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NMED
Hazardous Waste Bureau

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Colonel Tom D. Miller
377 ABW/CC
2000 Wyoming Blvd SE
Kirtland AFB, NM 87117-5000

Mr. John Kieling, Manager
RCRA Permits Management Program
Hazardous Waste Bureau (HWB)
New Mexico Environment Department (NMED)
2905 Rodeo Park Road
Santa Fe, New Mexico 87505

Dear Mr. Kieling

Kirtland Air Force Base (KAFB) is in receipt of your offices Notice of Disapproval dated 27 March 2014, titled "Proposed Amendment of the Closure Plan for the Open Detonation Unit, November 16, 2010 and submittal of March 14, 2013, Response to First Notice of Deficiency Kirtland Air Force Base, EPA ID #NM9570024423 HWB-KAFB-10-005-OD". The requested changes have been made to the July 2010 RCRA permit issued to Kirtland AFB, the Permit Modification Request (PMR) submitted subsequent to the July 2010 permit, and the most recent revision of the Open Detonation unit closure plan dated March 2013. Both a "redline" and a "clean" version for all 3 documents are included per your request.

In order to avoid the potential need for contract extensions and elevated Open Detonation unit closure cost, please consider a rapid turn of the subject documents, as previously discussed with members of your staff, by 31 December 2014.

Please contact Mr. Cole Crosgrove at (505) 853-3098 or at cole.crosgrove@us.af.mil if you have any questions.

Sincerely

TOM D. MILLER, Colonel, USAF
Commander

Attachments:
July 2010 RCRA permit (clean/redline versions)
Permit Modification Request (clean/redline versions)
Open Detonation Unit Closure Plan (clean/redline versions)

KAFB4201

cc:
AFCEC/CZO Kirtland
NMED (Mr. Tom Blaine, Environmental Health Division Director, w/o attachments)
NMED-HWB (Mr. Moats with attachments)
NMED-HWB (Mr. McDonald without attachments)
EPA Region 6 (Ms. King without attachments)
AFCEE/CMSE (Mr. Oyelowo without attachments)
Central New Mexico Community College Montoya Campus
File

HAZARDOUS WASTE TREATMENT

FACILITY OPERATING PERMIT

EPA ID No. NM9570024423

issued to

UNITED STATES AIR FORCE

for the

OPEN DETONATION UNIT

located at

KIRTLAND AIR FORCE BASE

BERNALILLO COUNTY, NEW MEXICO

issued by

NEW MEXICO ENVIRONMENT DEPARTMENT

HAZARDOUS WASTE BUREAU

2905 RODEO PARK DRIVE EAST, BUILDING I

SANTA FE, NEW MEXICO 87505

July 2010

KAFB4201

I. PREAMBLE

A. SUMMARY

Kirtland Air Force Base (AFB) hereby submits a request to modify the Hazardous Waste Treatment Facility Operating Permit (Renewal Permit)(hereinafter defined) issued by New Mexico Environment Department (NMED) in July 2010 for an Open Detonation (OD) Treatment Unit EPA ID# NM9570024423 (this request is hereinafter described as the "November PMR"), pursuant to Section 74-4-4.2.G(2) of the New Mexico Hazardous Waste Act ("HWA"), 40 CFR §§ 270.41 -.42 and Sections 20.4.1.900-.901 of the New Mexico Administrative Code (NMAC).

Kirtland AFB made a business decision to cease operations of the OD Unit and pursue closure of the OD Unit and its co-located Open Bum (OB) Treatment Unit approximately forty years earlier than anticipated in furtherance of NMED's stated goal of eliminating OD of hazardous waste at Kirtland AFB as soon as practicable. This decision and its resulting effects provide both legal bases and practical justifications for modifying the Renewal Permit. The resulting changes to the facts and circumstances surrounding the OD Unit and its permit provide cause for modification under 40 CFR § 270.41(a)(l)-(2), because new information that was not available at the time of either the permit renewal application or permit issuance and material and substantial alterations to activities have occurred. Kirtland AFB's reasons for making its decision to cease operations of the OD Unit and pursue closure were partially based on the fact that because of facts and circumstances beyond its control, Kirtland AFB would not be able to comply with the compliance schedules outlined in the Renewal Permit. These events and circumstances, including, but not limited to the budgetary allocation process of the Federal government, present continuing obstacles making it practically impossible for Kirtland AFB to comply with the Renewal Permit and therefore provide cause for modification of the Renewal Permit under 40 CFR § 270.41(a)(4).

In addition, the resulting effects of ceasing treatment operation and seeking closure 40 years prior to the anticipated closure date and in furtherance of NMED's stated goal of eliminating OD hazardous waste at Kirtland AFB as soon as practicable, provide several practical reasons for modifying the Renewal Permit. Ceasing treatment at the permitted treatment unit and pursuing closure of that unit and its co-located OB Unit make the scope and resulting costs of the Renewal Permit's compliance, reporting and corrective action requirements unnecessarily expansive, broad, invasive and expensive.

Furthermore, the OD Unit is small, comprising a circular area with a diameter of roughly 1,500 feet, an insignificant geographic area in relation to the entire installation of 80.56 square miles at Kirtland AFB. The fact that Kirtland AFB applied for a renewal permit to continue operating a small OD Unit does not logically warrant base-wide application of the Renewal Permit corrective action requirements after Kirtland AFB ceased treating hazardous waste at the OD Unit. NMED has corrective action authority under the HSWA module from the 1990 Kirtland

Treatment, Storage and Disposal (TSD) Permit, sufficient to address individual releases and necessary corrective action requirements. NMED as recently as April 2010 asserted this authority under the HSWA Module and can continue to use this authority to require and oversee necessary corrective action at the base.

Moreover, Kirtland AFB believes that several facts and issues related to the Renewal Permit's issuance provide the bases for modification. Specifically, NMED's process time for the renewal application (from December 2004 until July 2010) was unreasonably long and seemingly in violation of NMED's statutory mandate in § 74-4-4.2(C) NMSA 1978. In fact, NMED's processing took longer than the entire term of the Renewal Permit. NMED also failed to provide Kirtland AFB with any notice of its issuance. This fact is particularly troublesome in light of the mandated closure of the OB Unit and Kirtland AFB's repeated submission of closure plans for the OD and OB Units pursuant to an executed settlement agreement between the parties and NMED' s directives. Kirtland AFB also believes that the record reflects that NMED failed to adequately address Kirtland AFB's comments to the Draft OB/OD Renewal Permit submitted to the NMED-HWB on 14 June 2007. Kirtland AFB further believes that several items included in the Renewal Permit and NMED determinations with respect to the Renewal Permit were not reasonably justified or supported by the record. Finally, Kirtland AFB believes that NMED failed to follow relevant laws, rules and guidance with respect to certain aspects of the Renewal Permit.

Accordingly, Kirtland AFB believes that facts related to the OD Unit, the reasons for and effects of Kirtland AFB' s decision to withdraw its renewal application and pursue closure of the units, as well as facts and issues related to the Renewal Permit issuance provide the basis for modification of the Renewal Permit under HWA § 74-4-4.2.0(2); 40 CFR §§ 270.41 -.42 and NMAC §§ 20.4.1.900-.901. In general, Kirtland AFB requests that the Renewal Permit be modified in scope and application to focus exclusively on closure of the OB and OD Units and corrective action activities related to those Units. Kirtland AFB also has specific requests with respect to many of the provisions contained in the Renewal Permit. Kirtland AFB' s general and specific bases for this November PMR are explained in detail below.

Kirtland AFB also hereby requests a stay of any and all enforcement and deliverable dates contained in the Renewal Permit pending a final agency decision by NMED on this November PMR.

Kirtland continues to challenge whether the Renewal Permit is in effect and NMED's recent determination on Kirtland AFB' s 8 October 2010 PMR request for approval of the revised closure plan and expressly reserves any and all legal rights with respect to these issues. Kirtland also expressly reserves all legal rights in response to final agency decisions made by NMED in its 12 November 2010 correspondence denying approval of the OD Unit closure plan.

B. RELEVANT FACTS

Kirtland AFB historically operated under three RCRA permits: a TSD permit; an OD treatment permit; and an OB treatment permit. EPA issued the TSD permit in July 1990 and the HSWA Module for the same in October 1990. In February 2000, Kirtland AFB submitted a renewal application for the TSD permit, which was deemed to be administratively complete. In late 2004, Kirtland AFB applied for closure of the TSD Permit. Kirtland AFB submitted a closure report for the TSD Permit in July 2005 and NMED declared the TSD Facility clean closed in August 2005. However, Kirtland AFB and NMED-HWB never closed the HSWA Module, which continues to cover investigation and clean-up of SWMU's across Kirtland AFB. This Module is updated annually as new solid waste management units (SWMUs) are identified. The HSWA Module has been utilized as recently as April 2010, when it was identified in initial correspondence between NMED and Kirtland AFB concerning an issue related to a fuel spill at Kirtland AFB.

NMED issued the OD Treatment Unit Permit to Kirtland AFB in December 1994. NMED issued the OB Treatment Unit Permit in July 1995. On 14 May 2004, Kirtland AFB timely submitted a permit renewal application for both the OB and OD Treatment Units. Kirtland AFB submitted a revised permit renewal application for the OD and OB Units in December 2005. ("Renewal Application"). On 16 April 2007, NMED issued a draft OD/OB Permit ("Draft OB/OD Renewal Permit"), a fact sheet ("Fact Sheet") and a notice announcing a 60-day public comment period. Kirtland AFB timely submitted three sets of comments to the Draft Renewal OB/OD Permit on 14 June 2007. Other comments were submitted from the Water Utility Authority, Water Quality Advisory Board and Water Utility Authority of Albuquerque Bernalillo County, as well as two interested citizens. On 12 July 2007, by letter to interested citizens, NMED extended the public comment period to the Draft OB/OD Renewal Permit with respect to paragraph 5.2.4, therein, entitled Sanitary Sewer Line.

On 22 May 2009, NMED issued a compliance order and proposed civil penalty to Kirtland AFB with respect to the OB Unit. To resolve the issues raised by the compliance order and proposed civil penalty, NMED and Kirtland AFB entered into a settlement agreement on 25 September 2009. By letter dated 30 October 2009, pursuant to the settlement agreement between NMED and Kirtland AFB, the USAF withdrew its application to renew the OB Unit. ("OB Unit Withdrawal Letter"). The OB Unit Withdrawal Letter also requested that the Draft Permit be revised to reflect the withdrawal of the request for continued operation of the OB unit. Also pursuant to the settlement agreement between NMED and Kirtland AFB, Kirtland submitted closure plans for both the OD Unit and OB Unit in February 2010, which were deemed administratively complete by NMED in April 2010. NMED subsequently withdrew its approval of the OB and OD Unit closure plans for failure to comply with public notice requirements. Kirtland AFB issued a notice of public hearing on 18 June 2010, setting a hearing date of 7 July 2010 and submitted a revised closure plan

on 21 June 2010. On 15 July 2010, Kirtland AFB notified NMED of its compliance with the public hearing requirements.

Also on July 15, 2010, NMED issued its responses to comments on the Draft OB/OD Permit, an interested person letter, a Final Order for a final hazardous waste facility permit and a renewal permit for the OD unit ("Renewal Permit"). According to the Final Order cover letter enclosing the Renewal Permit, the Renewal Permit was to become effective 16 August 2010. Kirtland AFB reviewed the Renewal Permit, NMED's responses to comments and the Final Order. For a variety ofreasons, it made the business decision to withdraw the Renewal Application, cease operations of the OD Unit and submit revised closure plans for both the OB and OD units. Accordingly, on 13 August 2010, Kirtland AFB submitted a letter to NMED withdrawing its application for the Renewal Permit prior to the effective date of the Renewal Permit ("Withdrawal Letter").

NMED officials soon thereafter contacted Kirtland AFB representatives and requested a meeting to discuss Kirtland AFB's Withdrawal Letter. This meeting was held 30 August 2010. The 30 August 2010 meeting revealed divergent views on several issues, including whether the renewal permit was effective and whether Kirtland AFB provided a timely notice of closure for the OD Unit. NMED requested that Kirtland AFB submit a letter to clarify certain issues related to Kirtland AFB's 13 August 2010 letter. Kirtland AFB submitted a clarification letter on 20 September 2010.

On 5 October 2010, Kirtland AFB submitted a cover letter and closure plans for the OB Unit and OD Unit. The cover letter indicated that the closure plans were being submitted as Class 3 modifications to the 1994 OD Permit and 1995 OB Permit ("October 2010 PMR").

On 8 October 2010, NMED issued a letter to Kirtland AFB stating in substantive part that the Renewal Permit is in effect and NMED will take any and all action to enforce such permit. On 12 November 2010, NMED issued a letter deciding that it will not consider the Class 3 modification submitted by Kirtland AFB with respect to the closure plan for the OD Unit, because it views closure of the OD Unit as covered exclusively by the Renewal Permit, but will consider only the closure plan for the OB Unit.

II. MODIFICATION REQUEST 1 - EXTENSION OF DUE DATES FOR DELIVERABLES PENDING NMED DETERMINATION ON THIS NOVEMBER PMR.

As provided by 40 CFR §270.33, Kirtland AFB is allowed to terminate its receipt and treatment of hazardous waste at the OD Unit on Kirtland AFB rather than continue to operate and meet permit requirements. Upon ceasing operations, an alternative schedule of compliance may be issued if, as the applicant/permittee, Kirtland AFB ceased operations before non-compliance with any interim or final compliance schedules specified in the permit. On 13 August 2010, Kirtland AFB terminated its receipt and

treatment of hazardous waste at the OD Unit prior to any non-compliance associated with the Permit. Notice of this action was provided by letter to the NMED-HWB, which notice comports with the requirement of 40 CFR §270.33(b)(4).

Accordingly, Kirtland AFB hereby requests the Renewal Permit be modified to amend the Renewal Permit by replacing the operational compliance schedule with the compliance schedule set forth in the revised OD Unit closure plan submitted to the NMED-HWB on 8 October 2010 and attached as Exhibit A to this November PMR. Additionally, Kirtland AFB requests, that until a decision is rendered on this November PMR that all deliverable due dates within the Permit's compliance schedule be stayed until ninety (90) days subsequent to the issuance of NMED's determination on this November PMR.

III. MODIFICATION REQUEST 2 - STAY OF ENFORCEMENT PENDING NMED DETERMINATION OF THIS NOVEMBER PMR.

As discussed above in Modification Request 1, on 13 August 2010 Kirtland AFB terminated the receipt and treatment of hazardous waste at the OD Unit. Additionally, the termination of operations at the OD Unit occurred prior to any non-compliance associated with the Renewal Permit. Accordingly, Kirtland AFB hereby requests that any and/or all enforcement of the requirements set forth in the Renewal Permit be stayed pending the issuance of a decision on the modification requests contained herein.

IV. MODIFICATION REQUEST 3 -AMENDMENTS TO THE RENEWAL PERMIT INCORPORATING THE 8 OCTOBER 2010 REVISED CLOSURE PLAN

A. REQUESTED MODIFICATIONS: PERMIT PART 1 -GENERAL PERMIT REQUIREMENTS

1. Title Page

Requested Modification: Change to read "... Hazardous Waste Treatment Operating Permit. . ."

Justification for Request: Throughout the permit, the term Facility has been used to identify both Kirtland AFB as a whole and the OD Unit as separate treatment unit. However, since the Permit Application was submitted for the treatment of hazardous waste at the OD Unit, the Title should identify the specific treatment unit permitted.

2. Section 1.0, Page 13: Introduction

Requested Modification: "This Permit Part (I) contains general requirements pertaining to hazardous waste management at the Open Detonation (OD) Unit at Kirtland Air Force Base (AFB) Facility. . ."

Justification for Request:

Effective 13 August 2010, Kirtland AFB terminated the receipt and treatment of hazardous waste at the OD Unit. Accordingly, references to treatment and corrective actions should be deleted, in that the provisions of 40 CFR §264 pertaining to operating treatment, storage or disposal (TSD) facilities are inapplicable to closure activities. Additionally, as per §74-4-4.2(B) NMSA 1978, permits contain corrective action measures only for releases of hazardous waste or constituents from a solid waste management unit (SWMU). Since there has not been a release from the OD Unit, any reference to treatment and corrective actions should be deleted.

3. Section 1.3, Page 13: Permitted Activity

Requested Modification: Change section to read "The OD Unit is classified as a miscellaneous unit under 40 CFR Part 264 Subpart X. This Permit establishes standards for the closure and sets forth the requirements for corrective action to address releases of hazardous waste and hazardous constituents into the environment at the OD Unit pursuant to the HWA and the HWMR."

Justification for Request: Since the receipt and treatment of hazardous waste has been terminated at the OD Unit, the operational compliance requirements of 20.4.1 NMAC and 40 CFR Part 264 are inapplicable. Therefore they should be deleted. Corrective action requirements are only required if a release has occurred (§74-4-4.2(B) NMSA 1978). Therefore, since there has not been a release of hazardous wastes or hazardous constituents from the OD Unit, corrective actions should not listed in the permit. "At the OD Unit" was added to clarify and differentiate from hazardous releases in other parts of Kirtland AFB that may be addressed by CERCLA or RCRA corrective action under the HSWA Module.

4. Section 1.4, Page 14: Compliance with Permit.

Requested Modification: Change to section to read "Compliance with this Permit during its term constitutes compliance, for purposes of enforcement, with 40 CFR Parts 260 through 273 . . ."

Requested Modification: See justification statement discussion in amendments 2 and 3 above.

5. Section 1.8, Page 16: Definitions

Requested Modification: Insert the following definition for "Open Detonation Unit: the area circular in shape with a diameter of approximately 1,500 feet where detonation treatment events take place (See Permit, Page 110)."

Justification for Request: The Permit as written only defines the term "Facility," which is used to refer to Kirtland AFB. "Facility" is sometimes used throughout the Permit when discussing sections of the Permit which should only apply to the OD Unit.

6. Section 1.10, Page 17: Term of the Permit

Requested Modification: "This Permit shall be effective for a fixed period of I 0 years in accordance with 40 CFR § 270.50(a), subject to Permit Sections 1.5, 1.12 and 1.15.

Justification for Request: In NMED's Response to Comments on the Draft Permit, the justification given for shortening the permit term to 3 years was "so that changes to the technology for the treatment ofreactive and ignitable hazardous wastes can be initiated at Kirtland AFB." Because Kirtland AFB has notified the NMED of its intent to close the OD Unit and discontinue the treatment of hazardous waste, the shortening of the permit term is no longer relevant. The Renewal Permit term should be increased to the standard I 0 years, which term was granted in the 1995 OD Permit and is consistent with the 40 CFR §270.50(a).

7. Section 1.11, Page 17: Alternative Assessment for Waste Treatment

Requested Modification: Delete this section regarding the alternative assessment for waste treatment.

Justification for Request: Effective 13 August 2010, Kirtland AFB terminated its receipt and treatment of hazardous waste at the OD Unit, as well as providing written notice to the NMED-HWB. An alternative assessment for waste treatment is no longer needed when there is no waste being treated.

8. Section 1.13, Pages 19: Transfer of Land Ownership

Requested Modification: Change to read "...ownership of any land that is part of the OD Unit (See also Permit § 6.1.12)..." wherever Facility appears in this Section.

Justification for Request: It appears that the term "Facility," which is defined as all contiguous land at Kirtland AFB, was incorrectly inserted expanding applicability to non-OD Unit acres.

9. Section 1.23.I, Page 21: Representative Sampling

Requested Modification: Change to read "The Permittee shall take representative closure samples and measurements in accordance with the procedures in this permit and 40 CFR Part 270. This includes, but is not limited to, sampling and analysis of waste, treatment residue, soil, groundwater, and spills. To obtain . . ."

Justification for Request: See justification statement discussion in amendments 2 and 3 above.

10. Section 1.23.1.l, Page 21: Monitoring Records Contents

Requested Modification: Change to read ". . . Monitoring records shall contain:
I. The dates . . ."

Justification for Request: See justification statement discussion in amendments 2 and 3 above.

11. Section 1.29, Page 25:

Corrective Action Requested

Modification: Delete Section.

Justification for Request: See justification statement discussion in amendments 2 and 3 above.

B. REQUESTED MODIFICATIONS: PERMIT PART 2 - GENERAL FACILITY REQUIREMENTS

12. Sections - All, Pages 30 through 45

Requested Modification: Change "Facility" to "OD Unit" or "Treatment Unit" throughout Permit Part 2.

Justification for Request: Throughout Part 2, the term Facility has been used to identify both Kirtland AFB as a whole and the OD Unit as separate treatment unit. However, since the Permit Application was submitted for the treatment of hazardous waste at the OD Unit, the term "OD Unit" should be referenced in that it is the specific treatment unit subject to the Permit.

13. Permit Part 2, Page 30: General Facility Requirements

Requested Modification: Change to read "General OD Unit Requirements"

Justification for Request: See justification statement for amendment 12 above. Also, the term "facility," which is defined as all contiguous land at Kirtland AFB, was apparently incorrectly inserted expanding applicability to non-OD Unit acres.

14. Section 2.2, Page 30: Inspections

Requested Modification: Delete this section.

Justification for Request: The inspection requirements identified in Section 2.2 apply to operational treatment units. Since Kirtland AFB closed the OD unit to the receipt and treatment of hazardous wastes on 13 August 2010, the identified requirements for inspection malfunctions, deterioration, operator errors, discharges, equipment testing and maintenance, etc., are no longer applicable. See justification statement discussion in amendments 2 and 3 above.

15. Section 2.3, Page 31: Personnel Training

Requested Modification: Change this section to read: "The Permittee shall follow the personnel training procedures for the OD Unit closure activities specified in Renewal Permit Attachment G."

Justification for Request: As set forth in this Section and Attachment G, the identified personnel training "... is to prepare personnel to conduct operations at the OD Unit ..." However, since the OD Unit has been closed to the receipt and treatment of hazardous wastes since 13 August 2010 and Kirtland AFB has filed a request for OD Unit closure, this requirement should only apply to closure plan activities. See justification statement discussion in amendments 2 and 3 above.

16. Section 2.4.1, Page 31: Required Equipment

Requested Modification: Delete paragraph 2 discussing an internal communications and/or alarm system for the OD Unit.

Justification for Request: The internal communications and/or alarm system requirement provided OD Unit personnel the capability of immediate emergency contact during treatment operations. However, since the OD Unit has been closed for the receipt and treatment of hazardous wastes and is scheduled for closure, this requirement is no longer applicable. See justification statement discussion in amendments 2 and 3 above.

17. Section 2.4.3, Page 32: Required Aisle Space

Requested Modification: Delete this section.

Justification for Request: The aisle spacing requirements of 40 CFR § 264.35 do not apply to the OD Unit.

18. Section 2.4.4, Page 32: Arrangements with Local Authorities

Requested Modification: Delete this section.

Justification for request: This requirement for potential emergency response by local authorities during OD Unit treatment activities is no longer applicable, in that the unit has been closed to the receipt and treatment of hazardous waste eliminating the need for emergency response activities. See justification statement discussion in amendments 2 and 3 above.

19. Section 2.45, Pages 32-33: Preventive Procedures, Structures and Equipment

Requested Modification: Delete this section.

Justification for request: The requirements set forth in this section apply to operational OD Units. However, since this unit has been closed to the receipt and treatment of hazardous wastes since 13 August 2010, this requirement is no longer applicable.

20. Section 2.5.4, Page 34: Emergency Coordinator

Requested Modification: Delete 3rd sentence in Paragraph land last sentence in Paragraph 2.

Justification for request: The requirements identified for deletion apply to operational OD Units. However, since the OD Unit has been closed to the receipt and treatment of hazardous wastes since 13 August 2010, this requirement is no longer applicable.

21. Section 2.6, Pages 34-37: Waste Characterization

Requested Modification: Delete sections 2.6.1 through 2.6.5.1.

Justification for request: The sections identified for deletion apply to treating hazardous wastes at operational OD Units. However, since the OD Unit has been closed to the receipt and treatment of hazardous wastes since 13 August 2010, this

waste characterization requirement is no longer applicable. See justification statement discussion in amendments 2 and 3 above.

22. Section 2.7, Pages 38-40: Waste Management

Requested Modification: Delete section 2.7.1.

Justification for request: Each of the subsections identified for deletion specifically pertain to treating hazardous waste at the OD Unit. However, since the OD Unit has been closed to the receipt and treatment of hazardous wastes since 13 August 2010, these waste management requirements are no longer applicable. See justification statement discussion in amendments 2 and 3 above.

23. Section 2.7.2.2, Page 40: Treatment Facility Requirements

Requested Modification: Change section title to read "OD Unit Treatment Requirements." Change section to read "Treatment residues generated at the OD Unit are subject to LDR requirements, as well as other applicable 40 CFR Parts 260 through 273 requirements, as applicable, and this permit."

Justification for request: See justification statement discussion in amendments 2 and 3 above.

24. Section 2.8, Page 40: Waste Minimization

Requested Modification: Change to read "...hazardous wastes that are generated at the OD Unit to the degree ..." and change all references to "facility with the term "OD Unit."

Justification for request: The requirement applies to operations at the OD Unit, not the Facility, as defined. See justification statement discussion in amendment 12 above.

25. Section 2.12, Page 42: Air Emissions From The OD Unit

Requested Modification: Change the section to read "During OD Unit closure, the Permittee shall comply ... and as required by Permit Section 3.3 ... The Permittee shall maintain all records..."

Justification for request: On 13 August 2010, Kirtland AFB terminated the receipt and treatment of wastes at the OD Unit. 40 CFR Part 264 Subpart BB is not applicable, in that it only applies to owners/operators that treat, store or dispose of hazardous wastes. See justification statement discussion in amendments 2 and 3 above.

26. Section 2.20, Page 43: Additional Reports

Requested Modification: Delete

section.

Justification for request: This requirement is applicable to the OD Unit, not SWMU's or Areas of Concern (AOC) base wide. Also, since the OD Unit has been closed to the receipt and treatment of hazardous wastes since 13 August 2010, there will be no additional wastes received at the OD Unit to be reported to the NMED-HWB. See justification statement discussion in amendments 2 and 3 above.

27. Table 2-1, Page 44: Off-Site Generators

Requested Modification: Delete Table 2-1.

Justification for request: Since the OD Unit has been closed to the receipt and treatment of hazardous wastes since 13 August 2010, there will be no additional wastes received at the OD Unit from off-site generators. See justification statement discussion in amendments 2 and 3 above.

C. REQUESTED MODIFICATIONS: PERMIT PART 3 - OPEN DETONATION UNIT

28. Section 3.0, Page 46: Introduction

Requested Modification: Change to read "This Permit Part 3 contains soil and groundwater monitoring requirement for the OD Unit."

Justification for request: See the justification statement discussion in amendments 2 and 3 above.

29. Section 3.1, Page 46: Authorized Waste and Maximum Quantity of Waste

Requested Modification: Change to read 'The Permittee no longer treats hazardous waste and has initiated the OD Unit closure process. As of 13 August 2010, there are no hazardous wastes received or treated at the OD Unit. No hazardous wastes have been or are stored at the OD Unit."

Justification for request: The limitations placed on the explosive weights by the NMED were overly limiting and did not justify the expense of continuing to operate the Renewal Permit. Kirtland AFB submitted a revised closure plan to the NMED-HWB for review and approval.

30. Section 3.2.1, Paragraph 1, Page 46: General Requirements

Requested Modification: Change to read "The Permittee shall maintain the OD Unit. . ."

Justification for request: On 13 August 2010, Kirtland AFB submitted its notice of intent to close the OD Unit, which closure for the receipt and treatment of hazardous waste has occurred. Accordingly, there are no further design, construction or operation requirements.

31. Section 3.2.1, Paragraph 2, Page 46: General Requirements

Requested Modification: Change to read "The Permittee shall mark the boundary of the EOD Range with signs or structures. . ."

Justification for request: The OD Unit is clearly discemable, in that the OD Unit is graded and bounded by a storm water berm. The EOD Range is required to have signs and/or structures preventing entry by unauthorized personnel, both of which meet the requirements of 40 CFR §264.14(b).

32. Section 3.2.3.1, Page 46: Hours of Operation

Requested Modification: Change to read "The Permittee will conduct OD Unit closure activities between sunrise and sunset."

Justification for request: See justification statement discussion in amendments 2 and 3 above.

33. Section 3.2.3.2, Page 47: Weather Conditions

Requested Modification: Change to read "The Permittee will discontinue OD Unit closure activities when the Albuquerque Environmental Health Department (AEHD) issues high wind stop work advisories."

Justification for request: See justification statement discussion in amendments 2 and 3 above.

34. Section 3.2.3.3, Page 47: Range Fire

Requested Modification: Change to read "The Permittee no longer conducts treatment operations at the OD Unit. Closure activities will be conducted in a manner to minimize the risk of fire danger."

Justification for request: Effective 13 August 2010, Kirtland AFB terminated the receipt and treatment of hazardous waste at the OD Unit. Accordingly, references to treatment and corrective actions have been deleted, in that the provisions of 40 CFR §264 pertaining to operating treatment, storage or disposal (TSD) facilities are inapplicable to closure activities. Also, the EOD Range has adequate fire breaks and contingency measures to contain a range fire, even if extreme fire conditions have been established.

35. Section 3.2.3.4, Page 47: Other Restrictions

Requested Modification: Change to read "As of 13 August 2010, the Permittee no longer receives or treats hazardous waste at the OD Unit."

Justification for request: Effective 13 August 2010, Kirtland AFB terminated the receipt and treatment of hazardous waste at the OD Unit. Accordingly, references to treatment and corrective actions have been deleted, in that the provisions of 40 CFR §264 pertaining to operating treatment, storage or disposal (TSD) facilities are inapplicable to closure activities.

36. Section 3.2.4.1, Page 47: Personnel Safety

Requested Modification: Change to read "As of 13 August 2010, the Permittee no longer receives or treats hazardous waste at the OD Unit. A Health and Safety Plan will be developed for the OD Unit closure activities, which is designed to ensure personnel safety".

Justification for request: Effective 13 August 2010, Kirtland AFB terminated the receipt and treatment of hazardous waste at the OD Unit. Accordingly, references to treatment and corrective actions have been deleted, in that the provisions of 40 CFR §264 pertaining to operating treatment, storage or disposal (TSD) facilities are inapplicable to closure activities.

37. Section 3.2.4.2, Page 48: Safety Precautions

Requested Modification: Change to read "The Permittee shall conduct all OD Unit closure activities in accordance . . ."

Justification for request: Effective 13 August 2010, Kirtland AFB terminated the receipt and treatment of hazardous waste at the OD Unit. Accordingly, references to treatment and corrective actions have been deleted, in that the provisions of 40 CFR §264 pertaining to operating treatment, storage or disposal (TSD) facilities are inapplicable to closure activities.

38. Section 3.2.5.1, Page 48: Accumulated Precipitation

Requested Modification: Change to read "To avoid accumulated precipitation, the Permittee will fill in all pits that may accumulate standing water."

Justification for request: On 13 August 2010, Kirtland AFB submitted its notice of intent to close the OD Unit, which closure for the receipt and treatment of hazardous waste has occurred. On 8 October 2010, Kirtland AFB submitted a revised OD Unit closure plan, which will require all pits to be filled.

39. Section 3.2.5.2, Page 48: Untreated Waste (Kick-Out) and Treatment Residues

Requested Modification: Delete current text and insert OD Unit Closure Plan language to read: "The first phase of closure will consist of a hazards survey of the OD Unit conducted by qualified contractor health physics and industrial hygiene personnel, which will include unexploded ordnance (UXO) safety personnel and Kirtland AFB EOD Personnel. The purpose of the survey shall be to locate and remove any "kick-out" (untreated waste, waste fragments or UXO), and to identify potential contamination concerns that may present hazards to workers during the closure activities and to specify control measures necessary to reduce worker risk. The survey will provide the information necessary to identify worker qualifications, protective equipment (PPE), safety awareness, work permits, exposure control programs and emergency coordination required to complete closure. Any munitions and/or explosives of concern (MEC) identified during the hazard survey will be reported to and handled by Kirtland AFB EOD staff personnel accordance with standard operating procedures."

Justification for request: Since the receipt and treatment of hazardous waste has been terminated at the OD Unit, the operational compliance requirements of 20.4.1 NMAC and 40 CFR Part 264 are inapplicable. Therefore they have been deleted.

40. Section 3.3, Page 48: Air Monitoring

Requested Modification: Change to read "The Permittee shall conduct all OD Unit closure activities in accordance with AEHD air program requirements."

Justification for request: On 8 October 2010, Kirtland AFB submitted a revised OD Unit closure plan as a Class 3 permit modification to the NMED-HWB for consideration and approval. The closure plan was prepared in compliance with

the requirements of the Resource Conservation Recovery Act (RCRA) (42 U.S.C. §§6901 et seq.) and its implementing regulations at 40 CFR Parts 264 and 270 (see 40 CFR Part 264 Subparts G and X and 270.14(b)(13)), and state implementing statutes and regulations under which the state has delegated RCRA authority (see New Mexico Hazardous Waste Act, Chapter 74 Article 4 NMSA 1978 and 20.4.1 NMAC).

The closure plan is designed to: 1) minimize the need for further maintenance; 2) control, minimize or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to ground water or surface waters or to the atmosphere; and 3) comply with the requirements of 40 CFR Part 264, Subpart G and 40 CFR §264.601.

Also, see justification statement discussion in amendments 2 and 3 above.

41. Section 3.4, Page 48: Soil Monitoring

Requested Modification: Change to read "OD Unit closure soil sampling and human risk screening will be performed in accordance with the NMED-HWB approved closure plan."

Justification for request: See justification statement discussion in amendment 40 above.

42. Section 3.5, Page 49: Groundwater Monitoring

Requested Modification: Delete all text and replace with "Installation of monitoring wells and subsequent groundwater sampling and analysis protocol will be accomplished as part of the OD Unit closure activities, in accordance with Attachment H, Closure Plan for Open Detonation Unit. ."

Justification for request: See justification statement discussion in amendment 40 above.

43. Section 3.6.1, Page 51: Additional Waste Characterization Requirements for Air Emissions

Requested Modification: Change to read "The Permittee shall characterize hazardous waste generated as a result of OD Unit closure to insure compliance with . . ."

Justification for request: See justification statement discussion in amendment 40 above.

44. Section 3.6.2, Page 51: Equipment Containing or Contacting Hazardous Waste

Requested Modification: Change to read "Each piece of equipment used during OD Unit closure activities that contains or contacts hazardous waste. . ."

Justification for request: See justification statement discussion in amendment 40 above.

45. Section 3.7, Page 51: Pre-Treatment Preparation

Requested Modification: Change to read "As of 13 August 2010, the Permittee no longer receives or treats hazardous waste at the OD Unit."

Justification for request: See justification statement discussion in amendment 40 above.

46. Section 3.8, Page 51-52: Transportation of Waste To The OD Unit and Container Specifications

Requested Modification: Delete section.

Justification for request: As of 13 August 2010, the Permittee no longer receives or treats hazardous waste at the OD Unit. See justification statement discussion in amendment 40 above.

47. Section 3.9, Page 52: Waste Staging

Requested Modification: Delete section.

Justification for request: As of 13 August 2010, the Permittee no longer receives or treats hazardous waste at the OD Unit. See justification statement discussion in amendment 40 above.

48. Section 3.10, Page 52: Waste Treatment

Requested Modification: Change to read "As of 13 August 2010, the Permittee no longer receives or treats hazardous waste at the OD Unit."

Justification for request: See justification statement discussion in amendment 40 above.

49. Section 3.11, Page 52: Post Treatment

Requested Modification: Delete

section.

Justification for request: As of 13 August 2010, the Permittee no longer receives or treats hazardous waste at the OD Unit. See justification statement discussion in amendment 40 above.

D. REQUESTED MODIFICATIONS: PERMIT PART 4 - CLOSURE

50. Section 4.2, Pages 53 and 54: Clean Closure

Requested Modification: Change to read "The Permittee shall close the OD Unit by removing all hazardous waste residues and hazardous constituents and all structures and equipment from the OD Unit and demonstrating that no unacceptable risk to human health and the environment exists in soil or groundwater at the OD Unit (clean closure).
However, if the OD Unit cannot be clean closed, post closure care is required and the closure plan shall be amended in accordance with Permit Section 4.1, and corrective action shall be immediately implemented to remediate contamination to protect human health and the environment pursuant to the requirements of Permit Part 6. Closure of the OD Unit will not be approved by the Department while corrective action is required for the OD Unit.

51. Section 4.4, Pages 54 and 55: Time Allowed For Closure

Requested Modification: Change to read "... as applicable. The Permittee shall complete closure activities for the OD Unit following the schedule and requirements set forth in the closure plan, Permit Attachment H, and as required by this Permit Part."

E. REQUESTED MODIFICATIONS: PERMIT PART 5 -POST CLOSURE

52. Section 5.0, Page 56: Post-Closure Care

Requested Modification: If the OD Unit cannot be clean closed pursuant to Permit Section 4.2, then the OD until shall be subject to the requirements of 40 C.F.R 264.603 for post-closure care. If post-closure care is required, the Permittee shall submit a post-closure care permit application to the Department within 180 days of the Department's approval of closure of the OD Unit.

F. REQUESTED MODIFICATIONS: PERMIT PART 6 -CORRECTIVE ACTION

53. Sections -All, Pages 57 throughl 09:

Requested Modification: Change all effective dates to the effective date of the modified permit.

Justification for request: No enforcement prior to 90 days from the effective date of final Department action on this PMR.

54. Sections – All, Pages 57 through 109:

Requested Modification: Delete all references to monitoring media associated with SWMU's or AOC's.

Justification for request: Modified title of Part 6 to reflect that this section should only apply to the OD Unit. See the justification statements discussed in amendments 1 and 3 above.

55. Section -Part 6 Title, Page 57

Requested Modification: Change to read: "Corrective Action Requirements for OD Unit Closure".

Justification for request: Only corrective actions related to the OD Unit are included in the permit. See the justification statement discussion in amendment 1 above.

56. Section 6.0, Page 57: Introduction

Requested Modification: Change to read: "...to protect human health and the environment from all releases of hazardous waste or hazardous constituents from the OD Unit."

Justification for request: Only those activities related to the OD Unit are addressed in the permit. See the justification statement discussion in amendments 2 and 3 above.

57. Section 6.1.2, Page 57: Field Activities

Requested Modification: Delete this entire section.

Justification for request: Notifying the NMED in writing before any field sampling, other field activities, or implementation of work plans is an extra requirement in excess ofrequirements of the Hazardous Waste Act. 40 CFR 270.30(i) regarding inspection and entry states that Kirtland AFB must allow entry to the Department at reasonable times, and that the Department may sample or monitor at reasonable times.

58. Section 6.1.3, Page 57: Record Preservation

Requested Modification: Change to read: "...written notice that clean closure has been accomplished for the OD Unit, the Permittee ...this permit for closure."

Justification for request: Only those records related to the OD Unit closure are addressed in the permit. See justification statement discussion in amendments 2 and 3 above.

59. Section 6.1.4, Page 57: Releases Beyond Facility Boundary

Requested Modification: Delete this section.

Justification for request: On 13 August 2010, Kirtland AFB terminated the receipt and treatment of hazardous waste at the OD Unit, as well as providing notice to the NMED-HWB of its intent to close the OD Unit. Since there have been no releases from the OD Unit, this section is inapplicable. See justification statement discussion in amendments 2 and 3 above.

60. Section 6.1.6, page 58: Quarterly Progress Reports

Requested Modification: Change to read: "...summarizing clean closure corrective action activities for the OD Unit conducted pursuant to this Permit... Each report shall summarize the OD Unit clean closure activities for the quarter.. "

Justification for request: On 13 August 2010, Kirtland AFB terminated the receipt and treatment of hazardous waste at the OD Unit, as well as providing notice to the NMED-HWB of its intent to close the OD Unit. Therefore, only those reports related to the OD Unit closure are addressed in the permit. See justification statement discussion in amendments 2 and 3 above.

61. Section 6.1.7, Page 58: List of SWMUs and AOCs and Annual Reporting of Outdoor Activities

Requested Modification: Delete this entire section.

Justification for request: As written, this section exceeds the authority granted in §74-4-4.2(B) NMSA 1978. §74-4-4.2(B) NMSA requires the NMED-HWB to require corrective action for all releases of hazardous waste from any SWMU. As identified in 55 FR 30808, EPA considers a SWMU as a site where solid waste, to include hazardous waste, has been placed. Similarly, an AOC is a site where a release of hazardous waste has occurred. This section is attempting to require Kirtland AFB to investigate and monitor test and training activities and sites that might have some type of release at some point of time in the future, clearly disregarding the legal pre-requisite of an existing release before such requirements can apply.

Additionally, 40 CFR Subpart M, which was adopted and incorporated in the Title 20 NMAC without exception, specifically states that military munitions are not solid wastes if used for their intended purposes, including training and testing. Since military munitions used for training and testing purposes are not solid wastes, their use can not constitute a release of hazardous waste. Thus, Kirtland AFB test and training sites can not be classified as SWMU's or AOC's solely on

the basis of the use of military munitions, in that SWMU's or AOC's do not exist unless there has been the release or probable release of hazardous wastes.

62. Section 6.1.9, Pages 59 and 60: Determination of Corrective Action Complete (No Further Action)

    Requested Modification: Delete this entire section.

    Justification for request: This section does not apply to the OD Unit, in that the OD Unit is planned for clean closure. See justification statement discussion in amendment 67 above.

63. Section 6.1.10, Health and Safety Plan

    Requested Modification: Change the section to read "The Permittee shall develop an OD Unit Closure Activity Health and Safety Plan as part of the closure activities at the OD Unit. The OD Unit Closure Activity Health and Safety Plan shall be in accordance with: 1. National . . . §§ 1910 and 1926 and 7. Other . . ."

    Justification for request: Only health and safety requirements related to the OD Unit are addressed in the permit and KAFB operates under the OSHA Voluntary Protection Program; state and local requirements are not applicable.

64. Section 6.1.11, Page 61: Community Relations Plan

    Requested Modification: Delete entire section.

    Justification for request: There is no requirement in the CFR to have a Community Relations Plan for an Open Detonation Unit permit. Any permit modifications for the OD Unit are subject to the public notification requirements of 40 CFR §270.42.

65. Section 6.1.12, Page 61: Land Transfer

    Requested Modification: Change to read: "In transferring land included in the OD Unit to another entity..."

    Justification for request: Only land transfers associated with the OD Unit are addressed in the permit.

66. Section 6.1.13, Page 62: Abandoned Septic Systems

Requested Modification: Delete entire section.

Justification for request: There are no septic systems at the OD Unit.

67. Section 6. 2.1.1, Page 62: General Facility Information

Requested Modification: Change section heading to read "General OD Unit Information" and change "facility" to "OD Unit" throughout the section.

Justification for request: This information is site-specific, and requiring the information for the entire Facility is too open-ended. Only information related to the OD Unit should be addressed in the Renewal Permit. See justification statement discussion in amendment 67 above.

68. Section 6. 2.1. 2, Page 62: Potential Human Receptors Information

Requested Modification: Change "Facility" to "OD Unit" throughout section.

Justification for request: This information is site-specific, and requiring the information for the entire Facility is too open-ended. Only information related to the OD Unit should be addressed in the Renewal Permit. See justification statement discussion in amendment 67 above.

69. Section 6. 2.1.3, Pages 62 and 63: Information on Surface Water

Requested Modification: Delete this section.

Justification for request: There are no surface water bodies associated with or located at the OD Unit or EOD Range. Only information related to the OD Unit should be addressed in the Renewal Permit. See justification statement discussion in amendment 67 above.

70. Section 6.2.2, Pages 63 through 69: Corrective Action Procedures

Requested Modification: Delete entire section.

Justification for request: Corrective action procedures are not applicable to the OD Unit, which will be clean closed. Only procedures applicable to the OD Unit should be addressed in the Renewal Permit. See justification statement discussion in amendments 2, 3 and 67 above.

71. Section 6.2.3, Page 69: Cleanup Levels

Req uested Modification: Change section to read: "The Permittee shall adhere to the requirements of this Permit Section (6.2.3) for implementing and completing cleanup of groundwater and soil at the OD Unit."

Justification for request: Only cleanup levels related to the OD Unit should be addressed in the Renewal Permit. No surface waters are associated with or located on the OD Unit or EOD Range. See justification statement discussion in amendments 2, 3 and 67 above.

72. Section 6.2.3.1, Page 69: Cleanup Levels for Contaminants in Groundwater (other than Perchlorate)

Requested Modification: Change section to read: "Groundwater sampling results will be compared to the Federal Safe Drinking Water Act maximum contaminant levels (MCL's). If the levels of hazardous constituents in the groundwater exceed the MCLs, a risk assessment will be prepared for each of the constituents exceeding the MCL. If the risk assessment demonstrates that the level of contamination is unacceptable under CERCLA or RCRA, the groundwater shall be subject to corrective action, and a corrective action work plan subject to NMED review and approval will be developed."

Justification for request: Change reflects the language contained in the revised OD Unit closure plan submitted to the NMED-HWB on 08 October 2010.

73. Section 6.2.3.2, Page 69: Cleanup Levels for Perchlorate in Groundwater

Requested Modification: Change section to read "If the New Mexico WQCC adopts a perchlorate groundwater standard greater than or equal to 15 ug/L (ppb), the Permittee shall initiate remediation through its CERCLA authority based on a risk assessment and a residential use scenario."

Justification for request: As written, this section exceeds the authority granted to the NMED-HWB. As per §74-4(A) NMSA 1978, the New Mexico Environmental Improvement Board, and by extension the NMED-HWB, are only allowed to establish requirements that are "equivalent to and no more stringent than federal regulations adopted by the [EPA] pursuant to the federal [RCRA] of 1976, as amended. §74-4(A)(1) also denies the NMED-HWAB the authority to identify and list hazardous wastes that have not been listed and/or designated as hazardous wastes by the EPA. At this time, the EPA has not listed and/or designated perchlorate as a hazardous waste. Additionally, § 20.6.2.3103 NMAC contains no established contaminated level for perchlorate. Finally, both EPA and the Department of Defense as a policy matter have guidance recommending an interim perchlorate action level of 15 ppb.

74. Section 6.2.3.3, Page 69: Cleanup Levels for Soil Contaminants (Other than PCBs and Lead)

Requested Modification: Change section to read: "Inorganic soil contaminant concentrations will be compared to background levels. For other constituents, background will be considered to be the most current NMED residential soil screening level (SSL) or EPA Regional Screening Levels (RSLs). If analysis shows that the soil contains contaminant concentrations that are above the appropriate residential SSL or RSL, additional soils will be excavated, removed, and supplementary conformation samples collected and analyzed, or a risk assessment will be prepared for each constituent exceeding the appropriate residential SSL or RSL."

Justification for request: Change reflects the language in the revised OD Unit Closure Plan submitted to the NMED-HWB on 08 October 2010.

75. Section 6.2.3.4, Page 70: Cleanup Levels for PCBs in Soil

Requested Modification: Delete entire section.

Justification for request: PCB contamination is not a concern at the OD Unit. Additionally, no regulatory requirement is cited for the PCB soil cleanup level.

76. Section 6.2.3.5, Page 70: Cleanup Levels for Lead in Soil

Requested Modification: Please insert the standard used to establish the 400 mg/kg cleanup level for lead in soil.

Justification for request: Appropriate regulatory citation should be present in the permit to avoid arbitrary direction on cleanup levels.

77. Section 6.2.3.6, Page 70: Cleanup Levels for Surface Water

Requested Modification: Delete entire section.

Justification for request: There are no surface waters at the OD Unit. See justification statement discussion in amendments 2, 3 and 67 above.

78. Section 6.2.3.7, Page 70: Ecological Risk Evaluation and Cleanup Levels

Requested Modification: Change section to read: "Ecological risk shall be evaluated for the OD Unit if clean closure cannot be achieved."

Justification for request: Only risk evaluation related to the OD Unit should be addressed in the Renewal Permit. See justification statement discussion in amendments 2, 3 and 67 above.

79. Section 6.2.3.8, Page 70: Requests for Variance from Cleanup Levels

Requested Modification: Change to read "The Permittee may request a variance from a particular cleanup level. Ifthe Permittee requests a variance from a cleanup level, the Permittee shall submit documentation to the Department that achievement of the cleanup level is impracticable . . . Such action shall include, but is not limited to, completion of a site-specific risk assessment and identification of alternate cleanup levels."

Justification for request: There are no surface waters at the OD Unit. Only variance procedures related to OD Unit cleanup levels should be addressed in the Renewal Permit. See justification statement discussion in amendments 2, 3 and 67 discussed above.

80. Section 6.2.4, Pages 71 through 78: Reporting Requirements

Requested Modification: Delete subsections 6.2.4.2, Investigation Work Plans; 6.2.4.3 Investigation Reports; 6.2.4.6 CME Work Plans; 6.2.4.7 CME Reports; 6.2.4.8 CMI Work Plans; 6.2.4.9 CMI Work Plan Progress Reports; and 6.2.4.10, CMI Reports.

Justification for request: Only reporting requirements related to the OD Unit should be addressed in the Renewal Permit. Seejustification statement discussion in amendments 2, 3 and 67 discussed above.

81. Section 6.3, Page 78: Compliance Schedule Tables

Requested Modification: Delete entire section.

Justification for request: There is no compliance schedule for the OD Unit. The compliance schedules referred to in Attachment I are not related to closure of the OD Unit. The revised OD Unit closure plan identifies the closure schedule for the OD Unit. See justification statement discussion in amendments 2, 3 and 67 discussed above.

82. Section 6.4, Pages Special Requirements for Information Submittals and Corrective Measures

Requested Modification: Delete entire section.

Justification for request: There are no special requirement information submittals related to the OD Unit, in that:

1. the OD Unit contains no landfills and, as stated in the revised OD Unit closure plan, will be clean closed.

2) the section is also inconsistent with the NMED's adoption of the Military Munitions Rule (MMR) contained in 40 CPR Part 266, Subpart M. As discussed in amendment 67 above, the expenditure of military munitions for their intended purposes exclude them from RCRA regulation, until which time DoD declares them a waste. Also, the Military Munitions Range Program is a CERCLA program and does not fall under the regulatory authority of the NMED/HWB.

3. Groundwater contamination outside of the OD Unit is regulated under the HSWA module associated with the 2005 closure of the Kirtland AFB TSDF storage permit.

4. See the perchlorate justification statement discussed for amendment 79 above.

5. The sanitary sewer line at LF-002 does not contain a regulated hazardous waste, in that domestic sewage is excluded under 40 CPR § 261.4(a)(l).

83. Section 6.5, Pages 80 and 81: Technical Requirements

Requested Modification: Replace all references to SWMUs and AOCs with "OD Unit".

Justification for request: Only technical requirements related to the OD Unit should be addressed in the Renewal Permit. See justification statement discussion in amendments 2, 3 and 67 above.

84. Section 6.5.2, Page 81: Documentation of Field Activities

Requested Modification: Change to read "Daily OD Unit closure activities, including . . ."

Justification for request: Only closure activities associated with the OD Unit should be addressed in the Renewal Permit. See justification statement discussion in amendments 2, 3 and 67 above.

85. Section 6.5.17, Page 92: Technical Requirements for Groundwater Investigation

Requested Modification: Change to read "The Permittee . . .originating from the OD Unit to determine . . ."

Justification for request: See justification statement discussion in amendments 2, 3 and 67 above.

86. Section 6.5.17.8, Page 96: Springs

Requested Modification: Delete entire section.

Justification for request: There are no springs at the OD Unit.

G. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "A" - GENERAL FACILITY INFORMATION

87. Section 1.0, Page 110: Introduction

Requested Modification: Delete 2"d sentence "It also presents general information on wastes treated at the OD Unit."

Justification for request: As of 13 August 2010, Kirtland AFB terminated the receipt and treatment of wastes at the OD Unit.

88. Section I.I, General Description of the Facility and the EOD Range

Requested Modification: Change title to read: "General Description of Kirtland AFB and the EOD Range." Change 1st sentence to read "Kirtland AFB, which is owned and operated by the U.S. Air Force (the Permittee)..."

Justification for request: The change in text is more accurate and is more consistent with the remainder of the Renewal Permit.

89. Section 1.2, Pages 110 and 111: Purpose of the OD Treatment Unit

Requested Modification: Change all tenses to past tense.

Justification for request: Past tense will indicate that wastes are no longer treated at the OD Unit.

90. Section 1.3, Page 111: Routes of Travel

Requested Modification: Delete last sentence: "The roads along which wastes are transported to the EOD Range within KAFB include... Demolition Range Road."

Justification for request: Wastes are no longer transported to the EOD Range.

H. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "B" - LIST OF AUTHORIZED HAZARDOUS WASTES

91. Section 1.0, Pages 113 through 118: Introduction

Requested Modification: Delete the entire section and Table B-1.

Justification for request: The OD Unit is closed to the receipt and treatment of hazardous wastes. Thus, there are no hazardous wastes authorized at the OD Unit.

I. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "C"-WASTE ANALYSIS PLAN

92. Sections 1.0 through 1.5, Pages 119 through 124: All Sections

Requested Modification: Delete Attachment C.

Justification for request: The OD Unit is closed to the receipt and treatment of hazardous wastes. Thus, no waste analysis plan is required.

J. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "D" -ANNUAL SOIL SAMPLING AND ANALYSIS PLAN

93. Sections 1.0 through 1.7, Pages 125 through 137: All Sections

Requested Modification: Delete Attachment D.

Justification for request: The OD Unit is closed to the receipt and treatment of hazardous wastes. Thus, no annual soil sampling is required. Soil sampling for OD Unit closure activities is addressed in the revised OD Unit Closure Plan.

K. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "E" -INSPECTION PLAN

94. Sections 1.3, Page 139: Table E-1, Inspection Schedule for the OD Unit

Requested Modification: Delete items 6 (Is the OD Unit clear of explosives from previous treatment activities including the loading and unloading areas?), 16 (Is there standing water in a pit or crater at the OD Unit?), and 17 (Is there kick out or treatment residues following OD operations?).

Change all frequencies tied to treatment operations to "monthly."

Justification for request: Treatment operations no longer occur and the 3 identified inspection items are no longer applicable. Inspections will be conducted monthly.

L. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "F"-CONTINGENCY PLAN

95. Section 1.3, Page 140: Characteristics of Waste Managed at the OD Unit

Requested Modification: Change to read: "On 13 August 2010, the Permittee terminated the receipt and treatment of wastes at the OD Unit. The formerly treated reactive (D003) and ignitable (DOOi) hazardous wastes included explosives, propellants, and pyrotechnics."

Justification for request: Changed to reflect that treatment operations no longer occur at the OD Unit.

96. Section 1.5, Page 141: Emergency Coordinator

Requested Modification: Change first paragraph to read: "An EC (see Table F-1 of this Permit Attachment) shall be on call during OD Unit closure activities to coordinate emergency response measures. The EC shall be thoroughly familiar with this Contingency Plan, this Permit, characteristics of the hazardous waste formerly managed at the OD Unit, the closure activities being conducted at the OD Unit, the location of the Operating Record at the OD Unit, and the EOD Range layout.

Justification for request: Changed to reflect that treatment operations no longer occur at the OD Unit.

97. Section 1.6.1, Page 142: Spills

Requested Modification: Delete 2nd sentence "If any hazardous waste is spilled during transfer to a treatment unit, transfer of the waste shall be discontinued immediately."

Justification for request: Changed to reflect that treatment operations and waste transfers no longer occur at the OD Unit.

98. Section 1.6.5.2, Page 143: Evacuation Route

Requested Modification: Change section to read: "The map shall be posted at the EOD Range personnel bunker."

Justification for request: Changed to reflect that treatment operations no longer occur at the OD Unit.

99. Section 1.8.2, Page 144: Post-Emergency or Incident Reports

Requested Modification: Change item #3 to read: "The notification shall address the fact that closure activities will not continue until cleanup procedures are completed and that all emergency equipment is cleaned and fit for its intended use."

Justification for request: Change to reflect that treatment operations no longer occur at the OD Unit.

100. Section 1.8.3, Page 145: Table F-1, Emergency Coordinator Contact Information for the OD Unit

Requested Modification: Strike the home phone number of Mr. D. Brent Wilson and replace with his 24-hour cell phone number (505-401-1197).

List Alternate EC: Mr. H. Bo Bohannon, Address: Building 20684 2050 Wyoming Blvd SE KAFB, NM 87117 Office: (505) 846-7911 24-Hour Cell Phone: (505) 270-5080

Justification for request: As discussed in KAFB's letter to the NMED on 28 Feb 2010 requesting a modification to the contingency plan, the Freedom of Information Act exempts releasing employee's unlisted home phone numbers. Mr. Wilson's cell phone number can be called 24 hours per day. Also, Mr. H. Bohannon serves as the alternate EC.

101. Section 1.8.3, Page 146: Table F-2, Type and Location of Emergency Equipment Available for Use at the OD Unit

Requested Modification: Replace all contact numbers with the KCP number: 911 or (505) 846-3777.

Justification for request: As discussed in KAFB's letter to the NMED on 28 Feb 2010 requesting a modification to the contingency plan, all emergency equipment is available by contacting the Kirtland AFB Command Post, which eliminates the multiple contact numbers.

M. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT G - PERSONNEL TRAINING PLAN

102. Section 1.0, Page 148: Introduction

Requested Modification: Change section to read: "The primary objective of the training program shall be to prepare personnel to support closure operations at the Open Detonation (OD) Unit in a safe and environmentally sound manner and in compliance with this Permit and the New Mexico Hazardous Waste Management Regulations (HWMR), 20.4.1 NMAC. To achieve this objective, the program provides personnel with training relevant to their positions.

All personnel shall complete initial training prior to participating in OD Unit closure activities. Personnel shall not work at the OD Unit until they have completed training on the Contingency Plan (Permit Attachment F). Personnel

shall be given, at a minimum, a basic understanding of the regulatory requirements of hazardous waste management, this Permit, and emergency response procedures. Personnel shall receive additional classroom and on-the-job training designed specifically to teach them how to perform their duties safely and in conformance with regulatory requirements and this Permit. All personnel shall receive the required training prior to being allowed to work unsupervised."

Justification for request: Changed to reflect that treatment operations no longer occur at the OD Unit.

103. Section 1.1, Page 148: Training Program

Requested Modification: Change section to read: "Training for EOD unit personnel is the overall responsibility of the EOD Flight Chief. Training includes formal classroom sessions, on-the-job training, and review of written procedures and plans. A summary of the training program for personnel is shown in Table G-1."

Justification for request: Training on the Renewal Permit requirements and procedures for OD Unit closure will be taught by other qualified personnel, not by EOD technicians.

104. Section 1.1.2, Page 148: Relevance of Training to Job Position

Requested Modification: Change section to read: "The training program shall provide employees with training to respond effectively to emergencies at the OD Unit. Personnel shall receive relevant training on the requirements of this Permit (including Contingency Plan implementation) and OD Unit closure activities (including emergency procedures, equipment, and systems)."

Justification for request: Changed to reflect that treatment operations no longer occur at the OD Unit.

105. Section 1.3, Pages 149 and 150: Table G-1, Training Program for the OD Unit

Requested Modification: Change "Content" of "Relevant In-House Training" to read:

"General Overview of Procedures to Perform Closure at the OD Unit; Range Operation; Safety Practices; Security; Range Inspections; Preventive Procedures, Structures, and Equipment"

Justification for request: Changed to reflect that treatment operations no longer occur at the OD Unit.

N. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "H" - CLOSURE PLAN

106. Sections 1.0 through 1.6, Pages 151 through 168: All Sections

Requested Modification: Replace sections 1.0 through 1.6 and Tables H-1 through H-7 with the revised OD Unit closure plan that was submitted to the NMED-HWB by Kirtland AFB on 8 October 2010.

Justification for request: The revised closure plan reflects changes in the timetable for closure of the OD Unit, as well as the processes and procedures to be following in completing a compliant clean closure at the OD Unit.

1. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "I" - COMPLIANCE SCHEDULES

113. Section 1.0, Page 169: Introduction

Requested Modification: Change section to read: "The Permittee shall meet the due dates in the compliance schedules of Tables I-1 and I-2 of this Permit Attachment (I), as well as any other due dates specified in this Permit that are not included in the tables of Permit Attachment I. Table I-1 contains a list of general submittals and their due dates. Table I-2 lists various submittals related to OD Unit corrective action and their due dates."

Justification for request: Compliance schedules not applicable to the OD Unit should not be addressed in the Renewal Permit. See justification statement discussion in amendments 2, 3 and 67.

114. Section 1.0, Page 170: Table I-1, General Submittals

Requested Modification: Remove schedules for: Waste Minimization Program Certified Report; Annual Sampling and Analysis Report for Air Permit; Annual Soil Sampling Report; Monitoring Well Installation Plan; Well Completion Report; Groundwater Sampling and Analysis Plan

Justification for request: KAFB submitted its intent to close the OD Unit on 13 August 2010 and discontinue the treatment of waste, which either eliminates the need for these requirements or moves them to the submitted closure plan for the OD Unit. See justification statement discussion in amendments 2, 3 and 67 above.

115 Section 1.0, Pages 171 and 172: Table I-2, Submittal Requirements for Corrective Action

Requested Modification: Delete the following submittals and corresponding due dates: Annual Report: Outdoor Testing and Training Activities (Permit Section 6.1.7); Field Sampling/Activities (Permit Section 6.1.2); Verbal Notification of newly-discovered releases, SWMUs, or AOCs (Permit Section 6.1.8); Written Notification of newly-discovered releases, SWMUs, or AOCs (Permit Section 6.1.8); SWMU Assessment Report (SAR) (Permit Section 6.1.8); Investigation Work Plan (Permit Section 6.2.2.1.1); Investigation Report (Permit Section 6.2.2.1.2); Corrective Measures Evaluation (CME) Work Plan (Permit Section 6.2.2.2.2); Corrective Measures Evaluation (CME) Report (Permit Section 6.2.2.2.3); Risk Assessment Report (Permit Section 6.2.4.5); CMI Work Plan (Permit Section 6.2.2.2.7); CMI Work Plan Progress Report (Permit Section 6.2.2.2.9); CMI Report (Permit Section 6.2.2.2.1O); Accelerated Corrective Measures (ACM) Work Plan (Permit Section 6.2.2.2.11.2); ACM CMI Report (Permit Section 6.2.2.2.11.3); Interim Measures Work Plan (Permit Section 6.2.2.2.12.2); Interim Measures Report (Permit Section 6.2.2.2.12.5); Emergency Interim Measures (Permit Section 6.2.2.2.12.4); Corrective Measures Evaluation (CME) Work Plan: Landfills with Contents Not Removed (Permit Section 6.4.1.1); Military Range Assessment Report (Permit Section 6.4.1.2)

Justification for request: Changes reflect other modifications requested in other sections of the Renewal Permit.

116. Section 1.0, Pages 173 through 175: Table I-3, Solid Waste Management Units (SWMUs) and Ares of Concern (AOCs) Requiring Corrective Action

Requested Modification: Delete table.

Justification for request: These SWMUs and AOCs are not applicable to the OD Unit Renewal Permit. See justification statement discussion in amendments 2, 3 and 67 above.

P. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "J" -LIST OF HAZARDOUS WASTE MANGEMENT UNITS

117. Section 1.0, Page 176: Table J-1, Hazardous Waste Management Units

Requested Modification: Revise table to reflect open detonation unit is pending closure.

Justification for request: KAFB submitted a revised closure plan for the OD Unit on 08 October 2010.

Q. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "K" - LIST OF SWMU's and AOC's FOR WHICH CORRECTIVE ACTION IS COMPLETE

118. Section 1.0, Pages 177 through 181: Introduction and Tables

Requested Modification: Delete Attachment K.

Justification for request: These SWMUs and AOCs are not applicable to the OD Unit Renewal Permit. See justification statement discussion in amendments 2, 3 and 67.

IV. MODIFICATION REQUEST 3 - TEMPORARY AUTHORIZATION TO IMPLEMENT OD UNIT CLOSURE.

As provided by 40 CFR §270.42(e), Kirtland AFB is allowed to submit a Class 3 permit modification request for temporary authorization to "facilitate timely implementation of closure [ ] activities," provided the authorization is necessary to achieve the closure before action may be taken on a modification request. Upon receipt of a request for a temporary authorization to implement closure, the NMED-HWB may grant the request for a term of one hundred eighty (180) days, with the option of an additional one hundred eighty (180) if determined to be warranted to continue the closure activity.

Accordingly, Kirtland AFB requests temporary authorization to implement the revised closure plan filed with the NMED-HWB on 8 October 2010.

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 377TH AIR BASE WING (AFMC)
KIRTLAND AIR FORCE BASE NEW MEXICO

Colonel Robert L. Maness
377 ABW/CC
2000 Wyoming Blvd SE
Kirtland AFB, NM 87117-5000

NOV 16 2010

RECEIVED
NOV 20
OD Hazardous Waste Bureau

Mr. James Bearzi
Chief, Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505

Dear Mr. Bearzi:

As per your previous request, I am acknowledging receipt of your 12 October 2010 letter discussing the Open Detonation (OD) Unit Operating Permit (Permit), EPA ID No. NM9570024423, and closure plan at Kirtland Air Force Base (AFB). As stated in your letter, you indicate that Kirtland AFB must either implement the Peml.it closure plan found in Permit Attachment H or submit a Class 3 Permit Modification Request (PMR) seeking to amend the closure plan.

Accordingly, Kirtland AFB is hereby submitting this Class 3 PMR as allowed in 40 CFR § 270.42, § 74-4-4.2 NMSA 1978 and § 1.12.1 of the Permit. In addition to requesting to amend various portions of the Permit, including the closure plan found at Attachment H, the modification request also requests a stay of enforcement, extension of due dates for deliverables and a 40 CFR §270.42(e) request for temporary authorization to facilitate timely implementation of closure activities pending NMED determination of this PMR. By submitting this Class 3 PMR, Kirtland AFB is not waiving its argument concerning the invalidity of the 2010 Open Detonation Unit Operating Permit.

However, as we move forward through this process of developing and implementing the final Permit closure plan to close the unit approximately forty (40) years ahead of the previously anticipated closure date, Kirtland AFB will work closely with your office to ensure the final closure plan and closure activities comply with all statutory and regulatory closure requirements.

If you have any questions, please contact Mr. John Pike, Environmental Management Chief, at (505) 846-8546.

Sincerely,

ROBERT L. MANESS, Colonel, USAF
Commander

cc:
John Kieling, NMED
Will Moats, NMED

HAZARDOUS WASTE TREATMENT FACILITY OPERATING PERMIT
EPA ID No. NM9570024423

issued to

UNITED STATES AIR FORCE

for the

OPEN DETONATION UNIT

located at

KIRTLAND AIR FORCE BASE
BERNALILLO COUNTY, NEW MEXICO

issued by the

NEW MEXICO ENVIRONMENT DEPARTMENT
HAZARDOUS WASTE BUREAU
2905 RODEO PARK DRIVE EAST, BUILDING 1
SANTA FE, NEW MEXICO, 87505

July 2010

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ACRONYMS AND ABBREVIATIONS

ACM accelerated corrective measure
AK acceptable knowledge
AOC area of concern ARCH
air rotary casing hammer
ASTM American Society for Testing and Materials
CAC Corrective Action Complete
CERCLA Comprehensive Environmental Response, Compensation, and Liability Act
C.F.R. Code of Federal Regulations
CMI corrective measures implementation
CME corrective measures evaluation
DQOs data quality objectives
DOT United States Department of Transportation
EC Emergency Coordinator
ECO-SSLs Ecological Soil Screening Levels (EPA)
EOD explosive ordnance disposal
EPA U.S. Environmental Protection Agency
GC/ECD gas chromatograph/electron-capture device
GC/MS gas chromatograph/mass spectrometry
HE high explosive(s)
HI hazard index
HWA New Mexico Hazardous Waste Act
HWB Hazardous Waste Bureau
HWMR New Mexico Hazardous Waste Management Regulations
HQ hazard quotient
ICP inductively coupled plasma
IDW investigation derived waste
KAFB Kirtland Air Force Base
KCP KAFB Command Post
kg kilogram
LDR land disposal restrictions
m^3 cubic meters
MCL maximum contaminant level
mg milligram
mg/kg milligram per kilogram
mg/L milligram per liter

mL	milliliter
MS/MSD	matrix spike/matrix spike duplicate
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMSA	New Mexico Statutes Annotated
OD	open detonation
PCBs	polychlorinated biphenyls
PPE	personal protective equipment
QA	quality assurance
QAPP	quality assurance program plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA facility investigation
RPD	relative percent difference
RSL	regional screening level SAP
	sampling and analysis plan
SAR	SWMU Assessment Report
SSAP	Soil Sampling and Analysis
Plan SSL	soil screening levels
SVOC	semi-volatile organic compound
SWMU	solid waste management unit
TAG	Tijeras Arroyo Groundwater
TKN	total Kjeldahl nitrogen
TSDF	treatment, storage and disposal facility
UCL	upper confidence limit of the mean
ug	microgram
ug/L	microgram per liter
UHC	underlying hazardous constituent
U.S.C.	United States Code
UXO	unexploded ordnance
VOC	volatile organic compound
WQCC	New Mexico Water Quality Control Commission
XRF	x-ray fluorescence

PERMIT PART 1: GENERAL PERMIT REQUIREMENTS

1.0 INTRODUCTION

This Permit Part (1) contains general requirements pertaining to hazardous waste management and treatment at the Open Detonation (OD) Unit and corrective action at the Kirtland Air Force Base (KAFB) Facility (see Figures 1-1 and 1-2, of this Permit Part, for a map view of the Facility and an aerial view of the OD Unit), as permitted under the New Mexico Hazardous Waste Act (HWA), New Mexico Statutes Annotated (NMSA) 1978, §§ 74-4-1 to 74-4-14.

1.1. LEGAL AUTHORITY

Pursuant to § 74-4-10 of the HWA, the New Mexico Environment Department (the Department) issues this Permit to the U.S. Air Force, hereafter referred to as the Permittee, the owner and operator of the OD Unit, with U.S. Environmental Protection Agency (EPA) ID Number NMD9570024423, located in Bernalillo County, New Mexico.

Section 6001 of the Resource Conservation and Recovery Act (RCRA) provides, in part, that "each department, agency, and instrumentality of the executive branch of the Federal Government (1) having jurisdiction over any solid waste management facility or disposal site, or (2) engaged in any activity resulting, or which may result, in the disposal or management of solid waste or hazardous waste shall be subject to, and comply with, all Federal, State, interstate, and local requirements, both substantive and procedural, respecting control and abatement of solid waste or hazardous waste disposal and management in the same manner, and to the same extent, as any person is subject to such requirements." [42 U.S.C. § 6961].

1.2. ENFORCEMENT

Any violation of any requirement of this Permit may subject the Permittee, and its officers, employees, successors, and assigns, to a compliance order under § 74-4-10 of the HWA or § 3008(a) of RCRA, 42 U.S.C. § 6928(a); to an injunction under § 74-4-10 of the HWA, § 3008(a) of RCRA, 42 U.S.C. § 6928(a), or § 7002(a) of RCRA, 42 U.S.C. § 6972(a); to civil penalties under § 74-4-10 of the HWA, § 3008(a) and (g) of RCRA, 42 U.S.C. § 6928(a) and (g), or § 7002(a) of RCRA, 42 U.S.C. § 6972(a); to criminal penalties under § 74-4-11 of the HWA or § 3008(d), (e), and (f) of RCRA, 42 U.S.C. § 6928(d), (e), and (f); or to some combination of the foregoing. The list of authorities in this Permit Section (1.2) is not exhaustive, and the Department reserves the right to take any action authorized by the law to enforce the requirements of this Permit.

1.3. PERMITTED ACTIVITY

This Permit authorizes the Permittee to treat hazardous wastes at the OD Unit, and establishes the general and specific standards for these activities, as required by the HWA and the Hazardous Waste Management Regulations (HWMR) 20.4.1 New Mexico Administrative Code (NMAC). The OD Unit is classified as a miscellaneous unit under 40 C.F.R. Part 264 Subpart X. This Permit also establishes standards for closure and sets forth the requirements for corrective action to address releases of hazardous waste and hazardous constituents into the environment pursuant to the HWA and the HWMR.

The Permittee shall not treat, without a permit, hazardous wastes at any other location at this Facility, except as provided in 40 C.F.R. § 270.1(c)(2).

The Permittee shall not store for more than 90 days any hazardous waste at any location at this Facility except as provided in 40 C.F.R. § 262.34(b).

This Permit does not authorize the treatment of firearms or contraband that are not reactive or ignitable hazardous waste.

1.4. COMPLIANCE WITH PERMIT

Compliance with this Permit during its term constitutes compliance, for purposes of enforcement, with 40 C.F.R. Parts 264 and 268, only for those management practices specifically authorized by this Permit. The Permittee must also comply with 40 C.F.R. Parts 260 through 273 to the extent the requirements of those sections are applicable. The Permittee must also comply with all applicable self-implementing provisions imposed by statute or rule. Compliance with this Permit shall not constitute a defense to any order issued or any action brought under HWA, NMSA 1978, § 74-4-10(E), § 74-4-10.1, or § 74-4-13; RCRA § 3008(a), § 3008(h), § 3013,
§ 7002, or § 7003; the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C. §§ 9601 to 9675, or any other law providing for protection of public health or the environment.

This Permit does not convey any property rights of any sort or any exclusive privilege, nor does this Permit authorize any injury to persons or property, any invasion of other private rights, or any infringement of State or local laws or regulations in accordance with 40 C.F.R. § 270.4(b) and (c) and § 270.30(g).

1.5. EFFECT OF INACCURACIES IN PERMIT APPLICATION

This Permit is based on the information submitted in the Part B Permit application dated December 2005 and subsequent information, referred to as the Application. Any inaccuracies found in the Application may be grounds for the termination, revocation and reissuance, or modification of this Permit pursuant to 40 C.F.R. § 270.43(a)(2). Where and when the Permittee becomes aware that it failed to submit any relevant facts in the Application, or submitted incorrect information in the Application or in any report to the Department, it shall promptly submit such facts or corrected information pursuant to 40 C.F.R. § 270.30(l)(11).

1.6. PERMIT CITATIONS

Whenever the Permit cites a provision of 20.4.1 NMAC or 40 C.F.R. or Part or Section of this Permit, the Permit shall be deemed to incorporate the citation by reference, including all subordinate provisions of the cited provision, and make binding the full text of the cited provision.

Hazardous waste management regulations are frequently cited throughout this Permit. The Federal hazardous waste management regulations, 40 C.F.R. Parts 260 through 273, are generally cited rather than the New Mexico Hazardous Waste Management Regulations, 20.4.1 NMAC. The Federal regulations are cited because only the Federal regulations set forth the

detailed regulatory requirements; the State regulations incorporate by reference, with certain exceptions, the Federal regulations in their entirety. Citing only the federal regulations also serves to avoid encumbering each citation with references to two sets of regulations. However, it is the State regulations that are legally applicable and enforceable. Therefore, for the purpose of this Permit, and enforcement of its terms and requirements, all references to provisions of Federal regulations that have been incorporated into the State regulations shall be deemed to include the State incorporation of those provisions.

1.7. SEVERABILITY

The provisions of the Permit are severable, and if any provision of this Permit, or any application of any provision of this Permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this Permit shall not be affected thereby.

1.8. DEFINITIONS

For purposes of this Permit, terms used herein shall have the same meanings as those in HWA, RCRA, and their implementing regulations, unless this Permit specifically provides otherwise. Where a term is not defined in HWA, RCRA, pursuant regulations, or this Permit, the meaning associated with such a term shall be defined by a standard dictionary reference or the generally accepted scientific or industrial meaning of the term.

"Area of Concern" (AOC) means any area of the Facility under the control or ownership of the Permittee, which is not a solid waste management unit where a release of a hazardous waste or hazardous constituent has occurred, or is suspected to have occurred regardless of the frequency or duration of the release. An area of concern includes areas and structures at which releases of hazardous waste or hazardous constituents were not fully remediated, including one time and accidental events.

"Corrective Measures" means all corrective action necessary to protect human health and the environment for all releases of hazardous waste or hazardous constituents from any Solid Waste Management Unit or AOC at the Facility, regardless of the time at which waste was placed in the unit, as required under § 74-4-4.2(B) of the HWA and 40 C.F.R. § 264.101. Corrective Measures may address releases to air, soil, sediment, surface water, or groundwater.

"Days" refers to calendar days unless specified otherwise in this Permit.

"Department" means the New Mexico Environment Department and any successor agencies.

"EOD" means Explosives Ordnance Disposal

"**EPA**" means the United States Environmental Protection Agency and any successor agencies.

"Extent of contamination" means the horizontal and vertical area in which the concentrations of waste or hazardous constituents in the environmental media being investigated are above detection limits or background concentrations indicative of the region, whichever is appropriate, as determined by the Department.

"Facility" or "KAFB" means Kirtland Air Force Base, including all contiguous land, structures, other appurtenances, and improvements on the land. For the purpose of implementing corrective action under 40 C.F.R. § 264.101, RCRA § 3008(h), or the HWA, NMSA 1978, § 74-4-10(E),

the Facility includes all contiguous property under the control of the owner or operator seeking a permit under the HWA.

"Hazardous constituent" means any constituent identified in Appendix VIII of 40 C.F.R. Part 261, or any constituent identified in Appendix IX of 40 C.F.R. Part 264, incorporated by 20.4.1 NMAC.

"Hazardous waste" means a solid waste that is not excluded from regulation under 40 C.F.R. § 261.4(b), and that either is listed in 40 C.F.R. Part 261, Subpart D, exhibits any of the characteristics identified in 40 C.F.R. Part 261, Subpart C, or is a mixture of solid waste and one or more wastes listed in 40 C.F.R. Part 261, Subpart D. However, for purposes of corrective action, "hazardous waste" shall have the meaning set forth in the HWA, § 74-4-3(K).

"Hazardous waste regulations" or **"Hazardous Waste Management Regulations"** means the New Mexico Hazardous Waste Management Regulations, 20.4.1 NMAC and all provisions of 40 C.F.R. Parts 260 through 273 incorporated therein.

"Interim measures" means actions necessary to minimize or prevent the further migration of contaminants and limit actual or potential human and environmental exposure to contaminants while long-term corrective action remedies are evaluated and, if necessary, implemented.

"NMED" means New Mexico Environment Department.

"Off-site source" means a generator of Hazardous Waste located within the United States but outside the Permittee's Facility.

"Open Detonation" means the treatment of ignitable or reactive hazardous waste in accordance with the requirements of this Permit. Treatment by open detonation is accomplished by the detonation of hazardous waste in open pits using a counter charge to initiate the explosion.

"Permit" means this Permit, issued to the Permittee for the Facility, pursuant to the HWA and the New Mexico Hazardous Waste Management Regulations to conduct corrective action and to operate the OD Unit at the Facility, EPA ID No. NM9570024423, as it may be modified or amended.

"Permittee" means U.S. Air Force, a part of the U.S. Department of Defense, which is a Department in the U.S. Government, and any successor.

"RCRA" means the Resource Conservation and Recovery Act of 1980, as amended, 42 U.S.C. §§ 6901 to 6992k.

"Release" means any spilling, leaking, pouring, emitting, emptying, discharging, injecting, pumping, escaping, leaching, dumping, or disposing of any hazardous waste or hazardous constituents into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles containing hazardous waste or hazardous constituents).

"Remediation waste" means all solid and hazardous wastes, and all media (including groundwater, surface water, soil, and sediment) and debris, which contain listed hazardous wastes or which exhibit a hazardous waste characteristic, that are managed for the purpose of implementing corrective action requirements. Remediation wastes may originate from releases that extend beyond the Facility boundaries.

"Secretary" means the Secretary of the New Mexico Environment Department or his designee or authorized representative.

"**Solid waste**" means a solid waste as defined in the HWA, § 74-4-3(O).

"Solid waste management unit" (**SWMU**) means any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at the Facility at which solid wastes have been routinely and systematically released.

1.9. THE COMPLETE PERMIT

The complete Permit consists of the regulations incorporated by reference into this Permit (see Permit Section 1.6), the Permit requirements in Permit Parts 1 through 6, and Permit Attachments A through L:

Part 1	-	General Permit Requirements
Part 2	-	General Facility Requirements
Part 3	-	Open Detonation Unit
Part 4	-	Closure
Part 5	-	Post Closure
Part 6	-	Corrective Action
Attachment A	-	General Facility Information
Attachment B	-	List of Authorized Hazardous Wastes
Attachment C	-	Waste Analysis Plan
Attachment D	-	Annual Soil Sampling and Analysis Plan
Attachment E	-	Inspection Plan
Attachment F	-	Contingency Plan
Attachment G	-	Personnel Training Plan
Attachment H	-	Closure Plan
Attachment I	-	Compliance Schedules
Attachment J	-	List of Hazardous Waste Management Units
Attachment K	-	List of SWMUs and AOCs for which Corrective Action is Complete
Attachment L	-	Reserved for Groundwater Sampling and Analysis Plan

1.10. TERM OF THE PERMIT

This Permit shall be effective for a fixed period of 3 years in accordance with 40 C.F.R. § 270.50(a), subject to Permit Sections 1.5, 1.12 and 1.15.

1.11. ALTERNATIVE ASSESSMENT FOR WASTE TREATMENT

The Permittee shall submit an alternative treatment assessment report to the Department no later than the first anniversary of the effective date of this Permit. The report shall document the

Permittee's evaluation of the range of possible treatment technologies for waste that is authorized for treatment by open detonation under this Permit. The assessment report shall include identification and discussion of the alternative treatment technologies and for the technologies presented models of air emissions, contaminant dispersal, and risk to human and ecological receptors. Each alternative treatment technology, including open detonation, shall be evaluated for cost and the technology's ability to protect human health and the environment to include, but not be limited to the:

1. Ability of the technology to reduce or control emissions,
2. Ability of the technology to monitor emissions,
3. Ability of the technology to control noise, and
4. Ability of the technology to control ground vibrations.

The purpose of the alternative treatment assessment shall be to phase out open detonation of hazardous waste at the Facility as soon as practicable.

1.12. PERMIT ACTIONS

1.12.1. Permit Modification, Suspension, Revocation, and Termination

1. This Permit may be modified, suspended, revoked or terminated for cause in accordance with the provisions of HWA, NMSA 1978, § 74-4-4.2 and 40 C.F.R. §§ 270.41 through 270.43. The filing of a request by the Permittee for a Permit modification or the notification of planned changes or anticipated noncompliance or, if suspension, or revocation is ordered by the Department, shall not stay any Permit requirement, in accordance with 40 C.F.R. § 270.30(f).
2. If at any time for any of the reasons specified in 40 C.F.R. § 270.41, the Department determines that modification of this Permit is necessary, the Department may initiate a Permit modification or require the Permittee to request a Permit modification.
3. The Permittee may request permit modifications in accordance with 40 C.F.R. § 270.42. All applicable requirements specified in 40 C.F.R. § 270.42 and 20.4.1.900 NMAC shall be followed.
4. Modifications to the Permit do not constitute a reissuance of the Permit.

1.12.2. Unclassified Permit Modifications

Unless a permit modification is explicitly listed in Appendix I of 40 C.F.R. 270.42 as a Class 1 or 2 permit modification, the Permittee shall not submit the proposed permit modification as a Class 1 or 2 permit modification. The Permittee may only submit such a permit modification request as a Class 3 modification, or may request a determination from the Department that the proposed permit modification be reviewed and approved as a Class 1 or 2 modification pursuant to the requirements specified in 40 C.F.R. 270.42(d)(1).

1.13. TRANSFER OF LAND OWNERSHIP

The Permittee shall submit a permit modification request, in compliance with all requirements of 40 C.F.R. § 270.42, at least 180 calendar days prior to the proposed effective date of transfer of

ownership of any land which is part of the Facility (see also Permit Section 6.1.12). The permit modification request may be submitted as a Class 3 permit modification, or the Permittee may request a determination that the modification is a Class 1 or 2 pursuant to the requirements of 40 C.F.R. § 270.42(d). In addition to the requirements of 40 C.F.R. § 270.42, a permit modification request for transfer of land that is part of the Facility shall:

1. Identify the boundaries of the land proposed for transfer;
2. Describe the location and identity of any existing or prior SWMU, AOC, or hazardous waste management unit on the land proposed for transfer;
3. Describe any known or suspected presence of hazardous waste or hazardous constituents in soil, groundwater, or any other media at any depth within the boundaries of the land proposed for transfer;
4. Describe the status of any past, present, or planned investigations or remediation of any release of hazardous waste or hazardous constituents within the boundaries of the land proposed for transfer;
5. Include a revised map of the Facility;
6. Propose and describe all provisions necessary to ensure that the Permittee can meet the corrective action obligations, the HWA, and the Hazardous Waste Management Regulations (e.g., covenants, deed restrictions, proposed replacement of monitoring wells or enforceable agreements for access to monitoring wells on transferred land) [40 C.F.R. § 264.101; 40 C.F.R. §§ 270.30(l)(1), 270.32(b) and 270.42; and 20.4.1.901 NMAC]; and
7. Describe all measures taken to comply with § 120(h) of CERCLA, 42 U.S.C. § 9620(h).

1.14. PERMIT RENEWAL

If the Permittee wishes to continue the activities authorized by this Permit after the expiration date of this Permit, in accordance with 40 C.F.R. § 270.30(b), the Permittee must apply for and obtain a new permit. The Permittee may request renewal of this Permit by submitting an application for a new permit at least 180 calendar days before the expiration date of this Permit as required by 40 C.F.R. § 270.10(h).

1.15. CONTINUATION OF EXPIRING PERMIT

Pursuant to 40 C.F.R. § 270.51, if the Permittee has submitted a timely and complete application for renewal of this Permit as specified in 40 C.F.R. §§ 270.10, 270.11, 270.12 (as applicable), and §§ 270.13 through 270.29 (as applicable), this Permit shall remain in effect until the effective date of the new permit if, through no fault of the Permittee, the Department has not issued a new permit on or before the expiration date of this Permit. [40 C.F.R. § 270.51].

1.16. TRANSFER OF PERMIT

The Permittee may only transfer this Permit after providing notice to and receiving approval from the Department. The prospective new owner or operator must file a disclosure statement with the Department as specified at HWA, NMSA 1978, § 74-4-4.7. The Department may require modification or revocation and reissuance of this Permit in accordance with 40 C.F.R.

§ 270.40(b) and § 270.41(b)(2).

Before transferring ownership or operation of the Facility or any SWMUs or AOCs during its operating life, the Permittee shall notify the new owner or operator in writing of the requirements of 40 C.F.R. Part 264, and Part 270, and the HWA, pursuant to 40 C.F.R. § 264.12(c), and 40 C.F.R. § 270.30(l)(3), and shall provide the Department with a copy of this notice.

1.17. PERMIT REVIEW

The Department may review this Permit at any time after the effective date of Permit issuance, and may modify this Permit as necessary pursuant to § 74-4-4.2 of the HWA and 40 C.F.R. §§ 270.41, 270.50(b), and 270.50(d). Such modification shall not extend the effective term of this Permit as specified in requirements of Permit Section 1.10.

1.18. NEED TO HALT OR REDUCE ACTIVITY NOT A DEFENSE

It shall not be a defense for the Permittee in an enforcement action that it would have been necessary for the Permittee to halt or reduce the permitted activities in order to maintain compliance with the terms of this Permit. [40 C.F.R. § 270.30(c)].

1.19. DUTY TO MITIGATE

In the event of noncompliance with this Permit, the Permittee shall take all reasonable steps to minimize releases to the environment, and shall carry out such measures as are reasonable to prevent significant adverse impacts on human health or the environment. [40 C.F.R. § 270.30(d)].

1.20. PROPER OPERATION AND MAINTENANCE

The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the requirements of this Permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance/quality control procedures. This requirement includes the operation of back-up or auxiliary facilities or similar systems when necessary to achieve compliance with the requirements of this Permit. [40 C.F.R. § 270.30(e)].

1.21. DUTY TO PROVIDE INFORMATION

The Permittee shall furnish to the Department, within a reasonable time as specified by the Department, any relevant information which the Department may request to determine whether cause exists for modifying, revoking, reissuing, or terminating this Permit, or to determine compliance with this Permit. The Permittee shall also furnish to the Department, upon request, copies of records required to be kept by this Permit. [40 C.F.R. § 264.74(a), and 40 C.F.R. § 270.30(h)].

The Permit requirements of this Section (1.21) shall not be construed to limit, in any manner, the Department's authority under the HWA, NMSA 1978, § 74-4-4.3, or RCRA § 3007(a), 40 C.F.R. § 270.30(i), or any other applicable law or regulation.

1.22. INSPECTION AND ENTRY

In accordance with 40 C.F.R. § 270.30(i), the Permittee shall allow the Department, or authorized representatives, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter at reasonable times into the Permittee's premises where the regulated facility or activity is located or conducted, or where records must be kept under the requirements of this Permit;
2. Have access to and copy, at reasonable times, any records that must be kept under the requirements of this Permit;
3. Inspect at reasonable times the Facility, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Permit; and
4. Sample or monitor at reasonable times, for the purposes of assuring Permit compliance or as otherwise authorized by RCRA or HWA, any substances or parameters at any location, including waste, air, soil, sediment, surface water, and groundwater at the Facility.

The Permit requirements of this Section (1.22) shall not be construed to limit, in any manner, the Department's authority under the HWA, NMSA 1978, § 74-4-4.3, or RCRA, § 3007(a), 40 C.F.R. § 270.30(i), or any other applicable law or regulation.

1.23. MONITORING AND RECORDS

1.23.1. Representative Sampling

The Permittee shall take representative samples and measurements in accordance with the procedures in this Permit and 40 C.F.R. § 264.13(a)(1). All samples and measurements taken by the Permittee under any requirement in this Permit shall be representative of the waste, media, equipment or structure being sampled. This includes, but is not limited to, sampling and analysis of waste, treatment residues, soil, groundwater, spills, and includes sampling of media for purposes of conducting corrective action pursuant to Part 6 of this Permit. To obtain a representative sample of a waste stream the Permittee shall use an appropriate method from Appendix I of 40 C.F.R. Part 261 or an equivalent method approved by the Department. Laboratory methods must be those specified in the current edition of the EPA publication *Test Methods for Evaluating Solid Waste Physical/Chemical Methods SW-846*, or an equivalent method, as specified in the *Waste Analysis Plan* in Permit Attachment C. [40 C.F.R. § 270.30(j)(1)]. At a minimum, these analyses shall contain all of the information which must be known to treat, store, or dispose of the wastes properly. [40 C.F.R § 264.73(b)].

1.23.1.1. Monitoring Records Contents

Monitoring records, including those required for corrective action under Part 6 of this Permit, shall contain:

1. The dates, exact place, and times of sampling or measurements;
2. The names of the individuals who performed the sampling or measurements;
3. The name and address of the laboratory that performed the analysis;

4. The date on which analyses were performed;
5. The analytical techniques or methods used;
6. The results of such analyses including units of measurement;
7. Calibration data;
8. Quality control data;
9. Detection limits;
10. Data qualifiers; and
11. Data validation results.

[40 C.F.R. § 270.30(j)(3)].

1.23.2. Operating Record

The Permittee shall maintain a written Operating Record at the EOD Shop and the EM Branch Office as required by 40 C.F.R. § 264.73. The Permittee shall maintain all records in the Operating Record until completion of closure and, if necessary, post closure care, unless specified otherwise in this Permit. The retention period for all records is extended automatically during the course of any unresolved enforcement action regarding the Facility, or as may be requested by the Department, as required by 40 C.F.R. § 264.74(b). The Permittee shall make the Operating Record available at all reasonable times for inspection by any officer, employee, or authorized representative of the Department or EPA, upon request, or shall furnish copies of documents within the record, as required by 40 C.F.R. § 264.74.

The following operating records and documents shall be maintained at the Facility EOD Shop:

1. A current copy of this Permit including the closure plan (Permit Attachment H);
2. A written Operating Record that describes:
    a. The type and quantity of each hazardous waste received and treated at the OD Unit, and the date the hazardous waste was treated,
    b. The location of hazardous waste at the OD Unit,
    c. The method(s) of treatment of hazardous waste,
    d. Training records for EOD personnel,
    e. Written inspection log and schedule;
3. Training records for former EOD employees (maintained for a minimum of three years from the date the employee last worked at the OD Unit);
4. Current training records (including refresher seminars) for current EOD employees;
5. Inspection logs for the last three years;
6. A copy of the Contingency Plan;
7. A copy of the Waste Analysis Plan;
8. The name(s), address(es), and telephone number(s) of the Emergency Coordinator(s) and all such information for persons designated as alternate Emergency Coordinators;
9. A list of all equipment listed in Permit Attachment F, as required by 40 C.F.R. Part 264, Subpart C; and

10. A current file of pertinent material safety data sheets and records of all wastes that have been treated at the OD Unit.

The following operating records and documents shall be maintained at the Facility EM Branch Office:

1. Treatment facility notices and certifications;
2. Storage facility notices and certifications;
3. Air emissions records;
4. Correspondence and other documents from government agencies;
5. Notices to off-site generators;
6. Waste minimization certification.
7. Manifest documents for hazardous waste shipped off-site;
8. A copy of the Hazardous Waste Biennial Report;
9. Copies of unmanifested waste reports;
10. Copy of the Contingency Plan for the OD Unit and any revisions to the plan;
11. Waste characterization information and data;
12. A copy of the Waste Analysis Plan;
13. Reports of any incidents that required activation of the Contingency Plan;
14. Records of soil and groundwater monitoring, testing, analytical data, and any corrective actions taken to prevent or mitigate releases of hazardous waste or hazardous constituents to the environment;
15. All documents related to corrective action including, but not limited to, work plans, reports, and sampling and analysis plans;
16. The Permit Application;
17. Inspection Plan set forth in Permit Attachment E;
18. Closure Plan set forth in Permit Attachment H, as required by 40 C.F.R. § 264.112(a), and this Permit; and
19. All monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation;

A current copy of the Contingency Plan shall also be maintained at the EOD Range personnel bunker, and the KAFB Command Post.

1.24. REPORTING PLANNED CHANGES

The Permittee shall give advance notice to the Department as soon as possible, but no less than one week in advance of any planned physical alterations or additions to the OD Unit. [40 C.F.R. § 270.30(l)(1)]. Some alterations or additions may be subject to the requirements of Permit Section 1.12.

1.25. REPORTING ANTICIPATED NONCOMPLIANCE

The Permittee shall give advance notice to the Department as soon as possible, but no less than

one week in advance of any planned physical alterations or additions to the OD Unit or of any activities, which may result in noncompliance with the requirements of this Permit. [40 C.F.R. § 270.30(l)(2)]. Some alterations or additions may be subject to the requirements of Permit Section 1.12.

1.26. CERTIFICATION OF CONSTRUCTION OR MODIFICATION

If the OD Unit is modified, the Permittee shall not treat or analyze hazardous waste in the modified portion of the OD Unit, except as provided in 40 C.F.R. § 270.42, unless the following requirements have been satisfied:

1. The Permittee has submitted to the Department, by certified mail or hand delivery, a letter signed by the Permittee and an independent professional engineer registered in New Mexico stating that the modification meets the requirements of this Permit; and
2. The Department has:
    a. Inspected the modified or newly constructed portion of the OD Unit and finds it meets the requirements of this Permit; or
    b. Waived the inspection or, within 15 calendar days from the date of receipt of the letter required by paragraph 1, has not notified the Permittee of its intent to inspect.

[40 C.F.R. § 270.30(1)(2)].

1.27. TWENTY-FOUR HOUR AND SUBSEQUENT REPORTING

1. **Oral Report** - The Permittee shall report to the Department any noncompliance which may endanger human health or the environment. Any such information shall be reported orally within 24 hours from the time the Permittee becomes aware of the circumstances. The oral report shall include:
    a. Information concerning release of any hazardous waste or constituents that may cause an endangerment to public drinking water supplies; and
    b. Any information about a release or discharge of hazardous waste or hazardous constituent or of a fire or explosion which could threaten the environment or human health including:
        i. A description of the noncompliance and its cause;
        ii. The name, address, and telephone number of the owner, operator, and name of responsible official;
        iii. The name, address, and telephone number of the Facility;
        iv. The period of the occurrence including exact date and time and, if the noncompliance has not been corrected, the anticipated time it is expected to continue;
        v. The name and quantity of materials involved;
        vi. The extent of injuries, if any;

vii. An assessment of actual or potential hazards to the environment and human health at and outside the Facility, where this is applicable;

viii. The estimated quantity and disposition of recovered material that resulted from the incident; and

ix. The steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

[40 C.F.R. § 270.30(l)(6)(i and ii)].

2. **Non-Compliance Written Report** - The Permittee shall also submit a written report within five calendar days from the time the Permittee becomes aware of the circumstance of any noncompliance. The written report shall contain the information required for an oral report under this Permit Section (1.27).

The Department may extend the time for submitting the written report up to 15 calendar days upon written request by the Permittee prior to the end of the five calendar days allowed under Permit Section 1.27.2. [40 C.F.R. § 270.30(l)(6)(iii)].

1.28. REPORTS REQUIRED BY THE CONTINGENCY PLAN

If any incident requires implementation of the Contingency Plan provided in Permit Attachment F, the Permittee shall comply with the reporting requirements of 40 C.F.R. § 264.56(d).

1.29. CORRECTIVE ACTION

Corrective action required pursuant to 40 C.F.R. § 264.101, shall continue under this Permit for any period necessary to comply with the requirements specified in Part 6 of this Permit.

1.30. ADMISSIBILITY OF DATA

The Permittee waives any objection to the admissibility as evidence of any data required by this Permit in any administrative or judicial action to enforce a condition of this Permit.

1.31. OTHER NONCOMPLIANCE

The Permittee shall report all instances of noncompliance not otherwise required to be reported under this Permit at the time monitoring reports are submitted. The reports shall contain the information listed in Permit Section 1.27.1. [40 C.F.R. § 270.30(l)(10)].

1.32. SIGNATORY AND CERTIFICATION REQUIREMENTS

The Permittee shall sign and certify all applications, reports, or other information submitted to the Department or required by this Permit, in accordance with 40 C.F.R. § 270.11(a)(3).

The Permittee shall provide, upon request by the Department, notification and certification statements associated with the treatment of hazardous wastes in compliance with 40 C.F.R. § 268.7 and § 268.9.

1.33. MONITORING REPORTS

The Permittee shall submit Monitoring Reports to the Department as specified in the

requirements of Permit Sections 1.23 and 1.36. [40 C.F.R. § 270.30(l)(4)].

1.34. COMPLIANCE SCHEDULES

Reports of compliance or noncompliance with this Permit, any progress reports on activities conducted under this Permit, and interim and final requirements contained in any compliance schedule of this Permit shall be submitted to the Department no later than 14 calendar days following each schedule date set forth in this Permit. [40 C.F.R. § 270.30(l)(5)].

1.35. INFORMATION REPOSITORY

Upon written notification, the Department may require the Permittee to establish and maintain an information repository at any time, based on the factors set forth in 40 C.F.R. § 124.33(b) and 40 C.F.R. § 270.30(m). The information repository shall be governed by the provisions in 40 C.F.R. § 124.33(c).

1.36. REPORTS, NOTIFICATIONS, AND INFORMATION SUBMITTALS TO THE DEPARTMENT

The Permittee shall submit to the Department by certified mail or hand delivery all reports, notifications, or other submittals that are required by this Permit to be sent or given to the Department, at the following address:

Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

Telephone Number: (505) 476-6000
Facsimile Number: (505) 476-6030

Two hard (paper) copies and one electronic copy of these plans, reports, notifications, or other submissions shall be submitted to the Department.

1.37. POINTS OF CONTACT FOR THE FACILITY

Points of contact for the Facility during the term of the Permit are identified below.

Base Commander
377 ABW/CC
2000 Wyoming Blvd. SE
Kirtland AFB, NM 87117-5606

and

Director
Environmental Management
377 MSG/CEANR
2050 Wyoming Blvd. SE

Kirtland AFB, NM 87117-5270

All reports required by the permit shall be signed by a principal executive officer or their duly authorized representatives in accordance with 40 C.F.R. § 270.11(b).

The Permittee shall inform the Department in writing of changes in its principal executive officers (or their duly authorized representatives) within 30 days of the changes, and Emergency Coordinators and their telephone numbers and addresses within 15 calendar days of the changes. Changes to the principal executive officers (or their duly authorized representatives) are not permit modifications. Changes in name, address, or phone number for Emergency Coordinators are Class 1 permit modifications under 40 C.F.R § 270.42.

1.38. WORK PLANS AND OTHER DELIVERABLE DOCUMENTS

All documents that the Permittee prepares under the terms of this Permit and submits to the Department that are subject to the requirements of 20.4.2 NMAC shall be subject to the procedures set forth therein. Documents requiring Department approval that are not subject to the requirements of 20.4.2 NMAC may be reviewed and approved, approved with modifications or directions, disapproved, denied, or rejected by the Department.

Upon the Department's written approval, all submittals and associated schedules shall become enforceable under this Permit in accordance with the terms of the Department's written approval, and such documents as approved, shall control over any contrary or conflicting requirements of this Permit.

This provision does not affect any public process that is otherwise required by this Permit, the HWA, or its implementing regulations.

Failure to submit any of the work plans, schedules, reports, and other deliverable documents that the Permittee is required to prepare under this Permit in substantial compliance with this Permit, and according to the schedules or deadlines in this Permit, may subject the Permittee to enforcement action under § 74-4-10 of the HWA, or other applicable provisions of law, which may include fines, civil penalties, or suspension or revocation of the Permit.

Any noncompliance with approved plans and schedules shall be noncompliance with this Permit. The Department may grant extensions of written requests for due dates for submittals of reports and other deliverables, provided that the Permittee includes a written justification showing good cause and a proposed schedule for submittal.

1.39. CONFIDENTIAL INFORMATION

The Permittees may claim that any information required by this Permit or otherwise submitted to the Department is confidential pursuant to the provisions of §§ 74-4-4.3(D) and (F) of the HWA and 40 CFR §§ 260.2 and 270.12.

Figure 1-1

Figure 1-2

PERMIT PART 2: GENERAL FACILITY REQUIREMENTS

2.0 INTRODUCTION

Permit Part 2 contains general requirements applicable to the Facility.

2.1. SECURITY

In order to prevent the unknowing entry and to minimize the possibility of unauthorized entry of persons into the OD Unit, the Permittee shall comply with the security provisions and procedures described in this Permit Section (2.1), and in Permit Attachment A, and as required by 40 C.F.R. § 264.14.

The entrance gate to the EOD Range (see Figure 2-1, this Permit Part) shall be locked except when EOD personnel enter the area for inspections or for treatment operations, or for purposes of conducting repairs or maintenance to the OD Unit, or for conducting military training.

Warning signs shall be posted at the entrance gate and at a maximum spacing of 300-foot intervals along the fence. The signs shall be legible from a distance of 25 feet and shall be large enough to be seen from any approach toward the EOD Range. The warning signs shall state "Danger--Explosive Disposal Range--Keep Out" in English and Spanish. A sign indicating "No Smoking" in English and Spanish shall be placed conspicuously at the entrance to the EOD Range.

During treatment operations, the gate shall remain open in case emergency vehicle access is required; however, unauthorized entry must be prevented.

2.2. INSPECTIONS

The Permittee shall inspect the OD Unit for malfunctions and deterioration, operator errors, and discharges which may cause a release of hazardous waste or hazardous constituents into the environment or a threat to human health, as required by 40 C.F.R. § 264.15, and according to the Inspection Plan (Permit Attachment E). The Permittee shall remedy any such deterioration or malfunction, operator error, or discharge, as required by 40 C.F.R. § 264.15(c). Inspections shall be conducted often enough to identify problems in time to correct them before they harm human health or the environment. The Permittee shall maintain records of all such inspections in the Operating Record, as required by 40 C.F.R. § 264.15(d).

Pursuant to the miscellaneous unit requirements found in 40 C.F.R. Part 264 Subpart X, inspections must meet the inspection requirements in 40 C.F.R. § 264.15 and the equipment testing and maintenance requirements in 40 C.F.R. § 264.33, as well as any additional requirements needed to protect human health and the environment. The OD Unit inspection procedures for communication and fire-protection equipment shall include provisions for equipment testing and maintenance to ensure that the equipment will function properly in an emergency.

If an inspection of the OD Unit reveals that a non-emergency problem has developed, remedial action, including repairs, maintenance, and replacement, shall be completed as soon as practicable to protect human health and the environment and to preclude further damage and to reduce the need for emergency repairs. If a hazard appears imminent or if a hazardous situation

already exists, operations at the OD Unit shall stop, and remedial action shall be initiated immediately. These measures to implement remedial actions shall satisfy the requirements of 40 C.F.R. § 264.15(c). Any remedial action taken pursuant to an inspection shall be noted on the inspection log in accordance with 40 C.F.R. § 264.15(d).

In accordance with 40 C.F.R. § 264.15(b)(1), a written schedule shall be followed at the OD Unit to routinely inspect for problems or potential problems with safety and emergency equipment, security devices, and operating and other equipment for preventing, detecting, or responding to hazards to the environment or human health. The Permittee shall use an inspection log based on the schedule shown in Table E-1 to document inspection of all items listed on Table E-1. The inspection logs shall include the date and time of the inspection, the name of the inspector, a notation of the observations made, and the date and nature of any repairs or other remedial actions taken.

2.3. PERSONNEL TRAINING

The Permittee shall follow the personnel training procedures specified in Permit Attachment G. [40 C.F.R. § 264.16].

The Permittee shall comply with 40 C.F.R. § 264.16(d) by maintaining the following documentation at the Facility: a job title for each position and the name of each employee filling each position; a written description for each position including the requisite skill, education, or other qualifications, and duties; and a written description of introductory and continuing training for each person filling each position.

2.4. PREPAREDNESS AND PREVENTION

2.4.1. Required Equipment

As required by 40 C.F.R. § 264.32, the OD Unit shall be equipped with or personnel shall have access to adequate emergency equipment, which includes an internal communication equipment or alarm system, telephone or two-way radio, fire extinguishers, and fire control, spill control, and decontamination equipment. The emergency equipment available for use at the OD Unit is summarized in Tables F-2 and F-3 in the Contingency Plan under Permit Attachment F.

An internal communications or alarm system capable of providing immediate emergency instructions (voice or signal) to Facility personnel shall be available on-site. In addition, a telephone or two-way radio capable of summoning emergency assistance shall also be available on-site. Treatment activities at the OD Unit shall be conducted only after notifying the KAFB Command Post (KCP).

All vehicles used at the OD Unit shall carry a portable fire extinguisher and a shovel. At least two portable fire extinguishers and at least two shovels shall also be kept at the EOD personnel bunker for response to fires or spills.

Appropriate personal protective equipment shall be available for use at the OD Unit to clean up spills should any occur.

Eyewash solutions shall be included in the first-aid kits carried in the vehicles used at the OD Unit.

The KAFB Fire Department shall be on call during treatment operations to provide fire fighters, tanker trucks equipped with water at adequate volume and pressure to extinguish fires at the OD Unit, and other fire-fighting equipment, if any fires should occur.

2.4.2. Testing and Maintenance of Equipment

The Permittee shall test and maintain the equipment specified in the Contingency Plan in Permit Attachment F, as necessary, to assure its proper operation in time of emergency, as required by 40 C.F.R. § 264.33.

All communications systems, fire protection equipment, and decontamination equipment associated with the OD Unit shall, at a minimum, be tested and maintained according to the inspection schedule set forth in Permit Attachment E. Damaged or defective emergency equipment, communications equipment, fire protection equipment, and decontamination equipment shall be repaired or replaced immediately upon discovery.

2.4.3. Required Aisle Space

At a minimum, the Permittee shall maintain enough aisle space to allow the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to any area of the OD Unit, as required by 40 C.F.R. § 264.35.

2.4.4. Arrangements with Local Authorities

The Permittee shall attempt to enter into coordination agreements for emergency response, i.e., medical, ambulance, and fire protection services, with the City of Albuquerque Fire Department, the Bernalillo County Fire Department, the Albuquerque Police Department, and Albuquerque Regional Medical Center, as described in the Contingency Plan (Permit Attachment F), and as required by 40 C.F.R. § 264.37. Copies of all such agreements and documentation showing any unsuccessful attempts to enter into such an agreement shall be maintained at the Facility EM Branch Office as part of the Operating Record.

The Permittee shall provide the Chiefs of the City of Albuquerque Fire Department (AFD) and the Bernalillo County Fire Department (BCFD) with information that would ensure that emergency response personnel are at all times familiar with the potential hazards in performing their duties associated with the hazardous wastes at OD Unit. This information shall at a minimum include:

1. Waste types, *e.g.*, ignitable, reactive, corrosive;
2. Waste names that identify principle hazardous chemical constituents;
3. Approximate quantities of each waste type; and
4. General location of wastes types.

The Permittee shall annually sign a certification stating that the AFD and BCFD have been provided with this information. These certification statements shall be maintained in the Facility EOD Shop as part of the Operating Record.

2.4.5. Preventive Procedures, Structures, and Equipment

Descriptions of the preventive procedures, structures, and equipment at the OD Unit are

presented below. Adherence to the procedures and proper use of the structures and equipment shall be done to prevent hazards associated with unloading operations, prevent runoff from escaping hazardous waste management areas, prevent contamination of water supplies, mitigate the effects of equipment failures and power outages, prevent undue exposure of personnel to hazardous waste, prevent releases of hazardous wastes or hazardous constituents to soil, sediment, surface water, and groundwater, and prevent unacceptable releases of contaminants to the atmosphere.

Only properly trained personnel shall transport waste to the OD Unit for treatment. Unloading of the waste may be performed only by EOD Technicians/Specialists either manually or with appropriate heavy equipment, such as forklifts. At the OD Unit, vehicles shall park adjacent to the pit where the waste is to be treated, and the waste shall then be unloaded and placed into the pit. Additionally, personnel involved in waste management at the OD Unit shall be knowledgeable about the physical and chemical properties of the waste managed and shall take all precautions, as necessary, to ensure that wastes are managed safely.

Engineering and operational controls shall ensure that run-on and run-off are minimized to protect human health and the environment. A two-foot high earthen berm shall surround the OD Unit to prevent run-off from the OD Unit from flowing to other areas outside of the treatment area.

Because no electrical power is supplied to the EOD Range, equipment used at the OD Unit for unloading or placement of wastes (i.e., forklifts) is self-contained. If such heavy equipment experiences failure, the equipment shall be repaired or replacement equipment shall be obtained immediately.

Personnel exposure shall be minimized by restricting the handling of hazardous waste. EOD Technicians/Specialists shall wear appropriate protective clothing, which may include safety glasses. In case of exposure to the hazardous waste, first aid equipment, which includes eyewash solutions, shall be readily available.

Operations at the OD Unit shall be conducted in a manner to prevent any releases that may have adverse effects on human health or the environment due to migration of waste constituents in the air as required under 40 C.F. R. § 264.601(c). Treatment at the OD Unit shall be performed under the requirements in the applicable permit obtained from the City of Albuquerque Environmental Health Department Air Pollution Control Division and under the requirements of this Permit.

The Permittee shall clear and keep clear, at all times, all combustible materials, including wood, grass, brush, and trees located within 200 feet of the OD Unit. The cleared area shall be bladed routinely to minimize fire danger, and a series of at least three concentric firebreaks (at least 20-feet wide each) shall be maintained.

2.5. CONTINGENCY PLAN

2.5.1. Implementation of the Plan

The Permittee shall immediately implement the Contingency Plan contained in Permit Attachment F, whenever there is a release of hazardous waste or hazardous constituents or there is a fire or explosion that could threaten human health or the environment, as required by

40 C.F.R. § 264.51(b).

2.5.2. Copies of the Plan

The Permittee shall maintain copies of the current Contingency Plan and all revisions and amendments to the plan at the EOD Shop and at the EOD Range bunker as required by 40 C.F.R. § 264.53(a). The Permittee shall provide copies of the current Contingency Plan and all revisions and amendments to the plan to the Department and to each entity with which the Permittee has an emergency agreement pursuant to the Permit requirements of Permit Section 2.4.4, as required by
40 C.F.R. § 264.53(b).

2.5.3. Amendments to the Plan

The Permittee shall review at least annually and immediately amend, if necessary, the Contingency Plan, as required by 40 C.F.R. § 264.54.

2.5.4. Emergency Coordinator

Either the Emergency Coordinator (EC) or an alternate EC, as specified in Permit Attachment F, shall be available at all times in case of an emergency. The EC and alternate EC shall be thoroughly familiar with the Contingency Plan and shall have the authority to commit the resources needed to implement the Contingency Plan. [40 C.F.R. § 264.55]. In the event of an imminent or actual emergency, the EC shall activate the internal emergency alarm or emergency communication device, notify the appropriate State or local government agencies and implement other procedures, as required by 40 C.F.R. § 264.56, and as described in Permit Attachment F (*Contingency Plan*).

The Permittee shall submit to the Department a revised Table F-1, Permit Attachment F, within 30 days of the issuance of this Permit. The revised table shall contain the following emergency coordinator contact information in compliance with 40 C.F.R. 264.52(d): names, office addresses, and the home and office telephone numbers of all persons qualified to act as an EC. When more than one person is listed, one must be named as the primary EC and the others must be listed in the order in which they will assume responsibility as alternates. The Permittee shall not treat any hazardous waste at the OD Unit until this Permit requirement is fully satisfied as determined by the Department.

2.6. WASTE CHARACTERIZATION

2.6.1. General Requirements

The Permittee shall not treat any hazardous waste at the OD Unit unless the hazardous waste has been characterized pursuant to the requirements of this Permit. [40 C.F.R. Part 264 and 40 C.F.R. Part 268]. The Permittee shall characterize waste as required under the Permit requirements of Permit Section 2.6.3 by sampling and analysis or by use of acceptable knowledge (AK) of the process that generated the waste, as appropriate.

2.6.2. Characterization of Waste by Acceptable Knowledge

"Acceptable Knowledge" means generator knowledge of the process that generated a waste,

including but not limited to process knowledge, waste analysis data from generators of similar wastes, and facility records of analysis that is used by a generator to characterize wastes.

Acceptable knowledge may be used as the sole method to characterize waste only when the waste is generated from a process that is consistent and well-documented. Documentation of the process must include information that meets all characterization requirements of this Permit, including the requirement to determine the status of the waste for the purposes of the RCRA Land Disposal Restrictions (LDRs) as specified in the Permit requirements of Permit Section 2.6.3.2.

The Permittee shall maintain documentation used to support acceptable knowledge of a waste stream in the Operating Record in accordance with 40 C.F.R. § 268.7(a)(6) and 40 C.F.R. § 264.73(b)(3). This documentation must be readily retrievable upon request during a Department or United States Environmental Protection Agency (EPA) inspection, and must be maintained in the Operating Record for a minimum of three years from the date the waste was last managed at the Facility. For each waste stream characterized by acceptable knowledge, the Permittee shall maintain in the Operating Record, at a minimum, the following process knowledge information.

1. The location where the waste stream is generated,
2. The waste stream volume and time period of generation,
3. A description of the waste generating process, and
4. All material inputs or other information that identifies the chemical content, physical properties and physical form of the waste stream.

2.6.3. Characterization by Sampling and Analysis

2.6.3.1. Sampling

The Permittee shall establish and utilize a Sampling and Analysis Plan (SAP) for each waste stream for which sampling is required. The SAP shall identify the appropriate sampling methods to characterize the waste stream in accordance with the requirements of Permit Section 2.6.1. The Permittee shall maintain the SAP and all documents showing compliance with the SAP, in the Operating Record for a minimum of three years from the date the waste was last managed at the Facility.

The SAP shall identify the sample container types, preservation techniques, and holding times for each waste sampled. The SAP must conform to the most recent version of EPA's publication *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, (Publication SW-846) Chapter 9, Sampling Plan.* The SAP must ensure collection of a representative sample of waste by means that preserve its original physical form and composition, and the SAP shall ensure that sample collection meets the quality assurance objectives required in Section 1.3 of Permit Attachment D. The number of samples of each waste shall be sufficient to demonstrate that the Upper Confidence Limit of the mean (UCL), based on at least a 95% confidence level, is less than the applicable regulatory threshold.

2.6.3.2. Laboratory Analysis

The SAP shall identify the appropriate laboratory analytical methods to characterize the waste

stream in accordance with the Permit requirements of Permit Section 2.6.1. The Permittee shall perform or obtain laboratory analysis of wastes in accordance with the requirements of this Permit, and the *Waste Analysis Plan* (WAP) contained in Permit Attachment C. The SAP shall include the appropriate laboratory analytical methods, detection limits, and reporting limits. The Permittee shall maintain the SAP in the Operating Record.

To use any alternative analytical method, the Permittee must submit to the Department a petition for approval of such method in accordance with 40 C.F.R. § 260.21.

If the Permittee uses an independent contract laboratory to perform analyses, the Permittee shall inform the laboratory in writing that it must operate under the waste analysis requirements set forth in this Permit.

When using laboratory analysis as part of a hazardous waste determination, the Permittee shall require the laboratory to report concentrations of *all* hazardous constituents that the analytical test method is capable of measuring as identified in analytical method specific tables in the most current version of the EPA's *Test Method for Evaluating Solid Wastes (SW-846), Chapter 2*. When using laboratory analysis to demonstrate that the waste meets its applicable Land Disposal Restriction (LDR) treatment standard concentrations (specified at 40 C.F.R. § 268.40), the Permittee shall demonstrate that the analytical method detection limit is not higher than the treatment standard for each hazardous constituent that can reasonably be expected to be present.

2.6.3.3. Quality Assurance/Quality Control (QA/QC)

The Permittee shall perform and record all waste characterization QA/QC procedures in accordance with SW-846 for the data used to support waste characterizations required under this Permit. The precision, accuracy, completeness, comparability, and representativeness of the analytical data shall be addressed. The Permittee shall maintain a record of all QA/QC determinations in a manner traceable to specific wastes in the Operating Record.

When performing waste sampling required under this Permit, the Permittee shall use the applicable sample collection QA/QC procedures specified in EPA's *Field QA and QC Requirements Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, (Publication SW-846), Chapter 1, Section 3.4,* including, but not limited to those dealing with equipment preparation and field equipment maintenance, calibration, and cleaning. The SAP shall identify and the Permittee shall collect the appropriate number of quality control samples associated with each waste sampled.

When performing laboratory analysis required under this Permit, method blanks, laboratory duplicates, and other laboratory control samples shall be analyzed to assess the quality of the data resulting from laboratory analytical programs. The results of both field and laboratory quality control data shall be reported to the Department with the results of waste characterization samples.

2.6.4. Re-evaluation of Characterization Information

The Permittee shall re-evaluate the characterization of routinely generated wastes to ensure that the characterization remains accurate and up to date for subsequent batches of waste, in compliance with 40 C.F.R. § 264.13(b)(4). The results of the re-evaluation shall be thoroughly documented and placed in the Operating Record.

The Permittee shall perform re-evaluation of a waste in accordance with these minimum requirements:

1. Re-evaluation shall be performed at least annually to verify the accuracy of initial characterization. For wastes originally characterized through sampling and analysis, re-evaluation shall be achieved using the same sampling and analysis methods used in the initial analysis unless otherwise required by the Department. For wastes characterized through acceptable knowledge of waste generation processes, re-evaluation may be achieved through a review of that information supporting acceptable knowledge.
2. Re-evaluation shall be performed whenever there is a change in waste-generating processes. Any information that indicates a change in the process that generates the waste and may affect the waste shall cause the waste to be re-characterized.
3. Re-evaluation shall be performed when the Permittee is notified by an off-site facility receiving hazardous waste from the Facility that the characterization of the waste received at the receiving facility does not match a pre-approved waste analysis certification or accompanying waste manifest or shipping paper. The Permittee shall notify the Department within 24 hours of its receipt of such a discrepancy notice.

2.6.5. Characterization of Specific Wastes

2.6.5.1. Waste Received From Off-Site

The Permittee shall obtain a detailed chemical and physical analysis of any hazardous waste received at the Facility from an off-site facility, in compliance with 40 C.F.R. § 264.13(c). This characterization may be in the form of documented acceptable knowledge if all applicable waste characterization requirements specified in this Permit are met and documented. This includes, but is not limited to, identification of underlying hazardous constituents.

The Permittee shall physically examine the shipment of waste from the off-site facility at the time of acceptance for correct documentation, including appropriate waste container identification and labeling. The Permittee shall not accept at the Facility a hazardous waste shipment from an off-site facility without Uniform Hazardous Waste Manifests and LDR Notification Forms, as applicable. If discrepancies are found for waste shipped to the Facility, the Permittee shall immediately return the waste to the generator.

2.6.5.2. Waste to Be Shipped Off-Site

Prior to shipping any hazardous waste off-site, the Permittee shall characterize the waste as necessary for treatment and disposal and to ensure proper packaging, labeling, marking, and placarding in accordance with the Department of Transportation regulations at 49 C.F.R. Parts 172, 173, 178, and 179.

2.6.5.3. Remediation Waste

The Permittee shall characterize remediation waste (as defined at 40 C.F.R. § 260.10) in compliance with all waste characterization requirements in this Permit. The characterization information shall be included in the Operating Record, shall be maintained as required under Permit Section 1.23.2, and include at a minimum: a hazardous waste determination, an identification of all applicable hazardous waste numbers, a LDR status determination, the origin

of the waste and how it was subsequently managed, the time and circumstances of the release that created the waste, and any investigation or other reports describing the release.

2.6.5.4. Additional Characterization Requirements for Containerized Waste

The Permittee shall characterize hazardous wastes placed inside containers, including over packed drums, to ensure that the wastes do not react dangerously with, decompose, or ignite sorbent material in the container, in compliance with 40 C.F.R. § 264.316(c), and to ensure that the wastes are not incompatible or reactive with one another, in compliance with 40 C.F.R. § 264.316(d) and § 264.316(e). The Permittee shall characterize laboratory packs, if they are intended to undergo the alternative treatment standards at 40 C.F.R. § 268.42(c), to determine whether they contain any prohibited hazardous wastes.

2.6.6. Records of Waste Characterization

The Permittee shall record and maintain in the Operating Record the results of waste analyses and waste determinations performed by acceptable knowledge, and sampling and analysis, as specified in this Permit Part (2) in compliance with 40 C.F.R. §§ 264.73(b)(3), (b)(7), (b)(10), (b)(15), and (b)(16), and copies of notices and certifications required in Permit Sections 2.7.2.1 and 2.7.2.2. The requirement to record and maintain in the Operating Record the results of waste analyses, waste determinations, and copies of notices and certifications applies to solid wastes even when the hazardous characteristic is removed prior to disposal, or when waste is excluded from the definition of hazardous or solid waste under 40 C.F.R. § 261.2 through § 261.6, or exempted from Subtitle C regulation, subsequent to the point of generation. [40 C.F.R. § 268.7(a)(8)].

2.7. WASTE MANAGEMENT

2.7.1. Authorized Wastes and Waste Sources

2.7.1.1. Permitted Waste

The Permittee shall not treat at the OD Unit any wastes not included in the *List of Authorized Hazardous Wastes* under Permit Attachment B.

2.7.1.2. Prohibited Waste

The Permittee shall not treat any radioactive or mixed waste, any waste containing polychlorinated biphenyls, or any other wastes not listed in the *List of Authorized Hazardous Wastes* contained in Permit Attachment B. The Permittee shall not treat hazardous wastes by any other means not authorized by this Permit.

2.7.1.3. Waste from Foreign Sources

The Permittee shall not accept hazardous wastes from a foreign source (a hazardous waste source outside the United States).

2.7.1.4. Waste from Off-site Sources

The Permittee shall receive from off-site sources only hazardous waste that are to be treated at the OD Unit and only if such receipt is in compliance with the requirements of this Permit. The

Permittee shall receive for treatment at the OD Unit only the hazardous wastes listed in Permit Attachment B (*List of Authorized Hazardous Wastes*) and only from the sources listed in Table 2-1 of this Permit Part.

2.7.1.5. Incompatible Wastes

Incompatible wastes shall not be managed at the OD Unit.

2.7.2. Provisions for Complying with LDR Requirements

The Permittee shall comply with the restrictions for land disposal at 40 C.F.R. Part 268.

The Permittee shall not arrange for the disposal at an off-site land disposal facility any hazardous waste restricted from land disposal under 40 C.F.R. Part 268, unless:

1. The waste meets treatment standards specified in 40 C.F.R. § 268.40, § 268.41, § 268.42, or § 268.43; or
2. A variance from the treatment standards has been granted pursuant to 40 C.F.R. § 268.44.

This Permit does not authorize land disposal of hazardous waste at any location at the Facility.

2.7.2.1. Generator Requirements

Generators of hazardous waste must determine, based on the characteristics of the waste at the point of generation, if the waste must be treated before it can be land disposed.

Generators are required to send a one-time written notice to the Facility for the treatment of hazardous waste at the OD Unit for each exact type of waste stream. This includes the Permittee as a "generator" of waste to be treated at the OD Unit. A copy of the one-time notice shall be maintained at the EM Branch Office. The notice shall include:

1. The applicable EPA Hazardous Waste Numbers and the manifest number of the initial shipment;
2. A statement that the waste is subject to LDRs;
3. The UHCs and their concentrations in the wastes, if any;
4. The applicable treatability group category (normally as a non-wastewater);
5. Waste code subdivisions based on waste-specific criteria, if appropriate; and
6. Waste analysis data, if appropriate.

For wastes that do not meet treatment standards, the one-time written notice shall include the generator paperwork requirements information referenced in 40 C.F.R. § 268.7(a)(2).

For wastes that meet treatment standards at the original point of generation, the one-time notice shall include the generator paperwork regulatory requirements information and the certification statement referenced in 40 C.F.R. § 268.7(a)(3).

All of the supporting data used to determine that a waste is restricted from land disposal, either based on acceptable knowledge of waste generation processes or on sampling and analysis of the waste, shall be retained at the EM Branch Office, as required in 40 C.F.R. § 268.7(a)(6).

2.7.2.2. Treatment Facility Requirements

Treatment residues generated at the OD Unit are subject to LDR requirements, as well as other applicable requirements in 40 C.F.R. Parts 261-263 and this Permit.

If an analysis indicates that a treatment residue does not fully meet the treatment standards for hazardous waste in 40 C.F.R. § 268.40 and universal treatment standards of 40 C.F.R. § 268.48, the residue shall be sent to an offsite facility for additional treatment, including any necessary treatment of UHCs to meet the applicable standards, and disposal. The Permittee must comply with the notice and certification requirements in accordance with 40 C.F.R. § 268.7(b)(5) as well as Permit Section 2.6.5.2 and any other applicable requirements of this Permit. Untreated waste that is a result of kick-out may be collected and retreated at the OD Unit.

If analysis indicates that a treatment residue meets the treatment standards, it shall be sent offsite for disposal. In accordance with 40 C.F.R. § 268.7(b)(3) and (4), a notification and certification signed by an authorized representative shall be submitted to the offsite treatment facility with the initial shipment of treatment residue.

If a waste is determined to be no longer hazardous, a one-time notification and certification shall be placed in the files at the EM Branch Office, as required by 40 C.F.R. § 268.9(d). The notification and certification shall be updated if the process or operation generating the waste changes and/or if the Subtitle D facility receiving the waste changes. The notification shall include:

1. The name and address of the Subtitle D facility receiving the waste shipment; and
2. A description of the waste (e.g., the treatment residue) as initially generated, including EPA Hazardous Waste Number(s), treatability group(s), and UHCs.

An authorized Facility representative shall sign the certification.

2.8. WASTE MINIMIZATION

The Permittee shall submit to the Department a report annually by December 1, for the year ending the previous September 30, certifying that the Permittee has a program in place to reduce the volume and toxicity of all hazardous wastes that are generated by the Facility to the degree determined to be economically practicable, and that the proposed method of treatment is the practicable method currently available to the Permittee which minimizes the present and future threat to human health and the environment [see 40 C.F.R. § 264.73(b)(9)]. This certified report must include these items:

1. Any written policy or statement that outlines goals, objectives, and methods for source reduction and recycling of hazardous waste at the Facility;
2. Any employee training or incentive programs designed to identify and implement source reduction and recycling opportunities for all hazardous wastes;
3. Any source reduction or recycling measures implemented in the last five years or planned for the near future;

4. An itemized list of the dollar amounts of capital expenditures (plant and equipment) and operating costs devoted to source reduction and recycling of hazardous waste;
5. A discussion of factors that have prevented implementation of source reduction or recycling;
6. Sources of information on source reduction or recycling received at the Facility (e.g., local government, trade associations and suppliers);
7. An investigation of additional waste minimization efforts that could be implemented at the Facility, which investigation shall analyze the potential for reducing the quantity and toxicity of each waste stream through production process change, production reformulation, recycling, and all other appropriate means, including an assessment of the technical feasibility, cost, and potential waste reduction for each option;
8. A flow chart or table detailing all hazardous wastes the Facility produces, by quantity and type, and by building or area, and program if consistent with security considerations; and
9. A demonstration of the need to use those processes which produce a particular hazardous waste due to a lack of alternative processes, available technology, or available materials that would produce less volume of hazardous waste.

The Permittee shall include the report in the Operating Record.

2.9. IMPERMISSIBLE DILUTION

The Permittee shall not dilute a restricted waste as a substitute for treatment. [40 C.F.R. § 268.3]. Impermissible dilution to avoid an applicable treatment standard includes, but is not limited to, the addition of solid waste to reduce a hazardous constituent's concentration, or an ineffective treatment method that does not destroy, remove, or permanently immobilize hazardous constituents. Aggregating or mixing wastes as part of a legitimate treatment process are not considered impermissible dilution for purposes of this Permit requirement.

2.10. DUST SUPPRESSION

The Permittee shall not use waste or used oil or any other material which is contaminated with dioxin, polychlorinated biphenyls (PCBs), or any other hazardous waste, other than a waste identified solely on the basis of ignitability, for dust suppression or road treatment. [40 C.F.R. § 266.23(b)].

2.11. IGNITABLE AND REACTIVE WASTES

The Permittee shall take precautions to prevent accidental ignition or reaction of ignitable or reactive wastes, as required by 40 C.F.R. § 264.17.

Ignitable or reactive wastes shall be located at least 50 feet from the boundary of the OD Unit at all times and shall be protected from any sources of ignition, such as open flames, or reaction with other wastes or products, and shall be separated and protected from welding activities, hot surfaces, frictional heat, and sources of sparks.

Only containers made of or lined with materials that will not react with and are otherwise compatible with the waste to be managed shall be used to contain waste.

2.12. AIR EMISSIONS FROM THE OD UNIT

The Permittee shall comply with all air emission limitations and air monitoring requirements for the OD Unit set forth in the air quality permit for the OD Unit issued by the City of Albuquerque Environmental Health Department and as required by Permit Section 3.3. The Permittee shall also comply with the applicable requirements of 40 C.F.R. Part 264, Subpart BB. The Permittee shall maintain all records relating to the air quality permit in the Operating Record for the Facility.

2.13. OFF-SITE SHIPMENTS

Prior to shipping any hazardous waste off-site, the Permittee shall comply with all applicable generator requirements at 40 C.F.R. Part 262, as required by 40 C.F.R. §§ 262.10(h) and 264.71(c).

2.14. STORAGE OF RESTRICTED WASTE

The Permittee shall comply with 40 C.F.R. Part 268, Subpart E for any storage of hazardous waste restricted from land disposal under 40 C.F.R. Part 268, Subpart C.

2.15. MANIFEST SYSTEM

The Permittee shall comply with the manifest requirements of 40 C.F.R. § 264.71 and § 264.72. With the exception of waste shipments from conditionally exempt small quantity generators, the Permittee shall not accept for treatment any hazardous waste from an off-site source without an accompanying manifest.

If the Permittee accepts any hazardous wastes for treatment from an off-site facility without an accompanying manifest, if required, or without an accompanying shipping paper as described in 40 C.F.R. § 264.76, the Permittee shall prepare and submit an Unmanifested Waste Report to the Department within 15 calendar days after receiving the waste. The report shall include the following.

1. EPA identification number, name, and address of the off-site facility;
2. The date the Facility received the waste;
3. EPA identification number, name, and address of the generator and transporter;
4. A description and the quantity of each unmanifested hazardous waste received;
5. The method of treatment for each hazardous waste;
6. The certification signed by an authorized representative of the Facility; and
7. An explanation of why the waste was unmanifested, if known.

2.16. BIENNIAL REPORT

The Permittee shall prepare and submit to the Department two copies of a biennial report by March 1 of each even numbered year, as required by 40 C.F.R. § 264.75. The report shall document Facility activities during the previous calendar year and shall include.

1. EPA identification number, name, and address of the Facility;
2. The calendar years covered by the report;

3. A description and the quantity of each hazardous waste type the Facility received or generated that year;
4. The method of treatment for each hazardous waste type;
5. A description of the efforts undertaken during the year to reduce the volume and toxicity of waste generated;
6. A description of the changes in volume and toxicity of waste actually achieved during the year in comparison to previous years to the extent such information is available for the years prior to 1984; and
7. Treatment notices and their certifications signed by responsible Facility representatives.

2.17. LIABILITY INSURANCE REQUIREMENTS

Pursuant to 40 C.F.R. § 264.140(c), as a Federal entity, the Permittee is exempt from the requirement to have and to maintain liability coverage for sudden and accidental occurrences as specified at 40 C.F.R. § 264.147(a).

2.18. INCAPACITY OF OWNERS OR OPERATORS, GUARANTORS, OR FINANCIAL INSTITUTIONS

Pursuant to 40 C.F.R. § 264.140(c), as a department of the federal government, the Permittee is exempt from the requirement to notify the Department of the commencement of bankruptcy as specified at 40 C.F.R. § 264.148.

2.19. DISCLOSURE STATEMENT

Pursuant to NMSA 1978, § 74-4-4.7(F)(1), as a department of the federal government, the Permittee is not required to file a disclosure statement.

2.20. ADDITIONAL REPORTS

In accordance with the requirements of 40 C.F.R. § 264.77, the Permittee shall also report the following to the Department.

1. Releases of hazardous waste, hazardous constituents or contaminants, or any fires at or within 0.25 mile of the OD Unit or any SWMU or AOC,
2. Manifest discrepancies that cannot be resolved within 15 calendar days after receiving the waste,
3. Occurrences, if any, when hazardous waste is transported to the OD Unit in a container in noncompliance with regulatory requirements and the requirements of this Permit,
4. Treatment unit closures (40 C.F.R. §§ 264.77(b) and 264.115).

Table 2-1 **Off-Site Generators**
New Mexico State Police
Albuquerque Police Department
Bernalillo County Sheriff's Office
Sandia National Laboratories/New Mexico
Kirtland Air Force Base
University of New Mexico
New Mexico Institute of Mining and Technology

Figure 2-1

PERMIT PART 3: OPEN DETONATION UNIT

3.0 INTRODUCTION

This Permit Part (3) contains requirements that set forth the authorized waste types and maximum quantities of hazardous waste allowed to be treated at the Open Detonation (OD) Unit. It also contains other requirements, including those related to the design, construction, and operation of the Unit, and soil and groundwater monitoring.

3.1. AUTHORIZED WASTE AND MAXIMUM QUANTITY OF WASTE

The Permittee shall not treat more than 1,500 lbs of wastes per treatment event, 18,000 lbs per calendar year, or 180,000 lbs for the term of the Permit. The Permittee shall not treat more than the above quantities, except in case of an emergency and only after authorization by the Department. The Permittee shall not treat any wastes that are not authorized under Permit Attachment B.

3.2. DESIGN, CONSTRUCTION, OPERATION, AND MAINTENANCE

3.2.1. General Requirements

The Permittee shall design, construct, operate, and maintain the OD Unit in accordance with the requirements of this Permit to minimize noise and the possibility of an accidental fire, explosion, or any sudden or nonsudden release of hazardous waste or hazardous constituents into air, soil, sediment, surface water, or groundwater which could threaten human health or the environment, as required by 40 C.F.R. §§ 264.31 and 264.601.

The Permittee shall mark the boundary of the OD Unit with signs or structures such that the boundary is clearly discernible.

3.2.2. Run-Off and Run-On Controls

The Permittee shall design, construct, operate, and maintain run-off control systems (protective berm) at the OD Unit to prevent precipitation run-off from leaving the Unit and the migration of hazardous waste or hazardous constituents off-Unit, as required by 40 C.F.R. § 264.601(b).

The Permittee shall design, construct, operate, and maintain run-on control systems (protective berm) at the OD Unit to prevent precipitation from entering the Unit as overland run-on, as required by 40 C.F.R. § 264.601(b).

3.2.3. Restrictions on Operations

3.2.3.1. Hours of Operation

The Permittee shall conduct treatment operations only between sunrise and sunset, except in an emergency [see 40 C.F.R. § 264.1(g)(8)(i)(D)]. If the Permittee conducts treatment operations in response to an emergency before sunrise or after sunset on a given day, the Permittee shall notify the Department of this fact in writing within 3 days of conducting such treatment.

3.2.3.2. Weather Conditions

Treatment operations shall not be conducted during adverse climatic conditions. Operations shall not be conducted if lightning is within 10 miles (16 kilometers) of the OD Unit, when the cloud ceiling is less than 1,000 feet or when visibility is less than five miles.

The Permittee shall not conduct treatment operations when wind speed exceeds 15 miles per hour (24 kilometers per hour).

The Permittee shall not conduct treatment operations when a thunderstorm is imminent or within 10 miles (16 kilometers) of the OD Unit, or during a snowstorm, a dust storm, or sandstorm.

3.2.3.3. Range Fire

The Permittee shall not conduct treatment operations when extreme fire hazard conditions exist or if a range fire has the potential to reach the boundary of the Explosive Ordnance Disposal (EOD) Range.

3.2.3.4. Other Restrictions

Wastes shall be treated promptly upon transport to and acceptance at the OD Unit.

The Permittee shall cease treatment operations immediately upon the discovery of an unsafe situation including but not limited to an aircraft in dangerous proximity to the EOD Range or loss of communication with the EOD Shop.

The Emergency Coordinator (EC) shall remain on site at the personnel bunker for the duration of the treatment operation.

Waste shall not be stored at the OD Unit and shall be present at the Unit only during a planned treatment operation.

If a treatment event at the OD Unit is aborted, the waste shall be immediately sent back to the generator.

The maximum extent of hazardous waste operations at the OD Unit shall be confined to the OD Unit.

3.2.4. Operation Safety

3.2.4.1. Personnel Safety

When escorted visitors are present to observe treatment operations, there shall be at least one EOD Technician or Specialist present for every three visitors.

The Permittee shall not conduct treatment operations if unauthorized personnel are within 1500 feet of the OD Unit. The Permittee shall ensure that at least two authorized persons are present during any treatment operation.

Following a treatment operation, no personnel shall enter the OD Unit until the explosive ordnance Team Chief/Range Safety Officer determines that it is safe to enter.

3.2.4.2. Safety Precautions

The Permittee shall conduct all treatment operations in accordance with all the safety precautions required by this Permit.

3.2.5. Maintenance

3.2.5.1. Accumulated Precipitation

The Permittee shall not allow standing water in any pit (crater). The Permittee shall remove any standing water within 24 hours after a precipitation event, or within 24 hours of when impassible access roads become passable should inclement weather preclude access to the OD Unit. The Permittee shall analyze any water removed from the OD Unit to determine whether it is a hazardous waste in accordance with the *Waste Analysis Plan* (Permit Attachment C), and shall manage it appropriately.

3.2.5.2. Untreated Waste (Kick-Out) and Treatment Residues

Within 24 hours after each treatment operation, the Permittee shall inspect the entire OD Unit area for untreated waste (kick-out) or treatment residues (such as shrapnel, metal fragments) originating from treatment operations. This inspection shall be conducted only after it has been determined that it is safe for the purpose of conducting inspections. Any untreated waste or treatment residues shall be placed in appropriate containers and managed as hazardous waste or solid waste, as appropriate. Kick-out and treatment residues shall not be stored at the OD Unit.

3.3. AIR MONITORING

The Permittee shall evaluate the potential impact of the air pollutants on human health before, during, and after treatment operations by screening and assessment, in compliance with 40 C.F.R. § 264.601(c)(5). The Permittee shall not proceed with a treatment event if meteorological conditions or ambient air quality conditions do not meet the requirements of the City of Albuquerque air quality permit for the OD Unit and the requirements of this Permit Part.

The Permittee shall specify in an annual sampling and analysis report on air quality the types and schedules of air monitoring required by the Albuquerque Environmental Health Department, and the instrumentation required. The Permittee shall submit this report to the Department and include in the report any air monitoring data from the previous calendar year, and estimated monthly emissions based on the amounts of waste treated. The report is due by March 31 of each calendar year.

3.4. SOIL MONITORING AND HUMAN RISK SCREENING

The Permittee shall conduct an annual soil sampling and analysis program in accordance with Permit Attachment D, and as required by 40 C.F.R. § 264.601(b).

In order to monitor soil contamination resulting from open detonation operations at the OD Unit, the Permittee shall implement the *Soil Sampling and Analysis Plan* (SSAP), which is described in Permit Attachment D.

Installation of monitoring wells and subsequent groundwater sampling and analysis protocol will be accomplished as part of the OD Unit closure activities, in accordance with Attachment H, Closure Plan for Open Detonation Unit.

3.6. ORGANIC AIR EMISSIONS REQUIREMENTS

This Permit Section contains requirements for air emissions.

3.6.1. Additional Waste Characterization Requirements for Air Emissions

The Permittee shall characterize hazardous waste to ensure compliance with applicable emission requirements of 40 C.F.R. Part 264, Subpart BB.

3.6.2. Equipment Containing or Contacting Hazardous Waste

Each piece of equipment that contains or contacts hazardous wastes with organic concentrations of at least 10 percent by weight shall be marked in such a manner that it can be distinguished readily from other pieces of equipment in accordance with 40 C.F.R. § 264.1050(d).

Pursuant to 40 C.F.R. § 264.1050(f), equipment that contains or contacts hazardous waste with an organic concentration of at least 10 percent by weight for less than 300 hours per calendar year is excluded from the requirements of 40 C.F.R. §§ 264.1052 through 264.1060 if it is identified, as required in 40 C.F.R. § 264.1064(g)(6). Such equipment shall be identified in writing in a log that shall be kept with the Operating Record in accordance with 40 C.F.R. § 264.1064(g)(6). The information required pursuant to 40 C.F.R. § 264.1064(k)(1), (2), (3) shall also be recorded in a log that is kept with the Operating Record.

The Permittee shall comply with all applicable requirements of 40 C.F.R. §§ 264.1052 through 264.1060 for any equipment that contains or contacts hazardous waste with an organic concentration of at least 10 percent by weight for 300 or more hours per calendar year. The log shall note the total time elapsed that any equipment contains or contacts hazardous waste with an organic concentration of at least 10 percent by weight.

3.7. PRE-TREATMENT PREPARATION

Prior to a treatment operation, upon arrival at the OD Unit, an inspection of the OD Unit shall be conducted. The range flag shall be raised. The Team Chief shall then identify the designated EC and brief other EOD team members and escorted visitors (if present) on the treatment operation to be performed, required safety precautions, emergency procedures, and instruct all those present to be watchful for unsafe conditions at all times.

3.8. TRANSPORTATION OF WASTE TO THE OD UNIT AND CONTAINER SPECIFICATIONS

Hazardous wastes shall be packaged for transport to the OD Unit in appropriate containers that provide protection equivalent to U.S. Department of Transportation (DOT)-authorized containers. Appropriate containers include:

- Reinforced ammunition containers;
- Strong fiberboard boxes; or
- Strong, cleated wooden boxes.

Waste to be treated shall be transported to the OD Unit only on the day of the planned treatment event. Waste containers shall be secured to the vehicle during transport. Vehicles transporting hazardous wastes for treatment shall bear the appropriate "Explosives" placard and/or other necessary placards at the front, on both sides, and at the rear of the vehicle. These signs may be covered or removed when the vehicle no longer carries the hazardous wastes. Each transport vehicle shall, at minimum, carry one ABC-type portable fire extinguisher that is in operational

condition. Each transport vehicle shall have equipment to communicate with the KAFB Command Post and the emergency coordinator.

3.9. WASTE STAGING

Hazardous wastes shall only be transported to the OD Unit and unloaded and staged for treatment by appropriately trained EOD personnel. Wastes shall be treated as soon as possible after arrival at the OD Unit, provided the requirements of this Permit are met.

Outer waste containers are to be removed, and the waste placed into a pit (crater) for treatment by qualified EOD personnel. Outer containers may be returned to the generator for reuse. Outer and inner containers shall be managed appropriately as waste if not reusable.

If waste is placed in the OD Unit for treatment and site conditions are deemed unsafe to treat the waste, the waste shall be immediately removed and sent back to the generator.

3.10. WASTE TREATMENT

Prior to the treatment of hazardous waste, the Team Chief shall ensure that the EOD Range is clear of unauthorized personnel, that aircraft are not approaching, and that unauthorized vehicles and persons are not within or in the vicinity of the EOD Range as required under Section 3.2.4.1 of this Permit Part. The Team Chief shall also ensure that all persons at the EOD Range have relocated to the personnel bunker. In addition, the Team Chief shall obtain wind-speed information at or near the personnel bunker. The Team Chief shall also ensure that treatment operations comply with all restrictions in this Permit, including Permit Section 3.2.3.

Treatment of waste in the OD Unit shall be performed using explosives to countercharge the hazardous waste. Ignition of the explosives shall be done from the personnel bunker.

3.11. POST TREATMENT

After a treatment operation, the Permittee shall comply with the requirements of Permit Section 3.2.5.2, Permit Section 2.2, Permit Section 2.6.5.2, and any other requirement of this Permit applicable to post-treatment of waste.

The EOD Team Chief or his designee shall be responsible for clearing any misfires, should one occur. In such an event, a second qualified person shall serve as a safety backup for the EOD Team Chief.

If complete destruction of hazardous wastes is not achieved at the OD Unit, these wastes shall be treated again or shall be removed for appropriate treatment and disposed of at an off-site facility.

PERMIT PART 4: CLOSURE

4.0 GENERAL CLOSURE REQUIREMENTS

After receipt of the last hazardous waste to be treated at the OD Unit, or if required to cease operations as specified in Permit Section 1.10 and Permit Section 4.4, the Permittee shall close the OD Unit following the procedures described in the *Closure Plan* (Permit Attachment H), this Permit, and as required by 40 C.F.R. § 264.111.

4.1. SUBMITTAL OF REVISED CLOSURE PLAN

The Permittee shall submit to the Department for approval a revised Closure Plan within 60 days after discovering that a revised Closure Plan is required in accordance with this Permit, or the regulations at 40 C.F.R. § 264.112(c), or within 60 days after receiving written notification by the Department whichever is earlier. The Permittee shall amend the Closure Plan whenever changes in circumstances necessitate a modification of the Closure Plan, as required by 40 C.F.R.
§ 264.112(c). The Permittee shall amend the Closure Plan for any other reasons set forth in 40 C.F.R. 264.112(c) or if there are changes in state law that affect the Closure Plan. The Permittee shall comply with all the requirements of 40 C.F.R. 264.112(c) in amending the Closure Plan.

When amending or revising the Closure Plan, the Permittee shall submit to the Department for approval detailed, and as necessary, updated procedures and methods describing the procedures and sampling methods to verify removal of all structures and equipment and removal of treatment residues and any hazardous or solid wastes. At a minimum, the Permittee shall include in the revised Closure Plan:

1. Unit history and description, identifying, at a minimum, the following:
    a. Constituents of concern, including all hazardous waste and hazardous constituents managed at the Unit, listed by category of constituent subject to the same sampling methods,
    b. Spills or other releases of hazardous waste and hazardous constituents during operation of the Unit, and
    c. Visible staining or other conditions indicating potential release locations;
2. Proposed procedures for removal of all structures and equipment;
3. Proposed sample locations;
4. Sample methods, equipment, and procedures;
5. Analytes and analytical methods;
6. Detection limits;
7. QA/QC procedures; and
8. Sample management and preservation procedures.

4.2. CLEAN CLOSURE

The Permittee shall close the OD Unit by removing all hazardous waste residues and hazardous constituents and all structures and equipment from the OD Unit and demonstrating that no unacceptable risk to human health and the environment exists in soil or groundwater at the OD Unit clean closure).

4.3. However, if the OD Unit cannot be clean closed, post-closure care is required (see permit Part 5) the Closure Plan shall be amended in accordance with Permit Section 4.1, and corrective action shall be immediately implemented to remediate contamination to protect human health and the environment pursuant to the requirements of Permit Part 6. Closure of the OD Unit will not be approved by the Department while corrective action is required for the OD unit. NOTIFICATION OF CLOSURE

The Permittee shall notify the Department in writing at least 45 calendar days prior to the date on which it expects to begin closure of the OD Unit, as required by 40 C.F.R. § 264.112(d).

4.4. TIME ALLOWED FOR CLOSURE

Within 90 calendar days after the final volume of hazardous waste is received at the OD Unit, the Permittee shall remove all treatment residues and all other hazardous and solid waste from the Unit. The waste shall be sent to an off-site permitted treatment or disposal facility, as applicable. The Permittee shall complete closure activities for the OD Unit following the schedule and requirements set forth in the Closure Plan, Permit Attachment H, and as required by this Permit Part. \

If this Permit is terminated, or if the Facility is otherwise ordered, by judicial decree or final order under the HWA or § 3008 of RCRA, to cease treating hazardous wastes or to close the OD Unit, then the Permittee shall close the Unit in accordance with the deadlines established in 40 C.F.R. § 264.113.

4.5. DISPOSAL/DECONTAMINATION OF EQUIPMENT, STRUCTURES, AND SOILS

The Permittee shall remove and dispose of all equipment and structures, and shall decontaminate soil, as specified in the Closure Plan, Permit Attachment H. [40 C.F.R. § 264.114].

4.6. MANAGEMENT OF REMEDIATION WASTE

By removing hazardous waste or hazardous constituents or contaminated media during closure activities, the Permittee becomes a generator of hazardous waste, and shall manage that waste in accordance with all applicable requirements of 40 C.F.R. Part 262.

4.7. CERTIFICATION OF CLOSURE

Within 60 calendar days from the date of completion of closure of the OD Unit, the Permittee shall submit to the Department a final closure report and written certification signed by the Permittee and an independent professional engineer registered in the State of New Mexico, that the OD Unit was closed as required by the procedures specified in the Closure Plan (Permit Attachment H) and this Permit. [40 C.F.R. § 264.115].

4.8. FINANCIAL RESPONSIBILITY

4.8.1. Cost Estimate for Closure

Pursuant to 40 C.F.R. § 264.140(c), as a department of the federal government, the Permittee is exempt from the requirement to provide a cost estimate for closure as specified at 40 C.F.R. § 264.142.

4.8.2. Financial Assurance for Closure

Pursuant to 40 C.F.R. § 264.140(c), as a department of the federal government, the Permittee is exempt from the requirement to submit a signed duplicate original of the closure financial assurance instrument as specified at 40 C.F.R. § 264.143.

PERMIT PART 5: POST CLOSURE

5.0 POST-CLOSURE CARE

If the OD Unit cannot be clean closed pursuant to Permit Section 4.2, then the OD Unit shall be subject to the requirements of 40 C.F.R 264.603 for post-closure care. If post-closure care is required, the Permittee shall submit a post-closure care permit application to the Department with 180 days of the Department's approval of closure of the OD Unit.

PERMIT PART 6: CORRECTIVE ACTION

6.0 INTRODUCTION

Pursuant to § 3004(u) and (v) of RCRA, 42 U.S.C. § 6924(u) and (v); NMSA 1978, § 74-4-4.2(B) and 40 C.F.R. Part 264, Subparts F and G, the Permittee shall implement corrective action as necessary to protect human health and the environment from all releases of hazardous waste or hazardous constituents from operating or closed hazardous waste management units, and from any releases of hazardous waste or hazardous constituents from any Solid Waste Management Unit (SWMU) or Area of Concern (AOC) at the Facility.

6.1. GENERAL PROVISIONS

6.1.1. Offsite Access

To the extent any requirement of this Permit, including any work plan approved under this Permit, requires access to property not owned or controlled by the Permittee, the Permittee shall use its best efforts to obtain access from the present owners of such property to conduct required activities. In the event that access is not obtained when necessary, the Permittee shall immediately notify the Department in writing regarding its best efforts and its failure to obtain such access.

6.1.2. Field Activities

The Permittee shall notify the Department in writing of any field sampling or other field activities undertaken pursuant to any work plan or requirement of this Permit, and shall provide the Department the opportunity to collect split samples upon request by the Department. For such sampling or other field activities, the Permittee shall provide the Department with as much advance notice as is practicable, but no less than 15 days prior to the conduct of such sampling.

The Permittee shall notify the Department in writing a minimum of 15 days prior to the implementation of any work plan required under this Permit. Notification of sampling or other field activities may be made by email, fax, or letter.

6.1.3. Record Preservation

Until 10 years after the Permittee's receipt of the Department's written notice that corrective action has been completed for all SWMUs and AOCs listed on Table I-3 of Permit Attachment I, the Permittee shall maintain all records, documents, data, and other information that are required to be prepared under this Permit for corrective action.

6.1.4. Releases Beyond Facility Boundary

The Permittee shall notify the Department orally, within 24 hours of discovery, of any release of hazardous waste or hazardous constituent that has the potential to migrate beyond the Facility boundary or has migrated beyond the Facility boundary.

In the event that a hazardous waste or a hazardous constituent migrates beyond the Facility boundary, the Permittee shall implement corrective actions beyond the Facility property boundary as necessary to protect human health and the environment, unless the Permittee can

demonstrate to the Department that, despite the Permittee's best efforts, the Permittee is unable to obtain the necessary permission to undertake such actions. The Permittee is not relieved of any responsibility to clean up a release that has migrated beyond the Facility boundary where offsite access has been denied. On-site measures to address such releases will be determined on a case-by-case basis and will be subject to the approval of the Department.

6.1.5. Work Plans and Other Deliverable Documents

All work plans, schedules, reports, and other deliverable documents that the Permittee is required to prepare under this Part (6) shall be submitted to the Department for review and approval as detailed in Permit Section 1.38.

6.1.6. Quarterly Progress Reports

The Permittee shall submit to the Department quarterly reports summarizing all corrective action activities conducted pursuant to this Permit by January 31, April 30, July 31, and October 31 of each year. Each report shall summarize the corrective action activities for the quarter (i.e., 3 month time period) ending the month preceding the due date of the report. The content of these reports shall include the information specified in Permit Section 6.2.4.1.

6.1.7. Lists of SWMUs and AOCs and Annual Reporting of Outdoor Activities

Plate 1 is a map showing the locations of SWMUs and AOCs at the Facility. Corrective action is required for all SWMUs and AOCs identified in Table I-3 of Permit Attachment I. Table K-1 of Permit Attachment K contains a listing of all SWMUs and AOCs for which the Department has determined that corrective action is complete without controls.

Given the need to monitor current and future activities that could lead to creation of new SWMUs and AOCs, the Permittee shall submit to the Department an annual report containing a brief summary of outdoor testing and training activities. The report shall list the name, location, and a general description of the type or types of testing (e.g., firing site, explosives testing, drop testing, burn testing) and training conducted at each outdoor area. The first annual report shall be submitted to the Department within 90 days of the effective date of this Permit; subsequent reports shall be submitted annually thereafter by March 31 of each year.

6.1.8. Newly discovered SWMUs, AOCs, and Releases

The Permittee shall notify the Department orally, within 24 hours of discovery, of any newly identified SWMU or AOC. Within 15 days after the discovery of any newly identified or suspected SWMU or AOC, the Permittee shall notify the Department in writing of such discovery. The notification shall include, at a minimum, the location of the SWMU or AOC and all available information pertaining to the nature of any release of contaminants from the SWMU or AOC, including the contaminants that were released, the magnitude of the release, and the media affected by the release.

Within 90 days after submitting such written notification, the Permittee shall submit to the Department for approval a SWMU Assessment Report (SAR) for each newly identified or suspected SWMU or AOC. At a minimum, the report shall provide the following information, to the extent available:

1. Location of each newly identified or suspected SWMU or AOC on a topographic map of appropriate scale;
2. Designation of type and function of each newly identified or suspected SWMU or AOC;
3. General dimensions, capacities and structural description of each newly identified or suspected SWMU or AOC (including any available plans and drawings);
4. Dates of operation for each newly identified or suspected SWMU or AOC;
5. Identification of all wastes that have been managed at or in each newly identified or suspected SWMU or AOC, including any available data on hazardous constituents in the waste; and
6. All available information pertaining to any release of contaminants from each newly identified or suspected SWMU or AOC, including analytical data for groundwater, soil, sediment, rock, air, and surface water.

Based on the results of the report and any other relevant information, the Department will determine the need for further investigations at the SWMUs or AOCs covered in the report, including the need for an investigation report. The Department may also require corrective measures of the SWMU or AOC, based on a finding that releases of contaminants have occurred, are occurring, or are likely to occur.

Within 15 days after the discovery of any previously unknown release of a contaminant into soil, sediment, surface water, or groundwater, the Permittee shall notify the Department in writing of such discovery. Based on the results of the report and any other relevant information, the Department may determine that further investigation of the release of contaminants is needed, including the need for an Investigation Report. The Department may also require corrective measures, based on a finding that releases of contaminants have occurred, are occurring, or are likely to occur from the unit.

6.1.9. Determination of Corrective Action Complete (No Further Action)

Based on the results of an Investigation Report or other relevant information, the Permittee may submit a request to the Department for a Class 3 permit modification under 40 C.F.R. § 270.42(c) to terminate corrective action for a specific SWMU or AOC. This permit modification request must contain information demonstrating that there are no releases of hazardous waste including hazardous constituents from a particular SWMU or AOC at the Facility that pose a threat to human health or the environment, as well as any additional information required in 40 C.F.R. § 270.42(c).

A determination of Corrective Action Complete shall not preclude the Department from requiring continued or periodic monitoring of air, sediment, soil, groundwater, or surface water, when site-specific circumstances indicate that releases of hazardous waste or hazardous constituents may occur or have occurred, and it is necessary to protect human health or the environment.

A determination of Corrective Action Complete shall not preclude the Department from requiring further investigations, studies, or remediation at a later date, if new information or subsequent analysis indicates a release or likelihood of a release from a SWMU or AOC at the Facility that may pose a threat to human health or the environment. In such a case, the Department may initiate a modification to the Permit according to the requirements of Permit Section 1.12.1.

6.1.10. Health and Safety Plan

The Permittee shall maintain a Facility Health and Safety Plan, which shall include:

1. A description of the Facility including availability of resources such as roads, water supply, electricity and telephone service;
2. A description of the known hazards and evaluation of the risks associated with each activity conducted, including, but not limited to, on and off-site exposure to contaminants during implementation of interim or final corrective measures, site characterization, or monitoring activities;
3. A list of key personnel and alternates who are responsible for site safety, response operations, and protection of public health;
4. A delineation of the work area;
5. A description of levels of protection to be worn by personnel in the work area;
6. Procedures established to control site access;
7. Decontamination procedures for personnel and equipment;
8. Site emergency procedures;
9. Emergency medical care procedures for injuries and toxicological problems;
10. Requirements for an environmental field-monitoring program;
11. Routine and special training requirements for responders; and
12. Procedures for protecting workers from weather-related problems.

The Facility Health and Safety Plan shall be in accordance with:

1. National Institute of Occupational Safety and Health (NIOSH) Occupation Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);
2. EPA Order 1440.1 - Respiratory Protection;
3. EPA Order 1440.3 - Health and Safety Requirements for Employees engaged in Field Activities;
4. Facility Contingency Plans included in this Permit;
5. EPA Operating Safety Guide (1984);
6. Occupational Safety and Health Administration regulations, particularly 29 C.F.R. § 1910 and 1926;
7. State and local regulations; and
8. Other applicable EPA guidance.

6.1.11. Community Relations Plan

The Permittee shall maintain a plan for dissemination of information to the public regarding investigation and remediation activities and results. The plan shall:

1. Require the creation and maintenance of an active mailing list of interested parties, to be updated annually, including those on the official mailing list in accordance with 40 C.F.R. § 124.10;
2. Require informal meetings, including briefings and workshops as appropriate, with the public and local officials before and during the corrective action process, which shall be held at least twice every calendar year for as long as corrective action is required;
3. Require that news releases, fact sheets, work plan submittals, report submittals, and publicly available quarterly progress reports that explain the progress and conclusions of investigations and clean-ups be timely posted on the Permittee's website and timely provided to interested citizen groups and the public as requested;
4. Require the creation and maintenance of a public information repository and reading room;
5. Require that public tours and briefings be conducted to inform and to listen to public concerns, and to answer questions related to environmental monitoring, characterization, and remediation;
6. Require immediate written and, if possible, oral notification to affected parties of any discovered off-site release that could impact them; and
7. Require that interested community groups be notified of and be given opportunities to observe field data gathering activities conducted during the corrective action process (notices shall specify the time and need for any required safety and security training).

6.1.12. Land Transfer

In transferring land to another entity, the Permittee shall comply with the terms of § 120(h) of CERCLA, as amended, 42 U.S.C. § 9620(h), and as implemented in 40 C.F.R. Part 373. These provisions apply to any property owned by the Permittee on which any hazardous substance was stored for one year or more, known to have been released, or disposed of, subject to the limitations of 40 C.F.R. § 373.2. Consistent with CERCLA § 120(h)(3)(A), the Permittee shall include in any deed that transfers property, the information required by CERCLA § 120(h)(3)(A)(i), the covenant required by CERCLA § 120(h)(3)(A)(ii), and the access clause required by CERCLA § 120(h)(3)(A)(iii). The Permittee may defer the requirement of § 120(h)(3)(A)(ii)(I), consistent with the terms of CERCLA § 120(h)(3)(C).

For any deed transferring title from the Permittee that contains a restriction on future land use, the Permittee shall, within 90 days of transfer of the property, notify the Department of the transfer and identify for the Department the location of the property that is the subject of the transfer.

6.1.13. Abandoned Septic Systems

In addition to the corrective action specified in this Permit, the Permittee shall close all abandoned septic systems in accordance with the Department's Liquid Waste Disposal System Regulations 20.7.3.307 NMAC.

6.2. SPECIAL REQUIREMENTS

6.2.1. Special Information Submittals

6.2.1.1. General Facility Information

The Permittee shall submit in a report to the Department, within 90 days of the effective date of this Permit, the following information:

1. Maps and tables indicating the surveyed coordinates and locations of all existing springs, wells, and surface water gaging stations;
2. Water-level contour map of known radii-of-effects from pumping of municipal and Facility supply wells;
3. Water level data presented graphically and in tabular format; and
4. Maps showing the boundaries of all Facility SWMUs and AOCs.

This report is a one-time submittal, unless new information becomes available; in that case, the report shall be updated and resubmitted at least annually by March 31 of each year for each case that new information becomes available.

6.2.1.2. Potential Human Receptors Information

The Permittee shall, within 90 days of the effective date of this Permit, submit a report to the Department describing human populations that are susceptible to contaminant exposure from the Facility. At a minimum, the following information shall be gathered and reported:

1. Local uses and possible future uses of groundwater, including:
   a). Type of use (for example., potable, domestic, agricultural, residential, industrial, municipal) and
   b). Locations of all groundwater wells, names of owners or tenants at those locations, and current use of those wells within one mile of the Facility; and
2. Human use of or access to the Facility and adjacent lands, including but not limited to recreational, residential, commercial, and industrial.

This report is a one-time submittal, unless new information becomes available; in which case, the report shall be updated and resubmitted at least annually by March 31 of each year for each case that new information becomes available.

6.2.1.3. Information on Surface Water

The Permittee shall submit a report to the Department pertaining to surface water bodies at the Facility, within 90 days of the effective date of this Permit. The report shall at minimum include:

1. A description of each surface water body, including location (Coyote Springs and associated wetlands are examples of surface water at the Facility); and
2. A description of the chemistry of the surface waters, including pH, temperature, total dissolved solids, total suspended solids, alkalinity, conductivity, dissolved oxygen, total organic carbon, and any specific contaminant concentrations.

6.2.2. Corrective Action Procedures

The corrective action process for a given SWMU or AOC begins with a site investigation to characterize any releases of contaminants. If there has been a release of hazardous waste or hazardous constituents into the environment and corrective action is necessary to protect human health or the environment from the release, corrective measures shall be conducted at the contaminated site to remove or isolate the contaminants that pose the human health or environmental risk. Verification sampling is required to determine if cleanup levels have been successfully achieved.

6.2.2.1. Site Investigations

The Permittee shall conduct a site investigation for each SWMU and AOC listed on Table I-3 of Permit Attachment I. The Department may determine that further investigation is needed at any SWMU or AOC at the Facility. If the Department determines that such further investigation is needed, it will notify the Permittee in writing.

The Permittee shall perform the site investigations only in accordance with approved Investigation Work Plans.

6.2.2.1.1. Investigation Work Plans

The Permittee shall submit to the Department for approval an Investigation Work Plan, in the format and with the content described in Permit Section 6.2.4.2, for each SWMU and AOC needing further investigation, including those listed on Table I-3 of Permit Attachment I. An individual Investigation Work Plan may cover several SWMUs or AOCs. The Investigation Work Plans shall be submitted by the date specified in the Department's written notification or in accordance with the schedule in Table I-3 of Permit Attachment I. Additional characterization required by the Department that is not already covered in an approved Investigation Work Plan, or that is not addressed during implementation of field activities conducted under an existing approved Investigation Work Plan, shall be proposed in a supplemental Investigation Work Plan submitted to the Department for approval. The supplemental Investigation Work Plan may reference a prior approved Investigation Work Plan and any corresponding Investigation Report for background information.

6.2.2.1.2. Investigation Reports

The Permittee shall submit to the Department for approval an Investigation Report, in the format and with the content described in Permit Section 6.2.4.3, that presents the results of field activities, summarizes the data collected, and presents the recommendations and conclusions of each investigation conducted pursuant to an approved Investigation Work Plan. An individual Investigation Report may cover several SWMUs or AOCs.

6.2.2.2. Corrective Measures

6.2.2.2.1. General

The Department will require corrective measures if the Department determines, based on an Investigation Report or other relevant information available to the Department, that there has been a release of hazardous waste or hazardous constituents into the environment and that corrective action is necessary to protect human health or the environment from such a release. Upon making such a determination, the Department will notify the Permittee in writing.

6.2.2.2.2. CME Work Plans

If the Department requires corrective measures, the Permittee shall submit to the Department for approval a Corrective Measures Evaluation (CME) Work Plan, in the format and with the content described in Permit Section 6.2.4.6, within 90 days of notification by the Department that a CME Work Plan is required or by such other due date as is stated in the notification. The CME Work Plan shall contain a schedule to conduct the CME. Upon approval of the CME Work Plan by the Department, the Permittee shall implement the work plan.

The CME shall evaluate potential remedial alternatives and shall recommend a preferred remedy that will be protective of human health and the environment and that will attain the appropriate cleanup levels.

6.2.2.2.3. CME Reports

The Permittee shall submit a CME Report, in the format and with the content described in Permit Section 6.2.4.7, to the Department within 90 days of completion of the CME. When the Department determines that there are no deficiencies in the CME Report, the Department will seek and consider public comment prior to selecting a remedy.

In selecting a remedy, the Department may select a remedy for a particular SWMU or AOC that encompasses several separate actions. The use of the term "remedy" refers to all such actions.

6.2.2.2.4. Cleanup Standards

The Permittee shall evaluate corrective measures and propose a preferred remedy that is capable of achieving the cleanup levels outlined in Permit Section 6.2.3 including, as applicable, any approved alternate cleanup goals established by a risk assessment.

6.2.2.2.5. Remedy Evaluation Criteria

6.2.2.2.5.1. Threshold Criteria

The Permittee shall evaluate each of the remedy alternatives against the following threshold criteria. To be selected, the remedy alternative must:

1. Be protective of human health and the environment;
2. Attain media cleanup standards within a reasonable timeframe;
3. Control the source or sources of releases so as either to reduce to the extent practicable, or to eliminate, further releases of hazardous waste or hazardous constituents that may

pose a threat to human health and the environment; and

4. Comply with applicable standards for management of wastes.

6.2.2.2.5.2. Remedial Alternative Evaluation Criteria

The Permittee shall evaluate each of the remedial alternatives for the factors described in this Permit Section (6.2.2.2.5.2). These factors shall be balanced in proposing a preferred remedy.

Long-Term Reliability and Effectiveness

The remedy shall be evaluated for long-term reliability and effectiveness. This factor includes consideration of the magnitude of risks that will remain after implementation of the remedy; the extent of long-term monitoring, or other management that will be required after implementation of the remedy; the uncertainties associated with leaving wastes in place; and the potential for failure of the remedy. The Permittee shall give preference to a remedy that reduces risks with little long-term management and that has proven effective under similar conditions.

Reduction of Toxicity, Mobility, or Volume

The remedy shall be evaluated for its effectiveness in reducing the toxicity, mobility, and volume of hazardous wastes and hazardous constituents. The Permittee shall give preference to a remedy that will more completely, permanently, and promptly reduce the toxicity, mobility, and volume of hazardous wastes and hazardous constituents.

Short-Term Effectiveness

The remedy shall be evaluated for its short-term effectiveness in reducing the toxicity, mobility, and volume of hazardous wastes and hazardous constituents. This factor includes considerations of the short-term reduction in existing risks that the remedy would achieve; the time needed to achieve that reduction; and the short-term risks that might be posed to the community, workers, and the environment during implementation of the remedy. The Permittee shall give preference to a remedy that quickly reduces short-term risks, without creating significant additional risks.

Implementability

The remedy shall be evaluated for its implementability or the difficulty of implementing the remedy. This factor includes consideration of potential installation and construction difficulties; operation and maintenance difficulties; difficulties with cleanup technology; permitting and approval requirements; and the availability of necessary equipment, services, expertise, and waste storage and disposal capacity. The Permittee shall give preference to a remedy that can be implemented quickly and easily, and poses fewer and lesser difficulties.

Cost

The remedy shall be evaluated for its cost. This factor includes a consideration of both capital costs, and operation and maintenance costs. Capital costs shall include, without limitation, construction and installation costs; equipment costs; land development costs; and indirect costs including management costs, engineering costs, legal fees, permitting fees, startup and shakedown costs, and contingency allowances. Operation and maintenance costs shall include,

without limitation, operating labor and materials costs; maintenance labor and materials costs; replacement costs; utilities; monitoring and reporting costs; administrative costs; indirect costs; and contingency allowances. All costs shall be calculated based on their net present value. The Permittee shall give preference to a remedy that is less costly, but does not sacrifice protection of human health and the environment.

6.2.2.2.6. Remedy Selection

Upon deeming the CME Report to be complete, the Department will select a proposed remedy or remedies for the SWMU or AOC. The Department may propose a different remedy from that recommended by the Permittee in the CME Report. The Department will issue a Statement of Basis for the proposed remedy, and will receive public comment on the remedy. The public comment period will extend for at least 45 days from the date of the public notice of the Statement of Basis. As provided in 20.4.1.901(A)(5)(a) through (c) and 20.4.1.901(B)(5), the Department will provide an opportunity for a public hearing on the proposed remedy, at which all interested persons will be given a reasonable chance to submit data, views or arguments orally or in writing and to examine witnesses testifying at the hearing. The comment period will automatically be extended to the close of the public hearing, if a hearing is held. The public hearing will follow the requirements under 20.4.1.901.F NMAC. The Department will select a final remedy and issue a response to public comments to all commenters, after the end of the public comment period. In selecting a remedy, the Department will follow the public participation requirements applicable to remedy selection under 20.4.1.901 NMAC and 40 C.F.R. Part 270.

6.2.2.2.7. CMI Work Plans

Within 90 days after the Department's selection of a final remedy, or as otherwise specified by the Department in writing, the Permittee shall submit to the Department for approval a Corrective Measures Implementation (CMI) Work Plan describing the design, construction, operation, maintenance, and performance monitoring for the selected remedy, and a schedule for its implementation. The CMI Work Plan shall be submitted to the Department for review in accordance with the requirements in Permit Section 1.38. Upon approval of the work plan by the Department, the Permittee shall implement the work plan.

The CMI Work Plan shall, at a minimum, include the elements found in the format provided in Permit Section 6.2.4.8.

6.2.2.2.8. Corrective Measures Implementation

The Permittee shall implement the final remedy selected by the Department according to the approved CMI Work Plan and implementation schedule.

6.2.2.2.9. Progress Reports

The Permittee shall submit to the Department progress reports in accordance with the schedule approved in the CMI Work Plan. The progress reports shall, at a minimum, include the information specified in Permit Section 6.2.4.9.

6.2.2.2.10. CMI Reports

Within 90 days after completion of a remedy, the Permittee shall submit to the Department for approval a CMI Report. The CMI Report shall include the information specified in Permit Section 6.2.4.10.

6.2.2.2.11. Accelerated Cleanup Process

6.2.2.2.11.1. General

If the Permittee identifies a corrective measure that, if implemented voluntarily, will reduce risks to human health and the environment to levels acceptable to the Department, will reduce cost or will achieve cleanup of a SWMU or AOC ahead of schedule, the Permittee may implement the corrective measure as provided in this Permit Section, in lieu of the process established in Permit Section 6.2.2.2.12.4. The accelerated cleanup process shall be used only at sites to implement presumptive remedies at small-scale and relatively simple sites where groundwater contamination is not a component of the accelerated cleanup, where the remedy is considered likely to be the final remedy for the site, and where the field work will be accomplished within 180 days of the commencement of field activities.

6.2.2.2.11.2. ACM Work Plans

The Permittee shall submit to the Department for approval a proposed Accelerated Corrective Measures (ACM) Work Plan, which shall include the following:

1. A description of the proposed remedial action, including details of the unit or activity that is subject to the requirements of this Permit;
2. An explanation of how the proposed cleanup action is consistent with the overall corrective action objectives and requirements of this Permit;
3. The sampling and analytical methods and procedures for characterization and remediation verification; and schedule for implementation and reporting on the proposed cleanup action.

The Permittee shall obtain approval of an ACM Work Plan from the Department prior to implementation of the work. The Permittee shall prepare the ACM Work Plan in accordance with the requirements of this Permit Section (6.2.2.2.11.2), and shall include a proposed implementation schedule. In accordance with Permit Section 1.38, if the Department disapproves the ACM Work Plan, the Department will notify the Permittee in writing of the work plan deficiencies and will specify a due date for submittal of a revised ACM Work Plan.

6.2.2.2.11.3. ACM Implementation

The Permittee shall implement the accelerated cleanup measure according to the approved ACM Work Plan. Within 90 days of completion of the ACM, the Permittee shall submit to the Department for approval a CMI Report that is written in a format in accordance with Permit Section 6.2.4.10. If upon review, the Department identifies any deficiencies in the CMI Report, the Department will notify the Permittee in writing and will specify a due date for submittal of a revised CMI Report.

6.2.2.2.12. Interim Measures

6.2.2.2.12.1. General

The Department may require interim measures, if the Department determines that such measures are necessary, to reduce or prevent migration of hazardous wastes or hazardous constituents that have, or may result in, an unacceptable human or environmental receptor exposure to hazardous wastes or hazardous constituents while long-term corrective action remedies are being evaluated and implemented. Upon making such determination, the Department will notify the Permittee in writing. Alternatively, the Permittee may identify the need to implement interim measures and may submit an Interim Measures Work Plan in writing to the Department for approval. The Permittee may initiate emergency interim measures without prior approval of the Department pursuant to Permit Section 6.2.2.2.12.4.

6.2.2.2.12.2. Interim Measures Work Plans

Within 60 days after receiving notification from the Department that interim measures are required, or such other period as stated in the notification, the Permittee shall submit to the Department for approval an Interim Measures Work Plan. The Interim Measures Work Plan shall include the same elements as specified in Permit Section 6.2.4.8.

6.2.2.2.12.3. Interim Measures Implementation

The Permittee shall implement the interim measures in accordance with an approved Interim Measures Work Plan and implementation schedule unless the Permittee is implementing an emergency interim measures without prior Department approval in accordance with Permit Section 6.2.2.12.4.

6.2.2.2.12.4. Emergency Interim Measures

The Permittee may determine during implementation of site investigation activities that emergency interim measures are necessary to address an immediate threat of harm to human health or the environment. The Permittee shall notify the Department within three business days of discovery of the facts giving rise to the threat, and shall propose emergency interim measures to address the threat. If the Department approves the emergency interim measures in writing, the Permittee may implement the proposed emergency interim measures without submitting an Interim Measures Work Plan. If circumstances arise resulting in an immediate threat to human health or the environment such that initiation of emergency interim measures are necessary prior to obtaining written approval from the Department, the Permittee shall notify the Department within one business day of taking the emergency interim measure. The notification shall contain a description of the emergency situation, the types and quantities of contaminants involved, the emergency interim measures taken, and contact information for the emergency coordinator who handled the situation. The notification shall also include a written statement justifying the need to take the emergency action without prior written approval from the Department.

6.2.2.2.12.5. Interim Measures Reports

Within 60 days after completion of interim measures, or as otherwise specified in the implementation schedule contained in the approved Interim Measures Work Plan, the Permittee

shall submit to the Department for approval an Interim Measures Report summarizing the results of the interim measures, that shall include copies of the results of all field screening, monitoring, sampling, analyses, and other data generated as part of the interim measures implementation. The Interim Measures Report shall include the same elements as specified in Permit Section 6.2.4.10.

6.2.3. Cleanup Levels

The Permittee shall adhere to the requirements of this Permit Section (6.2.3) for implementing and completing cleanup of groundwater, surface water, and soil at all SWMUs and AOCs at the Facility. All proposed cleanup levels will be subject to the Department's review and approval.

6.2.3.1. Cleanup Levels for Contaminants in Groundwater (other than Perchlorate)

The cleanup levels for groundwater shall be the New Mexico Water Quality Control Commission (WQCC) water quality standards (20.6.2.3103 and 20.6.2.4103 NMAC) and the drinking water maximum contaminant levels (MCLs) adopted by EPA under the Federal Safe Drinking Water Act (42 U.S.C. §§ 300f to 300j-26). If both a WQCC standard and a Maximum Contaminant Level (MCL) have been established for a contaminant, then the most stringent of the two levels shall be the cleanup level for that contaminant.

If a WQCC standard or MCL has not been established for a contaminant, the EPA Regional Screening Level (RSL) (EPA, 2009) for tap water shall be used as the cleanup level. If an RSL for tap water does not exist for a contaminant, and toxicological information is available, the Permittee shall propose a cleanup level based on a residential scenario, a total target human health excess cancer risk level of 10^{-5}, and for non-carcinogenic contaminants a HQ of one (1.0).

6.2.3.2. Cleanup Levels for Perchlorate in Groundwater

As described in Permit Section 6.4.1.4, the Permittee shall determine the nature extent, and rate of migration of any perchlorate contamination in groundwater. If the New Mexico WQCC adopts a groundwater standard for perchlorate, or if EPA adopts a MCL for perchlorate, then the standard or MCL will become the cleanup level. Pending WQCC or EPA adoption of a groundwater standard or MCL, if perchlorate is detected in groundwater at a concentration greater than or equal to 4 ug/L, the Permittee shall, through a Corrective Measures Study, propose a cleanup level based on a risk assessment using a Hazards Index of 1.0 and a residential-use scenario. The proposed cleanup level shall be subject to approval by the Department.

6.2.3.3. Cleanup Levels for Soil Contaminants (Other than PCBs and Lead)

For contaminants in soil (other than PCBs and lead), the Permittee shall propose a cleanup level based on a total human health excess cancer risk level of 10^{-5}, and for noncarcinogenic contaminants a total HQ of one (1.0) for residential land use. Alternatively, the Permittee may propose cleanup levels using the screening levels and procedures listed in the Department's most current version of "*Technical Background Document for Development of Soil Screening Levels*" (as it may be updated) for a residential land use scenario.

6.2.3.4. Cleanup Levels for Polychlorinated Biphenyls (PCBs) in Soil

For PCB contamination in soil, the Permittee shall propose a cleanup level based on the Department's Position Paper "*Risk-based Remediation of Polychlorinated Biphenyls at RCRA Corrective Action Sites*" (March 2000), as it may be updated. The soil cleanup level for PCBs is either a default concentration of 1.00 milligram per kilogram (mg/kg) or a risk-based PCB concentration level established through performing a human-health risk assessment assuming a residential land use scenario.

6.2.3.5. Cleanup Levels for Lead in Soil

The lead concentration in soil shall not exceed 400 mg/kg.

6.2.3.6. Cleanup Levels for Surface Water

The Permittee shall comply with the surface water quality standards outlined in the Clean Water Act (33 U.S.C. §§ 1251 to 1387), the New Mexico WQCC Regulations (20.6.2 NMAC), and the State of New Mexico Standards for Interstate and Intrastate Surface Waters (20.6.4 NMAC), and the procedures for alternate abatement standards (20.6.2.4103 NMAC).

6.2.3.7. Ecological Risk Evaluation and Cleanup Levels

Ecological risk shall be evaluated for any SWMU or AOC where there has been a release of contaminants. The Permittee shall evaluate ecological risk and propose a cleanup level derived using the methods in the Department's most current version of *"Guidance for Assessing Ecological Risks Posed by Chemicals: Screening-Level Ecological Risk Assessment"* (March 2000, as it may be updated). The Permittee may use EPA's ECO-SSLs (EPA, 2005) with Department approval if a substance is not addressed in the Department's guidance on ecological risk.

6.2.3.8. Requests for Variance from Cleanup Levels

The Permittee may request a variance from a particular cleanup level. The nature of the request shall differ depending on whether a WQCC standard is involved. If a WQCC standard is involved, the Permittee may request an alternative abatement standard in accordance with the process specified in the WQCC Regulations at 20.6.2.4103.E and F NMAC.

For all other instances in which the Permittee requests a variance from a cleanup level, the Permittee shall submit a demonstration to the Department that achievement of the cleanup level is impracticable. In making such demonstration, the Permittee may propose consideration of such factors as technical or physical infeasibility of the project, ineffectiveness of proposed solutions, cost of the project, potential hazards to workers or to the public, and any other basis that may support a finding of project impracticability. In addition to demonstrating the basis for its impracticability request, the Permittee's written submittal shall propose the action to be taken by the Permittee if the Department approves the impracticability demonstration. Such action shall include, but is not limited to, completion of a site-specific risk assessment and identification of alternate clean-up levels. The proposed alternative cleanup level will be subject to the Department's review and approval.

6.2.4. Reporting Requirements

The purpose of this Permit Section (6.2.4) is to provide reporting requirements for corrective action activities required under this Permit. This Permit Section is not intended to provide reporting requirements for every potential type of activity conducted at the Facility; therefore, other formats or types of reports may be necessary or better suited for some activities. Described below are general reporting requirements and formats for Quarterly Reports, Investigation Work Plans, Investigation Reports, periodic monitoring reports, risk assessment reports, CME Work Plans, CME Reports, CMI Work Plans, CMI Work Plan Progress Reports, and CMI Reports. All Work Plans and Reports shall be prepared with technical and regulatory input from the Department. All Work Plans and Reports shall be submitted to the Department in the form of one electronic copy in a format acceptable to the Department and two paper copies.

6.2.4.1. Quarterly Reporting

Quarterly reports, as specified in Permit Section 6.1.6 shall include the following information:

1. A description of the work completed and an estimate of the percentage of total planned work completed;
2. Summaries of all findings, including summaries of laboratory data;
3. Summaries of all problems or potential problems encountered during the reporting period and actions taken to rectify problems;
4. Planned work for the next reporting period;
5. Summaries of contacts pertaining to corrective action with representatives of the local community, public interest groups, or State government during the reporting period;
6. Changes in key project personnel during the reporting period;
7. Summaries of any variances from approved investigation or remediation work plans; and
8. Brief summaries of any periodic monitoring reports prepared in accordance with the requirements in Permit Section 6.2.4.4.

6.2.4.2. Investigation Work Plans

The Permittee shall prepare an Investigation Work Plan using the format set forth below. All research, locations, depths and methods of exploration, field procedures, analytical requirements, data collection methods, and schedules shall be included in a work plan. Required sections for an Investigation Work Plan are:

1. Title Page and Signature Block (for the name, title, and organization of the preparer and the responsible Facility representative);
2. Executive Summary (Abstract);
3. Table of Contents;
4. Introduction;
5. Background Information;
6. Site Conditions;
7. Scope of Activities;
8. Investigation Methods;

9. Monitoring and Sampling;
10. Schedule;
11. Tables;
12. Figures; and
13. Appendices (e.g., Investigation–Derived Waste Management Plan).

The Permittee may insert figures and tables within the text sections of a work plan instead of in a separate section.

6.2.4.3. Investigation Reports

The Permittee shall prepare an Investigation Report using the format set forth below. This Permit Section (6.2.4.3) describes the minimum requirements for reporting. All data collected during investigation of a SWMU or AOC shall be included in the Investigation Report. Requirements for an RFI report are:

1. Title Page and Signature Block (for the name, title and organization of the preparer and the responsible Facility representative);
2. Executive Summary (Abstract);
3. Table of Contents;
4. Introduction;
5. Background Information;
6. Scope of Activities;
7. Field Investigation Results – Including, but not limited to (as applicable): surface conditions, subsurface conditions, monitoring well construction, boring or excavation abandonment, groundwater conditions, materials testing results, and pilot testing results;
8. Regulatory Criteria;
9. Site Contamination – Including as applicable, but not limited to: soil, rock and sediment sampling analytical results, soil, rock and sediment sample field screening results, groundwater sampling results, surface water sampling results, and subsurface vapor sampling results; and conclusions;
10. Conclusions and Recommendations;
11. Tables - An explanation shall be provided on each table for all abbreviations, symbols, acronyms, and qualifiers;
12. Figures - All map figures shall include an accurate bar scale and a north arrow, other types of figures shall include a bar scale, if appropriate, and an explanation shall be provided on each figure for all abbreviations, symbols, acronyms, and qualifiers; and,
13. Appendices - Including, as appropriate, field methods, boring/test pit logs and well construction diagrams, chemical analytical reports, and other appendices as required by the Department.

The Permittee may insert figures and tables within the text sections of an investigation report instead of in a separate section.

6.2.4.4. Periodic Monitoring Reports

The Permittee shall prepare a Periodic Monitoring Report using the format set forth below. The reports shall present the results of periodic or routine groundwater and remediation system monitoring at the Facility. All data collected during each monitoring and sampling event in the reporting period shall be included in a periodic monitoring report. In general, interpretation of data should be presented only in the background, conclusions, and recommendations sections of a report. The other text sections of a report should be reserved for presentation of facts and data without interpretation or qualifications. Requirements for a Periodic Monitoring Report are:

1. Title Page and Signature Block (for the name, title and organization of the preparer and the responsible Facility representative);
2. Executive Summary (Abstract);
3. Table of Contents;
4. Introduction;
5. Scope of Activities;
6. Regulatory Criteria;
7. Monitoring Results;
8. Conclusions and Recommendations;
9. Tables - An explanation shall be provided on each table for all abbreviations, symbols, acronyms, and qualifiers;
10. Figures - All map figures shall include an accurate bar scale and a north arrow; other types of figures shall include a bar scale, if appropriate, and an explanation shall be provided on each figure for all abbreviations, symbols, acronyms, and qualifiers; and,
11. Appendices - Including, as appropriate, field methods, boring/test pit logs and well construction diagrams, chemical analytical reports, and other appendices as required by the Department.

The Permittee may insert figures and tables within the text sections of a periodic monitoring report instead of in a separate section.

6.2.4.5. Risk Assessment Reports

The Permittee shall prepare a Risk Assessment Report using the format set forth below. Risk Assessment Reports may be appended to or combined with a CME Report or an Investigation Report to create a single document for a given SWMU or AOC. Human health and ecological risk assessments should be presented in separate sections, but the general risk assessment outline applicable to both sections is provided below. The conceptual site model shall be discussed in all risk assessments. Requirements for a Risk Assessment Report are:

1. Title Page and Signature Block (for the name, title and organization of the preparer and the responsible Facility representative);
2. Executive Summary (Abstract);
3. Table of Contents;
4. Introduction;

5. Background Information -- Including site description and sampling results;
6. Conceptual Site and Risk Exposure Models;
7. Risk Screening Results;
8. Conclusions and Recommendations;
9. Tables;
10. Figures; and
11. Appendices.

A section in the risk assessment report shall summarize the analytical results of sampling at the SWMU or AOC. It shall include a description of the history of releases of contaminants, the known and possible sources of contamination, the vertical and lateral extent of contamination present in each medium, and a discussion of any uncertainties that are associated with contaminant characterization. Sources that are no longer considered to be ongoing but represent the point of origination for contaminants transported to other locations shall be included. This section shall reference any pertinent figures, data summary tables, and references in other reports. References made to other reports shall include page number, table numbers, and figure numbers for the referenced information. Page numbers for references made to other reports may be presented in a formal reference section of a risk assessment report. Summaries of data for each contaminant shall include the maximum value detected, the detection limit, and the upper confidence limit of the mean (UCL) based on a 95% confidence level (if applicable to the data set) with a notation for the statistical method used to calculate the UCL. Background values used for comparison to inorganic constituents and discussion of how "non-detect" analytical results were handled in the statistical analysis of data shall also be included.

Another section in the report shall present the conceptual site and risk exposure models. It shall include information on the expected fate and transport of contaminants detected at the SWMU or AOC. The discussion of fate and transport shall address potential migration of each contaminant in each medium, potential breakdown products and their migration, and anticipated pathways of exposure for human or ecological receptors. Diagrammatic representations of the conceptual site and risk exposure models shall appear in the figures section of the document. For human health risk assessments, the conceptual site and risk exposure models shall include the current and foreseeable future land use (such as industrial or recreational) for all risk assessments. Cleanup levels for the Facility shall be based on a residential land-use scenario, even if the current use of the land is for other scenarios.

All values for exposure parameters and the source of those values shall be included in table format and presented in the Tables section of the document. Conceptual site and risk exposure models presented for ecological risk assessments shall identify assessment endpoints and measurement receptors for the SWMU or AOC. The discussion of the models shall explain how the measurement receptors are protective of the ecological receptors.

If risk screening is utilized, a section in the report shall present the actual screening values used for each contaminant for comparison to all applicable human health and ecological risk screening levels. Other regulatory levels that are applicable to screening the site, such as drinking water MCLs or WQCC standards shall also be included in this section.

For risk assessments a section of the report shall present risk values, HQs, and hazard indexes

(HI) for human health under projected future land use and residential scenarios and any site-specific scenarios. A similar section shall also present for each contaminant the HQ for each ecological receptor.

Finally, a section shall also be included in the report that contains a discussion of qualitative, semi-quantitative, and quantitative uncertainty in the risk assessment and provides estimates of the potential impact of the various uncertainties. Appendices may include the results of statistical analyses of data sets and comparisons of data, full sets of results of all sampling investigations at the site, or other data as appropriate.

6.2.4.6. CME Work Plans

The Permittee shall prepare a CME Work Plan using the format set forth below. Required sections for a CME Work Plan are:

1. Title Page and Signature Block (for the name, title, and organization of the preparer and the responsible Facility representative);
2. Executive Summary;
3. Table of Contents;
4. Introduction;
5. Background Information;
6. Identification of Potential Remedies;
7. Analysis of Potential Remedies;
8. Proposed Remedy;
9. Schedule to complete CME;
10. Estimated Cost to Conduct CME;
11. Qualifications of Personnel who will conduct the CME;
12. Tables;
13. Figures; and
14. Appendices.

The Permittee may insert figures and tables within the text sections of a CME Work Plan instead of in a separate section.

6.2.4.7. CME Reports

The Permittee shall prepare a CME Report using the format set forth below. Investigation summaries, site condition descriptions, corrective action goals, corrective action options, selection criteria, and schedules shall be included in the CME Report. At a minimum, detections of contaminants encountered during site investigations shall be presented in table format with an accompanying site map showing sample locations. The required format for CME Reports is:

1. Title Page and Signature Block (for the name, title and organization of the preparer and the responsible Facility representative);
2. Executive Summary (Abstract);
3. Table of Contents;

4. Introduction;
5. Background Information;
6. Site Conditions -- Including, as appropriate, surface, subsurface, and groundwater conditions;
7. Potential Receptors -- Including sources, pathways, and receptors;
8. Regulatory Criteria;
9. Identification of Corrective Measures Options;
10. Evaluation of Corrective Measures Options -- Including the required information in Permit Section 6.2.2.2.5.2;
11. Selection of a proposed preferred remedy;
12. Design Criteria to Meet Cleanup Objectives;
13. Schedule;
14. Tables;
15. Figures; and
16. Appendices.

The Permittee may insert figures and tables within the text sections of a CME Report instead of in a separate section.

A CME Report shall include the following information:

1. A description of the location, status, and current use of the site;
2. A description of the history of site operations, including an identification of hazardous and solid wastes managed at the site, and any releases of hazardous waste or hazardous constituents;
3. A description of site surface conditions;
4. A description of site subsurface conditions;
5. A description of on-site and any off-site contamination in all affected media;
6. An identification and description of all sources of contaminants;
7. An identification and description of contaminant migration pathways;
8. An identification and description of potential contaminant receptors;
9. An identification and description of applicable cleanup standards or other regulatory criteria;
10. An identification and description of remedial alternatives;
11. Remedial alternative pilot or bench scale testing results, if applicable;
12. A detailed evaluation and rating of each of the remedial alternatives, applying the criteria set forth in Permit Section 6.2.2.2.5.2;
13. An identification of a proposed preferred remedy;
14. Basic design criteria of the proposed preferred remedy; and
15. A schedule for implementation of the proposed preferred remedy.

6.2.4.8. CMI Work Plans

The Permittee shall prepare a CMI Work Plan using the format set forth below. The CMI Work Plan shall provide details on the design, construction, operation, maintenance, and performance monitoring for the selected remedy, and a schedule for implementation. The CMI Work Plan shall, at a minimum, include as necessary depending on the type of remedy to be implemented:

1. A description of the selected remedy;
2. A description of the remediation system objectives;
3. An identification and description of the qualifications of key persons, consultants, and contractors that will be implementing the remedy;
4. Detailed engineering design drawings and systems specifications for all elements of the remedy;
5. A construction quality assurance plan;
6. An operation and maintenance plan, if applicable;
7. The results of any remedy pilot tests, such as landfill cover test plots;
8. A schedule for submission to the Administrative Authority of periodic progress reports
9. A schedule for implementation of the remedy; and
10. A health and safety plan.

6.2.4.9. CMI Work Plan Progress Reports

The Permittee shall make progress reports on the execution of the CMI Work Plan to the Department, as described in this Permit Section (6.2.4.9). At a minimum, a progress report shall include the following information:

1. A description of the remedy work completed during the reporting period;
2. A summary of problems, potential problems, or delays encountered during the reporting period;
3. A description of actions taken to eliminate or mitigate the problems, potential problems, or delays;
4. A discussion of the remedial work projected for the next reporting period, including all sampling events;
5. Copies of the results of all monitoring, including sampling and laboratory analyses, and any other data generated during the reporting period; and
6. Copies of all waste disposal records generated during the reporting period.

6.2.4.10. CMI Reports

A CMI Report shall, at a minimum, include the following information.

1. A summary of the work completed;
2. A statement, signed by a registered professional engineer, that the remedy has been completed in accordance with the Department approved CMI Work Plan for the remedy;
3. As-built drawings and specifications signed and stamped by a registered professional engineer;

4. Copies of the results of all monitoring, including sampling and laboratory analyses, and other data generated during the remedy implementation, if not previously submitted in a progress report; and
5. Copies of all waste disposal records, if not previously submitted in a progress report.

6.2.4.11. Certification

Pursuant to 40 C.F.R. § 270.11(d)(1), all corrective action documents shall include a certification, signed by a responsible official of the Facility, stating:

> I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

6.3. COMPLIANCE SCHEDULE TABLES

The Permittee shall meet the specified compliance schedules for all actions and deliverables required by this Permit. Corrective action is required for all SWMUs and AOCs identified in Table I-3 of Permit Attachment I.

6.4. SPECIAL REQUIREMENTS FOR INFORMATION SUBMITTALS AND CORRECTIVE MEASURES

6.4.1. Special Investigation Requirements

6.4.1.1. Landfills to Be Closed with Waste Left in Place

For each landfill that the Permittee proposes to leave all or a portion of the contents of the landfill in place, the Permittee shall implement the corrective action procedures set forth in Permit Section 6.2.2. Within 180 days after the effective date of this Permit, the Permittee shall submit to the Department for approval in accordance with Permit Section 6.2.4.6 a CME Work Plan for each such landfill unless a CME Work Plan has been previously submitted to the Department for the landfill.

6.4.1.2. Military Munitions Ranges

The Permittee has conducted operations at areas that were used to research, develop, test, and evaluate military munitions and explosives, and other ordnance, or weapons systems, or to train military personnel in their use and handling. The Facility contains numerous military ranges where explosives are and were used for the purpose of conducting military exercises, munitions testing, research development, and demonstrations. These military ranges may include firing lines and positions, maneuver areas, firing lanes, test pads, impact areas, simulator sites, training

sites, research facilities, and buffer zones.

This Permit Section (6.4.1.2) applies to military munitions that meet the statutory definition of "solid waste" in NMSA 1978, 74-4-3(M), whether or not they also meet the regulatory definition of "solid waste" in 40 C.F.R. § 261.2.

Within 90 days of the effective date of this Permit, the Permittee shall submit to the Department for approval a Military Range Assessment Report that contains the following information:

1. A list of all active, inactive, and closed military ranges located on Facility property;
2. A list of any military ranges located on property that has been transferred from the Facility to another federal, private, or other entity;
3. An identification of those military ranges that are active, inactive, or closed;
4. For each inactive and closed military range, a description of the current use of the property;
5. Maps (or a map) that clearly illustrate the boundaries of all active, inactive, and closed military ranges, including transferred ranges, and the map must also illustrate any buffer zone around the ranges;
6. A qualitative assessment of the nature and extent of contamination at each active, inactive, and closed military range, including the potential risk to human health and the environment from the military munitions and other contamination;
7. A recommendation for further investigation necessary to fully characterize the nature and extent of the contamination on each of the active, inactive, and closed military ranges; and
8. A proposed schedule for implementation of the recommended investigation.

6.4.1.3. Areas with Groundwater Contamination

Groundwater contamination or the potential for groundwater contamination has been identified at the following areas:

1. Tijeras Arroyo Groundwater (TAG) Area – trichloroethylene (TCE) and nitrate;
2. Landfills #4, #5, and #6, LF-008 (SWMU 6-4)–potential for contamination by selenium and TCE;
3. Manzano Base Groundwater – TCE;
4. Sewage Lagoons and Golf Course Pond, WP-026 – TCE, nitrate;
5. Manzano Sewage Treatment Facility, WP-16 (SWMU 6-24) – potential for contamination;
6. Monitoring well WYO-4 area – TCE;
7. McCormick Ranch -- Nitrate;
8. Bulk Fuels Facility, ST-106 and SS-111 -- Fuel (JP-4, JP-8, and Aviation Gas) Contamination; and
9. EOD Hill – perchlorate contamination.

The Permittee shall complete an Investigation Work Plan, Investigation Report, or CME Report

for each of the nine areas of groundwater contamination in accordance with the compliance schedules in Table I-3 of Permit Attachment I. The Permittee shall complete a CME Report for each area of groundwater contamination that requires remediation, as determined by the Department. In addition, Permittee shall investigate other areas of the Facility, in addition to those listed above, where the Department determines that either groundwater is contaminated or there is potential for groundwater contamination.

6.4.1.4. Perchlorate Screening in Groundwater

Monitoring for perchlorate is required for eight consecutive quarters in groundwater monitoring wells installed at the Facility after the effective date of this Permit and in the following existing wells or their replacements: KAFB-1001 through KAFB-1007 (McCormick Ranch/Range wells), KAFB-1901 through KAFB-1904 (Lake Christian wells), and EOD Hill well. The Department reserves the right to include additional wells for perchlorate monitoring. The Permittee shall report all monitoring results on January 31, April 30, July 31, and October 31 of each year for at least 8 consecutive quarters to the Department, unless the Department agrees in writing to a longer reporting period.

The Permittee shall determine the nature, extent, and rate of migration of any perchlorate contamination in groundwater at the Facility and, if necessary, down gradient of the Facility. The detection limit for the monitoring of perchlorate in groundwater shall not exceed 1 ug/L.

If perchlorate is detected in a groundwater at a concentration greater than or equal to 1 ug/L in a groundwater monitoring well, monitoring of perchlorate in such well must continue at a frequency determined by the Department. The frequency shall not exceed one year.

6.4.1.5. Sanitary Sewer Line at LF-002 (SWMU 6-2)

The sanitary sewer line that passes through LF-002 shall be removed in accordance with the Department's instructions (letters from NMED to Carl Lanz: July 16, 2004; September 13, 2004; and March 10, 2005). Instead of removing the sanitary sewer line, the Permittee may abandon the sanitary sewer line in place, provided that the sewage within the line is completely drained when the line is abandoned. The sewer line shall be taken out of service within two years of the effective date of this Permit.

Within 180 days after the effective date of this Permit, the Permittee shall submit to the Department for approval - in accordance with Permit Section 6.2.2.2.7 - a CMI Work Plan with a schedule for removing or abandoning the sewer line. After completion of the work, the Permittee shall augment the CMI Report for LF-002 by describing the removal or abandonment of the sewer line.

6.5. TECHNICAL REQUIREMENTS

The methods used to conduct investigation, remediation, and monitoring activities shall be sufficient to fulfill the requirements of this Permit, and to provide accurate and representative data for the evaluation of site conditions, the nature, concentration, rate of migration, and extent of contamination, and for remedy selection and implementation, where necessary. The methods presented in this Permit are minimum requirements for environmental investigation and sampling, and are not intended to include all methods that may be necessary to fulfill the

requirements of this Permit. The methods for conducting investigations, corrective actions, and monitoring at the Facility must be determined based on the conditions and contaminants that exist at each SWMU or AOC.

The Permittee shall provide a description of investigation, sampling or analytical methods and procedures in documents submitted to the Department that includes sufficient detail to evaluate the quality of the acquired data. The Department must approve any proposed combinations of SWMUs and AOCs that are grouped for the purpose of site investigation, remediation, and/or monitoring activities.

6.5.1. Standard Operating Procedures

The Permittee may reference relevant Facility Standard Operating Procedures, provided that copies of these procedures are also submitted to the Department for review. If any requirement or procedure in a Standard Operating Procedure is found by the Department to be unacceptable for reasons including, but not limited to, that the requirement or procedure will or could prevent the acquisition of representative and reliable sampling results, the requirement or procedure shall be replaced by the Permittee with a different requirement or procedure that is acceptable to the Department.

6.5.2. Documentation of Field Activities

Daily field activities, including observations and field procedures, shall be recorded on appropriate forms. The original field forms shall be retained at the Facility and made available to the Department upon request. Completed forms shall be maintained in a bound and sequentially numbered field file (logbook) for reference. Indelible ink shall be used to record all field activities. Photographic documentation of field activities shall be performed, as appropriate. The daily record of field activities shall include, at minimum:

1. SWMU or AOC designation;
2. Date;
3. Time of personnel arrival and departure;
4. Field investigation team members who are present, including subcontractors and visitors;
5. Weather conditions;
6. Daily activities conducted and times of performance;
7. Observations;
8. Record of samples collected with sample designations and locations specified;
9. Photographic log;
10. Field monitoring data, including health and safety monitoring if conditions arise that threaten worker or public safety, or the environment;
11. Equipment used and calibration records, if appropriate;
12. List of additional data sheets and maps completed;
13. An inventory of the waste generated and the method of storage and/or disposal; and
14. Signature of personnel completing the field record.

6.5.3. Decontamination Procedures

The objective of the decontamination procedures described below is to minimize the potential for cross-contamination. A designated area shall be established for decontamination of drilling equipment, reusable sampling equipment, and well materials. Drilling rigs and other equipment shall be decontaminated prior to entering a SWMU or AOC. Drilling equipment or other exploration equipment that may come in contact with a borehole shall be decontaminated by steam cleaning, by hot-water pressure washing, or by another method approved by the Department prior to drilling each boring.

Sampling or measurement equipment, including but not limited to, stainless steel sampling tools, split-barrel or core samplers, well development or purging equipment, groundwater quality measurement instruments, and water level measurement instruments, shall be decontaminated in accordance with the following procedures or other methods approved by the Department before each sampling event:

1. Brush equipment with a wire or other suitable brush, if necessary or practicable, to remove large particulate matter;
2. Rinse with potable tap water;
3. Wash with non-phosphate detergent or other detergent approved by the Department (e.g., Fantastik™ and Liqui-Nox®) followed by a tap water rinse;
4. Rinse with 0.1 M nitric acid to remove trace metals, if necessary, followed by a tap water rinse;
5. Rinse with methanol to remove organic compounds, if necessary;
6. Rinse with potable tap water; and
7. Double rinse with deionized water.

All decontamination solutions shall be collected and stored temporarily as Investigation Derived Waste (IDW) as described in Permit Section 6.5.7. Decontamination procedures and the cleaning agents used shall be documented in the daily field log.

6.5.4. Field Equipment Calibration Procedures

Field equipment requiring calibration shall be calibrated before use in the field to known standards, in accordance with the manufacturers' recommended schedules and procedures. Calibration measurements shall be recorded in the daily field logs. If field equipment becomes inoperable, its use shall be discontinued until the necessary repairs are made. In the interim, a properly calibrated replacement instrument shall be used.

6.5.5. Sample Handling, Shipping, and Custody Requirements

The Permittee shall follow all procedures for sampling activities that are detailed in this Permit Section.

6.5.5.1. Sample Handling

At a minimum, the following procedures shall be used at all times when collecting samples during investigation, corrective action, and monitoring activities:

1. Neoprene, nitrile, or other protective gloves shall be worn when collecting samples. New disposable gloves shall be used to collect samples. If any glove is contaminated by touching the sampled material, or other material that could contaminate or dilute the sample, the glove shall be replaced before taking another sample;
2. All samples collected of each medium shall be transferred into clean containers with the exception of soil, rock, and sediment samples obtained in brass sleeves or in Encore™ samplers. Sample container volumes and preservation methods shall be in accordance with EPA SW-846 and established industry practices; and
3. Sample labels and documentation shall be completed for each sample following procedures included in the site-specific work plans that are to be approved by the Department. Immediately after the samples are collected, they shall be stored either in a cooler with ice or by other appropriate storage method until they are delivered to the analytical laboratory. Chain-of-custody procedures, as described in this Permit Section (6.5.5.1) and Section 1.3.2.4 of Permit Attachment C shall be followed for all samples collected. All samples shall be submitted to the laboratory in an appropriate timeframe that will allow the laboratory to conduct the specified analyses within the method holding times.

6.5.5.2. Sample Shipment Procedures

Shipment procedures shall include:

1. Individual sample containers shall be packed to prevent breakage, and transported in a sealed cooler with ice or other suitable coolant or as otherwise approved by the Department. Any drainage hole at the bottom of the cooler shall be sealed and secured to prevent leakage;
2. Each cooler or other container shall be delivered in a timely manner to the analytical laboratory;
3. Glass bottles shall be separated in the shipping container by cushioning material to prevent breakage;
4. Plastic containers shall be protected from possible puncture during shipping using cushioning material;
5. The chain-of-custody form and analytical request form shall be shipped inside the sealed storage container to be delivered to the laboratory; and
6. Chain-of-custody seals (signed and dated) shall be used to seal individual sample containers and the sample-shipping container in conformance with EPA guidance.

6.5.5.3. Sample Custody

All samples collected for analysis shall be recorded in the field report or data sheets. Chain-of-custody forms shall be completed prior to the transfer of samples off-site, and shall accompany the samples during shipment to the laboratory. Upon receipt of the samples at the laboratory, the custody seals will be broken by laboratory personnel, the chain-of-custody form shall be signed as received by the laboratory, and the conditions of the samples shall be recorded on the form. The original chain-of-custody form shall remain with the laboratory and copies shall be returned to the relinquishing party. The Permittee shall maintain copies of all chain-of-custody forms

generated as part of sampling activities. Copies of the chain-of-custody records (either paper copies or electronically scanned in PDF format) shall be included with final reports submitted to the Department.

A chain-of-custody form shall be used to track samples from collection through analysis to ensure the integrity of analytical results. A chain-of-custody form shall include:

1. Sample identification number;
2. Signature of sample collector;
3. Date and time of sample collection;
4. Location at which sample was collected;
5. Type of media sampled (e.g., soil);
6. Type of preservation;
7. Analysis required;
8. Signature of all persons that have had custody of the samples;
9. Dates and times of possession; and
10. Signature, date and time of breaking the custody seal.

An individual in custody of any sample must comply with the procedures identified in SW-846 Chapter Nine (EPA, 1986) and those included here.

6.5.5.4. Sample Labels

Sample labels or tags are necessary to prevent misidentification. Gummed paper labels or tags are adequate and shall include at a minimum:

1. Sample identification number;
2. Name or initial of collector;
3. Sample location;
4. Sample date and time;
5. Analytical method or parameter to be analyzed for (e.g., VOCs, SVOCs, metals);
6. Preservation method; and
7. Other remarks.

Labels shall be affixed to sample containers before sampling, and they shall be immediately completed with the above information after the samples are collected.

The Permittee shall adhere to the following field custody procedures:

1. When collecting samples, as few people as possible should handle them;
2. Sampling personnel are responsible for the care and custody of samples until they are transferred or properly dispatched to the laboratory in accordance with the procedures described herein; and
3. Sample tags or labels shall be completed for each sample using waterproof ink, or covered by transparent waterproof tape.

6.5.6. In-Situ Testing and Other Tests

In-situ permeability tests, remediation system pilot tests, stream flow tests, and other tests conducted to evaluate site, surface, and subsurface conditions shall be designed to accommodate specific site conditions and to achieve test objectives. The testing methods must be approved, in writing, by the Department prior to implementation. The tests shall be conducted in accordance with Department, EPA, United States Geological Survey, ASTM International (ASTM - http://www.astm.org/) or other methods generally accepted by industry that will allow information representative of site conditions to be obtained. Detailed logs of all relevant site conditions and measurements shall be made during the testing events. A summary of the general test results, including unexpected or unusual test results and equipment failures or testing limitations shall be reported to the Department. The summary shall be presented in a format acceptable to the Department and in general accordance with the report formats outlined in Permit Section 6.2.4.

6.5.7. Collection and Management of Investigation Derived Waste

IDW includes, but is not limited to, general refuse, drill cuttings, excess sample material, water (e.g., decontamination, development and purge), spent materials, and used disposable equipment generated during the course of investigation, corrective action, or monitoring activities. All IDW shall be properly characterized and disposed of in accordance with Permit Attachment C (Waste Analysis Plan) and all federal, state, and local laws and regulations for storage, labeling, handling, transport, and disposal of waste. The Permittee shall include a description of the anticipated IDW management process as part of any work plan submitted to the Department for approval.

All waste generated during sampling and decontamination activities shall be temporarily stored in containers appropriate for the waste.

6.5.8. Surveying Sample, Well, and Site Feature Locations

The horizontal and vertical coordinates of the top of each monitoring well casing and the ground surface elevation at each monitoring well location shall be determined by a registered New Mexico professional land surveyor or licensed Professional Engineer. Horizontal coordinates shall be measured in accordance with the State Plane Coordinate System (NMSA 1978, 47-1-49-56 [Repl. Pamp. 1993]). The surveys shall be conducted in accordance with 12.8.2 NMAC -- *Minimum Standards for Surveying in New Mexico*. Horizontal positions shall be measured to the nearest 0.1 foot, and vertical elevations shall be measured to the nearest 0.01 foot. The Permittee shall prepare site map(s), certified by a registered New Mexico professional land surveyor or licensed Professional Engineer, presenting all surveyed locations and elevations of wells and relevant site features and structures for submittal with all associated reports to the Department.

Site attributes (e.g., soil sample locations, sediment sample locations, springs, outfalls, pertinent structures, monitoring stations, as well as staked-out sampling grids), shall be located by using the global positioning system (GPS), an electronic total station with prism reflectors, transit with stadia rod or tape, or a combination of these surveying systems, or by a registered New Mexico Registered Land Surveyor or licensed Professional Engineer using the methods described in the paragraph above. Horizontal locations of site attributes shall be measured to the nearest 1.0-foot.

The Permittee shall provide the Department with a statement of accuracy for survey data upon request.

6.5.9. Requirements for Exploratory and Well Installation Borings and Exploratory Excavations

Borings shall be completed at locations specified in this Permit or as approved by the Department in Investigation Work Plans. The Department may require additional exploratory or well borings as needed to ensure protection of human health and the environment. Any additional boring locations will be determined, and approved, by the Department. The anticipated depths and locations of exploratory and well borings shall be specified in work plans submitted to the Department for approval prior to the start of the field activities.

Borings that are not completed as permanent groundwater or soil-vapor monitoring wells shall be properly abandoned. Borings completed as either groundwater monitoring or soil-vapor wells shall be completed in accordance with the requirements described in this Permit Section (6.5.9).

Exploratory and monitoring well borings shall be drilled using the most effective, proven, and practicable method for recovery of undisturbed samples and potential contaminants. The drilling method selected must be approved by the Department prior to the start of field activities. Based on the drilling conditions, the borings shall be completed using one of the following methods:

1. Hollow-stem auger;
2. Air rotary;
3. Mud rotary (generally will not be approved by the Department);
4. Percussion hammer;
5. Dual wall air rotary;
6. Direct Push Technology;
7. Cable tool;
8. Sonic; or
9. Air Rotary Casing Hammer (ARCH).

Hollow-stem auger or Direct Push Technology drilling methods are preferred if vapor-phase or volatile organic compound (VOC) contamination is known or suspected to be present. Air rotary, hollow stem auger, percussion hammer, dual wall air rotary, direct push technology, cable tool or sonic drilling are preferred for borings intersecting the saturated zone of any aquifer. The type of drilling fluids or additives used, if necessary, must be approved by the Department prior to the start of drilling activities. The use of drilling fluids, especially other than air and potable water, is discouraged.

All drilling equipment shall be in good working condition and capable of performing the assigned task. Drilling rigs and equipment shall be operated by properly trained, experienced, and responsible crews. The Permittee is responsible for ensuring that contaminants from another site or facility are not introduced into the SWMU or AOC under investigation due to equipment malfunction or poor equipment decontamination. Drilling equipment shall be properly decontaminated before initiation of drilling for each boring.

Exploratory borings shall be advanced to the depths specified or approved by the Department. The Permittee shall propose drilling depths in the site-specific work plans submitted for each subject area where subsurface investigations are needed. Unless otherwise specified in this Permit or approved by the Department in work plans, the borings shall be advanced to the following minimum depths (see also Permit Section 6.5.11):

1. In all borings, 25 feet below the deepest detected contamination;
2. Twenty-five feet below the base of disposal units;
3. Five feet below the base of shallow structures such as piping or building sumps, or other building structures; and
4. Depths specified by the Department based on regional, or on SWMU or AOC specific data needs.

The Permittee shall notify the Department as early as practicable if conditions arise or are encountered that do not allow the advancement of borings to the depths specified or approved by the Department so that alternative actions may be approved. Precautions shall be taken to prevent the migration of contaminants between geologic, hydrologic, or other identifiable zones during drilling and well installation activities. Contaminant zones shall be isolated from other zones encountered in the borings.

The drilling and sampling shall be conducted under the direction of a qualified engineer or geologist who shall maintain a detailed log of the materials and conditions encountered in each boring. Both sample information and visual observations of the cuttings and core samples shall be recorded on a boring log. Known site features and/or site survey grid markers shall be used as references to locate each boring prior to surveying the location. The boring locations shall be located to the nearest foot of their planned location, and locations shall be recorded on a scaled site map upon completion of each boring.

Trenching and other exploratory excavation methods shall follow the applicable general procedures outlined in this Permit. Methods proposed by the Permittee for exploratory excavation and sampling at any SWMU or AOC shall be included in a site-specific Investigation Work Plan submitted to the Department.

6.5.10. Requirements for Geophysical Surveys

Where necessary, the Permittee shall conduct geophysical surveys to locate underground utilities, pipelines, drums, debris, and other buried features, including buried waste, in the shallow subsurface. The methods used to conduct the surveys, such as magnetometer, ground penetrating radar, resistivity, or other methods, shall be selected based on the characteristics of the site and the possible or suspected underground features. Results of the surveys shall be included in Investigation Reports submitted to the Department.

The Department may require the Permittee to excavate test pits or trenches to identify targets located by geophysical surveys.

The Permittee shall conduct geophysical logging of boreholes using techniques such as acoustic televiewer, spinner flow, acoustic velocity/full wave form acoustic, density/porosity, gamma, neutron, single point resistance or electric (long/short normal or inductance) methods as required by the Department.

6.5.11. Requirements for Deep Subsurface Soil, Rock, and Sediment Sampling

Deep subsurface samples are those collected at depths that generally require the use of power equipment. Relatively undisturbed discrete soil and rock samples shall be obtained, where possible, during the advancement of each boring for the purpose of logging, field screening, and analytical testing. Generally, samples shall be collected at the following intervals and depths:

1. At five-foot intervals, ten-foot intervals, continuously, or as approved by the Department;
2. At the depth immediately below the base of the disposal unit or facility structure;
3. At the maximum depth of each boring or excavation;
4. At the depths of contacts or first encounter with geologic units of different lithology, structural or textural characteristics, or of relatively higher or lower permeability that are observed during drilling or excavating;
5. At depths where soil or rock types are more likely to sorb or retain contaminants as compared to surrounding lithologic units;
6. At the depth of the first encounter of any saturated zones;
7. At intervals suspected of being source or contaminated zones; and
8. At other intervals approved or required by the Department.

Additional samples may be obtained from any depth based on field observations. A split-barrel sampler lined with brass sleeves, a coring device, or other method approved by the Department shall be used to obtain samples during the drilling of each boring.

A split barrel sampler lined with brass sleeves is the preferred sampling method for borehole soil and sediment; a coring device is the preferred sampling method for rock sampling. The following procedures should be followed if a split barrel sampler is used. Upon recovery of the sample, the brass sleeves shall be removed from the split barrel sampler, and the open ends of the sleeves covered with Teflon tape or foil and sealed with plastic caps fastened to the sleeves with tape for shipment to an analytical laboratory. If brass sleeves are not used, a portion of the sample shall be placed in clean containers for laboratory analysis. The remaining portions of the sample shall be used for field screening and logging, as described in Permit Sections 6.5.13 and 6.5.15, respectively.

Discrete samples shall be collected for field screening and laboratory analyses. For analyses other than that for VOCs and semivolatile organic compounds (SVOCs), the Permittee may submit site-specific, alternative methods for homogenization of samples in the field to the Department for review and written approval.

Samples to be submitted for laboratory analyses shall be selected based upon: 1) the results of the field screening or mobile laboratory analyses; 2) the position of the sample relative to

groundwater, suspected releases, or site structures; 3) the sample location relative to former or altered site features or structures; 4) the stratigraphy encountered in the boring; and 5) the specific objectives and requirements of this Permit and the approved work plan for the SWMU or AOC under investigation. The proposed number of samples and analytical parameters shall be included as part of the site-specific work plan submitted to the Department for approval prior to the start of field investigation activities.

6.5.12. Surface and Shallow Subsurface Soil and Sediment Sampling Procedures

Surface soil samples are those collected at depths of 0 to 6 inches. Shallow subsurface samples are those collected at depths that do not require the use of power equipment. Surface and shallow subsurface soil and sediment samples shall be collected in accordance with the procedures described below.

Samples that are collected for analyses other than for VOCs or SVOCs shall be obtained using a hand-held stainless steel coring device, Shelby tube, thin-wall sampler, or other device approved by the Department. The samples shall be transferred to clean containers for submittal to the laboratory.

Samples obtained for VOC or SVOC analysis shall be collected using Shelby tubes, thin-wall samplers, or other device approved by the Department. The ends of the samplers shall be lined with Teflon tape or aluminum foil and sealed with plastic caps fastened to the sleeves with tape for shipment to the analytical laboratory.

6.5.13. Field Screening of Soil, Rock, and Sediment Samples

Samples shall be screened in the field for the presence of contaminants, if required by the Investigation Work Plan or other sampling and analysis plan. Field screening results shall be recorded on the exploratory boring and excavation logs or other field logs. Field screening results are used as a general guideline to determine the nature and extent of possible contamination. In addition, screening results shall be used to aid in the selection of soil, rock, sediment, and vapor-phase samples for laboratory analysis.

The primary screening methods to be used shall include:

1) Visual examination;
2) Headspace vapor screening for VOCs; and
3) Metals screening using X-ray fluorescence (XRF).

Additional screening for characteristics such as pH, high explosives, or for other specific compounds using field test kits shall be conducted where appropriate.

Headspace vapor screening shall target VOCs and shall be conducted by placing a soil, sediment, or rock sample in a plastic sample bag or a foil-sealed container, allowing head space for ambient air. The container shall be sealed and then shaken gently to expose the sample to the air trapped in the container. The sealed container shall be allowed to rest for a minimum of five minutes while vapor concentrations equilibrate. Vapor concentrations present within the headspace will then be measured by inserting the probe of the monitoring instrument into a small opening in the bag or through the foil. The maximum value and the ambient air temperature shall be recorded on the log for each sample. A photo-ionization detector equipped with a 10.6

or higher electron volt (eV) lamp, combustible gas indicator, or other instrument approved by the Department shall be used for VOC field screening. The limitations, precision, and calibration procedures of the monitoring instrument to be used for VOC field screening shall be included in the Investigation Work Plan prepared for each SWMU or AOC.

XRF shall target metals. XRF screening requires proper sample preparation and instrument calibration. Sample preparation and instrument calibration procedures shall be documented in the field logs. The methods and procedures for sample preparation and instrument calibration shall be approved by the Department prior to the start of field activities.

The Permittee shall record on the field logs all conditions capable of influencing the results of field screening. The Permittee shall submit to the Department a report detailing any conditions potentially influencing field screening results. This report shall be included in any report where the field screening results are presented.

At a minimum, the Permittee shall submit the samples with the greatest apparent degree of contamination, based on field observations and field screening, for laboratory analysis. In addition, the Permittee shall submit the samples with no or little apparent contamination, based on field screening, for laboratory analysis if the intention is to confirm that the base (or other depth interval) of a boring or other sample location is not contaminated.

6.5.14. Field Quality Control for Soil, Rock, and Sediment Sampling

The Permittee shall collect Quality Control (QC) samples to monitor the quality of sample collection and laboratory analysis.

Field duplicates shall consist of two samples either split from the same sample device or collected sequentially. Field duplicates shall be collected at a rate of at least 10 percent of the total number of environmental samples submitted for analysis. At a minimum, one duplicate sample shall always be collected and analyzed for the appropriate contaminants.

The Permittee shall prepare and analyze equipment blanks from all sampling apparatus at a frequency of at least five percent of the total number of samples submitted for analysis. Equipment blanks shall be generated by rinsing decontaminated sampling equipment with deionized water, and capturing the rinsate water in an appropriate sample container.

In the case of VOC analyses, the Permittee shall prepare and analyze field blanks at a frequency of at least one per day for each medium sampled at each SWMU, AOC, or other site.

Reagent blanks shall be prepared and analyzed if chemical analytical procedures requiring reagents are employed in the field as part of the investigation or monitoring program.

Each type of QC sample shall be submitted for laboratory analyses, and analyzed in the same batch that the environmental samples they represent.

6.5.15. Logging of Soil, Rock, and Sediment Samples

The physical characteristics of soil, rock, and sediment samples, such as mineralogy, ASTM soil classification, American Geological Institute rock classification, moisture content, texture, color, presence of stains or odors, field screening results, depth, location, method of sample collection, and other observations shall be recorded in a field log. Samples shall be visually inspected and

the soil, sediment, or rock type classified in general accordance with ASTM D2487 (Unified Soil Classification System) and ASTM D2488 (Standard Practice for Description and Identification of Soils), or American Geological Institute Methods for soil and rock classification or in other ways approved by the Department. Detailed logs shall be completed in the field by a qualified geologist. Additional information, such as the presence of water-bearing zones and any unusual or notable conditions encountered during drilling shall be recorded on the logs. Field boring logs, test pit logs, and field well construction diagrams shall be converted to a format acceptable for use in final reports submitted to the Department.

6.5.16. Requirements for Soil-Vapor Monitoring

Samples of subsurface vapors shall be collected from vapor monitoring points where required by the Department. The Permittee shall, as required by the Department, collect soil-vapor samples for field measurement of:

1. Percent oxygen;
2. Organic vapors (using a photo-ionization detector with a 10.6 eV lamp, a combustible vapor indicator or other method approved by the Department);
3. Percent carbon dioxide;
4. Static subsurface pressure; and
5. Other parameters, such as carbon monoxide and hydrogen sulfide.

The Permittee also shall collect soil-vapor samples for laboratory analysis of the following:

1. Percent moisture;
2. VOCs; and
3. Other analytes required by the Department.

When collecting soil-vapor samples for laboratory or field analysis, the Permittee shall continually monitor the concentrations of soil vapor from a given monitoring point with an appropriate field instrument (e.g., photoionization detector). The Permittee shall collect soil-vapor samples after the field instrument readings have stabilized and after the sampling tubing and soil-vapor monitoring well have been appropriately purged to remove all stagnant vapor. Soil-vapor samples for laboratory analysis shall be collected using SUMMA canisters[1] or other sample collection method approved by the Department. The samples shall be analyzed for VOC concentrations by EPA Method TO-15 (as it may be updated) or equivalent VOC analytical method approved by the Department.

In the field, soil-vapor measurements, the date and time of each measurement, and the type and

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1 The term "SUMMA" Canister is a trademark that refers to electropolished, passivated stainless steel vacuum sampling devices, such as TO canisters, SilcoCans, MiniCans, etc, which are cleaned, evacuated, and used to collect whole-air samples for laboratory analysis

serial number of field instrument used shall be recorded in a field log book. The method used to obtain soil-vapor field measurements and samples must be approved by the Department in writing prior to the start of monitoring.

Soil vapor wells shall not be installed with the use of any fluids. Soil vapor wells may be completed by backfilling with native materials. If a soil vapor well is installed as a permanent monitoring point, the Permittee shall not sample the well before the expiration of the 24-hour equilibration period following completion of installation. Information on the design and construction of soil-vapor monitoring wells shall be recorded as for groundwater monitoring wells (Permit Section 6.5.17.10) as applicable.

Soil-vapor monitoring wells shall be designed and constructed in a manner that will yield high-quality samples. The design and depth of installation must be approved by the Department.

6.5.17. Technical Requirements for Groundwater Investigations

The Permittee shall conduct investigations of groundwater in accordance with Department approved work plans to fully characterize the nature, vertical and lateral extent, concentration, rate of migration, fate, and transport of groundwater contamination originating from the Facility to determine the need for, and scope of, corrective action. The investigation shall include an evaluation of the physical, biological, and chemical factors influencing the transport of hazardous constituents and other contaminants in groundwater. The Permittee shall implement the groundwater investigation requirements in accordance with the requirements set forth in this Permit Section (6.5.17) and in approved work plans. All data shall be collected according to Department, EPA and industry accepted methods and procedures, and in accordance with this Permit Section (6.5.17) and any other requirements of this Permit.

6.5.17.1. Objectives

The Permittee shall implement groundwater investigations to determine the following as required by the Department:

1. Nature, extent, rate of migration, and concentration of historical and current releases of contaminants to groundwater;
2. Fate and transport, including boundary conditions, of contaminants releases within groundwater;
3. The depth to groundwater, water table elevations, potentiometric surfaces, and any seasonal variations;
4. Groundwater flow directions and velocities;
5. Migration of groundwater across hydrostratigraphic and structural boundaries;
6. Watershed and regional water balance information for evaluating contaminant fate and transport including:
    - recharge and discharge locations, rates, and volumes,
    - evapotranspiration data,
    - stream-flow data;

7. Water supply well pumping influences, including data for wells not owned by the Permittee, if available;
8. Saturated and unsaturated hydraulic-conductivity ($K_{x,y,z}$), porosity, effective porosity, permeability, transmissivity, particle-size, storage coefficients, and estimated fracture/secondary porosity;
9. Contaminant concentrations in soil, rock, sediment, air, and vapor; and absorption coefficients (K_ds);
10. Changes in groundwater chemistry and the causes;
11. Regional and perched aquifer boundaries;
12. Geologic, hydrostratigraphic, and structural relationships; and,
13. General water chemistry.

In selecting a site for a new well, the Permittee shall consider paleotopography, fracture density and orientation, source areas, contaminant characteristics, geologic structures, groundwater flow direction, and the known occurrences of groundwater. All existing and newly installed wells and piezometers shall be surveyed in accordance with the requirements described in Permit Section 6.5.8.

6.5.17.2. Groundwater Levels

The Permittee shall obtain groundwater levels in all wells from which the Permittee is collecting groundwater samples and from other wells as specified by the Department, the schedule for which shall be provided in the Investigation Work Plans or other work plans.

Groundwater levels shall be measured in monitoring wells at frequencies required by the Department and within 24 hours from the start of monitoring the water level in the first well, unless another time frame is specified in the work plan and approved by the Department. Groundwater levels also shall be obtained prior to purging for any sampling event. Measurement data and the date and time of each measurement shall be recorded on a field log. The depth to groundwater shall be measured to the nearest 0.01 foot. The depth to groundwater shall be recorded relative to the surveyed well casing rim or other surveyed datum, as appropriate.

6.5.17.3. Groundwater Sampling

Initial groundwater samples shall be obtained from newly-installed monitoring wells within 30 days after completion of well development. Subsequent groundwater monitoring and sampling shall be conducted at frequencies approved by the Department. All monitoring wells specified in a Department approved Investigation Work Plan shall be sampled within 21 calendar days from the start of the groundwater sampling event. The Permittee shall sample all groundwater in all wells as specified in a Department-approved Investigation Work Plan. Any requests for variances from the approved groundwater sampling plan or schedule shall be submitted to the Department in writing 90 days prior to the start of scheduled monitoring and sampling events.

Groundwater samples shall be collected from all saturated zones including from exploratory borings that are not intended to be completed as monitoring wells prior to abandonment of the borings.

In addition to other required analyses, water samples shall be analyzed in accordance with approved work plans for one or more of the following general chemistry parameters in Table 6-1 below. The Department will specify through approved work plans which parameters in Table 6-1 that the Permittee must analyze for in water samples.

TABLE 6-1.
Groundwater General Chemistry Parameters

nitrate/nitrite	sulfate	chloride	sodium
dissolved CO2	alkalinity	carbonate/bicarbonate	boron
fluoride	manganese	calcium	silicon
ferric/ferrous iron	ammonia	potassium	phosphorus/phosphate
strontium	lithium	magnesium	molybdenum
Total Kjeldahl Nitrogen (TKN)	total organic carbon	suspended sediment concentration*	
total dissolved solids	bromide	stable isotopes (as required by the Department)	
Other parameters indicating oxidation/reduction conditions			
Eh	pH	dissolved oxygen	specific conductivity
dissolved manganese		dissolved iron	
sulfide		alkalinity	
temperature			

*ASTM Method D3977-97 standard test for determining sediment concentration in water samples

6.5.17.4. Well Purging

All screened zones in each monitoring well shall be purged by removing groundwater prior to sampling in order to ensure that fresh formation water is sampled. Purge volumes shall be as required by the Department. Field parameters that shall be monitored while purging are: groundwater pH, specific conductance, dissolved oxygen concentrations, turbidity, redox potential, and temperature. Field parameters shall be recorded at intervals approved by the Department. Measuring instruments are to be approved by the Department and are to be specified in the Investigation Work Plan or other sampling and analysis plan. The volume of groundwater purged, the readings obtained at each interval, and the instruments used shall be recorded on the field monitoring log. Water samples shall be obtained from a well only after the measured values of purge water field parameters have stabilized to within 10 percent for three consecutive measurements and after purging at least 75 percent of one well-bore volume. A well-bore volume is herein defined as the volume of water in the saturated filter pack plus the volume of all standing water within the well screen and casing including the sump. The Permittee may submit to the Department for approval, a written request for a variance from the described method of well purging for individual wells no later than 90 days prior to scheduled

sampling activities.

6.5.17.5. Groundwater Sample Collection

Groundwater samples shall be obtained using methods approved by the Department within eight hours of the completion of well purging. Groundwater in monitoring wells with low recharge rates and that purge dry shall be sampled when the water level in the well has recovered sufficiently to collect the required samples. Sample collection methods shall be documented in field monitoring logs. The samples shall be transferred to appropriate clean containers. Sample handling and chain-of-custody procedures that shall be implemented are described in Permit Sections 6.5.5. Decontamination procedures shall be established and, implemented, for non-dedicated water sampling equipment as described in Permit Section 6.5.3.

Groundwater samples intended for metals analysis shall be submitted to the laboratory for analyses of total metals; the samples shall not be filtered in the field or laboratory, unless the Department requires analyses for dissolved metals concentrations. If dissolved metals concentrations are required by the Department, the Permittee shall obtain groundwater samples for dissolved metals analysis; said samples shall be filtered using disposable in-line filters with a 0.45 micron or other mesh size approved by the Department.

6.5.17.6. Field QC for Groundwater Sampling

Field duplicates, field blanks, equipment rinsate blanks, reagent blanks, and trip blanks (the latter required for VOC analyses only) shall be collected or prepared and analyzed for quality control purposes. The samples shall be managed as described in Permit Section 6.5.5.

Field duplicates shall consist of two samples collected sequentially. Field duplicate samples shall be collected and analyzed at a frequency of at least 10 percent of the total number of environmental samples submitted for analysis. At a minimum, one duplicate sample per sampling event shall always be collected and analyzed.

In the case of VOC analyses, field blanks shall be prepared and analyzed at a frequency of no less than one per day per SWMU or AOC. Field blanks shall be generated by filling sample containers in the field with deionized water and submitting the field blank, along with the groundwater samples, to an analytical laboratory.

Equipment blanks shall be prepared and analyzed at a rate of at least five percent of the total number of environmental samples submitted for analysis, but no less than one equipment blank per sampling day. Equipment blanks shall be generated by rinsing decontaminated sampling equipment with deionized water, and capturing the rinsate water in an appropriate clean container. The equipment blank then shall be submitted with the groundwater samples to the analytical laboratory for the same analyses as the environmental samples.

Reagent blanks may be required by the Department if chemical analyses requiring the use of chemical reagents are conducted in the field during water sampling activities. Reagent blanks shall be prepared and analyzed at a frequency of at least 10 percent of the total number of media samples, but no less than one per day per SWMU or AOC.

Trip blanks shall be prepared using deionized water. Trip blanks shall be managed exactly the same as environmental samples. Trip blanks shall accompany sampling personnel into the field

throughout sampling activities, and then shall be placed into a shipping container with environmental samples for shipment to the analytical laboratory. Trip blanks shall be analyzed at a frequency of one for each shipping container holding samples for VOC analysis.

6.5.17.7. Periodic Monitoring Report

The Permittee shall submit to the Department periodic monitoring reports providing the results of the monitoring and sampling of groundwater, surface water, and springs over the previous reporting period. The reports shall be prepared in accordance with Permit Section 6.2.4.4. The reports shall be submitted within 90 days after completion of the monitoring fieldwork or in accordance with the schedule set forth in the approved monitoring work plans.

6.5.17.8. Springs

The sampling and analysis requirements for groundwater found in this Permit shall also apply to springs. Additionally:

1. Springs shall be sampled as close to the point of discharge as possible and shall be sampled at the same locations during each sampling event. If field conditions change, the spring shall be sampled as close to the original location as possible, and the Permittee shall notify the Department in the periodic monitoring report that the sampling location for the spring has changed;
2. The sampling point for each spring shall be located in accordance with the survey methods described in Permit Section 6.5.8 or by other survey methods approved by the Department;
3. Spring water flow rates shall be measured. In addition, as required by the Department, pH, specific conductance, dissolved oxygen, turbidity, temperature, and oxidation-reduction potential of the spring water shall be measured during each sampling event;
4. Spring samples shall be submitted to an analytical laboratory for analyses of the general chemistry parameters listed in Permit Section 6.5.17.3, as required by the Department and in accordance with approved work plans; and
5. The Permittee shall perform the same field QC procedures as are described in Permit Section 6.5.17.6 and Section 1.3 of Permit Attachment D for groundwater.

6.5.17.9. Surface Water

Surface water samples shall be collected using methods approved by the Department. Samples shall be collected and placed into clean containers. Field parameters and the methods and instruments used to measure them shall be approved by the Department prior to conducting surface water sampling. The sampling and monitoring techniques used and the measurements obtained shall be recorded in field monitoring logs. Stream flow rates shall be measured in conjunction with surface water sampling events.

The Permittee shall perform the same field QC procedures as are detailed in Permit Section 6.5.17.6 and Section 1.3 of Permit Attachment D for groundwater.

6.5.17.10. Groundwater Monitoring Well Construction Requirements

Groundwater monitoring wells shall be designed and constructed in a manner that will yield high

quality samples, ensure that the well will last the duration of the project or other specified time period, and ensure that the well will not serve as a conduit for hazardous constituents to migrate between different stratigraphic units or aquifers. The design and construction of groundwater monitoring wells shall comply with the guidelines established in various RCRA guidance, including, but not limited to:

1. EPA, *RCRA Groundwater Monitoring Technical Enforcement Guidance Document*, OSWER-9950.1, September, 1986; and
2. Aller, L., Bennett, T.W., Hackett, G., Petty, R.J., Lehr, J.H., Sedoris, H., Nielsen, D.M., and Denne, J.E., *Handbook of Suggested Practices for the Design and Installation of Groundwater Monitoring Wells*, EPA 600/4-89/034, 1989.

All well construction and installation shall be conducted in accordance with this Permit Section (6.5.17.10) of this Part and in accordance with approved work plans. All monitoring and sampling shall be conducted in accordance with Permit Section 6.5.17 and in accordance with approved work plans.

The Department must approve in writing all drilling locations, monitoring well and piezometer construction and installation details, sampling depths, and abandonment activities prior to the start of these activities.

6.5.17.10.1. Drilling Methods

A variety of methods are available for drilling monitoring wells. While the selection of the drilling procedure is usually based on the site-specific geologic conditions, the following issues shall be considered:

1. Drilling shall be performed in a manner that minimizes impacts to the natural properties of the subsurface materials;
2. Drilling shall be performed in a manner that contamination and cross-contamination of groundwater and aquifer materials is avoided;
3. The drilling method shall allow for the collection of representative samples of rock, unconsolidated sediment, and soil;
4. The drilling method shall allow the Permittee to determine when the appropriate location for the screened interval(s) has been encountered;
5. The drilling method shall allow for the proper placement of a filter pack and annular sealant for each monitored zone, and the borehole diameter shall be at least four inches larger in diameter than the nominal diameter of the well casing and screen to allow adequate space for emplacement of the filter pack and annular sealants;
6. The drilling method shall also allow for the collection of representative groundwater samples, and drilling fluids, including air, shall be used only when minimal impact to the surrounding formation and groundwater can be ensured (in general the Department discourages the use of drilling mud and drilling additives for groundwater monitoring well installations); and,
7. Requirements specified in Permit Section 6.5.9.

Justification for the drilling method used must be provided in writing to the Department for approval prior to well installations.

6.5.17.10.2. Monitoring Wells and Piezometers Construction

The Permittee shall submit to the Department for approval work plans for construction of wells and piezometers that meet the following requirements:

1. If required by the Department, well and piezometer borings targeting the contact between alluvium and bedrock shall be advanced to a minimum depth of five feet below the alluvium-bedrock interface;
2. Samples of sediment, bedrock, soil, and soil vapor shall be collected as appropriate for hydraulic and soil property testing and for analysis to determine the presence of hazardous waste and constituents at depths or intervals approved by the Department;
3. Samples shall at a minimum be obtained from each boring between the ground surface and one foot below the ground surface (0.0-1.0 foot interval), at subsequent five-foot intervals, at any alluvium-bedrock contact, and at the maximum depth of each boring. For sites where drilling depths exceed 50 feet, the Permittee may propose for Department approval alternative sampling intervals in work plans;
4. Field screening and chemical analyses of collected samples shall be conducted in accordance with Permit Section 6.5.13 and in accordance with approved work plans;
5. Groundwater, soil, soil vapor, rock, and sediment samples collected during drilling activities shall be delivered to an analytical laboratory for the required analyses;
6. No borehole shall be left open or cased with temporary casing for longer than five days;
7. The Department may impose specific requirements for well construction, require borings to be extended to the regional aquifer, or require the drilling of additional borings that intersect perched saturated zones or the regional aquifer based on investigation results;
8. The proposed locations, depths and details of drilling, sampling, and well construction shall be described in work plans prepared in accordance with this Permit Section (6.5.17.10.2) and Permit Section 6.2.4.2 or other document approved by the Department prior to well installation;
9. Geophysical measurements shall be collected from the borings in accordance with Permit Section 6.5.10 and as required by the Department;
10. Where appropriate, the borings shall be monitored for the presence of vapor-phase hazardous constituents prior to well construction; and
11. Based on the results of subsurface soil-vapor monitoring, the Department may require that the Permittee construct the wells to accommodate subsurface soil-vapor monitoring in addition to groundwater monitoring and sampling.

6.5.17.10.3. Well and Piezometer Construction Materials

Well and piezometers construction materials shall be selected based on the goals and objectives of the proposed monitoring program and the geologic conditions at the site. When selecting

construction materials, the primary concern shall be selecting materials that will not contribute to or remove hazardous waste or constituents from groundwater samples. Other factors to be considered include the tensile strength, compressive strength, and collapse strength of the materials; the length of time the monitoring well or piezometer will be in service; and the material's resistance to chemical and microbiological corrosion.

6.5.17.10.4. Design and Construction of Screens and Filter Packs

Screens and filter packs shall be designed to allow accurate sampling of the saturated zone that the well is intended to sample, minimize the passage of formation materials (turbidity) into the well, and ensure sufficient structural integrity to prevent the collapse of the intake structure.

The filter pack shall be installed in a manner that prevents bridging and particle-size segregation. Filter packs shall be installed by the tremie pipe method. At least two inches of filter pack material shall be installed between the screen and the borehole wall, and two feet of filter pack material shall extend above the top of the screen. A minimum of six inches and a maximum of two feet of filter pack material shall also be placed under the bottom of the screen to provide a firm footing. The precise volume of filter pack material required shall be calculated and recorded before placement, and the actual volume used shall be determined and recorded during construction. Any significant discrepancy between the calculated and actual volume shall be explained. Prior to installing the filter pack annular seal, a one to two-foot layer of chemically inert fine sand shall be placed over the filter pack to prevent the intrusion of annular sealants into the filter pack. The use of pre-fabricated screens and filter packs shall be approved in advance of well installation by the Department.

6.5.17.10.5. Design and Construction of Annular Seals

The annular space between the casing and the borehole wall shall be properly sealed to prevent cross-contamination. The materials used for annular sealants shall be chemically inert with respect to the highest anticipated concentration of chemical constituents expected in the groundwater. The precise volume of annular sealant required shall be calculated and recorded before placement, and the actual volume shall be determined and recorded during construction. Any significant discrepancy between the calculated volume and the actual volume shall be explained.

During construction, an annular seal shall be placed on top of the filter pack. This seal shall normally consist of a high solids (10 to 30 percent) bentonite material in the form of bentonite pellets, granular bentonite, or bentonite chips. The seal shall be placed in the annulus through a tremie pipe. A tamping device shall be used to ensure that the seal is emplaced at the proper depth. The bentonite seal shall be placed above the filter pack with a minimum of two-foot vertical thickness. The bentonite seal shall be allowed to completely hydrate in conformance with the manufacturer's specifications prior to installing the overlying annular grout seal.

A grout seal shall be installed on top of the filter pack seal. The grout shall be placed into the annular space by the tremie pipe method, from the top of the filter pack annular seal to within a few feet of the ground surface; however, the grout shall be installed at intervals necessary to allow it time to cure and not damage the filter pack or filter pack annular seal during installation of the grout. The tremie pipe shall be equipped with a side discharge port (or bottom discharge for grouting at depths greater than 100 ft) to minimize damage to the filter pack or filter pack

annular seal during grout placement. The grout seal shall be allowed to cure for a minimum of 24 hours before the concrete surface pad is installed. All grouts shall be prepared in accordance with the manufacturer's specifications. High solids (30 percent) bentonite grouts shall have a minimum density of ten pounds per gallon (as measured by a mud balance) to ensure proper setup. Cement grouts shall be mixed using six and one-half to seven gallons of water per 94-pound bag of Type I Portland cement. Bentonite (five to 10 percent) may be added to delay the setting time and reduce the shrinkage of the grout.

6.5.17.10.6. Well and Piezometer Development Methods

All monitoring wells and piezometers shall be developed to create an effective filter pack around the screen, correct damage to the formation caused by drilling, remove residual drilling mud or other drilling additives, if present, and fine particles from the formation near the borehole, and assist in restoring the original water quality of the aquifer in the vicinity of the well or piezometer. Monitoring wells and piezometers shall be developed until the column of water in each well or piezometer is free of visible sediment, and the pH, temperature, turbidity, and specific conductance have stabilized to within 10%.

If a well or piezometer is pumped dry, the water level shall be allowed to sufficiently recover before the next development period is initiated.

Approval shall be obtained from the Department prior to introducing air, water, or other fluids into a well or piezometer for the purpose of development. If water is introduced to a borehole during drilling and completion, then at minimum the same volume of water shall be removed from the well or piezometer during development. In addition, the volume of water withdrawn from or introduced into a well or piezometer during development shall be recorded.

6.5.17.10.7. Surface Completion Methods

Monitoring wells and piezometers may be completed either as flush-mounted wells or piezometers, or as above-ground completions. A surface seal shall be installed over the grout seal and extended vertically up the well annulus to the land surface. The lower end of the surface seal shall extend a minimum of one foot below the frost line to prevent damage from frost heaving. The composition of the surface seal shall be neat cement or concrete. In above-ground completions wherein the well casing rises or sticks up above ground level, a three-foot square by four-inch thick concrete surface pad shall be installed around the well immediately after the protective casing is installed. The surface pad shall be sloped so that drainage will be off the pad and away from the protective casing. In addition, a minimum of one inch of the finished pad shall be below grade or ground elevation to prevent washing and undermining by soil erosion.

Protective casing with a locking cover shall be installed around the well or piezometer casing (stickup or riser) to prevent damage or unauthorized entry. The protective casing shall be anchored in the concrete surface pad below the frost line and extend at least several inches above the casing stickup. A weep hole shall be drilled into the protective casing just above the top of the concrete surface pad to prevent water from accumulating and freezing inside the protective casing. A cap shall be placed on the well riser to prevent the entry of foreign materials into the well or piezometer, and a lock shall be installed on the cover of the protective casing to provide security against tampering. If a well or piezometer is located in an area that receives vehicular

traffic, a minimum of three bumper guards consisting of steel pipes three to four inches in diameter and a minimum of five-feet in length shall be installed next to the concrete surface pad. The bumper guards shall be installed to a minimum depth of two feet below the ground surface in a concrete footing and extend a minimum of three feet above ground surface. The pipes that form the bumper guards shall be filled with concrete to provide additional strength, and shall be painted a bright color to make them readily visible.

If flush-mounted completions are required (e.g., in active roadway areas), a protective structure such as a traffic-rated utility vault or meter box shall be installed around the casing. In addition, measures should be taken to prevent the accumulation of surface water in the protective structure and around the well or piezometer intake. These measures shall include outfitting the protective structure with a steel lid or manhole cover that has a rubber seal or gasket, and ensuring that the bond between the cement surface seal and the protective structure is watertight. A lock shall be installed on the lid or cover of the protective structure to prevent unauthorized access to the well or piezometer.

6.5.17.10.8. Well and Piezometer Completion Reports

For each monitoring well or piezometer completed under this Permit, the Permittee shall submit to the Department a completion summary report within 30 days of completing installation which shall include a construction log and diagram, a boring log, and a development log. The construction log and diagram and the boring log shall contain at a minimum the information required under Permit Section 6.5.17.10.10.Well or piezometer development must be completed within 30 days of installation.

6.5.17.10.9. Well or Piezometer Abandonment

Wells and piezometers shall be abandoned when they are no longer required to address corrective action requirements or when they are damaged beyond repair; however, no well or piezometer shall be abandoned without prior approval by the Department. Well abandonment must comply with current State Engineer well abandonment guidance (19.27.4.30 and 31 NMAC)

For wells and piezometers with small diameter casing (i.e., two-inch or less), abandonment shall be accomplished by over drilling with a large diameter hollow-stem auger. After the well or piezometer has been over drilled, the casing and grout shall be removed from the ground with a drill rig, and the remaining filter pack shall be drilled out. The open borehole shall then be pressure-grouted via the tremie pipe method from the bottom of the borehole to the ground surface. After the grout has cured, the top two feet of the borehole shall be filled with concrete to insure a secure surface seal.

For larger-diameter wells (i.e. greater than 2-inch), the Permittee may attempt to remove the well casing or grout the well in place. To abandon a well or piezometer in place, a tremie pipe shall be placed at the lowest point in the well or piezometer (i.e., at the bottom of the screen or in the sump). The entire well or piezometer shall then be pressure grouted from the bottom upward to force grout out through the screen into the filter pack and up the inside of the casing, sealing off all breaks and holes in the casing. Once the well or piezometer is grouted, the casing shall be cut off even with the ground surface and covered with concrete.

6.5.17.10.10. Well and Piezometer Construction Diagrams, Logs, and Boring Logs

Information on the design, construction, and development of each monitoring well or piezometer shall be recorded. Construction and boring logs and diagrams shall include the following information:

1. Well, boring or piezometer name/number;
2. Date/time of construction;
3. Borehole diameter and casing diameter;
4. Surveyed location coordinates;
5. Total depth, expressed both as depth below ground surface and elevation above sea level;
6. Name of drilling contractor;
7. Casing length;
8. Casing materials;
9. Casing and screen joint type;
10. Screened intervals, expressed both as depth(s) below ground surface and elevation(s) above sea level;
11. Screen materials;
12. Screen slot size and design;
13. Filter-pack material and size;
14. Filter-pack volume (calculated and actual);
15. Filter-pack placement method;
16. Filter-pack interval(s), expressed both as depth(s) below ground surface and elevation(s) above sea level;
17. Annular sealant composition;
18. Annular sealant placement method;
19. Annular sealant volume (calculated and actual);
20. Annular sealant interval, expressed both as depth below ground surface and elevation above sea level;
21. Surface sealant composition;
22. Surface seal placement method;
23. Surface sealant volume (calculated and actual);
24. Surface sealant interval, expressed both as depth below ground surface and elevation above sea level;
25. Surface seal and well apron design and construction;
26. Development procedure and turbidity measurements;
27. Well development purge volume(s) and stabilization parameter measurements;
28. Type, design, and construction of protective casing;
29. Type of cap and lock;

30. Ground surface elevation above sea level;
31. Survey reference point elevation above sea level on well casing;
32. Top of casing elevation above sea level;
33. Top of protective steel casing elevation above sea level;
34. Drilling method(s); and
35. Types, quantities, and dates/times that additives were introduced, if any.

6.5.18. Laboratory Analyses Requirements for all Environmental Media

The Permittee shall submit all samples for laboratory analysis to laboratories within the EPA Contract Laboratory Program. The laboratories shall use the most recent EPA and industry-accepted extraction and analytical methods as the testing methods for each medium sampled.

The Permittee shall submit a list of analytes and analytical methods to the Department for review and written approval as part of each site-specific investigation, corrective action, or monitoring work plan. The analyte detection limit for each analytical method shall be less than applicable background or regulatory cleanup level as applicable. Analyses conducted with detection limits that are greater than applicable background or regulatory cleanup levels as applicable shall be considered data quality exceptions, and the reasons for use of the elevated detection limits shall be reported to the Department; results based on these data quality exceptions may not be accepted by the Department. All analytical data (including non-detects, estimated values, and detects) shall be included in the electronic copy of the Investigation Report or other report in Microsoft™ Excel format with any qualifiers as attached from the analytical laboratory. The Permittee shall not censor data based on detection limits, quantitation limits, or measurement uncertainty. The Permittee shall also report whether any dilution of the sample was needed prior to laboratory analysis, and the amount of dilution, if any. The Department will not accept J-coded (estimated) results for samples requiring dilution prior to laboratory analysis.

6.5.18.1. Laboratory QA/QC Requirements

The following requirements for laboratory QA/QC procedures shall be considered the minimum QA/QC standards for the laboratories employed by the Permittee. The Permittee shall provide to the Department the names of the contract analytical laboratories within 45 days of awarding a contract for analytical services to any contract laboratory. The Permittee shall maintain copies of laboratory QA/QC manuals in the Operating Record and they shall be subject to inspection by the Department.

6.5.18.1.1. Quality Assurance

The Permittee shall ensure that contract analytical laboratories maintain internal quality assurance programs in accordance with EPA and industry-accepted practices and procedures. At a minimum, the laboratories shall use a combination of standards, blanks, surrogates, duplicates, matrix spike/matrix spike duplicates (MS/MSD), and other laboratory control samples to assess data quality. The laboratories shall establish control limits for individual chemicals or groups of chemicals based on the long-term performance of the test methods. In addition, the laboratories shall establish internal QA/QC procedures that meet EPA's laboratory certification requirements. Specific procedures to be completed are identified in the following sections. If a laboratory is

unable or unwilling to meet the requirements of this Permit, the Permittee shall select a different laboratory that can and will meet the requirements.

6.5.18.1.2. Equipment Calibration Procedures and Frequency

The laboratories' equipment calibration procedures, calibration frequency, and calibration standards shall be in accordance with the EPA test method requirements and documented in quality assurance and standard operating procedures manuals. All instruments and equipment used by laboratories shall be operated, calibrated, and maintained according to manufacturers' guidelines and recommendations. Operation, calibration, and maintenance shall be performed by personnel who have been properly trained in these procedures. A routine schedule and record of instrument calibration and maintenance shall be kept on file at the laboratories.

6.5.18.1.3. Laboratory QC Samples

Analytical procedures shall be evaluated for quality by analyzing reagent blanks or method blanks, surrogates, MS/MSDs, and laboratory duplicates, as appropriate for each method. Laboratory QC samples and frequency of analysis are documented in EPA test methods. At a minimum, laboratories shall analyze laboratory blanks, MS/MSDs, and laboratory duplicates at a frequency of at least one in 20 for all batch runs requiring EPA test methods and at a frequency of at least one in 10 for non-EPA test methods. All laboratory quality control data reported with the Facility's sample analysis results must be related to the analysis of the Facility's samples.

6.5.18.2. Laboratory Deliverables

Laboratory analytical data packages shall be prepared in accordance with EPA-established Level III or IV analytical support protocols. The following shall be provided in the analytical laboratory reports submitted to the Permittee either electronically or in hard (paper) copy:

1. Transmittal letter, including information about the receipt of samples, the testing methods performed, any deviations from the required procedures, any problems encountered in the analysis of samples, any data quality exceptions and qualifiers, and any corrective actions taken by the laboratory relative to the quality of the data contained in the report;
2. Holding times and requirements;
3. Sample analytical results, including sampling date; date of sample extraction or preparation; date of sample analysis; dilution factors and test method identification; soil, rock, or sediment sample results in consistent units (such as mg/kg in dry-weight basis); water sample results in consistent units (such as milligrams/liter); soil-vapor sample results in consistent units (such as ug/m^3); and detection limits; results shall be reported for all samples, including field duplicates, blanks, and other QC samples;
4. Method blank results, including detection limits;
5. Surrogate recovery results and corresponding control limits for samples and method blanks (organic analyses only);
6. MS/MSD concentrations, percent recoveries, relative percent differences (RPDs), and corresponding control limits;
7. Laboratory duplicate results, including RPDs and corresponding control limits;

8. Sample chain-of-custody documentation;
9. Instrument calibration; and
10. Discussion of completeness.

The following data deliverables for organic compounds shall also be required from the laboratory:

1. A cover letter referencing the analytical procedure used and discussing any analytical problems, deviations, and modifications, including signature from authority representative certifying to the quality and authenticity of data as reported;
2. Data qualification in conformance with EPA protocol, and definition of data descriptor codes;
3. Reconstructed ion chromatograms for gas chromatograph/mass spectrometry (GC/MS) analyses for each sample and standard calibration;
4. Selected ion chromatograms and mass spectra of detected target analytes (GC/MS) for each sample and calibration with associated library/reference spectra;
5. Gas chromatograph/electron-capture device (GC/ECD) and/or gas chromatograph/flame ionization detector (GC/FID) chromatograms for each sample and standard calibration;
6. Raw data quantification reports for each sample and calibrations, including areas and retention times for analytes, surrogates, and internal standards;
7. A calibration data summary reporting calibration range used and a measure of linearity (include decafluorotriphenylphosphine and p-bromofluorobenzene spectra and compliance with tuning criteria for GC/MS);
8. Final extract volumes (and dilutions required), sample size, wet-to-dry weight ratios, and instrument practical detection/quantitation limit for each analyte;
9. Analyte concentrations with reporting units identified, including data qualification in conformance with the CLP Statement of Work, including definition of data descriptor codes; and
10. Report of tentatively identified compounds with comparison of mass spectra to library/reference spectra.

The following data deliverables for inorganic compounds shall also be required from the laboratory.

1. A cover letter referencing the procedure used and discussing any analytical problems, deviations, and modifications, including signature from authority representative certifying to the quality and authenticity of data as reported;
2. Results of all method QA/QC checks, including inductively coupled plasma (ICP) Interference Check Sample and ICP serial dilution results;
3. Raw data quantification report for each sample;
4. A calibration data summary reporting calibration range used and a measure of linearity, where appropriate; and
5. Final digestate volumes (and dilutions required), sample size, and wet-to-dry weight ratios.

The Permittee shall present summary tables of these data and Level II QC results to the Department in reports or other documents prepared in accordance with Permit Section 6.2.4. Raw analytical data, including calibration curves, instrument calibration data, data calculation work sheets, and other laboratory supporting data for samples from this project, shall be compiled and kept on file at the Facility for reference. The Permittee shall make all data available to the Department upon request.

6.5.18.3. Review of Field and Laboratory QC Data for all Media

6.5.18.3.1. General QC Review Process

The Permittee shall require the laboratory to notify the Permittee of data quality exceptions within three working days of discovery in order to allow for sample re-analysis, if possible. The Permittee shall contact the Department within three working days of receipt of the laboratory notification of data quality exceptions to discuss the implications to the sampling data, and to determine whether the data will still be considered acceptable or if sample re-analysis or resampling is necessary. The Permittee shall summarize the results of this discussion with Department personnel in a letter. The Permittee shall submit the letter to the Department by fax or electronic mail within five working days of the conclusion of the data quality discussion and shall mail the original signed copy of the letter to the Department within 10 days of the conclusion of the data quality discussion.

The Permittee shall evaluate all sample data, and all field and laboratory QC results for acceptability. Each group of samples shall be evaluated using data validation guidelines contained in EPA guidance documents, the latest version of SW-846, and industry-accepted methods and procedures. Additionally, the Permittee shall evaluate all data for compliance with the following parameters:

1. Representativeness -- the Permittee shall implement procedures to assure representative samples are collected and analyzed, such as repeated measurements of the same parameter at the same location over several distinct sampling events. The Permittee shall note any procedures or variations that may affect the collection or analysis of representative samples and shall qualify the data accordingly;
2. Comparability -- to assure comparability of data, the Permittee shall implement standard collection and analytical procedures, and shall report analytical results in appropriate units for comparison with other data (e.g., past studies, comparable sites, screening levels, and cleanup standards). Any procedure or variation that may affect comparability shall be noted, and the data shall be qualified appropriately;
3. Completeness -- the Permittee shall evaluate all laboratory data for completeness with respect to data quality objectives. The degree of completeness shall be reported with the data in any reports in which the data are referenced;
4. Accuracy -- the Permittee shall evaluate all data for accuracy with respect to percent recovered of spiked samples. Results shall be reported for each analyte in any report in which the data are cited; and
5. Precision -- the Permittee shall evaluate all data for precision with respect to RPDs of duplicate samples. Results shall be reported for each analyte in any report in which the data are cited.

6.5.18.3.2. Review of Laboratory Reporting, Documentation, Data Reduction, and Corrective Action Process

Upon receipt of each laboratory data package, the Permittee shall evaluate the data against the criteria outlined in this Permit. Any deviation from the established criteria shall be noted and the data will be qualified appropriately. A full review and discussion of QC data and all data qualifiers shall be submitted with Investigation Reports or other reports prepared in accordance with Permit Section 6.2.4. Data validation procedures for all samples shall include review of the following, as appropriate:

1. Holding times;
2. Detection limits;
3. Field equipment rinsate blanks;
4. Field blanks;
5. Field duplicates;
6. Trip blanks;
7. Reagent blanks;
8. Laboratory duplicates;
9. Laboratory blanks;
10. Laboratory matrix spikes;
11. Laboratory matrix spike duplicates;
12. Surrogate recoveries; and
13. Representativeness, comparability, completeness, accuracy, and precision as required in Permit Section 6.5.18.3.1 above.

If quality control problems are encountered, appropriate corrective action shall be implemented. All corrective action shall be defensible and the corrected data shall be qualified as appropriate or rejected.

6.5.18.3.2.1. Blanks

The analytical results of field blanks and equipment blanks shall be reviewed to evaluate ambient site conditions and the adequacy of equipment decontamination, respectively. The analytical results of trip blanks shall be reviewed to evaluate the possibility for contamination of samples resulting from improperly cleaned sample containers or transport containers. The analytical results of laboratory blanks shall be reviewed to evaluate the possibility of contamination of a sample caused by analytical procedures. If reagent blanks are required, the analytical results of reagent blanks shall be reviewed to evaluate whether the reagents were contaminated prior to use. If contaminants are detected in any blanks, the sample data shall be qualified, as appropriate.

6.5.18.3.2.2. Field and Laboratory Duplicates

RPDs for field and laboratory duplicates shall be calculated and reported.

6.5.18.3.2.3. Laboratory Spikes

Percent recovered for laboratory spikes shall be calculated and reported.

6.5.18.3.2.4. Holding Times

The Permittee shall review the sampling, extraction, and analysis dates to confirm that extraction and analyses were completed within the recommended holding times, as specified by EPA protocol. Appropriate data qualifiers shall be noted if holding times were exceeded.

REFERENCES

New Mexico Environment Department (NMED), 2000. Guidance for Assessing Ecological Risks Posed by Chemicals: Screening-Level Ecological Risk Assessment, as updated, New Mexico Environment Department, Santa Fe, New Mexico, March 2000.

New Mexico Environment Department (NMED), 2009. Technical Background Document for Development of Soil Screening Levels, Rev. V, New Mexico Environment Department, Santa Fe, New Mexico, December 2009.

U.S. Environmental Protection Agency (EPA), 1980. Samplers and Sampling Procedures for Hazardous Waste Streams; Municipal and Environmental Research Laboratory, U.S. Environmental Protection Agency, Cincinnati, Ohio, EPA-600/2-80-018, January 1980.

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U.S. Environmental Protection Agency (EPA), 2005. Guidance for Developing Ecological Screening Levels, Office of Solid waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C., OSWER Directive 9825.7-55, Revised February 2005.

U.S. Environmental Protection Agency (EPA), 2009. Regional Screening Levels for Chemical Contaminants at Superfund Sites, December, 2009.

U.S. Environmental Protection Agency (EPA), 1996. Soil Screening Guidance: User's Guide, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C., EPA-9355.4-23, July 1996.

PERMIT ATTACHMENT A: GENERAL FACILITY INFORMATION

1.0 INTRODUCTION

This Permit Attachment (A) presents a general description of Kirtland Air Force Base (KAFB-the Facility) and KAFB's Explosive Ordnance Disposal (EOD) Range. It also presents general information on wastes treated at the Open Detonation (OD) Unit.

1.1. GENERAL DESCRIPTION OF THE FACILITY AND THE EOD RANGE

KAFB, which is owned and operated by the U.S. Department of Defense (the Permittee), is located in Bernalillo County, adjacent to Albuquerque in north-central New Mexico. An estimated 24,000 people are employed at the Facility and at the U.S. Department of Energy and with other tenants located within the Facility. The Facility comprises an area of approximately 52,233 acres (about 82 square miles). The location of KAFB is shown on Figure 1-1 (Permit Part 1). The central mission of KAFB is the administration of defense programs for the U.S. Department of Defense.

The OD Unit is located on the EOD Range in the south-central portion of KAFB. The EOD Range is southeast of the former Manzano Base, east of Demolition Range Road, and approximately two miles north of the southern perimeter of KAFB (Figure 1-1, Permit Part 1). The OD Unit is circular in shape with a diameter of 1,500 feet Figure 2-1, Permit Part 2). Typical excavations (craters, pits) where treatment takes place are rectangular and are about 30 feet long, 15 feet wide and about 12 feet deep. The EOD Range occupies generally flat, gently west-sloping land located between the Rio Grande Valley to the west and the base of the Manzano Mountains to the east. The nearest major surface water body is the Rio Grande, located about 10 miles west of the EOD Range.

1.2. PURPOSE OF THE OD TREATMENT UNIT

The Permittee treats hazardous wastes by open detonation at the OD Unit located at the EOD Range, which is located in a remote, sparsely populated area within the KAFB Facility boundary. The wastes treated at the OD Unit are assigned U.S. Environmental Protection Agency (EPA) Hazardous Waste Numbers D001 (ignitability) and/or D003 (reactivity). The wastes may also carry EPA Hazard Waste Numbers D002 (corrosivity), D005, D007, D008, and D009 (toxicity characteristic metals), D018 (benzene), D030 (2,4-dinitrotoluene), D034 (hexachloroethane), and D040 (trichloroethylene) and various underlying hazardous constituents. Wastes may be stabilized with safing fluids (i.e., a substance, such as hydraulic fluid or diesel fuel, with a specific gravity between a liquid and a solid used to desensitize explosives, making them safer to handle).

Treatment is performed by detonating explosives to countercharge hazardous wastes to remove their characteristics of reactivity and/or ignitability. The frequency of operations at the OD Unit varies, as treatment events are conducted on an as-needed basis.

All hazardous waste treated by the OD Unit has the potential to detonate or is a propellant. In accordance with 40 C.F.R. § 261.23(a)(6), the high explosive (HE) waste streams are capable of detonation if subjected to a strong initiating source or if heated under confinement. The remaining waste streams have the potential to detonate because they are explosives as defined in

49 C.F.R. §173.53, pursuant to 40 C.F.R. §261.23(a)(8). As stated in Chapter 7, Section 7.3, of SW-846 (EPA, 1986), as amended, the definition of reactivity "is intended to identify wastes that, because of their extreme instability and tendency to react violently or explode, pose a problem at all stages of the waste management process."

HE, when accidentally exposed to even a small initiating source such as friction, a pinch point, electrical discharge, heat, or impact, can potentially detonate. HEs typically managed at the OD Unit have detonation velocities averaging four to six miles per second and pressures as high as 300,000 times atmospheric pressure for short periods. Fickett and Davis (1979) explain that a good solid explosive converts energy at a rate of 10^{10} watts per square centimeter at its detonation front.

1.3. ROUTES OF TRAVEL

A system of interior roads, shown on Figure 1-1 (Permit Part 1), is maintained at KAFB. About 78 total miles of roadway exist, of which about 33 miles are paved.

Traffic access to and egress from the OD Unit is along the roads shown on Figure 1-1 (Permit Part 1). The roads along which wastes are transported to the EOD Range within KAFB include Southgate Avenue, Hardin Boulevard, Pennsylvania Street, Wyoming Boulevard, Lovelace Road, and Demolition Range Road.

1.4. SECURITY

1.4.1. Introduction

The following paragraphs describe the site-wide and OD Unit-specific security provisions at the KAFB Facility that shall be implemented to prevent unknowing or unauthorized entry of persons or livestock onto the OD Unit. Additional requirements are found in Permit Section 2.1.

1.4.2. Barriers and Means to Control Entry

The OD Unit, situated within the EOD Range is located within KAFB, which has 24-hour security surveillance and controls entry at all times to the Facility through entrance gates. Access to the KAFB Facility is provided through five controlled entrance gates. Access control procedures are designed to ensure that only properly identified and authorized persons, vehicles, and property are allowed entrance to and exit from KAFB. Surveillance is provided by KAFB Security Police, who continuously monitor and control entry inside the KAFB perimeter. The major duties of the KAFB security personnel are to control vehicle, personnel, and material access/egress. KAFB is enclosed by a 7.5-foot chain-link fence and by barbed wire fence. During non-working hours, security personnel routinely patrol the KAFB perimeter fence.

A fence is also located along the perimeter of the EOD Range. A gate is located at the entrance road to the EOD Range and OD Unit. The locations of the security fence and the access gate for the EOD Range and OD Unit are shown on Figure 2-1, in Permit Part 2.

Only personnel with appropriate clearance and escorted visitors are allowed access to the EOD Range. Vehicles and personnel entering the EOD Range are subject to search by security personnel. The EOD Range and OD Unit are surrounded by a three-strand barbed-wire fence, which limits any traffic through or other access to these areas.

REFERENCES

U.S. Environmental Protection Agency (EPA), 1986. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods; 3rd edition, update 3, SW-846, Office of Solid waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

W. Fickett and W. Davis, 1979. Detonation: University of California Press, Berkeley, CA.

PERMIT ATTACHMENT B: LIST OF AUTHORIZED HAZARDOUS WASTES

1.0 INTRODUCTION

Table B-1 lists the hazardous wastes that the Permittee is authorized to treat at the Open Detonation (OD) Unit. Wastes carrying Environmental Protection Agency (EPA) Hazardous Waste Numbers D002, D005, D007 through D009, D018, D030, D034, and D040 shall not be treated at the OD Unit unless, at the point of generation, the wastes are also reactive and/or ignitable. Wastes that are not reactive and/or ignitable shall not be mixed with reactive or ignitable wastes for the purpose of generating a hazardous waste that is authorized for treatment at the OD Unit. Hazardous wastes that are not authorized by this Permit for treatment shall not be accepted by the Facility for treatment and shall be returned to the generator. The Permittee shall also comply with Permit Section 2.7.

TABLE B-1 List of Hazardous Wastes Authorized to be Treated at the OD Unit	
Common and/or Chemical Name – Symbol	**EPA Hazardous Waste Number(s)**
ALSC, HNS	D001, D003
ALSC (RDX)	D001, D003
Amatol (AN, TNT)	D001, D003
Ammonium Nitrate (AN)	D003
Ammonium Perchlorate (AP)	D003
Ammonium Picrate	D001, D003
ANFO	D001, D003
APEX 1220	D001, D003
APEX 1320	D001, D003
ARTEC (HMX-water)	D001, D003
ATX-M	D001, D003
ATX 25RM Slurry	D001, D003
AWH Shape Charge	D001, D003
Baratol (HE)	D001, D003, D005
Barium Nitrate	D001, D003, D005
Barium Peroxide	D001, D003, D005
Barium Potassium Nitrate	D001, D003, D005
Barium Soluble Compounds	D001, D003, D005
BCTK Explosives	D001, D003
Benzene	D001, D018
BKN03 Propellant	D001, D003
Black Powder (Low Explosive)	D001, D003
Blasting Agent	D001, D003
Chromium	D007
CLSC (Copper Linear Shaped Charge)	D001, D003
Composition A (HE)	D001, D003
Composition B (HE)	D001, D003
Composition B/Baratol Mixture (HE)	D001, D003, D005
Composition C4 Class 3 (HE)	D001, D003
Cordite (Double-base gum)	D001, D003
CP (2-[5-cyanotetrazolato] pentamine cobalt (III) perchlorate)	D001, D003
Cyclonite (HE, RDX)	D001, D003
Cyclotol (RDX, TNT)	D001, D003
C-1 Detasheet	D001, D003
C-3	D001, D003
C-4	D001, D003
C-6 Discs	D001, D003
DACP Powder	D001, D003
TABLE B-1	

(continued)	
Common and/or Chemical Name - Symbol	**EPA Hazardous Waste Number(s)**
Detaflex	D003
Detasheet A	D001, D003
Detasheet A4	D001, D003
Detasheet A5	D001, D003
Detasheet C	D001, D003
Detasheet C1	D001, D003
Detasheet C2	D001, D003
Detasheet C3	D001, D003
Detasheet C4	D001, D003
Detasheet C5	D001, D003
Detasheet C6	D001, D003
Detasheet D	D001, D003
Detasheet L	D001, D003
DetCord (PETN)	D001, D003
Detonators	D001, D003, D008
Detonators EBW	D001, D003
Detonators HBW, Ensign Bickford	D001, D003
Dinitrotoluene (DNT)	D001, D003, D030
Dipicrylamide	D001, D003
DBX	D003
Diazodinitrophenol (DDNP)	D003
Double Base Smokeless Powder	D001, D003
DNP	D001, D003
DNPT	D003
Dynamite	D003
Ednatol	D003
EL-506A (HE, PETN)	D001, D003
EL-506D (HE, PETN)	D001, D003
Extex 3003	D001, D003
Extex 8003	D001, D003
Explosive D	D001, D003
Explosive Piston Motors	D003
Flex Linear Shaped Charge	D001, D003, D008
Gas Pressure Generator	D001, D003
Heat Powder	D001, D003
Hexachlorethane (HC Smoke)	D034
Hexanitroazobenzene	D001, D003
HMX (octogen) High Melting Explosive	D001, D003
HNAB	D001, D003
Hexanitrostilbene (HNS)	D001, D003
TABLE B-1	

(continued)	
Common and/or Chemical Name - Symbol	**EPA Hazardous Waste Number(s)**
HNS I	D001, D003
HNS II	D001, D003
HNS Titanium Powder	D001, D003
Holex 2506	D001, D003
Improved Military Rifle (IMR) propellant 4350	D001
IMR 4064	D001
Iremite 60	D001, D003
Iremite 80	D001, D003
Iragel	D001, D003
Ireco Booster 2-C, 3-C, 4-C	D001, D003
Iron Perchlorate	D003
Iron Potassium Perchlorate	D003
JPN Propellant	D001, D003
Kinestik Part A, B	D001, D003
Lead Azide (HE)	D001, D003, D008
Lead Case Flexible Linear Shaped Charge	D001, D003, D008
Lead Mononitraresorcinate (LMNR)	D001, D003, D008
Lead Sulfocyanate	D001, D003, D008
Lead Styphnate (HE)	D001, D003, D008
LX-04	D001, D003
LX-10	D001, D003
LX-13	D001, D003
LX-14	D001, D003
LX-15	D001, D003
LX-16	D001, D003
LX-17	D001, D003
M-6 Propellant	D001, D003
M-77 Water Gel Explosives	D001, D003, D005
MDF (RDX, HNS)	D001, D003
Mercury Fulminate (HE)	D001, D003, D009
Minol	D001, D003
N-5 Sheet Propellant	D001, D003
Nitrocellulose	D001, D003
Nitroglycerin	D001, D003
Nitroguanidine	D001, D003
Nitromethane	D001, D003
NQ	D001, D003
Octol LGE Cast	D001, D003
PBX 9010	D001, D003
PBX 9205	D001, D003
TABLE B-1	

(continued)	
Common and/or Chemical Name - Symbol	**EPA Hazardous Waste Number(s)**
PBX 9404	D001, D003
PBX 9407	D001, D003
PBX 9504	D001, D003
PBXN-5	D001, D003
PBXN-6	D001, D003
PBXN-301	D001, D003
Pentaerythritol Tetranitrate (PETN) (HE)	D001, D003
PETN/Titanium Mix	D001, D003
PETN Zirconium	D001, D003
PETRIN	D001, D003
Pentolite (PETN/TNT) (HE)	D001, D003
Photo Flash Powder (simulators)	D001, D003
Picric Acid	D001, D002, D003
Picritol	D001, D003
Plain Wave Generator (PBX 9404)	D001, D003
Plasticized White Phosphorous	D001
Plasticizer	D001, D003
Polysulfide Prepolymer	D001, D003
Potassium Chlorate	D003
Potassium Nitrate	D003
Potassium Perchlorate (initiator)	D001, D003
Primacord (PETN)	D001, D003
Propellant HPC-95, HPC-60	D001, D003
Propellant M-30, M1, M6	D001, D003
Propellant MC-1951	D001, D003
Propellant (TPH1207C)	D001, D003
RDX	D001, D003
RDX #5	D001, D003
Red Phosphorous	D001
RL-5-X Detcord	D001, D003
Rocket Motor Double Base Propellant	D001, D003
RP-2	D001
RP-87	D001
Separation Explosives (RDX)	D001, D003
Semtex	D001, D003
Smokeless Powder	D003
Sodium Azide	D001, D003
Sodium Nitrate	D003
Strontium Nitrate	D003
Strontium Peroxide	D003
TABLE B-1	

(continued)	
Common and/or Chemical Name - Symbol	**EPA Hazardous Waste Number(s)**
Tetryl (HE)	D001, D003
Tetrytol	D001, D003
TH-1	D001, D003
TH-3	D001, D003
Thermite Powder	D003
TH/KP	D001, D003
Titanium Tetrachloride	D003
TPH 3442 (propellant)	D003
Titanium Boron Powder	D001
Titanium Hydride	D001
Titanium Subhydride	D001
TLX	D001, D003
Trinitrotoluene (TNT)	D001, D003
Tritonal	D001, D003
TATB Pellets, Pad	D001, D003
Toluene (nitrated forms)	D001, D003
Torpex	D003
Tovex	D003
TPH 3386 (propellant)	D003
Triaminotrinitrobenzene (TATB)	D001, D003, D018
Trichloroethylene	D040
WAK 2, TP-H12	D001, D003
XTX 8003	D001, D003
Aluminum	D001, D003
Iron	D001
Lead	D008
Lead Alloy	D008

DEFINITIONS

ALSC aluminum linear shaped charge
AN ammonium nitrate
Anfo ammonium nitrate-fuel oil
AP ammonium perchlorate
CLSC copper linear shaped charge
DDNP Diazodinitrophenol
DNT Dinitrotoluene
HC hexachlorathane
HE high explosive
HMX cyclotetramethylene-tetranitramine; octohydro-1,3,5,7-tetranitro 1,3,5,7-tetrazocine
HNS hexanitrostilbene
IMR improved military rifle
LMNR lead mononitraresorcinate
PBX plastic-bonded explosive; RDX and plasticizer
PETN nitropentaerythrite; pentaerythrite tetranitrate; pentaerythritol
RDX cyclotrimethylenetrinitramine
TATB triaminotrinitrobenzene
TNT trinitrotoluene

PERMIT ATTACHMENT C: WASTE ANALYSIS PLAN

1.0 INTRODUCTION

This Waste Analysis Plan (WAP) describes the procedures that shall be used at the Facility to characterize waste to be treated at the Open Detonation (OD) Unit.

1.1. HAZARDOUS WASTES TREATED AT THE OD UNIT

Hazardous wastes treated at the OD Unit are classified as a non-wastewater waste under the Land Disposal Restrictions (LDR) regulations at 40 C.F.R. Part 268. Knowledge of the chemical and physical properties of hazardous wastes to be treated at the OD Unit is essential for proper waste management. The hazardous wastes treated at the OD Unit exhibit the characteristic of reactivity (D003). Some of these wastes also exhibit the characteristics of ignitability (D001). These wastes may also potentially contain the following toxicity characteristic metals and organic compounds, identified by specific U.S. Environmental Protection Agency (EPA) Hazardous Waste Numbers: barium (D005), chromium (D007), lead (D008), mercury (D009), benzene (D018), 2,4-dinitrotoluene (D030), hexachloroethane (D034), and trichloroethylene (D040). They may also contain underlying hazardous constituents (UHCs) such as chromium, lead, nickel, vanadium, and zinc. The characteristics of hazardous wastes treated at the OD Unit shall be identified using Acceptable Knowledge (AK) or sampling and analysis, as appropriate, and shall be documented in writing. Incompatible wastes shall not be accepted for treatment at the OD Unit. It may be necessary to saturate the wastes with a safing fluid (e.g., water, acetone, alcohol, hydraulic fluid) before treatment.

Categories of hazardous waste that may be accepted for treatment include, for example, explosives, propellants, and pyrotechnics in the form of pure substances and explosives-contaminated wastes. Waste that may be treated at the OD Unit shall include only the waste types authorized in Permit Attachment B. Corrosive (D002) wastes (e.g., picric acid) that are also reactive may be treated at the OD Unit. The hazardous wastes to be treated at the OD Unit are mostly in solid form, however, on occasion, wastes in liquid form (e.g., picric acid) may be treated.

Barium (D005), chromium (D007), lead (D008), and mercury (D009) are toxicity characteristic metals that may be in the wastes or in the casings surrounding the wastes to be treated. The toxicity characteristic organic compounds benzene (D018), 2,4-dinitrotoluene (D030), hexachloroethane (D034), and trichloroethylene (D040) may also be present.

1.2. WASTE ANALYSIS PARAMETERS

Explosive Ordnance Disposal (EOD) personnel shall review characterization information to ensure that hazardous wastes are properly characterized for their physical and chemical properties and can be managed safely and in accordance with the requirements of this Permit. AK shall only be used in lieu of sampling and analysis when the composition and physical characteristics of the waste are exactly known and well controlled.

Waste characterization information must include all necessary information on the presence of toxicity characteristic metals and organic compounds, as defined in 40 C.F.R. Part 261, Subpart C, and data on the presence of any UHCs listed in 40 C.F.R. § 268.48 in accordance with 40 C.F.R. § 268.9(a).

1.3. WASTE CHARACTERIZATION PROCEDURES

The approach to characterization shall be based on the chemical and physical nature of the waste. Characterization procedures used at the Facility require all generators to provide AK, related technical information, and/or sampling and analysis results (including information on UHCs) as appropriate. Accurate characterization is necessary for appropriate waste classification and assignment of EPA Hazardous Waste Numbers, in the preparation of LDR documentation, and ensuring proper management of waste.

1.3.1. Characterization Strategy

The characterization strategy for hazardous wastes to be treated at the OD Unit is described below.

1.3.1.1. Wastes to be Treated

Prior to accepting waste for treatment at the OD Unit, a detailed chemical and physical description of the waste shall be provided by the generator.

Ensuring that detailed and accurate waste characterization exists shall include the steps outlined below in Permit Sections 1.3.1.2 through 1.3.1.4. Hazardous waste destined for treatment shall be packaged in containers; both the waste and the containers shall be inspected before acceptance for treatment and again before loading the waste into the treatment unit.

1.3.1.2. Verification

All waste shipments to the OD Unit shall be verified in two phases prior to treatment to ensure that the waste is authorized for treatment in accordance with Permit Attachment B. Phase 1 will be conducted to ensure shipping documentation completeness, and Phase 2 is to ensure that the waste delivered corresponds to the documentation provided for that waste. Waste shall not be accepted for treatment until all verification is complete.

1.3.1.3. Phase 1 Verification

Screening is performed by the appointed EOD Team Chief. Documentation may include, but is not limited to, a completed Ammunition Disposition Request (ADR), a hazardous waste manifest, a material safety data sheet, a description of the process generating the waste, and sampling and analysis data.

Upon receipt of a waste shipment at the OD Unit, a determination of shipping documentation (hazardous waste manifest) completeness shall be made by EOD personnel. Each shipping document that accompanies an off-site waste shipment shall be checked to ensure that the following information is present and complete:

- The shipment identification number.

- The proper U.S. Department of Transportation basic description.
- The quantity (weight) of waste in the shipment.
- The number and type of containers in the shipment.
- A signed and dated certification of the shipment's content.
- The shipment labels and placards which match the shipping document.

If documentation is incomplete or inadequate, EOD personnel shall contact the generator for clarification and require that the generator correct the situation. Only waste that meets the requirements of this Permit shall be transported to the OD Unit for treatment.

Containers will be visually examined for defects such as dents, cracks, and corrosion. Conditionally exempt small quantity generators do not need a hazardous waste manifest. If there are discrepancies, they shall be resolved by contacting the generator before EOD personnel sign the shipping document. If the discrepancies cannot be resolved, EOD personnel shall reject the shipment. Rejected waste shall be returned to the generator.

1.3.1.4. Phase 2 Verification

The EOD Team Chief, with assistance from other EOD personnel, shall compare the contents of waste shipments received with the description on the documentation provided by the generator to ensure that they match. The visual inspection shall include content identification and quantity estimation. If any waste fails verification, it shall be returned to the generator to resolve the discrepancy.

1.3.2. Sampling and Analysis of Waste

Sampling and analysis of waste for purposes of characterization shall be conducted in accordance with the procedures outlined in Sections 1.3.2.1 through 1.3.2.4 of this Permit Attachment (C) and Permit Section 2.6.3.

1.3.2.1. Sampling Equipment

Each sample of waste requiring sampling and analysis shall be collected using appropriate sampling equipment, as recommended in SW-846 (EPA, 1986) or other Department-approved sampling guidance.

1.3.2.2. Equipment Decontamination

Disposable, clean equipment shall be used to eliminate the potential for cross contamination during sampling. Therefore, maintaining and decontaminating sampling equipment will not be necessary.

1.3.2.3. Sample Preservation and Storage

Waste samples shall be collected in clean containers and preserved, as appropriate, to ensure that their integrity remains intact prior to, during, and after transport to the analytical laboratory. Container types, preservation techniques, and holding times for expected analytes of interest are presented in Table C-1.

1.3.2.4. Quality Assurance/Quality Control

The Permittee shall implement a quality assurance (QA) process designed to obtain high quality data. Quality control (QC) procedures shall be employed to measure the degree to which this QA objective is fulfilled. At a minimum, the QA process shall meet the requirements of Permit Sections 6.5.17.6, 6.5.18.1, and 6.5.18.3.

QC samples shall be collected as part of sampling activities. Duplicates shall be collected and analyzed for all constituents of concern. A chain-of-custody form shall be completed and shall include the type of sample collected; the names and signatures of the sampler(s); sample identification numbers, date, and time of collection; the designation as a grab or composite sample; the names, dates, times, and signatures of any persons involved in transferring samples; and the shipping number. Personnel shall be properly trained in the use of sampling equipment, sample containers, and sampling methods to ensure that sampling activities are conducted appropriately.

1.4. ANALYTICAL LABORATORY AND TESTING/ANALYTICAL METHODS SELECTION

An EPA-certified analytical laboratory shall be selected to perform laboratory analysis of waste. The laboratory shall be required to have a comprehensive QA/QC program, technical analytical expertise, and an effective information management system.

The selection of analytical testing methods for waste is based on the following.

- The physical state of the waste.
- The analytes of interest.
- The required detection limits (i.e., regulatory thresholds).
- Information requirements (e.g., to ensure compliance with LDR treatment standards).

1.5. WASTE RE-EVALUATION FREQUENCIES

A re-evaluation of waste characterization data shall be conducted as necessary but at least annually to ensure that data are accurate, in accordance with 40 C.F.R. § 264.13(a)(3). Updates of waste characterization information are required when:

- A change occurs in the process or operation generating the hazardous waste, and
- Hazardous waste received from an off-site facility does not match the waste specified on the accompanying manifest or shipping papers.

Waste characterization data for the wastes treated at the OD Unit shall be re-evaluated at least annually. This information shall be used to determine if waste characterization data are accurate and to determine the appropriateness of current waste management practices and characterization methods, and shall be documented in the Operating Record.

REFERENCE

U.S. Environmental Protection Agency (EPA), 1986. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods; 3rd edition, update 3, SW-846, Office of Solid waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

TABLE C-1
Sample Containers, Preservation Methods, and Holding Times for Analysis of Waste[a]

Sample Type	Container Type[b]	Preservation Method	Holding Time
Volatile Organics	4 oz glass jar with Teflon cap	Cool to 4 °C	14 days
Semivolatile Organics	4 oz glass jar with Teflon cap	Cool to 4°C	14 days
Metals			
(except hexavalent chromium and mercury)	4 oz glass jar with Teflon cap	Cool to 4°C	180 days
(Hexavalent chromium)	4 oz glass jar with Teflon cap		28 days
(Mercury)	4 oz glass jar with Teflon cap		28 days

a. Containers, methods and holding times from most current version of SW-846 (EPA, 1986)
b. Other container types may be used depending upon the laboratory or the method, with prior NMED approval.

DEFINITIONS
NMED New Mexico Environment Department
oz ounces
°C degrees Celsius

PERMIT ATTACHMENT D: ANNUAL SOIL SAMPLING AND ANALYSIS PLAN

1.0 INTRODUCTION

The purpose of this sampling and analysis plan is to ensure that accurate data are collected to determine whether a release of hazardous waste or hazardous constituents has occurred during the operating period of the Open Detonation (OD) Unit that may pose a threat to human health. Any corrective action that may be required for the OD Unit shall be conducted in accordance with Part 6 of this Permit.

The OD Unit is located at the Kirtland Air Force Base (KAFB) Explosive Ordnance Disposal (EOD) Range and is permitted as a Resource Conservation and Recovery Act (RCRA) Subpart X miscellaneous unit. The OD Unit is used to treat hazardous waste to remove the hazardous characteristics of reactivity and ignitability. The Permittee shall perform soil monitoring at the OD Unit during operations to assess whether or not contaminants are being released to soil at levels that could endanger human health. This soil sampling and analysis shall be performed on an annual basis in accordance with the procedures described in this Annual Soil Sampling and Analysis Plan (SSAP).

1.1. SAMPLING PROCEDURES

This Section (1.1) describes procedures and methods for sampling soil at the OD Unit. Other applicable procedures or methods provided in the most current version of *SW-846* (EPA, 1986) may be used if conditions or experience show the alternate method(s) to be more appropriate and if approved by the Department. All sampling procedures used will be documented in a field logbook. Sampling shall be performed in accordance with procedures given in *Samplers and Sampling Procedures for Hazardous Waste Streams* (EPA, 1980), or SW-846, and in accordance with this SSAP.

1.1.1. Sampling Schedule and Frequency

Soil samples shall be collected annually at the OD Unit during the month of June. Sampling shall be conducted at the OD Unit before any backfilling, excavation, or grading is performed at the site since the last treatment event. If no treatment events have occurred during a particular annual period, annual sampling will not be conducted for that annual period. The Department shall be notified if this circumstance occurs.

1.1.2. Sampling Strategy and Analytical Parameters

For the OD Unit, four soil samples shall be collected from the zero- to six-inch depth and analyzed for total metals, explosives and other constituents listed in Table D-1. The sampling location strategy depends on the physical characteristics of the OD Unit. If only one crater (pit) is present during the sampling event, then four soil samples shall be taken from the walls of the crater at each of the four primary compass directions (Figure D-1). If more than one crater is present, a grid (with a minimum of 100 possible locations) that encompasses all of the craters shall be established, and four random sample locations within the grid will be selected for the sampling event (Figure D-2). The grid will be square in shape and its overall maximum size shall be established using the maximum distance between the walls of the craters that are present

at the site. If no craters are present, then a 150-foot by 150-foot grid shall be established at the center of the cleared area which composes the OD Unit, and four soil sample locations shall be randomly selected from within the grid.

Each sample location shall be located by reference to a surveyed grid datum, prominent site features, or from some documented reference point that can be located in the field. Sample locations shall be recorded in the field logbook, and shall be shown on a figure depicting the OD Unit in the annual reports (see Section 1.7 of this Permit Attachment).

1.1.3. Sample Collection

Qualified personnel shall collect soil samples. Sample collection procedures, types of containers and storage procedures specific to each SW-846 method shall be strictly adhered to. Prior to collecting a soil sample, sampling personnel shall scrape aside loose materials (e.g., rocks, litter) from the sampling location. Personnel shall collect soil samples using metal or plastic scoops, wooden or disposable plastic hand trowels, or similar equipment. Non-sparking equipment shall be used whenever required by EOD personnel for worker safety. Excess soil generated at each soil sampling location may be used as backfill. Samples shall be representative of the site. Cross-contamination of samples shall be prevented. Sample collection activities shall also conform to these requirements:

1. Personnel shall schedule sampling activities with EOD Range Control;
2. Personnel shall obtain clearance from an EOD Technician/Specialist for the selected location of each sample;
3. Personnel shall wear clean gloves before collecting each individual sample;
4. Personnel shall use clean sampling equipment to collect soil samples. (Note: A disposable sampler may be presumed clean if it is still in a factory-sealed wrapper. Reusable samplers will be scraped to remove any loose material, washed with a detergent and water solution, rinsed several times with tap water, rinsed with deionized water, drained of excess water, and air-dried or wiped dry.);
5. Personnel shall clear each sample for shipment to the analytical laboratory by an EOD Technician/Specialist; and
6. Personnel shall check out with EOD Range Control when sampling has been completed.

Samples collected for analysis of white phosphorous must the follow the special sample collection procedures in SW-846, Method 7580.

1.1.3.1. Sample Containers and Preservatives

Samples shall be placed in appropriate containers, compatible with the intended analysis. All containers shall be new and certified clean to ensure the integrity of samples collected. Samples shall be properly prepared and preserved as necessary to maintain sample integrity. Table D-1 lists the proper container, preservative, and holding time for each chemical parameter of interest.

1.1.3.2. Sample Identification

Sample identification numbers shall be assigned by alpha/numeric characters corresponding to the last two digits of the calendar year (YY), two digits of the month (MM), two digits of the day

of the month (DD), a code indicating soil sample (SS), and a unique number (##) designating the sample location. Thus, a complete format of a sample identification number is: YYMMDDSS##. For example, soil sample number two collected on 3rd of June 2007 would be labeled: 070603SS02.

1.1.3.3. Sample Handling, Documentation, and Custody Procedures

Chain-of-custody procedures shall be followed in accordance with Permit Section 6.5.5.3. Labels shall be affixed to sample containers in accordance with Permit Section 6.5.5.4.

The chain-of-custody form shall be signed upon receipt at the laboratory, and the original or a copy returned to the KAFB Environmental Management (EM) Branch Office for inclusion in the Operating Record. The Chain-of-custody form shall include or be accompanied by a request-for-analysis form that lists all analyses to be performed for the samples and all special instructions related to sample management or analysis. Any potential hazards posed by the samples shall be listed on the request-for-analysis form.

The sample container shall be sealed with a gummed paper seal or tag attached to the container in such a way that the seal must be broken in order to open the container.

A field logbook shall be kept and shall contain information pertinent to field surveys and sampling. Entries in the logbook shall be conducted in accordance with Permit Section 6.5.2.

The analytical laboratory shall be required to have procedures for minimizing cross contamination of samples and securing sample custody within the laboratory.

Samples relinquished to the laboratory shall be subject to the following procedures for transfer of custody and shipment.

1. When transferring the possession of samples, the individuals relinquishing and receiving them shall sign, date, and note the time on the Chain-of-custody form.
2. Shipping containers such as coolers shall be custody-sealed for shipment to the laboratory.

Laboratory personnel shall verify that samples are correctly labeled, that documentation is correct, and shall inspect the physical condition of the containers. Any discrepancies are to be resolved between laboratory and sampling personnel at this time. The laboratory portion of the form shall be completed by the laboratory personnel and shall include at a minimum:

1. The name of the person receiving the sample,
2. Laboratory accession (identification) number,
3. The date and time of sample receipt, and
4. Sample condition

1.1.3.4. Sample Shipping

Sample shipment shall be conducted in accordance with Permit Section 6.5.5.2.

1.2. INVESTIGATION-DERIVED WASTE

Investigation–derived waste shall be managed in accordance with Permit Section 6.5.7.

1.3. QUALITY ASSURANCE/QUALITY CONTROL PROGRAM

Because important decisions will be based on the data collected as part of this SSAP, a program to ensure that data are of high quality is essential. The Permittee shall follow a quality assurance/quality control (QA/QC) program that mandates documentation of the precision and accuracy of laboratory analyses as well as other aspects of quality assurance.

1.3.1. Quality Control Targets

For metals, quality control targets for accuracy and precision shall be 75-125% recovered and ±35% relative percent difference (RPD), respectively. The laboratory reporting limits for metals shall be at or below the respective background level for each metal subject to analysis.
For high explosives (HE), quality control targets for accuracy and precision shall be 20-120% recovered and ±50% RPD, respectively. The laboratory reporting limits for HE compounds shall be at or below the appropriate human risk industrial screening level for each HE compound (NMED, 2009).

1.3.2. Field Quality Control

Field quality control shall be conducted in accordance with Permit Section 6.5.14 and Table D-2 of this Permit Attachment.

1.4. LABORATORY ANALYSIS

Laboratory analysis shall be conducted in accordance with Permit Section 6.5.18.

1.5. DATA VALIDATION

Data validation shall be conducted in accordance with Permit Section 6.5.18.3.

1.6. HUMAN RISK SCREENING

If a sample result for a metal exceeds the applicable background level listed in Table D-4, the result shall be compared to the most current EPA Regional Screening Levels (RSLs) and Department soil screening levels (SSLs-NMED, 2009) for an industrial land use scenario. The industrial land use scenario shall only apply to risk screening under this SSAP, and not for purposes of closure or corrective action. Analytical results for explosives and SVOCs shall be compared to the SSLs. EPA RSLs and Department SSLs for industrial scenarios are presented in Table D-4 for the metals, SVOCs, and HE compounds that are to be evaluated.

Sample results for arsenic shall be compared with the approved background level because the natural background concentration of arsenic in this area exceeds the EPA human health medium-specific screening level. Additionally, the screening level for thallium shall be set equal to the Department soil screening level for this constituent.

If a Department SSL or EPA RSL does not exist for a substance, the Permittee shall calculate a screening level based on an industrial scenario and a cancer risk of 10^{-5} for carcinogens, and a hazard quotient (HQ) of 1.0 for noncarcinogens. This calculated screening level shall be subject to Department approval and shall be revised if determined by the Department not to be protective of human health.

Any exceedance of an EPA RSL, Department SSL, or calculated screening level shall be

reported to the Department in writing within 15 calendar days. The Department will review the information and, at its discretion, may require additional site characterization to protect the health and safety of site workers. If the Department requires additional site characterization, the Permittee shall prepare a sampling and analysis plan (SAP) for Department approval. The SAP shall be prepared and submitted to the Department within 60 calendar days of the request. Upon Department approval of the SAP, the Permittee shall implement the plan within 30 days. Upon completion of the field investigation, the Permittee shall report the results of the additional site characterization effort in writing to the Department within 90 calendar days. The Department will then determine if additional sampling is required, if the site must be remediated immediately to protect workers, or if no corrective action is required.

1.7. REPORTING

The Permittee shall submit two copies of each annual report to the Department within 90 days of completion of each sampling event. Each annual report shall include:

1. A summary cover letter.
2. Copies of all laboratory reports associated with the sampling event, including the analytical results for each sample.
3. A summary of any constituents detected at concentrations exceeding human risk levels including any exceeding a screening level calculated by the Permittee when a Department SSL or EPA RSL is unavailable. The method and data used by the Permittee to calculate a screening level must also be reported.
4. A summary of field and laboratory QC sample results.
5. A summary of whether the data meet the data quality objectives listed in this Permit Attachment. And,
6. A scaled, oriented map showing the location of the OD Unit sampling grid (if any), craters (if any), and all sample locations.

REFERENCES

New Mexico Environment Department (NMED), 2009. Technical Background Document for Development of Soil Screening Levels, Rev, V, New Mexico Environment Department, Santa Fe, New Mexico, December 2009.

U.S. Environmental Protection Agency (EPA), 1980. Samplers and Sampling Procedures for Hazardous Waste Streams; Municipal and Environmental Research Laboratory, U.S. Environmental Protection Agency, Cincinnati, Ohio, EPA-600/2-80-018, January 1980.

U.S. Environmental Protection Agency (EPA), 1986. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods; 3rd edition, update 3, SW-846, Office of Solid waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 2002. RCRA Waste Sampling Draft Technical Guidance; Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C., EPA530-D-002, August 2002.

Table D-1
Analytical Parameters and Methods, Container Types, Preservation Methods, and Holding Times for Soil Samples[a]

Parameter	Analytical Method[b]	Container Type and Preservation Method[c]	Holding Time
Total Metals: Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium (total), Cobalt, Copper, Lead, Mercury, Nickel, Selenium, Silver, Thallium, Tin, Vanadium, Zinc	6010C or 7000 Series	4 oz plastic or glass jar, stored at <4°C	180 days; 28 days for Mercury and Chromium
High Explosives (HEs): 1,3,5-Trinitrobenzene; 1,3-Dinitrobenzene; TNT (2,4,6-trinitrotoluene); 2,4-Dinitrotoluene; 2,6-Dinitrotoluene; 2-Amino-4,6-Dinitrotoluene; 4-Amino-2,6-Dinitrotoluene; HMX (octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine); 2-Nitrotoluene; Nitrobenzene; 3-Nitrotoluene; 4-Nitrotoluene; Tetryl; RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine), 3,5-Dinitroaniline, PETN (pentaerythritol nitrate), nitroglycerine	8330B	4 oz glass jar, stored at <4°C	14 days
White Phosphorous	7580	4 oz glass jar with PTFE lid, fill to top to minimize air in jar, stored at <4°C	Indefinite (if preserved at <4°C, kept in dark and tightly sealed)
Dioxins and Furans	8280B or 8290A	250 mL wide mouth amber glass jar with PTFE lid, stored at <4°C	30 days
Perchlorate	6850	4 oz glass jar, stored at <4°C	28 days

a. Analytical methods, preservation methods, and holding times are from most current version of Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846 (EPA, 1986).
b. Another applicable or newer method may be used with prior NMED approval.
c. Other container types may be used depending upon the laboratory or the method used with prior NMED approval.

DEFINITIONS:

mL	milliliters
NMED	New Mexico Environment Department
oz	ounces
PTFE	polytetrafluoroethylene
°C	degrees Celsius
<	less than

TABLE D-2
Field Quality Control Samples

Quality Control Sample Type	Sample Matrix	Applicable Analytes	Frequency	Purpose
Field duplicate	Soil	Metals, HE, White Phosphorus, Perchlorate, Dioxins and Furans	One sample per sampling event	Document precision of the sampling process
Equipment blank	Water	Metals, HE, White Phosphorus, Perchlorate, Dioxins and Furans	One sample per day (if using non-disposable equipment)	Document if equipment is being properly decontaminated between samples

DEFINITION
HE high explosive

TABLE D-3
Background Concentrations Of Naturally Occurring Metals in Soil at Kirtland Air Force Base

Metal	Surface Soil (mg/kg)
Antimony	3.9
Arsenic	5.6
Barium	130
Beryllium	0.65
Cadmium	<1
Chromium (total)	17.3
Cobalt	5.2
Copper	15.4
Lead	21.4
Mercury	<0.25
Nickel	11.5
Selenium	<1
Silver	<1
Thallium	<1.1
Tin	<10
Vanadium	20.4
Zinc	62

DEFINITIONS
mg/kg milligrams per kilogram
< less than

TABLE D-4
List of Analytical Parameters and Industrial Soil Screening Levels

Analytical Parameters	EPA Regional RSL[a] (mg/kg)	NMED SSL[b] (mg/kg)
Metals		
Antimony	410	454
Arsenic	1.6	17.7
Barium	190,000	224,000
Beryllium	2,000	2,260
Cadmium	810	1,120
Chromium (Total)	1,400	Not established
Cobalt	300	20,500
Copper	41,000	45,400
Lead	800	800
Mercury (methyl)	100	114
Nickel	20,000	22,700
Selenium	5,100	5,680
Silver	5,100	5,680
Thallium	66	74.9
Tin	610,000	Not established
Vanadium	5,200	5,680
Zinc	310,000	341,000
High Explosives (HE)		
1,3,5-Trinitrobenzene	27,000	Not established
1,3-Dinitrobenzene	62	Not established
TNT (2,4,6-Trinitrotoluene)	79	469
2,4-Dinitrotoluene	1,200	103
2,6-Dinitrotoluene	620	687
2-Amino-4,6-Dinitrotoluene	2,000	Not established
4-Amino-2,6-Dinitrotoluene	1,900	Not established
HMX (Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine)	49,000	34,200
RDX (Hexahydro-1,3,5-trinitro-1,3,5-triazine)	24	174
m-Nitrotoluene	12,000	22,700
Nitrobenzene	280	277
o-Nitrotoluene	13	145
p-Nitrotoluene	110	1,200
Tetryl	2,500	2,740
3,5-Dinitroaniline	Not established	Not established
PETN (pentaerythritol tetranitrate)	Not established	Not established
Nitroglycerine	62	68.4
Other Analytes		
White phosphorous	20	Not established
Perchlorate	720	795
Dioxins and Furans (in TEQ TCDD)	0.000018	0.000204

a. Values from "Regional Screening Levels for Chemical Contaminants at Superfund Sites" (EPA, 2009).

http://www.epa.gov/reg3hwmd/risk/human/rb-concentration-table/index.htm
b. Values from "Technical Background Document for Development of Soil Screening Levels", Rev. 5 (NMED, 2009).
c. The toxicity of dioxins and furans will be measured in relation to the most toxic form of dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin [TCDD]) by calculating the toxic equivalent (TEQ).

DEFINITIONS

mg/kg	milligram per kilogram
NMED	New Mexico Environment Department
RSL	Regional Screening Level
SSL	soil screening level

Figure D-1

Figure D-2

PERMIT ATTACHMENT E: INSPECTION PLAN

1.0 INTRODUCTION

This Permit Attachment addresses general inspection requirements of 40 C.F.R. § 264.15.

1.1. INSPECTION SCHEDULE

The inspection schedule is presented in Table E-1 and shall be maintained at the Explosive Ordnance Disposal (EOD) Shop, as required by 40 C.F.R. § 264.15(b)(2).

1.2. SCOPE OF INSPECTIONS

At a minimum, the items listed in Table E-1 shall be inspected at the indicated frequencies.

1.3. FREQUENCY OF INSPECTIONS

Items listed in Table E-1 shall be inspected at the frequencies indicated in the table.

TABLE E-1
Inspection Schedule for the OD Unit

Item Number	Inspected For	Frequency
1	Are warning signs posted on the Explosive Ordnance Disposal Range boundary fence at 300-foot intervals?	Monthly
2	Is the EOD Range flag serviceable/posted?	Immediately before treatment operations
3	Are all combustibles clear of the OD Unit to 200 feet, including vegetation?	Immediately before treatment operations
4	Are firebreaks clear of combustibles, including vegetation?	Within 24 hours before treatment operations
5	Is a first-aid kit available?	Immediately before treatment operations
6	Is the OD Unit clear of explosives from previous treatment activities including the loading and unloading areas?	Immediately before treatment operations and within 24 hours after treatment operations
7	Are the EOD Range gates working properly?	Monthly
8	Is the Contingency Plan available at the EOD Range personnel bunker?	Immediately before treatment operations
9	Are all fire-protection and communication equipment operational?	Immediately before treatment operations
10	Is the OD Unit area in good condition?	Monthly and within 24 hours before treatment operations
11	Are metal fragments cleaned up?	Monthly and within 24 hours after treatment operations
12	Is the EOD Range boundary fence in good condition?	Monthly
13	Are the EOD Range roads and firebreaks in good condition?	Monthly
14	Is the personnel bunker in good condition?	Monthly
15	Is the runoff berm around the OD Unit in good condition?	Monthly
16	Is there standing water in a pit or crater at the OD Unit?	Immediately before treatment operations and within 24 hours of a precipitation event
17	Is there kick out or treatment residues following OD operations?	Within 24 hours after treatment operations

PERMIT ATTACHMENT F: CONTINGENCY PLAN

1.0 INTRODUCTION

This Contingency Plan has been prepared for the Open Detonation (OD) Unit located at the Explosive Ordnance Disposal (EOD) Range at the Kirtland Air Force Base (KAFB) Facility in compliance with 40 C.F.R. Part 264, Subpart D, as applicable. This plan consists of emergency response procedures and activities specific to the OD Unit.

1.1. PURPOSE AND IMPLEMENTATION

The purpose of this Contingency Plan is to define the responsibilities and provide for coordination of activities to minimize hazards to human health or the environment from fires, explosions, or any sudden or non-sudden release of hazardous waste or hazardous constituents. In accordance with 40 C.F.R. § 264.51(b), the provisions of this plan shall be carried out immediately whenever there is a fire, explosion, or a release of hazardous waste or hazardous constituents that could threaten human health or the environment.

In the case of major incidents or emergencies that cannot be controlled with EOD Range resources, the Emergency Coordinator (EC) shall notify the KAFB Fire Department and the KAFB Command Post (KCP). The KCP shall assume primary responsibility for response coordination in the case of such major incidents or emergencies or delegate that responsibility to the KAFB Fire Chief. Once the KCP or KAFB Fire Chief completes its response, the EC shall assume responsibility to ensure compliance with all the provisions of this Contingency Plan, including post-emergency inspections and reporting.

1.2. DISTRIBUTION

To assure proper implementation, this Contingency Plan shall be studied and understood by all personnel involved in the management of hazardous waste at the OD Unit and by all personnel required to respond to emergency situations at the OD Unit.

A copy of this Contingency Plan and any subsequent revisions to the plan shall be maintained at the Environmental Management (EM) Branch Office and a current copy shall be maintained at the KCP, and at the personnel bunker at the EOD Range. Copies and subsequent revisions shall be distributed to the KAFB Fire Department, the Albuquerque Fire Department, and the New Mexico Environment Department in the event that they are called upon to assist with or provide emergency services.

1.3. CHARACTERISTICS OF WASTES MANAGED AT THE OD UNIT

The Permittee treats reactive (D003) and ignitable (D001) hazardous wastes. These hazardous wastes include explosives, propellants, and pyrotechnics.

1.4. SUPPORT AGREEMENTS WITH OUTSIDE FACILITIES

The Permittee shall maintain support agreements in accordance with Permit Section 2.4.4.

1.5. EMERGENCY COORDINATOR

An EC (see Table F-1 of this Permit Attachment) shall be on site during treatment activities to coordinate emergency response measures. The EC shall be thoroughly familiar with this Contingency Plan, this Permit, characteristics of the hazardous wastes managed at the OD Unit, the hazardous waste management operations and activities conducted at the OD Unit, the location of hazardous wastes managed at the OD Unit when treatment operations are in progress, the location of the Operating Record at the Facility, and the EOD Range layout. The Base Civil Engineer shall also serve as the functional equivalent of an alternate EC. If the Base Civil Engineer becomes the EC (because the primary EC is not available), the Base Civil Engineer shall be present at the OD Unit for the entire duration of the treatment event.

The EC shall ensure that personnel assigned to the EOD Range are trained in the location and use of eyewash solutions, fire extinguishers, and emergency protective clothing; in emergency procedures; and in evacuation procedures before starting any treatment operations.

The EC has three primary responsibilities. They are:

1. Assess the situation. By observing the scene, interviewing personnel, and/or reviewing records, the EC shall gather information relevant to the response, such as the type of event, quantity and type of released material, and actual or potential hazards to human health or the environment.
2. Protect personnel. The EC shall take reasonable measures to ensure the safety of personnel, such as accounting for EOD Range personnel, attending to injuries, or coordinating the evacuation of EOD Range personnel, if necessary. If evacuation is indicated for personnel, the KCP shall be informed.
3. Contain or mitigate the hazards. The EC shall take reasonable measures to ensure that fires, explosions, or releases do not occur, recur, or spread.

1.6. RESPONSE PROCEDURES

When the EC is notified of an incident or emergency, he shall first determine the scale of the incident or emergency and decide if the incident or emergency is minor or major. In the case of minor incidents or emergencies, the EC shall coordinate the response. In the case of major incidents, the EC shall relinquish control to the KCP, which may in turn relinquish control to the KAFB Fire Chief when he arrives to handle the emergency; however, the EC shall remain available to provide technical guidance and information.

If necessary to protect human health, personnel shall evacuate the OD Unit during an emergency in accordance with the requirements of Section 1.6.5 of this Permit Attachment.

In the event that the EC determines an incident to be minor, a person shall be assigned to stand by at a safe distance with a two-way radio. At the first indication of an escalation in the degree of the incident, the standby person shall be instructed to notify the KCP.

The EC or EM Branch Chief of Compliance shall notify the National Response Center (1-800-424-8802 or current phone number) and the Department with the details of the incident or emergency as soon as possible after being notified of the incident or emergency.

After any incident or emergency, the EC shall ensure that the OD Unit and emergency

equipment are cleaned, waste is properly managed and disposed of, and the OD Unit is safe to resume operation. Before operations are resumed, the EC shall contact the EM Branch Chief of Compliance, who shall inform the appropriate agencies. The EC shall also ensure that the emergency recovery inspections and activities described in Section 1.8.1 of this Permit Attachment are conducted. The EC shall also be responsible for preparing post-emergency or post-incident reports, as presented below in Section 1.8.2 of this Permit Attachment.

1.6.1. Spills

The first priority in dealing with any spill is protection of personnel. If any hazardous waste is spilled during transfer to a treatment unit, transfer of the waste shall be discontinued immediately. The Range Supervisor shall notify the EC, proper personal protective equipment (PPE) shall be donned, and the spilled material and potentially contaminated media (e.g., soil) shall be contained, removed, and managed appropriately as solid or hazardous waste. Wastes not authorized for treatment at the OD Unit shall be removed and treated or disposed of at an off-site facility, as appropriate. If appropriate, the waste shall be saturated (e.g., with water) as a precautionary measure. The incident, including details of the spill and cleanup, shall be noted in the Operating Record.

1.6.2. Personnel Exposure

In the event of personnel exposure to hazardous waste, including, but not limited to, irritation of the eyes, breathing passages, or skin; difficulty in breathing; and/or nausea, light-headedness, vertigo, or blurred vision, personnel shall immediately take the following measures.

1. Notify the EC immediately.
2. The EC shall attempt to ascertain what, if any, chemical exposure occurred and what corrective measures are appropriate.
3. Transport the affected person to a medical facility for evaluation.
4. Evacuate and barricade the area to prevent unauthorized entry.

1.6.3. Explosion and/or Fire Involving Ordnance

EOD personnel shall implement operating practices designed to minimize the risk of fires and explosions that endanger human health or the environment at the OD Unit.

1.6.4. Natural Disasters

After any natural disaster in the vicinity of the OD Unit (e.g., earthquake, floods, lightning strike), the EC shall inspect the OD Unit for any signs of damage, leakage, and land movement and initiate any necessary corrective measures to rectify potential or actual problems. Inspection findings and corrective measures shall be recorded in the Operating Record.

1.6.5. Evacuation

Personnel shall evacuate the EOD Range upon voice command or by notification over two-way radio or other communication device.

1.6.5.1. Evacuation Procedure

The following procedure shall be implemented for evacuation:

1. When an evacuation is announced, stop work.
2. Assist injured personnel to evacuate, if possible.
3. Report to the designated assembly area outside the EOD Range personnel bunker for roll call to be taken by the EC or his designee.
4. Be continually cognizant of wind directions (stay upwind, if possible) and emergency equipment.
5. Do not reenter the affected area until the EC or KAFB Fire Chief authorizes reentry.

1.6.5.2. Evacuation Route

The EC shall be responsible for ensuring that all EOD personnel and site visitors are familiar with evacuation procedures and routes. A map showing the evacuation route is provided as Figure F-1. The map shall be posted at the EOD Range personnel bunker and carried by the EC on all treatment operations.

1.7. EMERGENCY EQUIPMENT

Emergency equipment shall be available for use at the OD Unit. The emergency equipment listed in Table F-2 shall be repaired, replaced, and/or upgraded with functionally equivalent components and equipment, as necessary.

1.8. EMERGENCY AND INCIDENT RECOVERY PROCEDURES

The recovery procedures that shall be followed after a minor or major incident or emergency at the OD Unit are described below.

1.8.1. Post-Emergency Inspections and Activities

The following post-emergency incident inspections and activities shall be conducted:

1. The EC will assure that the time, date, and details of any incident or emergency are noted in the Operating Record in accordance with 40 C.F.R. § 264.56(i).
2. The EC shall inspect the premises for leaks or ruptures of equipment, and shall ensure that all recovered material and waste is managed properly. The results of the inspection shall be recorded in the Operating Record. Only containers made of or lined with materials that will not react with and are otherwise compatible with the waste resulting from cleanup procedures shall be used.
3. Emergency response equipment shall be carefully inspected and the equipment decontaminated, replaced, or refurbished, if needed. Fire extinguishers shall be checked for adequate charge. PPE shall be checked for contamination. Remedial equipment shall be inspected for contamination and proper operation. The supply of eyewash solution and other expendable items used for first aid or cleanup shall be checked and replaced, as necessary.

4. Within 24 hours of an emergency or incident, fire extinguishers shall be replaced or recharged and PPE decontaminated, repaired, or replaced as necessary.
5. Within three days of an emergency or incident, other equipment and structures shall be decontaminated. Decontamination wastes shall be collected and managed appropriately. Appropriate PPE shall be worn during decontamination procedures.
6. Within 30 days of an emergency or incident, other equipment shall be repaired or replaced as necessary.

1.8.2. Post-Emergency or Incident Reports

The following post-emergency or incident reports shall be made:

1. A verbal report of any incident or emergency shall be reported promptly to the EM Branch Chief of Compliance if he was not informed during its occurrence.
2. A written emergency or incident report shall be prepared jointly by the EC and the EM Branch Chief of Compliance and forwarded to the Department within 15 working days, as required by 40 C.F.R. § 264.56(i). The written report shall include, at a minimum, the following.
    a. Name, address, and telephone number of the Commander of KAFB, the EC, and the EM Branch Chief of Compliance;
    b. Name, address, and telephone number of the responsible official;
    c. Date, time, and the type of emergency or incident;
    d. Name and quantity of material and waste involved;
    e. Extent of injuries, if any;
    f. Assessment of actual or potential hazards to human health or the environment; and
    g. Estimated quantity and disposition of recovered material and waste.
3. Before operations are resumed at the OD Unit, the Department shall be notified that the OD Unit is in compliance with 40 C.F.R. §§ 264.56(h) and 264.56(i) and the requirements of this Permit. The notification shall address the fact that no new waste shall be treated that may be incompatible with released material and waste until cleanup procedures are completed and that all emergency equipment is cleaned and fit for its intended use.

1.8.3. Emergency/Incident Response Evaluation

The Permittee shall be responsible for annual evaluations of the KAFB Facility emergency response plans and for evaluation of the response to any incident or emergency. If these evaluations reveal that changes to the emergency response plans are necessary, they shall be amended by the Permittee and distributed to the appropriate organizations.

This Contingency Plan shall be reviewed and, if necessary, amended by the Permittee whenever:

1. The Permit, or applicable regulations, is revised.
2. The plan fails in an incident or emergency.

3. The design, construction, operation, and/or maintenance of the OD Unit or other circumstances change in a way that materially increases the potential for fires, explosions, or releases of hazardous waste or hazardous constituents, or changes the response necessary in an incident or emergency.
4. The list of emergency equipment changes.

Whenever any of the EC contact information in Table F-1 changes, a revised table shall be provided to the Department and distributed to all Contingency Plan holders. A copy of the revised table shall also be maintained at the EOD Range personnel bunker. A revision of Table F-1 constitutes an amendment to this Contingency Plan. The Permittee shall request a modification to this Permit should it become necessary to amend this Contingency Plan for any reason.

TABLE F-1
Emergency Coordinator Contact Information for the OD Unit

Contact or Name	Address	Office Phone	Home Phone
D. Brent Wilson, Base Civil Engineer	Building 20684, KAFB, NM 87117	846-7911 or 846-0411	281-5857

TABLE F-2
Type and Location of Emergency Equipment Available for Use at the OD Unit

Emergency Item or Equipment	Description	Location	Contact
Emergency Vehicles	Emergency Response Vehicle: Mobile Command Post equipped with communications equipment.	KAFB Civil Engineer Readiness	846-9196
	Ambulances	KAFB Fire Department	911 or 846-8069
	Security Vehicles: Vans and trucks equipped with communications equipment and utilized for transportation of personnel and equipment.	KAFB Security Police	846-7926
	Fire Trucks: Fire-fighting vehicles outfitted with equipment for fighting fires and with self-contained breathing apparatuses (SCBAs).	KAFB Fire Department	911 or 846-8069
	Helicopter: Rotary-wing aircraft for transportation of personnel to or from site.	KAFB Command Post	846-3777
Medical Supplies	First aid kit	EOD Range personnel bunker or vehicle	EC or Range Safety Officer
	Stretchers/Stokes Litter: Equipment for movement of injured personnel.	KAFB Fire Department	846-8069
	Blankets: Normal blankets.		
	Medical Kits: Emergency first-aid supplies.		
	Oxygen: Medical grade oxygen in compressed cylinders equipped for personnel use.		
Safety Supplies	Fire Extinguisher (ABC)	EOD Range personnel bunker or vehicle	EC or Range Safety Officer
	Eye Wash Kit		
	Spill Containment Kit		
	Decontamination Kit		
	Air Packs: SCBAs equipped with positive pressure mode for use by personnel entering hazardous atmospheres.	KAFB Fire Department	846-8069
	Monitoring Instruments		
General Supplies	Two-Way Radio	EOD Range personnel bunker or vehicle	EC or Range Safety Officer
	Shovels		
	Hand Tools		
	Broom(s)		
Transportation	Tractor-trailer combinations,	KAFB Logistics Readiness Squadron	853-7843
	Flat-bed trucks		
	Enclosed panel vans		
	Passenger vehicles, including sedans and vans		
	Passenger buses		

DEFINITIONS
SCBA self contained breathing apparatus

Figure F-1

PERMIT ATTACHMENT G: PERSONNEL TRAINING PLAN

1.0 INTRODUCTION

The primary objective of the Explosives Ordnance Disposal (EOD) training program shall be to prepare personnel to conduct operations at the Open Detonation (OD) Unit in a safe and environmentally sound manner and in compliance with this Permit and the New Mexico Hazardous Waste Management Regulations (HWMR), 20.4.1 NMAC. To achieve this objective, the program provides personnel with training relevant to their positions.

All personnel shall complete initial training within six months of assignment to EOD Range duty. Personnel shall not work at the OD Unit until they have completed training on the Contingency Plan (Permit Attachment F). Personnel shall be given, at a minimum, a basic understanding of the regulatory requirements of hazardous waste management, this Permit, and emergency response procedures. Personnel shall receive additional classroom and on-the-job training designed specifically to teach them how to perform their duties safely and in conformance with regulatory requirements and this Permit. All personnel shall receive the required training prior to being allowed to work unsupervised.

1.1. TRAINING PROGRAM

Training for personnel is the overall responsibility of the EOD Flight Chief. All training shall be conducted by qualified EOD Technicians and includes formal classroom sessions, on-the-job training, and review of written procedures and plans. A summary of the training program for personnel is shown in Table G-1.

1.1.1. Job Title/Job Description

As required by 40 C.F.R. § 264.16(d)(1) and (2), records of each job title related to hazardous waste management at the OD Unit, a list of employees for each job title, and job descriptions for each job title shall be maintained at the EOD Shop. Job descriptions shall include hazardous waste management duties, and required skills, experience, and education.

Records relating to the training program shall be maintained at the EOD Shop. The records shall also include a list of courses required for each position, course descriptions, documentation that each employee has received and completed appropriate training, and information regarding qualifications.

1.1.2. Relevance of Training to Job Position

The training program shall provide employees with training to respond effectively to emergencies at the OD Unit. Personnel shall receive relevant training on the requirements of this Permit (including Contingency Plan implementation), OD Unit operations (including emergency procedures, equipment, and systems), and in management of hazardous wastes.

1.1.3. Training Content, Frequency, and Techniques

The training program shall include a comprehensive combination of internal training courses and on-the-job training. Each training course shall be developed carefully to support the goal of safe and environmentally sound operations at the OD Unit in compliance with this Permit and the

HWMR. Course outlines shall be maintained in the Training Section at the EOD Shop. The general training content and frequency of training are presented in Table G-1.

1.2. TRAINING DIRECTOR

The Training Director (EOD Flight Chief) shall direct the training program and shall be responsible for establishing training requirements for personnel. The EOD Flight Chief shall be required to be knowledgeable of the applicable hazardous waste management regulations and specific processes employed at the OD Unit, pursuant to the HWMR and this Permit.

1.3. IMPLEMENTATION OF TRAINING PROGRAM

The training program shall be implemented to ensure that all personnel who work at the OD Unit receive the training indicated in Table G-1. All personnel shall participate annually in a training refresher. Visitors shall be provided instruction commensurate with the nature of their visit.

TABLE G-1
Training Program for the OD Unit

Course	Content	Frequency
Basic EOD Course	Covers all aspects of positions and duties associated with EOD and OD Unit operations	Initial
Explosive Safety	General Safety Requirements, Motor Vehicle Transportation, Disposal Range Requirements, Disposal Range Procedures, Range Safety, Standard Safety Guidelines, Site Entry, Site Control, Personal Protective Equipment, Contingency Plan, Implementation, Procedures for Using Emergency Equipment, Procedures for Shutdown of Operations, Responses(s) to Emergencies, Emergency Coordinator(s), Evacuation Route and Procedures, Post-emergency Procedures	Initial/Annual
Relevant In-House Training	General Overview of Procedures to Perform Operations at the EOD Range and OD Unit; Waste Analysis Plan; Identification of Waste to be Managed; Waste Screening and Verification; Range Operation; Safety Practices; Security; Range Inspections; Preventive Procedures, Structures, and Equipment; Prevention of Reaction of Reactive Waste, Ignitable and Incompatible Waste; Authorized Wastes	Initial/Annual
Resource Conservation and Recovery Act Training	Hazardous Waste Management and Regulations – Overview, Hazardous Substances and Properties, General Facility Standards, Preparedness and Prevention, Contingency Plan and Emergency Procedures, Record Keeping and Reporting	Initial/Annual

KIRTLAND AIR FORCE BASE ALBUQUERQUE, NEW MEXICO

Closure Plan for Open Detonation Unit

May 2014

377 MSG/CEIR
2050 Wyoming Blvd. SE
Kirtland AFB, New Mexico 87117-5270

40 CFR 270.11
DOCUMENT CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

TOM D. MILLER, Colonel, USAF
Commander, 377th Air Base Wing

This document has been approved for public release in accordance with Department of Defense Directives and Air Force Instructions.

KIRTLAND AIR FORCE BASE
377th Air Base Wing Public Affairs

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1. INTRODUCTION

This closure plan describes the activities necessary to close the Open Detonation (OD) treatment unit located within the Explosive Ordnance Disposal (EOD) Range at Kirtland Air Force Base (AFB). The OD Unit consists of a cleared circular area approximately 1,000 ft in diameter and surrounded and delineated by an approximately two-foot (ft) high earthen berm. Figures H-1 and H-2 show the location of the EOD Range at Kirtland AFB, and the collocated OD and Open Burn (OB) Units within the EOD Range. Detonations were conducted in pits measuring approximately 30 ft long, 15 wide and 12 ft deep.

Until final closure of the unit is complete in accordance with the New Mexico Hazardous Waste Management Regulations and certification of closure has been approved by the New Mexico Environment Department (the Department), a copy of the approved Closure Plan, and any revisions thereof, shall be maintained in the Operating Record. This Closure Plan, and any revisions thereof, shall be made available, upon request, to the Department.

If the OD Unit cannot be clean-closed, a post-closure care plan addressing the hazardous constituents remaining at the site shall be prepared and submitted to the Department for approval.

The OD Unit is collocated with the OB treatment unit at the EOD Range. The OD and OB Units are scheduled to undergo final closure activities simultaneously. The OB Unit has a separate closure plan, but several elements of the OB and OD Unit closure plans overlap and are noted within the documents. Additionally, there is currently a perchlorate groundwater investigation occurring to the west of the EOD range. This investigation and its results are independent of this OD Unit closure plan.

As per Kirtland AFB's Hazardous Waste Treatment Facility Operating Permit for the Open Detonation Unit (Permit), Attachment I, Table I-3 , SWMU 06-19 (KAFB IRP site OT-29), which is located approximately 20 ft northeast of the present OB structure, requires corrective action. Corrective action at SWMU 06-19 shall comply with the provisions of the Resource Conservation and Recovery Act (RCRA).

1.1 General Closure Information

This closure plan has been prepared in compliance with the requirements of RCRA (42 U.S.C. §§6901 et seq.) and its implementing regulations at 40 CFR Parts 264 and 270 (see 40 CFR Part 264 Subparts G and X and 270.14(b)(13)), and state implementing statutes and regulations under which the state has delegated RCRA authority (see New Mexico Hazardous Waste Act, Chapter 74 Article 4 NMSA 1978 and 20.4.1 NMAC).

1.2 Closure Performance Standard

The OD Unit shall be closed to meet the following performance standards:

- Minimize the need for further maintenance;
- Control, minimize or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to ground water or surface waters or to the atmosphere; and
- Comply with the requirements of 40 CFR Part 264, Subpart G and 40 CFR §264.601.

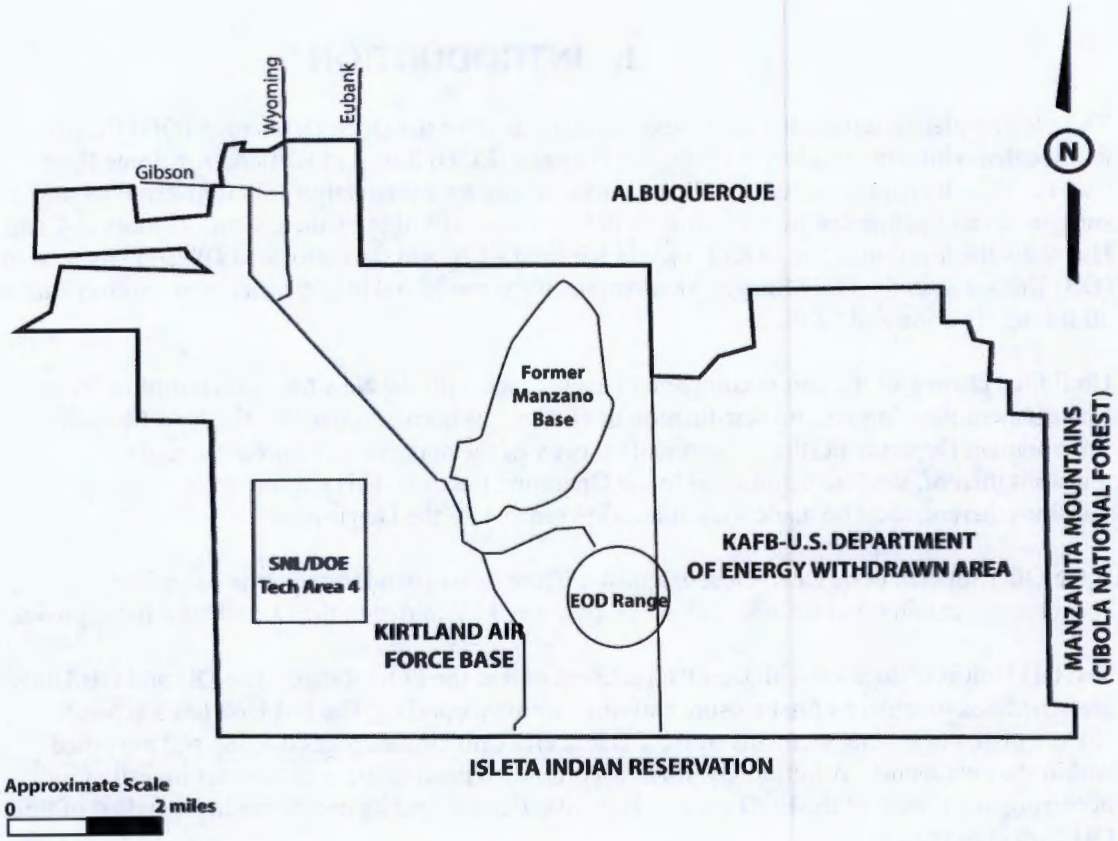

Figure H-1. Location of EOD Range at Kirtland AFB

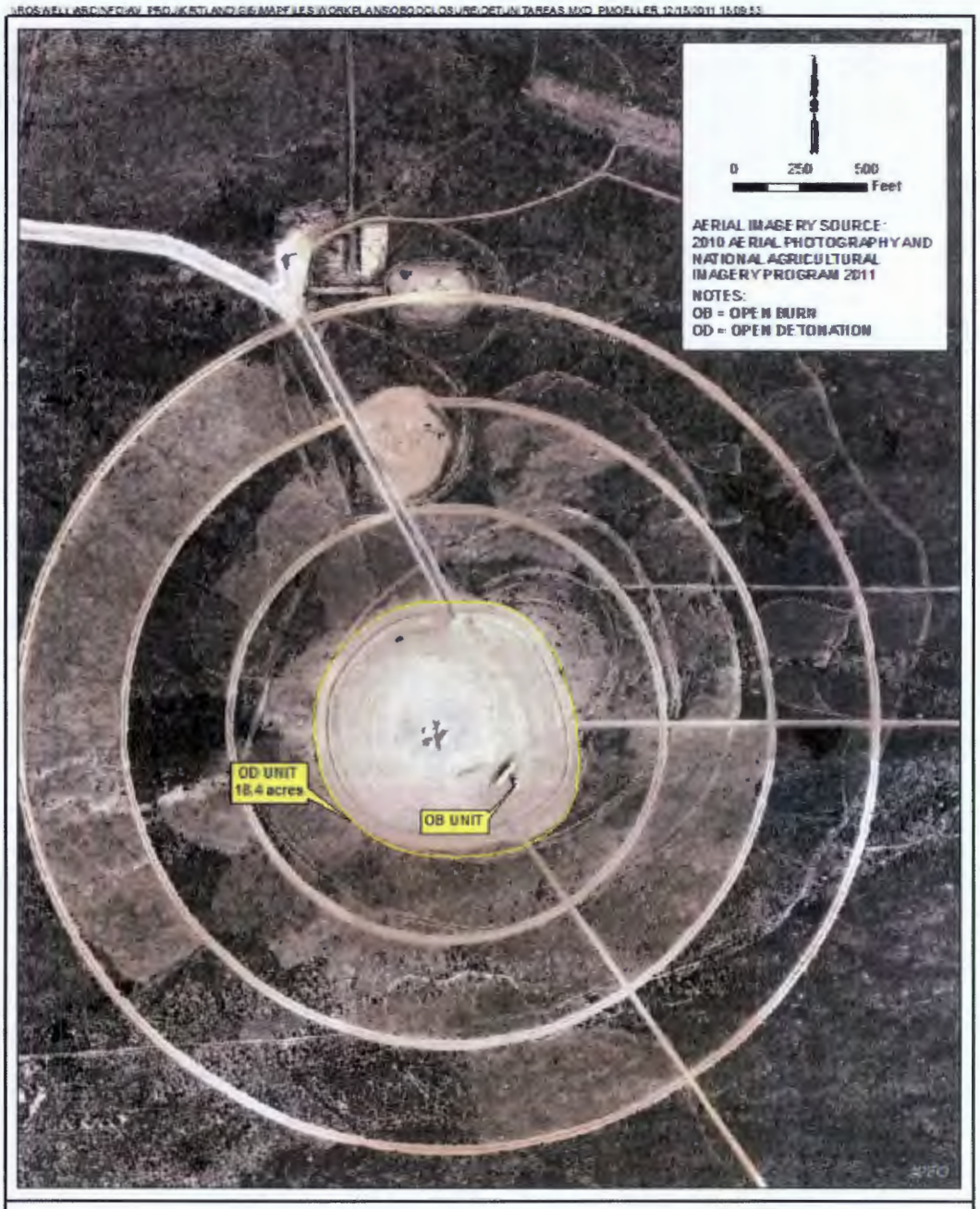

FIGURE H-2
LOCATION OF OPEN BURN AND OPEN DETONATION UNITS
EOD RANGE, KIRTLAND AIR FORCE BASE, NEW MEXICO

1.3 Final Closure Activities

The last treatment event at the OD Unit occurred on 11 August 2010. The Department was notified on 13 August 2010 that, effective immediately, the Permitee had closed the OD Unit for all treatment activities. The Permitee shall notify the Department, in writing, at least 45 calendar days prior to the date that closure activities shall commence.

Final closure activities at the OD Unit shall consist of:

- Installation of four groundwater monitoring wells at the EOD range (one upgradient and three downgradient wells) and eight consecutive quarters of groundwater sampling to determine the presence or absence of groundwater contamination;
- Removing any soil or debris from the OD Unit that have contaminant concentrations which pose unacceptable risk to human health or the environment;
- Sending for treatment and disposal any solid and hazardous waste, including any treatment residues, to a permitted Treatment, Storage, or Disposal Facility (TSDF) in accordance with applicable regulatory requirements.

Final closure for the OD Unit shall be completed when:

- All solid and hazardous waste has been disposed of off-site as required by law;
- Sampling and analysis demonstrates that no unacceptable risk to human health or the environment originating from the OD Unit exists in soil or groundwater;
- A Certification of Closure and Closure Report has been submitted to the Department; and
- The Department has approved the Certification of Closure and Closure Report.

1.4 Maximum Extent of Operations and Maximum Waste Inventory

The OD Unit was previously permitted on 20 December 1994 as Permit# NM9570024423-OD, which allowed 100,000 pounds of net explosive weight (NEW) to be treated at the OD Unit annually. Rocket motors, large caliber munitions, explosive wastes and firearms were treated at the OD Unit. Based on the operating record, the maximum inventory treated at the OD Unit was approximately 316,012 pounds of NEW.

Closure activities and any corrective action that may be required shall not be limited to the OD Unit if contamination has migrated beyond the OD Unit boundary. Any corrective action that may be required because of a release at the OB Unit shall be conducted under the terms and conditions of the 2010 Permit.

1.5 Schedule for Closure

Final closure of the OD Unit shall proceed by the general schedule presented in Table H-1.

Table H-1
Closure Schedule for the Open Detonation Unit at Kirtland AFB

Activity	Time Required
Notify the Department of receiving final volume of hazardous waste at the OD Unit	Completed
Removal of all hazardous waste from the OD Unit	Completed
Department approval of final OD Unit closure plan	TBD
Notify Department of commencement of closure activities	45 days before closure activities begin
Commence closure activities	Day 0
Remove all solid and hazardous waste	Day 90
Commence groundwater monitoring well installations	Day 90
Complete groundwater monitoring well installations	Day 180
Complete all closure activities, except groundwater monitoring	Day 360
Complete 8 quarters of groundwater monitoring	Day 900
Submit Closure Report and certification to Department	Day 960

Note: The schedule above indicates calendar days on which closure activities shall be started or completed subsequent

1.6 Closure Report

Within 60 days of completion of the final closure activities, a closure report shall be submitted to the Department. The report shall document the closure activities conducted and contain, at a minimum, the following information:

- A summary of the closure activities;
- Any significant variance from the approved closure plan and the reason for the variance;
- A summary of sampling data associated with closure, including analytical results for all field and laboratory quality control samples;
- A quality assurance statement on the adequacy of the analyses to support closure;
- The location of the file of supporting documentation (e.g., memos, logbooks, laboratory sample analysis data);
- Disposal location and quantities of all solid and hazardous wastes removed from the OD Unit;
- Certification of the accuracy of the report; and
- Survey plat.

1.7 Survey Plat and Post-Closure Requirements

Upon completion of closure activities at the OD Unit, a survey plat shall be prepared, certified by a professional land surveyor, and submitted with the closure report to the Department. The survey plat shall also be simultaneously filed with the local zoning authority. In the event that the OD Unit cannot be clean closed, a post-closure care plan shall be submitted to the Department for review and approval.

2. CLOSURE PROCEDURES

There is no hazardous waste present at the OD Unit; the last treatment event at the OD Unit occurred on 11 August 2010, and there are no treatment residues remaining. There are no structures or equipment at the OD Unit. (The structures associated with the collocated OB Unit are addressed under the OB Unit closure plan.)

The first phase of closure shall consist of a hazards survey of the OD Unit conducted by qualified contractor health physics and industrial hygiene personnel, which shall include unexploded ordnance (UXO) safety personnel, and Kirtland AFB EOD personnel. The purpose of the survey shall be to locate and remove any "kick-out" (untreated waste, waste fragments, or UXO), and to identify potential contamination concerns that may present hazards to workers during the closure activities and to specify any control measures necessary to reduce worker risk. This survey shall provide the information necessary for health physics, UXO safety, and industrial hygiene personnel to identify worker qualifications, personal protective equipment (PPE), safety awareness, work permits, exposure control programs, and emergency coordination that shall be required to perform closure. Any munitions and explosives of concern (MEC) identified during the hazard survey shall be reported to and handled by Kirtland AFB EOD staff personnel only in accordance with standard operating procedures. All workers involved in the closure activities shall be required to have training and medical monitoring as required by applicable regulations. Personnel performing closure activities shall be required to wear PPE as specified by health physics, UXO safety, and industrial hygiene personnel.

Sufficient sampling and analysis shall be required to demonstrate there are no contaminant concentrations which pose unacceptable risk to human health or the environment. Groundwater and soil samples shall be analyzed for parameters listed in Tables H-2 and H-3 to quantify contamination, if any, originating from the OD Unit.

Surface and subsurface soil at the OD Unit shall be characterized by sampling and analysis. Soil sampling shall follow the procedures described in Section 2.2.1 of this Permit Attachment (H). Soil shall be analyzed for the parameters listed in Table H-3. If sampling and analysis of soil indicates the presence of hazardous waste or hazardous constituents above background levels, a risk assessment shall be conducted based on a residential land-use scenario to determine whether the contaminants pose an unacceptable risk to human health or the environment. In lieu of a baseline risk assessment, the Permittee may compare the soil sampling results to the soil screening levels using the procedures listed in the Department's most current version of "Technical Background Document for Development of Soil Screening Levels," as it may be updated, provided the soil screening levels are based on a residential land-use scenario. If the risk assessment demonstrates that the level of contamination is unacceptable, the contaminated soil exhibiting unacceptable risk shall be subject to corrective action under Permit Part 6 and shall be excavated and removed. The excavated soil shall be collected, transferred to containers, and, if applicable, managed and disposed of as hazardous waste. The Permittee shall conduct corrective action activities at the OD Unit using the cleanup levels in Permit Section 6.2.3 if corrective action is necessary. Clean up levels shall be based on a residential land use scenario. Background soil concentrations for metals are those approved by the Department for the KAFB Facility, and are listed in Table D-4 of Permit Attachment D.

2.1 Monitoring Wells

2.1.1 Installation of New Monitoring Wells

The OD Unit is subject to the environmental performance standards of 40 C.F.R. § 264.601. As such, groundwater monitoring shall be conducted as part of closure activities to demonstrate that operations did not impact groundwater. Four monitoring wells, one upgradient and three downgradient of the OD Unit, shall be installed. The locations of the proposed monitoring wells are presented in Figure H-3.

The wells installed at the OD Unit shall meet the groundwater monitoring requirements of 40 C.F.R. §§ 264.97(a)(2), (b), and (c). Within 30 days of completing well installation, the Permitee shall submit a well completion report to the Department for approval.

Groundwater monitoring wells shall be properly plugged and abandoned in accordance with applicable New Mexico statutes and regulations, provided groundwater contamination has not occurred. If groundwater contamination has occurred, these monitoring wells shall be maintained for the purpose of implementing corrective action. The wells shall not be plugged or abandoned until the Department has approved closure of the OD Unit.

Activities for monitoring well installation are presented in the following paragraphs and include:

- Well locations,
- Drilling specifications,
- Well construction specifications,
- Well development procedures,
- A schedule for implementation and completion of the well installations;
- Preparation and submittal of a well completion report; and
- Groundwater sampling and analysis requirements for eight quarters.

The primary project objective is the installation and sampling of four groundwater monitoring wells, one upgradient and three downgradient of the site, to evaluate the potential groundwater impacts from the operation of the OD unit. The new monitoring wells shall be installed in the vicinity of the OD Unit (Figure H-3). Installation of the monitoring wells shall facilitate groundwater sampling from the uppermost groundwater both up and downgradient of potential source areas associated with the OD unit. Based on data from nearby wells, groundwater at the proposed locations is expected to occur under confined conditions within the Paleozoic sedimentary rocks of the Madera Group or Sandia Formation or the underlying Precambrian granite. The depth to the uppermost water bearing zones at the proposed well locations is expected to range from approximately 100 to 200 feet (ft) below ground surface (bgs). Final well design shall be dependent on field conditions and the placement of the fourth well shall be performed in consultation with the Department.

Table H-2

Comparison of Reporting Levels to Screening Objectives in Groundwater, Open Burn and Open Detonation Units at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Water Quality Standard	EPA Maximum Contaminant Levels/Secondary Contaminant Levels[a]	EPA Regional Screening Levels Tap Water (Nov 2012)	DOE Open Burn Suggested Maximum Background (Dec 1998)	LOQ	LOD	DL
EPA 160.2	Total dissolved solids	NA	mg/L	--	--	--	--	4	2	1
EPA 310.2	Alkalinity	NA	mg/L	--	--	--	--	10	5	2.5
EPA 350.1	Ammonia	7664-41-7	mg/L	--	--	--	--	0.5	0.1	0.049
SW9030B	Sulfide	18496-25-8	mg/L	--	--	--	--	2	0.8	0.4
SW9056	Nitrate	14797-55-8	mg/L	58.4	10	25	4 (as NO2/NO3)	0.5	0.1	0.04
SW9056	Nitrite	14797-65-0	mg/L	3.65	1	1.6	4 (as NO2/NO3)	0.5	0.1	0.05
SW9056	Chloride	16887-00-6	mg/L	--	--	--	--	0.5	0.1	0.05
SW9056	Sulfate	18785-72-3	mg/L	--	--	--	--	0.5	0.1	0.05
SW9056	Fluoride	7782-41-4	mg/L	1.46	--	620	--	0.5	0.1	0.05
SW9056	Bromide	7726-95-6	mg/L	--	--	--	--	0.5	0.1	0.05
SW9060	Total organic carbon	7440-44-0	mg/L	--	--	--	--	1	0.5	0.25
SW6010B	Barium	7440-39-3	µg/L	1,000	2,000	--	120	20	5	0.25
SW6010B	Boron	7440-42-8	µg/L	7,300	--	3100	--	20	5	1
SW6010B	Beryllium	7440-41-7	µg/L	--	4	--	4	3	1	0.3
SW6010B	Cadmium	7440-43-9	µg/L	10	5	--	0.47	3	1	0.5
SW6010B	Calcuim	7440-70-2	µg/L	--	--	--	--	1000	80	35
SW6010B	Chromium	7440-47-3	µg/L	50	100	--	43	10	5	1.2
SW6010B	Cobalt	7440-48-4	µg/L	50	--	--	2.5	10	5	3
SW6010B	Copper	7440-50-8	µg/L	1,000	1,300 (1,000)	--	<50	15	5	2.1
SW6010B	Iron	7439-89-6	µg/L	1,000	300	11000	--	200	100	50
SW6010B	Lead	7439-92-1	µg/L	50	15	--	10	10	5	2.5
SW6010B	Lithium	7439-93-2	µg/L	--	--	31	--	500	25	11
SW6010B	Magnesium	7439-95-4	µg/L	--	--	--	--	500	25	11
SW6010B	Manganese	7439-96-5	µg/L	876	--	320	--	500	25	11
SW6010B	Molybdenum	7439-98-7	µg/L	183	--	78	--	500	25	11
SW6010B	Nickel	7440-02-0	µg/L	--	--	300	28	10	5	2.4
SW6010B	Potasium	9/7/7440	µg/L	--	--	--	--	3000	250	237
SW6010B	Selenium	7782-49-2	µg/L	50	50	--	5	40	25	13
SW6010B	Silver	7440-22-4	µg/L	50	100	--	<10	5	2	0.84
SW6010B	Sodium	7440-23-5	µg/L	--	--	--	--	5000	250	91.6
SW6010B	Strontium	7440-24-6	µg/L	21900	--	9300	--	500	25	11
SW6010B	Tin	7440-31-5	µg/L	--	--	9300	50	50	15	1.7
SW6010B	Vanadium*	7440-62-2	µg/L	--	--	--	13	20	5	1.9
SW6010B	Zinc	7440-66-6	µg/L	10,000	5,000	--	260	20	10	3
SW6020A	Antimony	7440-36-0	µg/L	--	6	--	6	6	4	2
SW6020A	Arsenic	7440-38-2	µg/L	100	10	--	14	3	2	1
SW6020A	Thallium	7440-28-0	µg/L	--	2	--	2	1.5	1	0.5
SW7470A	Mercury	7439-97-6	µg/L	2	2	--	2	0.3	0.1	0.1
SW6850	Perchlorate	14797-73-0	µg/L	4[b]	--	--	--	0.5	0.25	0.082
SW8260B	1,1,1-Trichloroethane	71-55-6	µg/L	60	200	--	--	1	0.4	0.19
SW8260B	1,1,2,2-Tetrachloroethane	79-34-5	µg/L	10	--	--	--	1	0.2	0.09
SW8260B	1,1,2-trichloro-1,1,2-trifluoroethane*	76-13-1	µg/L	--	--	--	--	50	0.4	0.25
SW8260B	1,1,2-Trichloroethane	79-00-5	µg/L	10	5	--	--	1	0.4	0.31
SW8260B	1,1-Dichloroethane	75-34-3	µg/L	25	--	--	--	1	0.2	0.1
SW8260B	1,1-Dichloroethene	75-35-4	µg/L	5	7	--	--	1	0.4	0.14
SW8260B	1,2,3-Trichlorobenzene	87-61-6	µg/L	70	--	--	--	1	0.4	0.14
SW8011	1,2,3-Trichloropropane	96-18-4	µg/L	--	--	0.00065	--	0.2	0.09	0.09
SW8260B	1,2,4-Trichlorobenzene	120-82-1	µg/L	--	70	--	--	1	0.4	0.1
SW8260B	1,2,4-Trimethylbenzene	95-63-6	µg/L	--	--	15	--	1	0.2	0.12
SW8011	1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	µg/L	--	0.2	NA	--	0.02	0.005	0.005
SW8011	1,2-Dibromoethane (EDB)	106-93-4	µg/L	0.1	0.05	NA	--	0.02	0.005	0.0022
SW8260B	1,2-Dichlorobenzene	95-50-1	µg/L	--	600	--	--	1	0.4	0.14
SW8260B	1,2-Dichloroethane	107-06-2	µg/L	10	5	--	--	1	0.4	0.22
SW8260B	1,2-Dichloropropane	78-87-5	µg/L	--	5	--	--	1	0.2	0.15
SW8260B	1,3,5-Trimethylbenzene	108-67-8	µg/L	--	--	87	--	1	0.2	0.14
SW8260B	1,3-Dichlorobenzene*	541-73-1	µg/L	--	--	--	--	1	0.4	0.11
SW8260B	1,4-Dichlorobenzene	106-46-7	µg/L	--	75	--	--	1	0.2	0.13
SW8260B	1,4-Dioxane	123-91-1	µg/L	--	--	0.67	--	1	TBD	0.12
SW8260B	2-Butanone (MEK)	78-93-3	µg/L	--	--	4,900	--	2	0.4	0.35
SW8260B	2-Hexanone	591-78-6	µg/L	--	--	34	--	2	0.4	0.17
SW8260B	4-Methyl-2-pentanone (MIBK)	108-10-1	µg/L	--	--	1,000	--	2	0.4	1
SW8260B	Acetone	67-64-1	µg/L	--	--	12,000	--	10	4	2.1
SW8260B	Benzene	71-43-2	µg/L	10	5	--	--	1	0.2	0.13
SW8260B	Bromochloromethane	74-97-5	µg/L	--	--	83	--	1	0.4	0.14
SW8260B	Bromodichloromethane	75-27-4	µg/L	--	100	--	--	1	0.4	0.14
SW8260B	Bromoform	75-25-2	µg/L	--	100	--	--	1	0.4	0.1
SW8260B	Bromomethane	74-83-9	µg/L	--	--	7	--	1	0.4	0.29
SW8260B	Carbon disulfide	75-15-0	µg/L	--	--	720	--	2	0.2	0.16
SW8260B	Carbon tetrachloride	56-23-5	µg/L	10	5	--	--	1	0.4	0.15
SW8260B	Chlorobenzene	108-90-7	µg/L	--	100	--	--	1	0.2	0.12
SW8260B	Chloroethane	75-00-3	µg/L	--	--	21,000	--	1	0.4	0.34

Table H-2

Comparison of Reporting Levels to Screening Objectives in Groundwater, Open Burn and Open Detonation Units at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Water Quality Standard	EPA Maximum Contaminant Levels/Secondary Contaminant Levels[a]	EPA Regional Screening Levels Tap Water (Nov 2012)	DOE Open Burn Suggested Maximum Background (Dec 1998)	LOQ	LOD	DL
SW8260B	Chloroform	67-66-3	µg/L	100	100	--	--	1	0.2	0.12
SW8260B	Chloromethane	74-87-3	µg/L	--	--	190	--	1	0.4	0.25
SW8260B	cis-1,2-Dichloroethene	156-59-2	µg/L	--	70	--	--	1	0.4	0.1
SW8260B	cis-1,3-Dichloropropene*	10061-01-5	µg/L	--	--	--	--	1	0.4	0.22
SW8260B	Cyclohexane*	1735-17-7	µg/L	--	--	--	--	(a)	(a)	(a)
SW8260B	Dibromochloromethane	124-48-1	µg/L	--	100	--	--	1	0.4	0.13
SW8260B	Dichlorodifluoromethane (Freon 12)	75-71-8	µg/L	--	--	190	--	1	0.4	0.16
SW8260B	Ethylbenzene	100-41-4	µg/L	750	700	--	--	1	0.2	0.1
SW8260B	Isopropylbenzene	98-82-8	µg/L	--	--	390	--	1	0.2	0.12
SW8260B	Methyl tert-butyl ether (MTBE)	1634-04-4	µg/L	--	(5)	--	--	2	0.4	0.19
SW8260B	Methylene chloride	75-09-2	µg/L	100	5	--	--	1	0.4	0.35
SW8260B	Methyl Acetate*	79-20-9	µg/L	--	--	--	--	(a)	(a)	(a)
SW8260B	Methly Cyclohexane*	108-87-2	µg/L	--	--	--	--	(a)	(a)	(a)
SW8260B	m-Xylene & p-Xylene	136777-61-2	µg/L	--	10,000	--	--	1	0.8	0.18
SW8260B	Naphthalene	91-20-3	µg/L	30	--	NA	--	1	0.2	0.15
SW8260B	o-Xylene	95-47-6	µg/L	--	10,000	--	--	1	0.4	0.1
SW8260B	Styrene	100-42-5	µg/L	--	100	--	--	1	0.2	0.15
SW8260B	Tetrachloroethene	127-18-4	µg/L	--	5	--	--	1	0.2	0.1
SW8260B	Toluene	108-88-3	µg/L	750	1,000	--	--	1	0.4	0.25
SW8260B	trans-1,2-Dichloroethene	156-60-5	µg/L	--	100	--	--	1	0.4	0.11
SW8260B	trans-1,3-Dichloropropene*	10061-02-6	µg/L	--	--	--	--	1	0.2	0.08
SW8260B	Trichloroethene	79-01-6	µg/L	100	5	--	--	1	0.4	0.13
SW8260B	Trichlorofluoromethane (Freon 11)	75-69-4	µg/L	--	--	1,100	--	1	0.4	0.23
SW8260B	Vinyl chloride	75-01-4	µg/L	1	2	--	--	1	0.4	0.22
SW8260B	1,2-Dichloroethane-d4 (Surrogate)		%	--	--	--	--	--	--	--
SW8260B	4-Bromofluorobenzene (Surrogate)		%	--	--	--	--	--	--	--
SW8260B	Dibromofluoromethane (Surrogate)		%	--	--	--	--	--	--	--
SW8260B	Toluene-d8 (Surrogate)		%	--	--	--	--	--	--	--
SW8270C	1,1-biphenyl	92-52-4	µg/L	--	--	0.83	--	10	NA	5
SW8270C	1,2,4,5-tetrachlrorbenzene	95-94-3	µg/L	--	--	1.2	--	10	2.1	0.54
SW8270C	2,4,5-Trichlorophenol	95-95-4	µg/L	--	--	890	--	10	3.0	2
SW8270C	2,4,6-Trichlorophenol	88-06-2	µg/L	--	--	3.5	--	10	3.0	2
SW8270C	2,4-Dichlorophenol	120-83-2	µg/L	--	--	35	--	10	3.0	2.6
SW8270C	2,4-Dimethylphenol	105-67-9	µg/L	--	--	270	--	10	3.0	2.2
SW8270C	2,4-Dinitrotoluene	121-14-2	µg/L	--	--	0.2	--	10	3.0	2
SW8270C	2,6-Dichlorophenol*	87-65-0	µg/L	--	--	--	--	15	3.0	5
SW8270C	2,6-Dinitrotoluene	606-20-2	µg/L	--	--	15	--	10	3.0	2
SW8270C	2-Chloronaphthalene	91-58-7	µg/L	--	--	550	--	10	3.0	1.3
SW8270C	2-Chlorophenol	95-57-8	µg/L	--	--	71	--	10	3.0	1.6
SW8270C	2-Methylphenol	95-48-7	µg/L	--	--	720	--	10	3.0	0.93
SW8270C	2-Nitroaniline	88-74-4	µg/L	--	--	150	--	50	3.0	2
SW8270C	2-Nitrophenol*	88-75-5	µg/L	--	--	--	--	10	3.0	1.9
SW8270C	2,2-oxybis(1-chloropropane)*	52438-91-2	µg/L	--	--	--	--	10	3	1.3
SW8270C	3,3'-Dichlorobenzidine	91-94-1	µg/L	--	--	0.11	--	50	3.0	0.96
SW8270C	3-Methylphenol & 4-Methylphenol	65794-96-9	µg/L	--	--	720	--	30	20	10
SW8270C	3-Nitroaniline*	99-09-2	µg/L	--	--	--	--	50	3.0	1.4
SW8270C	4,6-Dinitro-2-methylphenol	534-52-1	µg/L	--	--	1.2	--	60	20	2.2
SW8270C	4-Bromophenyl phenyl ether*	101-55-3	µg/L	--	--	--	--	10	3.0	1.1
SW8270C	4-Chloro-3-methylphenol	59-50-7	µg/L	--	--	1,100	--	10	3.0	2
SW8270C	4-Chloroaniline	106-47-8	µg/L	--	--	0.32	--	10	3.0	2
SW8270C	4-Chlorophenyl phenyl ether*	7005-72-3	µg/L	--	--	--	--	10	3.0	1.1
SW8270C	4-Nitroaniline	100-01-6	µg/L	--	--	3.3	--	50	3.0	1.5
SW8270C	4-Nitrophenol*	100-02-7	µg/L	--	--	--	--	60	20	6.1
SW8270C	Acetophenone	17537-31-4	µg/L	--	--	1,500	--	10	3	0.78
SW8270C	Azobenzene (as 1,2 Diphenylhydrazine)	103-33-3	µg/L	--	--	0.067	--	10	3.0	0.71
SW8270C	Atrazine	93616-39-8	µg/L	--	--	0.26	--	(a)	(a)	(a)
SW8270C	Benzaldehyde	100-52-7	µg/L	--	--	1,500	--	(a)	(a)	(a)
SW8270C	bis(2-Chloroethoxy)methane	111-91-1	µg/L	--	--	46	--	10	3.0	1
SW8270C	bis(2-Chloroethyl) ether	111-44-4	µg/L	--	--	0.012	--	10	3.0	1.5
SW8270C	bis(2-Ethylhexyl) phthalate	117-81-7	µg/L	--	6	--	--	10	3.0	1
SW8270C	Butyl benzyl phthalate	85-68-7	µg/L	--	--	14	--	10	3.0	1.4
SW8270C	Caprolactam	105-60-2	µg/L	--	--	7,700	--	(a)	(a)	(a)
SW8270C	Carbazole*	86-74-8	µg/L	--	--	--	--	10	3.0	1.2
SW8270C	Dibenzofuran	132-64-9	µg/L	--	--	5.8	--	10	3.0	1.1
SW8270C	Diethyl phthalate	84-66-2	µg/L	--	--	11,000	--	10	3.0	0.93
SW8270C	Dimethyl phthalate*	131-11-3	µg/L	--	--	--	--	10	3.0	0.88
SW8270C	Di-n-butyl phthalate	84-74-2	µg/L	--	--	670	--	10	3.0	1.1
SW8270C	Di-n-octyl phthalate*	117-84-0	µg/L	--	--	--	--	10	3.0	1.5
SW8270C	Hexachlorobenzene	118-74-1	µg/L	--	1	--	--	10	3.0	1.4
SW8270C	Hexachlorobutadiene	87-68-3	µg/L	--	--	0.26	--	10	3.0	1.3
SW8270C	Hexachloroethane	67-72-1	µg/L	--	--	0.79	--	10	3.0	1.4

Table H-2

Comparison of Reporting Levels to Screening Objectives in Groundwater, Open Burn and Open Detonation Units at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Water Quality Standard	EPA Maximum Contaminant Levels/Secondary Contaminant Levels[a]	EPA Regional Screening Levels Tap Water (Nov 2012)	DOE Open Burn Suggested Maximum Background (Dec 1998)	LOQ	LOD	DL
SW8270C	Hexachlorocyclopentadiene	77-47-4	µg/L		--	22	--	10	3	0.214
SW8270C	Isophorone	78-59-1	µg/L	--	--	67	--	10	3.0	1
SW8270C	Nitrobenzene	98-95-3	µg/L	--	--	0.12	--	10	3.0	1.6
SW8270C	N-Nitrosodimethylamine	62-75-9	µg/L	--	--	0.0004	--	15	3.0	0.96
SW8270C	N-Nitrosodi-n-propylamine	621-64-7	µg/L	--	--	0.0093	--	10	3.0	1.4
SW8270C	N-Nitrosodiphenylamine	86-30-6	µg/L	--	--	10	--	10	3.0	0.54
SW8270C	Pentachlorophenol	87-86-5	µg/L	--	1	--	--	60	20	2
SW8270C	Phenol	108-95-2	µg/L	--	--	4,500	--	10	3.0	1.1
SW8270C	Phenol-d6		%	--	--	--	--	--	--	--
SW8270C	2-Fluorobiphenyl		%	--	--	--	--	--	--	--
SW8270C	Terphenyl-d14		%	--	--	--	--	--	--	--
SW8270C-SIM	1-methylnaphthalene	90-12-0	µg/L	--	--	0.97	--	0.1	0.01	0.006
SW8270C-SIM	2-methylnaphthalene	91-57-6	µg/L	--	--	27	--	0.1	0.01	0.006
SW8270C-SIM	Acenaphthene	83-32-9	µg/L	--	--	400	--	0.1	0.01	0.003
SW8270C-SIM	Acenaphthylene	208-96-8	µg/L	--	--	--	--	0.1	0.01	0.003
SW8270C-SIM	Anthracene	120-12-7	µg/L	--	--	1300	--	0.1	0.01	0.004
SW8270C-SIM	Benzo (a) anthracene	56-55-3	µg/L	--	--	0.029	--	0.1	0.01	0.005
SW8270C-SIM	Benzo (a) pyrene	50-32-8	µg/L	0.7	0.2	--	--	0.1	0.01	0.004
SW8270C-SIM	Benzo (b) fluoranthene	205-99-2	µg/L	--	--	0.029	--	0.1	0.02	0.012
SW8270C-SIM	Benzo (g,h,i) perylene	191-24-2	µg/L	--	--	--	--	0.1	0.01	0.006
SW8270C-SIM	Benzo (k) fluoranthene	207-08-9	µg/L	--	--	0.29	--	0.1	0.01	0.008
SW8270C-SIM	Chrysene	218-01-9	µg/L	--	--	2.9	--	0.1	0.01	0.004
SW8270C-SIM	Dibenzo (a,h) anthracene	53-70-3	µg/L	--	--	0.0029	--	0.1	0.02	0.014
SW8270C-SIM	Fluoranthene	206-44-0	µg/L	--	--	630	--	0.1	0.01	0.004
SW8270C-SIM	Fluorene	86-73-7	µg/L	--	--	220	--	0.1	0.01	0.004
SW8270C-SIM	Indeno (1,2,3-c,d) pyrene	193-39-5	µg/L	--	--	0.029	--	0.1	0.02	0.014
SW8270C-SIM	Naphthalene	91-20-3	µg/L	30		NA	--	0.1	0.01	0.004
SW8270C-SIM	Phenanthrene	85-01-8	µg/L	--	--	--	--	0.1	0.01	0.006
SW8270C-SIM	Pyrene	129-00-0	µg/L	--	--	87	--	0.1	0.01	0.004
SW8290	2,3,7,8-TCDF*	51207-31-9	pg/L	--	--	--	--	10	2.5	EDL
SW8290	2,3,7,8-TCDD*	1746-01-6	pg/L	--	--	--	--	10	2.5	EDL
SW8290	1,2,3,7,8-PeCDF*	57117-41-6	pg/L	--	--	--	--	50	6.5	EDL
SW8290	2,3,4,7,8-PeCDF*	57117-31-4	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,7,8-PeCDD*	40321-76-4	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,4,7,8-HxCDF*	70648-26-9	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,6,7,8-HxCDF*	57117-44-9	pg/L	--	--	--	--	50	12.5	EDL
SW8290	2,3,4,6,7,8-HxCDF*	60851-34-5	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,7,8,9-HxCDF*	72918-21-9	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,4,7,8-HxCDD*	39227-28-6	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,6,7,8-HxCDD*	57653-85-7	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,7,8,9-HxCDD*	19408-74-3	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,4,6,7,8-HpCDF*	67562-39-4	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,4,7,8,9-HpCDF*	55673-89-7	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,4,6,7,8-HpCDD*	35822-46-9	pg/L	--	--	--	--	50	12.5	EDL
SW8290	OCDF*	39001-02-0	pg/L	--	--	--	--	100	25	EDL
SW8290	OCDD*	3268-87-9	pg/L	--	--	--	--	100	50	EDL
SW8330B	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	µg/L	--	--	780	--	0.15	0.05	0.036
SW8330B	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	µg/L	--	--	0.61	--	0.25	0.05	0.036
SW8330B	1,3,5-Trinitrobenzene (1,3,5-TNB)	99-35-4	µg/L	--	--	460	--	0.1	0.05	0.03
SW8330B	1,3-Dinitrobenzene (1,3-DNB)	99-65-0	µg/L	--	--	1.5	--	0.15	0.1	0.05
SW8330B	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	479-45-8	µg/L	--	--	61	--	0.15	0.1	0.05
SW8330B	Nitrobenzene (NB)	98-95-3	µg/L	--	--	0.12	--	0.15	0.1	0.05
SW8330B	2,4,6-Trinitrotoluene (2,4,6-TNT)	118-96-7	µg/L	--	--	2.2	--	0.15	0.1	0.05
SW8330B	4-Amino-2,6-dinitrotoluene (4-Am-DNT)	19406-51-0	µg/L	--	--	30	--	0.15	0.1	0.05
SW8330B	2-Amino-4,6-dinitrotoluene (2-Am-DNT)	35572-78-2	µg/L	--	--	30	--	0.3	0.1	0.1
SW8330B	2,4-Dinitrotoluene (2,4-DNT)	121-14-2	µg/L	--	--	0.2	--	0.15	0.1	0.05
SW8330B	2,6-Dinitrotoluene (2,6-DNT)	606-20-2	µg/L	--	--	15	--	0.15	0.1	0.05
SW8330B	2-Nitrotoluene (2-NT)	88-72-2	µg/L	--	--	0.27	--	1	0.1	0.088
SW8330B	3-Nitrotoluene (3-NT)	99-08-1	µg/L	--	--	1.3	--	0.5	0.1	0.057
SW8330B	4-Nitrotoluene (4-NT)	99-99-0	µg/L	--	--	3.7	--	1	0.1	0.088
SW8330B	Nitroglycerin	55-63-0	µg/L	--	--	1.5	--	1	0.5	0.33
SW8330B	PETN	78-11-5	µg/L	--	--	16	--	1	0.5	0.3
SW7580	White phosphorous	7723-14-0	µg/L	--	--	0.31	--	0.05	0.025	0.015

The laboratory does not analyze for these compounds. The compounds will be tentatively identified based on a computer library search of the sample chromotography. If found, the coumpound concentration will be reported as an estimated value.

The detection limit exceeds most stringent criteria.

[a] Secondary Contaminant Levels are in parentheses

[b] KAFB RCRA permit screening criteria for perchlorate

* Risk based screening levels will be calculated if analyte is detected and toxicological information is available

Constituents with "%" units are surrogates and are not a part of the target analytes.

CAS - Chemical Abstract Service

DL - Detection limit

DOE - Department of Energy

LOD - Limit of detection

LOQ - Limit of quantitation

µg/L - micrograms per liter

mg/L - milligrams per liter

NA - not applicable

pg/L - picograms per liter

RPD - relative percent difference

Table H-3

Comparison of Reporting Levels to Screening Objectives in Soil, Open Burn Unit at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Residential SSG (Feb 2012)	Coyote Test Field Super Group Background Values (surface soil)	Coyote Test Field Super Group Background Values (subsurface soil)	EPA Regional Screening Levels, Residential (Nov 2012)	LOQ	LOD	DL
SW6010B	Antimony	7440-36-0	mg/kg	31.3	3.9	3.9	--	3	2	0.94
SW6010B	Barium	7440-39-3	mg/kg	15,596	130	214	--	2	0.5	0.12
SW6010B	Beryllium	7440-41-7	mg/kg	156	0.65	0.65	--	0.3	0.1	0.03
SW6010B	Cadmium	7440-43-9	mg/kg	70.3	1	0.9	--	0.3	0.1	0.03
SW6010B	Chromium	7440-47-3	mg/kg	117,321/2.97	17.3	12.8	--	1	0.5	0.14
SW6010B	Cobalt	7440-48-4	mg/kg	--	5.2	5.2	23	1	0.5	0.25
SW6010B	Copper	7440-50-8	mg/kg	3,129	15.4	18.2	--	1.5	0.5	0.22
SW6010B	Lead	7439-92-1	mg/kg	400	21.4	11.8	--	1	0.5	0.26
SW6010B	Nickel	7440-02-0	mg/kg	1,564	11.5	11.5	--	1	0.5	0.24
SW6010B	Selenium	7782-49-2	mg/kg	391	1	1	--	4	2.5	1.4
SW6010B	Silver	7440-22-4	mg/kg	391	1	1	--	0.5	0.2	0.09
SW6010B	Tin	7440-31-5	mg/kg	--	10	10	47,000	100	25	11
SW6010B	Vanadium	7440-62-2	mg/kg	391	20.4	21.5	--	2	0.5	0.19
SW6010B	Zinc	7440-66-6	mg/kg	23,464	62	62	--	2	1	0.19
SW6020A	Arsenic	7440-38-2	mg/kg	3.9	5.6	7.4	--	0.5	0.3	0.15
SW6020A	Thallium	7440-28-0	mg/kg	0.78	1.1	1.1	--	0.15	0.1	0.05
SW7471A	Mercury	7439-97-6	mg/kg	15.6/7.82	0.25	0.10	--	0.04	0.012	0.0086
SW6850	Perchlorate	14797-73-0	µg/kg	54,800	--	--	--	5	0.4	0.26
SW7580	White Phosphorus	7723-14-0W	µg/kg	--	--	--	1,600	0.1	0.05	0.015
SW8260B	1,1,1-Trichloroethane	71-55-6	µg/kg	15,609,580	--	--	--	5	1	0.36
SW8260B	1,1,2,2-Tetrachloroethane	79-34-5	µg/kg	8,021	--	--	--	5	1	0.68
SW8260B	1,1,2-Trichloroethane	79-00-5	µg/kg	2,811	--	--	--	5	1	0.44
SW8260B	1,1,2-trichloro-1,1,2-trifluoroethane	76-13-1	µg/kg	72,080,604	--	--	--	10	1	0.83
SW8260B	1,1-Dichloroethane	75-34-3	µg/kg	64,514	--	--	--	5	1	0.29
SW8260B	1,1-Dichloroethene	75-35-4	µg/kg	448,879	--	--	--	5	0.5	0.26
SW8260B	1,2,3-Trichlorobenzene	87-61-6	µg/kg	--	--	--	49,000	5	1	0.75
SW8260B	1,2,3-Trichloropropane	96-18-4	µg/kg	50	--	--	--	5	1	0.76
SW8260B	1,2,4-Trichlorobenzene	120-82-1	µg/kg	72,980	--	--	--	5	1	0.75
SW8260B	1,2,4-Trimethylbenzene	95-63-6	µg/kg	--	--	--	62,000	5	1	0.51
SW8260B	1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	µg/kg	186	--	--	--	10	1	0.88
SW8260B	1,2-Dibromoethane (EDB)	106-93-4	µg/kg	588	--	--	--	10	1	0.27
SW8260B	1,2-Dichlorobenzene	95-50-1	µg/kg	2,306,711	--	--	--	5	1	0.64
SW8260B	1,2-Dichloroethane	107-06-2	µg/kg	7,885	--	--	--	5	1	0.73
SW8260B	1,2-Dichloropropane	78-87-5	µg/kg	15,238	--	--	--	5	1	0.6
SW8260B	1,3,5-Trimethylbenzene	108-67-8	µg/kg	--	--	--	780,000	5	1	0.35
SW8260B	1,3-Dichlorobenzene*	541-73-1	µg/kg	--	--	--	--	5	1	0.3
SW8260B	1,4-Dichlorobenzene	106-46-7	µg/kg	31,731	--	--	--	5	1	0.78
SW8260B	1,4-Dioxane	123-91-1	µg/kg	48,634	--	--	--	250	75	39
SW8260B	2-Butanone (MEK)	78-93-3	µg/kg	37,076,608	--	--	--	10	3	1.4
SW8260B	2-Hexanone	591-78-6	µg/kg	--	--	--	210,000	10	1	0.74
SW8260B	4-Methyl-2-pentanone (MIBK)	108-10-1	µg/kg	51,578	--	--	--	10	1	0.92
SW8260B	Acetone	67-64-1	µg/kg	66,556,733	--	--	--	20	3	1.4
SW8260B	Benzene	71-43-2	µg/kg	15,381	--	--	--	5	1	0.26
SW8260B	Bromochloromethane	74-97-5	µg/kg	--	--	--	160,000	5	1	0.94
SW8260B	Bromodichloromethane	75-27-4	µg/kg	5,411	--	--	--	5	1	0.53
SW8260B	Bromoform	75-25-2	µg/kg	--	--	--	--	5	1	0.4
SW8260B	Bromomethane	74-83-9	µg/kg	16,485	--	--	--	5	3	0.86
SW8260B	Carbon disulfide	75-15-0	µg/kg	1,532,527	--	--	--	10	1	0.49
SW8260B	Carbon tetrachloride	56-23-5	µg/kg	10,833	--	--	--	5	1	0.53
SW8260B	Chlorobenzene	108-90-7	µg/kg	376,370	--	--	--	5	1	0.29
SW8260B	Chloroethane	75-00-3	µg/kg	29,806,983	--	--	--	5	1	0.45
SW8260B	Chloroform	67-66-3	µg/kg	5,864	--	--	--	5	1	0.26
SW8260B	Chloromethane	74-87-3	µg/kg	274,707	--	--	--	5	1	0.5
SW8260B	cis-1,2-Dichloroethene	156-59-2	µg/kg	156,428	--	--	--	5	1	0.89
SW8260B	cis-1,3-Dichloropropene*	10061-01-5	µg/kg	33713	--	--	--	5	1	0.64
SW8260B	Cyclohexane	1735-17-7	µg/kg	--	--	--	7,000,000	(a)	(a)	(a)
SW8260B	Dibromochloromethane	124-48-1	µg/kg	12,127	--	--	--	5	0.5	0.21
SW8260B	Dichlorodifluoromethane (Freon 12)	75-71-8	µg/kg	168,142	--	--	--	5	3	0.89
SW8260B	Ethylbenzene	100-41-4	µg/kg	68,448	--	--	--	5	1	0.34
SW8260B	Isopropylbenzene	98-82-8	µg/kg	2,430,743	--	--	--	5	1	0.52
SW8260B	Methyl Acetate	79-20-9	µg/kg	78,214,000	--	--	--	(a)	(a)	(a)
SW8260B	Methly Cyclohexane	108-87-2	µg/kg	5,625,911	--	--	--	(a)	(a)	(a)
SW8260B	Methyl tert-butyl ether (MTBE)	1634-04-4	µg/kg	901,073	--	--	--	10	1	0.6
SW8260B	Methylene chloride	75-09-2	µg/kg	409,376	--	--	--	5	1	0.84
SW8260B	m-Xylene & p-Xylene	136777-61-2	µg/kg	774,289	--	--	--	5	1	0.81
SW8260B	Naphthalene	91-20-3	µg/kg	42,976	--	--	--	5	1	0.63
SW8260B	o-Xylene	95-47-6	µg/kg	898,344	--	--	--	5	0.5	0.33
SW8260B	Styrene	100-42-5	µg/kg	7,277,612	--	--	--	5	1	0.31
SW8260B	Tetrachloroethene	127-18-4	µg/kg	7,021	--	--	--	5	1	0.61
SW8260B	Toluene	108-88-3	µg/kg	5,274,400	--	--	--	5	1	0.61
SW8260B	trans-1,2-Dichloroethene	156-60-5	µg/kg	269,586	--	--	--	5	1	0.38
SW8260B	trans-1,3-Dichloropropene*	10061-02-6	µg/kg	33713	--	--	--	5	1	0.75
SW8260B	Trichloroethene	79-01-6	µg/kg	8,767	--	--	--	5	1	0.6
SW8260B	Trichlorofluoromethane (Freon 11)	75-69-4	µg/kg	1,412,976	--	--	--	10	1	0.34
SW8260B	Vinyl chloride	75-01-4	µg/kg	728	--	--	--	5	1	0.36

Table H-3

Comparison of Reporting Levels to Screening Objectives in Soil, Open Burn Unit at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Residential SSG (Feb 2012)	Coyote Test Field Super Group Background Values (surface soil)	Coyote Test Field Super Group Background Values (subsurface soil)	EPA Regional Screening Levels, Residential (Nov 2012)	LOQ	LOD	DL
SW8270C	1,1-biphenyl	92-52-4	µg/kg	57117	--	--	--	330	NA	165
SW8270C	1,2,4,5-tetrachlorbenzene	95-94-3	µg/kg	18,331	--	--	--	(a)	(a)	(a)
SW8270C	2,4,5-Trichlorophenol	95-95-4	µg/kg	6,110,491	--	--	--	330	167	83
SW8270C	2,4,6-Trichlorophenol	88-06-2	µg/kg	61,105	--	--	--	330	167	84
SW8270C	2,4-Dichlorophenol	120-83-2	µg/kg	183,315	--	--	--	330	167	89
SW8270C	2,4-Dimethylphenol	105-67-9	µg/kg	1,222,098	--	--	--	500	167	167
SW8270C	2,4-Dinitrotoluene	121-14-2	µg/kg	15,689	--	--	--	330	167	89
SW8270C	2,6-Dichlorophenol*	87-65-0	µg/kg	--	--	--	--	500	167	165
SW8270C	2,6-Dinitrotoluene	606-20-2	µg/kg	61,105	--	--	--	330	167	99
SW8270C	2-Chloronaphthalene	91-58-7	µg/kg	6,257,143	--	--	--	330	167	81
SW8270C	2-Chlorophenol	95-57-8	µg/kg	391,071	--	--	--	330	167	88
SW8270C	2-Methylnaphthalene	91-57-6	µg/kg	--	--	--	230,000	330	167	85
SW8270C	2-Methylphenol	95-48-7	µg/kg	--	--	--	3,100,000	330	167	58
SW8270C	2-Nitroaniline	88-74-4	µg/kg	--	--	--	610,000	1600	167	84
SW8270C	2-Nitrophenol*	88-75-5	µg/kg	--	--	--	--	330	167	82
SW8270C	2,2-oxybis(1-chloropropane)*	52438-91-2	µg/kg	--	--	--	--	330	167	54
SW8270C	3,3'-Dichlorobenzidine	91-94-1	µg/kg	10,808	--	--	--	1600	167	94
SW8270C	3-Methylphenol & 4-Methylphenol	65794-96-9	µg/kg	--	--	--	3,100,000	1000	660	330
SW8270C	3-Nitroaniline*	99-09-2	µg/kg	--	--	--	--	1600	333	167
SW8270C	4,6-Dinitro-2-methylphenol	534-52-1	µg/kg	4,888	--	--	--	2000	333	81
SW8270C	4-Bromophenyl phenyl ether*	101-55-3	µg/kg	--	--	--	--	330	167	85
SW8270C	4-Chloro-3-methylphenol	59-50-7	µg/kg	--	--	--	6,100,000	330	167	92
SW8270C	4-Chloroaniline	106-47-8	µg/kg	--	--	--	2,400	330	167	58
SW8270C	4-Chlorophenyl phenyl ether*	7005-72-3	µg/kg	--	--	--	--	330	167	93
SW8270C	4-Nitroaniline	100-01-6	µg/kg	--	--	--	24,000	1600	167	88
SW8270C	4-Nitrophenol*	100-02-7	µg/kg	--	--	--	--	2000	333	280
SW8270C	Acenaphthene	83-32-9	µg/kg	3,440,510	--	--	--	330	167	83
SW8270C	Acenaphthylene*	208-96-8	µg/kg	--	--	--	--	330	167	85
SW8270C	Anthracene	120-12-7	µg/kg	17,202,560	--	--	--	330	167	86
SW8270C	Acetophenone	17537-31-4	µg/kg	7,821,428	--	--	--	(a)	(a)	(a)
SW8270C	Azobenzene (as 1,2 diphenyl hydrazine)	103-33-3	µg/kg	6079	--	--	610	330	167	92
SW8270C	Atrazine	93616-39-8	µg/kg	--	--	--	2,100	(a)	(a)	(a)
SW8270C	Benzaldehyde	100-52-7	µg/kg	--	--	--	7,800,000	(a)	(a)	(a)
SW8270C	Benz(a)anthracene	56-55-3	µg/kg	1,476	--	--	--	330	167	92
SW8270C	Benzo(a)pyrene	50-32-8	µg/kg	147	--	--	--	330	167	94
SW8270C	Benzo(b)fluoranthene	205-99-2	µg/kg	1,476	--	--	--	330	167	95
SW8270C	Benzo(ghi)perylene*	191-24-2	µg/kg	--	--	--	--	330	167	110
SW8270C	Benzo(k)fluoranthene	207-08-9	µg/kg	14,762	--	--	--	330	167	113
SW8270C	bis(2-Chloroethoxy)methane	111-91-1	µg/kg	--	--	--	180,000	330	167	88
SW8270C	bis(2-Chloroethyl) ether	111-44-4	µg/kg	6	--	--	--	330	167	81
SW8270C	bis(2-Ethylhexyl) phthalate	117-81-7	µg/kg	347,387	--	--	--	330	167	98
SW8270C	Butyl benzyl phthalate	85-68-7	µg/kg	--	--	--	260,000	330	167	95
SW8270C	Carbazole*	86-74-8	µg/kg	--	--	--	--	330	167	95
SW8270C	Caprolactam	105-60-2	µg/kg	--	--	--	31,000,000	(a)	(a)	(a)
SW8270C	Chrysene	218-01-9	µg/kg	148,629	--	--	--	330	167	84
SW8270C	Dibenz(a,h)anthracene	53-70-3	µg/kg	147	--	--	--	330	167	102
SW8270C	Dibenzofuran	132-64-9	µg/kg	--	--	--	78,000	330	167	86
SW8270C	Diethyl phthalate	84-66-2	µg/kg	48,883,929	--	--	--	330	167	90
SW8270C	Dimethyl phthalate	131-11-3	µg/kg	611,049,107	--	--	--	330	167	87
SW8270C	Di-n-butyl phthalate	84-74-2	µg/kg	6,110,491	--	--	--	330	167	97
SW8270C	Di-n-octyl phthalate*	117-84-0	µg/kg	--	--	--	--	330	167	97
SW8270C	Fluoranthene	206-44-0	µg/kg	2,293,674	--	--	--	330	167	95
SW8270C	Fluorene	86-73-7	µg/kg	2,293,674	--	--	--	330	167	92
SW8270C	Hexachlorobenzene	118-74-1	µg/kg	3,040	--	--	--	330	167	89
SW8270C	Hexachlorobutadiene	87-68-3	µg/kg	--	--	--	--	330	167	82
SW8270C	Hexachloroethane	67-72-1	µg/kg	42,773	--	--	--	330	167	81
SW8270C	Hexachlorocyclopentadiene	77-47-4	µg/kg	366,000	--	--	--	1600	250	62
SW8270C	Indeno(1,2,3-cd)pyrene	193-39-5	µg/kg	1,476	--	--	--	330	167	96
SW8270C	Isophorone	78-59-1	µg/kg	5,119,394	--	--	--	330	167	93
SW8270C	Naphthalene	91-20-3	µg/kg	42,976	--	--	--	330	167	82
SW8270C	Nitrobenzene	98-95-3	µg/kg	53,500	--	--	--	330	167	76
SW8270C	N-Nitrosodimethylamine	62-75-9	µg/kg	22.5	--	--	--	330	167	96
SW8270C	N-Nitrosodi-n-propylamine	621-64-7	µg/kg	--	--	--	69	330	167	84
SW8270C	N-Nitrosodiphenylamine	86-30-6	µg/kg	992,516	--	--	--	330	167	86
SW8270C	Pentachlorophenol	87-86-5	µg/kg	8,935	--	--	--	330	167	51
SW8270C	2,4,6-Tribromophenol		%	--	--	--	--	--	--	--
SW8270C	2-Flourophenol		%	--	--	--	--	--	--	--
SW8270C	Nitrobenzene-d5		%	--	--	--	--	--	--	--

Table H-3

Comparison of Reporting Levels to Screening Objectives in Soil, Open Burn Unit at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Residential SSG (Feb 2012)	Coyote Test Field Super Group Background Values (surface soil)	Coyote Test Field Super Group Background Values (subsurface soil)	EPA Regional Screening Levels, Residential (Nov 2012)	LOQ	LOD	DL
SW8290	2,3,7,8-TCDF*	51207-31-9	pg/g	449	--	--	--	1	0.15	EDL
SW8290	2,3,7,8-TCDD	1746-01-6	pg/g	44.9	--	--	--	1	0.15	EDL
SW8290	1,2,3,7,8-PeCDF*	57117-41-6	pg/g	--	--	--	--	5	0.75	EDL
SW8290	2,3,4,7,8-PeCDF*	57117-31-4	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,7,8-PeCDD*	40321-76-4	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,7,8-HxCDF*	70648-26-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,6,7,8-HxCDF*	57117-44-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	2,3,4,6,7,8-HxCDF*	60851-34-5	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,7,8,9-HxCDF*	72918-21-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,7,8-HxCDD*	39227-28-6	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,6,7,8-HxCDD*	57653-85-7	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,7,8,9-HxCDD*	19408-74-3	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,6,7,8-HpCDF*	67562-39-4	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,7,8,9-HpCDF*	55673-89-7	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,6,7,8-HpCDD*	35822-46-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	OCDF*	39001-02-0	pg/g	--	--	--	--	10	1.5	EDL
SW8290	OCDD*	3268-87-9	pg/g	--	--	--	--	10	1.5	EDL
SW8330B	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	mg/kg	3,911	--	--	--	0.25	0.05	0.012
SW8330B	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	mg/kg	58.2	--	--	--	0.25	0.05	0.012
SW8330B	1,3,5-Trinitrobenzene (1,3,5-TNB)	99-35-4	mg/kg	--	--	--	2,200,000	0.25	0.05	0.01
SW8330B	1,3-Dinitrobenzene (1,3-DNB)	99-65-0	mg/kg	--	--	--	6,100	0.25	0.05	0.0042
SW8330B	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	479-45-8	mg/kg	244	--	--	--	0.25	0.05	0.01
SW8330B	Nitrobenzene (NB)	98-95-3	mg/kg	53.5	--	--	--	0.25	0.05	0.0176
SW8330B	2,4,6-Trinitrotoluene (2,4,6-TNT)	118-96-7	mg/kg	39.1	--	--	--	0.25	0.05	0.0194
SW8330B	4-Amino-2,6-dinitrotoluene (4-Am-DNT)	19406-51-0	mg/kg	--	--	--	150,000	0.25	0.05	0.01
SW8330B	2-Amino-4,6-dinitrotoluene (2-Am-DNT)	35572-78-2	mg/kg	--	--	--	150,000	0.25	0.05	0.0125
SW8330B	2,4-Dinitrotoluene (2,4-DNT)	121-14-2	mg/kg	7.15	--	--	--	0.25	0.05	0.0053
SW8330B	2-Nitrotoluene (2-NT)	88-72-2	mg/kg	29.1	--	--	--	0.5	0.05	0.013
SW8330B	3-Nitrotoluene (3-NT)	99-08-1	mg/kg	7.8	--	--	--	0.25	0.05	0.0155
SW8330B	4-Nitrotoluene (4-NT)	99-99-0	mg/kg	244	--	--	--	0.25	0.05	0.0182
SW8330B	Nitroglycerin	55-63-0	mg/kg	6.11	--	--	--	0.5	0.25	0.015
SW8330B	PETN	78-11-5	mg/kg	--	--	--	120,000	0.5	0.25	0.025
SW8330B	3,4-Dinitrotoluene (Surrogate)	610-39-9	%	--	--	--	--	--	--	--

The laboratory does not analyze for these compounds. The compounds will be tentatively identified based on a computer library search of the sample chromotography. If found, the coumpound concentration will be reported as an estimated value.

The detection limit exceeds most stringent criteria.

Constituents with "%" units are surrogates and are not a part of the target analytes.

* Risk based screening levels will be calculated if analyte is detected and toxicological information is available

DL - Detection limit

LOD - Limit of detection

LOQ - Limit of quantitation

µg/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

pg/g - picograms per gram

RPD - relative percent difference

RSD - relative standard deviation for multi-incremental sample collection

SSG - soil screening goal

V:\Kirtland_AFB\GIS\MapFiles\Figure H-3 - Proposed GW Monitoring Well Locations.mxd

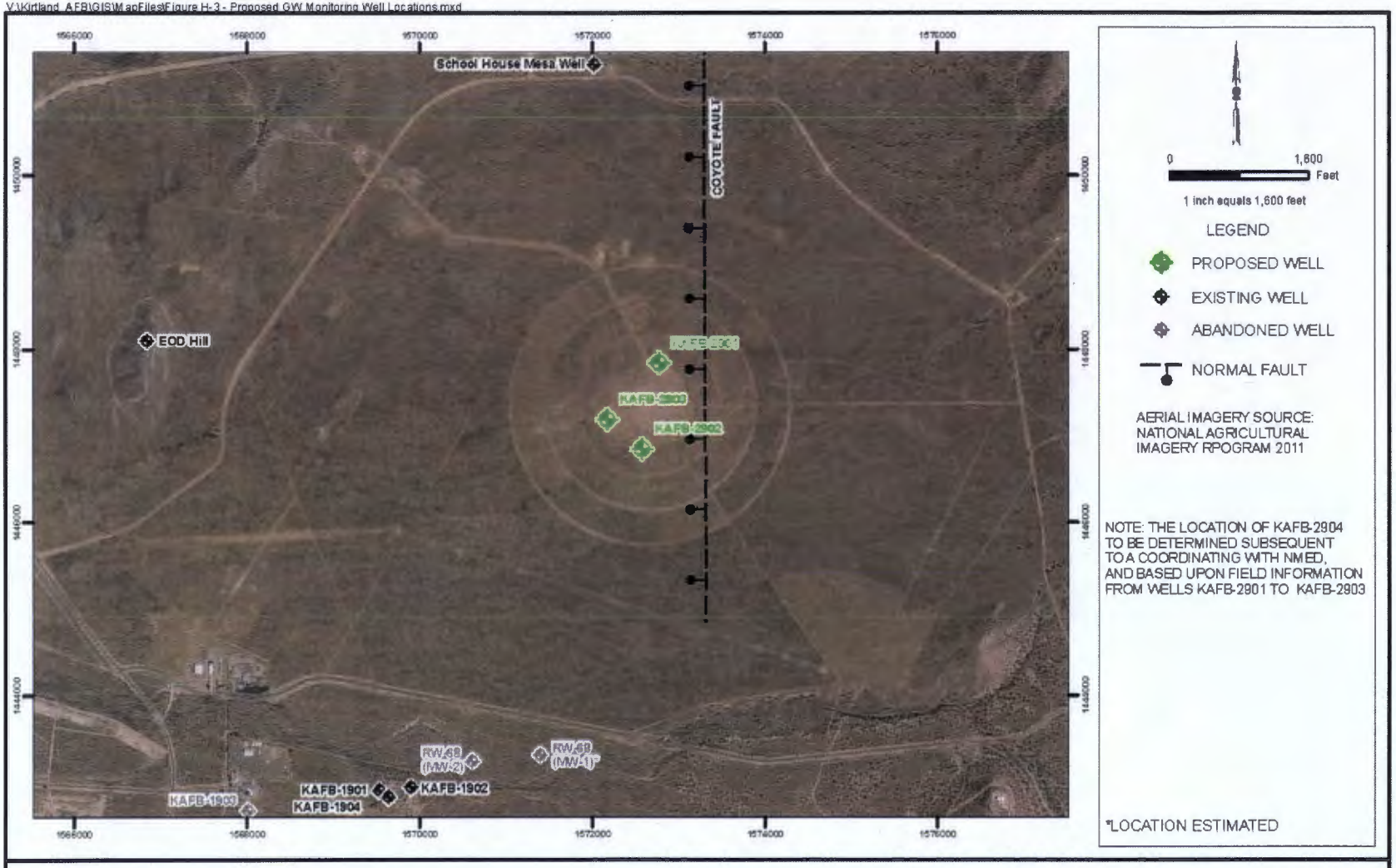

FIGURE H-3
PROPOSED GROUNDWATER MONITORING WELL LOCATIONS
FOR THE OPEN DETONATION UNIT
KIRTLAND AIR FORCE BASE, NEW MEXICO

2.1.1.1 Hydrogeologic Setting

The EOD Range is located within the Tijeras fault complex hydrogeologic region at Kirtland AFB (Sandia National Laboratories/New Mexico [SNL/NM], 2011a). The Sandia, Hubbel Springs, and Tijeras faults converge in this area and define eastern edge of the Albuquerque Basin. Within the Tijeras fault complex, a thin layer of alluvium covers bedrock. The hydrogeology in this area is poorly understood due to the complex geology created by the fault systems. On the eastern side of the Tijeras fault complex, the depth to groundwater ranges from about 45 to 325 ft bgs. Most of the monitoring wells in this area are completed in fractured bedrock at relatively shallow depths and produce modest yields of groundwater.

The nearest existing wells to the proposed monitoring well locations include the School House Well approximately 3,500 ft north-northwest of the OD unit; the EOD Hill Well approximately 4,300 ft west-northwest of the OD unit; three wells at Lake Christian (Kirtland AFB Solid Waste Management Unit [SWMU] 6-22), roughly 5,500 ft southeast of the OD unit; and three monitoring wells installed at the Old Burn Site (SNL SWMU 68), approximately 7,000 ft south of the OD unit. Nearby former monitoring well locations include two wells at the Radium Dump/Slag Piles (Kirtland AFB SWMU RW-68); approximately 4,500 ft south-southeast of the OD unit; and one well at Lake Christian (Kirtland AFB SWMU 6-22), roughly 5,500 ft southeast of the OD unit. The existing and former well locations are shown in Figure H-4.

All of the nearby wells are completed in water bearing zones of the Paleozoic sedimentary rocks of the Madera Group or Sandia Formation or the underlying Precambrian granite. The available borehole logs and well completion diagrams from the surrounding wells and former well locations indicate that the uppermost groundwater occurs under confined conditions.

The groundwater flow direction in the vicinity of the EOD Range is not well defined and is assumed to mirror the topographic gradient of the land surface. There are several north-south trending faults mapped along the Sandia/Manzanita/Manzano Mountain range front. In the vicinity of the OD unit, one normal fault crosses along the eastern edge of the EOD range, identified as the Coyote Fault in Figure H-4. This fault was encountered during drilling boreholes at the Old Burn Site (SNL SWMU 68), located south of the OD unit (SNL/NM, 2011b). This fault location is important to the OD unit investigation because it likely influences the groundwater flow across the site from east to west and may act as a hydraulic barrier. Comparison of water levels in the upgradient well and the downgradient wells shall provide data on the possible influence the fault has on local groundwater flow. The majority of the EOD Range is located west of the inferred location of the fault. The triangular configuration of the proposed downgradient monitoring wells and the measured groundwater elevations in the wells shall be used to calculate the groundwater flow direction and hydraulic gradient in the uppermost groundwater aquifer across the majority of the site.

The depth to the uppermost water bearing zones at the proposed well locations is expected to range from approximately 100 to 200 ft bgs. The horizontal groundwater flow velocity is estimated to be on the order of 50 to 100 ft/year. Based on a history of at least 40 or more years of activities in the EOD Range area, potential contaminant impacts in groundwater could be expected to have traveled roughly 2,000 to 4,000 ft downgradient based on those flow velocity estimates.

The three proposed well locations were selected in consultation with the Department (Figure H-3). One presumed upgradient and two presumed downgradient locations were selected for installation of the wells. Location of the fourth well shall be determined in consultation with the Department following installation of the three proposed wells based on gradient and flow direction.

FIGURE H-4
AREA FEATURES AND WELL LOCATIONS
MONITORING WELL INSTALLATION WORK PLAN FOR THE OPEN BURN AND OPEN DETONATION UNITS
KIRTLAND AIR FORCE BASE, NEW MEXICO

2.1.1.2 Investigation Activities

Well installation activities shall be conducted in accordance with the *Kirtland Air Force Base, Base-Wide Plans for the Environmental Restoration Program, 2004 Update* (USAF, 2004) and with the RCRA Permit. The procedures in Section 3.5 of the RCRA Permit, as well as procedures of the Base-Wide Plans, Standard Operating Procedure (SOP) B1.3: Monitoring Well Installation, shall be adhered to for this project, unless they are specifically modified by this closure plan.

2.1.1.3 Mobilization

The schedule of events for the investigation activities shall commence by drilling and installing three groundwater monitoring wells as shown in Figure H-3. Following well installations, the gradient and flow direction shall be established within the investigation area. The Permitee shall then meet with Department to determine the appropriate location of the fourth groundwater monitoring well. The fourth monitoring well, KAFB-2904, shall be installed and followed directly by the first groundwater monitoring event for the new wells. Quarterly groundwater monitoring shall be conducted according to this closure plan. At the conclusion of the investigation and four quarters of monitoring activities, the Permitee shall provide a report with recommendations based on the data collected from the first four quarters of monitoring.

An exploratory well application permit for each well shall be filed with the New Mexico Office of the State Engineer (NMOSE) in accordance with the Rules and Regulations Governing Well Driller Licensing; Construction, Repair and Plugging of Wells (NMOSE, 2005). The Bernalillo County well installation regulations are not applicable to wells installed on Kirtland AFB. All well locations shall be cleared by Unexploded Ordnance (UXO) support personnel prior to mobilization of drilling activities. An environmental impact analysis shall be performed through the Base Civil Engineering and Natural Resources Request (AF Form 813). A utility clearance of the area shall be performed using Base Civil Engineering Clearance Requests (AF IMT 103), Base Civil Engineer Work Requests (AF IMT 332), and New Mexico One Call services. A surface disturbance permit shall not be required because the total disturbed area of the wells is less than 1 acre.

2.1.1.4 Drilling Method and Sequence

The boreholes shall be installed using air-rotary casing hammer (ARCH) drilling method. This method has been successfully used for the installation of nearby monitoring wells and should facilitate lithologic description of drill cuttings and allow for the observation of soil/bedrock moisture content for identification of groundwater zones. The ARCH drilling method shall be used to advance the boring through the vadose zone and anchor the drive casing in the underlying bedrock.

The specific depths shall be determined in the field based on site conditions such as lithology and presence of groundwater. The following sequence of drilling is anticipated based on known hydrogeologic conditions and drill method capabilities:

1. Initiate boring with the ARCH method using an 8½-inch tri-cone bit and 9-5/8-inch diameter drive casing. Advance the drive casing to the depth of the contact between the alluvium and underlying bedrock.
2. Set the drive casing in the bedrock and continue drilling the borehole using an open hole drilling technique. If dense bedrock conditions are encountered in the boring, a change from a tri-cone bit to a down hole hammer bit may be required.

3. Advance the boring into the uppermost water bearing unit. Complete the borehole approximately 25 ft into the water bearing unit.

During the ARCH drilling activities, the field staff shall monitor for the presence of groundwater by visually inspecting drill cuttings for moisture. If the cuttings become wet, the borehole shall be allowed to sit idle for approximately one hour. A water level probe shall then be lowered into the borehole to assess whether groundwater has accumulated and this information shall be documented on the field log.

Field screening of the soil cuttings for the presence of volatile organic compounds (VOCs) shall be conducted during the drilling process using a portable photo ionization detector (PID) as described in Base-Wide Plans, Appendix B, SOP B3.1: Photo-ionization Detectors and Organic Vapor Analyzers (USAF, 2004). As the boreholes are advanced, the field geologist shall continuously collect soil cuttings to aid in the preparation of lithologic logs. The monitoring well lithologic log shall be completed as described in Base-Wide Plans, Appendix B SOP B1.1: Borehole and Sample Logging. Drill cuttings from ARCH method drilling shall be stored at the well site on plastic sheeting or in roll-off containers and managed as investigation-derived waste (IDW).

Groundwater purged from the boring during borehole advancement and sampling shall be allowed to settle in roll-off bins then transferred to holding tank(s). These plastic holding tanks shall be managed as IDW along with decontamination and well development fluids.

Decontamination of the drill rig, drill tools, sampling equipment, and associated equipment shall be accomplished by steam cleaning prior to drilling each well. Decontamination activities shall be conducted at a central location with water obtained from an approved onsite source. Decontamination fluids shall be contained in polyethylene tanks and managed as IDW.

2.1.1.5 Subsurface Soil Sampling

Soil and rock sampling shall be performed for lithologic description. Subsurface soil laboratory analysis is not proposed as part of this investigation. No soil or rock samples shall be submitted for laboratory analysis.

2.1.1.6 Monitoring Well Construction

Monitoring wells shall be designed and constructed based on the lithology and groundwater elevations encountered at each proposed well location. The well construction details may be subject to change based on the observed field conditions, but procedures and methods shall comply with Section 3.5 of the RCRA Permit and the OSE criteria. The anticipated well constructions details are shown in Figure H-5. The proposed monitoring well design includes the use of 4-inch-inside diameter (ID), Schedule 80 polyvinyl chloride (PVC) casing with a 5-ft well sump, 20-ft of 0.020-inch slot size well screen, and approximately 2 to 3 ft of stickup at the surface. Centralizers shall be used to stabilize the well casing within the borehole at the top and bottom of the screen interval and at a minimum spacing of 40 ft on casing above the top of the well screen.

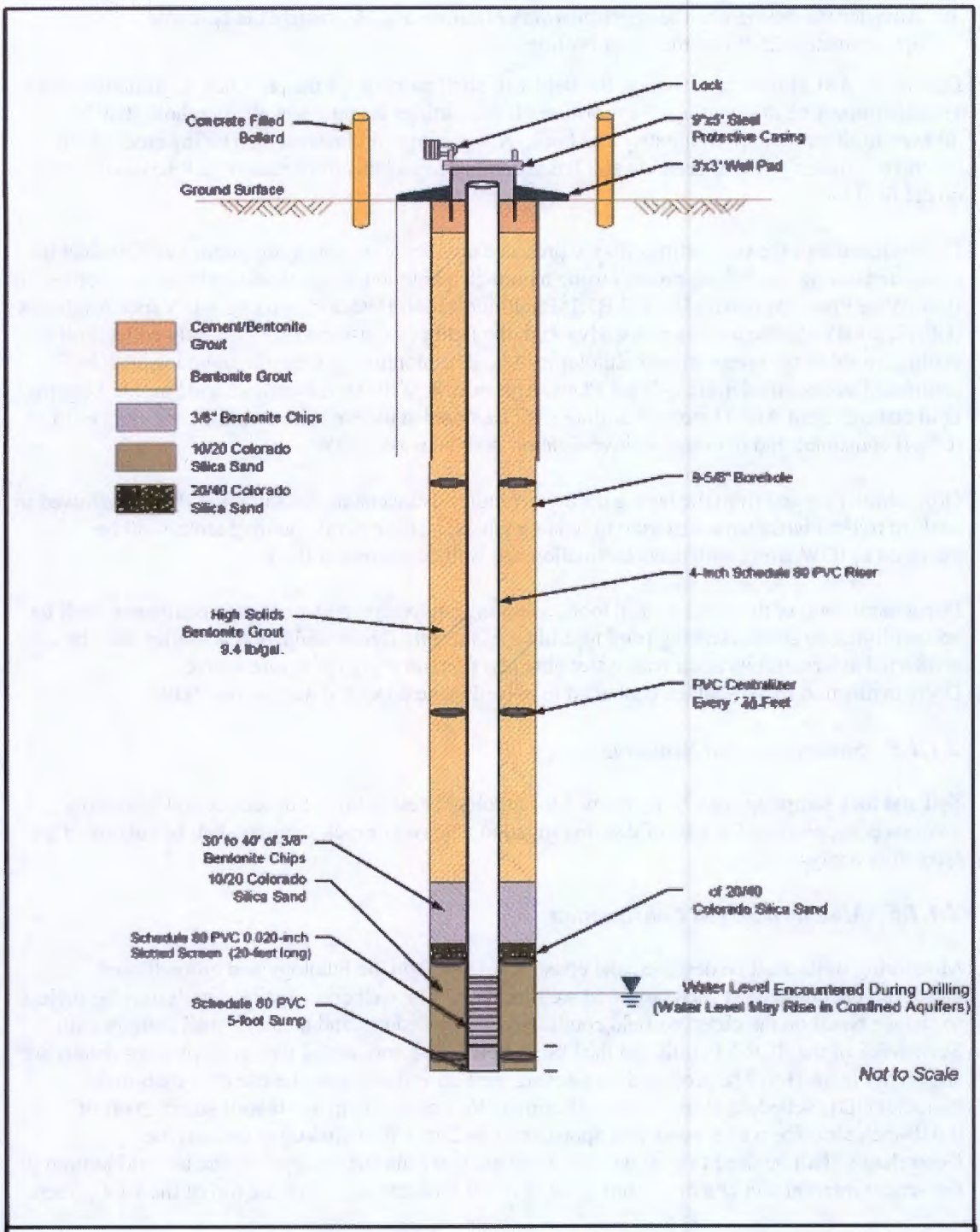

FIGURE H-5
PROPOSED MONITORING WELL DESIGN
MONITORING WELL INSTALLATION WORK PLAN
FOR THE OPEN BURN AND OPEN DETONATION UNITS
KIRTLAND AIR FORCE BASE, NEW MEXICO

Wells shall be completed as follows:

- The sand filter pack type shall be determined based on field observations and shall extend from the bottom of the silt trap to 5 ft above the top of the screen. However, it is anticipated that a filter pack of 10-20 gradation Colorado Silica Sand shall be used in the construction of the monitoring wells. The filter pack sand shall be placed through a tremie pipe. Approximately 2 ft of barrier sand, 100 percent passing an American Society for Testing and Materials (ASTM) U.S. Standard Sieve No. 60, shall be placed above the filter pack to inhibit flow of grout into the filter pack.

- A minimum of 10 ft of bentonite chips or pellets shall be installed above the filter pack through a tremie pipe. The seal shall be hydrated with clean potable water in 6-inch lifts. Setup time for the bentonite shall be at the discretion of the field geologist.

- The annular space above the hydrated bentonite seal shall be backfilled with bentonite slurry. Bentonite slurries are effective in sealing off groundwater units above the screened and sand-packed intervals of a well and are less likely to damage the well casing than bentonite-cement grout. The bentonite slurry shall be installed through a tremie pipe. The bentonite slurry shall extend from the bentonite pellet seal to approximately 50 ft bgs.

- The remaining 50 ft of annular space shall be filled with bentonite-cement grout consisting of 94 pounds of Portland cement, 3 percent by weight sodium bentonite powder, and 7 gallons of contaminant-free water. The bentonite-cement grout shall be placed using a grout pump and tremie pipe to within 5 ft of the land surface. The grout shall be allowed to set for at least 24 hours before well development begins.

- The monitoring wells shall be completed at the surface in accordance with specifications as presented in SOP B1.3 of the *Base-Wide Plans, Field Sampling Plan* (FSP) (USAF, 2004). The surface completion shall consist of a 5-foot-long, 9-inch-diameter steel stand pipe with locking cap cemented into a 3-foot-square concrete well pad. Four concrete-filled steel bollards shall be installed at the corners of the well pad to protect the well from vehicle damage.

- At the conclusion of the project, when wells KAFB-2901, KAFB-2902, KAFB-2903, and KAFB-2904 are no longer needed, the wells shall be properly abandoned in compliance with *Rules and Regulations Governing Well Driller Licensing; Construction, Repair and Plugging of Wells* (NMOSE, 2005).

2.1.1.7 Well Development

Monitoring wells shall be developed using a variety of techniques including swabbing, surging, bailing, air lifting and pumping. Monitoring well development shall adhere to procedures outlined in Base-Wide Plans, Appendix B, SOP B1.4: Monitoring Well Development (USAF, 2004). Monitoring well development shall be performed within one week after well installation but no sooner than 24 hours after grout installation. Groundwater discharged from the wells shall be monitored for pH, temperature, specific conductance, dissolved oxygen, oxidation-reduction (redox) potential, and turbidity. Each monitoring well screen shall be developed until pH and specific conductance stabilize and the water appears substantially free of sediment. The development goal is to reduce the turbidity to less than 10 nephelometric turbidity units (NTUs) and a less than 10 percent variance in the other parameters observed in the final three readings.

However, a final turbidity of less than 100 NTUs is acceptable. If the field parameters have not stabilized after 4 hours of continuous pumping, the well shall be allowed to sit overnight and development shall continue the following day for a maximum of 2 hours. If the turbidity still does not fall below 100 NTUs, the Permitee shall seek further direction from the Department.

Proposed monitoring wells KAFB-2901, KAFB-2902, and KAFB-2903 shall be developed and surveyed subsequent to installation. A static groundwater elevation from each surveyed and developed well shall be measured and used to determine the groundwater gradient and flow direction across the OD unit area. This information shall be used to determine the location and design of KAFB-2904.

2.1.1.8 Well Survey

A New Mexico licensed professional surveyor shall survey the horizontal well locations relative to New Mexico State Plane Coordinates and the vertical elevations to the nearest one-hundredth of 1 ft for the newly installed monitoring wells. Surveying shall be conducted in accordance with SOP B1.9 of the Base-Wide Plans FSP (USAF, 2004).

2.1.1.9 Groundwater Gradient Calculations

Depth to water measurements for static conditions shall be collected from monitoring wells KAFB-2901, KAFB-2902, and KAFB-2903 subsequent to well development. These measurements shall be converted to groundwater elevation data using well survey data. These elevations shall be mapped, and gradients shall be calculated perpendicular to the equipotential groundwater contours. The direction and magnitude of groundwater gradients shall provide information that shall be used to propose optimum locations for monitoring well KAFB-2904. The permitee shall consult with the Department to determine the final location of KAFB-2904. Groundwater elevations may also be collected from comparable aquifer units from nearby monitoring wells. The previously installed wells surrounding the investigation area include KAFB-1901, KAFB-1902, KAFB-1904, EOD Hill Well, and School House Mesa Well.

2.1.2 Groundwater Sampling and Analysis Plan

Groundwater monitoring shall be performed subsequent to well development at a quarterly frequency for up to eight quarters. Groundwater elevations shall be measured in each well prior to sampling. Groundwater elevations shall be used to determine groundwater flow rate and gradient on a quarterly basis. Well purging methods shall comply with the RCRA Permit Section 6.5.17.4 and groundwater samples shall be analyzed for VOCs, semivolatile organic compounds (SVOCs), explosives, perchlorate, white phosphorus, target analyte list metals, dioxins, and furans, total dissolved solids, alkalinity, anions, cations, and total organic carbon (Table H-4). Data shall be of sufficient precision and quality to meet data quality objectives and to ensure that method detection limits are less than cleanup levels where technologically feasible.

Up to eight consecutive quarters of groundwater monitoring are currently planned at the four monitoring wells. If groundwater contamination from the operation of the OD unit is not detected in the monitoring wells, they shall be properly plugged and abandoned in accordance with NMOSE regulations and Department guidance. If groundwater contamination from the operation of the OD unit is identified, the monitoring wells shall be maintained for the purpose of monitoring corrective action.

Table H-4
Groundwater Monitoring Parameters and Testing Methods for the Groundwater Investigation of the OD Unit

Analysis	Method	Testing Location	Data Use
Groundwater elevation	Groundwater probe	Field	Groundwater flow direction
pH	pH probe	Field, flow-through cell	General groundwater parameter
Temperature	Digitalthermometer	Field, flow-through cell	General groundwater parameter
Specific conductance	Conductivity meter	Field, flow-through cell	General groundwater parameter
Dissolved oxygen	Dissolved oxygen probe	Field, flow-through cell	Assess aerobic or anaerobic conditions
Oxidation-reduction potential	EH (hydrogen electrode) meter	Field, flow-through cell	Assess conditions for natural attenuation of contaminants
Turbidity	Turbidity meter	Field, flow-through cell	General groundwater parameter
Total dissolved solids	EPA 160.2[a]	Laboratory	General groundwater parameter
Alkalinity	EPA 310.2[a]	Laboratory	General groundwater parameter
Ammonia	EPA350.1[a]	Laboratory	General groundwater parameter
Sulfide	SW9030B[b]	Laboratory	General groundwater parameter
Anions (sulfate, nitrate, nitrite, chloride, bromide and fluoride)	SW9056[b]	Laboratory	General groundwater parameter
Total organic carbon	SW9060[b]	Laboratory	General groundwater parameter
Metals (barium, boron, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, lithium, magnesium, manganese, molybdenum, nickel, potassium, selenium, silver, sodium, strontium, tin, vanadium, zinc, antimony, arsenic, thallium, mercury)	SW6010B[b], SW6020A[b], SW7470A[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Perchlorate	SW6850[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Volatile organic compounds	SW8260B[b], SW8011[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Semivolatile organic compounds	SW8270C[b], SW8270-SIM[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Dioxins and furans	SW8290[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Explosives	SW8330B[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
White phosphorous	SW7580[b]	Laboratory	Assess potential contamination from OB/OD Unit operations

[a] EPA, 1993.
[b] EPA, 1996.
EPA – U.S. Environmental Protection Agency
OB/OD – Open Burn/Open Detonation

2.1.2.1 Well Purging and Field Measurements

Each monitoring well shall be purged by removing groundwater prior to sampling in order to ensure that fresh formation water is sampled. One to three well-bore volumes shall be purged from each well prior to sampling. A well-bore volume is defined as the volume of water in the saturated filter pack plus the volume of all standing water within the well screen and casing. Purge water shall be contained in polyethylene tanks for subsequent characterization and management as IDW. The following groundwater field parameters shall be measured during well purging: pH, specific conductance, dissolved oxygen concentration, turbidity, redox potential, and temperature. The volume of groundwater purged, the field parameter readings obtained at each time interval, and the instruments used to measure the field parameters shall be recorded on the field monitoring log. Water samples shall be obtained from a well only after the measured values of purge water field parameters have stabilized to within 10 percent for three consecutive measurements or once three well-bore volumes have been purged from the well.

Groundwater samples shall be collected using a pneumatic pump, a submersible electronic pump, or a bailer within eight hours of the completion of well purging. Groundwater in monitoring wells with low recharge rates and that purge dry shall be sampled when the water level in the well has recovered sufficiently to collect the required sample volume. Sampling handling, preservation, and storage shall comply with the RCRA permit requirements of Table H-5.

2.1.2.2 Laboratory Analysis and Quality Control/Quality Assurance Procedures

Groundwater samples shall be collected from each monitoring well and analyzed for VOCs, SVOCs, explosives, perchlorate, white phosphorus, target analyte list metals, dioxins, and furans, total dissolved solids, alkalinity, anions, cations, and total organic carbon (Table H-4). The proposed suite of parameters and analyses for the groundwater samples is presented in Table H-2. The contacted laboratory must meet DoD certification requirements. To ensure that data is of sufficient precision, laboratory method detection limits shall be those shown in the approved OD Unit Closure Plan. To ensure that analytical data is of sufficient quality and that laboratory and field methods are assured of proper quality field quality control samples shall be collected in compliance with the approved OD Unit Closure Plan. Level 4 laboratory data shall be requested and validated by qualified chemists to meet criteria specified by the Department and the DoD.

Data reliability shall be ensured by documenting sample management so that analyses are traceable to specific areas of potential contamination and by following a quality assurance/quality control (QA/QC) program that mandates documentation of the precision and accuracy of laboratory analyses, as well as data representativeness, completeness, comparability, and sensitivity.

The QC samples to be collected include: field duplicate samples, trip blanks, and rinsate blanks. Sample designations shall follow the guidelines as outlined in Section 4.2.1 of the Base-Wide Plans, FSP (USAF, 2004). The well identification numbers assigned to the four new wells for this investigation are: KAFB-2901, KAFB-2902, KAFB-2903, and KAFB-2904. The proposed sample number scheme is presented in Table H-6.

Table H-5
Sample Containers, Preservation Techniques, and Holding Times for Soil and Groundwater Samples

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers	Preservation Requirements	Maximum Holding Time
Soil	Metals (including mercury)	SW6010B/ SW6020 and SW7471A	1 gram	250-ml glass or polyethylene	4±2 degrees Celsius (°C)	180 days from date of collection for metals; 28 days from collection to analysis for mercury
Soil	Volatile Organic Compounds (VOCs)	SW8260B/ SW5035	3 different 5-gram aliquots	6 40-milliliters (ml) volatile organic analysis (VOA) vials	Per sample collection: 2 VOA vials with 10-ml water and 1 VOA vial with 10-ml methanol. All vials contain a stir bar. Or 3 VOA vials containing stir bars will have a 5-gram sample aliquot added, seals and frozen on site with dry ice. Samples must remain frozen in shipment and storage at the lab until analysis.	Freeze within 48 hours of arrival at the lab, analyze within 14 days from data of collection Analyze within 14 days from data of collection
Soil	Semivolatile Organic Compounds (SVOCs)	SW8270C	30 grams	250-ml glass	4±2°C	14 days from date of collection to extraction and 40 days from extraction to analysis
Soil	Perchlorate	SW6850	30 grams	250-ml glass	4±2°C	28days
Soil	Explosives	SW8330B	10 grams	250-ml glass	4±2°C	14 days from date of collection to extraction and 40 days from extraction to analysis
Soil	White Phosphorous	SW7580	40 grams	250-ml glass	4±2°C	30 days from date of collection to extraction and analysis
Soil	Dioxins/ Furans	SW8290	30 grams	250-ml glass	4±2°C	30 days from date of collection to extraction and 45 days from extraction to analysis
Groundwater	Dissolved metals (including mercury)	SW6010B/ 6020 and SW7470A	100-ml	1-liter polyethylene	pH < 2 with nitric acid; 4±2°C	28 days from date of collection for Hg, 180 days for others
Groundwater	VOCs	SW8260B	3 40-ml vials	3 40-ml VOA vials	No headspace; 4±2°C	7 days from data of collection
Groundwater	SVOCs	SW8270C	1 liter	2 1-liter amber glass	4±2°C	7 days from date of collection to extraction and 40 days from extraction to analysis
Groundwater	Explosives	SW8330B	1 liter	2 1-liter amber glass	4±2°C	7 days from date of collection to extraction and 40 days from extraction to analysis

Table H-5
Sample Containers, Preservation Techniques, and Holding Times for Soil and Groundwater Samples

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers	Preservation Requirements	Maximum Holding Time
Groundwater	Perchlorate	SW6850	1 liter	1- 250mL precleaned sterile, plastic containers	Field filtered with 1/3 volume headspace to remove and/or minimize microbial and anaerobic bacteria. Store at 4 ± 2 C	28 days
Groundwater	White Phosphorous	SW7580	120 ml	1-liter amber glass	4±2°C	5 days from date of collection to extraction and analysis
Groundwater	Dioxins/ Furans	SW8290	1 liter	2 1-liter amber glass	4±2°C	30 days from date of collection to extraction and 45 days from extraction to analysis
Groundwater	Anions (sulfate, nitrate, nitrite, chloride, bromide and fluoride)	SW9056	100-ml	1-liter polyethylene	4±2°C	28 days from date of collection for all anions except that nitrate and nitrite are 48 hours
Groundwater	Ammonia	E350.1	100-ml	250 ml Poly	4°C pH < 2 with H2SO4	28days
Groundwater	Alkalinity	EPA 310.2	100-ml	250 ml Poly	4°C (share with SW9056)	14 days
Groundwater	Total Organic Carbon	SW9060	100-ml	1-liter polyethylene	4°C pH < 2 with HCL	28 days
Groundwater	Sulfide	SW9030B	500-ml	1-liter polyethylene	4°C Zn acetate NaOH to pH > 9	7 days
Groundwater	Total dissolved solids	EPA 160.2	100-ml	250 ml Poly	4°C	7 days

°C – degrees Celsius
H2SO4 – glycine, sulfate
HCL – hydrochloric acid
mL – milliliters
NaOH – sodium hydroxide
pH – potential of hydrogen
SVOC – Semivolatile organic compound
VOA – volatile organic analysis
VOC – volatile organic compound
Zn – zinc

Table H-6
Proposed Groundwater Sample Identification for the Groundwater Investigation of the OD Unit

Sample Identifier[a]	Sample Type
OT29-GW-2901-_____	Normal
OT29-GW-2902-_____	Normal
OT29-GW-2903-_____	Normal
OT29-GW-2904-_____	Normal
OT29-FD-2901-_____	Duplicate
OT29-EB-2902-_____	Rinsate Blank
OT29-TB-2903-_____	Trip Blank[b]
OT29-MS-2904-_____	Matrix Spike
OT29-MSD-2904-_____	Matrix Spike Duplicate

[a] The six digit sample date shall make up the last portion of the sample identification number
[b] Trip Blanks shall only be analyzed for VOCs

2.1.2.3 Groundwater Data Analysis

Groundwater laboratory analytical results shall be analyzed to determine if there is statistically significant evidence of contamination at each groundwater monitoring well after each sampling event. The groundwater results shall be analyzed by comparison to baseline constituent concentrations and applicable groundwater standards.

Baseline constituent concentrations for the aquifer shall be calculated using laboratory analytical results for groundwater monitoring well KAFB-2901 and other groundwater monitoring wells completed within the same aquifer unit and located nearby. Groundwater monitoring wells that could potentially be used in the baseline constituent concentration calculations include KAFB-1902, KAFB-1903, KAFB-1904, RW68-01, RW68-02, and groundwater monitoring wells sampled by Sandia National Laboratory/New Mexico. Analysis to determine which of the groundwater monitoring wells are completed within the same aquifer unit shall be completed following installation of monitoring well KAFB-2901.

Baseline constituent concentrations shall be calculated for detected naturally occurring compounds including ammonia, sulfide, anions, metals, and perchlorate as listed in Table H-4. Anthropogenic compounds, including VOCs, SVOCs, explosives, dioxins and furans, are assumed to occur at levels less than detection limits. Baseline concentrations shall not be calculated for the anthropogenic compounds.

Baseline constituent concentrations shall be established by calculating a 95 percent upper tolerance limit (UTL) for each of the detected constituents listed above. The 95 percent UTLs shall be calculated following the methodology established as part of the Kirtland AFB Long-Term Monitoring Program (USAF, 2007). The purpose of the UTL approach is to define a constituent concentration from background well data, below which 95 percent of the monitoring well observations fall with a high degree of probability. Once the UTL is determined based on the background monitoring wells, data from downgradient site wells can be compared for evidence of a release by evaluating how the downgradient well results compare to the UTL. If the downgradient well results are greater than the UTL, there is statistical evidence that there has been an increase in the downgradient concentration of the constituent in groundwater. A detailed

description of the process to determine baseline concentrations can be found in the *Long-Term Groundwater Monitoring Summary and Baseline Determination Report, Fiscal Year 2005* (USAF, 2007).

2.1.2.4 Reporting

One well completion report shall be prepared to document the drilling and well installation activities. No laboratory analytical data shall be presented in the well completion report. The well completion report shall be submitted to the Department for approval within 30 days of the completion of well installation activities. The well installation report shall include the following information:

- Descriptions of the field program including the drilling, well installation, surveying, and IDW management activities;
- Field documentation including soil boring logs, well construction diagrams, well development logs, and survey data.

Field and laboratory data shall be submitted to the Department within 90 days after all samples are collected for each quarter.

Periodic groundwater monitoring reports shall be prepared to document quarterly groundwater monitoring results. All validated groundwater laboratory results shall be presented in periodic groundwater monitoring reports which comply with Section 6.2.4.4 of the RCRA Permit. Groundwater analytical results shall be compared to New Mexico water quality control standards and EPA maximum contaminant levels and secondary screening levels to determine if contamination above standards is present in the groundwater monitoring wells. Each quarter of analytical data shall be evaluated for the presence of potential contaminants. The Periodic Groundwater Monitoring Reports for the OD unit shall be prepared annually and following four quarters of groundwater monitoring and submitted within 90 days after the completion of the last quarterly monitoring event. Currently, up to eight consecutive quarters of groundwater monitoring and two Periodic Groundwater Monitoring Reports are planned.

2.1.2.5 Project Schedule

Table H-7 outlines the project schedule for the installation and sampling of groundwater monitoring wells. The monitoring well drilling and installation activities shall be conducted upon approval of the OD Unit Closure Plan. The well installation activities shall be documented in a Well Completion Report. Final validated groundwater analytical results from four quarters of groundwater sampling shall be reported in an Annual Groundwater Monitoring Report for the OD unit.

Table H-7
Proposed Schedule of Activities for Groundwater Monitoring Well Installation for the Closure of the OD Unit

Activity	Duration (calendar days)	Start Date
Field Investigation		
Mobilize drilling equipment	3	15 days following Closure Plan approval
Well installation, development, and surveying collection of IDW soil and water samples	28	Following mobilization
IDW characterization and disposal	45	Following well installation
Preparation of Well Completion Report		
Initiate Well Completion Report Preparation	30	Upon completion of all well drilling, development, and surveying activities
Submit Well Completion Report to USACE, USAF, and the Department	1	30 days following well installation
Quarterly Groundwater Monitoring and Periodic Reporting		
Conduct quarterly groundwater monitoring	3	Following installation of four groundwater monitoring wells and on a quarterly basis
Submit field and laboratory data from monitoring event	1	90 days following collection of groundwater samples on a quarterly basis
Prepare Periodic Groundwater Monitoring Report	90	Following collection of four quarters of groundwater samples
Submit Periodic Groundwater Monitoring Report to the Department	1	90 days following collection of fourth quarter groundwater samples

IDW – investigation-derived waste
USACE – United States Army Corps of Engineers
USAF – United States Air Force

2.1.3 Mesa Schoolhouse Well

The Mesa Schoolhouse Well, a Department of Energy/National Nuclear Surety Administration (DOE/NNSA) well authorized under Kirtland AFB permit #PERM/0-K1-91-0010 was monitored for groundwater contamination as part of the December 1994 OD Unit's sampling and analysis plan. This sampling has been discontinued and the wellhead is secure. The well shall remain in place for possible future monitoring by DOE/NNSA

2.2 Sampling, Decontamination Procedures, and PPE

This section describes procedures and methods for soil and liquid sampling applicable to closure activities. While the procedures and methods are specific, other applicable procedures or methods given in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA, 1996; SW-846) may be used if conditions or experience show the alternate method to be more appropriate, and if approved by the Department. All sampling procedures actually used shall be annotated in the final closure report. Sampling shall be conducted in accordance with procedures given in "Samplers and Sampling Procedures for Hazardous Waste Streams" (EPA, 1980; EPA 600/2-80-018) or SW-846, as appropriate.

Surface and subsurface soil at the OD Unit shall be characterized by sampling and analysis.

The tools and equipment used during the sampling shall be vacuumed, cleaned with detergent and water, and scraped as necessary to remove any residue. The wash water shall be collected and

analyzed for characterization of waste. The vacuums used and their contents shall be containerized and shipped off site as hazardous waste for disposal.

All of the PPE worn by personnel performing closure activities shall be disposable; therefore, all PPE shall be placed into containers and managed as hazardous waste. This waste shall be considered to be contaminated with all of the hazardous waste constituents contained in the wastes that have been treated at the OB Unit and the OD Unit. All contained PPE wastes shall be transported to a permitted facility for disposal.

2.2.1 Soil Sampling

Soil samples shall be collected on a 25-ft by 25-ft grid spacing from the surface to 15 ft below ground surface at five ft intervals (total of four samples per location). At a minimum, the grid shall encompass all portions of the OD Unit that have hosted or may have hosted a pit used for the treatment of hazardous waste (Figure H-6).

Surface soil samples shall be collected approximately 25 ft from the OB Unit. Three samples shall be collected from each side of the OB for a total of 12 surface soil samples. These samples shall characterize potential contamination from the OB Unit that may have migrated onto the OD Unit.

The soil samples shall be analyzed for the parameters listed in Table H-3 which include all hazardous constituents of the hazardous wastes that were detonated at the OD Unit. Proposed sample identification numbers are shown in Table H-8.

Surface soil samples (zero to six inches depth) shall be collected with a wooden or Teflon™ trowel or scoop. Disposable sampling tools shall be used. In the event that the Department requests split samples, sufficient soils shall be collected to provide split samples to the Department representatives.

A Veihmeyer soil sampler, auger drill, direct push technology or other appropriate method shall be used to collect subsurface soil samples. Only discrete grab samples shall be collected; no samples shall be composited.

Clean sampling equipment shall be used to collect each sample. Unused, disposable sampling equipment may be presumed clean if still in a factory-sealed wrapper prior to use. Reusable sampling equipment shall be decontaminated after each use by scraping to remove any loose material, washing with a detergent and water solution, rinsing several times with tap water, rinsing with deionized water, and drained of excess water, and air-dried or wiped dry.

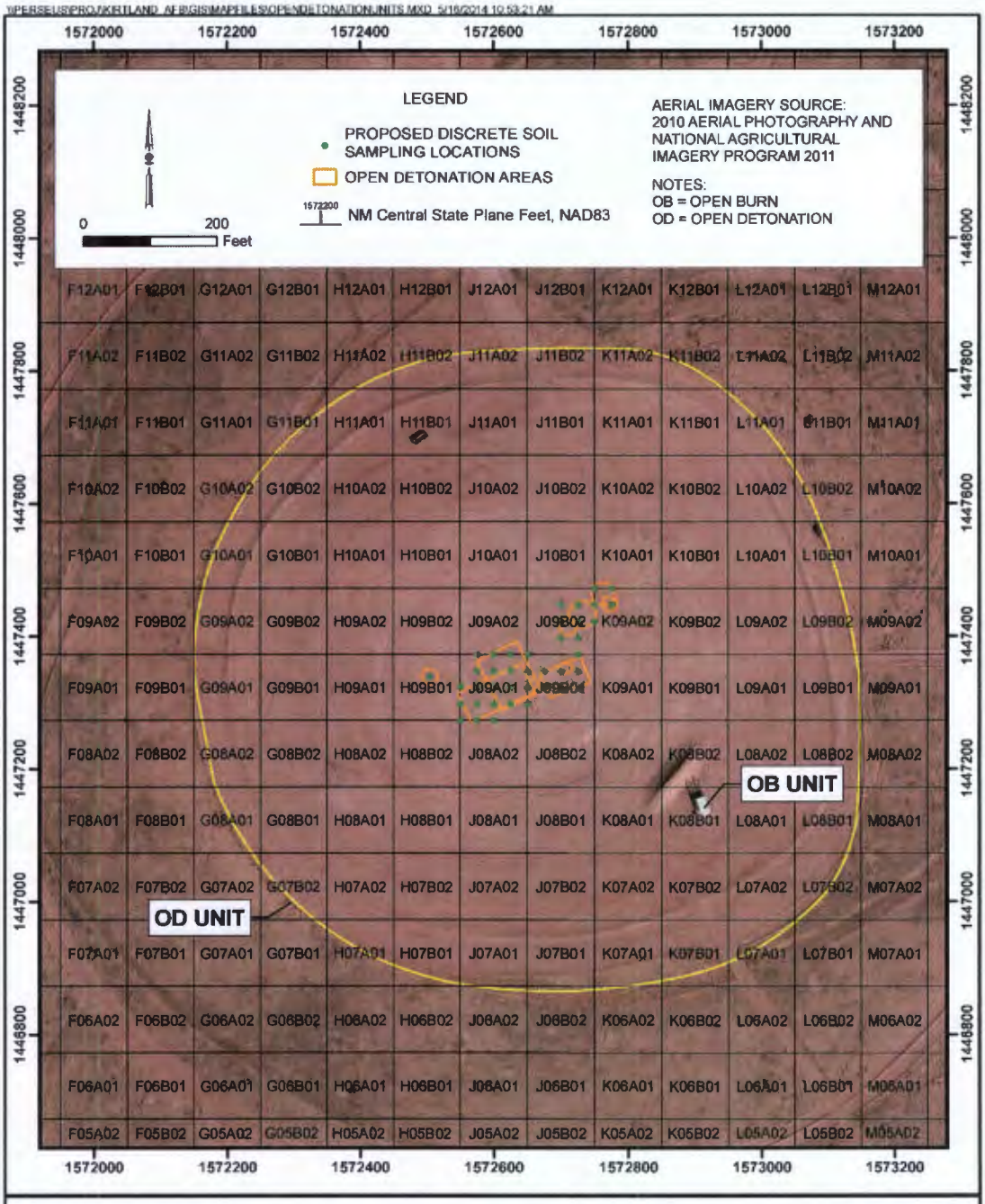

FIGURE H-6
PROPOSED DISCRETE SOIL SAMPLING LOCATIONS
OPEN DETONATION CLOSURE PLAN
KIRTLAND AIR FORCE BASE, NEW MEXICO

Table H-8
Proposed Discrete Soil Samples for the Open Detonation Unit, Kirtland Air Force Base, New Mexico

Soil Boring	Sample Identification	Depth (feet below ground surface)	Sample Type	**Metals** Methods SW-846 6010B, 6020A, 7471B	**VOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8260B	**SVOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8270C	**Total Explosives** (Per Table D-4 of RCRA Permit) Method SW-846 8330B	**Perchlorate** Method SW-846 6850	**White Phosphorous** Method SW-846 7580	**Dioxins** Method SW-846 8290
H09B1-01	OT29-SO-H09B1-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-H09B01-01-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-H09B01-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-H09B01-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-H09B01-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-01	OT29-SO-J09A1-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-02	OT29-SO-J09A1-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-03	OT29-SO-J09A1-03-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-03-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-03-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-03-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-03-1415	14 - 15	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-03-1415MS	14 - 15	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09A1-03-1415MSD	14 - 15	MS/MSD	X	X	X	X	X	X	X
J09A1-04	OT29-SO-J09A1-04-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-04-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-04-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-04-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-05	OT29-SO-J09A1-05-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09A1-05-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09A1-05-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-05-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-05-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-06	OT29-SO-J09A1-06-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-06-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-06-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-06-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-07	OT29-SO-J09A1-07-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-07-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-07-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-07-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-07-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-08	OT29-SO-J09A1-08-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-08-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-08-0405MS	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09A1-08-0405MSD	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09A1-08-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-08-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-09	OT29-SO-J09A1-09-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-09-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-09-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-09-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-10	OT29-SO-J09A1-10-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-10-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-10-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-10-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-11	OT29-SO-J09A1-11-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09A1-11-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09A1-11-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-11-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-11-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-12	OT29-SO-J09A1-12-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-12-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-12-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-12-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-13	OT29-SO-J09A1-13-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-13-0001MS	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09A1-13-0001MSD	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09A1-13-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-13-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-13-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-13-1415	14 - 15	Normal	X	X	X	X	X	X	X

Table H-8
Proposed Discrete Soil Samples for the Open Detonation Unit, Kirtland Air Force Base, New Mexico

Soil Boring	Sample Identification	Depth (feet below ground surface)	Sample Type	**Metals** Methods SW-846 6010B, 6020A, 7471B	**VOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8260B	**SVOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8270C	**Total Explosives** (Per Table D-4 of RCRA Permit) Method SW-846 8330B	**Perchlorate** Method SW-846 6850	**White Phosphorous** Method SW-846 7580	**Dioxins** Method SW-846 8290
J09A1-14	OT29-SO-J09A1-14-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-14-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-14-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-14-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-15	OT29-SO-J09A1-15-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09A1-15-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09A1-15-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-15-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-15-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-16	OT29-SO-J09A1-16-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-16-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-16-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-16-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-17	OT29-SO-J09A1-17-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-17-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-17-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-17-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-17-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-18	OT29-SO-J09A1-18-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-18-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-18-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-18-0910MS	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09A1-18-0910MSD	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09A1-18-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-19	OT29-SO-J09A1-19-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-19-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-19-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-19-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-20	OT29-SO-J09A1-20-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-20-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-20-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-20-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-20-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-21	OT29-SO-J09A1-21-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-21-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-21-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-21-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-01	OT29-SO-J09B1-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B1-01-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B1-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-02	OT29-SO-J09B1-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-03	OT29-SO-J09B1-03-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-03-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09B1-03-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09B1-03-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-03-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-04	OT29-SO-J09B1-04-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-04-0001MS	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09B1-04-0001MSD	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09B1-04-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-04-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-04-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-05	OT29-SO-J09B1-05-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-05-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-05-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-05-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-06	OT29-SO-J09B1-06-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-06-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09B1-06-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09B1-06-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-06-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-07	OT29-SO-J09B1-07-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-07-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-07-0405MS	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09B1-07-0405MSD	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09B1-07-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-07-1415	14 - 15	Normal	X	X	X	X	X	X	X

Table H-8
Proposed Discrete Soil Samples for the Open Detonation Unit, Kirtland Air Force Base, New Mexico

Soil Boring	Sample Identification	Depth (feet below ground surface)	Sample Type	**Metals** Methods SW-846 6010B, 6020A, 7471B	**VOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8260B	**SVOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8270C	**Total Explosives** (Per Table D-4 of RCRA Permit) Method SW-846 8330B	**Perchlorate** Method SW-846 6850	**White Phosphorous** Method SW-846 7580	**Dioxins** Method SW-846 8290
J09B2-01	OT29-SO-J09B2-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-02	OT29-SO-J09B2-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B2-02-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B2-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-03	OT29-SO-J09B2-03-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-03-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-03-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-03-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-04	OT29-SO-J09B2-04-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B2-04-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B2-04-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-04-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-04-1415	14 - 15	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-04-1415MS	14 - 15	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09B2-04-1415MSD	14 - 15	MS/MSD	X	X	X	X	X	X	X
J09B2-05	OT29-SO-J09B2-05-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-05-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-05-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-05-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-06	OT29-SO-J09B2-06-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-06-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-06-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-06-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-07	OT29-SO-J09B2-07-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B2-07-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B2-07-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-07-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-07-0910MS	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09B2-07-0910MSD	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09B2-07-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-08	OT29-SO-J09B2-08-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-08-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-08-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-08-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-09	OT29-SO-J09B2-09-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-09-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-09-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-09-1415	14 - 15	Normal	X	X	X	X	X	X	X
K09A2-01	OT29-SO-K09A2-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-K09A2-01-0405	4 - 5	Normal	X			X	X		
	OT29-FD-K09A2-01-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-K09A2-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-K09A2-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
K09A2-02	OT29-SO-K09A2-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-K09A2-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-K09A2-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-K09A2-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
QC	OT29-WW-RINSATE1	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-RINSATE2	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-RINSATE3	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-RINSATE4	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-TB1	-	Trip Blank		X					
	OT29-WW-TB2	-	Trip Blank		X					
	OT29-WW-TB3	-	Trip Blank		X					
	OT29-WW-TB4	-	Trip Blank		X					
			Total Normal Samples	160	80	80	160	160	80	80
			Total Field Duplicates	16	8	8	16	16	8	8
			Total Matrix Spike/Matrix Spike Duplicates	8	4	4	8	8	4	4
			Total Rinsate Blanks	4	4	4	4	4	4	4
			Total Trip Blanks		4					

MS/MSD - matrix spike/matrix spike duplicate
QC - quality control
RCRA - Resource Conservation and Recovery Act
SVOCs - semivolatile organic compounds
VOCs - volatile organic compounds

2.2.2 Liquid Sampling

Groundwater samples shall be collected from the groundwater monitoring wells installed at the OD Unit. Eight consecutive quarters of groundwater monitoring shall be conducted initially, following installation of the wells. Groundwater samples shall be obtained using methods approved by the Department within eight hours of the completion of well purging. The samples shall be analyzed for the parameters listed in Table H-4, which include all hazardous constituents of the hazardous wastes that were treated at the OD Unit.

Groundwater in monitoring wells with low recharge rates and that purge dry shall be sampled when the water level in the well has recovered sufficiently to collect the required samples. A low-flow bladder pump shall be utilized. Groundwater samples intended for metals analysis shall be submitted to the laboratory for analyses of total metals; the samples shall not be filtered in the field or laboratory.

Glass tubes shall be used to sample liquids, except groundwater. The primary advantage to using this type of sampling device is that the tube can be disposed of after each sample is collected, thus eliminating cross-contamination. Alternatively, a Coliwasa sampler may be used to sample liquids, except groundwater.

2.2.3 Appropriate Sample Containers and Preservatives

Samples shall be placed in clean containers compatible with the intended analysis and shall be properly prepared and preserved to maintain sample integrity. The most recent version of SW-846 lists the proper container, preservative, and holding time for each chemical parameter of interest, and these requirements shall be followed for all samples collected during the closure process. Table H-5 summarizes the sample containers, preservation techniques, and holding times for soil and liquid samples (including groundwater).

2.2.4 Sample Handling and Documentation

Each sample shall be labeled, sealed, and accompanied by a chain-of-custody and a request-for-analysis form. A chain-of-custody form shall be used to track samples from collection through analysis to ensure that the integrity of the samples is protected, and that analytical results can be attributed to specific samples of environmental media or waste. The procedures followed during closure shall be equivalent to those provided in the most current version of SW-846. Important aspects of the procedures are presented below. A chain-of-custody form shall be prepared for all samples collected for laboratory analyses. The form includes:

- • Sample identification number;
- • Name and signature of sample collector;
- • Date and time of sample collection;
- • Location at which sample was collected;
- • Type of waste (e.g., soil, liquid, etc.);
- • Signatures of persons who have had samples in their possession;
- • Dates and times of possession.

This form shall be initiated at the point of sample collection and shall then remain with the sample during transfer to the laboratory. The form shall be completed upon receipt at the laboratory and returned to the Permitee for inclusion in facility operating record. The chain-of-

Table H-3 for soil analysis; and in Table H-2 for groundwater analysis. Minimum calibration, operation, and quality control (bias, precision, blank and matrix effects) requirements for laboratory analyses shall be performed as listed in the individual analytical methods of SW-846. All laboratory analyst notebooks, log sheets, instrument printouts, charts, and calculations relevant to analyses of these samples shall be identified and remain accessible. This information may be requested for independent review and validation. If requested by the Department, this information shall be provided by the Permitee.

2.2.7 Quality Assurance/Quality Control Program

Because decisions about closure activities may be based, in part, on analyses of samples, a program to ensure reliability of analytical data is mandatory. Data reliability shall be ensured by documenting sample management so that analyses are traceable to specific areas of potential contamination and by following a quality assurance/quality control (QA/QC) program that mandates documentation of the precision and accuracy of laboratory analyses, as well as data completeness, representativeness, and comparability.

Sampling activities shall include collection of QC samples in addition to field documentation requirements. QC samples to be collected include: duplicate samples, trip blanks, field blanks, and rinsate blanks. Table H-9 summarizes field QC sample requirements.

Blanks and duplicate samples shall be collected to determine potential errors introduced in the data from sample collection and handling activities, laboratory error, and to assess analytical precision. To determine the potential for cross contamination, rinsate blanks consisting of rinsate from decontaminated equipment shall be collected and analyzed. At least one rinsate blank shall be collected for every ten samples collected using non-dedicated sampling equipment. Duplicate samples shall be collected at a frequency of one duplicate sample for every ten field samples. In no case shall less than one rinsate blank or duplicate sample be collected for a sampling effort. Trip blanks shall be collected on a daily basis and included in each shipment of samples that contain VOCs samples. Trip blanks are analyzed for VOCs only and are used to assess possible VOC contamination from outside sources. Trip blanks are shipped from the analytical laboratory and maintained with the sample bottles throughout the sampling process. These blank and duplicate samples shall be identified and treated as separate samples. Acceptance criteria for QA/QC sample analyses shall be compatible with the most recent version of SW-846 or other applicable guidance.

The analytical laboratory shall operate under a QA program plan (QAPP) that meets the requirements of the required methods. QC procedures in the analytical laboratory are guided by the laboratory's QAPP. Laboratory QC samples are required to establish the accuracy and precision of analytical data in order to determine the quality of the data. Table H-10- lists laboratory QC procedures by analytical methods.

The analytical laboratory data shall be evaluated using the following criteria:

- Completeness of data deliverable;
- Collection, extraction, and analysis holding times;
- Blank data;
- Laboratory control sample results;
- Matrix spike/matrix spike duplicate results;
- Laboratory duplicate sample results; and
- Overall data assessment and usability.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method 7580

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Multipoint ICAL for all analytes (minimum five standards)	Before sample analysis	One of the following options. Option 1: Linear—RSD for each analyte ≤ 20%. Option 2: Linear—least squares regression r ≥0.995 for each analyte. Option 3: Nonlinear—COD ≥0.99 (six points will be used for second order, seven points will be used for third order) .	Correct problem then repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL. Calibration may not be forced through the origin. All quantitation for multicomponent analytes, such as technical chlordane, toxaphene, and Aroclors, must be performed form a five-point calibration. Results may not be quantified from a single point.
Second-source calibration verification	Immediately after each ICAL	All analytes within ± 20% of expected value	Correct problem and verify second-source standard. Rerun second-source verification. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Retention time window position established for each analyte and surrogate	Each ICAL and after the initial daily CCV	Position will be set using the midpoint standard of the ICAL curve. On days when an ICAL is not performed, the CCV is used.	N/A	N/A
Retention time window width established for each analyte and surrogate	At method setup and after major maintenance (for example, column change)	±3 times standard deviation for each analyte retention time from 72-hour study.	N/A	N/A
Retention time window verification for each analyte and surrogate	Each calibration verification	Analyte within established window.	Correct problem, then reanalyze all samples analyzed since the last acceptable retention time check.	**ICV:** Flagging criteria are not appropriate for initial verification. **CCV:** Apply Q-flag to all results for the specific analyte(s) in the sample that are outside the established window.
CCV	Daily, before sample analysis unless ICAL performed on same day, after every 10 samples, and at the end of the analysis sequence	All analytes within ± 15% of expected value (% D).	Correct problem, then rerun. If that fails, repeat ICAL. Reanalyze all samples since last successful calibration verification.	**If reanalysis cannot be performed,** apply Q-flag to all results for the specific analyte(s) >15%D for all samples associated with the calibration verification.
Method blank	One per analytical batch	No analytes detected > ½ LOQ. For common laboratory contaminants no analytes detected > LOQ and see Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and reanalyze method blank and all	Apply "B" flag to all associated positive results for the specific analyte(s), as appropriate. See Worksheet #36, Section 36.2.5.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method 7580

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			set at the higher concentration.	
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[c])	At initial setup (1) verify LOQ; and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of the DoD QSM[c])	(1) LOQ and associated precision and bias must meet client requirements and be reported; or (2) in the absence of client requirements, must meet LCS control limits (see Box D-14 of the DoD QSM[c]).	If the LOQ verification fails, laboratory must either establish a higher LOQ or modify method to meet client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag "U."
Demonstrate acceptable analyst capability	Before using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of DoD QSM[c])	QC acceptance criteria published by DoD, if available; otherwise, method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for analytes not meeting criteria (see section C.1.f of DoD QSM[c]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by an analyst until capability is demonstrated.

End of Method 7580

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Retention time window verification for each analyte	Each sample	RRT of the analyte within ± 0.06 RRT units of ICAL. Laboratories may update the retention times based on the CCV to account for minor performance fluctuations or after routine system maintenance (e.g., column clipping. With each sample, the RRT will be compared with the most recently updated RRT. If the RRT has changed by more than ±0.06 RRT units since the last update, there has been a significant change in system performance and the laboratory must take appropriate corrective actions as required by the method and rerun the ICAL to re-establish the retention times.	Correct problem then reanalyze all samples analyzed since the last retention time check.	Apply Q-flag to all results for the specific analyte(s) in the sample that are outside the established window.
CCV	Daily, before sample analysis (unless ICAL performed on same day), and after every 12 hours of analysis time	SPCCs: Average RF ≥ 0.30 (SW8260B), ≥ 0.050 (SW8270C) CCCs: % RSD for RFs ≤ 30% and All analytes within ± 20% D of expected value from ICAL.	Correct problem, then rerun CCV. If that fails, repeat ICAL.	Apply Q-flag to all results for the specific analyte(s) > 20% D for all samples associated with the calibration verification.
ISs	Each sample, standard, and QC sample	Retention time ± 30 seconds from retention time of the IS in the ICAL midpoint standard. Extracted ion current profile area within -50% to +100% of area from IS in ICAL mid-point standard.	Inspect mass spectrometer and GC for malfunctions and make corrections as appropriate. Reanalysis of samples analyzed while the system was malfunctioning is mandatory.	Apply Q-flag to all results for analytes associated with a failed IS (unless a matrix effect can be verified), then apply M-flag.
Method blank	One per analytical batch	No analytes detected > ½ LOQ. For common laboratory contaminants, no analytes detected > LOQ. See Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and analyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s), as appropriate. See Worksheet #36, Section 36.2.5.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[C])	At initial setup and then once per 12-month period or quarterly DL verification	Detection limits established will be ≤ ½ the RL in Worksheet 15. See 40 CFR, Part 136, Appendix B. All analytes must be detected and identified by method-specified criteria for the for the verification check to be valid, or the verification check must produce a response that is at least 3 times the instrument noise level and greater than the response in the blanks associated with the MDL study.	Continue the MDL study until all criteria are met.	N/A.
LOD determination and verification (see Section D.1.2.1 and Box D-13 of the DoD QSM[C])	At initial setup and verified quarterly (if a laboratory uses multiple instruments for a given method, the LOD must be verified on each)	The apparent signal-to-noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must (1) repeat the detection limit determination and LOD verification at a higher concentration or (2) perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	N/A; samples may not be analyzed without a valid LOD.
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[C])	At initial setup: (1) verify LOQ; and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if a laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of DoD QSM[C]	(1) The LOQ and associated precision and bias must meet client requirements and must be reported or (2) in the absence of client requirements, must meet LCS control limits. See Box D-14 of the DoD QSM[C].	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag "U."
Demonstrate acceptable analyst capability	Before using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of DoD QSM[C])	QC acceptance criteria published by DoD, if available; otherwise method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for those analytes that did not meet criteria (see Section C.1.f of the DoD QSM[C]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by an analyst until capability is demonstrated.

End of Methods SW8260B, SW8270C, and SW8270C (SIM)

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8330B

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
LCS for all analytes	One LCS per analytical batch	Acceptance criteria: Table 7-4	Correct problem then reanalyze. If still out, reprep and reanalyze the LCS and all samples in the affected AB.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
Confirmation Analysis	When target analytes detected on the primary column at concentrations > LOD.	Calibration and QC criteria the same as for initial/primary analsyis. Results between primary and secondary column RPD ≤ 40%	Evaluate data, then report with flag to denote RPD > 40%. Narrate obvious matrix issues.	RPD between primary and confirmation analysis ≤ 40%..
Soil Grinding Blank	When puck mill grinding is performed, one blank between each sample processed.	Blank material ground and subsampled as with the samples. Composited prior to analysis. No target analytes detected at > than 1/2 the LOQ	All blanks are reported, and data is flagged/narrated if the criteria are exceeded.	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements
Grinding Certified Reference Material (CRM)	When puck mill grinding is performed, CRM is ground for every 20 samples ground.	Within the control limits supplied by manufacturer of material	Evaluate the data, narrate any outliers and report.	Manufacturer's acceptance limits.
DL study (as part of the LOD process, reference Section D.1.2.1 of the DoD QSM)	At initial setup and subsequently once per 12-month period or quarterly DL verification checks.	DL established shall meet 40 CFR, Part 136 Appendix B.	Continue to run the DL study until all criteria are passing	N/A
LOD determination and verification (reference Section D.1.2.1 and grey box D-13 of the QSM)	At initial set-up and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must: 1) Repeat the detection limit determination and LOD verification at a higher concentration;or 2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	Not Applicable, Samples may not be analyzed without a valid LOD.
LOQ establishment and verification (reference Section D.1.2.2 and grey box D-14 of the QSM)	At initial setup: 1) Verify LOQ; and 2) Determine precision and bias at the LOQ. Subsequently, verify LOQ quarterly. If a laboratory uses multiple instruments for a given method, the LOQ must be verified on each. See Box D-14.	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or 2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DOD QSM.	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	Not Applicable, Samples may not be analyzed without a valid LOD.
Results reported between DL and LOD and the LOD and the LOQ	None	None	None	Apply F-flag to all results between DL and LOQ. If no Detection determined below the LOD, report to the LOD, flag U.

End of Method SW8330B

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Interference Check Sample (ICS)	One per preparation batch	70% -130%	Reanalyze once. If still outside the acceptance limits, evaluate to determine if cleanup filters or column degradation are suspect, replace appropriate materials and reprepare (filters) or reanalyze (column). Repeat the Interference Threshold Study to deter. If problem still exists, recalibrate.	Recovery as described in DoD Perchlorate Handbook.
IS	During acquisition of calibration standard, samples, and QC check samples	Areas within -50% to +100% of the midpoint of the last ICAL for each sample and QC in accordance with DoD QSM requirements	Inspect LCMS for malfunctions; mandatory reanalysis of samples analyzed while system was malfunctioning in accordance with DoD QSM requirements	Meets all EPA Method requirements
Isotope Ratio $^{35}CL/^{37}CL$	Every sample, batch QC sample and standard	Monitor for either the parent ion at masses 99/101 or the daughter ion at masses 83/85 depending on which ions are quantified.	Re-extract, re-clean, and/or reanalyze affected sample(s). If problem persists, perform post-spike or dilution as appropriate to confirm presence of perchlorate	Theoretical ratio approx. 3.06 Must fall within 2.3 to 3.8
LCS	One LCS per analytical/preparation batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Reanalyze LCS once. If acceptable, report. Otherwise, evaluate and re prepared and reanalyze the LCS and all samples in the associated prep batch for failed analytes, if sufficient sample material is available.	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
MS/MSD	One MS/MSD per batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Identify problem; if not related to matrix interference, re-extract and reanalyze MS/MSD in accordance with DoD QSM requirements	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
DL study (as part of the LOD process, reference Section D.1.2.1 of the DoD QSM)	At initial setup and subsequently once per 12-month period or quarterly DL verification checks.	DL established shall meet 40 CFR, Part 136 Appendix B.	Continue to run the DL study until all criteria are passing	N/A
LOD determination and verification (reference Section D.1.2.1 and grey box D-13 of the QSM)	At initial set-up and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must: 1) Repeat the detection limit determination and LOD verification at a higher concentration; or 2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD	Not Applicable, Samples may not be analyzed without a valid LOD.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Tuning (Mass Calibration Verification)	Prior to ICAL and after any mass calibration or maintenance is performed.	Quantitation ions within 0.3 m/z of expected mass.	Perform mass calibration on the MS/MS. If required, consult with instrument engineer for further maintenance.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Minimum six-point initial calibration for target analytes, lowest concentration standard at or below the reporting limit	Initial calibration prior to sample analysis	Linear: $r^2 > 0.990$ ($r>0.995$) with intercept ≤ LOD, or Average Response Factor: RSD≤ 20%.	Evaluate standards, chromatography, and mass spectrometer response. If problem found with above, correct as appropriate, then repeat initial calibration.	Evaluate standards, chromatography, and detector response. If problem found with above, correct as appropriate, then repeat initial calibration
Second-source calibration verification	Once per six-point initial calibration	Perchlorate within ±15% of the true value	Evaluate data. If problem (e.g., concentrated standard, plugged transfer line) found, correct, then repeat second source verification. If it still fails, then repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Daily calibration verification	Mid-range standard analyzed before sample analysis, after every 10 samples, and at the end of the sequence.	Perchlorate within ±15% of the true value	Correct problem, then repeat. If still fails, repeat initial calibration	Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.
Limit of Detection verification (LODv) (per batch)	Prior to sample analysis and at the end of the analysis sequence.	Perchlorate within ± 30% of the true value	Correct problem. Evaluate samples. Samples with results > RL (LOQ) may be reported. Samples since the last passing LODv with results ≤ RL (LOQ) must be reanalyzed.	Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.
Laboratory Reagent Blank	Prior to ICAL, following samples with overrange concentration of perchlorate, and at the end of the analytical sequence.	No perchlorate detected > LOQ	Reanalyze reagent blank (until no carryover seen), and any samples with perchlorate detections since the contaminated blank.	No target analytes ≥ ½ LOQ
Internal Standard	Every Calibration Standard	ICAL: IS for each standard must be within ± 50% of the average area of the ICAL. ICV, CCV: Within ± 50% of the average area of the ICAL or within ± 50% of the 1st CCV of the run, if the ICAL is not run the same day.	Evaluate the system. Reanalyze/repeat the calibration.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples.
Method Blank	One per preparation batch	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements	Correct problem, then re-extract and reanalyze method blank and all samples processed with the contaminated blank in accordance with DoD QSM requirements	No target analytes ≥ ½ LOQ

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			is set at the higher concentration.	
LOQ establishment and verification (reference Section D.1.2.2 and grey box D-14 of the QSM)	At initial setup: 1) Verify LOQ; and 2) Determine precision and bias at the LOQ. Subsequently, verify LOQ quarterly. If a laboratory uses multiple instruments for a given method, the LOQ must be verified on each. See Box D-14.	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or 2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DOD QSM.	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	Not Applicable. Samples may not be analyzed without a valid LOD.
Results reported between DL and LOD and the LOD and the LOQ	None	None	None	Apply F-flag to all results between DL and LOQ. If no Detection determined below the LOD, report to the LOD, flag U.

End of Method SW6850

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW6010B and SW7470A/71A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
LCS for all analytes	One per analytical batch	Acceptance criteria: Worksheet #15.	Correct problem then reanalyze. If still out, reprepare and reanalyze the LCS and all samples in the affected batch.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
Dilution test	Each new sample matrix, at least once per analytical batch (only applicable for analytes with concentrations > 50 times LOQ)	Fivefold (1+4) dilution must agree within ± 10% of the original determination.	Add post-digestion spike.	Apply J-flag to all sample results for the specific analyte from the same matrix in the batch if either of following exist: (1) dilution test not run and batch had analyte concentrations >50X LOQ or (2) %D ≥10 and post-digestion spike not performed.
Post-digestion spike addition	When dilution test fails or if an analyte's concentration for all samples in a batch is less than 50 times LOQ (<25 for Method SW7470A/SW7471A)	Recovery within 75–125% of expected results (85-115 for SW7470A/SW7471A).	Check for instrumental problem, then reanalyze post-digestion spike addition if appropriate.	Apply J-flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition. If post-digestion spike addition recovery is < 10%, apply Q-flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition.
MS/MSD	One per 20 samples per matrix as a minimum and as defined on the chain-of-custody form	Acceptance criteria: Worksheet #15.	Assess data to determine whether there is a matrix effect or analytical error. Analyze LCS or failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made regarding PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: (1) %R for MS or MSD > UCL (2) %R for MS or MSD < LCL (3) MS/MSD RPD > control limit
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[c])	At initial setup and then once per 12-month period or quarterly DL verification checks	Detection limits established will be ≤ ½ the RL in Worksheet #15 Tables. See 40 CFR, Part 136, Appendix B. All analytes must be detected and identified by method-specified criteria for the for the verification check to be valid, or the verification check must produce a response that is at least 3X the instrument noise level and greater than the response in the blanks	Continue the MDL study until all criteria are met.	N/A.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6020A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
MS tuning sample	Before ICAL.	Mass calibration ≤ 0.1 amu from the true value. Resolution <0.9 amu full width at 10% peak height. Stability: RSD ≤ 5% for at least four replicate analyses.	Retune instrument then reanalyze tuning solution.	Not appropriate.
ICAL for all analytes (minimum one standard and a blank)	Daily before sample analysis	If more than one standard is used, correlation coefficient must be ≥ 0.995.	If applicable, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL.
ICV (second source)	After ICAL, before beginning a sample run at a concentration other than used for calibration	All analytes within ± 10% of expected value.	Correct problem and verify second-source standard. Rerun ICV. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
CCV	After every 10 samples and at the end of the analysis sequence—at a concentration near the middle of the calibration range	All analytes within ± 10% of expected value.	Correct problem, then repeat CCV and reanalyze all samples since last successful calibration verification.	Apply Q-flag to all results for the specific analyte(s) >10 %D for all samples associated with the calibration verification.
Calibration blank	Before beginning a sample run, after every 10 samples and at end of the analysis sequence	No analytes detected > LOD.	Correct problem, then analyze calibration blank and previous 10 samples.	Apply B-flag to all associated positive results for the specific analyte(s) as appropriate.
Low-level calibration check standard (at or below LOQ)	Daily, after ICAL Not required if multipoint calibration (3 or more points) with low standard at or below LOQ is performed	All analyte(s) with ± 20% of expected value.	Correct problem then reanalyze.	No samples may be analyzed without a valid low-level calibration check standard. Low-level calibration check standard should be less than or equal to the LOQ.
Linear range calibration (high) check standard	Every 6 months	Analyte within ± 10% of expected value.	Correct problem then reanalyze or reset linear range.	Apply J-flag to the specific analyte(s) for all results not within linear range.
Method blank (Preparation blank)	One per analytical batch	No analytes detected > ½ LOQ For common laboratory contaminants, no analytes detected > LOQ. See Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and analyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s) as appropriate. See Worksheet #36, Section 36.2.5.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6020A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[c])	At initial setup and then once per 12-month period or quarterly DL verification.	Detection limits established will be ≤ ½ the RL in Worksheet #15 tables. See 40 CFR, Part 136 Appendix B. Analytes must be detected and identified by method-specified criteria for the for the verification check to be valid, or the verification check must produce a response that is at least 3 times the instrument noise level and greater than the response in the blanks associated with the MDL study.	Continue to run the MDL study until all criteria are passing.	N/A.
LOD determination and verification (see Section D.1.2.1 and Box D-13 of the DoD QSM[c])	At initial setup and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must: (1) Repeat the detection limit determination and LOD verification at a higher concentration; or (2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	N/A; samples may not be analyzed without a valid LOD.
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[c])	At initial setup: (1) verify LOQ and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if a laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of the DoD QSM[c])	(1) The LOQ and associated precision and bias must meet client requirements and must be reported; or (2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DoD QSM[c].	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag "U."
Demonstrate acceptable analyst capability	Prior to using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of the DoD QSM[c])	QC acceptance criteria published by DoD, if available; otherwise method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for those analytes that did not meet criteria (see Section C.1.f of the DoD QSM[c]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by an analyst until capability is demonstrated.

End of Method SW6020A

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8290

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Routine (continuing) calibration check (Use HRCC-3 calibration standard) (CCV)	At the beginning of each 12-hour period (after successful GC resolution and MS resolution checks), and at the end of 12-hour shift.	Ion abundance ratios in accordance with Table 8, Method SW8290 and RF within ± 20% D for unlabeled standards from mean RF from initial calibration and RF within ± 30% for labeled standards from mean RF from initial calibration **End of run CCV only:** If the RF for an unlabeled or labeled standard fails by ≤ 5% in the final CCV, a new "daily" mean RF may be calculated using the initial and final RF values and used to determine the specific analyte concentrations for all samples analyzed during the shift.	Correct problem, repeat calibration verification standard one more time. If that fails, then repeat initial calibration and reanalyze all samples analyzed since the last successful calibration verification. Evaluation of corresponding labeled/unlabeled standards may impact the corrective action required. **End of run CCV:** If the RF for an unlabeled or labeled standard fails by > 5% in the final CCV, run a new ICAL immediately (within 2 hours) and use the new RF values to process the samples. Alternatively, reanalyze all samples with positive detections.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified. **End of run CCV:** Apply Q-flag to all results for the specific analyte(s) in the sample which are not reprocessed or reanalyzed.
PCDD/PCDF identification	Verify all sample positive detections per Method SW8290	Retention time of sample components in accordance with stated criteria in Method SW8290 (Section 7.8.4.1) and Ion abundance ratios for all analytes, ISs, and recovery standards in accordance with criteria in Method SW8290 (Table 8, Section 7.8.4.2) and S/N ratio of all labeled analytes ≥ 10 times background noise (Method SW8290 Section 7.8.4.3) and S/N ratio of all remaining analyte ions ≥ 2.5 times background noise (Method SW8290 Section 7.8.4.3) and For PCDF, no signal present having a S/N ratio ≥ 2.5 for the corresponding ether (PCDPE) detected at the same retention time (± 2 sec, (Section 7.8.4.4)	Correct problem, then reprep and reanalyze the sample(s) with failed criteria for any of the internal, recovery, or standards. If PCDPE is detected or if sample peaks present do not meet all identification criteria, calculate the EMPC (estimated maximum possible concentration) according to Method SW8290 Section 7.9.5.2.	Flagging criteria are not appropriate. Positive identification of 2,3,7,8-TCDF on the DB-5 or equivalent column must be confirmed on a column capable of isomer specificity (DB-225) (see Method SW8290 Section 3.4). If peak identification criteria are met but ion abundance criteria fail for the analyte and IS, the sample should be presumed to have interfering contaminants. The sample should be rerun or the extract reanalyzed.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods 160.2, 310.2, 350.1, SW9030B, SW9056, and SW9060

QC Check*	Frequency	Criteria	Corrective Action
Multi-point initial calibration (a blank and at least five standards) – does not apply to titrimetric method	Before initial sample analysis, every 24 hours, whenever modifications are made to the analytical system, or when continuing calibration verification fails	Correlation coefficient of linear regression is ≥ 0.995	Correct the problem and repeat the initial calibration.
Second-source calibration verification	Immediately following each initial calibration	Analytes within ±15% (±10% for SW9056) of expected value	Correct the problem and repeat initial calibration.
Calibration blank – does not apply to titrimetric methods	After every Second-source or Continuing calibration verification analysis	No analytes detected at or above the LOQ	Correct the problem, then reanalyze previous 10 samples.
Continuing calibration verification	After every 10 samples and at the end of the analysis sequence	Within ±15% (±10% for SW9056) of expected value	Recalibrate and reanalyze all samples since the last acceptable continuing calibration verification
Method Blank	At least one per analytical batch	No analytes detected at or above the LOQ	Correct the problem and re-prep and reanalyze all associated samples
MS/MSD	One set per 20 project-specific samples. MSD is optional if a laboratory sample duplicate is performed	All analytes within limits specified Limits Worksheet 15	None
Laboratory sample duplicate	Once per analytical batch if MSD not performed	Concentration of reported analytes are > 5 times the reporting limit in either sample and RPD >20%. One sample result < RL and a difference of ±2 times the reporting limit	None
LCS	At least one per analytical batch	All analytes within limits specified limits in Worksheet 15	Correct the problem, and re-prep and reanalyze the LCS and all samples in the analytical batch

*Unless calibration and QC requirements are specified for an individual method.

End of Methods 160.2, 310.2, 350.1, SW9030B, SW9056, and SW9060

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Notes, Acronyms, and Abbreviations

[a]All corrective actions associated with project work shall be documented, and all records shall be maintained by the laboratory.

[b]Flagging criteria shall be applied when acceptance criteria were not met and corrective action was not successful or corrective action was not performed.

[c]DoD. 2010. *Department of Defense (DoD) Quality Systems Manual for Environmental Laboratories*. Version 4.2. October.

% D – percent difference
%R – percent recovery
CCC – calibration check compounds
CCV – continuing calibration verification
COD – coefficient of determination
DL – detection limit
DRO – diesel range organics
GC – gas chromatography
GRO – gasoline range organics
ICAL – initial calibration
ICS – interference check sample
ICV – initial calibration verification
IS – internal standard(s)
LCL – lower confidence limit
LCS – laboratory control sample
LOD – limit of detection
LODv – limit of detection verification
LOQ – limit of quantitation
MDL – method detection limit
MS/MSD – matrix spike/matrix spike duplicate
N/A – not applicable
PQO – practical quantitation objectives
PT – performance testing
QC – quality control
QSM – Quality Systems Manual (DoD)
RF – response factor
RL – reporting limit
RPD – relative percent difference
RRT – relative retention time
RSD – relative standard deviation
SPCC – system performance calibration compounds
UCL – upper confidence limit

End of Table H-10

3. MANAGEMENT OF WASTE FROM CLOSURE ACTIVITIES

Wastes that are expected to be generated during the final closure activities at the OD Unit include: excess soil from sampling; well purge water, drill cuttings, decontamination water; PPE; and excavated soils. To minimize the amount of waste to be generated during closure activities, excess soil cuttings from borings shall be replaced in the auger holes. The volume of liquid waste generated during the cleaning of equipment is to be minimized by using only the smallest amount of wash rinse water necessary to achieve successful decontamination. Solvents shall not be used.

3.1 Waste Management

Wastes associated with closure activities at the OD Unit shall be managed as follows:

- Wastes shall be stored in appropriate containers that are compatible with the wastes and are in good condition.
- If analytical results indicate that the waste is hazardous or the Permitee project manager determines that the waste shall be classified as hazardous, the Permitee shall manage the waste in accordance with all applicable regulations in 40 CFR §261-268.
- Waste containers shall remain within the OD Unit boundary under the control of the personnel generating the waste until it is transported for treatment and disposal.
- Waste containers shall be segregated according to the compatibility and chemical waste type.
- Waste shall be stored in containers that remain closed, except when adding or removing wastes.
- Waste containers bearing free liquid shall be provided with secondary containment of sufficient volume to prevent spilled liquids from being released onto the ground.
- Waste containers shall be managed in such a manner as to prevent ruptures and leaks.
- Waste containers shall be labeled appropriately, pending receipt of analytical results. Labels shall be filled out appropriately and marked using permanent marker or pen. Label information shall include waste source, suspected contaminants, contents, depth (if appropriate), the date which accumulation began, and a contact name.

3.2 Waste Characterization

Characterization of the liquid waste and excavated soil generated during the closure of the OD Unit shall be based upon the results of sampling and analysis. Decontamination water shall be analyzed for the constituents listed in Tables H-3. PPE shall be handled in accordance with Section 1.4 of this Permit Attachment (H) and applicable state and federal regulations.

3.3 Waste Disposal

All wastes from closure activities determined to be hazardous shall be managed in accordance with the Hazardous Waste Management Regulations from the time of generation. Hazardous wastes shall be shipped off-site for treatment and disposal at a permitted RCRA facility. Wastes characterized as nonhazardous shall be evaluated to determine the appropriate disposal method in accordance with applicable law.

4. REFERENCES

EPA, 1980, "Samplers and Sampling Procedures for Hazardous Waste Streams," EPA-600/2-80-018, U.S. Environmental Protection Agency, Municipal Environmental Research Laboratory, Cincinnati, OH.

EPA, 1996. *EPA Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846),* 3d ed. U.S. Environmental Protection Agency, September 1986; Final Update I, July 1992; Final Update IIA, August 1993; Final Update II, September 1994, Final Update IIB, January 1995; Final Update III, December 1996.

IT Corporation, 1996, "Background Concentrations of Constituents of Concern to the Sandia National Laboratories/New Mexico Environmental Restoration Project and the Kirtland Air Force Base Installation Restoration Program," prepared for Sandia National Laboratories/New Mexico Environmental Restoration Department 7585, Albuquerque, NM.

NMOSE, 2005. *Rules and Regulations Governing Well Driller Licensing; Construction, Repair, and Plugging of Wells* New Mexico Office of the State Engineer. August.

SNL/NM, 2011a. *Annual Groundwater Monitoring Report, Calendar Year 2010, Sandia Report SAND2011-5781P.* Groundwater Protection Program, Sandia National Laboratories, Albuquerque, New Mexico. September.

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USAF, 2007. *Long-Term Groundwater Monitoring Summary and Baseline Determination Report, Fiscal Year 2005.* U.S. Air Force, Kirtland Air Force Base, New Mexico. April.

USAF, 2004. *Kirtland Air Force Base, Base-Wide Plans for the Environmental Restoration Program, 2004 Update.* U.S. Air Force, Kirtland Air Force Base, New Mexico. April.

Red Line Version

HAZARDOUS WASTE TREATMENT FACILITY OPERATING PERMIT

EPA ID No. NM9570024423

issued to

UNITED STATES AIR FORCE

for the

OPEN DETONATION UNIT

located at

KIRTLAND AIR FORCE BASE

BERNALILLO COUNTY, NEW MEXICO

issued by

NEW MEXICO ENVIRONMENT DEPARTMENT

HAZARDOUS WASTE BUREAU

2905 RODEO PARK DRIVE EAST, BUILDING 1

SANTA FE, NEW MEXICO 87505

July 2010

KAFB4201

I. PREAMBLE

A. SUMMARY

Kirtland Air Force Base (AFB) hereby submits a request to modify the Hazardous Waste Treatment Facility Operating Permit (Renewal Permit)(hereinafter defined) issued by New Mexico Environment Department (NMED) in July 2010 for an Open Detonation (OD) Treatment Unit EPA ID# NM9570024423 (this request is hereinafter described as the "November PMR"), pursuant to Section 74-4-4.2.G(2) of the New Mexico Hazardous Waste Act ("HWA"), 40 CFR §§ 270.41 -.42 and Sections 20.4.1.900-.901 of the New Mexico Administrative Code (NMAC).

Kirtland AFB made a business decision to cease operations of the OD Unit and pursue closure of the OD Unit and its co-located Open Bum (OB) Treatment Unit approximately forty years earlier than anticipated in furtherance of NMED's stated goal of eliminating OD of hazardous waste at Kirtland AFB as soon as practicable. This decision and its resulting effects provide both legal bases and practical justifications for modifying the Renewal Permit. The resulting changes to the facts and circumstances surrounding the OD Unit and its permit provide cause for modification under 40 CFR § 270.41(a)(l)-(2), because new information that was not available at the time of either the permit renewal application or permit issuance and material and substantial alterations to activities have occurred. Kirtland AFB's reasons for making its decision to cease operations of the OD Unit and pursue closure were partially based on the fact that because of facts and circumstances beyond its control, Kirtland AFB would not be able to comply with the compliance schedules outlined in the Renewal Permit. These events and circumstances, including, but not limited to the budgetary allocation process of the Federal government, present continuing obstacles making it practically impossible for Kirtland AFB to comply with the Renewal Permit and therefore provide cause for modification of the Renewal Permit under 40 CFR § 270.41(a)(4).

In addition, the resulting effects of ceasing treatment operation and seeking closure 40 years prior to the anticipated closure date and in furtherance of NMED's stated goal of eliminating OD hazardous waste at Kirtland AFB as soon as practicable, provide several practical reasons for modifying the Renewal Permit. Ceasing treatment at the permitted treatment unit and pursuing closure of that unit and its co-located OB Unit make the scope and resulting costs of the Renewal Permit's compliance, reporting and corrective action requirements unnecessarily expansive, broad, invasive and expensive.

Furthermore, the OD Unit is small, comprising a circular area with a diameter of roughly 1,500 feet, an insignificant geographic area in relation to the entire installation of 80.56 square miles at Kirtland AFB. The fact that Kirtland AFB applied for a renewal permit to continue operating a small OD Unit does not logically warrant base-wide application of the Renewal Permit corrective action requirements after Kirtland AFB ceased treating hazardous waste at the OD Unit. NMED has corrective action authority under the HSWA module from the 1990 Kirtland

Treatment, Storage and Disposal (TSD) Permit, sufficient to address individual releases and necessary corrective action requirements. NMED as recently as April 2010 asserted this authority under the HSWA Module and can continue to use this authority to require and oversee necessary corrective action at the base.

Moreover, Kirtland AFB believes that several facts and issues related to the Renewal Permit's issuance provide the bases for modification. Specifically, NMED's process time for the renewal application (from December 2004 until July 2010) was unreasonably long and seemingly in violation of NMED's statutory mandate in § 74-4-4.2(C) NMSA 1978. In fact, NMED's processing took longer than the entire term of the Renewal Permit. NMED also failed to provide Kirtland AFB with any notice of its issuance. This fact is particularly troublesome in light of the mandated closure of the OB Unit and Kirtland AFB's repeated submission of closure plans for the OD and OB Units pursuant to an executed settlement agreement between the parties and NMED' s directives. Kirtland AFB also believes that the record reflects that NMED failed to adequately address Kirtland AFB's comments to the Draft OB/OD Renewal Permit submitted to the NMED-HWB on 14 June 2007. Kirtland AFB further believes that several items included in the Renewal Permit and NMED determinations with respect to the Renewal Permit were not reasonably justified or supported by the record. Finally, Kirtland AFB believes that NMED failed to follow relevant laws, rules and guidance with respect to certain aspects of the Renewal Permit.

Accordingly, Kirtland AFB believes that facts related to the OD Unit, the reasons for and effects of Kirtland AFB' s decision to withdraw its renewal application and pursue closure of the units, as well as facts and issues related to the Renewal Permit issuance provide the basis for modification of the Renewal Permit under HWA § 74-4-4.2.0(2); 40 CFR §§ 270.41 -.42 and NMAC §§ 20.4.1.900-.901. In general, Kirtland AFB requests that the Renewal Permit be modified in scope and application to focus exclusively on closure of the OB and OD Units and corrective action activities related to those Units. Kirtland AFB also has specific requests with respect to many of the provisions contained in the Renewal Permit. Kirtland AFB's general and specific bases for this November PMR are explained in detail below.

Kirtland AFB also hereby requests a stay of any and all enforcement and deliverable dates contained in the Renewal Permit pending a final agency decision by NMED on this November PMR.

Kirtland continues to challenge whether the Renewal Permit is in effect and NMED's recent determination on Kirtland AFB's 8 October 2010 PMR request for approval of the revised closure plan and expressly reserves any and all legal rights with respect to these issues. Kirtland also expressly reserves all legal rights in response to final agency decisions made by NMED in its 12 November 2010 correspondence denying approval of the OD Unit closure plan.

B. RELEVANT FACTS

Kirtland AFB historically operated under three RCRA permits: a TSD permit; an OD treatment permit; and an OB treatment permit. EPA issued the TSD permit in July 1990 and the HSWA Module for the same in October 1990. In February 2000, Kirtland AFB submitted a renewal application for the TSD permit, which was deemed to be administratively complete. In late 2004, Kirtland AFB applied for closure of the TSD Permit. Kirtland AFB submitted a closure report for the TSD Permit in July 2005 and NMED declared the TSD Facility clean closed in August 2005. However, Kirtland AFB and NMED-HWB never closed the HSWA Module, which continues to cover investigation and clean-up of SWMU's across Kirtland AFB. This Module is updated annually as new solid waste management units (SWMUs) are identified. The HSWA Module has been utilized as recently as April 2010, when it was identified in initial correspondence between NMED and Kirtland AFB concerning an issue related to a fuel spill at Kirtland AFB.

NMED issued the OD Treatment Unit Permit to Kirtland AFB in December 1994. NMED issued the OB Treatment Unit Permit in July 1995. On 14 May 2004, Kirtland AFB timely submitted a permit renewal application for both the OB and OD Treatment Units. Kirtland AFB submitted a revised permit renewal application for the OD and OB Units in December 2005. ("Renewal Application"). On 16 April 2007, NMED issued a draft OD/OB Permit ("Draft OB/OD Renewal Permit"), a fact sheet ("Fact Sheet") and a notice announcing a 60-day public comment period. Kirtland AFB timely submitted three sets of comments to the Draft Renewal OB/OD Permit on 14 June 2007. Other comments were submitted from the Water Utility Authority, Water Quality Advisory Board and Water Utility Authority of Albuquerque Bernalillo County, as well as two interested citizens. On 12 July 2007, by letter to interested citizens, NMED extended the public comment period to the Draft OB/OD Renewal Permit with respect to paragraph 5.2.4, therein, entitled Sanitary Sewer Line.

On 22 May 2009, NMED issued a compliance order and proposed civil penalty to Kirtland AFB with respect to the OB Unit. To resolve the issues raised by the compliance order and proposed civil penalty, NMED and Kirtland AFB entered into a settlement agreement on 25 September 2009. By letter dated 30 October 2009, pursuant to the settlement agreement between NMED and Kirtland AFB, the USAF withdrew its application to renew the OB Unit. ("OB Unit Withdrawal Letter"). The OB Unit Withdrawal Letter also requested that the Draft Permit be revised to reflect the withdrawal of the request for continued operation of the OB unit. Also pursuant to the settlement agreement between NMED and Kirtland AFB, Kirtland submitted closure plans for both the OD Unit and OB Unit in February 2010, which were deemed administratively complete by NMED in April 2010. NMED subsequently withdrew its approval of the OB and OD Unit closure plans for failure to comply with public notice requirements. Kirtland AFB issued a notice of public hearing on 18 June 2010, setting a hearing date of 7 July 2010 and submitted a revised closure plan

on 21 June 2010. On 15 July 2010, Kirtland AFB notified NMED of its compliance with the public hearing requirements.

Also on July 15, 2010, NMED issued its responses to comments on the Draft OB/OD Permit, an interested person letter, a Final Order for a final hazardous waste facility permit and a renewal permit for the OD unit ("Renewal Permit"). According to the Final Order cover letter enclosing the Renewal Permit, the Renewal Permit was to become effective 16 August 2010. Kirtland AFB reviewed the Renewal Permit, NMED's responses to comments and the Final Order. For a variety ofreasons, it made the business decision to withdraw the Renewal Application, cease operations of the OD Unit and submit revised closure plans for both the OB and OD units. Accordingly, on 13 August 2010, Kirtland AFB submitted a letter to NMED withdrawing its application for the Renewal Permit prior to the effective date of the Renewal Permit ("Withdrawal Letter").

NMED officials soon thereafter contacted Kirtland AFB representatives and requested a meeting to discuss Kirtland AFB's Withdrawal Letter. This meeting was held 30 August 2010. The 30 August 2010 meeting revealed divergent views on several issues, including whether the renewal permit was effective and whether Kirtland AFB provided a timely notice of closure for the OD Unit. NMED requested that Kirtland AFB submit a letter to clarify certain issues related to Kirtland AFB's 13 August 2010 letter. Kirtland AFB submitted a clarification letter on 20 September 2010.

On 5 October 2010, Kirtland AFB submitted a cover letter and closure plans for the OB Unit and OD Unit. The cover letter indicated that the closure plans were being submitted as Class 3 modifications to the 1994 OD Permit and 1995 OB Permit ("October 2010 PMR").

On 8 October 2010, NMED issued a letter to Kirtland AFB stating in substantive part that the Renewal Permit is in effect and NMED will take any and all action to enforce such permit. On 12 November 2010, NMED issued a letter deciding that it will not consider the Class 3 modification submitted by Kirtland AFB with respect to the closure plan for the OD Unit, because it views closure of the OD Unit as covered exclusively by the Renewal Permit, but will consider only the closure plan for the OB Unit.

II. MODIFICATION REQUEST 1 - EXTENSION OF DUE DATES FOR DELIVERABLES PENDING NMED DETERMINATION ON THIS NOVEMBER PMR.

As provided by 40 CFR §270.33, Kirtland AFB is allowed to terminate its receipt and treatment of hazardous waste at the OD Unit on Kirtland AFB rather than continue to operate and meet permit requirements. Upon ceasing operations, an alternative schedule of compliance may be issued if, as the applicant/permittee, Kirtland AFB ceased operations before non-compliance with any interim or final compliance schedules specified in the permit. On 13 August 2010, Kirtland AFB terminated its receipt and

treatment of hazardous waste at the OD Unit prior to any non-compliance associated with the Permit. Notice of this action was provided by letter to the NMED-HWB, which notice comports with the requirement of 40 CFR §270.33(b)(4).

Accordingly, Kirtland AFB hereby requests the Renewal Permit be modified to amend the Renewal Permit by replacing the operational compliance schedule with the compliance schedule set forth in the revised OD Unit closure plan submitted to the NMED-HWB on 8 October 2010 and attached as Exhibit A to this November PMR. Additionally, Kirtland AFB requests, that until a decision is rendered on this November PMR that all deliverable due dates within the Permit's compliance schedule be stayed until ninety (90) days subsequent to the issuance of NMED's determination on this November PMR.

III. MODIFICATION REQUEST 2 - STAY OF ENFORCEMENT PENDING NMED DETERMINATION OF THIS NOVEMBER PMR.

As discussed above in Modification Request 1, on 13 August 2010 Kirtland AFB terminated the receipt and treatment of hazardous waste at the OD Unit. Additionally, the termination of operations at the OD Unit occurred prior to any non-compliance associated with the Renewal Permit. Accordingly, Kirtland AFB hereby requests that any and/or all enforcement of the requirements set forth in the Renewal Permit be stayed pending the issuance of a decision on the modification requests contained herein.

IV. MODIFICATION REQUEST 3 -AMENDMENTS TO THE RENEWAL PERMIT INCORPORATING THE 8 OCTOBER 2010 REVISED CLOSURE PLAN

A. REQUESTED MODIFICATIONS: PERMIT PART 1 -GENERAL PERMIT REQUIREMENTS

1. Title Page

Requested Modification: Change to read "... Hazardous Waste Treatment Operating Permit. . ."

Justification for Request: Throughout the permit, the term Facility has been used to identify both Kirtland AFB as a whole and the OD Unit as separate treatment unit. However, since the Permit Application was submitted for the treatment of hazardous waste at the OD Unit, the Title should identify the specific treatment unit permitted.

2. Section 1.0, Page 13: Introduction

Requested Modification: "This Permit Part (I) contains general requirements pertaining to hazardous waste management at the Open Detonation (OD) Unit at Kirtland Air Force Base (AFB) Facility. . ."

Justification for Request:

Effective 13 August 2010, Kirtland AFB terminated the receipt and treatment of hazardous waste at the OD Unit. Accordingly, references to treatment and corrective actions should be deleted, in that the provisions of 40 CFR §264 pertaining to operating treatment, storage or disposal (TSD) facilities are inapplicable to closure activities. Additionally, as per §74-4-4.2(B) NMSA 1978, permits contain corrective action measures only for releases of hazardous waste or constituents from a solid waste management unit (SWMU). Since there has not been a release from the OD Unit, any reference to treatment and corrective actions should be deleted.

3. Section 1.3, Page 13: Permitted Activity

Requested Modification: Change section to read "The OD Unit is classified as a miscellaneous unit under 40 CFR Part 264 Subpart X. This Permit establishes standards for the closure and sets forth the requirements for corrective action to address releases of hazardous waste and hazardous constituents into the environment at the OD Unit pursuant to the HWA and the HWMR."

Justification for Request: Since the receipt and treatment of hazardous waste has been terminated at the OD Unit, the operational compliance requirements of 20.4.1 NMAC and 40 CFR Part 264 are inapplicable. Therefore they should be deleted. Corrective action requirements are only required if a release has occurred (§74-4-4.2(B) NMSA 1978). Therefore, since there has not been a release of hazardous wastes or hazardous constituents from the OD Unit, corrective actions should not listed in the permit. "At the OD Unit" was added to clarify and differentiate from hazardous releases in other parts of Kirtland AFB that may be addressed by CERCLA or RCRA corrective action under the HSWA Module.

4. Section 1.4, Page 14: Compliance with Permit.

Requested Modification: Change to section to read "Compliance with this Permit during its term constitutes compliance, for purposes of enforcement, with 40 CFR Parts 260 through 273 . . ."

Requested Modification: See justification statement discussion in amendments 2 and 3 above.

5. Section 1.8, Page 16: Definitions

Requested Modification: Insert the following definition for "Open Detonation Unit: the area circular in shape with a diameter of approximately 1,500 feet where detonation treatment events take place (See Permit, Page 110)."

Justification for Request: The Permit as written only defines the term "Facility," which is used to refer to Kirtland AFB. "Facility" is sometimes used throughout the Permit when discussing sections of the Permit which should only apply to the OD Unit.

6. Section 1.10, Page 17: Term of the Permit

Requested Modification: "This Permit shall be effective for a fixed period of I 0 years in accordance with 40 CFR § 270.50(a), subject to Permit Sections 1.5, 1.12 and 1.15.

Justification for Request: In NMED's Response to Comments on the Draft Permit, the justification given for shortening the permit term to 3 years was "so that changes to the technology for the treatment ofreactive and ignitable hazardous wastes can be initiated at Kirtland AFB." Because Kirtland AFB has notified the NMED of its intent to close the OD Unit and discontinue the treatment of hazardous waste, the shortening of the permit term is no longer relevant. The Renewal Permit term should be increased to the standard I 0 years, which term was granted in the 1995 OD Permit and is consistent with the 40 CFR §270.50(a).

7. Section 1.11, Page 17: Alternative Assessment for Waste Treatment

Requested Modification: Delete this section regarding the alternative assessment for waste treatment.

Justification for Request: Effective 13 August 2010, Kirtland AFB terminated its receipt and treatment of hazardous waste at the OD Unit, as well as providing written notice to the NMED-HWB. An alternative assessment for waste treatment is no longer needed when there is no waste being treated.

8. Section 1.13, Pages 19: Transfer of Land Ownership

Requested Modification: Change to read "...ownership of any land that is part of the OD Unit (See also Permit § 6.1.12)..." wherever Facility appears in this Section.

Justification for Request: It appears that the term "Facility," which is defined as all contiguous land at Kirtland AFB, was incorrectly inserted expanding applicability to non-OD Unit acres.

9. Section 1.23.I, Page 21: Representative Sampling

Requested Modification: Change to read 'The Permittee shall take representative closure samples and measurements in accordance with the procedures in this permit and 40 CFR Part 270. This includes, but is not limited to, sampling and analysis of waste, treatment residue, soil, groundwater, and spills. To obtain . . ."

Justification for Request: See justification statement discussion in amendments 2 and 3 above.

10. Section 1.23.1.I, Page 21: Monitoring Records Contents

Requested Modification: Change to read ". . . Monitoring records shall contain:
I. The dates . . ."

Justification for Request: See justification statement discussion in amendments 2 and 3 above.

11. Section 1.29, Page 25:

Corrective Action Requested

Modification: Delete Section.

Justification for Request: See justification statement discussion in amendments 2 and 3 above.

B. REQUESTED MODIFICATIONS: PERMIT PART 2 - GENERAL FACILITY REQUIREMENTS

12. Sections - All, Pages 30 through 45

Requested Modification: Change "Facility" to 'OD Unit" or "Treatment Unit" throughout Permit Part 2.

Justification for Request: Throughout Part 2, the term Facility has been used to identify both Kirtland AFB as a whole and the OD Unit as separate treatment unit. However, since the Permit Application was submitted for the treatment of hazardous waste at the OD Unit, the term "OD Unit" should be referenced in that it is the specific treatment unit subject to the Permit.

13. Permit Part 2, Page 30: General Facility Requirements

Requested Modification: Change to read "General OD Unit Requirements"

Justification for Request: See justification statement for amendment 12 above. Also, the term "facility," which is defined as all contiguous land at Kirtland AFB, was apparently incorrectly inserted expanding applicability to non-OD Unit acres.

14. Section 2.2, Page 30: Inspections

Requested Modification: Delete this section.

Justification for Request: The inspection requirements identified in Section 2.2 apply to operational treatment units. Since Kirtland AFB closed the OD unit to the receipt and treatment of hazardous wastes on 13 August 2010, the identified requirements for inspection malfunctions, deterioration, operator errors, discharges, equipment testing and maintenance, etc., are no longer applicable. See justification statement discussion in amendments 2 and 3 above.

15. Section 2.3, Page 31: Personnel Training

Requested Modification: Change this section to read: "The Permittee shall follow the personnel training procedures for the OD Unit closure activities specified in Renewal Permit Attachment G."

Justification for Request: As set forth in this Section and Attachment G, the identified personnel training "... is to prepare personnel to conduct operations at the OD Unit ..." However, since the OD Unit has been closed to the receipt and treatment of hazardous wastes since 13 August 2010 and Kirtland AFB has filed a request for OD Unit closure, this requirement should only apply to closure plan activities. See justification statement discussion in amendments 2 and 3 above.

16. Section 2.4.1, Page 31: Required Equipment

Requested Modification: Delete paragraph 2 discussing an internal communications and/or alarm system for the OD Unit.

Justification for Request: The internal communications and/or alarm system requirement provided OD Unit personnel the capability of immediate emergency contact during treatment operations. However, since the OD Unit has been closed for the receipt and treatment of hazardous wastes and is scheduled for closure, this requirement is no longer applicable. See justification statement discussion in amendments 2 and 3 above.

17. Section 2.4.3, Page 32: Required Aisle Space

Requested Modification: Delete this section.

Justification for Request: The aisle spacing requirements of 40 CFR § 264.35 do not apply to the OD Unit.

18. Section 2.4.4, Page 32: Arrangements with Local Authorities

Requested Modification: Delete this section.

Justification for request: This requirement for potential emergency response by local authorities during OD Unit treatment activities is no longer applicable, in that the unit has been closed to the receipt and treatment of hazardous waste eliminating the need for emergency response activities. See justification statement discussion in amendments 2 and 3 above.

19. Section 2.45, Pages 32-33: Preventive Procedures, Structures and Equipment

Requested Modification: Delete this section.

Justification for request: The requirements set forth in this section apply to operational OD Units. However, since this unit has been closed to the receipt and treatment of hazardous wastes since 13 August 2010, this requirement is no longer applicable.

20. Section 2.5.4, Page 34: Emergency Coordinator

Requested Modification: Delete 3rd sentence in Paragraph land last sentence in Paragraph 2.

Justification for request: The requirements identified for deletion apply to operational OD Units. However, since the OD Unit has been closed to the receipt and treatment of hazardous wastes since 13 August 20D, this requirement is no longer applicable.

21. Section 2.6, Pages 34-37: Waste Characterization

Requested Modification: Delete sections 2.6.1 through 2.6.5.1.

Justification for request: The sections identified for deletion apply to treating hazardous wastes at operational OD Units. However, since the OD Unit has been closed to the receipt and treatment of hazardous wastes since 13 August 2010, this

waste characterization requirement is no longer applicable. See justification statement discussion in amendments 2 and 3 above.

22. Section 2.7, Pages 38-40: Waste Management

Requested Modification: Delete section 2.7.1.

Justification for request: Each of the subsections identified for deletion specifically pertain to treating hazardous waste at the OD Unit. However, since the OD Unit has been closed to the receipt and treatment of hazardous wastes since 13 August 2010, these waste management requirements are no longer applicable. See justification statement discussion in amendments 2 and 3 above.

23. Section 2.7.2.2, Page 40: Treatment Facility Requirements

Requested Modification: Change section title to read "OD Unit Treatment Requirements." Change section to read "Treatment residues generated at the OD Unit are subject to LDR requirements, as well as other applicable 40 CFR Parts 260 through 273 requirements, as applicable, and this permit."

Justification for request: See justification statement discussion in amendments 2 and 3 above.

24. Section 2.8, Page 40: Waste Minimization

Requested Modification: Change to read "...hazardous wastes that are generated at the OD Unit to the degree ..." and change all references to "facility with the term "OD Unit."

Justification for request: The requirement applies to operations at the OD Unit, not the Facility, as defined. See justification statement discussion in amendment 12 above.

25. Section 2.12, Page 42: Air Emissions From The OD Unit

Requested Modification: Change the section to read "During OD Unit closure, the Permittee shall comply ... and as required by Permit Section 3.3 ... The Permittee shall maintain all records..."

Justification for request: On 13 August 2010, Kirtland AFB terminated the receipt and treatment of wastes at the OD Unit. 40 CFR Part 264 Subpart BB is not applicable, in that it only applies to owners/operators that treat, store or dispose of hazardous wastes. See justification statement discussion in amendments 2 and 3 above.

26. Section 2.20, Page 43: Additional Reports

Requested Modification: Delete section.

Justification for request: This requirement is applicable to the OD Unit, not SWMU's or Areas of Concern (AOC) base wide. Also, since the OD Unit has been closed to the receipt and treatment of hazardous wastes since 13 August 2010, there will be no additional wastes received at the OD Unit to be reported to the NMED-HWB. See justification statement discussion in amendments 2 and 3 above.

27. Table 2-1, Page 44: Off-Site Generators

Requested Modification: Delete Table 2-1.

Justification for request: Since the OD Unit has been closed to the receipt and treatment of hazardous wastes since 13 August 2010, there will be no additional wastes received at the OD Unit from off-site generators. See justification statement discussion in amendments 2 and 3 above.

C. REQUESTED MODIFICATIONS: PERMIT PART 3 - OPEN DETONATION UNIT

28. Section 3.0, Page 46: Introduction

Requested Modification: Change to read "This Permit Part 3 contains soil and groundwater monitoring requirement for the OD Unit."

Justification for request: See the justification statement discussion in amendments 2 and 3 above.

29. Section 3.1, Page 46: Authorized Waste and Maximum Quantity of Waste

Requested Modification: Change to read 'The Permittee no longer treats hazardous waste and has initiated the OD Unit closure process. As of 13 August 2010, there are no hazardous wastes received or treated at the OD Unit. No hazardous wastes have been or are stored at the OD Unit."

Justification for request: The limitations placed on the explosive weights by the NMED were overly limiting and did not justify the expense of continuing to operate the Renewal Permit. Kirtland AFB submitted a revised closure plan to the NMED-HWB for review and approval.

30. Section 3.2.1, Paragraph 1, Page 46: General Requirements

Requested Modification: Change to read "The Permittee shall maintain the OD Unit. . ."

Justification for request: On 13 August 2010, Kirtland AFB submitted its notice of intent to close the OD Unit, which closure for the receipt and treatment of hazardous waste has occurred. Accordingly, there are no further design, construction or operation requirements.

31. Section 3.2.1, Paragraph 2, Page 46: General Requirements

Requested Modification: Change to read "The Permittee shall mark the boundary of the EOD Range with signs or structures. . ."

Justification for request: The OD Unit is clearly discemable, in that the OD Unit is graded and bounded by a storm water berm. The EOD Range is required to have signs and/or structures preventing entry by unauthorized personnel, both of which meet the requirements of 40 CFR §264.14(b).

32. Section 3.2.3.1, Page 46: Hours of Operation

Requested Modification: Change to read "The Permittee will conduct OD Unit closure activities between sunrise and sunset."

Justification for request: See justification statement discussion in amendments 2 and 3 above.

33. Section 3.2.3.2, Page 47: Weather Conditions

Requested Modification: Change to read "The Permittee will discontinue OD Unit closure activities when the Albuquerque Environmental Health Department (AEHD) issues high wind stop work advisories."

Justification for request: See justification statement discussion in amendments 2 and 3 above.

34. Section 3.2.3.3, Page 47: Range Fire

Requested Modification: Change to read "The Permittee no longer conducts treatment operations at the OD Unit. Closure activities will be conducted in a manner to minimize the risk of fire danger."

Justification for request: Effective 13 August 2010, Kirtland AFB terminated the receipt and treatment of hazardous waste at the OD Unit. Accordingly, references to treatment and corrective actions have been deleted, in that the provisions of 40 CFR §264 pertaining to operating treatment, storage or disposal (TSD) facilities are inapplicable to closure activities. Also, the EOD Range has adequate fire breaks and contingency measures to contain a range fire, even if extreme fire conditions have been established.

35. Section 3.2.3.4, Page 47: Other Restrictions

Requested Modification: Change to read "As of 13 August 2010, the Permittee no longer receives or treats hazardous waste at the OD Unit."

Justification for request: Effective 13 August 2010, Kirtland AFB terminated the receipt and treatment of hazardous waste at the OD Unit. Accordingly, references to treatment and corrective actions have been deleted, in that the provisions of 40 CFR §264 pertaining to operating treatment, storage or disposal (TSD) facilities are inapplicable to closure activities.

36. Section 3.2.4.1, Page 47: Personnel Safety

Requested Modification: Change to read "As of 13 August 2010, the Permittee no longer receives or treats hazardous waste at the OD Unit. A Health and Safety Plan will be developed for the OD Unit closure activities, which is designed to ensure personnel safety".

Justification for request: Effective 13 August 2010, Kirtland AFB terminated the receipt and treatment of hazardous waste at the OD Unit. Accordingly, references to treatment and corrective actions have been deleted, in that the provisions of 40 CFR §264 pertaining to operating treatment, storage or disposal (TSD) facilities are inapplicable to closure activities.

37. Section 3.2.4.2, Page 48: Safety Precautions

Requested Modification: Change to read "The Permittee shall conduct all OD Unit closure activities in accordance . . ."

Justification for request: Effective 13 August 2010, Kirtland AFB terminated the receipt and treatment of hazardous waste at the OD Unit. Accordingly, references to treatment and corrective actions have been deleted, in that the provisions of 40 CFR §264 pertaining to operating treatment, storage or disposal (TSD) facilities are inapplicable to closure activities.

38. Section 3.2.5.1, Page 48: Accumulated Precipitation

Requested Modification: Change to read "To avoid accumulated precipitation, the Permittee will fill in all pits that may accumulate standing water."

Justification for request: On 13 August 2010, Kirtland AFB submitted its notice of intent to close the OD Unit, which closure for the receipt and treatment of hazardous waste has occurred. On 8 October 2010, Kirtland AFB submitted a revised OD Unit closure plan, which will require all pits to be filled.

39. Section 3.2.5.2, Page 48: Untreated Waste (Kick-Out) and Treatment Residues

Requested Modification: Delete current text and insert OD Unit Closure Plan language to read: "The first phase of closure will consist of a hazards survey of the OD Unit conducted by qualified contractor health physics and industrial hygiene personnel, which will include unexploded ordnance (UXO) safety personnel and Kirtland AFB EOD Personnel. The purpose of the survey shall be to locate and remove any "kick-out" (untreated waste, waste fragments or UXO), and to identify potential contamination concerns that may present hazards to workers during the closure activities and to specify control measures necessary to reduce worker risk. The survey will provide the information necessary to identify worker qualifications, protective equipment (PPE), safety awareness, work permits, exposure control programs and emergency coordination required to complete closure. Any munitions and/or explosives of concern (MEC) identified during the hazard survey will be reported to and handled by Kirtland AFB EOD staff personnel accordance with standard operating procedures."

Justification for request: Since the receipt and treatment of hazardous waste has been terminated at the OD Unit, the operational compliance requirements of 20.4.1 NMAC and 40 CFR Part 264 are inapplicable. Therefore they have been deleted.

40. Section 3.3, Page 48: Air Monitoring

Requested Modification: Change to read "The Permittee shall conduct all OD Unit closure activities in accordance with AEHD air program requirements."

Justification for request: On 8 October 2010, Kirtland AFB submitted a revised OD Unit closure plan as a Class 3 permit modification to the NMED-HWB for consideration and approval. The closure plan was prepared in compliance with

the requirements of the Resource Conservation Recovery Act (RCRA) (42 U.S.C. §§6901 et seq.) and its implementing regulations at 40 CFR Parts 264 and 270 (see 40 CFR Part 264 Subparts G and X and 270.14(b)(13)), and state implementing statutes and regulations under which the state has delegated RCRA authority (see New Mexico Hazardous Waste Act, Chapter 74 Article 4 NMSA 1978 and 20.4.1 NMAC).

The closure plan is designed to: 1) minimize the need for further maintenance; 2) control, minimize or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to ground water or surface waters or to the atmosphere; and 3) comply with the requirements of 40 CFR Part 264, Subpart G and 40 CFR §264.601.

Also, see justification statement discussion in amendments 2 and 3 above.

41. Section 3.4, Page 48: Soil Monitoring

Requested Modification: Change to read "OD Unit closure soil sampling and human risk screening will be performed in accordance with the NMED-HWB approved closure plan."

Justification for request: See justification statement discussion in amendment 40 above.

42. Section 3.5, Page 49: Groundwater Monitoring

Requested Modification: Delete all text and replace with "Installation of monitoring wells and subsequent groundwater sampling and analysis protocol will be accomplished as part of the OD Unit closure activities, in accordance with Attachment H, Closure Plan for Open Detonation Unit. ~~the NMED-HWB approved closure plan~~."

Justification for request: See justification statement discussion in amendment 40 above.

43. Section 3.6.1, Page 51: Additional Waste Characterization Requirements for Air Emissions

Requested Modification: Change to read "The Permittee shall characterize hazardous waste generated as a result of OD Unit closure to insure compliance with . . ."

Justification for request: See justification statement discussion in amendment 40 above.

44. Section 3.6.2, Page 51: Equipment Containing or Contacting Hazardous Waste

Requested Modification: Change to read "Each piece of equipment used during OD Unit closure activities that contains or contacts hazardous waste. . ."

Justification for request: See justification statement discussion in amendment 40 above.

45. Section 3.7, Page 51: Pre-Treatment Preparation

Requested Modification: Change to read "As of 13 August 2010, the Permittee no longer receives or treats hazardous waste at the OD Unit."

Justification for request: See justification statement discussion in amendment 40 above.

46. Section 3.8, Page 51-52: Transportation of Waste To The OD Unit and Container Specifications

Requested Modification: Delete section.

Justification for request: As of 13 August 2010, the Permittee no longer receives or treats hazardous waste at the OD Unit. See justification statement discussion in amendment 40 above.

47. Section 3.9, Page 52: Waste Staging

Requested Modification: Delete section.

Justification for request: As of 13 August 2010, the Permittee no longer receives or treats hazardous waste at the OD Unit. See justification statement discussion in amendment 40 above.

48. Section 3.10, Page 52: Waste Treatment

Requested Modification: Change to read "As of 13 August 2010, the Permittee no longer receives or treats hazardous waste at the OD Unit."

Justification for request: See justification statement discussion in amendment 40 above.

49. Section 3.11, Page 52: Post Treatment

Requested Modification: Delete section.

Justification for request: As of 13 August 2010, the Permittee no longer receives or treats hazardous waste at the OD Unit. See justification statement discussion in amendment 40 above.

D. REQUESTED MODIFICATIONS: PERMIT PART 4 - CLOSURE

~~50. Section 4, Pages 53 through 55: Closure~~

~~Requested Modification: Permit Attachment H is referenced throughout part 4. Attachment H should be replaced in its entirety with the revised OD Unit closure plan submitted on 8 August 2010 once the public comment period has passed and the plan is approved by the NMED HWB.~~

~~Justification for request: On 8 August 2010, Kirtland AFB terminated the receipt and treatment of hazardous waste at the OD Unit. Subsequently, on 8 October 2010, Kirtland AFB submitted a revised OD Unit closure plan as a Class 3 permit modification to the NMED HWB for consideration and approval. This revised closure plan reflects the termination of receipt and treatment of hazardous waste, as well as the revised OD Unit's closure schedule.~~

~~The closure plan was prepared in compliance with the requirements of the Resource Conservation Recovery Act (RCRA) (42 U.S.C. §§6901 et seq.) and its implementing regulations at 40 CFR Parts 264 and 270 (see 40 CFR Part 264 Subparts G and X and 270.14(b)(13)), and state implementing statutes and regulations under which the state has delegated RCRA authority (see New Mexico Hazardous Waste Act, Chapter 74 Article 4 NMSA 1978 and 20.4.1 NMAC).~~

~~The closure plan is designed to: 1) minimize the need for further maintenance; 2) control, minimize or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to ground water or surface waters or to the atmosphere; and 3) comply with the requirements of 40 CFR Part 264, Subpart G and 40 CFR §264.601.~~

~~51. Section 4.0, Page 53: General Closure Requirement~~

~~Requested Modification: Change to read "The Permittee shall close the OD Unit following the procedures described in the revised OD Unit closure plan submitted on 8 October 2010, attached hereto, and as required by 40 . . ."~~

~~Justification for request: As of 13 August 2010, the Permittee terminated receipt and treatment of hazardous waste at the OD Unit. Accordingly, Kirtland AFB submitted a revised OD Unit closure plan to comply with the provisions of 40 CFR§§ 264.112(c) and 270.42(c) and this permit. The revised closure plan identifies the accelerated closure from 2050 to 2010 and the revised closure schedule, as well as the other closure activities and processes required for clean closure.~~

~~52. Section 4.1, Page 53: Submittal of Revised Closure Plan~~

~~Requested Modification: Change to read "On 13 August 2010, the Permittee discontinued receipt and treatment of hazardous waste and operation of the OD Unit. The Permittee has submitted a revised OD Unit closure plan for the OD Unit as a Class 3 permit modification in accordance with 40 CFR §264.112(c)(3). The Permittee shall amend . . ."~~

~~Justification for request: Although this section contains standard closure requirements, the section should reflect that Kirtland AFB has discontinued all hazardous waste treatment operations at the OD Unit, as well as having submitted a revised OD Unit closure plan to the NMED HWB on 8 October 2010 as per 40 CFR§§ 264.112(c) and 270.42(c).~~

~~53.~~50. Section 4.2, Pages 53 and 54: Clean Closure

Requested Modification: Change to read "The Permittee shall close the OD Unit by removing all hazardous waste residues and hazardous constituents and all structures and equipment from the OD Unit and demonstrating that no unacceptable risk to human health and~~or~~ the environment exists in soil or groundwater at the OD Unit (clean closure).
However, if the OD Unit cannot be clean closed, post closure care is required and the closure plan shall be amended in accordance with Permit Section 4.1, and corrective action shall be immediately implemented to remediate contamination to protect human health and the environment pursuant to the requirements of Permit Part 6. Closure of the OD Unit will not be approved by the Department while corrective action is required for the OD Unit. ~~In the event that closure performance standards cannot be achieved for the OD Unit, a post-closure plan will be submitted to the NMED HWB for review and approval."~~

~~Justification for request: The inclusion of removal of all "hazardous constituents" without providing maximum concentrations above which they will be removed~~

~~does not provide an adequate definition of clean closure. Defining clean closure as simply "as determined by the Department" is arbitrary. The Renewal Permit should instead reference promulgated federal or state cleanup standards (i.e. maximum contaminant levels (MCL's) as identified in 20.6.2.3103 NMAC) or~~

~~site-specific levels developed through a risk assessment. Also, if clean closure cannot be accomplished at the OD Unit, a risk assessment and long-term corrective action plan will be developed. Construction of a cap and landfill closure requirements may not be the best technical solution to address any identified long-term risks. It is also premature to establish remedial requirements at this stage prior to the closure activities and investigation outlined in the submitted closure plan.~~

~~54. Section 4.3, Page 54: Notification of Closure~~

~~Requested Modification: Change to read "On 13 August 2010, the Permittee notified the NMED HWB that it had terminated the receipt and treatment of hazardous waste, as well as its intent to close the OD Unit. In accordance with 40 CFR §264.112(c)(3), the Permittee has also submitted a Class 3 permit modification for the revised OD Unit closure plan".~~

~~Justification for request: Although this section contains standard closure requirements, the section should reflect that Kirtland AFB has terminated hazardous waste treatment operations at the OB Unit and notified the NMED-HWB of its intent to close OD Unit on 13 August 2010.~~

~~55.~~51. Section 4.4, Pages 54 and 55: Time Allowed For Closure

Requested Modification: Change to read ". . . as applicable. The Permittee shall complete closure activities for the OD Unit following the schedule and requirements set forth in the ~~revised~~ closure plan, Permit Attachment H, and as required by this Permit Part."

~~Justification for request: The schedule in the revised OD Unit closure plan submitted on 8 October 2010 by Kirtland AFB is no longer 180 days, in that the plan had to account for the addition of eight quarters of groundwater monitoring. Also, the reference to Section 3008 was deleted in that it relates to imminent and substantial endangerment, which does not appear in other NMED HWB issued hazardous waste permits.~~

~~56. Section 4.5, Page 55: Disposal/Decontamination of Equipment, Structures and Soils~~

~~Requested Modification: Change to read "The Permittee shall decontaminate soil as specified in the revised closure plan."~~

~~Justification for request: The requirement for removing and disposing of equipment and structures was removed, in that the OD Unit contains no equipment or structures. Also, as identified in the revised closure plan, the OD Unit will be clean closed.~~

~~57. Section 4.7, Page 55: Certification of Closure~~

~~Requested Modification: Change to read "...the OD Unit was closed as required by the procedures specified in the revised closure plan and this permit, as per 40 CFR § 264.115."~~

~~Justification for request: Kirtland AFB has submitted a revised closure plan for replacing Attachment H of the Permit.~~

E. REQUESTED MODIFICATIONS: PERMIT PART 5 -POST CLOSURE

~~58.~~52. Section 5.0, Page 56: Post-Closure Care

Requested Modification: If the OD Unit cannot be clean closed pursuant to Permit Section 4.2, then the OD until shall be subject to the requirements of 40 C.F.R 264.603 for post-closure care. If post-closure care is required, the Permittee shall submit a post-closure care permit application to the Department within 180 days of the Department's approval of closure of the OD Unit. ~~Change to read "Clean Closure is planned for the OD Unit. If clean closure cannot be accomplished at the OD Unit, a risk assessment and long-term corrective action plan will be developed."~~

~~Justification for request: A permit should not contain assumptions, i.e. the Department should not assume clean closure. A definitive goal should be established to provide the Permittee with a readily identifiable remediation standard. See 40 CFR § 264.111. If clean closure cannot be accomplished at the OD Unit, a risk assessment and long-term corrective action plan will be developed. Landfill closure requirements many not be the best technical solution to address identified long risks.~~

F. REQUESTED MODIFICATIONS: PERMIT PART 6 -CORRECTIVE ACTION

~~59.~~53. Sections -All, Pages 57 throughl 09:

Requested Modification: Change all effective dates to the effective date of the modified permit.

Justification for request: No enforcement prior to 90 days from the effective date of final Department action on this PMR.

~~60.~~54. Sections – All, Pages 57 through 109:

Requested Modification: Delete all references to monitoring media associated with SWMU's or AOC's.

Justification for request: Modified title of Part 6 to reflect that this section should only apply to the OD Unit. See the justification statements discussed in amendments 1 and 3 above.

~~61.~~55. Section -Part 6 Title, Page 57

Requested Modification: Change to read: "Corrective Action Requirements for OD Unit Closure".

Justification for request: Only corrective actions related to the OD Unit are included in the permit. See the justification statement discussion in amendment 1 above.

~~62.~~56. Section 6.0, Page 57: Introduction

Requested Modification: Change to read: "... to protect human health and the environment from all releases of hazardous waste or hazardous constituents from the OD Unit."

Justification for request: Only those activities related to the OD Unit are addressed in the permit. See the justification statement discussion in amendments 2 and 3 above.

~~63.~~57. Section 6.1.2, Page 57: Field Activities

Requested Modification: Delete this entire section.

Justification for request: Notifying the NMED in writing before any field sampling, other field activities, or implementation of work plans is an extra requirement in excess ofrequirements of the Hazardous Waste Act. 40 CFR 270.30(i) regarding inspection and entry states that Kirtland AFB must allow entry to the Department at reasonable times, and that the Department may sample or monitor at reasonable times.

~~64.~~58. Section 6.1.3, Page 57: Record Preservation

Requested Modification: Change to read: "... written notice that clean closure has been accomplished for the OD Unit, the Permittee ... this permit for closure."

Justification for request: Only those records related to the OD Unit closure are addressed in the permit. Seejustification statement discussion in amendments 2 and 3 above.

~~65.~~59. Section 6.1.4, Page 57: Releases Beyond Facility Boundary

Requested Modification: Delete this section.

Justification for request: On 13 August 2010, Kirtland AFB terminated the receipt and treatment of hazardous waste at the OD Unit, as well as providing notice to the NMED-HWB of its intent to close the OD Unit. Since there have been no releases from the OD Unit, this section is inapplicable. See justification statement discussion in amendments 2 and 3 above.

~~66.~~60. Section 6.1.6, page 58: Quarterly Progress Reports

Requested Modification: Change to read: "...summarizing clean closure corrective action activities for the OD Unit conducted pursuant to this Permit... Each report shall summarize the OD Unit clean closure activities for the quarter.. "

Justification for request: On 13 August 2010, Kirtland AFB terminated the receipt and treatment of hazardous waste at the OD Unit, as well as providing notice to the NMED-HWB of its intent to close the OD Unit. Therefore, only those reports related to the OD Unit closure are addressed in the permit. See justification statement discussion in amendments 2 and 3 above.

~~67.~~61. Section 6.1.7, Page 58: List of SWMUs and AOCs and Annual Reporting of Outdoor Activities

Requested Modification: Delete this entire section.

Justification for request: As written, this section exceeds the authority granted in §74-4-4.2(B) NMSA 1978. §74-4-4.2(B) NMSA requires the NMED-HWB to require corrective action for all releases of hazardous waste from any SWMU. As identified in 55 FR 30808, EPA considers a SWMU as a site where solid waste, to include hazardous waste, has been placed. Similarly, an AOC is a site where a release of hazardous waste has occurred. This section is attempting to require Kirtland AFB to investigate and monitor test and training activities and sites that might have some type of release at some point of time in the future, clearly disregarding the legal pre-requisite of an existing release before such requirements can apply.

Additionally, 40 CFR Subpart M, which was adopted and incorporated in the Title 20 NMAC without exception, specifically states that military munitions are not solid wastes if used for their intended purposes, including training and testing. Since military munitions used for training and testing purposes are not solid wastes, their use can not constitute a release of hazardous waste. Thus, Kirtland AFB test and training sites can not be classified as SWMU's or AOC's solely on

the basis of the use of military munitions, in that SWMU's or AOC's do not exist unless there has been the release or probable release of hazardous wastes.

~~68.~~62. Section 6.1.9, Pages 59 and 60: Determination of Corrective Action Complete (No Further Action)

Requested Modification: Delete this entire section.

Justification for request: This section does not apply to the OD Unit, in that the OD Unit is planned for clean closure. See justification statement discussion in amendment 67 above.

~~69.~~63. Section 6.1.10, Health and Safety Plan

Requested Modification: Change the section to read "The Permittee shall develop an OD Unit Closure Activity Health and Safety Plan as part of the closure activities at the OD Unit. The OD Unit Closure Activity Health and Safety Plan shall be in accordance with: 1. National . . . §§ 1910 and 1926 and 7. Other . . ."

Justification for request: Only health and safety requirements related to the OD Unit are addressed in the permit and KAFB operates under the OSHA Voluntary Protection Program; state and local requirements are not applicable.

~~70.~~64. Section 6.1.11, Page 61: Community Relations

Plan Requested Modification: Delete entire

section.

Justification for request: There is no requirement in the CFR to have a Community Relations Plan for an Open Detonation Unit permit. Any permit modifications for the OD Unit are subject to the public notification requirements of 40 CFR §270.42.

~~71.~~65. Section 6.1.12, Page 61: Land Transfer

Requested Modification: Change to read: "In transferring land included in the OD Unit to another entity..."

Justification for request: Only land transfers associated with the OD Unit are addressed in the permit.

~~72.~~66. Section 6.1.13, Page 62: Abandoned Septic Systems

Requested Modification: Delete entire section.

Justification for request: There are no septic systems at the OD Unit.

~~73.~~67. Section 6. 2.1.1, Page 62: General Facility Information

Requested Modification: Change section heading to read "General OD Unit Information" and change "facility" to "OD Unit" throughout the section.

Justification for request: This information is site-specific, and requiring the information for the entire Facility is too open-ended. Only information related to the OD Unit should be addressed in the Renewal Permit. See justification statement discussion in amendment 67 above.

~~74.~~68. Section 6. 2.1. 2, Page 62: Potential Human Receptors Information

Requested Modification: Change "Facility" to "OD Unit" throughout section.

Justification for request: This information is site-specific, and requiring the information for the entire Facility is too open-ended. Only information related to the OD Unit should be addressed in the Renewal Permit. See justification statement discussion in amendment 67 above.

~~75.~~69. Section 6. 2.1.3, Pages 62 and 63: Information on Surface

Water Requested Modification: Delete this section.

Justification for request: There are no surface water bodies associated with or located at the OD Unit or EOD Range. Only information related to the OD Unit should be addressed in the Renewal Permit. See justification statement discussion in amendment 67 above.

~~76.~~70. Section 6.2.2, Pages 63 through 69: Corrective Action

Procedures Requested Modification: Delete entire section.

Justification for request: Corrective action procedures are not applicable to the OD Unit, which will be clean closed. Only procedures applicable to the OD Unit should be addressed in the Renewal Permit. See justification statement discussion in amendments 2, 3 and 67 above.

~~77.~~71. Section 6.2.3, Page 69: Cleanup Levels

Req uested Modification: Change section to read: "The Permittee shall adhere to the requirements of this Permit Section (6.2.3) for implementing and completing cleanup of groundwater and soil at the OD Unit."

Justification for request: Only cleanup levels related to the OD Unit should be addressed in the Renewal Permit. No surface waters are associated with or located on the OD Unit or EOD Range. See justification statement discussion in amendments 2, 3 and 67 above.

~~78.~~72. Section 6.2.3.1, Page 69: Cleanup Levels for Contaminants in Groundwater (other than Perchlorate)

Requested Modification: Change section to read: "Groundwater sampling results will be compared to the Federal Safe Drinking Water Act maximum contaminant levels (MCL's). If the levels of hazardous constituents in the groundwater exceed the MCLs, a risk assessment will be prepared for each of the constituents exceeding the MCL. Ifthe risk assessment demonstrates that the level of contamination is unacceptable under CERCLA or RCRA, the groundwater shall be subject to corrective action, and a corrective action work plan subject to NMED review and approval will be developed."

Justification for request: Change reflects the language contained in the revised OD Unit closure plan submitted to the NMED-HWB on 08 October 2010.

~~79.~~73. Section 6.2.3.2, Page 69: Cleanup Levels for Perchlorate in Groundwater

Requested Modification: Change section to read "Ifthe New Mexico WQCC adopts a perchlorate groundwater standard greater than or equal to 15 ug/L (ppb), the Permittee shall initiate remediation through its CERCLA authority based on a risk assessment and a residential use scenario."

Justification for request: As written, this section exceeds the authority granted to the NMED-HWB. As per §74-4(A) NMSA 1978, the New Mexico Environmental Improvement Board, and by extension the NMED-HWB, are only allowed to establish requirements that are "equivalent to and no more stringent than federal regulations adopted by the [EPA] pursuant to the federal [RCRA] of 1976, as amended. §74-4(A)(1) also denies the NMED-HWAB the authority to identify and list hazardous wastes that have not been listed and/or designated as hazardous wastes by the EPA. At this time, the EPA has not listed and/or designated perchlorate as a hazardous waste. Additionally, § 20.6.2.3103 NMAC contains no established contaminated level for perchlorate. Finally, both EPA and the Department of Defense as a policy matter have guidance recommending an interim perchlorate action level of 15 ppb.

~~80.~~74. Section 6.2.3.3, Page 69: Cleanup Levels for Soil Contaminants (Other than PCBs and Lead)

Requested Modification: Change section to read: "Inorganic soil contaminant concentrations will be compared to background levels. For other constituents, background will be considered to be the most current NMED residential soil screening level (SSL) or EPA Regional Screening Levels (RSLs). If analysis shows that the soil contains contaminant concentrations that are above the appropriate residential SSL or RSL, additional soils will be excavated, removed, and supplementary conformation samples collected and analyzed, or a risk assessment will be prepared for each constituent exceeding the appropriate residential SSL or RSL."

Justification for request: Change reflects the language in the revised OD Unit Closure Plan submitted to the NMED-HWB on 08 October 2010.

~~81.~~75. Section 6.2.3.4, Page 70: Cleanup Levels for PCBs in

Soil Requested Modification: Delete entire section.

Justification for request: PCB contamination is not a concern at the OD Unit. Additionally, no regulatory requirement is cited for the PCB soil cleanup level.

~~82.~~76. Section 6.2.3.5, Page 70: Cleanup Levels for Lead in Soil

Requested Modification: Please insert the standard used to establish the 400 mg/kg cleanup level for lead in soil.

Justification for request: Appropriate regulatory citation should be present in the permit to avoid arbitrary direction on cleanup levels.

~~83.~~77. Section 6.2.3.6, Page 70: Cleanup Levels for Surface

Water Requested Modification: Delete entire section.

Justification for request: There are no surface waters at the OD Unit. See justification statement discussion in amendments 2, 3 and 67 above.

~~84.~~78. Section 6.2.3.7, Page 70: Ecological Risk Evaluation and Cleanup Levels

Requested Modification: Change section to read: "Ecological risk shall be evaluated for the OD Unit if clean closure cannot be achieved."

Justification for request: Only risk evaluation related to the OD Unit should be addressed in the Renewal Permit. See justification statement discussion in amendments 2, 3 and 67 above.

~~85.~~79. Section 6.2.3.8, Page 70: Requests for Variance from Cleanup Levels

Requested Modification: Change to read "The Permittee may request a variance from a particular cleanup level. Ifthe Permittee requests a variance from a cleanup level, the Permittee shall submit documentation to the Department that achievement of the cleanup level is impracticable . . . Such action shall include, but is not limited to, completion of a site-specific risk assessment and identification of alternate cleanup levels."

Justification for request: There are no surface waters at the OD Unit. Only variance procedures related to OD Unit cleanup levels should be addressed in the Renewal Permit. See justification statement discussion in amendments 2, 3 and 67 discussed above.

~~86.~~80. Section 6.2.4, Pages 71 through 78: Reporting Requirements

Requested Modification: Delete subsections 6.2.4.2, Investigation Work Plans; 6.2.4.3 Investigation Reports; 6.2.4.6 CME Work Plans; 6.2.4.7 CME Reports; 6.2.4.8 CMI Work Plans; 6.2.4.9 CMI Work Plan Progress Reports; and 6.2.4.10, CMI Reports.

Justification for request: Only reporting requirements related to the OD Unit should be addressed in the Renewal Permit. Seejustification statement discussion in amendments 2, 3 and 67 discussed above.

~~87.~~81. Section 6.3, Page 78: Compliance Schedule

Tables Requested Modification: Delete entire section.

Justification for request: There is no compliance schedule for the OD Unit. The compliance schedules referred to in Attachment I are not related to closure of the OD Unit. The revised OD Unit closure plan identifies the closure schedule for the OD Unit. See justification statement discussion in amendments 2, 3 and 67 discussed above.

~~88.~~82. Section 6.4, Pages Special Requirements for Information Submittals and Corrective Measures

Requested Modification: Delete entire section.

Justification for request: There are no special requirement information submittals related to the OD Unit, in that:

1. the OD Unit contains no landfills and, as stated in the revised OD Unit closure

plan, will be clean closed.

2) the section is also inconsistent with the NMED's adoption of the Military Munitions Rule (MMR) contained in 40 CPR Part 266, Subpart M. As discussed in amendment 67 above, the expenditure of military munitions for their intended purposes exclude them from RCRA regulation, until which time DoD declares them a waste. Also, the Military Munitions Range Program is a CERCLA program and does not fall under the regulatory authority of the NMED/HWB.

3. Groundwater contamination outside of the OD Unit is regulated under the HSWA module associated with the 2005 closure of the Kirtland AFB TSDF storage permit.

4. See the perchlorate justification statement discussed for amendment 79 above.

5. The sanitary sewer line at LF-002 does not contain a regulated hazardous waste, in that domestic sewage is excluded under 40 CPR § 261.4(a)(l).

~~89.~~83. Section 6.5, Pages 80 and 81: Technical Requirements

Requested Modification: Replace all references to SWMUs and AOCs with "OD Unit".

Justification for request: Only technical requirements related to the OD Unit should be addressed in the Renewal Permit. See justification statement discussion in amendments 2, 3 and 67 above.

~~90.~~84. Section 6.5.2, Page 81: Documentation of Field Activities

Requested Modification: Change to read "Daily OD Unit closure activities, including . . ."

Justification for request: Only closure activities associated with the OD Unit should be addressed in the Renewal Permit. See justification statement discussion in amendments 2, 3 and 67 above.

~~91.~~85. Section 6.5.17, Page 92: Technical Requirements for Groundwater Investigation

Requested Modification: Change to read "The Permittee . . .originating from the OD Unit to determine . . ."

Justification for request: See justification statement discussion in amendments 2, 3 and 67 above.

~~92.~~86. Section 6.5.17.8, Page 96: Springs

Requested Modification: Delete entire section.

Justification for request: There are no springs at the OD Unit.

G. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "A" - GENERAL FACILITY INFORMATION

~~93.~~87. Section 1.0, Page 110: Introduction

Requested Modification: Delete 2"d sentence "It also presents general information on wastes treated at the OD Unit."

Justification for request: As of 13 August 2010, Kirtland AFB terminated the receipt and treatment of wastes at the OD Unit.

~~94.~~88. Section I.I, General Description of the Facility and the EOD Range

Requested Modification: Change title to read: "General Description of Kirtland AFB and the EOD Range." Change 1st sentence to read "Kirtland AFB, which is owned and operated by the U.S. Air Force (the Permittee)..."

Justification for request: The change in text is more accurate and is more consistent with the remainder of the Renewal Permit.

~~95.~~89. Section 1.2, Pages 110 and 111: Purpose of the OD Treatment

Unit Requested Modification: Change all tenses to past tense.

Justification for request: Past tense will indicate that wastes are no longer treated at the OD Unit.

~~96.~~90. Section 1.3, Page 111: Routes of Travel

Requested Modification: Delete last sentence: "The roads along which wastes are transported to the EOD Range within KAFB include... Demolition Range Road."

Justification for request: Wastes are no longer transported to the EOD Range.

H. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "B"-LIST OF AUTHORIZED HAZARDOUS WASTES

~~97.~~91. Section 1.0, Pages 113 through 118: Introduction

Requested Modification: Delete the entire section and Table B-1.

Justification for request: The OD Unit is closed to the receipt and treatment of hazardous wastes. Thus, there are no hazardous wastes authorized at the OD Unit.

I. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "C"-WASTE ANALYSIS PLAN

~~98.~~92. Sections 1.0 through 1.5, Pages 119 through 124: All

Sections Requested Modification: Delete Attachment C.

Justification for request: The OD Unit is closed to the receipt and treatment of hazardous wastes. Thus, no waste analysis plan is required.

J. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "D" -ANNUAL SOIL SAMPLING AND ANALYSIS PLAN

~~99.~~93. Sections 1.0 through 1.7, Pages 125 through 137: All

Sections Requested Modification: Delete Attachment D.

Justification for request: The OD Unit is closed to the receipt and treatment of hazardous wastes. Thus, no annual soil sampling is required. Soil sampling for OD Unit closure activities is addressed in the revised OD Unit Closure Plan.

K. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "E" -INSPECTION PLAN

~~100.~~94. Sections 1.3, Page 139: Table E-1, Inspection Schedule for the OD Unit

Requested Modification: Delete items 6 (Is the OD Unit clear of explosives from previous treatment activities including the loading and unloading areas?), 16 (Is there standing water in a pit or crater at the OD Unit?), and 17 (Is there kick out or treatment residues following OD operations?).

Change all frequencies tied to treatment operations to "monthly."

Justification for request: Treatment operations no longer occur and the 3 identified inspection items are no longer applicable. Inspections will be conducted monthly.

L. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "F"-CONTINGENCY PLAN

~~101.~~95. Section 1.3, Page 140: Characteristics of Waste Managed at the OD Unit

Requested Modification: Change to read: "On 13 August 2010, the Permittee terminated the receipt and treatment of wastes at the OD Unit. The formerly treated reactive (D003) and ignitable (DOOi) hazardous wastes included explosives, propellants, and pyrotechnics."

Justification for request: Changed to reflect that treatment operations no longer occur at the OD Unit.

~~102.~~96. Section 1.5, Page 141: Emergency Coordinator

Requested Modification: Change first paragraph to read: "An EC (see Table F-1 of this Permit Attachment) shall be on call during OD Unit closure activities to coordinate emergency response measures. The EC shall be thoroughly familiar with this Contingency Plan, this Permit, characteristics of the hazardous waste formerly managed at the OD Unit, the closure activities being conducted at the OD Unit, the location of the Operating Record at the OD Unit, and the EOD Range layout.

Justification for request: Changed to reflect that treatment operations no longer occur at the OD Unit.

~~103.~~97. Section 1.6.l, Page 142: Spills

Requested Modification: Delete 2nd sentence "If any hazardous waste is spilled during transfer to a treatment unit, transfer of the waste shall be discontinued immediately."

Justification for request: Changed to reflect that treatment operations and waste transfers no longer occur at the OD Unit.

~~104.~~98. Section 1.6.5.2, Page 143: Evacuation Route

Requested Modification: Change section to read: "The map shall be posted at the EOD Range personnel bunker."

Justification for request: Changed to reflect that treatment operations no longer occur at the OD Unit.

~~105.~~99. Section 1.8.2, Page 144: Post-Emergency or Incident Reports

Requested Modification: Change item #3 to read: "The notification shall address the fact that closure activities will not continue until cleanup procedures are completed and that all emergency equipment is cleaned and fit for its intended use."

Justification for request: Change to reflect that treatment operations no longer occur at the OD Unit.

~~106.~~100. Section 1.8.3, Page 145: Table F-1, Emergency Coordinator Contact Information for the OD Unit

Requested Modification: Strike the home phone number of Mr. D. Brent Wilson and replace with his 24-hour cell phone number (505-401-1197).

List Alternate EC: Mr. H. Bo Bohannon, Address: Building 20684 2050 Wyoming Blvd SE KAFB, NM 87117 Office: (505) 846-7911 24-Hour Cell Phone: (505) 270-5080

Justification for request: As discussed in KAFB's letter to the NMED on 28 Feb 2010 requesting a modification to the contingency plan, the Freedom of Information Act exempts releasing employee's unlisted home phone numbers. Mr. Wilson's cell phone number can be called 24 hours per day. Also, Mr. H. Bohannon serves as the alternate EC.

~~107.~~101. Section 1.8.3, Page 146: Table F-2, Type and Location of Emergency Equipment Available for Use at the OD Unit

Requested Modification: Replace all contact numbers with the KCP number: 911 or (505) 846-3777.

Justification for request: As discussed in KAFB's letter to the NMED on 28 Feb 2010 requesting a modification to the contingency plan, all emergency equipment is available by contacting the Kirtland AFB Command Post, which eliminates the multiple contact numbers.

M. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT G-PERSONNEL TRAINING PLAN

~~108.~~102. Section 1.0, Page 148: Introduction

Requested Modification: Change section to read: "The primary objective of the training program shall be to prepare personnel to support closure operations at the Open Detonation (OD) Unit in a safe and environmentally sound manner and in compliance with this Permit and the New Mexico Hazardous Waste Management Regulations (HWMR), 20.4.1 NMAC. To achieve this objective, the program provides personnel with training relevant to their positions.

All personnel shall complete initial training prior to participating in OD Unit closure activities. Personnel shall not work at the OD Unit until they have completed training on the Contingency Plan (Permit Attachment F). Personnel

shall be given, at a minimum, a basic understanding of the regulatory requirements of hazardous waste management, this Permit, and emergency response procedures. Personnel shall receive additional classroom and on-the-job training designed specifically to teach them how to perform their duties safely and in conformance with regulatory requirements and this Permit. All personnel shall receive the required training prior to being allowed to work unsupervised."

Justification for request: Changed to reflect that treatment operations no longer occur at the OD Unit.

~~109.~~103. Section 1.1, Page 148: Training Program

Requested Modification: Change section to read: "Training for EOD unit personnel is the overall responsibility of the EOD Flight Chief. Training includes formal classroom sessions, on-the-job training, and review of written procedures and plans. A summary of the training program for personnel is shown in Table G-1."

Justification for request: Training on the Renewal Permit requirements and procedures for OD Unit closure will be taught by other qualified personnel, not by EOD technicians.

~~110.~~104. Section 1.1.2, Page 148: Relevance of Training to Job Position

Requested Modification: Change section to read: "The training program shall provide employees with training to respond effectively to emergencies at the OD Unit. Personnel shall receive relevant training on the requirements of this Permit (including Contingency Plan implementation) and OD Unit closure activities (including emergency procedures, equipment, and systems)."

Justification for request: Changed to reflect that treatment operations no longer occur at the OD Unit.

~~111.~~105. Section 1.3, Pages 149 and 150: Table G-1, Training Program for the OD Unit

Requested Modification: Change "Content" of "Relevant In-House Training" to read:

"General Overview of Procedures to Perform Closure at the OD Unit; Range Operation; Safety Practices; Security; Range Inspections; Preventive Procedures, Structures, and Equipment"

Justification for request: Changed to reflect that treatment operations no longer occur at the OD Unit.

N. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "H" - CLOSURE PLAN

~~112.~~106. Sections 1.0 through 1.6, Pages 151 through 168: All Sections

Requested Modification: Replace sections 1.0 through 1.6 and Tables H-1 through H-7 with the revised OD Unit closure plan that was submitted to the NMED-HWB by Kirtland AFB on 8 October 2010.

Justification for request: The revised closure plan reflects changes in the timetable for closure of the OD Unit, as well as the processes and procedures to be following in completing a compliant clean closure at the OD Unit.

1. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "I" - COMPLIANCE SCHEDULES

113. Section 1.0, Page 169: Introduction

Requested Modification: Change section to read: "The Permittee shall meet the due dates in the compliance schedules of Tables I-1 and I-2 of this Permit Attachment (I), as well as any other due dates specified in this Permit that are not included in the tables of Permit Attachment I. Table I-1 contains a list of general submittals and their due dates. Table I-2 lists various submittals related to OD Unit corrective action and their due dates."

Justification for request: Compliance schedules not applicable to the OD Unit should not be addressed in the Renewal Permit. See justification statement discussion in amendments 2, 3 and 67.

114. Section 1.0, Page 170: Table I-1, General Submittals

Requested Modification: Remove schedules for: Waste Minimization Program Certified Report; Annual Sampling and Analysis Report for Air Permit; Annual Soil Sampling Report; Monitoring Well Installation Plan; Well Completion Report; Groundwater Sampling and Analysis Plan

Justification for request: KAFB submitted its intent to close the OD Unit on 13 August 2010 and discontinue the treatment of waste, which either eliminates the need for these requirements or moves them to the submitted closure plan for the OD Unit. See justification statement discussion in amendments 2, 3 and 67 above.

115 Section 1.0, Pages 171 and 172: Table I-2, Submittal Requirements for Corrective Action

Requested Modification: Delete the following submittals and corresponding due dates: Annual Report: Outdoor Testing and Training Activities (Permit Section 6.1.7); Field Sampling/Activities (Permit Section 6.1.2); Verbal Notification of newly-discovered releases, SWMUs, or AOCs (Permit Section 6.1.8); Written Notification of newly-discovered releases, SWMUs, or AOCs (Permit Section 6.1.8); SWMU Assessment Report (SAR) (Permit Section 6.1.8); Investigation Work Plan (Permit Section 6.2.2.1.1); Investigation Report (Permit Section 6.2.2.1.2); Corrective Measures Evaluation (CME) Work Plan (Permit Section 6.2.2.2.2); Corrective Measures Evaluation (CME) Report (Permit Section 6.2.2.2.3); Risk Assessment Report (Permit Section 6.2.4.5); CMI Work Plan (Permit Section 6.2.2.2.7); CMI Work Plan Progress Report (Permit Section 6.2.2.2.9); CMI Report (Permit Section 6.2.2.2.1O); Accelerated Corrective Measures (ACM) Work Plan (Permit Section 6.2.2.2.11.2); ACM CMI Report (Permit Section 6.2.2.2.11.3); Interim Measures Work Plan (Permit Section 6.2.2.2.12.2); Interim Measures Report (Permit Section 6.2.2.2.12.5); Emergency Interim Measures (Permit Section 6.2.2.2.12.4); Corrective Measures Evaluation (CME) Work Plan: Landfills with Contents Not Removed (Permit Section 6.4.1.1); Military Range Assessment Report (Permit Section 6.4.1.2)

Justification for request: Changes reflect other modifications requested in other sections of the Renewal Permit.

116. Section 1.0, Pages 173 through 175: Table I-3, Solid Waste Management Units (SWMUs) and Ares of Concern (AOCs) Requiring Corrective Action

Requested Modification: Delete table.

Justification for request: These SWMUs and AOCs are not applicable to the OD Unit Renewal Permit. See justification statement discussion in amendments 2, 3 and 67 above.

P. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "J" -LIST OF HAZARDOUS WASTE MANGEMENT UNITS

117. Section 1.0, Page 176: Table J-1, Hazardous Waste Management Units

Requested Modification: Revise table to reflect open detonation unit is pending closure.

Justification for request: KAFB submitted a revised closure plan for the OD Unit on 08 October 2010.

Q. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "K" - LIST OF SWMU's and AOC's FOR WHICH CORRECTIVE ACTION IS COMPLETE

118. Section 1.0, Pages 177 through 181: Introduction and Tables

Requested Modification: Delete Attachment K.

Justification for request: These SWMUs and AOCs are not applicable to the OD Unit Renewal Permit. See justification statement discussion in amendments 2, 3 and 67.

IV. MODIFICATION REQUEST 3 - TEMPORARY AUTHORIZATION TO IMPLEMENT OD UNIT CLOSURE.

As provided by 40 CFR §270.42(e), Kirtland AFB is allowed to submit a Class 3 permit modification request for temporary authorization to "facilitate timely implementation of closure [ ] activities," provided the authorization is necessary to achieve the closure before action may be taken on a modification request. Upon receipt of a request for a temporary authorization to implement closure, the NMED-HWB may grant the request for a term of one hundred eighty (180) days, with the option of an additional one hundred eighty (180) if determined to be warranted to continue the closure activity.

Accordingly, Kirtland AFB requests temporary authorization to implement the revised closure plan filed with the NMED-HWB on 8 October 2010.

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 377TH AIR BASE WING (AFMC)
KIRTLAND AIR FORCE BASE NEW MEXICO

Colonel Robert L. Maness
377 ABW/CC
2000 Wyoming Blvd SE
Kirtland AFB, NM 87117-5000

NOV 16 2010

RECEIVED
NOV 20
Hazardous Waste Bureau

Mr. James Bearzi
Chief, Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505

Dear Mr. Bearzi:

As per your previous request, I am acknowledging receipt of your 12 October 2010 letter discussing the Open Detonation (OD) Unit Operating Permit (Permit), EPA ID No. NM9570024423, and closure plan at Kirtland Air Force Base (AFB). As stated in your letter, you indicate that Kirtland AFB must either implement the Peml.it closure plan found in Permit Attachment H or submit a Class 3 Permit Modification Request (PMR) seeking to amend the closure plan.

Accordingly, Kirtland AFB is hereby submitting this Class 3 PMR as allowed in 40 CFR § 270.42, § 74-4-4.2 NMSA 1978 and § 1.12.l of the Permit. In addition to requesting to amend various portions of the Permit, including the closure plan found at Attachment H, the modification request also requests a stay of enforcement, extension of due dates for deliverables and a 40 CFR §270.42(e) request for temporary authorization to facilitate timely implementation of closure activities pending NMED determination of this PMR. By submitting this Class 3 PMR, Kirtland AFB is not waiving its argument concerning the invalidity of the 2010 Open Detonation Unit Operating Permit.

However, as we move forward through this process of developing and implementing the final Permit closure plan to close the unit approximately forty (40) years ahead of the previously anticipated closure date, Kirtland AFB will work closely with your office to ensure the final closure plan and closure activities comply with all statutory and regulatory closure requirements.

If you have any questions, please contact Mr. John Pike, Environmental Management Chief, at (505) 846-8546.

Sincerely,

ROBERT L. MANESS, Colonel, USAF
Commander

cc:
John Kieling, NMED
Will Moats, NMED

HAZARDOUS WASTE TREATMENT FACILITY OPERATING PERMIT

EPA ID No. NM9570024423

issued to

UNITED STATES AIR FORCE

for the

OPEN DETONATION UNIT

located at

KIRTLAND AIR FORCE BASE
BERNALILLO COUNTY, NEW MEXICO

issued by the

NEW MEXICO ENVIRONMENT DEPARTMENT
HAZARDOUS WASTE BUREAU
2905 RODEO PARK DRIVE EAST, BUILDING 1
SANTA FE, NEW MEXICO, 87505

July 2010

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ACRONYMS AND ABBREVIATIONS

ACM accelerated corrective measure
AK acceptable knowledge
AOC area of concern ARCH
air rotary casing hammer
ASTM American Society for Testing and Materials
CAC Corrective Action Complete
CERCLA Comprehensive Environmental Response, Compensation, and Liability Act
C.F.R. Code of Federal Regulations
CMI corrective measures implementation
CME corrective measures evaluation
DQOs data quality objectives
DOT United States Department of Transportation
EC Emergency Coordinator
ECO-SSLs Ecological Soil Screening Levels (EPA)
EOD explosive ordnance disposal
EPA U.S. Environmental Protection Agency
GC/ECD gas chromatograph/electron-capture device
GC/MS gas chromatograph/mass spectrometry
HE high explosive(s)
HI hazard index
HWA New Mexico Hazardous Waste Act
HWB Hazardous Waste Bureau
HWMR New Mexico Hazardous Waste Management Regulations
HQ hazard quotient
ICP inductively coupled plasma
IDW investigation derived waste
KAFB Kirtland Air Force Base
KCP KAFB Command Post
kg kilogram
LDR land disposal restrictions
m^3 cubic meters
MCL maximum contaminant level
mg milligram
mg/kg milligram per kilogram
mg/L milligram per liter

mL	milliliter
MS/MSD	matrix spike/matrix spike duplicate
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMSA	New Mexico Statutes Annotated
OD	open detonation
PCBs	polychlorinated biphenyls
PPE	personal protective equipment
QA	quality assurance
QAPP	quality assurance program plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA facility investigation
RPD	relative percent difference
RSL	regional screening level SAP
	sampling and analysis plan
SAR	SWMU Assessment Report
SSAP	Soil Sampling and Analysis
Plan SSL	soil screening levels
SVOC	semi-volatile organic compound
SWMU	solid waste management unit
TAG	Tijeras Arroyo Groundwater
TKN	total Kjeldahl nitrogen
TSDF	treatment, storage and disposal facility
UCL	upper confidence limit of the mean
ug	microgram
ug/L	microgram per liter
UHC	underlying hazardous constituent
U.S.C.	United States Code
UXO	unexploded ordnance
VOC	volatile organic compound
WQCC	New Mexico Water Quality Control Commission
XRF	x-ray fluorescence

PERMIT PART 1: GENERAL PERMIT REQUIREMENTS

1.0 INTRODUCTION

This Permit Part (1) contains general requirements pertaining to hazardous waste management and treatment at the Open Detonation (OD) Unit and corrective action at the Kirtland Air Force Base (KAFB) Facility (see Figures 1-1 and 1-2, of this Permit Part, for a map view of the Facility and an aerial view of the OD Unit), as permitted under the New Mexico Hazardous Waste Act (HWA), New Mexico Statutes Annotated (NMSA) 1978, §§ 74-4-1 to 74-4-14.

1.1. LEGAL AUTHORITY

Pursuant to § 74-4-10 of the HWA, the New Mexico Environment Department (the Department) issues this Permit to the U.S. Air Force, hereafter referred to as the Permittee, the owner and operator of the OD Unit, with U.S. Environmental Protection Agency (EPA) ID Number NMD9570024423, located in Bernalillo County, New Mexico.

Section 6001 of the Resource Conservation and Recovery Act (RCRA) provides, in part, that "each department, agency, and instrumentality of the executive branch of the Federal Government (1) having jurisdiction over any solid waste management facility or disposal site, or (2) engaged in any activity resulting, or which may result, in the disposal or management of solid waste or hazardous waste shall be subject to, and comply with, all Federal, State, interstate, and local requirements, both substantive and procedural, respecting control and abatement of solid waste or hazardous waste disposal and management in the same manner, and to the same extent, as any person is subject to such requirements." [42 U.S.C. § 6961].

1.2. ENFORCEMENT

Any violation of any requirement of this Permit may subject the Permittee, and its officers, employees, successors, and assigns, to a compliance order under § 74-4-10 of the HWA or § 3008(a) of RCRA, 42 U.S.C. § 6928(a); to an injunction under § 74-4-10 of the HWA, § 3008(a) of RCRA, 42 U.S.C. § 6928(a), or § 7002(a) of RCRA, 42 U.S.C. § 6972(a); to civil penalties under § 74-4-10 of the HWA, § 3008(a) and (g) of RCRA, 42 U.S.C. § 6928(a) and (g), or § 7002(a) of RCRA, 42 U.S.C. § 6972(a); to criminal penalties under § 74-4-11 of the HWA or § 3008(d), (e), and (f) of RCRA, 42 U.S.C. § 6928(d), (e), and (f); or to some combination of the foregoing. The list of authorities in this Permit Section (1.2) is not exhaustive, and the Department reserves the right to take any action authorized by the law to enforce the requirements of this Permit.

1.3. PERMITTED ACTIVITY

This Permit authorizes the Permittee to treat hazardous wastes at the OD Unit, and establishes the general and specific standards for these activities, as required by the HWA and the Hazardous Waste Management Regulations (HWMR) 20.4.1 New Mexico Administrative Code (NMAC). The OD Unit is classified as a miscellaneous unit under 40 C.F.R. Part 264 Subpart X. This Permit also establishes standards for closure and sets forth the requirements for corrective action to address releases of hazardous waste and hazardous constituents into the environment pursuant to the HWA and the HWMR.

The Permittee shall not treat, without a permit, hazardous wastes at any other location at this Facility, except as provided in 40 C.F.R. § 270.1(c)(2).

The Permittee shall not store for more than 90 days any hazardous waste at any location at this Facility except as provided in 40 C.F.R. § 262.34(b).

This Permit does not authorize the treatment of firearms or contraband that are not reactive or ignitable hazardous waste.

1.4. COMPLIANCE WITH PERMIT

Compliance with this Permit during its term constitutes compliance, for purposes of enforcement, with 40 C.F.R. Parts 264 and 268, only for those management practices specifically authorized by this Permit. The Permittee must also comply with 40 C.F.R. Parts 260 through 273 to the extent the requirements of those sections are applicable. The Permittee must also comply with all applicable self-implementing provisions imposed by statute or rule. Compliance with this Permit shall not constitute a defense to any order issued or any action brought under HWA, NMSA 1978, § 74-4-10(E), § 74-4-10.1, or § 74-4-13; RCRA § 3008(a), § 3008(h), § 3013,
§ 7002, or § 7003; the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C. §§ 9601 to 9675, or any other law providing for protection of public health or the environment.

This Permit does not convey any property rights of any sort or any exclusive privilege, nor does this Permit authorize any injury to persons or property, any invasion of other private rights, or any infringement of State or local laws or regulations in accordance with 40 C.F.R. § 270.4(b) and (c) and § 270.30(g).

1.5. EFFECT OF INACCURACIES IN PERMIT APPLICATION

This Permit is based on the information submitted in the Part B Permit application dated December 2005 and subsequent information, referred to as the Application. Any inaccuracies found in the Application may be grounds for the termination, revocation and reissuance, or modification of this Permit pursuant to 40 C.F.R. § 270.43(a)(2). Where and when the Permittee becomes aware that it failed to submit any relevant facts in the Application, or submitted incorrect information in the Application or in any report to the Department, it shall promptly submit such facts or corrected information pursuant to 40 C.F.R. § 270.30(l)(11).

1.6. PERMIT CITATIONS

Whenever the Permit cites a provision of 20.4.1 NMAC or 40 C.F.R. or Part or Section of this Permit, the Permit shall be deemed to incorporate the citation by reference, including all subordinate provisions of the cited provision, and make binding the full text of the cited provision.

Hazardous waste management regulations are frequently cited throughout this Permit. The Federal hazardous waste management regulations, 40 C.F.R. Parts 260 through 273, are generally cited rather than the New Mexico Hazardous Waste Management Regulations, 20.4.1 NMAC. The Federal regulations are cited because only the Federal regulations set forth the

detailed regulatory requirements; the State regulations incorporate by reference, with certain exceptions, the Federal regulations in their entirety. Citing only the federal regulations also serves to avoid encumbering each citation with references to two sets of regulations. However, it is the State regulations that are legally applicable and enforceable. Therefore, for the purpose of this Permit, and enforcement of its terms and requirements, all references to provisions of Federal regulations that have been incorporated into the State regulations shall be deemed to include the State incorporation of those provisions.

1.7. SEVERABILITY

The provisions of the Permit are severable, and if any provision of this Permit, or any application of any provision of this Permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this Permit shall not be affected thereby.

1.8. DEFINITIONS

For purposes of this Permit, terms used herein shall have the same meanings as those in HWA, RCRA, and their implementing regulations, unless this Permit specifically provides otherwise. Where a term is not defined in HWA, RCRA, pursuant regulations, or this Permit, the meaning associated with such a term shall be defined by a standard dictionary reference or the generally accepted scientific or industrial meaning of the term.

"Area of Concern" (AOC) means any area of the Facility under the control or ownership of the Permittee, which is not a solid waste management unit where a release of a hazardous waste or hazardous constituent has occurred, or is suspected to have occurred regardless of the frequency or duration of the release. An area of concern includes areas and structures at which releases of hazardous waste or hazardous constituents were not fully remediated, including one time and accidental events.

"Corrective Measures" means all corrective action necessary to protect human health and the environment for all releases of hazardous waste or hazardous constituents from any Solid Waste Management Unit or AOC at the Facility, regardless of the time at which waste was placed in the unit, as required under § 74-4-4.2(B) of the HWA and 40 C.F.R. § 264.101. Corrective Measures may address releases to air, soil, sediment, surface water, or groundwater.

"Days" refers to calendar days unless specified otherwise in this Permit.

"Department" means the New Mexico Environment Department and any successor agencies.

"EOD" means Explosives Ordnance Disposal

"EPA" means the United States Environmental Protection Agency and any successor agencies.

"Extent of contamination" means the horizontal and vertical area in which the concentrations of waste or hazardous constituents in the environmental media being investigated are above detection limits or background concentrations indicative of the region, whichever is appropriate, as determined by the Department.

"Facility" or "KAFB" means Kirtland Air Force Base, including all contiguous land, structures, other appurtenances, and improvements on the land. For the purpose of implementing corrective action under 40 C.F.R. § 264.101, RCRA § 3008(h), or the HWA, NMSA 1978, § 74-4-10(E),

the Facility includes all contiguous property under the control of the owner or operator seeking a permit under the HWA.

"Hazardous constituent" means any constituent identified in Appendix VIII of 40 C.F.R. Part 261, or any constituent identified in Appendix IX of 40 C.F.R. Part 264, incorporated by 20.4.1 NMAC.

"Hazardous waste" means a solid waste that is not excluded from regulation under 40 C.F.R. § 261.4(b), and that either is listed in 40 C.F.R. Part 261, Subpart D, exhibits any of the characteristics identified in 40 C.F.R. Part 261, Subpart C, or is a mixture of solid waste and one or more wastes listed in 40 C.F.R. Part 261, Subpart D. However, for purposes of corrective action, "hazardous waste" shall have the meaning set forth in the HWA, § 74-4-3(K).

"**Hazardous waste regulations**" or "**Hazardous Waste Management Regulations**" means the New Mexico Hazardous Waste Management Regulations, 20.4.1 NMAC and all provisions of 40 C.F.R. Parts 260 through 273 incorporated therein.

"**Interim measures**" means actions necessary to minimize or prevent the further migration of contaminants and limit actual or potential human and environmental exposure to contaminants while long-term corrective action remedies are evaluated and, if necessary, implemented.

"NMED" means New Mexico Environment Department.

"Off-site source" means a generator of Hazardous Waste located within the United States but outside the Permittee's Facility.

"**Open Detonation**" means the treatment of ignitable or reactive hazardous waste in accordance with the requirements of this Permit. Treatment by open detonation is accomplished by the detonation of hazardous waste in open pits using a counter charge to initiate the explosion.

"**Permit**" means this Permit, issued to the Permittee for the Facility, pursuant to the HWA and the New Mexico Hazardous Waste Management Regulations to conduct corrective action and to operate the OD Unit at the Facility, EPA ID No. NM9570024423, as it may be modified or amended.

"**Permittee**" means U.S. Air Force, a part of the U.S. Department of Defense, which is a Department in the U.S. Government, and any successor.

"**RCRA**" means the Resource Conservation and Recovery Act of 1980, as amended, 42 U.S.C. §§ 6901 to 6992k.

"**Release**" means any spilling, leaking, pouring, emitting, emptying, discharging, injecting, pumping, escaping, leaching, dumping, or disposing of any hazardous waste or hazardous constituents into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles containing hazardous waste or hazardous constituents).

"Remediation waste" means all solid and hazardous wastes, and all media (including groundwater, surface water, soil, and sediment) and debris, which contain listed hazardous wastes or which exhibit a hazardous waste characteristic, that are managed for the purpose of implementing corrective action requirements. Remediation wastes may originate from releases that extend beyond the Facility boundaries.

"Secretary" means the Secretary of the New Mexico Environment Department or his designee or authorized representative.

"**Solid waste**" means a solid waste as defined in the HWA, § 74-4-3(O).

"Solid waste management unit" (SWMU) means any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at the Facility at which solid wastes have been routinely and systematically released.

1.9. THE COMPLETE PERMIT

The complete Permit consists of the regulations incorporated by reference into this Permit (see Permit Section 1.6), the Permit requirements in Permit Parts 1 through 6, and Permit Attachments A through L:

Part 1	-	General Permit Requirements
Part 2	-	General Facility Requirements
Part 3	-	Open Detonation Unit
Part 4	-	Closure
Part 5	-	Post Closure
Part 6	-	Corrective Action
Attachment A	-	General Facility Information
Attachment B	-	List of Authorized Hazardous Wastes
Attachment C	-	Waste Analysis Plan
Attachment D	-	Annual Soil Sampling and Analysis Plan
Attachment E	-	Inspection Plan
Attachment F	-	Contingency Plan
Attachment G	-	Personnel Training Plan
Attachment H	-	Closure Plan
Attachment I	-	Compliance Schedules
Attachment J	-	List of Hazardous Waste Management Units
Attachment K	-	List of SWMUs and AOCs for which Corrective Action is Complete
Attachment L	-	Reserved for Groundwater Sampling and Analysis Plan

1.10. TERM OF THE PERMIT

This Permit shall be effective for a fixed period of 3 years in accordance with 40 C.F.R. § 270.50(a), subject to Permit Sections 1.5, 1.12 and 1.15.

1.11. ALTERNATIVE ASSESSMENT FOR WASTE TREATMENT

The Permittee shall submit an alternative treatment assessment report to the Department no later than the first anniversary of the effective date of this Permit. The report shall document the

Permittee's evaluation of the range of possible treatment technologies for waste that is authorized for treatment by open detonation under this Permit. The assessment report shall include identification and discussion of the alternative treatment technologies and for the technologies presented models of air emissions, contaminant dispersal, and risk to human and ecological receptors. Each alternative treatment technology, including open detonation, shall be evaluated for cost and the technology's ability to protect human health and the environment to include, but not be limited to the:

1. Ability of the technology to reduce or control emissions,
2. Ability of the technology to monitor emissions,
3. Ability of the technology to control noise, and
4. Ability of the technology to control ground vibrations.

The purpose of the alternative treatment assessment shall be to phase out open detonation of hazardous waste at the Facility as soon as practicable.

1.12. PERMIT ACTIONS

1.12.1. Permit Modification, Suspension, Revocation, and Termination

1. This Permit may be modified, suspended, revoked or terminated for cause in accordance with the provisions of HWA, NMSA 1978, § 74-4-4.2 and 40 C.F.R. §§ 270.41 through 270.43. The filing of a request by the Permittee for a Permit modification or the notification of planned changes or anticipated noncompliance or, if suspension, or revocation is ordered by the Department, shall not stay any Permit requirement, in accordance with 40 C.F.R. § 270.30(f).
2. If at any time for any of the reasons specified in 40 C.F.R. § 270.41, the Department determines that modification of this Permit is necessary, the Department may initiate a Permit modification or require the Permittee to request a Permit modification.
3. The Permittee may request permit modifications in accordance with 40 C.F.R. § 270.42. All applicable requirements specified in 40 C.F.R. § 270.42 and 20.4.1.900 NMAC shall be followed.
4. Modifications to the Permit do not constitute a reissuance of the Permit.

1.12.2. Unclassified Permit Modifications

Unless a permit modification is explicitly listed in Appendix I of 40 C.F.R. 270.42 as a Class 1 or 2 permit modification, the Permittee shall not submit the proposed permit modification as a Class 1 or 2 permit modification. The Permittee may only submit such a permit modification request as a Class 3 modification, or may request a determination from the Department that the proposed permit modification be reviewed and approved as a Class 1 or 2 modification pursuant to the requirements specified in 40 C.F.R. 270.42(d)(1).

1.13. TRANSFER OF LAND OWNERSHIP

The Permittee shall submit a permit modification request, in compliance with all requirements of 40 C.F.R. § 270.42, at least 180 calendar days prior to the proposed effective date of transfer of

ownership of any land which is part of the Facility (see also Permit Section 6.1.12). The permit modification request may be submitted as a Class 3 permit modification, or the Permittee may request a determination that the modification is a Class 1 or 2 pursuant to the requirements of 40 C.F.R. § 270.42(d). In addition to the requirements of 40 C.F.R. § 270.42, a permit modification request for transfer of land that is part of the Facility shall:

1. Identify the boundaries of the land proposed for transfer;
2. Describe the location and identity of any existing or prior SWMU, AOC, or hazardous waste management unit on the land proposed for transfer;
3. Describe any known or suspected presence of hazardous waste or hazardous constituents in soil, groundwater, or any other media at any depth within the boundaries of the land proposed for transfer;
4. Describe the status of any past, present, or planned investigations or remediation of any release of hazardous waste or hazardous constituents within the boundaries of the land proposed for transfer;
5. Include a revised map of the Facility;
6. Propose and describe all provisions necessary to ensure that the Permittee can meet the corrective action obligations, the HWA, and the Hazardous Waste Management Regulations (e.g., covenants, deed restrictions, proposed replacement of monitoring wells or enforceable agreements for access to monitoring wells on transferred land) [40 C.F.R. § 264.101; 40 C.F.R. §§ 270.30(l)(1), 270.32(b) and 270.42; and 20.4.1.901 NMAC]; and
7. Describe all measures taken to comply with § 120(h) of CERCLA, 42 U.S.C. § 9620(h).

1.14. PERMIT RENEWAL

If the Permittee wishes to continue the activities authorized by this Permit after the expiration date of this Permit, in accordance with 40 C.F.R. § 270.30(b), the Permittee must apply for and obtain a new permit. The Permittee may request renewal of this Permit by submitting an application for a new permit at least 180 calendar days before the expiration date of this Permit as required by 40 C.F.R. § 270.10(h).

1.15. CONTINUATION OF EXPIRING PERMIT

Pursuant to 40 C.F.R. § 270.51, if the Permittee has submitted a timely and complete application for renewal of this Permit as specified in 40 C.F.R. §§ 270.10, 270.11, 270.12 (as applicable), and §§ 270.13 through 270.29 (as applicable), this Permit shall remain in effect until the effective date of the new permit if, through no fault of the Permittee, the Department has not issued a new permit on or before the expiration date of this Permit. [40 C.F.R. § 270.51].

1.16. TRANSFER OF PERMIT

The Permittee may only transfer this Permit after providing notice to and receiving approval from the Department. The prospective new owner or operator must file a disclosure statement with the Department as specified at HWA, NMSA 1978, § 74-4-4.7. The Department may require modification or revocation and reissuance of this Permit in accordance with 40 C.F.R.

§ 270.40(b) and § 270.41(b)(2).

Before transferring ownership or operation of the Facility or any SWMUs or AOCs during its operating life, the Permittee shall notify the new owner or operator in writing of the requirements of 40 C.F.R. Part 264, and Part 270, and the HWA, pursuant to 40 C.F.R. § 264.12(c), and 40 C.F.R. § 270.30(l)(3), and shall provide the Department with a copy of this notice.

1.17. PERMIT REVIEW

The Department may review this Permit at any time after the effective date of Permit issuance, and may modify this Permit as necessary pursuant to § 74-4-4.2 of the HWA and 40 C.F.R. §§ 270.41, 270.50(b), and 270.50(d). Such modification shall not extend the effective term of this Permit as specified in requirements of Permit Section 1.10.

1.18. NEED TO HALT OR REDUCE ACTIVITY NOT A DEFENSE

It shall not be a defense for the Permittee in an enforcement action that it would have been necessary for the Permittee to halt or reduce the permitted activities in order to maintain compliance with the terms of this Permit. [40 C.F.R. § 270.30(c)].

1.19. DUTY TO MITIGATE

In the event of noncompliance with this Permit, the Permittee shall take all reasonable steps to minimize releases to the environment, and shall carry out such measures as are reasonable to prevent significant adverse impacts on human health or the environment. [40 C.F.R. § 270.30(d)].

1.20. PROPER OPERATION AND MAINTENANCE

The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the requirements of this Permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance/quality control procedures. This requirement includes the operation of back-up or auxiliary facilities or similar systems when necessary to achieve compliance with the requirements of this Permit. [40 C.F.R. § 270.30(e)].

1.21. DUTY TO PROVIDE INFORMATION

The Permittee shall furnish to the Department, within a reasonable time as specified by the Department, any relevant information which the Department may request to determine whether cause exists for modifying, revoking, reissuing, or terminating this Permit, or to determine compliance with this Permit. The Permittee shall also furnish to the Department, upon request, copies of records required to be kept by this Permit. [40 C.F.R. § 264.74(a), and 40 C.F.R. § 270.30(h)].

The Permit requirements of this Section (1.21) shall not be construed to limit, in any manner, the Department's authority under the HWA, NMSA 1978, § 74-4-4.3, or RCRA § 3007(a), 40 C.F.R. § 270.30(i), or any other applicable law or regulation.

1.22. INSPECTION AND ENTRY

In accordance with 40 C.F.R. § 270.30(i), the Permittee shall allow the Department, or authorized representatives, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter at reasonable times into the Permittee's premises where the regulated facility or activity is located or conducted, or where records must be kept under the requirements of this Permit;
2. Have access to and copy, at reasonable times, any records that must be kept under the requirements of this Permit;
3. Inspect at reasonable times the Facility, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Permit; and
4. Sample or monitor at reasonable times, for the purposes of assuring Permit compliance or as otherwise authorized by RCRA or HWA, any substances or parameters at any location, including waste, air, soil, sediment, surface water, and groundwater at the Facility.

The Permit requirements of this Section (1.22) shall not be construed to limit, in any manner, the Department's authority under the HWA, NMSA 1978, § 74-4-4.3, or RCRA, § 3007(a), 40 C.F.R. § 270.30(i), or any other applicable law or regulation.

1.23. MONITORING AND RECORDS

1.23.1. Representative Sampling

The Permittee shall take representative samples and measurements in accordance with the procedures in this Permit and 40 C.F.R. § 264.13(a)(1). All samples and measurements taken by the Permittee under any requirement in this Permit shall be representative of the waste, media, equipment or structure being sampled. This includes, but is not limited to, sampling and analysis of waste, treatment residues, soil, groundwater, spills, and includes sampling of media for purposes of conducting corrective action pursuant to Part 6 of this Permit. To obtain a representative sample of a waste stream the Permittee shall use an appropriate method from Appendix I of 40 C.F.R. Part 261 or an equivalent method approved by the Department. Laboratory methods must be those specified in the current edition of the EPA publication *Test Methods for Evaluating Solid Waste Physical/Chemical Methods SW-846*, or an equivalent method, as specified in the *Waste Analysis Plan* in Permit Attachment C. [40 C.F.R. § 270.30(j)(1)]. At a minimum, these analyses shall contain all of the information which must be known to treat, store, or dispose of the wastes properly. [40 C.F.R § 264.73(b)].

1.23.1.1. Monitoring Records Contents

Monitoring records, including those required for corrective action under Part 6 of this Permit, shall contain:

1. The dates, exact place, and times of sampling or measurements;
2. The names of the individuals who performed the sampling or measurements;
3. The name and address of the laboratory that performed the analysis;

4. The date on which analyses were performed;
5. The analytical techniques or methods used;
6. The results of such analyses including units of measurement;
7. Calibration data;
8. Quality control data;
9. Detection limits;
10. Data qualifiers; and
11. Data validation results.

[40 C.F.R. § 270.30(j)(3)].

1.23.2. Operating Record

The Permittee shall maintain a written Operating Record at the EOD Shop and the EM Branch Office as required by 40 C.F.R. § 264.73. The Permittee shall maintain all records in the Operating Record until completion of closure and, if necessary, post closure care, unless specified otherwise in this Permit. The retention period for all records is extended automatically during the course of any unresolved enforcement action regarding the Facility, or as may be requested by the Department, as required by 40 C.F.R. § 264.74(b). The Permittee shall make the Operating Record available at all reasonable times for inspection by any officer, employee, or authorized representative of the Department or EPA, upon request, or shall furnish copies of documents within the record, as required by 40 C.F.R. § 264.74.

The following operating records and documents shall be maintained at the Facility EOD Shop:

1. A current copy of this Permit including the closure plan (Permit Attachment H);
2. A written Operating Record that describes:
   a. The type and quantity of each hazardous waste received and treated at the OD Unit, and the date the hazardous waste was treated,
   b. The location of hazardous waste at the OD Unit,
   c. The method(s) of treatment of hazardous waste,
   d. Training records for EOD personnel,
   e. Written inspection log and schedule;
3. Training records for former EOD employees (maintained for a minimum of three years from the date the employee last worked at the OD Unit);
4. Current training records (including refresher seminars) for current EOD employees;
5. Inspection logs for the last three years;
6. A copy of the Contingency Plan;
7. A copy of the Waste Analysis Plan;
8. The name(s), address(es), and telephone number(s) of the Emergency Coordinator(s) and all such information for persons designated as alternate Emergency Coordinators;
9. A list of all equipment listed in Permit Attachment F, as required by 40 C.F.R. Part 264, Subpart C; and

10. A current file of pertinent material safety data sheets and records of all wastes that have been treated at the OD Unit.

The following operating records and documents shall be maintained at the Facility EM Branch Office:

1. Treatment facility notices and certifications;
2. Storage facility notices and certifications;
3. Air emissions records;
4. Correspondence and other documents from government agencies;
5. Notices to off-site generators;
6. Waste minimization certification.
7. Manifest documents for hazardous waste shipped off-site;
8. A copy of the Hazardous Waste Biennial Report;
9. Copies of unmanifested waste reports;
10. Copy of the Contingency Plan for the OD Unit and any revisions to the plan;
11. Waste characterization information and data;
12. A copy of the Waste Analysis Plan;
13. Reports of any incidents that required activation of the Contingency Plan;
14. Records of soil and groundwater monitoring, testing, analytical data, and any corrective actions taken to prevent or mitigate releases of hazardous waste or hazardous constituents to the environment;
15. All documents related to corrective action including, but not limited to, work plans, reports, and sampling and analysis plans;
16. The Permit Application;
17. Inspection Plan set forth in Permit Attachment E;
18. Closure Plan set forth in Permit Attachment H, as required by 40 C.F.R. § 264.112(a), and this Permit; and
19. All monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation;

A current copy of the Contingency Plan shall also be maintained at the EOD Range personnel bunker, and the KAFB Command Post.

1.24. REPORTING PLANNED CHANGES

The Permittee shall give advance notice to the Department as soon as possible, but no less than one week in advance of any planned physical alterations or additions to the OD Unit. [40 C.F.R. § 270.30(l)(1)]. Some alterations or additions may be subject to the requirements of Permit Section 1.12.

1.25. REPORTING ANTICIPATED NONCOMPLIANCE

The Permittee shall give advance notice to the Department as soon as possible, but no less than

one week in advance of any planned physical alterations or additions to the OD Unit or of any activities, which may result in noncompliance with the requirements of this Permit. [40 C.F.R. § 270.30(l)(2)]. Some alterations or additions may be subject to the requirements of Permit Section 1.12.

1.26. CERTIFICATION OF CONSTRUCTION OR MODIFICATION

If the OD Unit is modified, the Permittee shall not treat or analyze hazardous waste in the modified portion of the OD Unit, except as provided in 40 C.F.R. § 270.42, unless the following requirements have been satisfied:

1. The Permittee has submitted to the Department, by certified mail or hand delivery, a letter signed by the Permittee and an independent professional engineer registered in New Mexico stating that the modification meets the requirements of this Permit; and
2. The Department has:
    a. Inspected the modified or newly constructed portion of the OD Unit and finds it meets the requirements of this Permit; or
    b. Waived the inspection or, within 15 calendar days from the date of receipt of the letter required by paragraph 1, has not notified the Permittee of its intent to inspect.

[40 C.F.R. § 270.30(1)(2)].

1.27. TWENTY-FOUR HOUR AND SUBSEQUENT REPORTING

1. **Oral Report** - The Permittee shall report to the Department any noncompliance which may endanger human health or the environment. Any such information shall be reported orally within 24 hours from the time the Permittee becomes aware of the circumstances. The oral report shall include:
    a. Information concerning release of any hazardous waste or constituents that may cause an endangerment to public drinking water supplies; and
    b. Any information about a release or discharge of hazardous waste or hazardous constituent or of a fire or explosion which could threaten the environment or human health including:
        i. A description of the noncompliance and its cause;
        ii. The name, address, and telephone number of the owner, operator, and name of responsible official;
        iii. The name, address, and telephone number of the Facility;
        iv. The period of the occurrence including exact date and time and, if the noncompliance has not been corrected, the anticipated time it is expected to continue;
        v. The name and quantity of materials involved;
        vi. The extent of injuries, if any;

vii. An assessment of actual or potential hazards to the environment and human health at and outside the Facility, where this is applicable;

viii. The estimated quantity and disposition of recovered material that resulted from the incident; and

ix. The steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

[40 C.F.R. § 270.30(l)(6)(i and ii)].

2. **Non-Compliance Written Report** - The Permittee shall also submit a written report within five calendar days from the time the Permittee becomes aware of the circumstance of any noncompliance. The written report shall contain the information required for an oral report under this Permit Section (1.27).

The Department may extend the time for submitting the written report up to 15 calendar days upon written request by the Permittee prior to the end of the five calendar days allowed under Permit Section 1.27.2. [40 C.F.R. § 270.30(l)(6)(iii)].

1.28. REPORTS REQUIRED BY THE CONTINGENCY PLAN

If any incident requires implementation of the Contingency Plan provided in Permit Attachment F, the Permittee shall comply with the reporting requirements of 40 C.F.R. § 264.56(d).

1.29. CORRECTIVE ACTION

Corrective action required pursuant to 40 C.F.R. § 264.101, shall continue under this Permit for any period necessary to comply with the requirements specified in Part 6 of this Permit.

1.30. ADMISSIBILITY OF DATA

The Permittee waives any objection to the admissibility as evidence of any data required by this Permit in any administrative or judicial action to enforce a condition of this Permit.

1.31. OTHER NONCOMPLIANCE

The Permittee shall report all instances of noncompliance not otherwise required to be reported under this Permit at the time monitoring reports are submitted. The reports shall contain the information listed in Permit Section 1.27.1. [40 C.F.R. § 270.30(l)(10)].

1.32. SIGNATORY AND CERTIFICATION REQUIREMENTS

The Permittee shall sign and certify all applications, reports, or other information submitted to the Department or required by this Permit, in accordance with 40 C.F.R. § 270.11(a)(3).

The Permittee shall provide, upon request by the Department, notification and certification statements associated with the treatment of hazardous wastes in compliance with 40 C.F.R. § 268.7 and § 268.9.

1.33. MONITORING REPORTS

The Permittee shall submit Monitoring Reports to the Department as specified in the

requirements of Permit Sections 1.23 and 1.36. [40 C.F.R. § 270.30(l)(4)].

1.34. COMPLIANCE SCHEDULES

Reports of compliance or noncompliance with this Permit, any progress reports on activities conducted under this Permit, and interim and final requirements contained in any compliance schedule of this Permit shall be submitted to the Department no later than 14 calendar days following each schedule date set forth in this Permit. [40 C.F.R. § 270.30(l)(5)].

1.35. INFORMATION REPOSITORY

Upon written notification, the Department may require the Permittee to establish and maintain an information repository at any time, based on the factors set forth in 40 C.F.R. § 124.33(b) and 40 C.F.R. § 270.30(m). The information repository shall be governed by the provisions in 40 C.F.R. § 124.33(c).

1.36. REPORTS, NOTIFICATIONS, AND INFORMATION SUBMITTALS TO THE DEPARTMENT

The Permittee shall submit to the Department by certified mail or hand delivery all reports, notifications, or other submittals that are required by this Permit to be sent or given to the Department, at the following address:

Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

Telephone Number: (505) 476-6000
Facsimile Number: (505) 476-6030

Two hard (paper) copies and one electronic copy of these plans, reports, notifications, or other submissions shall be submitted to the Department.

1.37. POINTS OF CONTACT FOR THE FACILITY

Points of contact for the Facility during the term of the Permit are identified below.

Base Commander
377 ABW/CC
2000 Wyoming Blvd. SE
Kirtland AFB, NM 87117-5606

and

Director
Environmental Management
377 MSG/CEANR
2050 Wyoming Blvd. SE

Kirtland AFB, NM 87117-5270

All reports required by the permit shall be signed by a principal executive officer or their duly authorized representatives in accordance with 40 C.F.R. § 270.11(b).

The Permittee shall inform the Department in writing of changes in its principal executive officers (or their duly authorized representatives) within 30 days of the changes, and Emergency Coordinators and their telephone numbers and addresses within 15 calendar days of the changes. Changes to the principal executive officers (or their duly authorized representatives) are not permit modifications. Changes in name, address, or phone number for Emergency Coordinators are Class 1 permit modifications under 40 C.F.R § 270.42.

1.38. WORK PLANS AND OTHER DELIVERABLE DOCUMENTS

All documents that the Permittee prepares under the terms of this Permit and submits to the Department that are subject to the requirements of 20.4.2 NMAC shall be subject to the procedures set forth therein. Documents requiring Department approval that are not subject to the requirements of 20.4.2 NMAC may be reviewed and approved, approved with modifications or directions, disapproved, denied, or rejected by the Department.

Upon the Department's written approval, all submittals and associated schedules shall become enforceable under this Permit in accordance with the terms of the Department's written approval, and such documents as approved, shall control over any contrary or conflicting requirements of this Permit.

This provision does not affect any public process that is otherwise required by this Permit, the HWA, or its implementing regulations.

Failure to submit any of the work plans, schedules, reports, and other deliverable documents that the Permittee is required to prepare under this Permit in substantial compliance with this Permit, and according to the schedules or deadlines in this Permit, may subject the Permittee to enforcement action under § 74-4-10 of the HWA, or other applicable provisions of law, which may include fines, civil penalties, or suspension or revocation of the Permit.

Any noncompliance with approved plans and schedules shall be noncompliance with this Permit. The Department may grant extensions of written requests for due dates for submittals of reports and other deliverables, provided that the Permittee includes a written justification showing good cause and a proposed schedule for submittal.

1.39. CONFIDENTIAL INFORMATION

The Permittees may claim that any information required by this Permit or otherwise submitted to the Department is confidential pursuant to the provisions of §§ 74-4-4.3(D) and (F) of the HWA and 40 CFR §§ 260.2 and 270.12.

Figure 1-1

Figure 1-2

PERMIT PART 2: GENERAL FACILITY REQUIREMENTS

2.0 INTRODUCTION

Permit Part 2 contains general requirements applicable to the Facility.

2.1. SECURITY

In order to prevent the unknowing entry and to minimize the possibility of unauthorized entry of persons into the OD Unit, the Permittee shall comply with the security provisions and procedures described in this Permit Section (2.1), and in Permit Attachment A, and as required by 40 C.F.R. § 264.14.

The entrance gate to the EOD Range (see Figure 2-1, this Permit Part) shall be locked except when EOD personnel enter the area for inspections or for treatment operations, or for purposes of conducting repairs or maintenance to the OD Unit, or for conducting military training.

Warning signs shall be posted at the entrance gate and at a maximum spacing of 300-foot intervals along the fence. The signs shall be legible from a distance of 25 feet and shall be large enough to be seen from any approach toward the EOD Range. The warning signs shall state "Danger--Explosive Disposal Range--Keep Out" in English and Spanish. A sign indicating "No Smoking" in English and Spanish shall be placed conspicuously at the entrance to the EOD Range.

During treatment operations, the gate shall remain open in case emergency vehicle access is required; however, unauthorized entry must be prevented.

2.2. INSPECTIONS

The Permittee shall inspect the OD Unit for malfunctions and deterioration, operator errors, and discharges which may cause a release of hazardous waste or hazardous constituents into the environment or a threat to human health, as required by 40 C.F.R. § 264.15, and according to the Inspection Plan (Permit Attachment E). The Permittee shall remedy any such deterioration or malfunction, operator error, or discharge, as required by 40 C.F.R. § 264.15(c). Inspections shall be conducted often enough to identify problems in time to correct them before they harm human health or the environment. The Permittee shall maintain records of all such inspections in the Operating Record, as required by 40 C.F.R. § 264.15(d).

Pursuant to the miscellaneous unit requirements found in 40 C.F.R. Part 264 Subpart X, inspections must meet the inspection requirements in 40 C.F.R. § 264.15 and the equipment testing and maintenance requirements in 40 C.F.R. § 264.33, as well as any additional requirements needed to protect human health and the environment. The OD Unit inspection procedures for communication and fire-protection equipment shall include provisions for equipment testing and maintenance to ensure that the equipment will function properly in an emergency.

If an inspection of the OD Unit reveals that a non-emergency problem has developed, remedial action, including repairs, maintenance, and replacement, shall be completed as soon as practicable to protect human health and the environment and to preclude further damage and to reduce the need for emergency repairs. If a hazard appears imminent or if a hazardous situation

already exists, operations at the OD Unit shall stop, and remedial action shall be initiated immediately. These measures to implement remedial actions shall satisfy the requirements of 40 C.F.R. § 264.15(c). Any remedial action taken pursuant to an inspection shall be noted on the inspection log in accordance with 40 C.F.R. § 264.15(d).

In accordance with 40 C.F.R. § 264.15(b)(1), a written schedule shall be followed at the OD Unit to routinely inspect for problems or potential problems with safety and emergency equipment, security devices, and operating and other equipment for preventing, detecting, or responding to hazards to the environment or human health. The Permittee shall use an inspection log based on the schedule shown in Table E-1 to document inspection of all items listed on Table E-1. The inspection logs shall include the date and time of the inspection, the name of the inspector, a notation of the observations made, and the date and nature of any repairs or other remedial actions taken.

2.3. PERSONNEL TRAINING

The Permittee shall follow the personnel training procedures specified in Permit Attachment G. [40 C.F.R. § 264.16].

The Permittee shall comply with 40 C.F.R. § 264.16(d) by maintaining the following documentation at the Facility: a job title for each position and the name of each employee filling each position; a written description for each position including the requisite skill, education, or other qualifications, and duties; and a written description of introductory and continuing training for each person filling each position.

2.4. PREPAREDNESS AND PREVENTION

2.4.1. Required Equipment

As required by 40 C.F.R. § 264.32, the OD Unit shall be equipped with or personnel shall have access to adequate emergency equipment, which includes an internal communication equipment or alarm system, telephone or two-way radio, fire extinguishers, and fire control, spill control, and decontamination equipment. The emergency equipment available for use at the OD Unit is summarized in Tables F-2 and F-3 in the Contingency Plan under Permit Attachment F.

An internal communications or alarm system capable of providing immediate emergency instructions (voice or signal) to Facility personnel shall be available on-site. In addition, a telephone or two-way radio capable of summoning emergency assistance shall also be available on-site. Treatment activities at the OD Unit shall be conducted only after notifying the KAFB Command Post (KCP).

All vehicles used at the OD Unit shall carry a portable fire extinguisher and a shovel. At least two portable fire extinguishers and at least two shovels shall also be kept at the EOD personnel bunker for response to fires or spills.

Appropriate personal protective equipment shall be available for use at the OD Unit to clean up spills should any occur.

Eyewash solutions shall be included in the first-aid kits carried in the vehicles used at the OD Unit.

The KAFB Fire Department shall be on call during treatment operations to provide fire fighters, tanker trucks equipped with water at adequate volume and pressure to extinguish fires at the OD Unit, and other fire-fighting equipment, if any fires should occur.

2.4.2. Testing and Maintenance of Equipment

The Permittee shall test and maintain the equipment specified in the Contingency Plan in Permit Attachment F, as necessary, to assure its proper operation in time of emergency, as required by 40 C.F.R. § 264.33.

All communications systems, fire protection equipment, and decontamination equipment associated with the OD Unit shall, at a minimum, be tested and maintained according to the inspection schedule set forth in Permit Attachment E. Damaged or defective emergency equipment, communications equipment, fire protection equipment, and decontamination equipment shall be repaired or replaced immediately upon discovery.

2.4.3. Required Aisle Space

At a minimum, the Permittee shall maintain enough aisle space to allow the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to any area of the OD Unit, as required by 40 C.F.R. § 264.35.

2.4.4. Arrangements with Local Authorities

The Permittee shall attempt to enter into coordination agreements for emergency response, i.e., medical, ambulance, and fire protection services, with the City of Albuquerque Fire Department, the Bernalillo County Fire Department, the Albuquerque Police Department, and Albuquerque Regional Medical Center, as described in the Contingency Plan (Permit Attachment F), and as required by 40 C.F.R. § 264.37. Copies of all such agreements and documentation showing any unsuccessful attempts to enter into such an agreement shall be maintained at the Facility EM Branch Office as part of the Operating Record.

The Permittee shall provide the Chiefs of the City of Albuquerque Fire Department (AFD) and the Bernalillo County Fire Department (BCFD) with information that would ensure that emergency response personnel are at all times familiar with the potential hazards in performing their duties associated with the hazardous wastes at OD Unit. This information shall at a minimum include:

1. Waste types, *e.g.*, ignitable, reactive, corrosive;
2. Waste names that identify principle hazardous chemical constituents;
3. Approximate quantities of each waste type; and
4. General location of wastes types.

The Permittee shall annually sign a certification stating that the AFD and BCFD have been provided with this information. These certification statements shall be maintained in the Facility EOD Shop as part of the Operating Record.

2.4.5. Preventive Procedures, Structures, and Equipment

Descriptions of the preventive procedures, structures, and equipment at the OD Unit are

presented below. Adherence to the procedures and proper use of the structures and equipment shall be done to prevent hazards associated with unloading operations, prevent runoff from escaping hazardous waste management areas, prevent contamination of water supplies, mitigate the effects of equipment failures and power outages, prevent undue exposure of personnel to hazardous waste, prevent releases of hazardous wastes or hazardous constituents to soil, sediment, surface water, and groundwater, and prevent unacceptable releases of contaminants to the atmosphere.

Only properly trained personnel shall transport waste to the OD Unit for treatment. Unloading of the waste may be performed only by EOD Technicians/Specialists either manually or with appropriate heavy equipment, such as forklifts. At the OD Unit, vehicles shall park adjacent to the pit where the waste is to be treated, and the waste shall then be unloaded and placed into the pit. Additionally, personnel involved in waste management at the OD Unit shall be knowledgeable about the physical and chemical properties of the waste managed and shall take all precautions, as necessary, to ensure that wastes are managed safely.

Engineering and operational controls shall ensure that run-on and run-off are minimized to protect human health and the environment. A two-foot high earthen berm shall surround the OD Unit to prevent run-off from the OD Unit from flowing to other areas outside of the treatment area.

Because no electrical power is supplied to the EOD Range, equipment used at the OD Unit for unloading or placement of wastes (i.e., forklifts) is self-contained. If such heavy equipment experiences failure, the equipment shall be repaired or replacement equipment shall be obtained immediately.

Personnel exposure shall be minimized by restricting the handling of hazardous waste. EOD Technicians/Specialists shall wear appropriate protective clothing, which may include safety glasses. In case of exposure to the hazardous waste, first aid equipment, which includes eyewash solutions, shall be readily available.

Operations at the OD Unit shall be conducted in a manner to prevent any releases that may have adverse effects on human health or the environment due to migration of waste constituents in the air as required under 40 C.F. R. § 264.601(c). Treatment at the OD Unit shall be performed under the requirements in the applicable permit obtained from the City of Albuquerque Environmental Health Department Air Pollution Control Division and under the requirements of this Permit.

The Permittee shall clear and keep clear, at all times, all combustible materials, including wood, grass, brush, and trees located within 200 feet of the OD Unit. The cleared area shall be bladed routinely to minimize fire danger, and a series of at least three concentric firebreaks (at least 20-feet wide each) shall be maintained.

2.5. CONTINGENCY PLAN

2.5.1. Implementation of the Plan

The Permittee shall immediately implement the Contingency Plan contained in Permit Attachment F, whenever there is a release of hazardous waste or hazardous constituents or there is a fire or explosion that could threaten human health or the environment, as required by

40 C.F.R. § 264.51(b).

2.5.2. Copies of the Plan

The Permittee shall maintain copies of the current Contingency Plan and all revisions and amendments to the plan at the EOD Shop and at the EOD Range bunker as required by 40 C.F.R. § 264.53(a). The Permittee shall provide copies of the current Contingency Plan and all revisions and amendments to the plan to the Department and to each entity with which the Permittee has an emergency agreement pursuant to the Permit requirements of Permit Section 2.4.4, as required by
40 C.F.R. § 264.53(b).

2.5.3. Amendments to the Plan

The Permittee shall review at least annually and immediately amend, if necessary, the Contingency Plan, as required by 40 C.F.R. § 264.54.

2.5.4. Emergency Coordinator

Either the Emergency Coordinator (EC) or an alternate EC, as specified in Permit Attachment F, shall be available at all times in case of an emergency. The EC and alternate EC shall be thoroughly familiar with the Contingency Plan and shall have the authority to commit the resources needed to implement the Contingency Plan. [40 C.F.R. § 264.55]. In the event of an imminent or actual emergency, the EC shall activate the internal emergency alarm or emergency communication device, notify the appropriate State or local government agencies and implement other procedures, as required by 40 C.F.R. § 264.56, and as described in Permit Attachment F (*Contingency Plan*).

The Permittee shall submit to the Department a revised Table F-1, Permit Attachment F, within 30 days of the issuance of this Permit. The revised table shall contain the following emergency coordinator contact information in compliance with 40 C.F.R. 264.52(d): names, office addresses, and the home and office telephone numbers of all persons qualified to act as an EC. When more than one person is listed, one must be named as the primary EC and the others must be listed in the order in which they will assume responsibility as alternates. The Permittee shall not treat any hazardous waste at the OD Unit until this Permit requirement is fully satisfied as determined by the Department.

2.6. WASTE CHARACTERIZATION

2.6.1. General Requirements

The Permittee shall not treat any hazardous waste at the OD Unit unless the hazardous waste has been characterized pursuant to the requirements of this Permit. [40 C.F.R. Part 264 and 40 C.F.R. Part 268]. The Permittee shall characterize waste as required under the Permit requirements of Permit Section 2.6.3 by sampling and analysis or by use of acceptable knowledge (AK) of the process that generated the waste, as appropriate.

2.6.2. Characterization of Waste by Acceptable Knowledge

"Acceptable Knowledge" means generator knowledge of the process that generated a waste,

including but not limited to process knowledge, waste analysis data from generators of similar wastes, and facility records of analysis that is used by a generator to characterize wastes.

Acceptable knowledge may be used as the sole method to characterize waste only when the waste is generated from a process that is consistent and well-documented. Documentation of the process must include information that meets all characterization requirements of this Permit, including the requirement to determine the status of the waste for the purposes of the RCRA Land Disposal Restrictions (LDRs) as specified in the Permit requirements of Permit Section 2.6.3.2.

The Permittee shall maintain documentation used to support acceptable knowledge of a waste stream in the Operating Record in accordance with 40 C.F.R. § 268.7(a)(6) and 40 C.F.R. § 264.73(b)(3). This documentation must be readily retrievable upon request during a Department or United States Environmental Protection Agency (EPA) inspection, and must be maintained in the Operating Record for a minimum of three years from the date the waste was last managed at the Facility. For each waste stream characterized by acceptable knowledge, the Permittee shall maintain in the Operating Record, at a minimum, the following process knowledge information.

1. The location where the waste stream is generated,
2. The waste stream volume and time period of generation,
3. A description of the waste generating process, and
4. All material inputs or other information that identifies the chemical content, physical properties and physical form of the waste stream.

2.6.3. Characterization by Sampling and Analysis

2.6.3.1. Sampling

The Permittee shall establish and utilize a Sampling and Analysis Plan (SAP) for each waste stream for which sampling is required. The SAP shall identify the appropriate sampling methods to characterize the waste stream in accordance with the requirements of Permit Section 2.6.1. The Permittee shall maintain the SAP and all documents showing compliance with the SAP, in the Operating Record for a minimum of three years from the date the waste was last managed at the Facility.

The SAP shall identify the sample container types, preservation techniques, and holding times for each waste sampled. The SAP must conform to the most recent version of EPA's publication *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, (Publication SW-846) Chapter 9, Sampling Plan.* The SAP must ensure collection of a representative sample of waste by means that preserve its original physical form and composition, and the SAP shall ensure that sample collection meets the quality assurance objectives required in Section 1.3 of Permit Attachment D. The number of samples of each waste shall be sufficient to demonstrate that the Upper Confidence Limit of the mean (UCL), based on at least a 95% confidence level, is less than the applicable regulatory threshold.

2.6.3.2. Laboratory Analysis

The SAP shall identify the appropriate laboratory analytical methods to characterize the waste

stream in accordance with the Permit requirements of Permit Section 2.6.1. The Permittee shall perform or obtain laboratory analysis of wastes in accordance with the requirements of this Permit, and the *Waste Analysis Plan* (WAP) contained in Permit Attachment C. The SAP shall include the appropriate laboratory analytical methods, detection limits, and reporting limits. The Permittee shall maintain the SAP in the Operating Record.

To use any alternative analytical method, the Permittee must submit to the Department a petition for approval of such method in accordance with 40 C.F.R. § 260.21.

If the Permittee uses an independent contract laboratory to perform analyses, the Permittee shall inform the laboratory in writing that it must operate under the waste analysis requirements set forth in this Permit.

When using laboratory analysis as part of a hazardous waste determination, the Permittee shall require the laboratory to report concentrations of *all* hazardous constituents that the analytical test method is capable of measuring as identified in analytical method specific tables in the most current version of the EPA's *Test Method for Evaluating Solid Wastes (SW-846), Chapter 2*. When using laboratory analysis to demonstrate that the waste meets its applicable Land Disposal Restriction (LDR) treatment standard concentrations (specified at 40 C.F.R. § 268.40), the Permittee shall demonstrate that the analytical method detection limit is not higher than the treatment standard for each hazardous constituent that can reasonably be expected to be present.

2.6.3.3. Quality Assurance/Quality Control (QA/QC)

The Permittee shall perform and record all waste characterization QA/QC procedures in accordance with SW-846 for the data used to support waste characterizations required under this Permit. The precision, accuracy, completeness, comparability, and representativeness of the analytical data shall be addressed. The Permittee shall maintain a record of all QA/QC determinations in a manner traceable to specific wastes in the Operating Record.

When performing waste sampling required under this Permit, the Permittee shall use the applicable sample collection QA/QC procedures specified in EPA's *Field QA and QC Requirements Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, (Publication SW-846), Chapter 1, Section 3.4,* including, but not limited to those dealing with equipment preparation and field equipment maintenance, calibration, and cleaning. The SAP shall identify and the Permittee shall collect the appropriate number of quality control samples associated with each waste sampled.

When performing laboratory analysis required under this Permit, method blanks, laboratory duplicates, and other laboratory control samples shall be analyzed to assess the quality of the data resulting from laboratory analytical programs. The results of both field and laboratory quality control data shall be reported to the Department with the results of waste characterization samples.

2.6.4. Re-evaluation of Characterization Information

The Permittee shall re-evaluate the characterization of routinely generated wastes to ensure that the characterization remains accurate and up to date for subsequent batches of waste, in compliance with 40 C.F.R. § 264.13(b)(4). The results of the re-evaluation shall be thoroughly documented and placed in the Operating Record.

The Permittee shall perform re-evaluation of a waste in accordance with these minimum requirements:

1. Re-evaluation shall be performed at least annually to verify the accuracy of initial characterization. For wastes originally characterized through sampling and analysis, re-evaluation shall be achieved using the same sampling and analysis methods used in the initial analysis unless otherwise required by the Department. For wastes characterized through acceptable knowledge of waste generation processes, re-evaluation may be achieved through a review of that information supporting acceptable knowledge.
2. Re-evaluation shall be performed whenever there is a change in waste-generating processes. Any information that indicates a change in the process that generates the waste and may affect the waste shall cause the waste to be re-characterized.
3. Re-evaluation shall be performed when the Permittee is notified by an off-site facility receiving hazardous waste from the Facility that the characterization of the waste received at the receiving facility does not match a pre-approved waste analysis certification or accompanying waste manifest or shipping paper. The Permittee shall notify the Department within 24 hours of its receipt of such a discrepancy notice.

2.6.5. Characterization of Specific Wastes

2.6.5.1. Waste Received From Off-Site

The Permittee shall obtain a detailed chemical and physical analysis of any hazardous waste received at the Facility from an off-site facility, in compliance with 40 C.F.R. § 264.13(c). This characterization may be in the form of documented acceptable knowledge if all applicable waste characterization requirements specified in this Permit are met and documented. This includes, but is not limited to, identification of underlying hazardous constituents.

The Permittee shall physically examine the shipment of waste from the off-site facility at the time of acceptance for correct documentation, including appropriate waste container identification and labeling. The Permittee shall not accept at the Facility a hazardous waste shipment from an off-site facility without Uniform Hazardous Waste Manifests and LDR Notification Forms, as applicable. If discrepancies are found for waste shipped to the Facility, the Permittee shall immediately return the waste to the generator.

2.6.5.2. Waste to Be Shipped Off-Site

Prior to shipping any hazardous waste off-site, the Permittee shall characterize the waste as necessary for treatment and disposal and to ensure proper packaging, labeling, marking, and placarding in accordance with the Department of Transportation regulations at 49 C.F.R. Parts 172, 173, 178, and 179.

2.6.5.3. Remediation Waste

The Permittee shall characterize remediation waste (as defined at 40 C.F.R. § 260.10) in compliance with all waste characterization requirements in this Permit. The characterization information shall be included in the Operating Record, shall be maintained as required under Permit Section 1.23.2, and include at a minimum: a hazardous waste determination, an identification of all applicable hazardous waste numbers, a LDR status determination, the origin

of the waste and how it was subsequently managed, the time and circumstances of the release that created the waste, and any investigation or other reports describing the release.

2.6.5.4. Additional Characterization Requirements for Containerized Waste

The Permittee shall characterize hazardous wastes placed inside containers, including over packed drums, to ensure that the wastes do not react dangerously with, decompose, or ignite sorbent material in the container, in compliance with 40 C.F.R. § 264.316(c), and to ensure that the wastes are not incompatible or reactive with one another, in compliance with 40 C.F.R. § 264.316(d) and § 264.316(e). The Permittee shall characterize laboratory packs, if they are intended to undergo the alternative treatment standards at 40 C.F.R. § 268.42(c), to determine whether they contain any prohibited hazardous wastes.

2.6.6. Records of Waste Characterization

The Permittee shall record and maintain in the Operating Record the results of waste analyses and waste determinations performed by acceptable knowledge, and sampling and analysis, as specified in this Permit Part (2) in compliance with 40 C.F.R. §§ 264.73(b)(3), (b)(7), (b)(10), (b)(15), and (b)(16), and copies of notices and certifications required in Permit Sections 2.7.2.1 and 2.7.2.2. The requirement to record and maintain in the Operating Record the results of waste analyses, waste determinations, and copies of notices and certifications applies to solid wastes even when the hazardous characteristic is removed prior to disposal, or when waste is excluded from the definition of hazardous or solid waste under 40 C.F.R. § 261.2 through § 261.6, or exempted from Subtitle C regulation, subsequent to the point of generation. [40 C.F.R. § 268.7(a)(8)].

2.7. WASTE MANAGEMENT

2.7.1. Authorized Wastes and Waste Sources

2.7.1.1. Permitted Waste

The Permittee shall not treat at the OD Unit any wastes not included in the *List of Authorized Hazardous Wastes* under Permit Attachment B.

2.7.1.2. Prohibited Waste

The Permittee shall not treat any radioactive or mixed waste, any waste containing polychlorinated biphenyls, or any other wastes not listed in the *List of Authorized Hazardous Wastes* contained in Permit Attachment B. The Permittee shall not treat hazardous wastes by any other means not authorized by this Permit.

2.7.1.3. Waste from Foreign Sources

The Permittee shall not accept hazardous wastes from a foreign source (a hazardous waste source outside the United States).

2.7.1.4. Waste from Off-site Sources

The Permittee shall receive from off-site sources only hazardous waste that are to be treated at the OD Unit and only if such receipt is in compliance with the requirements of this Permit. The

Permittee shall receive for treatment at the OD Unit only the hazardous wastes listed in Permit Attachment B (*List of Authorized Hazardous Wastes*) and only from the sources listed in Table 2-1 of this Permit Part.

2.7.1.5. Incompatible Wastes

Incompatible wastes shall not be managed at the OD Unit.

2.7.2. Provisions for Complying with LDR Requirements

The Permittee shall comply with the restrictions for land disposal at 40 C.F.R. Part 268.

The Permittee shall not arrange for the disposal at an off-site land disposal facility any hazardous waste restricted from land disposal under 40 C.F.R. Part 268, unless:

1. The waste meets treatment standards specified in 40 C.F.R. § 268.40, § 268.41, § 268.42, or § 268.43; or
2. A variance from the treatment standards has been granted pursuant to 40 C.F.R. § 268.44.

This Permit does not authorize land disposal of hazardous waste at any location at the Facility.

2.7.2.1. Generator Requirements

Generators of hazardous waste must determine, based on the characteristics of the waste at the point of generation, if the waste must be treated before it can be land disposed.

Generators are required to send a one-time written notice to the Facility for the treatment of hazardous waste at the OD Unit for each exact type of waste stream. This includes the Permittee as a "generator" of waste to be treated at the OD Unit. A copy of the one-time notice shall be maintained at the EM Branch Office. The notice shall include:

1. The applicable EPA Hazardous Waste Numbers and the manifest number of the initial shipment;
2. A statement that the waste is subject to LDRs;
3. The UHCs and their concentrations in the wastes, if any;
4. The applicable treatability group category (normally as a non-wastewater);
5. Waste code subdivisions based on waste-specific criteria, if appropriate; and
6. Waste analysis data, if appropriate.

For wastes that do not meet treatment standards, the one-time written notice shall include the generator paperwork requirements information referenced in 40 C.F.R. § 268.7(a)(2).

For wastes that meet treatment standards at the original point of generation, the one-time notice shall include the generator paperwork regulatory requirements information and the certification statement referenced in 40 C.F.R. § 268.7(a)(3).

All of the supporting data used to determine that a waste is restricted from land disposal, either based on acceptable knowledge of waste generation processes or on sampling and analysis of the waste, shall be retained at the EM Branch Office, as required in 40 C.F.R. § 268.7(a)(6).

2.7.2.2. Treatment Facility Requirements

Treatment residues generated at the OD Unit are subject to LDR requirements, as well as other applicable requirements in 40 C.F.R. Parts 261-263 and this Permit.

If an analysis indicates that a treatment residue does not fully meet the treatment standards for hazardous waste in 40 C.F.R. § 268.40 and universal treatment standards of 40 C.F.R. § 268.48, the residue shall be sent to an offsite facility for additional treatment, including any necessary treatment of UHCs to meet the applicable standards, and disposal. The Permittee must comply with the notice and certification requirements in accordance with 40 C.F.R. § 268.7(b)(5) as well as Permit Section 2.6.5.2 and any other applicable requirements of this Permit. Untreated waste that is a result of kick-out may be collected and retreated at the OD Unit.

If analysis indicates that a treatment residue meets the treatment standards, it shall be sent offsite for disposal. In accordance with 40 C.F.R. § 268.7(b)(3) and (4), a notification and certification signed by an authorized representative shall be submitted to the offsite treatment facility with the initial shipment of treatment residue.

If a waste is determined to be no longer hazardous, a one-time notification and certification shall be placed in the files at the EM Branch Office, as required by 40 C.F.R. § 268.9(d). The notification and certification shall be updated if the process or operation generating the waste changes and/or if the Subtitle D facility receiving the waste changes. The notification shall include:

1. The name and address of the Subtitle D facility receiving the waste shipment; and
2. A description of the waste (e.g., the treatment residue) as initially generated, including EPA Hazardous Waste Number(s), treatability group(s), and UHCs.

An authorized Facility representative shall sign the certification.

2.8. WASTE MINIMIZATION

The Permittee shall submit to the Department a report annually by December 1, for the year ending the previous September 30, certifying that the Permittee has a program in place to reduce the volume and toxicity of all hazardous wastes that are generated by the Facility to the degree determined to be economically practicable, and that the proposed method of treatment is the practicable method currently available to the Permittee which minimizes the present and future threat to human health and the environment [see 40 C.F.R. § 264.73(b)(9)]. This certified report must include these items:

1. Any written policy or statement that outlines goals, objectives, and methods for source reduction and recycling of hazardous waste at the Facility;
2. Any employee training or incentive programs designed to identify and implement source reduction and recycling opportunities for all hazardous wastes;
3. Any source reduction or recycling measures implemented in the last five years or planned for the near future;

4. An itemized list of the dollar amounts of capital expenditures (plant and equipment) and operating costs devoted to source reduction and recycling of hazardous waste;
5. A discussion of factors that have prevented implementation of source reduction or recycling;
6. Sources of information on source reduction or recycling received at the Facility (e.g., local government, trade associations and suppliers);
7. An investigation of additional waste minimization efforts that could be implemented at the Facility, which investigation shall analyze the potential for reducing the quantity and toxicity of each waste stream through production process change, production reformulation, recycling, and all other appropriate means, including an assessment of the technical feasibility, cost, and potential waste reduction for each option;
8. A flow chart or table detailing all hazardous wastes the Facility produces, by quantity and type, and by building or area, and program if consistent with security considerations; and
9. A demonstration of the need to use those processes which produce a particular hazardous waste due to a lack of alternative processes, available technology, or available materials that would produce less volume of hazardous waste.

The Permittee shall include the report in the Operating Record.

2.9. IMPERMISSIBLE DILUTION

The Permittee shall not dilute a restricted waste as a substitute for treatment. [40 C.F.R. § 268.3]. Impermissible dilution to avoid an applicable treatment standard includes, but is not limited to, the addition of solid waste to reduce a hazardous constituent's concentration, or an ineffective treatment method that does not destroy, remove, or permanently immobilize hazardous constituents. Aggregating or mixing wastes as part of a legitimate treatment process are not considered impermissible dilution for purposes of this Permit requirement.

2.10. DUST SUPPRESSION

The Permittee shall not use waste or used oil or any other material which is contaminated with dioxin, polychlorinated biphenyls (PCBs), or any other hazardous waste, other than a waste identified solely on the basis of ignitability, for dust suppression or road treatment. [40 C.F.R. § 266.23(b)].

2.11. IGNITABLE AND REACTIVE WASTES

The Permittee shall take precautions to prevent accidental ignition or reaction of ignitable or reactive wastes, as required by 40 C.F.R. § 264.17.

Ignitable or reactive wastes shall be located at least 50 feet from the boundary of the OD Unit at all times and shall be protected from any sources of ignition, such as open flames, or reaction with other wastes or products, and shall be separated and protected from welding activities, hot surfaces, frictional heat, and sources of sparks.

Only containers made of or lined with materials that will not react with and are otherwise compatible with the waste to be managed shall be used to contain waste.

2.12. AIR EMISSIONS FROM THE OD UNIT

The Permittee shall comply with all air emission limitations and air monitoring requirements for the OD Unit set forth in the air quality permit for the OD Unit issued by the City of Albuquerque Environmental Health Department and as required by Permit Section 3.3. The Permittee shall also comply with the applicable requirements of 40 C.F.R. Part 264, Subpart BB. The Permittee shall maintain all records relating to the air quality permit in the Operating Record for the Facility.

2.13. OFF-SITE SHIPMENTS

Prior to shipping any hazardous waste off-site, the Permittee shall comply with all applicable generator requirements at 40 C.F.R. Part 262, as required by 40 C.F.R. §§ 262.10(h) and 264.71(c).

2.14. STORAGE OF RESTRICTED WASTE

The Permittee shall comply with 40 C.F.R. Part 268, Subpart E for any storage of hazardous waste restricted from land disposal under 40 C.F.R. Part 268, Subpart C.

2.15. MANIFEST SYSTEM

The Permittee shall comply with the manifest requirements of 40 C.F.R. § 264.71 and § 264.72. With the exception of waste shipments from conditionally exempt small quantity generators, the Permittee shall not accept for treatment any hazardous waste from an off-site source without an accompanying manifest.

If the Permittee accepts any hazardous wastes for treatment from an off-site facility without an accompanying manifest, if required, or without an accompanying shipping paper as described in 40 C.F.R. § 264.76, the Permittee shall prepare and submit an Unmanifested Waste Report to the Department within 15 calendar days after receiving the waste. The report shall include the following.

1. EPA identification number, name, and address of the off-site facility;
2. The date the Facility received the waste;
3. EPA identification number, name, and address of the generator and transporter;
4. A description and the quantity of each unmanifested hazardous waste received;
5. The method of treatment for each hazardous waste;
6. The certification signed by an authorized representative of the Facility; and
7. An explanation of why the waste was unmanifested, if known.

2.16. BIENNIAL REPORT

The Permittee shall prepare and submit to the Department two copies of a biennial report by March 1 of each even numbered year, as required by 40 C.F.R. § 264.75. The report shall document Facility activities during the previous calendar year and shall include.

1. EPA identification number, name, and address of the Facility;
2. The calendar years covered by the report;

3. A description and the quantity of each hazardous waste type the Facility received or generated that year;
4. The method of treatment for each hazardous waste type;
5. A description of the efforts undertaken during the year to reduce the volume and toxicity of waste generated;
6. A description of the changes in volume and toxicity of waste actually achieved during the year in comparison to previous years to the extent such information is available for the years prior to 1984; and
7. Treatment notices and their certifications signed by responsible Facility representatives.

2.17. LIABILITY INSURANCE REQUIREMENTS

Pursuant to 40 C.F.R. § 264.140(c), as a Federal entity, the Permittee is exempt from the requirement to have and to maintain liability coverage for sudden and accidental occurrences as specified at 40 C.F.R. § 264.147(a).

2.18. INCAPACITY OF OWNERS OR OPERATORS, GUARANTORS, OR FINANCIAL INSTITUTIONS

Pursuant to 40 C.F.R. § 264.140(c), as a department of the federal government, the Permittee is exempt from the requirement to notify the Department of the commencement of bankruptcy as specified at 40 C.F.R. § 264.148.

2.19. DISCLOSURE STATEMENT

Pursuant to NMSA 1978, § 74-4-4.7(F)(1), as a department of the federal government, the Permittee is not required to file a disclosure statement.

2.20. ADDITIONAL REPORTS

In accordance with the requirements of 40 C.F.R. § 264.77, the Permittee shall also report the following to the Department.

1. Releases of hazardous waste, hazardous constituents or contaminants, or any fires at or within 0.25 mile of the OD Unit or any SWMU or AOC,
2. Manifest discrepancies that cannot be resolved within 15 calendar days after receiving the waste,
3. Occurrences, if any, when hazardous waste is transported to the OD Unit in a container in noncompliance with regulatory requirements and the requirements of this Permit,
4. Treatment unit closures (40 C.F.R. §§ 264.77(b) and 264.115).

Table 2-1 Off-Site Generators
New Mexico State Police
Albuquerque Police Department
Bernalillo County Sheriff's Office
Sandia National Laboratories/New Mexico
Kirtland Air Force Base
University of New Mexico
New Mexico Institute of Mining and Technology

Figure 2-1

PERMIT PART 3: OPEN DETONATION UNIT

3.0 INTRODUCTION

This Permit Part (3) contains requirements that set forth the authorized waste types and maximum quantities of hazardous waste allowed to be treated at the Open Detonation (OD) Unit. It also contains other requirements, including those related to the design, construction, and operation of the Unit, and soil and groundwater monitoring.

3.1. AUTHORIZED WASTE AND MAXIMUM QUANTITY OF WASTE

The Permittee shall not treat more than 1,500 lbs of wastes per treatment event, 18,000 lbs per calendar year, or 180,000 lbs for the term of the Permit. The Permittee shall not treat more than the above quantities, except in case of an emergency and only after authorization by the Department. The Permittee shall not treat any wastes that are not authorized under Permit Attachment B.

3.2. DESIGN, CONSTRUCTION, OPERATION, AND MAINTENANCE

3.2.1. General Requirements

The Permittee shall design, construct, operate, and maintain the OD Unit in accordance with the requirements of this Permit to minimize noise and the possibility of an accidental fire, explosion, or any sudden or nonsudden release of hazardous waste or hazardous constituents into air, soil, sediment, surface water, or groundwater which could threaten human health or the environment, as required by 40 C.F.R. §§ 264.31 and 264.601.

The Permittee shall mark the boundary of the OD Unit with signs or structures such that the boundary is clearly discernible.

3.2.2. Run-Off and Run-On Controls

The Permittee shall design, construct, operate, and maintain run-off control systems (protective berm) at the OD Unit to prevent precipitation run-off from leaving the Unit and the migration of hazardous waste or hazardous constituents off-Unit, as required by 40 C.F.R. § 264.601(b).

The Permittee shall design, construct, operate, and maintain run-on control systems (protective berm) at the OD Unit to prevent precipitation from entering the Unit as overland run-on, as required by 40 C.F.R. § 264.601(b).

3.2.3. Restrictions on Operations

3.2.3.1. Hours of Operation

The Permittee shall conduct treatment operations only between sunrise and sunset, except in an emergency [see 40 C.F.R. § 264.1(g)(8)(i)(D)]. If the Permittee conducts treatment operations in response to an emergency before sunrise or after sunset on a given day, the Permittee shall notify the Department of this fact in writing within 3 days of conducting such treatment.

3.2.3.2. Weather Conditions

Treatment operations shall not be conducted during adverse climatic conditions. Operations shall not be conducted if lightning is within 10 miles (16 kilometers) of the OD Unit, when the cloud ceiling is less than 1,000 feet or when visibility is less than five miles.

The Permittee shall not conduct treatment operations when wind speed exceeds 15 miles per hour (24 kilometers per hour).

The Permittee shall not conduct treatment operations when a thunderstorm is imminent or within 10 miles (16 kilometers) of the OD Unit, or during a snowstorm, a dust storm, or sandstorm.

3.2.3.3. Range Fire

The Permittee shall not conduct treatment operations when extreme fire hazard conditions exist or if a range fire has the potential to reach the boundary of the Explosive Ordnance Disposal (EOD) Range.

3.2.3.4. Other Restrictions

Wastes shall be treated promptly upon transport to and acceptance at the OD Unit.

The Permittee shall cease treatment operations immediately upon the discovery of an unsafe situation including but not limited to an aircraft in dangerous proximity to the EOD Range or loss of communication with the EOD Shop.

The Emergency Coordinator (EC) shall remain on site at the personnel bunker for the duration of the treatment operation.

Waste shall not be stored at the OD Unit and shall be present at the Unit only during a planned treatment operation.

If a treatment event at the OD Unit is aborted, the waste shall be immediately sent back to the generator.

The maximum extent of hazardous waste operations at the OD Unit shall be confined to the OD Unit.

3.2.4. Operation Safety

3.2.4.1. Personnel Safety

When escorted visitors are present to observe treatment operations, there shall be at least one EOD Technician or Specialist present for every three visitors.

The Permittee shall not conduct treatment operations if unauthorized personnel are within 1500 feet of the OD Unit. The Permittee shall ensure that at least two authorized persons are present during any treatment operation.

Following a treatment operation, no personnel shall enter the OD Unit until the explosive ordnance Team Chief/Range Safety Officer determines that it is safe to enter.

3.2.4.2. Safety Precautions

The Permittee shall conduct all treatment operations in accordance with all the safety precautions required by this Permit.

3.2.5. Maintenance

3.2.5.1. Accumulated Precipitation

The Permittee shall not allow standing water in any pit (crater). The Permittee shall remove any standing water within 24 hours after a precipitation event, or within 24 hours of when impassible access roads become passable should inclement weather preclude access to the OD Unit. The Permittee shall analyze any water removed from the OD Unit to determine whether it is a hazardous waste in accordance with the *Waste Analysis Plan* (Permit Attachment C), and shall manage it appropriately.

3.2.5.2. Untreated Waste (Kick-Out) and Treatment Residues

Within 24 hours after each treatment operation, the Permittee shall inspect the entire OD Unit area for untreated waste (kick-out) or treatment residues (such as shrapnel, metal fragments) originating from treatment operations. This inspection shall be conducted only after it has been determined that it is safe for the purpose of conducting inspections. Any untreated waste or treatment residues shall be placed in appropriate containers and managed as hazardous waste or solid waste, as appropriate. Kick-out and treatment residues shall not be stored at the OD Unit.

3.3. AIR MONITORING

The Permittee shall evaluate the potential impact of the air pollutants on human health before, during, and after treatment operations by screening and assessment, in compliance with 40 C.F.R. § 264.601(c)(5). The Permittee shall not proceed with a treatment event if meteorological conditions or ambient air quality conditions do not meet the requirements of the City of Albuquerque air quality permit for the OD Unit and the requirements of this Permit Part.

The Permittee shall specify in an annual sampling and analysis report on air quality the types and schedules of air monitoring required by the Albuquerque Environmental Health Department, and the instrumentation required. The Permittee shall submit this report to the Department and include in the report any air monitoring data from the previous calendar year, and estimated monthly emissions based on the amounts of waste treated. The report is due by March 31 of each calendar year.

3.4. SOIL MONITORING AND HUMAN RISK SCREENING

The Permittee shall conduct an annual soil sampling and analysis program in accordance with Permit Attachment D, and as required by 40 C.F.R. § 264.601(b).

In order to monitor soil contamination resulting from open detonation operations at the OD Unit, the Permittee shall implement the *Soil Sampling and Analysis Plan* (SSAP), which is described in Permit Attachment D.

~~3.5. GROUNDWATER MONITORING~~

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Installation of monitoring wells and subsequent groundwater sampling and analysis protocol will be accomplished as part of the OD Unit closure activities, in accordance with Attachment H, Closure Plan for Open Detonation Unit.

~~The OD Unit is subject to the environmental performance standards of 40 C.F.R. § 264.601. Groundwater monitoring shall be conducted during the entire period of operations, including the period for closure, to ensure the protection of groundwater. Groundwater monitoring shall also be conducted during post-closure care, if post-closure care is required.~~

~~3.5.1. Installation of Monitoring Wells~~

~~The Permittee shall install at least one well upgradient at the boundary of the OD Unit, and at least three wells downgradient at the boundary of the Unit. Within 90 days after the effective date of this Permit, the Permittee shall submit to the Department for approval a proposed monitoring well installation plan as a Class 3 Permit Modification to this Permit, which, at a minimum, shall include well locations, drilling specifications, well construction specifications, well development procedures, and a schedule for implementation and completion of the well installations and submittal of a well completion report. Upon Department approval of the plan, the Permittee shall implement the monitoring well installation plan according to the approved schedule. Within 30 days of completion of well installation, the Permittee shall submit to the Department for approval a well completion report. The well completion report shall include the information required in Permit Section 6.5.17.10.8. The Department may require additional wells to be installed at the OD Unit if the Department determines that the number or function of the existing wells is insufficient.~~

~~All wells installed at the OD Unit must meet the general groundwater monitoring requirements of 40 C.F.R. §§ 264.97(a)(2), (b), and (c).~~

~~If any of the wells at the OD Unit cannot be sampled due to a declining water table or for any other reasons, the Permittee shall apply for a permit modification to modify this Permit to propose replacement wells.~~

~~3.5.2. Sampling and Analysis~~

~~Within 90 days after the effective date of this Permit, the Permittee shall submit to the Department for approval a proposed groundwater sampling and analysis plan as a Class 3 modification to this Permit. Upon approval, the groundwater sampling and analysis plan and the monitoring well installation plan of Permit Section 3.5.1 shall become Permit Attachment L (reserved).~~

~~The groundwater sampling and analysis plan shall require:~~

- ~~That at least one sequence of samples be collected from each well at least semiannually.~~
- ~~That samples of groundwater be collected from each of the monitoring wells and field and laboratory analysis of the samples be conducted for the parameters listed in Table 3-1 of this Permit Part (3).~~
- ~~That the groundwater flow rate and direction in the uppermost aquifer be determined at least annually.~~

- ~~That a report on the field and laboratory analytical data shall be submitted to the Department within 90 days after the samples have been collected.~~

- ~~That a determination be made whether there is statistically significant evidence of contamination at each monitoring well after each sampling event.~~
- ~~That the method used to make the statistical determination is identified.~~
- ~~That the applicable groundwater investigation requirements of Permit Section 6.4.1.3 be met, including, but not limited to, the requirements for the collection and analysis of quality control samples, proper selection and use of sampling equipment, labeling, containers, preservatives, and analytical methods, use of chain-of-custody procedures, validation of analytical data, and reporting of data.~~

~~Table 3-1 Groundwater Monitoring Parameters~~
~~Volatile organic compounds~~
~~Semi-volatile organic compounds~~
~~Perchlorate~~
~~White Phosphorus~~
~~Explosives~~
~~Metals (all metals listed in Appendix IX to 40 C.F.R. Part 264, including antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, selenium, silver, thallium, tin, vanadium, and zinc)~~
~~Dioxins and Furans~~
~~General chemistry parameters in Table 6-1 of Permit Part 6, except phosphorus/phosphate, TKN, ferric/ferrous iron, dissolved CO_2, silicon, suspended sediment, stable isotopes~~

~~Upon Department approval of the plan, the Permittee shall implement the groundwater sampling and analysis plan according to the schedule in the plan. The schedule in the plan shall at a minimum set forth the time of sampling and when the data are to be reported to the Department.~~

~~If the Permittee or the Department determines that there is statistically significant evidence of contamination at any monitoring well, the Permittee shall notify the Department of this fact within 15 days of this discovery. The Department may itself make such a determination.~~

~~Should corrective action be required, the Permittee shall meet the requirements of Part 6 of this Permit, and shall implement corrective action as necessary to protect human health and the environment from all releases of hazardous waste or hazardous constituents.~~

~~If the Permittee determines that the monitoring program no longer satisfies the HWMR, the Permittee shall within 90 days submit to the Department an application for a Class 3 modification to this Permit to make any appropriate changes to the program.~~

3.6. ORGANIC AIR EMISSIONS REQUIREMENTS

This Permit Section contains requirements for air emissions.

3.6.1. Additional Waste Characterization Requirements for Air Emissions

The Permittee shall characterize hazardous waste to ensure compliance with applicable emission requirements of 40 C.F.R. Part 264, Subpart BB.

3.6.2. Equipment Containing or Contacting Hazardous Waste

Each piece of equipment that contains or contacts hazardous wastes with organic concentrations of at least 10 percent by weight shall be marked in such a manner that it can be distinguished readily from other pieces of equipment in accordance with 40 C.F.R. § 264.1050(d).

Pursuant to 40 C.F.R. § 264.1050(f), equipment that contains or contacts hazardous waste with an organic concentration of at least 10 percent by weight for less than 300 hours per calendar year is excluded from the requirements of 40 C.F.R. §§ 264.1052 through 264.1060 if it is identified, as required in 40 C.F.R. § 264.1064(g)(6). Such equipment shall be identified in writing in a log that shall be kept with the Operating Record in accordance with 40 C.F.R. § 264.1064(g)(6). The information required pursuant to 40 C.F.R. § 264.1064(k)(1), (2), (3) shall also be recorded in a log that is kept with the Operating Record.

The Permittee shall comply with all applicable requirements of 40 C.F.R. §§ 264.1052 through 264.1060 for any equipment that contains or contacts hazardous waste with an organic concentration of at least 10 percent by weight for 300 or more hours per calendar year. The log shall note the total time elapsed that any equipment contains or contacts hazardous waste with an organic concentration of at least 10 percent by weight.

3.7. PRE-TREATMENT PREPARATION

Prior to a treatment operation, upon arrival at the OD Unit, an inspection of the OD Unit shall be conducted. The range flag shall be raised. The Team Chief shall then identify the designated EC and brief other EOD team members and escorted visitors (if present) on the treatment operation to be performed, required safety precautions, emergency procedures, and instruct all those present to be watchful for unsafe conditions at all times.

3.8. TRANSPORTATION OF WASTE TO THE OD UNIT AND CONTAINER SPECIFICATIONS

Hazardous wastes shall be packaged for transport to the OD Unit in appropriate containers that provide protection equivalent to U.S. Department of Transportation (DOT)-authorized containers. Appropriate containers include:

- Reinforced ammunition containers;
- Strong fiberboard boxes; or
- Strong, cleated wooden boxes.

Waste to be treated shall be transported to the OD Unit only on the day of the planned treatment event. Waste containers shall be secured to the vehicle during transport. Vehicles transporting hazardous wastes for treatment shall bear the appropriate "Explosives" placard and/or other necessary placards at the front, on both sides, and at the rear of the vehicle. These signs may be covered or removed when the vehicle no longer carries the hazardous wastes. Each transport vehicle shall, at minimum, carry one ABC-type portable fire extinguisher that is in operational

condition. Each transport vehicle shall have equipment to communicate with the KAFB Command Post and the emergency coordinator.

3.9. WASTE STAGING

Hazardous wastes shall only be transported to the OD Unit and unloaded and staged for treatment by appropriately trained EOD personnel. Wastes shall be treated as soon as possible after arrival at the OD Unit, provided the requirements of this Permit are met.

Outer waste containers are to be removed, and the waste placed into a pit (crater) for treatment by qualified EOD personnel. Outer containers may be returned to the generator for reuse. Outer and inner containers shall be managed appropriately as waste if not reusable.

If waste is placed in the OD Unit for treatment and site conditions are deemed unsafe to treat the waste, the waste shall be immediately removed and sent back to the generator.

3.10. WASTE TREATMENT

Prior to the treatment of hazardous waste, the Team Chief shall ensure that the EOD Range is clear of unauthorized personnel, that aircraft are not approaching, and that unauthorized vehicles and persons are not within or in the vicinity of the EOD Range as required under Section 3.2.4.1 of this Permit Part. The Team Chief shall also ensure that all persons at the EOD Range have relocated to the personnel bunker. In addition, the Team Chief shall obtain wind-speed information at or near the personnel bunker. The Team Chief shall also ensure that treatment operations comply with all restrictions in this Permit, including Permit Section 3.2.3.

Treatment of waste in the OD Unit shall be performed using explosives to countercharge the hazardous waste. Ignition of the explosives shall be done from the personnel bunker.

3.11. POST TREATMENT

After a treatment operation, the Permittee shall comply with the requirements of Permit Section 3.2.5.2, Permit Section 2.2, Permit Section 2.6.5.2, and any other requirement of this Permit applicable to post-treatment of waste.

The EOD Team Chief or his designee shall be responsible for clearing any misfires, should one occur. In such an event, a second qualified person shall serve as a safety backup for the EOD Team Chief.

If complete destruction of hazardous wastes is not achieved at the OD Unit, these wastes shall be treated again or shall be removed for appropriate treatment and disposed of at an off-site facility.

PERMIT PART 4: CLOSURE

4.0 GENERAL CLOSURE REQUIREMENTS

After receipt of the last hazardous waste to be treated at the OD Unit, or if required to cease operations as specified in Permit Section 1.10 and Permit Section 4.4, the Permittee shall close the OD Unit following the procedures described in the *Closure Plan* (Permit Attachment H), this Permit, and as required by 40 C.F.R. § 264.111.

4.1. SUBMITTAL OF REVISED CLOSURE PLAN

The Permittee shall submit to the Department for approval a revised Closure Plan within 60 days after discovering that a revised Closure Plan is required in accordance with this Permit, or the regulations at 40 C.F.R. § 264.112(c), or within 60 days after receiving written notification by the Department whichever is earlier. The Permittee shall amend the Closure Plan whenever changes in circumstances necessitate a modification of the Closure Plan, as required by 40 C.F.R.
§ 264.112(c). The Permittee shall amend the Closure Plan for any other reasons set forth in 40 C.F.R. 264.112(c) or if there are changes in state law that affect the Closure Plan. The Permittee shall comply with all the requirements of 40 C.F.R. 264.112(c) in amending the Closure Plan.

When amending or revising the Closure Plan, the Permittee shall submit to the Department for approval detailed, and as necessary, updated procedures and methods describing the procedures and sampling methods to verify removal of all structures and equipment and removal of treatment residues and any hazardous or solid wastes. At a minimum, the Permittee shall include in the revised Closure Plan:

1. Unit history and description, identifying, at a minimum, the following:
    a. Constituents of concern, including all hazardous waste and hazardous constituents managed at the Unit, listed by category of constituent subject to the same sampling methods,
    b. Spills or other releases of hazardous waste and hazardous constituents during operation of the Unit, and
    c. Visible staining or other conditions indicating potential release locations;
2. Proposed procedures for removal of all structures and equipment;
3. Proposed sample locations;
4. Sample methods, equipment, and procedures;
5. Analytes and analytical methods;
6. Detection limits;
7. QA/QC procedures; and
8. Sample management and preservation procedures.

4.2. CLEAN CLOSURE

The Permittee shall close the OD Unit by removing all hazardous waste residues and hazardous constituents and all structures and equipment from the OD Unit and demonstrating that no unacceptable risk to human health and the environment exists in soil or groundwater at the OD Unit (clean closure).

However, if the OD Unit cannot be clean closed, post-closure care is required (see permit Part 5) ~~as determined by the Department, post-closure care is required and~~ the Closure Plan shall be amended in accordance with Permit Section 4.1, and corrective action shall be immediately implemented to remediate contamination to protect human health and the environment pursuant to the requirements of Permit Part 6. Closure of the OD Unit will not be approved by the Department while corrective action is required for the OD unit. ~~If post-closure care is required, closure of the OD Unit shall include the construction of a final cover to be placed over the ground surface occupied by the Unit and construction of drainage structures to minimize the infiltration and percolation of water into and beneath the final cover. The final cover shall be of a design equivalent to that which would be required for a hazardous waste landfill. If groundwater is contaminated or soil contamination poses a threat to groundwater, the Permittee shall also immediately implement corrective action to remediate the contamination or prevent the contamination threat pursuant to the requirements of Part 6 of this Permit.~~

~~If a cover is required because the OD Unit cannot be clean closed, the revised Closure Plan shall meet all of the applicable closure requirements of 40 C.F.R. §§ 264.111 through 264.116 and 264.310, including the applicable closure requirements for landfills. The revised Closure Plan shall also include, at minimum:~~

~~1. The results of performance modeling of the final cover;~~

~~2. A description of the design (including engineering drawings) and material specifications for construction of the final cover and drainage structures;~~

~~3. A description of how the closure performance standards under 40 C.F.R. §§ 264.111 and 264.310(a)(1) through (5) will be met by the design;~~

~~4. A construction quality-assurance plan;~~

~~5. A description of the construction procedures and equipment to be used;~~

~~6. A description of the qualifications of those responsible for the design and oversight of the construction of the cover and the drainage structures; and~~

~~7. A schedule to construct and complete the final cover and drainage structures.~~

~~The Permittee shall implement the revised Closure Plan within 90 days after approval by the Department and shall complete construction of the final cover and drainage structures by the deadlines in the approved Closure Plan. The Permittee shall also submit to the Department a request to extend the closure period in accordance with 40 C.F.R. § 264.113(b)(1) and (c)(2).~~

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4.3. NOTIFICATION OF CLOSURE

The Permittee shall notify the Department in writing at least 45 calendar days prior to the date on which it expects to begin closure of the OD Unit, as required by 40 C.F.R. § 264.112(d).

4.4. TIME ALLOWED FOR CLOSURE

Within 90 calendar days after the final volume of hazardous waste is received at the OD Unit, the Permittee shall remove all treatment residues and all other hazardous and solid waste from the Unit. The waste shall be sent to an off-site permitted treatment or disposal facility, as applicable. The Permittee shall complete closure activities for the OD Unit following the schedule and requirements set forth in the Closure Plan, Permit Attachment H, and as required by this Permit Part. \~~within 180 days, as required by~~

~~40 C.F.R. § 264.113, following the schedule and requirements in the Closure Plan, Permit Attachment H, and as required by this Permit Part.~~

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If this Permit is terminated, or if the Facility is otherwise ordered, by judicial decree or final order under the HWA or § 3008 of RCRA, to cease treating hazardous wastes or to close the OD Unit, then the Permittee shall close the Unit in accordance with the deadlines established in 40 C.F.R. § 264.113.

4.5. DISPOSAL/DECONTAMINATION OF EQUIPMENT, STRUCTURES, AND SOILS

The Permittee shall remove and dispose of all equipment and structures, and shall decontaminate soil, as specified in the Closure Plan, Permit Attachment H. [40 C.F.R. § 264.114].

4.6. MANAGEMENT OF REMEDIATION WASTE

By removing hazardous waste or hazardous constituents or contaminated media during closure activities, the Permittee becomes a generator of hazardous waste, and shall manage that waste in accordance with all applicable requirements of 40 C.F.R. Part 262.

4.7. CERTIFICATION OF CLOSURE

Within 60 calendar days from the date of completion of closure of the OD Unit, the Permittee shall submit to the Department a final closure report and written certification signed by the Permittee and an independent professional engineer registered in the State of New Mexico, that the OD Unit was closed as required by the procedures specified in the Closure Plan (Permit Attachment H) and this Permit. [40 C.F.R. § 264.115].

4.8. FINANCIAL RESPONSIBILITY

4.8.1. Cost Estimate for Closure

Pursuant to 40 C.F.R. § 264.140(c), as a department of the federal government, the Permittee is exempt from the requirement to provide a cost estimate for closure as specified at 40 C.F.R. § 264.142.

4.8.2. Financial Assurance for Closure

Pursuant to 40 C.F.R. § 264.140(c), as a department of the federal government, the Permittee is exempt from the requirement to submit a signed duplicate original of the closure financial assurance instrument as specified at 40 C.F.R. § 264.143.

PERMIT PART 5: POST CLOSURE

5.0 POST-CLOSURE CARE

~~The Department assumes that the OD Unit will be clean closed.~~

If the OD Unit cannot be clean closed pursuant to Permit Section 4.2, then the OD Unit shall be subject to the requirements of 40 C.F.R 264.603 for post-closure care. If post-closure care is required, the Permittee shall submit a post-closure care permit application to the Department with 180 days of the Department's approval of closure of the OD Unit.

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~~However, pursuant to 40 C.F.R. § 264.603, if any OD Unit operations release hazardous waste or hazardous constituents into soil, sediment, or groundwater that cannot be completely removed or decontaminated during closure (clean closed), then the OD Unit shall be subject to the requirements for closure and post-closure care for landfills in 40 C.F.R. §§ 264.117 through 120, and 264.310. The Permittee shall also meet the requirements of 40 C.F.R. § 264.601 during post-closure care for the OD Unit. The post-closure plan required under 40 C.F.R. § 264.118 must specify the procedures that will be used to satisfy these requirements.~~

PERMIT PART 6: CORRECTIVE ACTION

6.0 INTRODUCTION

Pursuant to § 3004(u) and (v) of RCRA, 42 U.S.C. § 6924(u) and (v); NMSA 1978, § 74-4-4.2(B) and 40 C.F.R. Part 264, Subparts F and G, the Permittee shall implement corrective action as necessary to protect human health and the environment from all releases of hazardous waste or hazardous constituents from operating or closed hazardous waste management units, and from any releases of hazardous waste or hazardous constituents from any Solid Waste Management Unit (SWMU) or Area of Concern (AOC) at the Facility.

6.1. GENERAL PROVISIONS

6.1.1. Offsite Access

To the extent any requirement of this Permit, including any work plan approved under this Permit, requires access to property not owned or controlled by the Permittee, the Permittee shall use its best efforts to obtain access from the present owners of such property to conduct required activities. In the event that access is not obtained when necessary, the Permittee shall immediately notify the Department in writing regarding its best efforts and its failure to obtain such access.

6.1.2. Field Activities

The Permittee shall notify the Department in writing of any field sampling or other field activities undertaken pursuant to any work plan or requirement of this Permit, and shall provide the Department the opportunity to collect split samples upon request by the Department. For such sampling or other field activities, the Permittee shall provide the Department with as much advance notice as is practicable, but no less than 15 days prior to the conduct of such sampling.

The Permittee shall notify the Department in writing a minimum of 15 days prior to the implementation of any work plan required under this Permit. Notification of sampling or other field activities may be made by email, fax, or letter.

6.1.3. Record Preservation

Until 10 years after the Permittee's receipt of the Department's written notice that corrective action has been completed for all SWMUs and AOCs listed on Table I-3 of Permit Attachment I, the Permittee shall maintain all records, documents, data, and other information that are required to be prepared under this Permit for corrective action.

6.1.4. Releases Beyond Facility Boundary

The Permittee shall notify the Department orally, within 24 hours of discovery, of any release of hazardous waste or hazardous constituent that has the potential to migrate beyond the Facility boundary or has migrated beyond the Facility boundary.

In the event that a hazardous waste or a hazardous constituent migrates beyond the Facility boundary, the Permittee shall implement corrective actions beyond the Facility property boundary as necessary to protect human health and the environment, unless the Permittee can

demonstrate to the Department that, despite the Permittee's best efforts, the Permittee is unable to obtain the necessary permission to undertake such actions. The Permittee is not relieved of any responsibility to clean up a release that has migrated beyond the Facility boundary where offsite access has been denied. On-site measures to address such releases will be determined on a case-by-case basis and will be subject to the approval of the Department.

6.1.5. Work Plans and Other Deliverable Documents

All work plans, schedules, reports, and other deliverable documents that the Permittee is required to prepare under this Part (6) shall be submitted to the Department for review and approval as detailed in Permit Section 1.38.

6.1.6. Quarterly Progress Reports

The Permittee shall submit to the Department quarterly reports summarizing all corrective action activities conducted pursuant to this Permit by January 31, April 30, July 31, and October 31 of each year. Each report shall summarize the corrective action activities for the quarter (i.e., 3 month time period) ending the month preceding the due date of the report. The content of these reports shall include the information specified in Permit Section 6.2.4.1.

6.1.7. Lists of SWMUs and AOCs and Annual Reporting of Outdoor Activities

Plate 1 is a map showing the locations of SWMUs and AOCs at the Facility. Corrective action is required for all SWMUs and AOCs identified in Table I-3 of Permit Attachment I. Table K-1 of Permit Attachment K contains a listing of all SWMUs and AOCs for which the Department has determined that corrective action is complete without controls.

Given the need to monitor current and future activities that could lead to creation of new SWMUs and AOCs, the Permittee shall submit to the Department an annual report containing a brief summary of outdoor testing and training activities. The report shall list the name, location, and a general description of the type or types of testing (e.g., firing site, explosives testing, drop testing, burn testing) and training conducted at each outdoor area. The first annual report shall be submitted to the Department within 90 days of the effective date of this Permit; subsequent reports shall be submitted annually thereafter by March 31 of each year.

6.1.8. Newly discovered SWMUs, AOCs, and Releases

The Permittee shall notify the Department orally, within 24 hours of discovery, of any newly identified SWMU or AOC. Within 15 days after the discovery of any newly identified or suspected SWMU or AOC, the Permittee shall notify the Department in writing of such discovery. The notification shall include, at a minimum, the location of the SWMU or AOC and all available information pertaining to the nature of any release of contaminants from the SWMU or AOC, including the contaminants that were released, the magnitude of the release, and the media affected by the release.

Within 90 days after submitting such written notification, the Permittee shall submit to the Department for approval a SWMU Assessment Report (SAR) for each newly identified or suspected SWMU or AOC. At a minimum, the report shall provide the following information, to the extent available:

1. Location of each newly identified or suspected SWMU or AOC on a topographic map of appropriate scale;
2. Designation of type and function of each newly identified or suspected SWMU or AOC;
3. General dimensions, capacities and structural description of each newly identified or suspected SWMU or AOC (including any available plans and drawings);
4. Dates of operation for each newly identified or suspected SWMU or AOC;
5. Identification of all wastes that have been managed at or in each newly identified or suspected SWMU or AOC, including any available data on hazardous constituents in the waste; and
6. All available information pertaining to any release of contaminants from each newly identified or suspected SWMU or AOC, including analytical data for groundwater, soil, sediment, rock, air, and surface water.

Based on the results of the report and any other relevant information, the Department will determine the need for further investigations at the SWMUs or AOCs covered in the report, including the need for an investigation report. The Department may also require corrective measures of the SWMU or AOC, based on a finding that releases of contaminants have occurred, are occurring, or are likely to occur.

Within 15 days after the discovery of any previously unknown release of a contaminant into soil, sediment, surface water, or groundwater, the Permittee shall notify the Department in writing of such discovery. Based on the results of the report and any other relevant information, the Department may determine that further investigation of the release of contaminants is needed, including the need for an Investigation Report. The Department may also require corrective measures, based on a finding that releases of contaminants have occurred, are occurring, or are likely to occur from the unit.

6.1.9. Determination of Corrective Action Complete (No Further Action)

Based on the results of an Investigation Report or other relevant information, the Permittee may submit a request to the Department for a Class 3 permit modification under 40 C.F.R. § 270.42(c) to terminate corrective action for a specific SWMU or AOC. This permit modification request must contain information demonstrating that there are no releases of hazardous waste including hazardous constituents from a particular SWMU or AOC at the Facility that pose a threat to human health or the environment, as well as any additional information required in 40 C.F.R. § 270.42(c).

A determination of Corrective Action Complete shall not preclude the Department from requiring continued or periodic monitoring of air, sediment, soil, groundwater, or surface water, when site-specific circumstances indicate that releases of hazardous waste or hazardous constituents may occur or have occurred, and it is necessary to protect human health or the environment.

A determination of Corrective Action Complete shall not preclude the Department from requiring further investigations, studies, or remediation at a later date, if new information or subsequent analysis indicates a release or likelihood of a release from a SWMU or AOC at the Facility that may pose a threat to human health or the environment. In such a case, the Department may initiate a modification to the Permit according to the requirements of Permit Section 1.12.1.

6.1.10. Health and Safety Plan

The Permittee shall maintain a Facility Health and Safety Plan, which shall include:

1. A description of the Facility including availability of resources such as roads, water supply, electricity and telephone service;
2. A description of the known hazards and evaluation of the risks associated with each activity conducted, including, but not limited to, on and off-site exposure to contaminants during implementation of interim or final corrective measures, site characterization, or monitoring activities;
3. A list of key personnel and alternates who are responsible for site safety, response operations, and protection of public health;
4. A delineation of the work area;
5. A description of levels of protection to be worn by personnel in the work area;
6. Procedures established to control site access;
7. Decontamination procedures for personnel and equipment;
8. Site emergency procedures;
9. Emergency medical care procedures for injuries and toxicological problems;
10. Requirements for an environmental field-monitoring program;
11. Routine and special training requirements for responders; and
12. Procedures for protecting workers from weather-related problems.

The Facility Health and Safety Plan shall be in accordance with:

1. National Institute of Occupational Safety and Health (NIOSH) Occupation Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);
2. EPA Order 1440.1 - Respiratory Protection;
3. EPA Order 1440.3 - Health and Safety Requirements for Employees engaged in Field Activities;
4. Facility Contingency Plans included in this Permit;
5. EPA Operating Safety Guide (1984);
6. Occupational Safety and Health Administration regulations, particularly 29 C.F.R. § 1910 and 1926;
7. State and local regulations; and
8. Other applicable EPA guidance.

6.1.11. Community Relations Plan

The Permittee shall maintain a plan for dissemination of information to the public regarding investigation and remediation activities and results. The plan shall:

1. Require the creation and maintenance of an active mailing list of interested parties, to be updated annually, including those on the official mailing list in accordance with 40 C.F.R. § 124.10;
2. Require informal meetings, including briefings and workshops as appropriate, with the public and local officials before and during the corrective action process, which shall be held at least twice every calendar year for as long as corrective action is required;
3. Require that news releases, fact sheets, work plan submittals, report submittals, and publicly available quarterly progress reports that explain the progress and conclusions of investigations and clean-ups be timely posted on the Permittee's website and timely provided to interested citizen groups and the public as requested;
4. Require the creation and maintenance of a public information repository and reading room;
5. Require that public tours and briefings be conducted to inform and to listen to public concerns, and to answer questions related to environmental monitoring, characterization, and remediation;
6. Require immediate written and, if possible, oral notification to affected parties of any discovered off-site release that could impact them; and
7. Require that interested community groups be notified of and be given opportunities to observe field data gathering activities conducted during the corrective action process (notices shall specify the time and need for any required safety and security training).

6.1.12. Land Transfer

In transferring land to another entity, the Permittee shall comply with the terms of § 120(h) of CERCLA, as amended, 42 U.S.C. § 9620(h), and as implemented in 40 C.F.R. Part 373. These provisions apply to any property owned by the Permittee on which any hazardous substance was stored for one year or more, known to have been released, or disposed of, subject to the limitations of 40 C.F.R. § 373.2. Consistent with CERCLA § 120(h)(3)(A), the Permittee shall include in any deed that transfers property, the information required by CERCLA § 120(h)(3)(A)(i), the covenant required by CERCLA § 120(h)(3)(A)(ii), and the access clause required by CERCLA § 120(h)(3)(A)(iii). The Permittee may defer the requirement of § 120(h)(3)(A)(ii)(I), consistent with the terms of CERCLA § 120(h)(3)(C).

For any deed transferring title from the Permittee that contains a restriction on future land use, the Permittee shall, within 90 days of transfer of the property, notify the Department of the transfer and identify for the Department the location of the property that is the subject of the transfer.

6.1.13. Abandoned Septic Systems

In addition to the corrective action specified in this Permit, the Permittee shall close all abandoned septic systems in accordance with the Department's Liquid Waste Disposal System Regulations 20.7.3.307 NMAC.

6.2. SPECIAL REQUIREMENTS

6.2.1. Special Information Submittals

6.2.1.1. General Facility Information

The Permittee shall submit in a report to the Department, within 90 days of the effective date of this Permit, the following information:

1. Maps and tables indicating the surveyed coordinates and locations of all existing springs, wells, and surface water gaging stations;
2. Water-level contour map of known radii-of-effects from pumping of municipal and Facility supply wells;
3. Water level data presented graphically and in tabular format; and
4. Maps showing the boundaries of all Facility SWMUs and AOCs.

This report is a one-time submittal, unless new information becomes available; in that case, the report shall be updated and resubmitted at least annually by March 31 of each year for each case that new information becomes available.

6.2.1.2. Potential Human Receptors Information

The Permittee shall, within 90 days of the effective date of this Permit, submit a report to the Department describing human populations that are susceptible to contaminant exposure from the Facility. At a minimum, the following information shall be gathered and reported:

1. Local uses and possible future uses of groundwater, including:
   a). Type of use (for example., potable, domestic, agricultural, residential, industrial, municipal) and
   b). Locations of all groundwater wells, names of owners or tenants at those locations, and current use of those wells within one mile of the Facility; and
2. Human use of or access to the Facility and adjacent lands, including but not limited to recreational, residential, commercial, and industrial.

This report is a one-time submittal, unless new information becomes available; in which case, the report shall be updated and resubmitted at least annually by March 31 of each year for each case that new information becomes available.

6.2.1.3. Information on Surface Water

The Permittee shall submit a report to the Department pertaining to surface water bodies at the Facility, within 90 days of the effective date of this Permit. The report shall at minimum include:

1. A description of each surface water body, including location (Coyote Springs and associated wetlands are examples of surface water at the Facility); and
2. A description of the chemistry of the surface waters, including pH, temperature, total dissolved solids, total suspended solids, alkalinity, conductivity, dissolved oxygen, total organic carbon, and any specific contaminant concentrations.

6.2.2. Corrective Action Procedures

The corrective action process for a given SWMU or AOC begins with a site investigation to characterize any releases of contaminants. If there has been a release of hazardous waste or hazardous constituents into the environment and corrective action is necessary to protect human health or the environment from the release, corrective measures shall be conducted at the contaminated site to remove or isolate the contaminants that pose the human health or environmental risk. Verification sampling is required to determine if cleanup levels have been successfully achieved.

6.2.2.1. Site Investigations

The Permittee shall conduct a site investigation for each SWMU and AOC listed on Table I-3 of Permit Attachment I. The Department may determine that further investigation is needed at any SWMU or AOC at the Facility. If the Department determines that such further investigation is needed, it will notify the Permittee in writing.

The Permittee shall perform the site investigations only in accordance with approved Investigation Work Plans.

6.2.2.1.1. Investigation Work Plans

The Permittee shall submit to the Department for approval an Investigation Work Plan, in the format and with the content described in Permit Section 6.2.4.2, for each SWMU and AOC needing further investigation, including those listed on Table I-3 of Permit Attachment I. An individual Investigation Work Plan may cover several SWMUs or AOCs. The Investigation Work Plans shall be submitted by the date specified in the Department's written notification or in accordance with the schedule in Table I-3 of Permit Attachment I. Additional characterization required by the Department that is not already covered in an approved Investigation Work Plan, or that is not addressed during implementation of field activities conducted under an existing approved Investigation Work Plan, shall be proposed in a supplemental Investigation Work Plan submitted to the Department for approval. The supplemental Investigation Work Plan may reference a prior approved Investigation Work Plan and any corresponding Investigation Report for background information.

6.2.2.1.2. Investigation Reports

The Permittee shall submit to the Department for approval an Investigation Report, in the format and with the content described in Permit Section 6.2.4.3, that presents the results of field activities, summarizes the data collected, and presents the recommendations and conclusions of each investigation conducted pursuant to an approved Investigation Work Plan. An individual Investigation Report may cover several SWMUs or AOCs.

6.2.2.2. Corrective Measures

6.2.2.2.1. General

The Department will require corrective measures if the Department determines, based on an Investigation Report or other relevant information available to the Department, that there has been a release of hazardous waste or hazardous constituents into the environment and that corrective action is necessary to protect human health or the environment from such a release. Upon making such a determination, the Department will notify the Permittee in writing.

6.2.2.2.2. CME Work Plans

If the Department requires corrective measures, the Permittee shall submit to the Department for approval a Corrective Measures Evaluation (CME) Work Plan, in the format and with the content described in Permit Section 6.2.4.6, within 90 days of notification by the Department that a CME Work Plan is required or by such other due date as is stated in the notification. The CME Work Plan shall contain a schedule to conduct the CME. Upon approval of the CME Work Plan by the Department, the Permittee shall implement the work plan.

The CME shall evaluate potential remedial alternatives and shall recommend a preferred remedy that will be protective of human health and the environment and that will attain the appropriate cleanup levels.

6.2.2.2.3. CME Reports

The Permittee shall submit a CME Report, in the format and with the content described in Permit Section 6.2.4.7, to the Department within 90 days of completion of the CME. When the Department determines that there are no deficiencies in the CME Report, the Department will seek and consider public comment prior to selecting a remedy.

In selecting a remedy, the Department may select a remedy for a particular SWMU or AOC that encompasses several separate actions. The use of the term "remedy" refers to all such actions.

6.2.2.2.4. Cleanup Standards

The Permittee shall evaluate corrective measures and propose a preferred remedy that is capable of achieving the cleanup levels outlined in Permit Section 6.2.3 including, as applicable, any approved alternate cleanup goals established by a risk assessment.

6.2.2.2.5. Remedy Evaluation Criteria

6.2.2.2.5.1. Threshold Criteria

The Permittee shall evaluate each of the remedy alternatives against the following threshold criteria. To be selected, the remedy alternative must:

1. Be protective of human health and the environment;
2. Attain media cleanup standards within a reasonable timeframe;
3. Control the source or sources of releases so as either to reduce to the extent practicable, or to eliminate, further releases of hazardous waste or hazardous constituents that may

pose a threat to human health and the environment; and

4. Comply with applicable standards for management of wastes.

6.2.2.2.5.2. Remedial Alternative Evaluation Criteria

The Permittee shall evaluate each of the remedial alternatives for the factors described in this Permit Section (6.2.2.2.5.2). These factors shall be balanced in proposing a preferred remedy.

Long-Term Reliability and Effectiveness

The remedy shall be evaluated for long-term reliability and effectiveness. This factor includes consideration of the magnitude of risks that will remain after implementation of the remedy; the extent of long-term monitoring, or other management that will be required after implementation of the remedy; the uncertainties associated with leaving wastes in place; and the potential for failure of the remedy. The Permittee shall give preference to a remedy that reduces risks with little long-term management and that has proven effective under similar conditions.

Reduction of Toxicity, Mobility, or Volume

The remedy shall be evaluated for its effectiveness in reducing the toxicity, mobility, and volume of hazardous wastes and hazardous constituents. The Permittee shall give preference to a remedy that will more completely, permanently, and promptly reduce the toxicity, mobility, and volume of hazardous wastes and hazardous constituents.

Short-Term Effectiveness

The remedy shall be evaluated for its short-term effectiveness in reducing the toxicity, mobility, and volume of hazardous wastes and hazardous constituents. This factor includes considerations of the short-term reduction in existing risks that the remedy would achieve; the time needed to achieve that reduction; and the short-term risks that might be posed to the community, workers, and the environment during implementation of the remedy. The Permittee shall give preference to a remedy that quickly reduces short-term risks, without creating significant additional risks.

Implementability

The remedy shall be evaluated for its implementability or the difficulty of implementing the remedy. This factor includes consideration of potential installation and construction difficulties; operation and maintenance difficulties; difficulties with cleanup technology; permitting and approval requirements; and the availability of necessary equipment, services, expertise, and waste storage and disposal capacity. The Permittee shall give preference to a remedy that can be implemented quickly and easily, and poses fewer and lesser difficulties.

Cost

The remedy shall be evaluated for its cost. This factor includes a consideration of both capital costs, and operation and maintenance costs. Capital costs shall include, without limitation, construction and installation costs; equipment costs; land development costs; and indirect costs including management costs, engineering costs, legal fees, permitting fees, startup and shakedown costs, and contingency allowances. Operation and maintenance costs shall include,

without limitation, operating labor and materials costs; maintenance labor and materials costs; replacement costs; utilities; monitoring and reporting costs; administrative costs; indirect costs; and contingency allowances. All costs shall be calculated based on their net present value. The Permittee shall give preference to a remedy that is less costly, but does not sacrifice protection of human health and the environment.

6.2.2.2.6. Remedy Selection

Upon deeming the CME Report to be complete, the Department will select a proposed remedy or remedies for the SWMU or AOC. The Department may propose a different remedy from that recommended by the Permittee in the CME Report. The Department will issue a Statement of Basis for the proposed remedy, and will receive public comment on the remedy. The public comment period will extend for at least 45 days from the date of the public notice of the Statement of Basis. As provided in 20.4.1.901(A)(5)(a) through (c) and 20.4.1.901(B)(5), the Department will provide an opportunity for a public hearing on the proposed remedy, at which all interested persons will be given a reasonable chance to submit data, views or arguments orally or in writing and to examine witnesses testifying at the hearing. The comment period will automatically be extended to the close of the public hearing, if a hearing is held. The public hearing will follow the requirements under 20.4.1.901.F NMAC. The Department will select a final remedy and issue a response to public comments to all commenters, after the end of the public comment period. In selecting a remedy, the Department will follow the public participation requirements applicable to remedy selection under 20.4.1.901 NMAC and 40 C.F.R. Part 270.

6.2.2.2.7. CMI Work Plans

Within 90 days after the Department's selection of a final remedy, or as otherwise specified by the Department in writing, the Permittee shall submit to the Department for approval a Corrective Measures Implementation (CMI) Work Plan describing the design, construction, operation, maintenance, and performance monitoring for the selected remedy, and a schedule for its implementation. The CMI Work Plan shall be submitted to the Department for review in accordance with the requirements in Permit Section 1.38. Upon approval of the work plan by the Department, the Permittee shall implement the work plan.

The CMI Work Plan shall, at a minimum, include the elements found in the format provided in Permit Section 6.2.4.8.

6.2.2.2.8. Corrective Measures Implementation

The Permittee shall implement the final remedy selected by the Department according to the approved CMI Work Plan and implementation schedule.

6.2.2.2.9. Progress Reports

The Permittee shall submit to the Department progress reports in accordance with the schedule approved in the CMI Work Plan. The progress reports shall, at a minimum, include the information specified in Permit Section 6.2.4.9.

6.2.2.2.10. CMI Reports

Within 90 days after completion of a remedy, the Permittee shall submit to the Department for approval a CMI Report. The CMI Report shall include the information specified in Permit Section 6.2.4.10.

6.2.2.2.11. Accelerated Cleanup Process

6.2.2.2.11.1. General

If the Permittee identifies a corrective measure that, if implemented voluntarily, will reduce risks to human health and the environment to levels acceptable to the Department, will reduce cost or will achieve cleanup of a SWMU or AOC ahead of schedule, the Permittee may implement the corrective measure as provided in this Permit Section, in lieu of the process established in Permit Section 6.2.2.2.12.4. The accelerated cleanup process shall be used only at sites to implement presumptive remedies at small-scale and relatively simple sites where groundwater contamination is not a component of the accelerated cleanup, where the remedy is considered likely to be the final remedy for the site, and where the field work will be accomplished within 180 days of the commencement of field activities.

6.2.2.2.11.2. ACM Work Plans

The Permittee shall submit to the Department for approval a proposed Accelerated Corrective Measures (ACM) Work Plan, which shall include the following:

1. A description of the proposed remedial action, including details of the unit or activity that is subject to the requirements of this Permit;
2. An explanation of how the proposed cleanup action is consistent with the overall corrective action objectives and requirements of this Permit;
3. The sampling and analytical methods and procedures for characterization and remediation verification; and schedule for implementation and reporting on the proposed cleanup action.

The Permittee shall obtain approval of an ACM Work Plan from the Department prior to implementation of the work. The Permittee shall prepare the ACM Work Plan in accordance with the requirements of this Permit Section (6.2.2.2.11.2), and shall include a proposed implementation schedule. In accordance with Permit Section 1.38, if the Department disapproves the ACM Work Plan, the Department will notify the Permittee in writing of the work plan deficiencies and will specify a due date for submittal of a revised ACM Work Plan.

6.2.2.2.11.3. ACM Implementation

The Permittee shall implement the accelerated cleanup measure according to the approved ACM Work Plan. Within 90 days of completion of the ACM, the Permittee shall submit to the Department for approval a CMI Report that is written in a format in accordance with Permit Section 6.2.4.10. If upon review, the Department identifies any deficiencies in the CMI Report, the Department will notify the Permittee in writing and will specify a due date for submittal of a revised CMI Report.

6.2.2.2.12. Interim Measures

6.2.2.2.12.1. General

The Department may require interim measures, if the Department determines that such measures are necessary, to reduce or prevent migration of hazardous wastes or hazardous constituents that have, or may result in, an unacceptable human or environmental receptor exposure to hazardous wastes or hazardous constituents while long-term corrective action remedies are being evaluated and implemented. Upon making such determination, the Department will notify the Permittee in writing. Alternatively, the Permittee may identify the need to implement interim measures and may submit an Interim Measures Work Plan in writing to the Department for approval. The Permittee may initiate emergency interim measures without prior approval of the Department pursuant to Permit Section 6.2.2.2.12.4.

6.2.2.2.12.2. Interim Measures Work Plans

Within 60 days after receiving notification from the Department that interim measures are required, or such other period as stated in the notification, the Permittee shall submit to the Department for approval an Interim Measures Work Plan. The Interim Measures Work Plan shall include the same elements as specified in Permit Section 6.2.4.8.

6.2.2.2.12.3. Interim Measures Implementation

The Permittee shall implement the interim measures in accordance with an approved Interim Measures Work Plan and implementation schedule unless the Permittee is implementing an emergency interim measures without prior Department approval in accordance with Permit Section 6.2.2.12.4.

6.2.2.2.12.4. Emergency Interim Measures

The Permittee may determine during implementation of site investigation activities that emergency interim measures are necessary to address an immediate threat of harm to human health or the environment. The Permittee shall notify the Department within three business days of discovery of the facts giving rise to the threat, and shall propose emergency interim measures to address the threat. If the Department approves the emergency interim measures in writing, the Permittee may implement the proposed emergency interim measures without submitting an Interim Measures Work Plan. If circumstances arise resulting in an immediate threat to human health or the environment such that initiation of emergency interim measures are necessary prior to obtaining written approval from the Department, the Permittee shall notify the Department within one business day of taking the emergency interim measure. The notification shall contain a description of the emergency situation, the types and quantities of contaminants involved, the emergency interim measures taken, and contact information for the emergency coordinator who handled the situation. The notification shall also include a written statement justifying the need to take the emergency action without prior written approval from the Department.

6.2.2.2.12.5. Interim Measures Reports

Within 60 days after completion of interim measures, or as otherwise specified in the implementation schedule contained in the approved Interim Measures Work Plan, the Permittee

shall submit to the Department for approval an Interim Measures Report summarizing the results of the interim measures, that shall include copies of the results of all field screening, monitoring, sampling, analyses, and other data generated as part of the interim measures implementation. The Interim Measures Report shall include the same elements as specified in Permit Section 6.2.4.10.

6.2.3. Cleanup Levels

The Permittee shall adhere to the requirements of this Permit Section (6.2.3) for implementing and completing cleanup of groundwater, surface water, and soil at all SWMUs and AOCs at the Facility. All proposed cleanup levels will be subject to the Department's review and approval.

6.2.3.1. Cleanup Levels for Contaminants in Groundwater (other than Perchlorate)

The cleanup levels for groundwater shall be the New Mexico Water Quality Control Commission (WQCC) water quality standards (20.6.2.3103 and 20.6.2.4103 NMAC) and the drinking water maximum contaminant levels (MCLs) adopted by EPA under the Federal Safe Drinking Water Act (42 U.S.C. §§ 300f to 300j-26). If both a WQCC standard and a Maximum Contaminant Level (MCL) have been established for a contaminant, then the most stringent of the two levels shall be the cleanup level for that contaminant.

If a WQCC standard or MCL has not been established for a contaminant, the EPA Regional Screening Level (RSL) (EPA, 2009) for tap water shall be used as the cleanup level. If an RSL for tap water does not exist for a contaminant, and toxicological information is available, the Permittee shall propose a cleanup level based on a residential scenario, a total target human health excess cancer risk level of 10^{-5}, and for non-carcinogenic contaminants a HQ of one (1.0).

6.2.3.2. Cleanup Levels for Perchlorate in Groundwater

As described in Permit Section 6.4.1.4, the Permittee shall determine the nature extent, and rate of migration of any perchlorate contamination in groundwater. If the New Mexico WQCC adopts a groundwater standard for perchlorate, or if EPA adopts a MCL for perchlorate, then the standard or MCL will become the cleanup level. Pending WQCC or EPA adoption of a groundwater standard or MCL, if perchlorate is detected in groundwater at a concentration greater than or equal to 4 ug/L, the Permittee shall, through a Corrective Measures Study, propose a cleanup level based on a risk assessment using a Hazards Index of 1.0 and a residential-use scenario. The proposed cleanup level shall be subject to approval by the Department.

6.2.3.3. Cleanup Levels for Soil Contaminants (Other than PCBs and Lead)

For contaminants in soil (other than PCBs and lead), the Permittee shall propose a cleanup level based on a total human health excess cancer risk level of 10^{-5}, and for noncarcinogenic contaminants a total HQ of one (1.0) for residential land use. Alternatively, the Permittee may propose cleanup levels using the screening levels and procedures listed in the Department's most current version of "*Technical Background Document for Development of Soil Screening Levels*" (as it may be updated) for a residential land use scenario.

6.2.3.4. Cleanup Levels for Polychlorinated Biphenyls (PCBs) in Soil

For PCB contamination in soil, the Permittee shall propose a cleanup level based on the Department's Position Paper "*Risk-based Remediation of Polychlorinated Biphenyls at RCRA Corrective Action Sites*" (March 2000), as it may be updated. The soil cleanup level for PCBs is either a default concentration of 1.00 milligram per kilogram (mg/kg) or a risk-based PCB concentration level established through performing a human-health risk assessment assuming a residential land use scenario.

6.2.3.5. Cleanup Levels for Lead in Soil

The lead concentration in soil shall not exceed 400 mg/kg.

6.2.3.6. Cleanup Levels for Surface Water

The Permittee shall comply with the surface water quality standards outlined in the Clean Water Act (33 U.S.C. §§ 1251 to 1387), the New Mexico WQCC Regulations (20.6.2 NMAC), and the State of New Mexico Standards for Interstate and Intrastate Surface Waters (20.6.4 NMAC), and the procedures for alternate abatement standards (20.6.2.4103 NMAC).

6.2.3.7. Ecological Risk Evaluation and Cleanup Levels

Ecological risk shall be evaluated for any SWMU or AOC where there has been a release of contaminants. The Permittee shall evaluate ecological risk and propose a cleanup level derived using the methods in the Department's most current version of *"Guidance for Assessing Ecological Risks Posed by Chemicals: Screening-Level Ecological Risk Assessment"* (March 2000, as it may be updated). The Permittee may use EPA's ECO-SSLs (EPA, 2005) with Department approval if a substance is not addressed in the Department's guidance on ecological risk.

6.2.3.8. Requests for Variance from Cleanup Levels

The Permittee may request a variance from a particular cleanup level. The nature of the request shall differ depending on whether a WQCC standard is involved. If a WQCC standard is involved, the Permittee may request an alternative abatement standard in accordance with the process specified in the WQCC Regulations at 20.6.2.4103.E and F NMAC.

For all other instances in which the Permittee requests a variance from a cleanup level, the Permittee shall submit a demonstration to the Department that achievement of the cleanup level is impracticable. In making such demonstration, the Permittee may propose consideration of such factors as technical or physical infeasibility of the project, ineffectiveness of proposed solutions, cost of the project, potential hazards to workers or to the public, and any other basis that may support a finding of project impracticability. In addition to demonstrating the basis for its impracticability request, the Permittee's written submittal shall propose the action to be taken by the Permittee if the Department approves the impracticability demonstration. Such action shall include, but is not limited to, completion of a site-specific risk assessment and identification of alternate clean-up levels. The proposed alternative cleanup level will be subject to the Department's review and approval.

6.2.4. Reporting Requirements

The purpose of this Permit Section (6.2.4) is to provide reporting requirements for corrective action activities required under this Permit. This Permit Section is not intended to provide reporting requirements for every potential type of activity conducted at the Facility; therefore, other formats or types of reports may be necessary or better suited for some activities. Described below are general reporting requirements and formats for Quarterly Reports, Investigation Work Plans, Investigation Reports, periodic monitoring reports, risk assessment reports, CME Work Plans, CME Reports, CMI Work Plans, CMI Work Plan Progress Reports, and CMI Reports. All Work Plans and Reports shall be prepared with technical and regulatory input from the Department. All Work Plans and Reports shall be submitted to the Department in the form of one electronic copy in a format acceptable to the Department and two paper copies.

6.2.4.1. Quarterly Reporting

Quarterly reports, as specified in Permit Section 6.1.6 shall include the following information:

1. A description of the work completed and an estimate of the percentage of total planned work completed;
2. Summaries of all findings, including summaries of laboratory data;
3. Summaries of all problems or potential problems encountered during the reporting period and actions taken to rectify problems;
4. Planned work for the next reporting period;
5. Summaries of contacts pertaining to corrective action with representatives of the local community, public interest groups, or State government during the reporting period;
6. Changes in key project personnel during the reporting period;
7. Summaries of any variances from approved investigation or remediation work plans; and
8. Brief summaries of any periodic monitoring reports prepared in accordance with the requirements in Permit Section 6.2.4.4.

6.2.4.2. Investigation Work Plans

The Permittee shall prepare an Investigation Work Plan using the format set forth below. All research, locations, depths and methods of exploration, field procedures, analytical requirements, data collection methods, and schedules shall be included in a work plan. Required sections for an Investigation Work Plan are:

1. Title Page and Signature Block (for the name, title, and organization of the preparer and the responsible Facility representative);
2. Executive Summary (Abstract);
3. Table of Contents;
4. Introduction;
5. Background Information;
6. Site Conditions;
7. Scope of Activities;
8. Investigation Methods;

9. Monitoring and Sampling;
10. Schedule;
11. Tables;
12. Figures; and
13. Appendices (e.g., Investigation–Derived Waste Management Plan).

The Permittee may insert figures and tables within the text sections of a work plan instead of in a separate section.

6.2.4.3. Investigation Reports

The Permittee shall prepare an Investigation Report using the format set forth below. This Permit Section (6.2.4.3) describes the minimum requirements for reporting. All data collected during investigation of a SWMU or AOC shall be included in the Investigation Report. Requirements for an RFI report are:

1. Title Page and Signature Block (for the name, title and organization of the preparer and the responsible Facility representative);
2. Executive Summary (Abstract);
3. Table of Contents;
4. Introduction;
5. Background Information;
6. Scope of Activities;
7. Field Investigation Results – Including, but not limited to (as applicable): surface conditions, subsurface conditions, monitoring well construction, boring or excavation abandonment, groundwater conditions, materials testing results, and pilot testing results;
8. Regulatory Criteria;
9. Site Contamination – Including as applicable, but not limited to: soil, rock and sediment sampling analytical results, soil, rock and sediment sample field screening results, groundwater sampling results, surface water sampling results, and subsurface vapor sampling results; and conclusions;
10. Conclusions and Recommendations;
11. Tables - An explanation shall be provided on each table for all abbreviations, symbols, acronyms, and qualifiers;
12. Figures - All map figures shall include an accurate bar scale and a north arrow, other types of figures shall include a bar scale, if appropriate, and an explanation shall be provided on each figure for all abbreviations, symbols, acronyms, and qualifiers; and,
13. Appendices - Including, as appropriate, field methods, boring/test pit logs and well construction diagrams, chemical analytical reports, and other appendices as required by the Department.

The Permittee may insert figures and tables within the text sections of an investigation report instead of in a separate section.

6.2.4.4. Periodic Monitoring Reports

The Permittee shall prepare a Periodic Monitoring Report using the format set forth below. The reports shall present the results of periodic or routine groundwater and remediation system monitoring at the Facility. All data collected during each monitoring and sampling event in the reporting period shall be included in a periodic monitoring report. In general, interpretation of data should be presented only in the background, conclusions, and recommendations sections of a report. The other text sections of a report should be reserved for presentation of facts and data without interpretation or qualifications. Requirements for a Periodic Monitoring Report are:

1. Title Page and Signature Block (for the name, title and organization of the preparer and the responsible Facility representative);
2. Executive Summary (Abstract);
3. Table of Contents;
4. Introduction;
5. Scope of Activities;
6. Regulatory Criteria;
7. Monitoring Results;
8. Conclusions and Recommendations;
9. Tables - An explanation shall be provided on each table for all abbreviations, symbols, acronyms, and qualifiers;
10. Figures - All map figures shall include an accurate bar scale and a north arrow; other types of figures shall include a bar scale, if appropriate, and an explanation shall be provided on each figure for all abbreviations, symbols, acronyms, and qualifiers; and,
11. Appendices - Including, as appropriate, field methods, boring/test pit logs and well construction diagrams, chemical analytical reports, and other appendices as required by the Department.

The Permittee may insert figures and tables within the text sections of a periodic monitoring report instead of in a separate section.

6.2.4.5. Risk Assessment Reports

The Permittee shall prepare a Risk Assessment Report using the format set forth below. Risk Assessment Reports may be appended to or combined with a CME Report or an Investigation Report to create a single document for a given SWMU or AOC. Human health and ecological risk assessments should be presented in separate sections, but the general risk assessment outline applicable to both sections is provided below. The conceptual site model shall be discussed in all risk assessments. Requirements for a Risk Assessment Report are:

1. Title Page and Signature Block (for the name, title and organization of the preparer and the responsible Facility representative);
2. Executive Summary (Abstract);
3. Table of Contents;
4. Introduction;

5. Background Information -- Including site description and sampling results;
6. Conceptual Site and Risk Exposure Models;
7. Risk Screening Results;
8. Conclusions and Recommendations;
9. Tables;
10. Figures; and
11. Appendices.

A section in the risk assessment report shall summarize the analytical results of sampling at the SWMU or AOC. It shall include a description of the history of releases of contaminants, the known and possible sources of contamination, the vertical and lateral extent of contamination present in each medium, and a discussion of any uncertainties that are associated with contaminant characterization. Sources that are no longer considered to be ongoing but represent the point of origination for contaminants transported to other locations shall be included. This section shall reference any pertinent figures, data summary tables, and references in other reports. References made to other reports shall include page number, table numbers, and figure numbers for the referenced information. Page numbers for references made to other reports may be presented in a formal reference section of a risk assessment report. Summaries of data for each contaminant shall include the maximum value detected, the detection limit, and the upper confidence limit of the mean (UCL) based on a 95% confidence level (if applicable to the data set) with a notation for the statistical method used to calculate the UCL. Background values used for comparison to inorganic constituents and discussion of how "non-detect" analytical results were handled in the statistical analysis of data shall also be included.

Another section in the report shall present the conceptual site and risk exposure models. It shall include information on the expected fate and transport of contaminants detected at the SWMU or AOC. The discussion of fate and transport shall address potential migration of each contaminant in each medium, potential breakdown products and their migration, and anticipated pathways of exposure for human or ecological receptors. Diagrammatic representations of the conceptual site and risk exposure models shall appear in the figures section of the document. For human health risk assessments, the conceptual site and risk exposure models shall include the current and foreseeable future land use (such as industrial or recreational) for all risk assessments. Cleanup levels for the Facility shall be based on a residential land-use scenario, even if the current use of the land is for other scenarios.

All values for exposure parameters and the source of those values shall be included in table format and presented in the Tables section of the document. Conceptual site and risk exposure models presented for ecological risk assessments shall identify assessment endpoints and measurement receptors for the SWMU or AOC. The discussion of the models shall explain how the measurement receptors are protective of the ecological receptors.

If risk screening is utilized, a section in the report shall present the actual screening values used for each contaminant for comparison to all applicable human health and ecological risk screening levels. Other regulatory levels that are applicable to screening the site, such as drinking water MCLs or WQCC standards shall also be included in this section.

For risk assessments a section of the report shall present risk values, HQs, and hazard indexes

(HI) for human health under projected future land use and residential scenarios and any site-specific scenarios. A similar section shall also present for each contaminant the HQ for each ecological receptor.

Finally, a section shall also be included in the report that contains a discussion of qualitative, semi-quantitative, and quantitative uncertainty in the risk assessment and provides estimates of the potential impact of the various uncertainties. Appendices may include the results of statistical analyses of data sets and comparisons of data, full sets of results of all sampling investigations at the site, or other data as appropriate.

6.2.4.6. CME Work Plans

The Permittee shall prepare a CME Work Plan using the format set forth below. Required sections for a CME Work Plan are:

1. Title Page and Signature Block (for the name, title, and organization of the preparer and the responsible Facility representative);
2. Executive Summary;
3. Table of Contents;
4. Introduction;
5. Background Information;
6. Identification of Potential Remedies;
7. Analysis of Potential Remedies;
8. Proposed Remedy;
9. Schedule to complete CME;
10. Estimated Cost to Conduct CME;
11. Qualifications of Personnel who will conduct the CME;
12. Tables;
13. Figures; and
14. Appendices.

The Permittee may insert figures and tables within the text sections of a CME Work Plan instead of in a separate section.

6.2.4.7. CME Reports

The Permittee shall prepare a CME Report using the format set forth below. Investigation summaries, site condition descriptions, corrective action goals, corrective action options, selection criteria, and schedules shall be included in the CME Report. At a minimum, detections of contaminants encountered during site investigations shall be presented in table format with an accompanying site map showing sample locations. The required format for CME Reports is:

1. Title Page and Signature Block (for the name, title and organization of the preparer and the responsible Facility representative);
2. Executive Summary (Abstract);
3. Table of Contents;

4. Introduction;
5. Background Information;
6. Site Conditions -- Including, as appropriate, surface, subsurface, and groundwater conditions;
7. Potential Receptors -- Including sources, pathways, and receptors;
8. Regulatory Criteria;
9. Identification of Corrective Measures Options;
10. Evaluation of Corrective Measures Options -- Including the required information in Permit Section 6.2.2.2.5.2;
11. Selection of a proposed preferred remedy;
12. Design Criteria to Meet Cleanup Objectives;
13. Schedule;
14. Tables;
15. Figures; and
16. Appendices.

The Permittee may insert figures and tables within the text sections of a CME Report instead of in a separate section.

A CME Report shall include the following information:

1. A description of the location, status, and current use of the site;
2. A description of the history of site operations, including an identification of hazardous and solid wastes managed at the site, and any releases of hazardous waste or hazardous constituents;
3. A description of site surface conditions;
4. A description of site subsurface conditions;
5. A description of on-site and any off-site contamination in all affected media;
6. An identification and description of all sources of contaminants;
7. An identification and description of contaminant migration pathways;
8. An identification and description of potential contaminant receptors;
9. An identification and description of applicable cleanup standards or other regulatory criteria;
10. An identification and description of remedial alternatives;
11. Remedial alternative pilot or bench scale testing results, if applicable;
12. A detailed evaluation and rating of each of the remedial alternatives, applying the criteria set forth in Permit Section 6.2.2.2.5.2;
13. An identification of a proposed preferred remedy;
14. Basic design criteria of the proposed preferred remedy; and
15. A schedule for implementation of the proposed preferred remedy.

6.2.4.8. CMI Work Plans

The Permittee shall prepare a CMI Work Plan using the format set forth below. The CMI Work Plan shall provide details on the design, construction, operation, maintenance, and performance monitoring for the selected remedy, and a schedule for implementation. The CMI Work Plan shall, at a minimum, include as necessary depending on the type of remedy to be implemented:

1. A description of the selected remedy;
2. A description of the remediation system objectives;
3. An identification and description of the qualifications of key persons, consultants, and contractors that will be implementing the remedy;
4. Detailed engineering design drawings and systems specifications for all elements of the remedy;
5. A construction quality assurance plan;
6. An operation and maintenance plan, if applicable;
7. The results of any remedy pilot tests, such as landfill cover test plots;
8. A schedule for submission to the Administrative Authority of periodic progress reports
9. A schedule for implementation of the remedy; and
10. A health and safety plan.

6.2.4.9. CMI Work Plan Progress Reports

The Permittee shall make progress reports on the execution of the CMI Work Plan to the Department, as described in this Permit Section (6.2.4.9). At a minimum, a progress report shall include the following information:

1. A description of the remedy work completed during the reporting period;
2. A summary of problems, potential problems, or delays encountered during the reporting period;
3. A description of actions taken to eliminate or mitigate the problems, potential problems, or delays;
4. A discussion of the remedial work projected for the next reporting period, including all sampling events;
5. Copies of the results of all monitoring, including sampling and laboratory analyses, and any other data generated during the reporting period; and
6. Copies of all waste disposal records generated during the reporting period.

6.2.4.10. CMI Reports

A CMI Report shall, at a minimum, include the following information.

1. A summary of the work completed;
2. A statement, signed by a registered professional engineer, that the remedy has been completed in accordance with the Department approved CMI Work Plan for the remedy;
3. As-built drawings and specifications signed and stamped by a registered professional engineer;

4. Copies of the results of all monitoring, including sampling and laboratory analyses, and other data generated during the remedy implementation, if not previously submitted in a progress report; and
5. Copies of all waste disposal records, if not previously submitted in a progress report.

6.2.4.11. Certification

Pursuant to 40 C.F.R. § 270.11(d)(1), all corrective action documents shall include a certification, signed by a responsible official of the Facility, stating:

> I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

6.3. COMPLIANCE SCHEDULE TABLES

The Permittee shall meet the specified compliance schedules for all actions and deliverables required by this Permit. Corrective action is required for all SWMUs and AOCs identified in Table I-3 of Permit Attachment I.

6.4. SPECIAL REQUIREMENTS FOR INFORMATION SUBMITTALS AND CORRECTIVE MEASURES

6.4.1. Special Investigation Requirements

6.4.1.1. Landfills to Be Closed with Waste Left in Place

For each landfill that the Permittee proposes to leave all or a portion of the contents of the landfill in place, the Permittee shall implement the corrective action procedures set forth in Permit Section 6.2.2. Within 180 days after the effective date of this Permit, the Permittee shall submit to the Department for approval in accordance with Permit Section 6.2.4.6 a CME Work Plan for each such landfill unless a CME Work Plan has been previously submitted to the Department for the landfill.

6.4.1.2. Military Munitions Ranges

The Permittee has conducted operations at areas that were used to research, develop, test, and evaluate military munitions and explosives, and other ordnance, or weapons systems, or to train military personnel in their use and handling. The Facility contains numerous military ranges where explosives are and were used for the purpose of conducting military exercises, munitions testing, research development, and demonstrations. These military ranges may include firing lines and positions, maneuver areas, firing lanes, test pads, impact areas, simulator sites, training

sites, research facilities, and buffer zones.

This Permit Section (6.4.1.2) applies to military munitions that meet the statutory definition of "solid waste" in NMSA 1978, 74-4-3(M), whether or not they also meet the regulatory definition of "solid waste" in 40 C.F.R. § 261.2.

Within 90 days of the effective date of this Permit, the Permittee shall submit to the Department for approval a Military Range Assessment Report that contains the following information:

1. A list of all active, inactive, and closed military ranges located on Facility property;
2. A list of any military ranges located on property that has been transferred from the Facility to another federal, private, or other entity;
3. An identification of those military ranges that are active, inactive, or closed;
4. For each inactive and closed military range, a description of the current use of the property;
5. Maps (or a map) that clearly illustrate the boundaries of all active, inactive, and closed military ranges, including transferred ranges, and the map must also illustrate any buffer zone around the ranges;
6. A qualitative assessment of the nature and extent of contamination at each active, inactive, and closed military range, including the potential risk to human health and the environment from the military munitions and other contamination;
7. A recommendation for further investigation necessary to fully characterize the nature and extent of the contamination on each of the active, inactive, and closed military ranges; and
8. A proposed schedule for implementation of the recommended investigation.

6.4.1.3. Areas with Groundwater Contamination

Groundwater contamination or the potential for groundwater contamination has been identified at the following areas:

1. Tijeras Arroyo Groundwater (TAG) Area – trichloroethylene (TCE) and nitrate;
2. Landfills #4, #5, and #6, LF-008 (SWMU 6-4)–potential for contamination by selenium and TCE;
3. Manzano Base Groundwater – TCE;
4. Sewage Lagoons and Golf Course Pond, WP-026 – TCE, nitrate;
5. Manzano Sewage Treatment Facility, WP-16 (SWMU 6-24) – potential for contamination;
6. Monitoring well WYO-4 area – TCE;
7. McCormick Ranch -- Nitrate;
8. Bulk Fuels Facility, ST-106 and SS-111 -- Fuel (JP-4, JP-8, and Aviation Gas) Contamination; and
9. EOD Hill – perchlorate contamination.

The Permittee shall complete an Investigation Work Plan, Investigation Report, or CME Report

for each of the nine areas of groundwater contamination in accordance with the compliance schedules in Table I-3 of Permit Attachment I. The Permittee shall complete a CME Report for each area of groundwater contamination that requires remediation, as determined by the Department. In addition, Permittee shall investigate other areas of the Facility, in addition to those listed above, where the Department determines that either groundwater is contaminated or there is potential for groundwater contamination.

6.4.1.4. Perchlorate Screening in Groundwater

Monitoring for perchlorate is required for eight consecutive quarters in groundwater monitoring wells installed at the Facility after the effective date of this Permit and in the following existing wells or their replacements: KAFB-1001 through KAFB-1007 (McCormick Ranch/Range wells), KAFB-1901 through KAFB-1904 (Lake Christian wells), and EOD Hill well. The Department reserves the right to include additional wells for perchlorate monitoring. The Permittee shall report all monitoring results on January 31, April 30, July 31, and October 31 of each year for at least 8 consecutive quarters to the Department, unless the Department agrees in writing to a longer reporting period.

The Permittee shall determine the nature, extent, and rate of migration of any perchlorate contamination in groundwater at the Facility and, if necessary, down gradient of the Facility. The detection limit for the monitoring of perchlorate in groundwater shall not exceed 1 ug/L.

If perchlorate is detected in a groundwater at a concentration greater than or equal to 1 ug/L in a groundwater monitoring well, monitoring of perchlorate in such well must continue at a frequency determined by the Department. The frequency shall not exceed one year.

6.4.1.5. Sanitary Sewer Line at LF-002 (SWMU 6-2)

The sanitary sewer line that passes through LF-002 shall be removed in accordance with the Department's instructions (letters from NMED to Carl Lanz: July 16, 2004; September 13, 2004; and March 10, 2005). Instead of removing the sanitary sewer line, the Permittee may abandon the sanitary sewer line in place, provided that the sewage within the line is completely drained when the line is abandoned. The sewer line shall be taken out of service within two years of the effective date of this Permit.

Within 180 days after the effective date of this Permit, the Permittee shall submit to the Department for approval - in accordance with Permit Section 6.2.2.2.7 - a CMI Work Plan with a schedule for removing or abandoning the sewer line. After completion of the work, the Permittee shall augment the CMI Report for LF-002 by describing the removal or abandonment of the sewer line.

6.5. TECHNICAL REQUIREMENTS

The methods used to conduct investigation, remediation, and monitoring activities shall be sufficient to fulfill the requirements of this Permit, and to provide accurate and representative data for the evaluation of site conditions, the nature, concentration, rate of migration, and extent of contamination, and for remedy selection and implementation, where necessary. The methods presented in this Permit are minimum requirements for environmental investigation and sampling, and are not intended to include all methods that may be necessary to fulfill the

requirements of this Permit. The methods for conducting investigations, corrective actions, and monitoring at the Facility must be determined based on the conditions and contaminants that exist at each SWMU or AOC.

The Permittee shall provide a description of investigation, sampling or analytical methods and procedures in documents submitted to the Department that includes sufficient detail to evaluate the quality of the acquired data. The Department must approve any proposed combinations of SWMUs and AOCs that are grouped for the purpose of site investigation, remediation, and/or monitoring activities.

6.5.1. Standard Operating Procedures

The Permittee may reference relevant Facility Standard Operating Procedures, provided that copies of these procedures are also submitted to the Department for review. If any requirement or procedure in a Standard Operating Procedure is found by the Department to be unacceptable for reasons including, but not limited to, that the requirement or procedure will or could prevent the acquisition of representative and reliable sampling results, the requirement or procedure shall be replaced by the Permittee with a different requirement or procedure that is acceptable to the Department.

6.5.2. Documentation of Field Activities

Daily field activities, including observations and field procedures, shall be recorded on appropriate forms. The original field forms shall be retained at the Facility and made available to the Department upon request. Completed forms shall be maintained in a bound and sequentially numbered field file (logbook) for reference. Indelible ink shall be used to record all field activities. Photographic documentation of field activities shall be performed, as appropriate. The daily record of field activities shall include, at minimum:

1. SWMU or AOC designation;
2. Date;
3. Time of personnel arrival and departure;
4. Field investigation team members who are present, including subcontractors and visitors;
5. Weather conditions;
6. Daily activities conducted and times of performance;
7. Observations;
8. Record of samples collected with sample designations and locations specified;
9. Photographic log;
10. Field monitoring data, including health and safety monitoring if conditions arise that threaten worker or public safety, or the environment;
11. Equipment used and calibration records, if appropriate;
12. List of additional data sheets and maps completed;
13. An inventory of the waste generated and the method of storage and/or disposal; and
14. Signature of personnel completing the field record.

6.5.3. Decontamination Procedures

The objective of the decontamination procedures described below is to minimize the potential for cross-contamination. A designated area shall be established for decontamination of drilling equipment, reusable sampling equipment, and well materials. Drilling rigs and other equipment shall be decontaminated prior to entering a SWMU or AOC. Drilling equipment or other exploration equipment that may come in contact with a borehole shall be decontaminated by steam cleaning, by hot-water pressure washing, or by another method approved by the Department prior to drilling each boring.

Sampling or measurement equipment, including but not limited to, stainless steel sampling tools, split-barrel or core samplers, well development or purging equipment, groundwater quality measurement instruments, and water level measurement instruments, shall be decontaminated in accordance with the following procedures or other methods approved by the Department before each sampling event:

1. Brush equipment with a wire or other suitable brush, if necessary or practicable, to remove large particulate matter;
2. Rinse with potable tap water;
3. Wash with non-phosphate detergent or other detergent approved by the Department (e.g., Fantastik™ and Liqui-Nox®) followed by a tap water rinse;
4. Rinse with 0.1 M nitric acid to remove trace metals, if necessary, followed by a tap water rinse;
5. Rinse with methanol to remove organic compounds, if necessary;
6. Rinse with potable tap water; and
7. Double rinse with deionized water.

All decontamination solutions shall be collected and stored temporarily as Investigation Derived Waste (IDW) as described in Permit Section 6.5.7. Decontamination procedures and the cleaning agents used shall be documented in the daily field log.

6.5.4. Field Equipment Calibration Procedures

Field equipment requiring calibration shall be calibrated before use in the field to known standards, in accordance with the manufacturers' recommended schedules and procedures. Calibration measurements shall be recorded in the daily field logs. If field equipment becomes inoperable, its use shall be discontinued until the necessary repairs are made. In the interim, a properly calibrated replacement instrument shall be used.

6.5.5. Sample Handling, Shipping, and Custody Requirements

The Permittee shall follow all procedures for sampling activities that are detailed in this Permit Section.

6.5.5.1. Sample Handling

At a minimum, the following procedures shall be used at all times when collecting samples during investigation, corrective action, and monitoring activities:

1. Neoprene, nitrile, or other protective gloves shall be worn when collecting samples. New disposable gloves shall be used to collect samples. If any glove is contaminated by touching the sampled material, or other material that could contaminate or dilute the sample, the glove shall be replaced before taking another sample;
2. All samples collected of each medium shall be transferred into clean containers with the exception of soil, rock, and sediment samples obtained in brass sleeves or in Encore™ samplers. Sample container volumes and preservation methods shall be in accordance with EPA SW-846 and established industry practices; and
3. Sample labels and documentation shall be completed for each sample following procedures included in the site-specific work plans that are to be approved by the Department. Immediately after the samples are collected, they shall be stored either in a cooler with ice or by other appropriate storage method until they are delivered to the analytical laboratory. Chain-of-custody procedures, as described in this Permit Section (6.5.5.1) and Section 1.3.2.4 of Permit Attachment C shall be followed for all samples collected. All samples shall be submitted to the laboratory in an appropriate timeframe that will allow the laboratory to conduct the specified analyses within the method holding times.

6.5.5.2. Sample Shipment Procedures

Shipment procedures shall include:

1. Individual sample containers shall be packed to prevent breakage, and transported in a sealed cooler with ice or other suitable coolant or as otherwise approved by the Department. Any drainage hole at the bottom of the cooler shall be sealed and secured to prevent leakage;
2. Each cooler or other container shall be delivered in a timely manner to the analytical laboratory;
3. Glass bottles shall be separated in the shipping container by cushioning material to prevent breakage;
4. Plastic containers shall be protected from possible puncture during shipping using cushioning material;
5. The chain-of-custody form and analytical request form shall be shipped inside the sealed storage container to be delivered to the laboratory; and
6. Chain-of-custody seals (signed and dated) shall be used to seal individual sample containers and the sample-shipping container in conformance with EPA guidance.

6.5.5.3. Sample Custody

All samples collected for analysis shall be recorded in the field report or data sheets. Chain-of-custody forms shall be completed prior to the transfer of samples off-site, and shall accompany the samples during shipment to the laboratory. Upon receipt of the samples at the laboratory, the custody seals will be broken by laboratory personnel, the chain-of-custody form shall be signed as received by the laboratory, and the conditions of the samples shall be recorded on the form. The original chain-of-custody form shall remain with the laboratory and copies shall be returned to the relinquishing party. The Permittee shall maintain copies of all chain-of-custody forms

generated as part of sampling activities. Copies of the chain-of-custody records (either paper copies or electronically scanned in PDF format) shall be included with final reports submitted to the Department.

A chain-of-custody form shall be used to track samples from collection through analysis to ensure the integrity of analytical results. A chain-of-custody form shall include:

1. Sample identification number;
2. Signature of sample collector;
3. Date and time of sample collection;
4. Location at which sample was collected;
5. Type of media sampled (e.g., soil);
6. Type of preservation;
7. Analysis required;
8. Signature of all persons that have had custody of the samples;
9. Dates and times of possession; and
10. Signature, date and time of breaking the custody seal.

An individual in custody of any sample must comply with the procedures identified in SW-846 Chapter Nine (EPA, 1986) and those included here.

6.5.5.4. Sample Labels

Sample labels or tags are necessary to prevent misidentification. Gummed paper labels or tags are adequate and shall include at a minimum:

1. Sample identification number;
2. Name or initial of collector;
3. Sample location;
4. Sample date and time;
5. Analytical method or parameter to be analyzed for (e.g., VOCs, SVOCs, metals);
6. Preservation method; and
7. Other remarks.

Labels shall be affixed to sample containers before sampling, and they shall be immediately completed with the above information after the samples are collected.

The Permittee shall adhere to the following field custody procedures:

1. When collecting samples, as few people as possible should handle them;
2. Sampling personnel are responsible for the care and custody of samples until they are transferred or properly dispatched to the laboratory in accordance with the procedures described herein; and
3. Sample tags or labels shall be completed for each sample using waterproof ink, or covered by transparent waterproof tape.

6.5.6. In-Situ Testing and Other Tests

In-situ permeability tests, remediation system pilot tests, stream flow tests, and other tests conducted to evaluate site, surface, and subsurface conditions shall be designed to accommodate specific site conditions and to achieve test objectives. The testing methods must be approved, in writing, by the Department prior to implementation. The tests shall be conducted in accordance with Department, EPA, United States Geological Survey, ASTM International (ASTM - http://www.astm.org/) or other methods generally accepted by industry that will allow information representative of site conditions to be obtained. Detailed logs of all relevant site conditions and measurements shall be made during the testing events. A summary of the general test results, including unexpected or unusual test results and equipment failures or testing limitations shall be reported to the Department. The summary shall be presented in a format acceptable to the Department and in general accordance with the report formats outlined in Permit Section 6.2.4.

6.5.7. Collection and Management of Investigation Derived Waste

IDW includes, but is not limited to, general refuse, drill cuttings, excess sample material, water (e.g., decontamination, development and purge), spent materials, and used disposable equipment generated during the course of investigation, corrective action, or monitoring activities. All IDW shall be properly characterized and disposed of in accordance with Permit Attachment C (Waste Analysis Plan) and all federal, state, and local laws and regulations for storage, labeling, handling, transport, and disposal of waste. The Permittee shall include a description of the anticipated IDW management process as part of any work plan submitted to the Department for approval.

All waste generated during sampling and decontamination activities shall be temporarily stored in containers appropriate for the waste.

6.5.8. Surveying Sample, Well, and Site Feature Locations

The horizontal and vertical coordinates of the top of each monitoring well casing and the ground surface elevation at each monitoring well location shall be determined by a registered New Mexico professional land surveyor or licensed Professional Engineer. Horizontal coordinates shall be measured in accordance with the State Plane Coordinate System (NMSA 1978, 47-1-49-56 [Repl. Pamp. 1993]). The surveys shall be conducted in accordance with 12.8.2 NMAC -- *Minimum Standards for Surveying in New Mexico*. Horizontal positions shall be measured to the nearest 0.1 foot, and vertical elevations shall be measured to the nearest 0.01 foot. The Permittee shall prepare site map(s), certified by a registered New Mexico professional land surveyor or licensed Professional Engineer, presenting all surveyed locations and elevations of wells and relevant site features and structures for submittal with all associated reports to the Department.

Site attributes (e.g., soil sample locations, sediment sample locations, springs, outfalls, pertinent structures, monitoring stations, as well as staked-out sampling grids), shall be located by using the global positioning system (GPS), an electronic total station with prism reflectors, transit with stadia rod or tape, or a combination of these surveying systems, or by a registered New Mexico Registered Land Surveyor or licensed Professional Engineer using the methods described in the paragraph above. Horizontal locations of site attributes shall be measured to the nearest 1.0-foot.

The Permittee shall provide the Department with a statement of accuracy for survey data upon request.

6.5.9. Requirements for Exploratory and Well Installation Borings and Exploratory Excavations

Borings shall be completed at locations specified in this Permit or as approved by the Department in Investigation Work Plans. The Department may require additional exploratory or well borings as needed to ensure protection of human health and the environment. Any additional boring locations will be determined, and approved, by the Department. The anticipated depths and locations of exploratory and well borings shall be specified in work plans submitted to the Department for approval prior to the start of the field activities.

Borings that are not completed as permanent groundwater or soil-vapor monitoring wells shall be properly abandoned. Borings completed as either groundwater monitoring or soil-vapor wells shall be completed in accordance with the requirements described in this Permit Section (6.5.9).

Exploratory and monitoring well borings shall be drilled using the most effective, proven, and practicable method for recovery of undisturbed samples and potential contaminants. The drilling method selected must be approved by the Department prior to the start of field activities. Based on the drilling conditions, the borings shall be completed using one of the following methods:

1. Hollow-stem auger;
2. Air rotary;
3. Mud rotary (generally will not be approved by the Department);
4. Percussion hammer;
5. Dual wall air rotary;
6. Direct Push Technology;
7. Cable tool;
8. Sonic; or
9. Air Rotary Casing Hammer (ARCH).

Hollow-stem auger or Direct Push Technology drilling methods are preferred if vapor-phase or volatile organic compound (VOC) contamination is known or suspected to be present. Air rotary, hollow stem auger, percussion hammer, dual wall air rotary, direct push technology, cable tool or sonic drilling are preferred for borings intersecting the saturated zone of any aquifer. The type of drilling fluids or additives used, if necessary, must be approved by the Department prior to the start of drilling activities. The use of drilling fluids, especially other than air and potable water, is discouraged.

All drilling equipment shall be in good working condition and capable of performing the assigned task. Drilling rigs and equipment shall be operated by properly trained, experienced, and responsible crews. The Permittee is responsible for ensuring that contaminants from another site or facility are not introduced into the SWMU or AOC under investigation due to equipment malfunction or poor equipment decontamination. Drilling equipment shall be properly decontaminated before initiation of drilling for each boring.

Exploratory borings shall be advanced to the depths specified or approved by the Department. The Permittee shall propose drilling depths in the site-specific work plans submitted for each subject area where subsurface investigations are needed. Unless otherwise specified in this Permit or approved by the Department in work plans, the borings shall be advanced to the following minimum depths (see also Permit Section 6.5.11):

1. In all borings, 25 feet below the deepest detected contamination;
2. Twenty-five feet below the base of disposal units;
3. Five feet below the base of shallow structures such as piping or building sumps, or other building structures; and
4. Depths specified by the Department based on regional, or on SWMU or AOC specific data needs.

The Permittee shall notify the Department as early as practicable if conditions arise or are encountered that do not allow the advancement of borings to the depths specified or approved by the Department so that alternative actions may be approved. Precautions shall be taken to prevent the migration of contaminants between geologic, hydrologic, or other identifiable zones during drilling and well installation activities. Contaminant zones shall be isolated from other zones encountered in the borings.

The drilling and sampling shall be conducted under the direction of a qualified engineer or geologist who shall maintain a detailed log of the materials and conditions encountered in each boring. Both sample information and visual observations of the cuttings and core samples shall be recorded on a boring log. Known site features and/or site survey grid markers shall be used as references to locate each boring prior to surveying the location. The boring locations shall be located to the nearest foot of their planned location, and locations shall be recorded on a scaled site map upon completion of each boring.

Trenching and other exploratory excavation methods shall follow the applicable general procedures outlined in this Permit. Methods proposed by the Permittee for exploratory excavation and sampling at any SWMU or AOC shall be included in a site-specific Investigation Work Plan submitted to the Department.

6.5.10. Requirements for Geophysical Surveys

Where necessary, the Permittee shall conduct geophysical surveys to locate underground utilities, pipelines, drums, debris, and other buried features, including buried waste, in the shallow subsurface. The methods used to conduct the surveys, such as magnetometer, ground penetrating radar, resistivity, or other methods, shall be selected based on the characteristics of the site and the possible or suspected underground features. Results of the surveys shall be included in Investigation Reports submitted to the Department.

The Department may require the Permittee to excavate test pits or trenches to identify targets located by geophysical surveys.

The Permittee shall conduct geophysical logging of boreholes using techniques such as acoustic televiewer, spinner flow, acoustic velocity/full wave form acoustic, density/porosity, gamma, neutron, single point resistance or electric (long/short normal or inductance) methods as required by the Department.

6.5.11. Requirements for Deep Subsurface Soil, Rock, and Sediment Sampling

Deep subsurface samples are those collected at depths that generally require the use of power equipment. Relatively undisturbed discrete soil and rock samples shall be obtained, where possible, during the advancement of each boring for the purpose of logging, field screening, and analytical testing. Generally, samples shall be collected at the following intervals and depths:

1. At five-foot intervals, ten-foot intervals, continuously, or as approved by the Department;
2. At the depth immediately below the base of the disposal unit or facility structure;
3. At the maximum depth of each boring or excavation;
4. At the depths of contacts or first encounter with geologic units of different lithology, structural or textural characteristics, or of relatively higher or lower permeability that are observed during drilling or excavating;
5. At depths where soil or rock types are more likely to sorb or retain contaminants as compared to surrounding lithologic units;
6. At the depth of the first encounter of any saturated zones;
7. At intervals suspected of being source or contaminated zones; and
8. At other intervals approved or required by the Department.

Additional samples may be obtained from any depth based on field observations. A split-barrel sampler lined with brass sleeves, a coring device, or other method approved by the Department shall be used to obtain samples during the drilling of each boring.

A split barrel sampler lined with brass sleeves is the preferred sampling method for borehole soil and sediment; a coring device is the preferred sampling method for rock sampling. The following procedures should be followed if a split barrel sampler is used. Upon recovery of the sample, the brass sleeves shall be removed from the split barrel sampler, and the open ends of the sleeves covered with Teflon tape or foil and sealed with plastic caps fastened to the sleeves with tape for shipment to an analytical laboratory. If brass sleeves are not used, a portion of the sample shall be placed in clean containers for laboratory analysis. The remaining portions of the sample shall be used for field screening and logging, as described in Permit Sections 6.5.13 and 6.5.15, respectively.

Discrete samples shall be collected for field screening and laboratory analyses. For analyses other than that for VOCs and semivolatile organic compounds (SVOCs), the Permittee may submit site-specific, alternative methods for homogenization of samples in the field to the Department for review and written approval.

Samples to be submitted for laboratory analyses shall be selected based upon: 1) the results of the field screening or mobile laboratory analyses; 2) the position of the sample relative to

groundwater, suspected releases, or site structures; 3) the sample location relative to former or altered site features or structures; 4) the stratigraphy encountered in the boring; and 5) the specific objectives and requirements of this Permit and the approved work plan for the SWMU or AOC under investigation. The proposed number of samples and analytical parameters shall be included as part of the site-specific work plan submitted to the Department for approval prior to the start of field investigation activities.

6.5.12. Surface and Shallow Subsurface Soil and Sediment Sampling Procedures

Surface soil samples are those collected at depths of 0 to 6 inches. Shallow subsurface samples are those collected at depths that do not require the use of power equipment. Surface and shallow subsurface soil and sediment samples shall be collected in accordance with the procedures described below.

Samples that are collected for analyses other than for VOCs or SVOCs shall be obtained using a hand-held stainless steel coring device, Shelby tube, thin-wall sampler, or other device approved by the Department. The samples shall be transferred to clean containers for submittal to the laboratory.

Samples obtained for VOC or SVOC analysis shall be collected using Shelby tubes, thin-wall samplers, or other device approved by the Department. The ends of the samplers shall be lined with Teflon tape or aluminum foil and sealed with plastic caps fastened to the sleeves with tape for shipment to the analytical laboratory.

6.5.13. Field Screening of Soil, Rock, and Sediment Samples

Samples shall be screened in the field for the presence of contaminants, if required by the Investigation Work Plan or other sampling and analysis plan. Field screening results shall be recorded on the exploratory boring and excavation logs or other field logs. Field screening results are used as a general guideline to determine the nature and extent of possible contamination. In addition, screening results shall be used to aid in the selection of soil, rock, sediment, and vapor-phase samples for laboratory analysis.

The primary screening methods to be used shall include:

1) Visual examination;
2) Headspace vapor screening for VOCs; and
3) Metals screening using X-ray fluorescence (XRF).

Additional screening for characteristics such as pH, high explosives, or for other specific compounds using field test kits shall be conducted where appropriate.

Headspace vapor screening shall target VOCs and shall be conducted by placing a soil, sediment, or rock sample in a plastic sample bag or a foil-sealed container, allowing head space for ambient air. The container shall be sealed and then shaken gently to expose the sample to the air trapped in the container. The sealed container shall be allowed to rest for a minimum of five minutes while vapor concentrations equilibrate. Vapor concentrations present within the headspace will then be measured by inserting the probe of the monitoring instrument into a small opening in the bag or through the foil. The maximum value and the ambient air temperature shall be recorded on the log for each sample. A photo-ionization detector equipped with a 10.6

or higher electron volt (eV) lamp, combustible gas indicator, or other instrument approved by the Department shall be used for VOC field screening. The limitations, precision, and calibration procedures of the monitoring instrument to be used for VOC field screening shall be included in the Investigation Work Plan prepared for each SWMU or AOC.

XRF shall target metals. XRF screening requires proper sample preparation and instrument calibration. Sample preparation and instrument calibration procedures shall be documented in the field logs. The methods and procedures for sample preparation and instrument calibration shall be approved by the Department prior to the start of field activities.

The Permittee shall record on the field logs all conditions capable of influencing the results of field screening. The Permittee shall submit to the Department a report detailing any conditions potentially influencing field screening results. This report shall be included in any report where the field screening results are presented.

At a minimum, the Permittee shall submit the samples with the greatest apparent degree of contamination, based on field observations and field screening, for laboratory analysis. In addition, the Permittee shall submit the samples with no or little apparent contamination, based on field screening, for laboratory analysis if the intention is to confirm that the base (or other depth interval) of a boring or other sample location is not contaminated.

6.5.14. Field Quality Control for Soil, Rock, and Sediment Sampling

The Permittee shall collect Quality Control (QC) samples to monitor the quality of sample collection and laboratory analysis.

Field duplicates shall consist of two samples either split from the same sample device or collected sequentially. Field duplicates shall be collected at a rate of at least 10 percent of the total number of environmental samples submitted for analysis. At a minimum, one duplicate sample shall always be collected and analyzed for the appropriate contaminants.

The Permittee shall prepare and analyze equipment blanks from all sampling apparatus at a frequency of at least five percent of the total number of samples submitted for analysis. Equipment blanks shall be generated by rinsing decontaminated sampling equipment with deionized water, and capturing the rinsate water in an appropriate sample container.

In the case of VOC analyses, the Permittee shall prepare and analyze field blanks at a frequency of at least one per day for each medium sampled at each SWMU, AOC, or other site.

Reagent blanks shall be prepared and analyzed if chemical analytical procedures requiring reagents are employed in the field as part of the investigation or monitoring program.

Each type of QC sample shall be submitted for laboratory analyses, and analyzed in the same batch that the environmental samples they represent.

6.5.15. Logging of Soil, Rock, and Sediment Samples

The physical characteristics of soil, rock, and sediment samples, such as mineralogy, ASTM soil classification, American Geological Institute rock classification, moisture content, texture, color, presence of stains or odors, field screening results, depth, location, method of sample collection, and other observations shall be recorded in a field log. Samples shall be visually inspected and

the soil, sediment, or rock type classified in general accordance with ASTM D2487 (Unified Soil Classification System) and ASTM D2488 (Standard Practice for Description and Identification of Soils), or American Geological Institute Methods for soil and rock classification or in other ways approved by the Department. Detailed logs shall be completed in the field by a qualified geologist. Additional information, such as the presence of water-bearing zones and any unusual or notable conditions encountered during drilling shall be recorded on the logs. Field boring logs, test pit logs, and field well construction diagrams shall be converted to a format acceptable for use in final reports submitted to the Department.

6.5.16. Requirements for Soil-Vapor Monitoring

Samples of subsurface vapors shall be collected from vapor monitoring points where required by the Department. The Permittee shall, as required by the Department, collect soil-vapor samples for field measurement of:

1. Percent oxygen;
2. Organic vapors (using a photo-ionization detector with a 10.6 eV lamp, a combustible vapor indicator or other method approved by the Department);
3. Percent carbon dioxide;
4. Static subsurface pressure; and
5. Other parameters, such as carbon monoxide and hydrogen sulfide.

The Permittee also shall collect soil-vapor samples for laboratory analysis of the following:

1. Percent moisture;
2. VOCs; and
3. Other analytes required by the Department.

When collecting soil-vapor samples for laboratory or field analysis, the Permittee shall continually monitor the concentrations of soil vapor from a given monitoring point with an appropriate field instrument (e.g., photoionization detector). The Permittee shall collect soil-vapor samples after the field instrument readings have stabilized and after the sampling tubing and soil-vapor monitoring well have been appropriately purged to remove all stagnant vapor. Soil-vapor samples for laboratory analysis shall be collected using SUMMA canisters[1] or other sample collection method approved by the Department. The samples shall be analyzed for VOC concentrations by EPA Method TO-15 (as it may be updated) or equivalent VOC analytical method approved by the Department.

In the field, soil-vapor measurements, the date and time of each measurement, and the type and

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1 The term "SUMMA" Canister is a trademark that refers to electropolished, passivated stainless steel vacuum sampling devices, such as TO canisters, SilcoCans, MiniCans, etc, which are cleaned, evacuated, and used to collect whole-air samples for laboratory analysis

serial number of field instrument used shall be recorded in a field log book. The method used to obtain soil-vapor field measurements and samples must be approved by the Department in writing prior to the start of monitoring.

Soil vapor wells shall not be installed with the use of any fluids. Soil vapor wells may be completed by backfilling with native materials. If a soil vapor well is installed as a permanent monitoring point, the Permittee shall not sample the well before the expiration of the 24-hour equilibration period following completion of installation. Information on the design and construction of soil-vapor monitoring wells shall be recorded as for groundwater monitoring wells (Permit Section 6.5.17.10) as applicable.

Soil-vapor monitoring wells shall be designed and constructed in a manner that will yield high-quality samples. The design and depth of installation must be approved by the Department.

6.5.17. Technical Requirements for Groundwater Investigations

The Permittee shall conduct investigations of groundwater in accordance with Department approved work plans to fully characterize the nature, vertical and lateral extent, concentration, rate of migration, fate, and transport of groundwater contamination originating from the Facility to determine the need for, and scope of, corrective action. The investigation shall include an evaluation of the physical, biological, and chemical factors influencing the transport of hazardous constituents and other contaminants in groundwater. The Permittee shall implement the groundwater investigation requirements in accordance with the requirements set forth in this Permit Section (6.5.17) and in approved work plans. All data shall be collected according to Department, EPA and industry accepted methods and procedures, and in accordance with this Permit Section (6.5.17) and any other requirements of this Permit.

6.5.17.1. Objectives

The Permittee shall implement groundwater investigations to determine the following as required by the Department:

1. Nature, extent, rate of migration, and concentration of historical and current releases of contaminants to groundwater;
2. Fate and transport, including boundary conditions, of contaminants releases within groundwater;
3. The depth to groundwater, water table elevations, potentiometric surfaces, and any seasonal variations;
4. Groundwater flow directions and velocities;
5. Migration of groundwater across hydrostratigraphic and structural boundaries;
6. Watershed and regional water balance information for evaluating contaminant fate and transport including:
    - recharge and discharge locations, rates, and volumes,
    - evapotranspiration data,
    - stream-flow data;

7. Water supply well pumping influences, including data for wells not owned by the Permittee, if available;
8. Saturated and unsaturated hydraulic-conductivity ($K_{x,y,z}$), porosity, effective porosity, permeability, transmissivity, particle-size, storage coefficients, and estimated fracture/secondary porosity;
9. Contaminant concentrations in soil, rock, sediment, air, and vapor; and absorption coefficients (K_{ds});
10. Changes in groundwater chemistry and the causes;
11. Regional and perched aquifer boundaries;
12. Geologic, hydrostratigraphic, and structural relationships; and,
13. General water chemistry.

In selecting a site for a new well, the Permittee shall consider paleotopography, fracture density and orientation, source areas, contaminant characteristics, geologic structures, groundwater flow direction, and the known occurrences of groundwater. All existing and newly installed wells and piezometers shall be surveyed in accordance with the requirements described in Permit Section 6.5.8.

6.5.17.2. Groundwater Levels

The Permittee shall obtain groundwater levels in all wells from which the Permittee is collecting groundwater samples and from other wells as specified by the Department, the schedule for which shall be provided in the Investigation Work Plans or other work plans.

Groundwater levels shall be measured in monitoring wells at frequencies required by the Department and within 24 hours from the start of monitoring the water level in the first well, unless another time frame is specified in the work plan and approved by the Department. Groundwater levels also shall be obtained prior to purging for any sampling event. Measurement data and the date and time of each measurement shall be recorded on a field log. The depth to groundwater shall be measured to the nearest 0.01 foot. The depth to groundwater shall be recorded relative to the surveyed well casing rim or other surveyed datum, as appropriate.

6.5.17.3. Groundwater Sampling

Initial groundwater samples shall be obtained from newly-installed monitoring wells within 30 days after completion of well development. Subsequent groundwater monitoring and sampling shall be conducted at frequencies approved by the Department. All monitoring wells specified in a Department approved Investigation Work Plan shall be sampled within 21 calendar days from the start of the groundwater sampling event. The Permittee shall sample all groundwater in all wells as specified in a Department-approved Investigation Work Plan. Any requests for variances from the approved groundwater sampling plan or schedule shall be submitted to the Department in writing 90 days prior to the start of scheduled monitoring and sampling events.

Groundwater samples shall be collected from all saturated zones including from exploratory borings that are not intended to be completed as monitoring wells prior to abandonment of the borings.

In addition to other required analyses, water samples shall be analyzed in accordance with approved work plans for one or more of the following general chemistry parameters in Table 6-1 below. The Department will specify through approved work plans which parameters in Table 6-1 that the Permittee must analyze for in water samples.

TABLE 6-1.
Groundwater General Chemistry Parameters

nitrate/nitrite	sulfate	chloride	sodium
dissolved CO2	alkalinity	carbonate/bicarbonate	boron
fluoride	manganese	calcium	silicon
ferric/ferrous iron	ammonia	potassium	phosphorus/phosphate
strontium	lithium	magnesium	molybdenum
Total Kjeldahl Nitrogen (TKN)	total organic carbon	suspended sediment concentration*	
total dissolved solids	bromide	stable isotopes (as required by the Department)	
Other parameters indicating oxidation/reduction conditions			
Eh	pH	dissolved oxygen	specific conductivity
dissolved manganese		dissolved iron	
sulfide		alkalinity	
temperature			

*ASTM Method D3977-97 standard test for determining sediment concentration in water samples

6.5.17.4. Well Purging

All screened zones in each monitoring well shall be purged by removing groundwater prior to sampling in order to ensure that fresh formation water is sampled. Purge volumes shall be as required by the Department. Field parameters that shall be monitored while purging are: groundwater pH, specific conductance, dissolved oxygen concentrations, turbidity, redox potential, and temperature. Field parameters shall be recorded at intervals approved by the Department. Measuring instruments are to be approved by the Department and are to be specified in the Investigation Work Plan or other sampling and analysis plan. The volume of groundwater purged, the readings obtained at each interval, and the instruments used shall be recorded on the field monitoring log. Water samples shall be obtained from a well only after the measured values of purge water field parameters have stabilized to within 10 percent for three consecutive measurements and after purging at least 75 percent of one well-bore volume. A well-bore volume is herein defined as the volume of water in the saturated filter pack plus the volume of all standing water within the well screen and casing including the sump. The Permittee may submit to the Department for approval, a written request for a variance from the described method of well purging for individual wells no later than 90 days prior to scheduled

sampling activities.

6.5.17.5. Groundwater Sample Collection

Groundwater samples shall be obtained using methods approved by the Department within eight hours of the completion of well purging. Groundwater in monitoring wells with low recharge rates and that purge dry shall be sampled when the water level in the well has recovered sufficiently to collect the required samples. Sample collection methods shall be documented in field monitoring logs. The samples shall be transferred to appropriate clean containers. Sample handling and chain-of-custody procedures that shall be implemented are described in Permit Sections 6.5.5. Decontamination procedures shall be established and, implemented, for non-dedicated water sampling equipment as described in Permit Section 6.5.3.

Groundwater samples intended for metals analysis shall be submitted to the laboratory for analyses of total metals; the samples shall not be filtered in the field or laboratory, unless the Department requires analyses for dissolved metals concentrations. If dissolved metals concentrations are required by the Department, the Permittee shall obtain groundwater samples for dissolved metals analysis; said samples shall be filtered using disposable in-line filters with a 0.45 micron or other mesh size approved by the Department.

6.5.17.6. Field QC for Groundwater Sampling

Field duplicates, field blanks, equipment rinsate blanks, reagent blanks, and trip blanks (the latter required for VOC analyses only) shall be collected or prepared and analyzed for quality control purposes. The samples shall be managed as described in Permit Section 6.5.5.

Field duplicates shall consist of two samples collected sequentially. Field duplicate samples shall be collected and analyzed at a frequency of at least 10 percent of the total number of environmental samples submitted for analysis. At a minimum, one duplicate sample per sampling event shall always be collected and analyzed.

In the case of VOC analyses, field blanks shall be prepared and analyzed at a frequency of no less than one per day per SWMU or AOC. Field blanks shall be generated by filling sample containers in the field with deionized water and submitting the field blank, along with the groundwater samples, to an analytical laboratory.

Equipment blanks shall be prepared and analyzed at a rate of at least five percent of the total number of environmental samples submitted for analysis, but no less than one equipment blank per sampling day. Equipment blanks shall be generated by rinsing decontaminated sampling equipment with deionized water, and capturing the rinsate water in an appropriate clean container. The equipment blank then shall be submitted with the groundwater samples to the analytical laboratory for the same analyses as the environmental samples.

Reagent blanks may be required by the Department if chemical analyses requiring the use of chemical reagents are conducted in the field during water sampling activities. Reagent blanks shall be prepared and analyzed at a frequency of at least 10 percent of the total number of media samples, but no less than one per day per SWMU or AOC.

Trip blanks shall be prepared using deionized water. Trip blanks shall be managed exactly the same as environmental samples. Trip blanks shall accompany sampling personnel into the field

throughout sampling activities, and then shall be placed into a shipping container with environmental samples for shipment to the analytical laboratory. Trip blanks shall be analyzed at a frequency of one for each shipping container holding samples for VOC analysis.

6.5.17.7. Periodic Monitoring Report

The Permittee shall submit to the Department periodic monitoring reports providing the results of the monitoring and sampling of groundwater, surface water, and springs over the previous reporting period. The reports shall be prepared in accordance with Permit Section 6.2.4.4. The reports shall be submitted within 90 days after completion of the monitoring fieldwork or in accordance with the schedule set forth in the approved monitoring work plans.

6.5.17.8. Springs

The sampling and analysis requirements for groundwater found in this Permit shall also apply to springs. Additionally:

1. Springs shall be sampled as close to the point of discharge as possible and shall be sampled at the same locations during each sampling event. If field conditions change, the spring shall be sampled as close to the original location as possible, and the Permittee shall notify the Department in the periodic monitoring report that the sampling location for the spring has changed;
2. The sampling point for each spring shall be located in accordance with the survey methods described in Permit Section 6.5.8 or by other survey methods approved by the Department;
3. Spring water flow rates shall be measured. In addition, as required by the Department, pH, specific conductance, dissolved oxygen, turbidity, temperature, and oxidation-reduction potential of the spring water shall be measured during each sampling event;
4. Spring samples shall be submitted to an analytical laboratory for analyses of the general chemistry parameters listed in Permit Section 6.5.17.3, as required by the Department and in accordance with approved work plans; and
5. The Permittee shall perform the same field QC procedures as are described in Permit Section 6.5.17.6 and Section 1.3 of Permit Attachment D for groundwater.

6.5.17.9. Surface Water

Surface water samples shall be collected using methods approved by the Department. Samples shall be collected and placed into clean containers. Field parameters and the methods and instruments used to measure them shall be approved by the Department prior to conducting surface water sampling. The sampling and monitoring techniques used and the measurements obtained shall be recorded in field monitoring logs. Stream flow rates shall be measured in conjunction with surface water sampling events.

The Permittee shall perform the same field QC procedures as are detailed in Permit Section 6.5.17.6 and Section 1.3 of Permit Attachment D for groundwater.

6.5.17.10. Groundwater Monitoring Well Construction Requirements

Groundwater monitoring wells shall be designed and constructed in a manner that will yield high

quality samples, ensure that the well will last the duration of the project or other specified time period, and ensure that the well will not serve as a conduit for hazardous constituents to migrate between different stratigraphic units or aquifers. The design and construction of groundwater monitoring wells shall comply with the guidelines established in various RCRA guidance, including, but not limited to:

1. EPA, *RCRA Groundwater Monitoring Technical Enforcement Guidance Document*, OSWER-9950.1, September, 1986; and
2. Aller, L., Bennett, T.W., Hackett, G., Petty, R.J., Lehr, J.H., Sedoris, H., Nielsen, D.M., and Denne, J.E., *Handbook of Suggested Practices for the Design and Installation of Groundwater Monitoring Wells*, EPA 600/4-89/034, 1989.

All well construction and installation shall be conducted in accordance with this Permit Section (6.5.17.10) of this Part and in accordance with approved work plans. All monitoring and sampling shall be conducted in accordance with Permit Section 6.5.17 and in accordance with approved work plans.

The Department must approve in writing all drilling locations, monitoring well and piezometer construction and installation details, sampling depths, and abandonment activities prior to the start of these activities.

6.5.17.10.1. Drilling Methods

A variety of methods are available for drilling monitoring wells. While the selection of the drilling procedure is usually based on the site-specific geologic conditions, the following issues shall be considered:

1. Drilling shall be performed in a manner that minimizes impacts to the natural properties of the subsurface materials;
2. Drilling shall be performed in a manner that contamination and cross-contamination of groundwater and aquifer materials is avoided;
3. The drilling method shall allow for the collection of representative samples of rock, unconsolidated sediment, and soil;
4. The drilling method shall allow the Permittee to determine when the appropriate location for the screened interval(s) has been encountered;
5. The drilling method shall allow for the proper placement of a filter pack and annular sealant for each monitored zone, and the borehole diameter shall be at least four inches larger in diameter than the nominal diameter of the well casing and screen to allow adequate space for emplacement of the filter pack and annular sealants;
6. The drilling method shall also allow for the collection of representative groundwater samples, and drilling fluids, including air, shall be used only when minimal impact to the surrounding formation and groundwater can be ensured (in general the Department discourages the use of drilling mud and drilling additives for groundwater monitoring well installations); and,
7. Requirements specified in Permit Section 6.5.9.

Justification for the drilling method used must be provided in writing to the Department for approval prior to well installations.

6.5.17.10.2. Monitoring Wells and Piezometers Construction

The Permittee shall submit to the Department for approval work plans for construction of wells and piezometers that meet the following requirements:

1. If required by the Department, well and piezometer borings targeting the contact between alluvium and bedrock shall be advanced to a minimum depth of five feet below the alluvium-bedrock interface;
2. Samples of sediment, bedrock, soil, and soil vapor shall be collected as appropriate for hydraulic and soil property testing and for analysis to determine the presence of hazardous waste and constituents at depths or intervals approved by the Department;
3. Samples shall at a minimum be obtained from each boring between the ground surface and one foot below the ground surface (0.0-1.0 foot interval), at subsequent five-foot intervals, at any alluvium-bedrock contact, and at the maximum depth of each boring. For sites where drilling depths exceed 50 feet, the Permittee may propose for Department approval alternative sampling intervals in work plans;
4. Field screening and chemical analyses of collected samples shall be conducted in accordance with Permit Section 6.5.13 and in accordance with approved work plans;
5. Groundwater, soil, soil vapor, rock, and sediment samples collected during drilling activities shall be delivered to an analytical laboratory for the required analyses;
6. No borehole shall be left open or cased with temporary casing for longer than five days;
7. The Department may impose specific requirements for well construction, require borings to be extended to the regional aquifer, or require the drilling of additional borings that intersect perched saturated zones or the regional aquifer based on investigation results;
8. The proposed locations, depths and details of drilling, sampling, and well construction shall be described in work plans prepared in accordance with this Permit Section (6.5.17.10.2) and Permit Section 6.2.4.2 or other document approved by the Department prior to well installation;
9. Geophysical measurements shall be collected from the borings in accordance with Permit Section 6.5.10 and as required by the Department;
10. Where appropriate, the borings shall be monitored for the presence of vapor-phase hazardous constituents prior to well construction; and
11. Based on the results of subsurface soil-vapor monitoring, the Department may require that the Permittee construct the wells to accommodate subsurface soil-vapor monitoring in addition to groundwater monitoring and sampling.

6.5.17.10.3. Well and Piezometer Construction Materials

Well and piezometers construction materials shall be selected based on the goals and objectives of the proposed monitoring program and the geologic conditions at the site. When selecting

construction materials, the primary concern shall be selecting materials that will not contribute to or remove hazardous waste or constituents from groundwater samples. Other factors to be considered include the tensile strength, compressive strength, and collapse strength of the materials; the length of time the monitoring well or piezometer will be in service; and the material's resistance to chemical and microbiological corrosion.

6.5.17.10.4. Design and Construction of Screens and Filter Packs

Screens and filter packs shall be designed to allow accurate sampling of the saturated zone that the well is intended to sample, minimize the passage of formation materials (turbidity) into the well, and ensure sufficient structural integrity to prevent the collapse of the intake structure.

The filter pack shall be installed in a manner that prevents bridging and particle-size segregation. Filter packs shall be installed by the tremie pipe method. At least two inches of filter pack material shall be installed between the screen and the borehole wall, and two feet of filter pack material shall extend above the top of the screen. A minimum of six inches and a maximum of two feet of filter pack material shall also be placed under the bottom of the screen to provide a firm footing. The precise volume of filter pack material required shall be calculated and recorded before placement, and the actual volume used shall be determined and recorded during construction. Any significant discrepancy between the calculated and actual volume shall be explained. Prior to installing the filter pack annular seal, a one to two-foot layer of chemically inert fine sand shall be placed over the filter pack to prevent the intrusion of annular sealants into the filter pack. The use of pre-fabricated screens and filter packs shall be approved in advance of well installation by the Department.

6.5.17.10.5. Design and Construction of Annular Seals

The annular space between the casing and the borehole wall shall be properly sealed to prevent cross-contamination. The materials used for annular sealants shall be chemically inert with respect to the highest anticipated concentration of chemical constituents expected in the groundwater. The precise volume of annular sealant required shall be calculated and recorded before placement, and the actual volume shall be determined and recorded during construction. Any significant discrepancy between the calculated volume and the actual volume shall be explained.

During construction, an annular seal shall be placed on top of the filter pack. This seal shall normally consist of a high solids (10 to 30 percent) bentonite material in the form of bentonite pellets, granular bentonite, or bentonite chips. The seal shall be placed in the annulus through a tremie pipe. A tamping device shall be used to ensure that the seal is emplaced at the proper depth. The bentonite seal shall be placed above the filter pack with a minimum of two-foot vertical thickness. The bentonite seal shall be allowed to completely hydrate in conformance with the manufacturer's specifications prior to installing the overlying annular grout seal.

A grout seal shall be installed on top of the filter pack seal. The grout shall be placed into the annular space by the tremie pipe method, from the top of the filter pack annular seal to within a few feet of the ground surface; however, the grout shall be installed at intervals necessary to allow it time to cure and not damage the filter pack or filter pack annular seal during installation of the grout. The tremie pipe shall be equipped with a side discharge port (or bottom discharge for grouting at depths greater than 100 ft) to minimize damage to the filter pack or filter pack

annular seal during grout placement. The grout seal shall be allowed to cure for a minimum of 24 hours before the concrete surface pad is installed. All grouts shall be prepared in accordance with the manufacturer's specifications. High solids (30 percent) bentonite grouts shall have a minimum density of ten pounds per gallon (as measured by a mud balance) to ensure proper setup. Cement grouts shall be mixed using six and one-half to seven gallons of water per 94-pound bag of Type I Portland cement. Bentonite (five to 10 percent) may be added to delay the setting time and reduce the shrinkage of the grout.

6.5.17.10.6. Well and Piezometer Development Methods

All monitoring wells and piezometers shall be developed to create an effective filter pack around the screen, correct damage to the formation caused by drilling, remove residual drilling mud or other drilling additives, if present, and fine particles from the formation near the borehole, and assist in restoring the original water quality of the aquifer in the vicinity of the well or piezometer. Monitoring wells and piezometers shall be developed until the column of water in each well or piezometer is free of visible sediment, and the pH, temperature, turbidity, and specific conductance have stabilized to within 10%.

If a well or piezometer is pumped dry, the water level shall be allowed to sufficiently recover before the next development period is initiated.

Approval shall be obtained from the Department prior to introducing air, water, or other fluids into a well or piezometer for the purpose of development. If water is introduced to a borehole during drilling and completion, then at minimum the same volume of water shall be removed from the well or piezometer during development. In addition, the volume of water withdrawn from or introduced into a well or piezometer during development shall be recorded.

6.5.17.10.7. Surface Completion Methods

Monitoring wells and piezometers may be completed either as flush-mounted wells or piezometers, or as above-ground completions. A surface seal shall be installed over the grout seal and extended vertically up the well annulus to the land surface. The lower end of the surface seal shall extend a minimum of one foot below the frost line to prevent damage from frost heaving. The composition of the surface seal shall be neat cement or concrete. In above-ground completions wherein the well casing rises or sticks up above ground level, a three-foot square by four-inch thick concrete surface pad shall be installed around the well immediately after the protective casing is installed. The surface pad shall be sloped so that drainage will be off the pad and away from the protective casing. In addition, a minimum of one inch of the finished pad shall be below grade or ground elevation to prevent washing and undermining by soil erosion.

Protective casing with a locking cover shall be installed around the well or piezometer casing (stickup or riser) to prevent damage or unauthorized entry. The protective casing shall be anchored in the concrete surface pad below the frost line and extend at least several inches above the casing stickup. A weep hole shall be drilled into the protective casing just above the top of the concrete surface pad to prevent water from accumulating and freezing inside the protective casing. A cap shall be placed on the well riser to prevent the entry of foreign materials into the well or piezometer, and a lock shall be installed on the cover of the protective casing to provide security against tampering. If a well or piezometer is located in an area that receives vehicular

traffic, a minimum of three bumper guards consisting of steel pipes three to four inches in diameter and a minimum of five-feet in length shall be installed next to the concrete surface pad. The bumper guards shall be installed to a minimum depth of two feet below the ground surface in a concrete footing and extend a minimum of three feet above ground surface. The pipes that form the bumper guards shall be filled with concrete to provide additional strength, and shall be painted a bright color to make them readily visible.

If flush-mounted completions are required (e.g., in active roadway areas), a protective structure such as a traffic-rated utility vault or meter box shall be installed around the casing. In addition, measures should be taken to prevent the accumulation of surface water in the protective structure and around the well or piezometer intake. These measures shall include outfitting the protective structure with a steel lid or manhole cover that has a rubber seal or gasket, and ensuring that the bond between the cement surface seal and the protective structure is watertight. A lock shall be installed on the lid or cover of the protective structure to prevent unauthorized access to the well or piezometer.

6.5.17.10.8. Well and Piezometer Completion Reports

For each monitoring well or piezometer completed under this Permit, the Permittee shall submit to the Department a completion summary report within 30 days of completing installation which shall include a construction log and diagram, a boring log, and a development log. The construction log and diagram and the boring log shall contain at a minimum the information required under Permit Section 6.5.17.10.10.Well or piezometer development must be completed within 30 days of installation.

6.5.17.10.9. Well or Piezometer Abandonment

Wells and piezometers shall be abandoned when they are no longer required to address corrective action requirements or when they are damaged beyond repair; however, no well or piezometer shall be abandoned without prior approval by the Department. Well abandonment must comply with current State Engineer well abandonment guidance (19.27.4.30 and 31 NMAC)

For wells and piezometers with small diameter casing (i.e., two-inch or less), abandonment shall be accomplished by over drilling with a large diameter hollow-stem auger. After the well or piezometer has been over drilled, the casing and grout shall be removed from the ground with a drill rig, and the remaining filter pack shall be drilled out. The open borehole shall then be pressure-grouted via the tremie pipe method from the bottom of the borehole to the ground surface. After the grout has cured, the top two feet of the borehole shall be filled with concrete to insure a secure surface seal.

For larger-diameter wells (i.e. greater than 2-inch), the Permittee may attempt to remove the well casing or grout the well in place. To abandon a well or piezometer in place, a tremie pipe shall be placed at the lowest point in the well or piezometer (i.e., at the bottom of the screen or in the sump). The entire well or piezometer shall then be pressure grouted from the bottom upward to force grout out through the screen into the filter pack and up the inside of the casing, sealing off all breaks and holes in the casing. Once the well or piezometer is grouted, the casing shall be cut off even with the ground surface and covered with concrete.

6.5.17.10.10. Well and Piezometer Construction Diagrams, Logs, and Boring Logs

Information on the design, construction, and development of each monitoring well or piezometer shall be recorded. Construction and boring logs and diagrams shall include the following information:

1. Well, boring or piezometer name/number;
2. Date/time of construction;
3. Borehole diameter and casing diameter;
4. Surveyed location coordinates;
5. Total depth, expressed both as depth below ground surface and elevation above sea level;
6. Name of drilling contractor;
7. Casing length;
8. Casing materials;
9. Casing and screen joint type;
10. Screened intervals, expressed both as depth(s) below ground surface and elevation(s) above sea level;
11. Screen materials;
12. Screen slot size and design;
13. Filter-pack material and size;
14. Filter-pack volume (calculated and actual);
15. Filter-pack placement method;
16. Filter-pack interval(s), expressed both as depth(s) below ground surface and elevation(s) above sea level;
17. Annular sealant composition;
18. Annular sealant placement method;
19. Annular sealant volume (calculated and actual);
20. Annular sealant interval, expressed both as depth below ground surface and elevation above sea level;
21. Surface sealant composition;
22. Surface seal placement method;
23. Surface sealant volume (calculated and actual);
24. Surface sealant interval, expressed both as depth below ground surface and elevation above sea level;
25. Surface seal and well apron design and construction;
26. Development procedure and turbidity measurements;
27. Well development purge volume(s) and stabilization parameter measurements;
28. Type, design, and construction of protective casing;
29. Type of cap and lock;

30. Ground surface elevation above sea level;
31. Survey reference point elevation above sea level on well casing;
32. Top of casing elevation above sea level;
33. Top of protective steel casing elevation above sea level;
34. Drilling method(s); and
35. Types, quantities, and dates/times that additives were introduced, if any.

6.5.18. Laboratory Analyses Requirements for all Environmental Media

The Permittee shall submit all samples for laboratory analysis to laboratories within the EPA Contract Laboratory Program. The laboratories shall use the most recent EPA and industry-accepted extraction and analytical methods as the testing methods for each medium sampled.

The Permittee shall submit a list of analytes and analytical methods to the Department for review and written approval as part of each site-specific investigation, corrective action, or monitoring work plan. The analyte detection limit for each analytical method shall be less than applicable background or regulatory cleanup level as applicable. Analyses conducted with detection limits that are greater than applicable background or regulatory cleanup levels as applicable shall be considered data quality exceptions, and the reasons for use of the elevated detection limits shall be reported to the Department; results based on these data quality exceptions may not be accepted by the Department. All analytical data (including non-detects, estimated values, and detects) shall be included in the electronic copy of the Investigation Report or other report in Microsoft™ Excel format with any qualifiers as attached from the analytical laboratory. The Permittee shall not censor data based on detection limits, quantitation limits, or measurement uncertainty. The Permittee shall also report whether any dilution of the sample was needed prior to laboratory analysis, and the amount of dilution, if any. The Department will not accept J-coded (estimated) results for samples requiring dilution prior to laboratory analysis.

6.5.18.1. Laboratory QA/QC Requirements

The following requirements for laboratory QA/QC procedures shall be considered the minimum QA/QC standards for the laboratories employed by the Permittee. The Permittee shall provide to the Department the names of the contract analytical laboratories within 45 days of awarding a contract for analytical services to any contract laboratory. The Permittee shall maintain copies of laboratory QA/QC manuals in the Operating Record and they shall be subject to inspection by the Department.

6.5.18.1.1. Quality Assurance

The Permittee shall ensure that contract analytical laboratories maintain internal quality assurance programs in accordance with EPA and industry-accepted practices and procedures. At a minimum, the laboratories shall use a combination of standards, blanks, surrogates, duplicates, matrix spike/matrix spike duplicates (MS/MSD), and other laboratory control samples to assess data quality. The laboratories shall establish control limits for individual chemicals or groups of chemicals based on the long-term performance of the test methods. In addition, the laboratories shall establish internal QA/QC procedures that meet EPA's laboratory certification requirements. Specific procedures to be completed are identified in the following sections. If a laboratory is

unable or unwilling to meet the requirements of this Permit, the Permittee shall select a different laboratory that can and will meet the requirements.

6.5.18.1.2. Equipment Calibration Procedures and Frequency

The laboratories' equipment calibration procedures, calibration frequency, and calibration standards shall be in accordance with the EPA test method requirements and documented in quality assurance and standard operating procedures manuals. All instruments and equipment used by laboratories shall be operated, calibrated, and maintained according to manufacturers' guidelines and recommendations. Operation, calibration, and maintenance shall be performed by personnel who have been properly trained in these procedures. A routine schedule and record of instrument calibration and maintenance shall be kept on file at the laboratories.

6.5.18.1.3. Laboratory QC Samples

Analytical procedures shall be evaluated for quality by analyzing reagent blanks or method blanks, surrogates, MS/MSDs, and laboratory duplicates, as appropriate for each method. Laboratory QC samples and frequency of analysis are documented in EPA test methods. At a minimum, laboratories shall analyze laboratory blanks, MS/MSDs, and laboratory duplicates at a frequency of at least one in 20 for all batch runs requiring EPA test methods and at a frequency of at least one in 10 for non-EPA test methods. All laboratory quality control data reported with the Facility's sample analysis results must be related to the analysis of the Facility's samples.

6.5.18.2. Laboratory Deliverables

Laboratory analytical data packages shall be prepared in accordance with EPA-established Level III or IV analytical support protocols. The following shall be provided in the analytical laboratory reports submitted to the Permittee either electronically or in hard (paper) copy:

1. Transmittal letter, including information about the receipt of samples, the testing methods performed, any deviations from the required procedures, any problems encountered in the analysis of samples, any data quality exceptions and qualifiers, and any corrective actions taken by the laboratory relative to the quality of the data contained in the report;
2. Holding times and requirements;
3. Sample analytical results, including sampling date; date of sample extraction or preparation; date of sample analysis; dilution factors and test method identification; soil, rock, or sediment sample results in consistent units (such as mg/kg in dry-weight basis); water sample results in consistent units (such as milligrams/liter); soil-vapor sample results in consistent units (such as ug/m^3); and detection limits; results shall be reported for all samples, including field duplicates, blanks, and other QC samples;
4. Method blank results, including detection limits;
5. Surrogate recovery results and corresponding control limits for samples and method blanks (organic analyses only);
6. MS/MSD concentrations, percent recoveries, relative percent differences (RPDs), and corresponding control limits;
7. Laboratory duplicate results, including RPDs and corresponding control limits;

8. Sample chain-of-custody documentation;
9. Instrument calibration; and
10. Discussion of completeness.

The following data deliverables for organic compounds shall also be required from the laboratory:

1. A cover letter referencing the analytical procedure used and discussing any analytical problems, deviations, and modifications, including signature from authority representative certifying to the quality and authenticity of data as reported;
2. Data qualification in conformance with EPA protocol, and definition of data descriptor codes;
3. Reconstructed ion chromatograms for gas chromatograph/mass spectrometry (GC/MS) analyses for each sample and standard calibration;
4. Selected ion chromatograms and mass spectra of detected target analytes (GC/MS) for each sample and calibration with associated library/reference spectra;
5. Gas chromatograph/electron-capture device (GC/ECD) and/or gas chromatograph/flame ionization detector (GC/FID) chromatograms for each sample and standard calibration;
6. Raw data quantification reports for each sample and calibrations, including areas and retention times for analytes, surrogates, and internal standards;
7. A calibration data summary reporting calibration range used and a measure of linearity (include decafluorotriphenylphosphine and p-bromofluorobenzene spectra and compliance with tuning criteria for GC/MS);
8. Final extract volumes (and dilutions required), sample size, wet-to-dry weight ratios, and instrument practical detection/quantitation limit for each analyte;
9. Analyte concentrations with reporting units identified, including data qualification in conformance with the CLP Statement of Work, including definition of data descriptor codes; and
10. Report of tentatively identified compounds with comparison of mass spectra to library/reference spectra.

The following data deliverables for inorganic compounds shall also be required from the laboratory.

1. A cover letter referencing the procedure used and discussing any analytical problems, deviations, and modifications, including signature from authority representative certifying to the quality and authenticity of data as reported;
2. Results of all method QA/QC checks, including inductively coupled plasma (ICP) Interference Check Sample and ICP serial dilution results;
3. Raw data quantification report for each sample;
4. A calibration data summary reporting calibration range used and a measure of linearity, where appropriate; and
5. Final digestate volumes (and dilutions required), sample size, and wet-to-dry weight ratios.

The Permittee shall present summary tables of these data and Level II QC results to the Department in reports or other documents prepared in accordance with Permit Section 6.2.4. Raw analytical data, including calibration curves, instrument calibration data, data calculation work sheets, and other laboratory supporting data for samples from this project, shall be compiled and kept on file at the Facility for reference. The Permittee shall make all data available to the Department upon request.

6.5.18.3. Review of Field and Laboratory QC Data for all Media

6.5.18.3.1. General QC Review Process

The Permittee shall require the laboratory to notify the Permittee of data quality exceptions within three working days of discovery in order to allow for sample re-analysis, if possible. The Permittee shall contact the Department within three working days of receipt of the laboratory notification of data quality exceptions to discuss the implications to the sampling data, and to determine whether the data will still be considered acceptable or if sample re-analysis or resampling is necessary. The Permittee shall summarize the results of this discussion with Department personnel in a letter. The Permittee shall submit the letter to the Department by fax or electronic mail within five working days of the conclusion of the data quality discussion and shall mail the original signed copy of the letter to the Department within 10 days of the conclusion of the data quality discussion.

The Permittee shall evaluate all sample data, and all field and laboratory QC results for acceptability. Each group of samples shall be evaluated using data validation guidelines contained in EPA guidance documents, the latest version of SW-846, and industry-accepted methods and procedures. Additionally, the Permittee shall evaluate all data for compliance with the following parameters:

1. Representativeness -- the Permittee shall implement procedures to assure representative samples are collected and analyzed, such as repeated measurements of the same parameter at the same location over several distinct sampling events. The Permittee shall note any procedures or variations that may affect the collection or analysis of representative samples and shall qualify the data accordingly;
2. Comparability -- to assure comparability of data, the Permittee shall implement standard collection and analytical procedures, and shall report analytical results in appropriate units for comparison with other data (e.g., past studies, comparable sites, screening levels, and cleanup standards). Any procedure or variation that may affect comparability shall be noted, and the data shall be qualified appropriately;
3. Completeness -- the Permittee shall evaluate all laboratory data for completeness with respect to data quality objectives. The degree of completeness shall be reported with the data in any reports in which the data are referenced;
4. Accuracy -- the Permittee shall evaluate all data for accuracy with respect to percent recovered of spiked samples. Results shall be reported for each analyte in any report in which the data are cited; and
5. Precision -- the Permittee shall evaluate all data for precision with respect to RPDs of duplicate samples. Results shall be reported for each analyte in any report in which the data are cited.

6.5.18.3.2. Review of Laboratory Reporting, Documentation, Data Reduction, and Corrective Action Process

Upon receipt of each laboratory data package, the Permittee shall evaluate the data against the criteria outlined in this Permit. Any deviation from the established criteria shall be noted and the data will be qualified appropriately. A full review and discussion of QC data and all data qualifiers shall be submitted with Investigation Reports or other reports prepared in accordance with Permit Section 6.2.4. Data validation procedures for all samples shall include review of the following, as appropriate:

1. Holding times;
2. Detection limits;
3. Field equipment rinsate blanks;
4. Field blanks;
5. Field duplicates;
6. Trip blanks;
7. Reagent blanks;
8. Laboratory duplicates;
9. Laboratory blanks;
10. Laboratory matrix spikes;
11. Laboratory matrix spike duplicates;
12. Surrogate recoveries; and
13. Representativeness, comparability, completeness, accuracy, and precision as required in Permit Section 6.5.18.3.1 above.

If quality control problems are encountered, appropriate corrective action shall be implemented. All corrective action shall be defensible and the corrected data shall be qualified as appropriate or rejected.

6.5.18.3.2.1. Blanks

The analytical results of field blanks and equipment blanks shall be reviewed to evaluate ambient site conditions and the adequacy of equipment decontamination, respectively. The analytical results of trip blanks shall be reviewed to evaluate the possibility for contamination of samples resulting from improperly cleaned sample containers or transport containers. The analytical results of laboratory blanks shall be reviewed to evaluate the possibility of contamination of a sample caused by analytical procedures. If reagent blanks are required, the analytical results of reagent blanks shall be reviewed to evaluate whether the reagents were contaminated prior to use. If contaminants are detected in any blanks, the sample data shall be qualified, as appropriate.

6.5.18.3.2.2. Field and Laboratory Duplicates

RPDs for field and laboratory duplicates shall be calculated and reported.

6.5.18.3.2.3. Laboratory Spikes

Percent recovered for laboratory spikes shall be calculated and reported.

6.5.18.3.2.4. Holding Times

The Permittee shall review the sampling, extraction, and analysis dates to confirm that extraction and analyses were completed within the recommended holding times, as specified by EPA protocol. Appropriate data qualifiers shall be noted if holding times were exceeded.

REFERENCES

New Mexico Environment Department (NMED), 2000. Guidance for Assessing Ecological Risks Posed by Chemicals: Screening-Level Ecological Risk Assessment, as updated, New Mexico Environment Department, Santa Fe, New Mexico, March 2000.

New Mexico Environment Department (NMED), 2009. Technical Background Document for Development of Soil Screening Levels, Rev. V, New Mexico Environment Department, Santa Fe, New Mexico, December 2009.

U.S. Environmental Protection Agency (EPA), 1980. Samplers and Sampling Procedures for Hazardous Waste Streams; Municipal and Environmental Research Laboratory, U.S. Environmental Protection Agency, Cincinnati, Ohio, EPA-600/2-80-018, January 1980.

U.S. Environmental Protection Agency (EPA), 1986. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods; 3rd edition, update 3, SW-846, Office of Solid waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 2005. Guidance for Developing Ecological Screening Levels, Office of Solid waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C., OSWER Directive 9825.7-55, Revised February 2005.

U.S. Environmental Protection Agency (EPA), 2009. Regional Screening Levels for Chemical Contaminants at Superfund Sites, December, 2009.

U.S. Environmental Protection Agency (EPA), 1996. Soil Screening Guidance: User's Guide, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C., EPA-9355.4-23, July 1996.

PERMIT ATTACHMENT A: GENERAL FACILITY INFORMATION

1.0 INTRODUCTION

This Permit Attachment (A) presents a general description of Kirtland Air Force Base (KAFB-the Facility) and KAFB's Explosive Ordnance Disposal (EOD) Range. It also presents general information on wastes treated at the Open Detonation (OD) Unit.

1.1. GENERAL DESCRIPTION OF THE FACILITY AND THE EOD RANGE

KAFB, which is owned and operated by the U.S. Department of Defense (the Permittee), is located in Bernalillo County, adjacent to Albuquerque in north-central New Mexico. An estimated 24,000 people are employed at the Facility and at the U.S. Department of Energy and with other tenants located within the Facility. The Facility comprises an area of approximately 52,233 acres (about 82 square miles). The location of KAFB is shown on Figure 1-1 (Permit Part 1). The central mission of KAFB is the administration of defense programs for the U.S. Department of Defense.

The OD Unit is located on the EOD Range in the south-central portion of KAFB. The EOD Range is southeast of the former Manzano Base, east of Demolition Range Road, and approximately two miles north of the southern perimeter of KAFB (Figure 1-1, Permit Part 1). The OD Unit is circular in shape with a diameter of 1,500 feet Figure 2-1, Permit Part 2). Typical excavations (craters, pits) where treatment takes place are rectangular and are about 30 feet long, 15 feet wide and about 12 feet deep. The EOD Range occupies generally flat, gently west-sloping land located between the Rio Grande Valley to the west and the base of the Manzano Mountains to the east. The nearest major surface water body is the Rio Grande, located about 10 miles west of the EOD Range.

1.2. PURPOSE OF THE OD TREATMENT UNIT

The Permittee treats hazardous wastes by open detonation at the OD Unit located at the EOD Range, which is located in a remote, sparsely populated area within the KAFB Facility boundary. The wastes treated at the OD Unit are assigned U.S. Environmental Protection Agency (EPA) Hazardous Waste Numbers D001 (ignitability) and/or D003 (reactivity). The wastes may also carry EPA Hazard Waste Numbers D002 (corrosivity), D005, D007, D008, and D009 (toxicity characteristic metals), D018 (benzene), D030 (2,4-dinitrotoluene), D034 (hexachloroethane), and D040 (trichloroethylene) and various underlying hazardous constituents. Wastes may be stabilized with safing fluids (i.e., a substance, such as hydraulic fluid or diesel fuel, with a specific gravity between a liquid and a solid used to desensitize explosives, making them safer to handle).

Treatment is performed by detonating explosives to countercharge hazardous wastes to remove their characteristics of reactivity and/or ignitability. The frequency of operations at the OD Unit varies, as treatment events are conducted on an as-needed basis.

All hazardous waste treated by the OD Unit has the potential to detonate or is a propellant. In accordance with 40 C.F.R. § 261.23(a)(6), the high explosive (HE) waste streams are capable of detonation if subjected to a strong initiating source or if heated under confinement. The remaining waste streams have the potential to detonate because they are explosives as defined in

49 C.F.R. §173.53, pursuant to 40 C.F.R. §261.23(a)(8). As stated in Chapter 7, Section 7.3, of SW-846 (EPA, 1986), as amended, the definition of reactivity "is intended to identify wastes that, because of their extreme instability and tendency to react violently or explode, pose a problem at all stages of the waste management process."

HE, when accidentally exposed to even a small initiating source such as friction, a pinch point, electrical discharge, heat, or impact, can potentially detonate. HEs typically managed at the OD Unit have detonation velocities averaging four to six miles per second and pressures as high as 300,000 times atmospheric pressure for short periods. Fickett and Davis (1979) explain that a good solid explosive converts energy at a rate of 10^{10} watts per square centimeter at its detonation front.

1.3. ROUTES OF TRAVEL

A system of interior roads, shown on Figure 1-1 (Permit Part 1), is maintained at KAFB. About 78 total miles of roadway exist, of which about 33 miles are paved.

Traffic access to and egress from the OD Unit is along the roads shown on Figure 1-1 (Permit Part 1). The roads along which wastes are transported to the EOD Range within KAFB include Southgate Avenue, Hardin Boulevard, Pennsylvania Street, Wyoming Boulevard, Lovelace Road, and Demolition Range Road.

1.4. SECURITY

1.4.1. Introduction

The following paragraphs describe the site-wide and OD Unit-specific security provisions at the KAFB Facility that shall be implemented to prevent unknowing or unauthorized entry of persons or livestock onto the OD Unit. Additional requirements are found in Permit Section 2.1.

1.4.2. Barriers and Means to Control Entry

The OD Unit, situated within the EOD Range is located within KAFB, which has 24-hour security surveillance and controls entry at all times to the Facility through entrance gates. Access to the KAFB Facility is provided through five controlled entrance gates. Access control procedures are designed to ensure that only properly identified and authorized persons, vehicles, and property are allowed entrance to and exit from KAFB. Surveillance is provided by KAFB Security Police, who continuously monitor and control entry inside the KAFB perimeter. The major duties of the KAFB security personnel are to control vehicle, personnel, and material access/egress. KAFB is enclosed by a 7.5-foot chain-link fence and by barbed wire fence. During non-working hours, security personnel routinely patrol the KAFB perimeter fence.

A fence is also located along the perimeter of the EOD Range. A gate is located at the entrance road to the EOD Range and OD Unit. The locations of the security fence and the access gate for the EOD Range and OD Unit are shown on Figure 2-1, in Permit Part 2.

Only personnel with appropriate clearance and escorted visitors are allowed access to the EOD Range. Vehicles and personnel entering the EOD Range are subject to search by security personnel. The EOD Range and OD Unit are surrounded by a three-strand barbed-wire fence, which limits any traffic through or other access to these areas.

REFERENCES

U.S. Environmental Protection Agency (EPA), 1986. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods; 3rd edition, update 3, SW-846, Office of Solid waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

W. Fickett and W. Davis, 1979. Detonation: University of California Press, Berkeley, CA.

PERMIT ATTACHMENT B: LIST OF AUTHORIZED HAZARDOUS WASTES

1.0 INTRODUCTION

Table B-1 lists the hazardous wastes that the Permittee is authorized to treat at the Open Detonation (OD) Unit. Wastes carrying Environmental Protection Agency (EPA) Hazardous Waste Numbers D002, D005, D007 through D009, D018, D030, D034, and D040 shall not be treated at the OD Unit unless, at the point of generation, the wastes are also reactive and/or ignitable. Wastes that are not reactive and/or ignitable shall not be mixed with reactive or ignitable wastes for the purpose of generating a hazardous waste that is authorized for treatment at the OD Unit. Hazardous wastes that are not authorized by this Permit for treatment shall not be accepted by the Facility for treatment and shall be returned to the generator. The Permittee shall also comply with Permit Section 2.7.

TABLE B-1 List of Hazardous Wastes Authorized to be Treated at the OD Unit	
Common and/or Chemical Name – Symbol	**EPA Hazardous Waste Number(s)**
ALSC, HNS	D001, D003
ALSC (RDX)	D001, D003
Amatol (AN, TNT)	D001, D003
Ammonium Nitrate (AN)	D003
Ammonium Perchlorate (AP)	D003
Ammonium Picrate	D001, D003
ANFO	D001, D003
APEX 1220	D001, D003
APEX 1320	D001, D003
ARTEC (HMX-water)	D001, D003
ATX-M	D001, D003
ATX 25RM Slurry	D001, D003
AWH Shape Charge	D001, D003
Baratol (HE)	D001, D003, D005
Barium Nitrate	D001, D003, D005
Barium Peroxide	D001, D003, D005
Barium Potassium Nitrate	D001, D003, D005
Barium Soluble Compounds	D001, D003, D005
BCTK Explosives	D001, D003
Benzene	D001, D018
BKN03 Propellant	D001, D003
Black Powder (Low Explosive)	D001, D003
Blasting Agent	D001, D003
Chromium	D007
CLSC (Copper Linear Shaped Charge)	D001, D003
Composition A (HE)	D001, D003
Composition B (HE)	D001, D003
Composition B/Baratol Mixture (HE)	D001, D003, D005
Composition C4 Class 3 (HE)	D001, D003
Cordite (Double-base gum)	D001, D003
CP (2-[5-cyanotetrazolato] pentamine cobalt (III) perchlorate)	D001, D003
Cyclonite (HE, RDX)	D001, D003
Cyclotol (RDX, TNT)	D001, D003
C-1 Detasheet	D001, D003
C-3	D001, D003
C-4	D001, D003
C-6 Discs	D001, D003
DACP Powder	D001, D003
TABLE B-1	

(continued)	
Common and/or Chemical Name - Symbol	**EPA Hazardous Waste Number(s)**
Detaflex	D003
Detasheet A	D001, D003
Detasheet A4	D001, D003
Detasheet A5	D001, D003
Detasheet C	D001, D003
Detasheet C1	D001, D003
Detasheet C2	D001, D003
Detasheet C3	D001, D003
Detasheet C4	D001, D003
Detasheet C5	D001, D003
Detasheet C6	D001, D003
Detasheet D	D001, D003
Detasheet L	D001, D003
DetCord (PETN)	D001, D003
Detonators	D001, D003, D008
Detonators EBW	D001, D003
Detonators HBW, Ensign Bickford	D001, D003
Dinitrotoluene (DNT)	D001, D003, D030
Dipicrylamide	D001, D003
DBX	D003
Diazodinitrophenol (DDNP)	D003
Double Base Smokeless Powder	D001, D003
DNP	D001, D003
DNPT	D003
Dynamite	D003
Ednatol	D003
EL-506A (HE, PETN)	D001, D003
EL-506D (HE, PETN)	D001, D003
Extex 3003	D001, D003
Extex 8003	D001, D003
Explosive D	D001, D003
Explosive Piston Motors	D003
Flex Linear Shaped Charge	D001, D003, D008
Gas Pressure Generator	D001, D003
Heat Powder	D001, D003
Hexachlorethane (HC Smoke)	D034
Hexanitroazobenzene	D001, D003
HMX (octogen) High Melting Explosive	D001, D003
HNAB	D001, D003
Hexanitrostilbene (HNS)	D001, D003
TABLE B-1	

(continued)	
Common and/or Chemical Name - Symbol	**EPA Hazardous Waste Number(s)**
HNS I	D001, D003
HNS II	D001, D003
HNS Titanium Powder	D001, D003
Holex 2506	D001, D003
Improved Military Rifle (IMR) propellant 4350	D001
IMR 4064	D001
Iremite 60	D001, D003
Iremite 80	D001, D003
Iragel	D001, D003
Ireco Booster 2-C, 3-C, 4-C	D001, D003
Iron Perchlorate	D003
Iron Potassium Perchlorate	D003
JPN Propellant	D001, D003
Kinestik Part A, B	D001, D003
Lead Azide (HE)	D001, D003, D008
Lead Case Flexible Linear Shaped Charge	D001, D003, D008
Lead Mononitraresorcinate (LMNR)	D001, D003, D008
Lead Sulfocyanate	D001, D003, D008
Lead Styphnate (HE)	D001, D003, D008
LX-04	D001, D003
LX-10	D001, D003
LX-13	D001, D003
LX-14	D001, D003
LX-15	D001, D003
LX-16	D001, D003
LX-17	D001, D003
M-6 Propellant	D001, D003
M-77 Water Gel Explosives	D001, D003, D005
MDF (RDX, HNS)	D001, D003
Mercury Fulminate (HE)	D001, D003, D009
Minol	D001, D003
N-5 Sheet Propellant	D001, D003
Nitrocellulose	D001, D003
Nitroglycerin	D001, D003
Nitroguanidine	D001, D003
Nitromethane	D001, D003
NQ	D001, D003
Octol LGE Cast	D001, D003
PBX 9010	D001, D003
PBX 9205	D001, D003
TABLE B-1	

(continued)	
Common and/or Chemical Name - Symbol	**EPA Hazardous Waste Number(s)**
PBX 9404	D001, D003
PBX 9407	D001, D003
PBX 9504	D001, D003
PBXN-5	D001, D003
PBXN-6	D001, D003
PBXN-301	D001, D003
Pentaerythritol Tetranitrate (PETN) (HE)	D001, D003
PETN/Titanium Mix	D001, D003
PETN Zirconium	D001, D003
PETRIN	D001, D003
Pentolite (PETN/TNT) (HE)	D001, D003
Photo Flash Powder (simulators)	D001, D003
Picric Acid	D001, D002, D003
Picritol	D001, D003
Plain Wave Generator (PBX 9404)	D001, D003
Plasticized White Phosphorous	D001
Plasticizer	D001, D003
Polysulfide Prepolymer	D001, D003
Potassium Chlorate	D003
Potassium Nitrate	D003
Potassium Perchlorate (initiator)	D001, D003
Primacord (PETN)	D001, D003
Propellant HPC-95, HPC-60	D001, D003
Propellant M-30, M1, M6	D001, D003
Propellant MC-1951	D001, D003
Propellant (TPH1207C)	D001, D003
RDX	D001, D003
RDX #5	D001, D003
Red Phosphorous	D001
RL-5-X Detcord	D001, D003
Rocket Motor Double Base Propellant	D001, D003
RP-2	D001
RP-87	D001
Separation Explosives (RDX)	D001, D003
Semtex	D001, D003
Smokeless Powder	D003
Sodium Azide	D001, D003
Sodium Nitrate	D003
Strontium Nitrate	D003
Strontium Peroxide	D003
TABLE B-1	

(continued)	
Common and/or Chemical Name - Symbol	**EPA Hazardous Waste Number(s)**
Tetryl (HE)	D001, D003
Tetrytol	D001, D003
TH-1	D001, D003
TH-3	D001, D003
Thermite Powder	D003
TH/KP	D001, D003
Titanium Tetrachloride	D003
TPH 3442 (propellant)	D003
Titanium Boron Powder	D001
Titanium Hydride	D001
Titanium Subhydride	D001
TLX	D001, D003
Trinitrotoluene (TNT)	D001, D003
Tritonal	D001, D003
TATB Pellets, Pad	D001, D003
Toluene (nitrated forms)	D001, D003
Torpex	D003
Tovex	D003
TPH 3386 (propellant)	D003
Triaminotrinitrobenzene (TATB)	D001, D003, D018
Trichloroethylene	D040
WAK 2, TP-H12	D001, D003
XTX 8003	D001, D003
Aluminum	D001, D003
Iron	D001
Lead	D008
Lead Alloy	D008

DEFINITIONS

ALSC aluminum linear shaped charge
AN ammonium nitrate
Anfo ammonium nitrate-fuel oil
AP ammonium perchlorate
CLSC copper linear shaped charge
DDNP Diazodinitrophenol
DNT Dinitrotoluene
HC hexachlorathane
HE high explosive
HMX cyclotetramethylene-tetranitramine; octohydro-1,3,5,7-tetranitro 1,3,5,7-tetrazocine
HNS hexanitrostilbene
IMR improved military rifle
LMNR lead mononitraresorcinate
PBX plastic-bonded explosive; RDX and plasticizer
PETN nitropentaerythrite; pentaerythrite tetranitrate; pentaerythritol
RDX cyclotrimethylenetrinitramine
TATB triaminotrinitrobenzene
TNT trinitrotoluene

PERMIT ATTACHMENT C: WASTE ANALYSIS PLAN

1.0 INTRODUCTION

This Waste Analysis Plan (WAP) describes the procedures that shall be used at the Facility to characterize waste to be treated at the Open Detonation (OD) Unit.

1.1. HAZARDOUS WASTES TREATED AT THE OD UNIT

Hazardous wastes treated at the OD Unit are classified as a non-wastewater waste under the Land Disposal Restrictions (LDR) regulations at 40 C.F.R. Part 268. Knowledge of the chemical and physical properties of hazardous wastes to be treated at the OD Unit is essential for proper waste management. The hazardous wastes treated at the OD Unit exhibit the characteristic of reactivity (D003). Some of these wastes also exhibit the characteristics of ignitability (D001). These wastes may also potentially contain the following toxicity characteristic metals and organic compounds, identified by specific U.S. Environmental Protection Agency (EPA) Hazardous Waste Numbers: barium (D005), chromium (D007), lead (D008), mercury (D009), benzene (D018), 2,4-dinitrotoluene (D030), hexachloroethane (D034), and trichloroethylene (D040). They may also contain underlying hazardous constituents (UHCs) such as chromium, lead, nickel, vanadium, and zinc. The characteristics of hazardous wastes treated at the OD Unit shall be identified using Acceptable Knowledge (AK) or sampling and analysis, as appropriate, and shall be documented in writing. Incompatible wastes shall not be accepted for treatment at the OD Unit. It may be necessary to saturate the wastes with a safing fluid (e.g., water, acetone, alcohol, hydraulic fluid) before treatment.

Categories of hazardous waste that may be accepted for treatment include, for example, explosives, propellants, and pyrotechnics in the form of pure substances and explosives-contaminated wastes. Waste that may be treated at the OD Unit shall include only the waste types authorized in Permit Attachment B. Corrosive (D002) wastes (e.g., picric acid) that are also reactive may be treated at the OD Unit. The hazardous wastes to be treated at the OD Unit are mostly in solid form, however, on occasion, wastes in liquid form (e.g., picric acid) may be treated.

Barium (D005), chromium (D007), lead (D008), and mercury (D009) are toxicity characteristic metals that may be in the wastes or in the casings surrounding the wastes to be treated. The toxicity characteristic organic compounds benzene (D018), 2,4-dinitrotoluene (D030), hexachloroethane (D034), and trichloroethylene (D040) may also be present.

1.2. WASTE ANALYSIS PARAMETERS

Explosive Ordnance Disposal (EOD) personnel shall review characterization information to ensure that hazardous wastes are properly characterized for their physical and chemical properties and can be managed safely and in accordance with the requirements of this Permit. AK shall only be used in lieu of sampling and analysis when the composition and physical characteristics of the waste are exactly known and well controlled.

Waste characterization information must include all necessary information on the presence of toxicity characteristic metals and organic compounds, as defined in 40 C.F.R. Part 261, Subpart C, and data on the presence of any UHCs listed in 40 C.F.R. § 268.48 in accordance with 40 C.F.R. § 268.9(a).

1.3. WASTE CHARACTERIZATION PROCEDURES

The approach to characterization shall be based on the chemical and physical nature of the waste. Characterization procedures used at the Facility require all generators to provide AK, related technical information, and/or sampling and analysis results (including information on UHCs) as appropriate. Accurate characterization is necessary for appropriate waste classification and assignment of EPA Hazardous Waste Numbers, in the preparation of LDR documentation, and ensuring proper management of waste.

1.3.1. Characterization Strategy

The characterization strategy for hazardous wastes to be treated at the OD Unit is described below.

1.3.1.1. Wastes to be Treated

Prior to accepting waste for treatment at the OD Unit, a detailed chemical and physical description of the waste shall be provided by the generator.

Ensuring that detailed and accurate waste characterization exists shall include the steps outlined below in Permit Sections 1.3.1.2 through 1.3.1.4. Hazardous waste destined for treatment shall be packaged in containers; both the waste and the containers shall be inspected before acceptance for treatment and again before loading the waste into the treatment unit.

1.3.1.2. Verification

All waste shipments to the OD Unit shall be verified in two phases prior to treatment to ensure that the waste is authorized for treatment in accordance with Permit Attachment B. Phase 1 will be conducted to ensure shipping documentation completeness, and Phase 2 is to ensure that the waste delivered corresponds to the documentation provided for that waste. Waste shall not be accepted for treatment until all verification is complete.

1.3.1.3. Phase 1 Verification

Screening is performed by the appointed EOD Team Chief. Documentation may include, but is not limited to, a completed Ammunition Disposition Request (ADR), a hazardous waste manifest, a material safety data sheet, a description of the process generating the waste, and sampling and analysis data.

Upon receipt of a waste shipment at the OD Unit, a determination of shipping documentation (hazardous waste manifest) completeness shall be made by EOD personnel. Each shipping document that accompanies an off-site waste shipment shall be checked to ensure that the following information is present and complete:

- The shipment identification number.

- The proper U.S. Department of Transportation basic description.
- The quantity (weight) of waste in the shipment.
- The number and type of containers in the shipment.
- A signed and dated certification of the shipment's content.
- The shipment labels and placards which match the shipping document.

If documentation is incomplete or inadequate, EOD personnel shall contact the generator for clarification and require that the generator correct the situation. Only waste that meets the requirements of this Permit shall be transported to the OD Unit for treatment.

Containers will be visually examined for defects such as dents, cracks, and corrosion. Conditionally exempt small quantity generators do not need a hazardous waste manifest. If there are discrepancies, they shall be resolved by contacting the generator before EOD personnel sign the shipping document. If the discrepancies cannot be resolved, EOD personnel shall reject the shipment. Rejected waste shall be returned to the generator.

1.3.1.4. Phase 2 Verification

The EOD Team Chief, with assistance from other EOD personnel, shall compare the contents of waste shipments received with the description on the documentation provided by the generator to ensure that they match. The visual inspection shall include content identification and quantity estimation. If any waste fails verification, it shall be returned to the generator to resolve the discrepancy.

1.3.2. Sampling and Analysis of Waste

Sampling and analysis of waste for purposes of characterization shall be conducted in accordance with the procedures outlined in Sections 1.3.2.1 through 1.3.2.4 of this Permit Attachment (C) and Permit Section 2.6.3.

1.3.2.1. Sampling Equipment

Each sample of waste requiring sampling and analysis shall be collected using appropriate sampling equipment, as recommended in SW-846 (EPA, 1986) or other Department-approved sampling guidance.

1.3.2.2. Equipment Decontamination

Disposable, clean equipment shall be used to eliminate the potential for cross contamination during sampling. Therefore, maintaining and decontaminating sampling equipment will not be necessary.

1.3.2.3. Sample Preservation and Storage

Waste samples shall be collected in clean containers and preserved, as appropriate, to ensure that their integrity remains intact prior to, during, and after transport to the analytical laboratory. Container types, preservation techniques, and holding times for expected analytes of interest are presented in Table C-1.

1.3.2.4. Quality Assurance/Quality Control

The Permittee shall implement a quality assurance (QA) process designed to obtain high quality data. Quality control (QC) procedures shall be employed to measure the degree to which this QA objective is fulfilled. At a minimum, the QA process shall meet the requirements of Permit Sections 6.5.17.6, 6.5.18.1, and 6.5.18.3.

QC samples shall be collected as part of sampling activities. Duplicates shall be collected and analyzed for all constituents of concern. A chain-of-custody form shall be completed and shall include the type of sample collected; the names and signatures of the sampler(s); sample identification numbers, date, and time of collection; the designation as a grab or composite sample; the names, dates, times, and signatures of any persons involved in transferring samples; and the shipping number. Personnel shall be properly trained in the use of sampling equipment, sample containers, and sampling methods to ensure that sampling activities are conducted appropriately.

1.4. ANALYTICAL LABORATORY AND TESTING/ANALYTICAL METHODS SELECTION

An EPA-certified analytical laboratory shall be selected to perform laboratory analysis of waste. The laboratory shall be required to have a comprehensive QA/QC program, technical analytical expertise, and an effective information management system.

The selection of analytical testing methods for waste is based on the following.

- The physical state of the waste.
- The analytes of interest.
- The required detection limits (i.e., regulatory thresholds).
- Information requirements (e.g., to ensure compliance with LDR treatment standards).

1.5. WASTE RE-EVALUATION FREQUENCIES

A re-evaluation of waste characterization data shall be conducted as necessary but at least annually to ensure that data are accurate, in accordance with 40 C.F.R. § 264.13(a)(3). Updates of waste characterization information are required when:

- A change occurs in the process or operation generating the hazardous waste, and
- Hazardous waste received from an off-site facility does not match the waste specified on the accompanying manifest or shipping papers.

Waste characterization data for the wastes treated at the OD Unit shall be re-evaluated at least annually. This information shall be used to determine if waste characterization data are accurate and to determine the appropriateness of current waste management practices and characterization methods, and shall be documented in the Operating Record.

REFERENCE

U.S. Environmental Protection Agency (EPA), 1986. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods; 3rd edition, update 3, SW-846, Office of Solid waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

TABLE C-1
Sample Containers, Preservation Methods, and Holding Times for Analysis of Waste[a]

Sample Type	Container Type[b]	Preservation Method	Holding Time
Volatile Organics	4 oz glass jar with Teflon cap	Cool to 4 °C	14 days
Semivolatile Organics	4 oz glass jar with Teflon cap	Cool to 4°C	14 days
Metals			
(except hexavalent chromium and mercury)	4 oz glass jar with Teflon cap	Cool to 4°C	180 days
(Hexavalent chromium)	4 oz glass jar with Teflon cap		28 days
(Mercury)	4 oz glass jar with Teflon cap		28 days

a. Containers, methods and holding times from most current version of SW-846 (EPA, 1986)
b. Other container types may be used depending upon the laboratory or the method, with prior NMED approval.

DEFINITIONS
NMED New Mexico Environment Department
oz ounces
°C degrees Celsius

PERMIT ATTACHMENT D: ANNUAL SOIL SAMPLING AND ANALYSIS PLAN

1.0 INTRODUCTION

The purpose of this sampling and analysis plan is to ensure that accurate data are collected to determine whether a release of hazardous waste or hazardous constituents has occurred during the operating period of the Open Detonation (OD) Unit that may pose a threat to human health. Any corrective action that may be required for the OD Unit shall be conducted in accordance with Part 6 of this Permit.

The OD Unit is located at the Kirtland Air Force Base (KAFB) Explosive Ordnance Disposal (EOD) Range and is permitted as a Resource Conservation and Recovery Act (RCRA) Subpart X miscellaneous unit. The OD Unit is used to treat hazardous waste to remove the hazardous characteristics of reactivity and ignitability. The Permittee shall perform soil monitoring at the OD Unit during operations to assess whether or not contaminants are being released to soil at levels that could endanger human health. This soil sampling and analysis shall be performed on an annual basis in accordance with the procedures described in this Annual Soil Sampling and Analysis Plan (SSAP).

1.1. SAMPLING PROCEDURES

This Section (1.1) describes procedures and methods for sampling soil at the OD Unit. Other applicable procedures or methods provided in the most current version of *SW-846* (EPA, 1986) may be used if conditions or experience show the alternate method(s) to be more appropriate and if approved by the Department. All sampling procedures used will be documented in a field logbook. Sampling shall be performed in accordance with procedures given in *Samplers and Sampling Procedures for Hazardous Waste Streams* (EPA, 1980), or SW-846, and in accordance with this SSAP.

1.1.1. Sampling Schedule and Frequency

Soil samples shall be collected annually at the OD Unit during the month of June. Sampling shall be conducted at the OD Unit before any backfilling, excavation, or grading is performed at the site since the last treatment event. If no treatment events have occurred during a particular annual period, annual sampling will not be conducted for that annual period. The Department shall be notified if this circumstance occurs.

1.1.2. Sampling Strategy and Analytical Parameters

For the OD Unit, four soil samples shall be collected from the zero- to six-inch depth and analyzed for total metals, explosives and other constituents listed in Table D-1. The sampling location strategy depends on the physical characteristics of the OD Unit. If only one crater (pit) is present during the sampling event, then four soil samples shall be taken from the walls of the crater at each of the four primary compass directions (Figure D-1). If more than one crater is present, a grid (with a minimum of 100 possible locations) that encompasses all of the craters shall be established, and four random sample locations within the grid will be selected for the sampling event (Figure D-2). The grid will be square in shape and its overall maximum size shall be established using the maximum distance between the walls of the craters that are present

at the site. If no craters are present, then a 150-foot by 150-foot grid shall be established at the center of the cleared area which composes the OD Unit, and four soil sample locations shall be randomly selected from within the grid.

Each sample location shall be located by reference to a surveyed grid datum, prominent site features, or from some documented reference point that can be located in the field. Sample locations shall be recorded in the field logbook, and shall be shown on a figure depicting the OD Unit in the annual reports (see Section 1.7 of this Permit Attachment).

1.1.3. Sample Collection

Qualified personnel shall collect soil samples. Sample collection procedures, types of containers and storage procedures specific to each SW-846 method shall be strictly adhered to. Prior to collecting a soil sample, sampling personnel shall scrape aside loose materials (e.g., rocks, litter) from the sampling location. Personnel shall collect soil samples using metal or plastic scoops, wooden or disposable plastic hand trowels, or similar equipment. Non-sparking equipment shall be used whenever required by EOD personnel for worker safety. Excess soil generated at each soil sampling location may be used as backfill. Samples shall be representative of the site. Cross-contamination of samples shall be prevented. Sample collection activities shall also conform to these requirements:

1. Personnel shall schedule sampling activities with EOD Range Control;
2. Personnel shall obtain clearance from an EOD Technician/Specialist for the selected location of each sample;
3. Personnel shall wear clean gloves before collecting each individual sample;
4. Personnel shall use clean sampling equipment to collect soil samples. (Note: A disposable sampler may be presumed clean if it is still in a factory-sealed wrapper. Reusable samplers will be scraped to remove any loose material, washed with a detergent and water solution, rinsed several times with tap water, rinsed with deionized water, drained of excess water, and air-dried or wiped dry.);
5. Personnel shall clear each sample for shipment to the analytical laboratory by an EOD Technician/Specialist; and
6. Personnel shall check out with EOD Range Control when sampling has been completed.

Samples collected for analysis of white phosphorous must the follow the special sample collection procedures in SW-846, Method 7580.

1.1.3.1. Sample Containers and Preservatives

Samples shall be placed in appropriate containers, compatible with the intended analysis. All containers shall be new and certified clean to ensure the integrity of samples collected. Samples shall be properly prepared and preserved as necessary to maintain sample integrity. Table D-1 lists the proper container, preservative, and holding time for each chemical parameter of interest.

1.1.3.2. Sample Identification

Sample identification numbers shall be assigned by alpha/numeric characters corresponding to the last two digits of the calendar year (YY), two digits of the month (MM), two digits of the day

of the month (DD), a code indicating soil sample (SS), and a unique number (##) designating the sample location. Thus, a complete format of a sample identification number is: YYMMDDSS##. For example, soil sample number two collected on 3rd of June 2007 would be labeled: 070603SS02.

1.1.3.3. Sample Handling, Documentation, and Custody Procedures

Chain-of-custody procedures shall be followed in accordance with Permit Section 6.5.5.3. Labels shall be affixed to sample containers in accordance with Permit Section 6.5.5.4.

The chain-of-custody form shall be signed upon receipt at the laboratory, and the original or a copy returned to the KAFB Environmental Management (EM) Branch Office for inclusion in the Operating Record. The Chain-of-custody form shall include or be accompanied by a request-for-analysis form that lists all analyses to be performed for the samples and all special instructions related to sample management or analysis. Any potential hazards posed by the samples shall be listed on the request-for-analysis form.

The sample container shall be sealed with a gummed paper seal or tag attached to the container in such a way that the seal must be broken in order to open the container.

A field logbook shall be kept and shall contain information pertinent to field surveys and sampling. Entries in the logbook shall be conducted in accordance with Permit Section 6.5.2.

The analytical laboratory shall be required to have procedures for minimizing cross contamination of samples and securing sample custody within the laboratory.

Samples relinquished to the laboratory shall be subject to the following procedures for transfer of custody and shipment.

1. When transferring the possession of samples, the individuals relinquishing and receiving them shall sign, date, and note the time on the Chain-of-custody form.
2. Shipping containers such as coolers shall be custody-sealed for shipment to the laboratory.

Laboratory personnel shall verify that samples are correctly labeled, that documentation is correct, and shall inspect the physical condition of the containers. Any discrepancies are to be resolved between laboratory and sampling personnel at this time. The laboratory portion of the form shall be completed by the laboratory personnel and shall include at a minimum:

1. The name of the person receiving the sample,
2. Laboratory accession (identification) number,
3. The date and time of sample receipt, and
4. Sample condition

1.1.3.4. Sample Shipping

Sample shipment shall be conducted in accordance with Permit Section 6.5.5.2.

1.2. INVESTIGATION-DERIVED WASTE

Investigation–derived waste shall be managed in accordance with Permit Section 6.5.7.

1.3. QUALITY ASSURANCE/QUALITY CONTROL PROGRAM

Because important decisions will be based on the data collected as part of this SSAP, a program to ensure that data are of high quality is essential. The Permittee shall follow a quality assurance/quality control (QA/QC) program that mandates documentation of the precision and accuracy of laboratory analyses as well as other aspects of quality assurance.

1.3.1. Quality Control Targets

For metals, quality control targets for accuracy and precision shall be 75-125% recovered and ±35% relative percent difference (RPD), respectively. The laboratory reporting limits for metals shall be at or below the respective background level for each metal subject to analysis.
For high explosives (HE), quality control targets for accuracy and precision shall be 20-120% recovered and ±50% RPD, respectively. The laboratory reporting limits for HE compounds shall be at or below the appropriate human risk industrial screening level for each HE compound (NMED, 2009).

1.3.2. Field Quality Control

Field quality control shall be conducted in accordance with Permit Section 6.5.14 and Table D-2 of this Permit Attachment.

1.4. LABORATORY ANALYSIS

Laboratory analysis shall be conducted in accordance with Permit Section 6.5.18.

1.5. DATA VALIDATION

Data validation shall be conducted in accordance with Permit Section 6.5.18.3.

1.6. HUMAN RISK SCREENING

If a sample result for a metal exceeds the applicable background level listed in Table D-4, the result shall be compared to the most current EPA Regional Screening Levels (RSLs) and Department soil screening levels (SSLs-NMED, 2009) for an industrial land use scenario. The industrial land use scenario shall only apply to risk screening under this SSAP, and not for purposes of closure or corrective action. Analytical results for explosives and SVOCs shall be compared to the SSLs. EPA RSLs and Department SSLs for industrial scenarios are presented in Table D-4 for the metals, SVOCs, and HE compounds that are to be evaluated.

Sample results for arsenic shall be compared with the approved background level because the natural background concentration of arsenic in this area exceeds the EPA human health medium-specific screening level. Additionally, the screening level for thallium shall be set equal to the Department soil screening level for this constituent.

If a Department SSL or EPA RSL does not exist for a substance, the Permittee shall calculate a screening level based on an industrial scenario and a cancer risk of 10^{-5} for carcinogens, and a hazard quotient (HQ) of 1.0 for noncarcinogens. This calculated screening level shall be subject to Department approval and shall be revised if determined by the Department not to be protective of human health.

Any exceedance of an EPA RSL, Department SSL, or calculated screening level shall be

reported to the Department in writing within 15 calendar days. The Department will review the information and, at its discretion, may require additional site characterization to protect the health and safety of site workers. If the Department requires additional site characterization, the Permittee shall prepare a sampling and analysis plan (SAP) for Department approval. The SAP shall be prepared and submitted to the Department within 60 calendar days of the request. Upon Department approval of the SAP, the Permittee shall implement the plan within 30 days. Upon completion of the field investigation, the Permittee shall report the results of the additional site characterization effort in writing to the Department within 90 calendar days. The Department will then determine if additional sampling is required, if the site must be remediated immediately to protect workers, or if no corrective action is required.

1.7. REPORTING

The Permittee shall submit two copies of each annual report to the Department within 90 days of completion of each sampling event. Each annual report shall include:

1. A summary cover letter.
2. Copies of all laboratory reports associated with the sampling event, including the analytical results for each sample.
3. A summary of any constituents detected at concentrations exceeding human risk levels including any exceeding a screening level calculated by the Permittee when a Department SSL or EPA RSL is unavailable. The method and data used by the Permittee to calculate a screening level must also be reported.
4. A summary of field and laboratory QC sample results.
5. A summary of whether the data meet the data quality objectives listed in this Permit Attachment. And,
6. A scaled, oriented map showing the location of the OD Unit sampling grid (if any), craters (if any), and all sample locations.

REFERENCES

New Mexico Environment Department (NMED), 2009. Technical Background Document for Development of Soil Screening Levels, Rev, V, New Mexico Environment Department, Santa Fe, New Mexico, December 2009.

U.S. Environmental Protection Agency (EPA), 1980. Samplers and Sampling Procedures for Hazardous Waste Streams; Municipal and Environmental Research Laboratory, U.S. Environmental Protection Agency, Cincinnati, Ohio, EPA-600/2-80-018, January 1980.

U.S. Environmental Protection Agency (EPA), 1986. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods; 3rd edition, update 3, SW-846, Office of Solid waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 2002. RCRA Waste Sampling Draft Technical Guidance; Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C., EPA530-D-002, August 2002.

Table D-1
Analytical Parameters and Methods, Container Types, Preservation Methods, and Holding Times for Soil Samples[a]

Parameter	Analytical Method[b]	Container Type and Preservation Method[c]	Holding Time
Total Metals: Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium (total), Cobalt, Copper, Lead, Mercury, Nickel, Selenium, Silver, Thallium, Tin, Vanadium, Zinc	6010C or 7000 Series	4 oz plastic or glass jar, stored at <4°C	180 days; 28 days for Mercury and Chromium
High Explosives (HEs): 1,3,5-Trinitrobenzene; 1,3-Dinitrobenzene; TNT (2,4,6-trinitrotoluene); 2,4-Dinitrotoluene; 2,6-Dinitrotoluene; 2-Amino-4,6-Dinitrotoluene; 4-Amino-2,6-Dinitrotoluene; HMX (octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine); 2-Nitrotoluene; Nitrobenzene; 3-Nitrotoluene; 4-Nitrotoluene; Tetryl; RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine), 3,5-Dinitroaniline, PETN (pentaerythritol nitrate), nitroglycerine	8330B	4 oz glass jar, stored at <4°C	14 days
White Phosphorous	7580	4 oz glass jar with PTFE lid, fill to top to minimize air in jar, stored at <4°C	Indefinite (if preserved at <4°C, kept in dark and tightly sealed)
Dioxins and Furans	8280B or 8290A	250 mL wide mouth amber glass jar with PTFE lid, stored at <4°C	30 days
Perchlorate	6850	4 oz glass jar, stored at <4°C	28 days

a. Analytical methods, preservation methods, and holding times are from most current version of Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846 (EPA, 1986).
b. Another applicable or newer method may be used with prior NMED approval.
c. Other container types may be used depending upon the laboratory or the method used with prior NMED approval.

DEFINITIONS:

mL	milliliters
NMED	New Mexico Environment Department
oz	ounces
PTFE	polytetrafluoroethylene
°C	degrees Celsius
<	less than

TABLE D-2
Field Quality Control Samples

Quality Control Sample Type	Sample Matrix	Applicable Analytes	Frequency	Purpose
Field duplicate	Soil	Metals, HE, White Phosphorus, Perchlorate, Dioxins and Furans	One sample per sampling event	Document precision of the sampling process
Equipment blank	Water	Metals, HE, White Phosphorus, Perchlorate, Dioxins and Furans	One sample per day (if using non-disposable equipment)	Document if equipment is being properly decontaminated between samples

DEFINITION
HE high explosive

TABLE D-3
Background Concentrations Of Naturally Occurring Metals in Soil at Kirtland Air Force Base

Metal	Surface Soil (mg/kg)
Antimony	3.9
Arsenic	5.6
Barium	130
Beryllium	0.65
Cadmium	<1
Chromium (total)	17.3
Cobalt	5.2
Copper	15.4
Lead	21.4
Mercury	<0.25
Nickel	11.5
Selenium	<1
Silver	<1
Thallium	<1.1
Tin	<10
Vanadium	20.4
Zinc	62

DEFINITIONS
mg/kg milligrams per kilogram
< less than

TABLE D-4
List of Analytical Parameters and Industrial Soil Screening Levels

Analytical Parameters	EPA Regional RSL[a] (mg/kg)	NMED SSL[b] (mg/kg)
Metals		
Antimony	410	454
Arsenic	1.6	17.7
Barium	190,000	224,000
Beryllium	2,000	2,260
Cadmium	810	1,120
Chromium (Total)	1,400	Not established
Cobalt	300	20,500
Copper	41,000	45,400
Lead	800	800
Mercury (methyl)	100	114
Nickel	20,000	22,700
Selenium	5,100	5,680
Silver	5,100	5,680
Thallium	66	74.9
Tin	610,000	Not established
Vanadium	5,200	5,680
Zinc	310,000	341,000
High Explosives (HE)		
1,3,5-Trinitrobenzene	27,000	Not established
1,3-Dinitrobenzene	62	Not established
TNT (2,4,6-Trinitrotoluene)	79	469
2,4-Dinitrotoluene	1,200	103
2,6-Dinitrotoluene	620	687
2-Amino-4,6-Dinitrotoluene	2,000	Not established
4-Amino-2,6-Dinitrotoluene	1,900	Not established
HMX (Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine)	49,000	34,200
RDX (Hexahydro-1,3,5-trinitro-1,3,5-triazine)	24	174
m-Nitrotoluene	12,000	22,700
Nitrobenzene	280	277
o-Nitrotoluene	13	145
p-Nitrotoluene	110	1,200
Tetryl	2,500	2,740
3,5-Dinitroaniline	Not established	Not established
PETN (pentaerythritol tetranitrate)	Not established	Not established
Nitroglycerine	62	68.4
Other Analytes		
White phosphorous	20	Not established
Perchlorate	720	795
Dioxins and Furans (in TEQ TCDD)	0.000018	0.000204

a. Values from "Regional Screening Levels for Chemical Contaminants at Superfund Sites" (EPA, 2009).

http://www.epa.gov/reg3hwmd/risk/human/rb-concentration-table/index.htm
b. Values from "Technical Background Document for Development of Soil Screening Levels", Rev. 5 (NMED, 2009).
c. The toxicity of dioxins and furans will be measured in relation to the most toxic form of dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin [TCDD]) by calculating the toxic equivalent (TEQ).

DEFINITIONS

mg/kg	milligram per kilogram
NMED	New Mexico Environment Department
RSL	Regional Screening Level
SSL	soil screening level

Figure D-1

Figure D-2

PERMIT ATTACHMENT E: INSPECTION PLAN

1.0 INTRODUCTION

This Permit Attachment addresses general inspection requirements of 40 C.F.R. § 264.15.

1.1. INSPECTION SCHEDULE

The inspection schedule is presented in Table E-1 and shall be maintained at the Explosive Ordnance Disposal (EOD) Shop, as required by 40 C.F.R. § 264.15(b)(2).

1.2. SCOPE OF INSPECTIONS

At a minimum, the items listed in Table E-1 shall be inspected at the indicated frequencies.

1.3. FREQUENCY OF INSPECTIONS

Items listed in Table E-1 shall be inspected at the frequencies indicated in the table.

TABLE E-1
Inspection Schedule for the OD Unit

Item Number	Inspected For	Frequency
1	Are warning signs posted on the Explosive Ordnance Disposal Range boundary fence at 300-foot intervals?	Monthly
2	Is the EOD Range flag serviceable/posted?	Immediately before treatment operations
3	Are all combustibles clear of the OD Unit to 200 feet, including vegetation?	Immediately before treatment operations
4	Are firebreaks clear of combustibles, including vegetation?	Within 24 hours before treatment operations
5	Is a first-aid kit available?	Immediately before treatment operations
6	Is the OD Unit clear of explosives from previous treatment activities including the loading and unloading areas?	Immediately before treatment operations and within 24 hours after treatment operations
7	Are the EOD Range gates working properly?	Monthly
8	Is the Contingency Plan available at the EOD Range personnel bunker?	Immediately before treatment operations
9	Are all fire-protection and communication equipment operational?	Immediately before treatment operations
10	Is the OD Unit area in good condition?	Monthly and within 24 hours before treatment operations
11	Are metal fragments cleaned up?	Monthly and within 24 hours after treatment operations
12	Is the EOD Range boundary fence in good condition?	Monthly
13	Are the EOD Range roads and firebreaks in good condition?	Monthly
14	Is the personnel bunker in good condition?	Monthly
15	Is the runoff berm around the OD Unit in good condition?	Monthly
16	Is there standing water in a pit or crater at the OD Unit?	Immediately before treatment operations and within 24 hours of a precipitation event
17	Is there kick out or treatment residues following OD operations?	Within 24 hours after treatment operations

PERMIT ATTACHMENT F: CONTINGENCY PLAN

1.0 INTRODUCTION

This Contingency Plan has been prepared for the Open Detonation (OD) Unit located at the Explosive Ordnance Disposal (EOD) Range at the Kirtland Air Force Base (KAFB) Facility in compliance with 40 C.F.R. Part 264, Subpart D, as applicable. This plan consists of emergency response procedures and activities specific to the OD Unit.

1.1. PURPOSE AND IMPLEMENTATION

The purpose of this Contingency Plan is to define the responsibilities and provide for coordination of activities to minimize hazards to human health or the environment from fires, explosions, or any sudden or non-sudden release of hazardous waste or hazardous constituents. In accordance with 40 C.F.R. § 264.51(b), the provisions of this plan shall be carried out immediately whenever there is a fire, explosion, or a release of hazardous waste or hazardous constituents that could threaten human health or the environment.

In the case of major incidents or emergencies that cannot be controlled with EOD Range resources, the Emergency Coordinator (EC) shall notify the KAFB Fire Department and the KAFB Command Post (KCP). The KCP shall assume primary responsibility for response coordination in the case of such major incidents or emergencies or delegate that responsibility to the KAFB Fire Chief. Once the KCP or KAFB Fire Chief completes its response, the EC shall assume responsibility to ensure compliance with all the provisions of this Contingency Plan, including post-emergency inspections and reporting.

1.2. DISTRIBUTION

To assure proper implementation, this Contingency Plan shall be studied and understood by all personnel involved in the management of hazardous waste at the OD Unit and by all personnel required to respond to emergency situations at the OD Unit.

A copy of this Contingency Plan and any subsequent revisions to the plan shall be maintained at the Environmental Management (EM) Branch Office and a current copy shall be maintained at the KCP, and at the personnel bunker at the EOD Range. Copies and subsequent revisions shall be distributed to the KAFB Fire Department, the Albuquerque Fire Department, and the New Mexico Environment Department in the event that they are called upon to assist with or provide emergency services.

1.3. CHARACTERISTICS OF WASTES MANAGED AT THE OD UNIT

The Permittee treats reactive (D003) and ignitable (D001) hazardous wastes. These hazardous wastes include explosives, propellants, and pyrotechnics.

1.4. SUPPORT AGREEMENTS WITH OUTSIDE FACILITIES

The Permittee shall maintain support agreements in accordance with Permit Section 2.4.4.

1.5. EMERGENCY COORDINATOR

An EC (see Table F-1 of this Permit Attachment) shall be on site during treatment activities to coordinate emergency response measures. The EC shall be thoroughly familiar with this Contingency Plan, this Permit, characteristics of the hazardous wastes managed at the OD Unit, the hazardous waste management operations and activities conducted at the OD Unit, the location of hazardous wastes managed at the OD Unit when treatment operations are in progress, the location of the Operating Record at the Facility, and the EOD Range layout. The Base Civil Engineer shall also serve as the functional equivalent of an alternate EC. If the Base Civil Engineer becomes the EC (because the primary EC is not available), the Base Civil Engineer shall be present at the OD Unit for the entire duration of the treatment event.

The EC shall ensure that personnel assigned to the EOD Range are trained in the location and use of eyewash solutions, fire extinguishers, and emergency protective clothing; in emergency procedures; and in evacuation procedures before starting any treatment operations.

The EC has three primary responsibilities. They are:

1. Assess the situation. By observing the scene, interviewing personnel, and/or reviewing records, the EC shall gather information relevant to the response, such as the type of event, quantity and type of released material, and actual or potential hazards to human health or the environment.
2. Protect personnel. The EC shall take reasonable measures to ensure the safety of personnel, such as accounting for EOD Range personnel, attending to injuries, or coordinating the evacuation of EOD Range personnel, if necessary. If evacuation is indicated for personnel, the KCP shall be informed.
3. Contain or mitigate the hazards. The EC shall take reasonable measures to ensure that fires, explosions, or releases do not occur, recur, or spread.

1.6. RESPONSE PROCEDURES

When the EC is notified of an incident or emergency, he shall first determine the scale of the incident or emergency and decide if the incident or emergency is minor or major. In the case of minor incidents or emergencies, the EC shall coordinate the response. In the case of major incidents, the EC shall relinquish control to the KCP, which may in turn relinquish control to the KAFB Fire Chief when he arrives to handle the emergency; however, the EC shall remain available to provide technical guidance and information.

If necessary to protect human health, personnel shall evacuate the OD Unit during an emergency in accordance with the requirements of Section 1.6.5 of this Permit Attachment.

In the event that the EC determines an incident to be minor, a person shall be assigned to stand by at a safe distance with a two-way radio. At the first indication of an escalation in the degree of the incident, the standby person shall be instructed to notify the KCP.

The EC or EM Branch Chief of Compliance shall notify the National Response Center (1-800-424-8802 or current phone number) and the Department with the details of the incident or emergency as soon as possible after being notified of the incident or emergency.

After any incident or emergency, the EC shall ensure that the OD Unit and emergency

equipment are cleaned, waste is properly managed and disposed of, and the OD Unit is safe to resume operation. Before operations are resumed, the EC shall contact the EM Branch Chief of Compliance, who shall inform the appropriate agencies. The EC shall also ensure that the emergency recovery inspections and activities described in Section 1.8.1 of this Permit Attachment are conducted. The EC shall also be responsible for preparing post-emergency or post-incident reports, as presented below in Section 1.8.2 of this Permit Attachment.

1.6.1. Spills

The first priority in dealing with any spill is protection of personnel. If any hazardous waste is spilled during transfer to a treatment unit, transfer of the waste shall be discontinued immediately. The Range Supervisor shall notify the EC, proper personal protective equipment (PPE) shall be donned, and the spilled material and potentially contaminated media (e.g., soil) shall be contained, removed, and managed appropriately as solid or hazardous waste. Wastes not authorized for treatment at the OD Unit shall be removed and treated or disposed of at an off-site facility, as appropriate. If appropriate, the waste shall be saturated (e.g., with water) as a precautionary measure. The incident, including details of the spill and cleanup, shall be noted in the Operating Record.

1.6.2. Personnel Exposure

In the event of personnel exposure to hazardous waste, including, but not limited to, irritation of the eyes, breathing passages, or skin; difficulty in breathing; and/or nausea, light-headedness, vertigo, or blurred vision, personnel shall immediately take the following measures.

1. Notify the EC immediately.
2. The EC shall attempt to ascertain what, if any, chemical exposure occurred and what corrective measures are appropriate.
3. Transport the affected person to a medical facility for evaluation.
4. Evacuate and barricade the area to prevent unauthorized entry.

1.6.3. Explosion and/or Fire Involving Ordnance

EOD personnel shall implement operating practices designed to minimize the risk of fires and explosions that endanger human health or the environment at the OD Unit.

1.6.4. Natural Disasters

After any natural disaster in the vicinity of the OD Unit (e.g., earthquake, floods, lightning strike), the EC shall inspect the OD Unit for any signs of damage, leakage, and land movement and initiate any necessary corrective measures to rectify potential or actual problems. Inspection findings and corrective measures shall be recorded in the Operating Record.

1.6.5. Evacuation

Personnel shall evacuate the EOD Range upon voice command or by notification over two-way radio or other communication device.

1.6.5.1. Evacuation Procedure

The following procedure shall be implemented for evacuation:

1. When an evacuation is announced, stop work.
2. Assist injured personnel to evacuate, if possible.
3. Report to the designated assembly area outside the EOD Range personnel bunker for roll call to be taken by the EC or his designee.
4. Be continually cognizant of wind directions (stay upwind, if possible) and emergency equipment.
5. Do not reenter the affected area until the EC or KAFB Fire Chief authorizes reentry.

1.6.5.2. Evacuation Route

The EC shall be responsible for ensuring that all EOD personnel and site visitors are familiar with evacuation procedures and routes. A map showing the evacuation route is provided as Figure F-1. The map shall be posted at the EOD Range personnel bunker and carried by the EC on all treatment operations.

1.7. EMERGENCY EQUIPMENT

Emergency equipment shall be available for use at the OD Unit. The emergency equipment listed in Table F-2 shall be repaired, replaced, and/or upgraded with functionally equivalent components and equipment, as necessary.

1.8. EMERGENCY AND INCIDENT RECOVERY PROCEDURES

The recovery procedures that shall be followed after a minor or major incident or emergency at the OD Unit are described below.

1.8.1. Post-Emergency Inspections and Activities

The following post-emergency incident inspections and activities shall be conducted:

1. The EC will assure that the time, date, and details of any incident or emergency are noted in the Operating Record in accordance with 40 C.F.R. § 264.56(i).
2. The EC shall inspect the premises for leaks or ruptures of equipment, and shall ensure that all recovered material and waste is managed properly. The results of the inspection shall be recorded in the Operating Record. Only containers made of or lined with materials that will not react with and are otherwise compatible with the waste resulting from cleanup procedures shall be used.
3. Emergency response equipment shall be carefully inspected and the equipment decontaminated, replaced, or refurbished, if needed. Fire extinguishers shall be checked for adequate charge. PPE shall be checked for contamination. Remedial equipment shall be inspected for contamination and proper operation. The supply of eyewash solution and other expendable items used for first aid or cleanup shall be checked and replaced, as necessary.

4. Within 24 hours of an emergency or incident, fire extinguishers shall be replaced or recharged and PPE decontaminated, repaired, or replaced as necessary.
5. Within three days of an emergency or incident, other equipment and structures shall be decontaminated. Decontamination wastes shall be collected and managed appropriately. Appropriate PPE shall be worn during decontamination procedures.
6. Within 30 days of an emergency or incident, other equipment shall be repaired or replaced as necessary.

1.8.2. Post-Emergency or Incident Reports

The following post-emergency or incident reports shall be made:

1. A verbal report of any incident or emergency shall be reported promptly to the EM Branch Chief of Compliance if he was not informed during its occurrence.
2. A written emergency or incident report shall be prepared jointly by the EC and the EM Branch Chief of Compliance and forwarded to the Department within 15 working days, as required by 40 C.F.R. § 264.56(i). The written report shall include, at a minimum, the following.
    a. Name, address, and telephone number of the Commander of KAFB, the EC, and the EM Branch Chief of Compliance;
    b. Name, address, and telephone number of the responsible official;
    c. Date, time, and the type of emergency or incident;
    d. Name and quantity of material and waste involved;
    e. Extent of injuries, if any;
    f. Assessment of actual or potential hazards to human health or the environment; and
    g. Estimated quantity and disposition of recovered material and waste.
3. Before operations are resumed at the OD Unit, the Department shall be notified that the OD Unit is in compliance with 40 C.F.R. §§ 264.56(h) and 264.56(i) and the requirements of this Permit. The notification shall address the fact that no new waste shall be treated that may be incompatible with released material and waste until cleanup procedures are completed and that all emergency equipment is cleaned and fit for its intended use.

1.8.3. Emergency/Incident Response Evaluation

The Permittee shall be responsible for annual evaluations of the KAFB Facility emergency response plans and for evaluation of the response to any incident or emergency. If these evaluations reveal that changes to the emergency response plans are necessary, they shall be amended by the Permittee and distributed to the appropriate organizations.

This Contingency Plan shall be reviewed and, if necessary, amended by the Permittee whenever:

1. The Permit, or applicable regulations, is revised.
2. The plan fails in an incident or emergency.

3. The design, construction, operation, and/or maintenance of the OD Unit or other circumstances change in a way that materially increases the potential for fires, explosions, or releases of hazardous waste or hazardous constituents, or changes the response necessary in an incident or emergency.
4. The list of emergency equipment changes.

Whenever any of the EC contact information in Table F-1 changes, a revised table shall be provided to the Department and distributed to all Contingency Plan holders. A copy of the revised table shall also be maintained at the EOD Range personnel bunker. A revision of Table F-1 constitutes an amendment to this Contingency Plan. The Permittee shall request a modification to this Permit should it become necessary to amend this Contingency Plan for any reason.

TABLE F-1
Emergency Coordinator Contact Information for the OD Unit

Contact or Name	Address	Office Phone	Home Phone
D. Brent Wilson, Base Civil Engineer	Building 20684, KAFB, NM 87117	846-7911 or 846-0411	281-5857

TABLE F-2
Type and Location of Emergency Equipment Available for Use at the OD Unit

Emergency Item or Equipment	Description	Location	Contact
Emergency Vehicles	Emergency Response Vehicle: Mobile Command Post equipped with communications equipment.	KAFB Civil Engineer Readiness	846-9196
	Ambulances	KAFB Fire Department	911 or 846-8069
	Security Vehicles: Vans and trucks equipped with communications equipment and utilized for transportation of personnel and equipment.	KAFB Security Police	846-7926
	Fire Trucks: Fire-fighting vehicles outfitted with equipment for fighting fires and with self-contained breathing apparatuses (SCBAs).	KAFB Fire Department	911 or 846-8069
	Helicopter: Rotary-wing aircraft for transportation of personnel to or from site.	KAFB Command Post	846-3777
Medical Supplies	First aid kit	EOD Range personnel bunker or vehicle	EC or Range Safety Officer
	Stretchers/Stokes Litter: Equipment for movement of injured personnel.	KAFB Fire Department	846-8069
	Blankets: Normal blankets.		
	Medical Kits: Emergency first-aid supplies.		
	Oxygen: Medical grade oxygen in compressed cylinders equipped for personnel use.		
Safety Supplies	Fire Extinguisher (ABC)	EOD Range personnel bunker or vehicle	EC or Range Safety Officer
	Eye Wash Kit		
	Spill Containment Kit		
	Decontamination Kit		
	Air Packs: SCBAs equipped with positive pressure mode for use by personnel entering hazardous atmospheres.	KAFB Fire Department	846-8069
	Monitoring Instruments		
General Supplies	Two-Way Radio	EOD Range personnel bunker or vehicle	EC or Range Safety Officer
	Shovels		
	Hand Tools		
	Broom(s)		
Transportation	Tractor-trailer combinations,	KAFB Logistics Readiness Squadron	853-7843
	Flat-bed trucks		
	Enclosed panel vans		
	Passenger vehicles, including sedans and vans		
	Passenger buses		

DEFINITIONS
SCBA self contained breathing apparatus

Figure F-1

PERMIT ATTACHMENT G: PERSONNEL TRAINING PLAN

1.0 INTRODUCTION

The primary objective of the Explosives Ordnance Disposal (EOD) training program shall be to prepare personnel to conduct operations at the Open Detonation (OD) Unit in a safe and environmentally sound manner and in compliance with this Permit and the New Mexico Hazardous Waste Management Regulations (HWMR), 20.4.1 NMAC. To achieve this objective, the program provides personnel with training relevant to their positions.

All personnel shall complete initial training within six months of assignment to EOD Range duty. Personnel shall not work at the OD Unit until they have completed training on the Contingency Plan (Permit Attachment F). Personnel shall be given, at a minimum, a basic understanding of the regulatory requirements of hazardous waste management, this Permit, and emergency response procedures. Personnel shall receive additional classroom and on-the-job training designed specifically to teach them how to perform their duties safely and in conformance with regulatory requirements and this Permit. All personnel shall receive the required training prior to being allowed to work unsupervised.

1.1. TRAINING PROGRAM

Training for personnel is the overall responsibility of the EOD Flight Chief. All training shall be conducted by qualified EOD Technicians and includes formal classroom sessions, on-the-job training, and review of written procedures and plans. A summary of the training program for personnel is shown in Table G-1.

1.1.1. Job Title/Job Description

As required by 40 C.F.R. § 264.16(d)(1) and (2), records of each job title related to hazardous waste management at the OD Unit, a list of employees for each job title, and job descriptions for each job title shall be maintained at the EOD Shop. Job descriptions shall include hazardous waste management duties, and required skills, experience, and education.

Records relating to the training program shall be maintained at the EOD Shop. The records shall also include a list of courses required for each position, course descriptions, documentation that each employee has received and completed appropriate training, and information regarding qualifications.

1.1.2. Relevance of Training to Job Position

The training program shall provide employees with training to respond effectively to emergencies at the OD Unit. Personnel shall receive relevant training on the requirements of this Permit (including Contingency Plan implementation), OD Unit operations (including emergency procedures, equipment, and systems), and in management of hazardous wastes.

1.1.3. Training Content, Frequency, and Techniques

The training program shall include a comprehensive combination of internal training courses and on-the-job training. Each training course shall be developed carefully to support the goal of safe and environmentally sound operations at the OD Unit in compliance with this Permit and the

HWMR. Course outlines shall be maintained in the Training Section at the EOD Shop. The general training content and frequency of training are presented in Table G-1.

1.2. TRAINING DIRECTOR

The Training Director (EOD Flight Chief) shall direct the training program and shall be responsible for establishing training requirements for personnel. The EOD Flight Chief shall be required to be knowledgeable of the applicable hazardous waste management regulations and specific processes employed at the OD Unit, pursuant to the HWMR and this Permit.

1.3. IMPLEMENTATION OF TRAINING PROGRAM

The training program shall be implemented to ensure that all personnel who work at the OD Unit receive the training indicated in Table G-1. All personnel shall participate annually in a training refresher. Visitors shall be provided instruction commensurate with the nature of their visit.

TABLE G-1 Training Program for the OD Unit		
Course	**Content**	**Frequency**
Basic EOD Course	Covers all aspects of positions and duties associated with EOD and OD Unit operations	Initial
Explosive Safety	General Safety Requirements, Motor Vehicle Transportation, Disposal Range Requirements, Disposal Range Procedures, Range Safety, Standard Safety Guidelines, Site Entry, Site Control, Personal Protective Equipment, Contingency Plan, Implementation, Procedures for Using Emergency Equipment, Procedures for Shutdown of Operations, Responses(s) to Emergencies, Emergency Coordinator(s), Evacuation Route and Procedures, Post-emergency Procedures	Initial/Annual
Relevant In-House Training	General Overview of Procedures to Perform Operations at the EOD Range and OD Unit; Waste Analysis Plan; Identification of Waste to be Managed; Waste Screening and Verification; Range Operation; Safety Practices; Security; Range Inspections; Preventive Procedures, Structures, and Equipment; Prevention of Reaction of Reactive Waste, Ignitable and Incompatible Waste; Authorized Wastes	Initial/Annual
Resource Conservation and Recovery Act Training	Hazardous Waste Management and Regulations – Overview, Hazardous Substances and Properties, General Facility Standards, Preparedness and Prevention, Contingency Plan and Emergency Procedures, Record Keeping and Reporting	Initial/Annual

KIRTLAND AIR FORCE BASE
ALBUQUERQUE, NEW MEXICO

Closure Plan for Open Detonation Unit

May 2014

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40 CFR 270.11
DOCUMENT CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

TOM D. MILLER, Colonel, USAF
Commander, 377th Air Base Wing

This document has been approved for public release in accordance with Department of Defense Directives and Air Force Instructions.

KIRTLAND AIR FORCE BASE
377th Air Base Wing Public Affairs

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1. INTRODUCTION

This closure plan describes the activities necessary to close the Open Detonation (OD) treatment unit located within the Explosive Ordnance Disposal (EOD) Range at Kirtland Air Force Base (AFB). The OD Unit consists of a cleared circular area approximately ~~1,500~~ 1,000 ft in diameter and surrounded and delineated by an approximately two-foot (ft) high earthen berm. Figures H-1 and H-2 show the location of the EOD Range at Kirtland AFB, and the collocated OD and Open Burn (OB) Units within the EOD Range. Detonations were conducted in pits measuring approximately 30 ft long, 15 wide and 12 ft deep.

Until final closure of the unit is complete in accordance with the New Mexico Hazardous Waste Management Regulations and certification of closure has been approved by the New Mexico Environment Department (~~NMED or~~ the Department), a copy of the approved Closure Plan, and any revisions thereof, shall be maintained in the Operating Record. This Closure Plan, and any revisions thereof, shall be made available, upon request, to the Department.

If the OD Unit cannot be clean-closed, a post-closure care plan addressing the hazardous constituents remaining at the site shall be prepared and submitted to the Department for approval.

The OD Unit is collocated with the OB treatment unit at the EOD Range. The OD and OB Units are scheduled to undergo final closure activities simultaneously. The OB Unit has a separate closure plan, but several elements of the OB and OD Unit closure plans overlap and are noted within the documents. Additionally, there is currently a perchlorate groundwater investigation occurring to the west of the EOD range. This investigation and its results are independent of this OD Unit closure plan.

As per Kirtland AFB's Hazardous Waste Treatment Facility Operating Permit for the Open Detonation Unit (Permit), Attachment I, Table I-3 , SWMU 06-19 (KAFB IRP site OT-29), which is located approximately 20 ft northeast of the present OB structure, requires corrective action. Corrective action at SWMU 06-19 shall comply with the provisions of the Resource Conservation and Recovery Act (RCRA).

1.1 General Closure Information

This closure plan has been prepared in compliance with the requirements of RCRA (42 U.S.C. §§6901 et seq.) and its implementing regulations at 40 CFR Parts 264 and 270 (see 40 CFR Part 264 Subparts G and X and 270.14(b)(13)), and state implementing statutes and regulations under which the state has delegated RCRA authority (see New Mexico Hazardous Waste Act, Chapter 74 Article 4 NMSA 1978 and 20.4.1 NMAC).

1.2 Closure Performance Standard

The OD Unit shall be closed to meet the following performance standards:

- Minimize the need for further maintenance;
- Control, minimize or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to ground water or surface waters or to the atmosphere; and
- Comply with the requirements of 40 CFR Part 264, Subpart G and 40 CFR §264.601.

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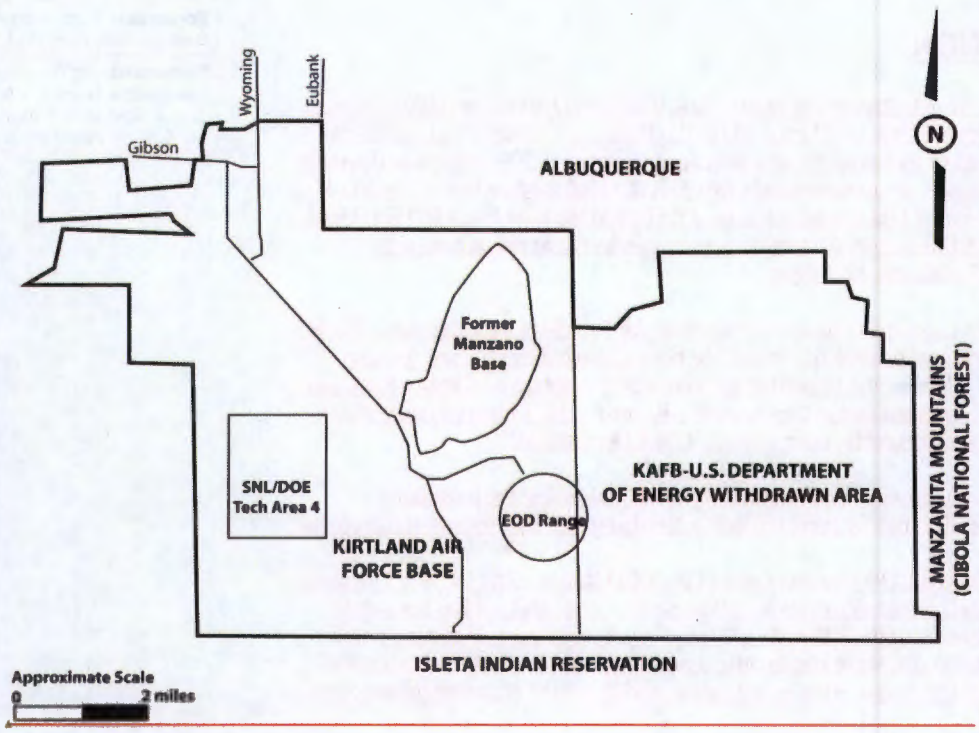

Figure H-1. Location of EOD Range at Kirtland AFB

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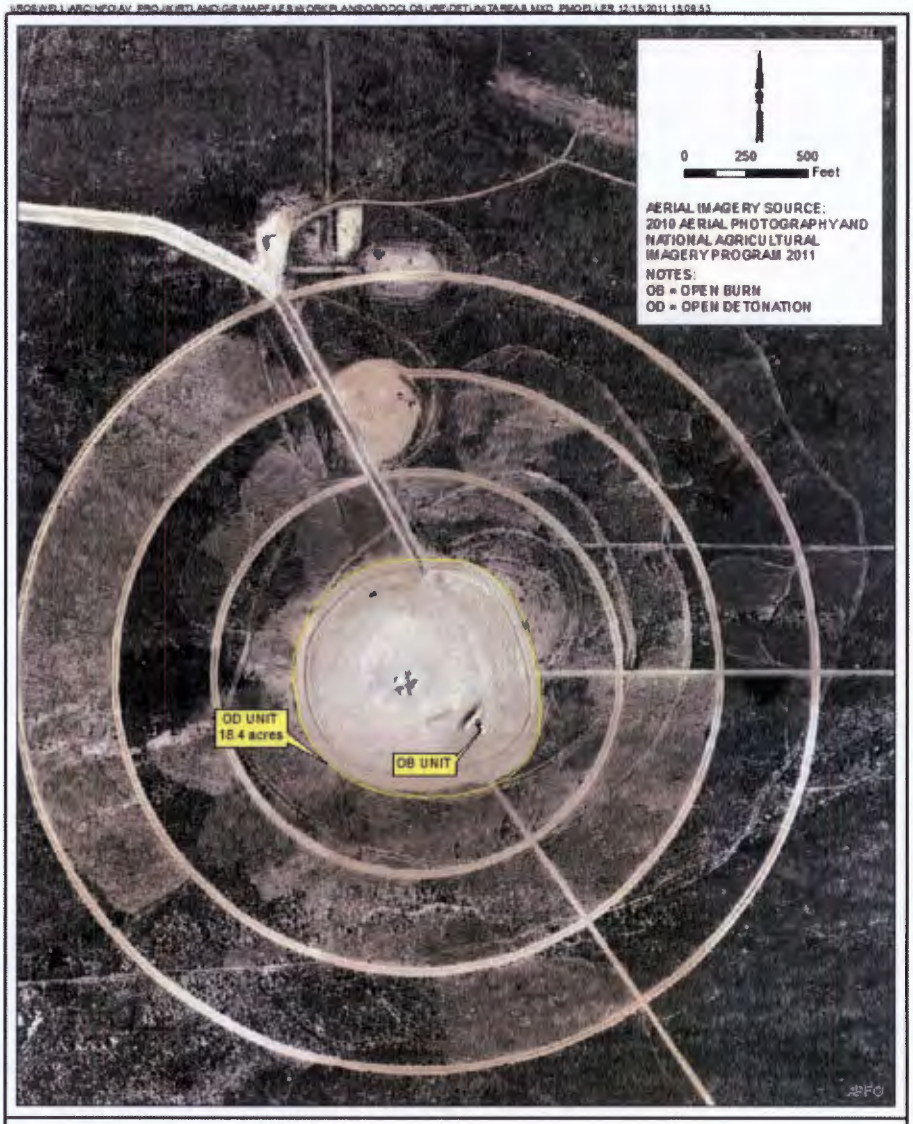

FIGURE H-2
LOCATION OF OPEN BURN AND OPEN DETONATION UNITS
EOD RANGE, KIRTLAND AIR FORCE BASE, NEW MEXICO

1.3 Final Closure Activities

The last treatment event at the OD Unit occurred on 11 August 2010. The Department was notified on 13 August 2010 that, effective immediately, ~~Kirtland AFB~~the Permitee had closed the OD Unit for all treatment activities~~.~~. The Permittee shall notify the Department, in writing, at least 45 calendar days prior to the date that closure activities shall commence.

Final closure activities at the OD Unit shall consist of:

- Installation of four groundwater monitoring wells at the EOD range (one upgradient and three downgradient wells) and eight consecutive quarters of groundwater sampling to determine the presence or absence of groundwater contamination;
- Removing any soil or debris from the OD Unit that have contaminant concentrations which pose unacceptable risk to human health or the environment;
- Sending for treatment and disposal any solid and hazardous waste, including any treatment residues, to a permitted Treatment, Storage, or Disposal Facility (TSDF) in accordance with applicable regulatory requirements.

Final closure for the OD Unit shall be completed when:

- All solid and hazardous waste has been disposed of off-site as required by law;
- Sampling and analysis demonstrates that no unacceptable risk to human health or the environment originating from the OD Unit exists in soil or groundwater;
- A Certification of Closure and Closure Report has been submitted to the Department; and
- The Department has approved the Certification of Closure and Closure Report.

1.4 Maximum Extent of Operations and Maximum Waste Inventory

The OD Unit was previously permitted on 20 December 1994 as Permit# NM9570024423-OD, which allowed 100,000 pounds of net explosive weight (NEW) to be treated at the OD Unit annually. Rocket motors, large caliber munitions, explosive wastes and firearms were treated at the OD Unit. Based on the operating record, the maximum inventory treated at the OD Unit was approximately 316,012 pounds of NEW.

Closure activities and any corrective action that may be required shall not be limited to the OD Unit if contamination has migrated beyond the OD Unit boundary. Any corrective action that may be required because of a release at the OB Unit shall be conducted under the terms and conditions of the 2010 Permit. ~~This will allow for an efficient closure of the OB Unit.~~

1.5 Schedule for Closure

Final closure of the OD Unit shall proceed by the general schedule presented in Table H-1.

Table H-1
Closure Schedule for the Open Detonation Unit at Kirtland AFB

Activity	Time Required
Notify the Department of receiving final volume of hazardous waste at the OD Unit	Completed
Removal of all hazardous waste from the OD Unit	Completed
Department approval of final OD Unit closure plan	TBD
Notify Department of commencement of closure activities	45 days before closure activities begin
Commence closure activities	Day 0
Remove all solid and hazardous waste	Day 90
Commence groundwater monitoring well installations	Day 90
Complete groundwater monitoring well installations	Day 180
Complete all closure activities, except groundwater monitoring	Day 360
Complete 8 quarters of groundwater monitoring	Day 900
Submit Closure Report and certification to ~~NMED~~Department	Day 960

Note: The schedule above indicates calendar days on which closure activities shall be started or completed subsequent to commencing of closure activities at day zero. Some activities may be conducted simultaneously or may require less time to complete.

1.6 Closure Report

Within 60 days of completion of the final closure activities, a closure report shall be submitted to the Department. The report shall document the closure activities conducted and contain, at a minimum, the following information:

- A summary of the closure activities;
- Any significant variance from the approved closure plan and the reason for the variance;
- A summary of sampling data associated with closure, including analytical results for all field and laboratory quality control samples;
- A quality assurance statement on the adequacy of the analyses to support closure;
- The location of the file of supporting documentation (e.g., memos, logbooks, laboratory sample analysis data);
- Disposal location and quantities of all solid and hazardous wastes removed from the OD Unit;
- Certification of the accuracy of the report; and
- Survey plat.

1.7 Survey Plat and Post-Closure Requirements

Upon completion of closure activities at the OD Unit, a survey plat shall be prepared, certified by a professional land surveyor, and submitted with the closure report to the Department. The survey plat shall also be simultaneously filed with the local zoning authority. In the event that the OD Unit cannot be clean closed, a post-closure care plan shall be submitted to the Department for review and approval.

2. CLOSURE PROCEDURES

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There is no hazardous waste present at the OD Unit; the last treatment event at the OD Unit occurred on 11 August 2010, and there are no treatment residues remaining. There are no structures or equipment at the OD Unit. (The structures associated with the collocated OB Unit are addressed under the OB Unit closure plan.)

The first phase of closure shall consist of a hazards survey of the OD Unit conducted by qualified contractor health physics and industrial hygiene personnel, which ~~will~~shall include unexploded ordnance (UXO) safety personnel, and Kirtland AFB EOD personnel. The purpose of the survey shall be to locate and remove any "kick-out" (untreated waste, waste fragments, or UXO), and to identify potential contamination concerns that may present hazards to workers during the closure activities and to specify any control measures necessary to reduce worker risk. This survey ~~will~~shall provide the information necessary for health physics, UXO safety, and industrial hygiene personnel to identify worker qualifications, personal protective equipment (PPE), safety awareness, work permits, exposure control programs, and emergency coordination that ~~will~~shall be required to perform closure. Any munitions and explosives of concern (MEC) identified during the hazard survey ~~will~~shall be reported to and handled by Kirtland AFB EOD staff personnel only in accordance with standard operating procedures. All workers involved in the closure activities ~~will~~shall be required to have training and medical monitoring as required by applicable regulations. Personnel performing closure activities ~~will~~shall be required to wear PPE as specified by health physics, UXO safety, and industrial hygiene personnel.

Sufficient sampling and analysis shall be required to demonstrate there are no contaminant concentrations which pose unacceptable risk to human health or the environment. ~~Soil and groundwater~~ Groundwater and soil samples shall be analyzed for parameters listed in Tables H-2 and H-3 to quantify contamination, if any, originating from the OD Unit.

~~Groundwater sampling results shall be compared to the New Mexico Water Quality Control Commission water quality standards and the Federal Safe Drinking Water Act maximum contaminant levels (MCLs), included in Table H-3. If the levels of hazardous constituents in the groundwater exceed the water quality standards or MCLs, a risk assessment shall be prepared. If the risk assessment demonstrates that the level of contamination is unacceptable, the groundwater shall be subject to corrective action, and a corrective action work plan subject to NMED review and approval shall be developed. For perchlorate, Kirtland AFB will apply the Office of the Under Secretary of Defense *Perchlorate Release Management Policy* dated 22 April 2009.~~

Surface and subsurface soil at the OD Unit shall be characterized by sampling and analysis. Soil sampling shall follow the procedures described in Section 2.2.1 of this Permit Attachment (H). Soil shall be analyzed for the parameters listed in Table H-~~2~~3. If sampling and analysis of soil indicates the presence of hazardous waste or hazardous constituents above background levels, a risk assessment shall be conducted based on a residential land-use scenario to determine whether the contaminants pose an unacceptable risk to human health or the environment. In lieu of a baseline risk assessment, the Permittee may compare the soil sampling results to the soil screening levels using the procedures listed in the Department's most current version of "Technical Background Document for Development of Soil Screening Levels," as ~~amended~~it may be updated, provided the soil screening levels are based on a residential land-use scenario. If the risk assessment demonstrates that the level of contamination is unacceptable, the contaminated soil exhibiting unacceptable risk shall be subject to corrective action under Permit Part 6 and shall be excavated and removed. The excavated soil shall be collected, transferred to containers, and, if

applicable, managed and disposed of as hazardous waste. The Permittee shall conduct corrective action activities at the OD Unit using the cleanup levels in Permit Section 6.2.3 if corrective action is necessary. Clean up levels shall be based on a residential land use scenario. Background soil concentrations for metals are those approved by the Department for the KAFB Facility, and are listed in Table D-4 of Permit Attachment D.

2.1 Monitoring Wells

2.1.1 Installation of New Monitoring Wells

The OD Unit is subject to the environmental performance standards of 40 C.F.R. § 264.601. As such, groundwater monitoring shall be conducted as part of closure activities to demonstrate that operations did not impact groundwater. Four monitoring wells, one upgradient and three downgradient of the OD Unit, shall be installed. The locations of the proposed monitoring wells are presented in Figure H-3.

~~A monitoring well installation plan is included as Attachment I to this Closure Plan. The Monitoring Well Installation Plan addresses:~~

~~Well locations,~~
~~Drilling specifications,~~
~~Well construction specifications,~~
~~Well development procedures,~~
~~A schedule for implementation and completion of the well installations;~~
~~Preparation and submittal of a well completion report; and~~
~~Groundwater sampling and analysis requirements for eight quarters.~~

The wells installed at the OD Unit shall meet the groundwater monitoring requirements of 40 C.F.R. §§ 264.97(a)(2), (b), and (c). Within 30 days of completing well installation, ~~Kirtland AFB~~the Permitee shall submit a well completion report to the Department for approval.

Groundwater monitoring wells shall be properly plugged and abandoned in accordance with applicable New Mexico statutes and regulations, provided groundwater contamination has not occurred. If groundwater contamination has occurred, these monitoring wells shall be maintained for the purpose of implementing corrective action. The wells shall not be plugged or abandoned until the Department has approved closure of the OD Unit.

A Activities for monitoring well installation ~~plan is included as Attachment I to this Closure Plan. The Monitoring Well Installation Plan addresses~~are presented in the following paragraphs and include:

Well locations,
Drilling specifications,
Well construction specifications,
Well development procedures,
A schedule for implementation and completion of the well installations;
Preparation and submittal of a well completion report; and
Groundwater sampling and analysis requirements for eight quarters.

This work plan describes the proposed monitoring well installation and sampling activities near the ~~Open Detonation (OD) unit on Kirtland Air Force Base (AFB), New Mexico.~~ The primary project objective is the installation and sampling of four groundwater monitoring wells, one upgradient and three downgradient of the site, to evaluate the potential groundwater impacts from the operation of the OD unit. ~~The general site location is shown in Figure 1.~~

The new monitoring wells ~~will~~shall be installed in the vicinity of the OD Unit (Figure H-3). ~~The proposed monitoring well locations are shown on Figure 2.~~ Installation of the monitoring wells ~~will~~shall facilitate groundwater sampling from the uppermost groundwater both up and downgradient of potential source areas associated with the OD unit. Based on data from nearby wells, groundwater at the proposed locations is expected to occur under confined conditions within the Paleozoic sedimentary rocks of the Madera Group or Sandia Formation or the underlying Precambrian granite. The depth to the uppermost water bearing zones at the proposed well locations is expected to range from approximately 100 to 200 feet (ft) below ground surface (bgs). Final well design ~~will~~shall be dependent on field conditions and the placement of the fourth well ~~will~~shall be performed in consultation with the ~~New Mexico Environment~~ Department ~~Hazardous Waste Bureau (NMED-HWB).~~

Table H-2

Comparison of Reporting Levels to Screening Objectives in Groundwater, Open Burn and Open Detonation Units at Kirtland Air Force Base, New Mexico

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Method	Analyte	CAS #	Units	New Mexico Water Quality Standard	EPA Maximum Contaminant Levels/Secondary Contaminant Levels[a]	EPA Regional Screening Levels Tap Water (Nov 2012)	DOE Open Burn Suggested Maximum Background (Dec 1998)	LOQ	LOD	DL
EPA 160.2	Total dissolved solids	NA	mg/L	--	--	--	--	4	2	1
EPA 310.2	Alkalinity	NA	mg/L	--	--	--	--	10	5	2.5
EPA 350.1	Ammonia	7664-41-7	mg/L	--	--	--	--	0.5	0.1	0.049
SW9030B	Sulfide	18496-25-8	mg/L	--	--	--	--	2	0.8	0.4
SW9056	Nitrate	14797-55-8	mg/L	58.4	10	25	4 (as NO2/NO3)	0.5	0.1	0.04
SW9056	Nitrite	14797-65-0	mg/L	3.65	1	1.6	4 (as NO2/NO3)	0.5	0.1	0.05
SW9056	Chloride	16887-00-6	mg/L	--	--	--	--	0.5	0.1	0.05
SW9056	Sulfate	18785-72-3	mg/L	--	--	--	--	0.5	0.1	0.05
SW9056	Fluoride	7782-41-4	mg/L	1.46	--	620	--	0.5	0.1	0.05
SW9056	Bromide	7726-95-6	mg/L	--	--	--	--	0.5	0.1	0.05
SW9060	Total organic carbon	7440-44-0	mg/L	--	--	--	--	1	0.5	0.25
SW6010B	Barium	7440-39-3	µg/L	1,000	2,000	--	120	20	5	0.25
SW6010B	Boron	7440-42-8	µg/L	7,300	--	3100	--	20	5	1
SW6010B	Beryllium	7440-41-7	µg/L	--	4	--	4	3	1	0.3
SW6010B	Cadmium	7440-43-9	µg/L	10	5	--	0.47	3	1	0.5
SW6010B	Calcuim	7440-70-2	µg/L	--	--	--	--	1000	80	35
SW6010B	Chromium	7440-47-3	µg/L	50	100	--	43	10	5	1.2
SW6010B	Cobalt	7440-48-4	µg/L	50	--	--	2.5	10	5	3
SW6010B	Copper	7440-50-8	µg/L	1,000	1,300 (1,000)	--	<50	15	5	2.1
SW6010B	Iron	7439-89-6	µg/L	1,000	300	11000	--	200	100	50
SW6010B	Lead	7439-92-1	µg/L	50	15	--	10	10	5	2.5
SW6010B	Lithium	7439-93-2	µg/L	--	--	31	--	500	25	11
SW6010B	Magnesium	7439-95-4	µg/L	--	--	--	--	500	25	11
SW6010B	Manganese	7439-96-5	µg/L	876	--	320	--	500	25	11
SW6010B	Molybdenum	7439-98-7	µg/L	183	--	78	--	500	25	11
SW6010B	Nickel	7440-02-0	µg/L	--	--	300	28	10	5	2.4
SW6010B	Potasium	9/7/7440	µg/L	--	--	--	--	3000	250	237
SW6010B	Selenium	7782-49-2	µg/L	50	50	--	5	40	25	13
SW6010B	Silver	7440-22-4	µg/L	50	100	--	<10	5	2	0.84
SW6010B	Sodium	7440-23-5	µg/L	--	--	--	--	5000	250	91.6
SW6010B	Strontium	7440-24-6	µg/L	21900	--	9300	--	500	25	11
SW6010B	Tin	7440-31-5	µg/L	--	--	9300	50	50	15	1.7
SW6010B	Vanadium*	7440-62-2	µg/L	--	--	--	13	20	5	1.9
SW6010B	Zinc	7440-66-6	µg/L	10,000	5,000	--	260	20	10	3
SW6020A	Antimony	7440-36-0	µg/L	--	6	--	6	6	4	2
SW6020A	Arsenic	7440-38-2	µg/L	100	10	--	14	3	2	1
SW6020A	Thallium	7440-28-0	µg/L	--	2	--	2	1.5	1	0.5
SW7470A	Mercury	7439-97-6	µg/L	2	2	--	2	0.3	0.1	0.1
SW6850	Perchlorate	14797-73-0	µg/L	4[b]	--	--	--	0.5	0.25	0.082
SW8260B	1,1,1-Trichloroethane	71-55-6	µg/L	60	200	--	--	1	0.4	0.19
SW8260B	1,1,2,2-Tetrachloroethane	79-34-5	µg/L	10	--	--	--	1	0.2	0.09
SW8260B	1,1,2-trichloro-1,1,2-trifluoroethane*	76-13-1	µg/L	--	--	--	--	50	0.4	0.25
SW8260B	1,1,2-Trichloroethane	79-00-5	µg/L	10	5	--	--	1	0.4	0.31
SW8260B	1,1-Dichloroethane	75-34-3	µg/L	25	--	--	--	1	0.2	0.1
SW8260B	1,1-Dichloroethene	75-35-4	µg/L	5	7	--	--	1	0.4	0.14
SW8260B	1,2,3-Trichlorobenzene	87-61-6	µg/L	70	--	--	--	1	0.4	0.14
SW8011	1,2,3-Trichloropropane	96-18-4	µg/L	--	--	0.00085	--	0.2	0.09	0.09
SW8260B	1,2,4-Trichlorobenzene	120-82-1	µg/L	--	70	--	--	1	0.4	0.1
SW8260B	1,2,4-Trimethylbenzene	95-63-6	µg/L	--	--	15	--	1	0.2	0.12
SW8011	1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	µg/L	--	0.2	NA	--	0.02	0.005	0.005
SW8011	1,2-Dibromoethane (EDB)	106-93-4	µg/L	0.1	0.05	NA	--	0.02	0.005	0.0022
SW8260B	1,2-Dichlorobenzene	95-50-1	µg/L	--	600	--	--	1	0.4	0.14
SW8260B	1,2-Dichloroethane	107-06-2	µg/L	10	5	--	--	1	0.4	0.22
SW8260B	1,2-Dichloropropane	78-87-5	µg/L	--	5	--	--	1	0.2	0.15
SW8260B	1,3,5-Trimethylbenzene	108-67-8	µg/L	--	--	87	--	1	0.2	0.14
SW8260B	1,3-Dichlorobenzene*	541-73-1	µg/L	--	--	--	--	1	0.4	0.11
SW8260B	1,4-Dichlorobenzene	106-46-7	µg/L	--	75	--	--	1	0.2	0.13
SW8260B	1,4-Dioxane	123-91-1	µg/L	--	--	0.67	--	1	TBD	0.12
SW8260B	2-Butanone (MEK)	78-93-3	µg/L	--	--	4,900	--	2	0.4	0.35
SW8260B	2-Hexanone	591-78-6	µg/L	--	--	34	--	2	0.4	0.17
SW8260B	4-Methyl-2-pentanone (MIBK)	108-10-1	µg/L	--	--	1,000	--	2	0.4	1
SW8260B	Acetone	67-64-1	µg/L	--	--	12,000	--	10	4	2.1
SW8260B	Benzene	71-43-2	µg/L	10	5	--	--	1	0.2	0.13
SW8260B	Bromochloromethane	74-97-5	µg/L	--	--	83	--	1	0.4	0.14
SW8260B	Bromodichloromethane	75-27-4	µg/L	--	100	--	--	1	0.4	0.14
SW8260B	Bromoform	75-25-2	µg/L	--	100	--	--	1	0.4	0.1
SW8260B	Bromomethane	74-83-9	µg/L	--	--	7	--	1	0.4	0.29
SW8260B	Carbon disulfide	75-15-0	µg/L	--	--	720	--	2	0.2	0.16
SW8260B	Carbon tetrachloride	56-23-5	µg/L	10	5	--	--	1	0.4	0.15
SW8260B	Chlorobenzene	108-90-7	µg/L	--	100	--	--	1	0.2	0.12
SW8260B	Chloroethane	75-00-3	µg/L	--	--	21,000	--	1	0.4	0.34

Table H-2

Comparison of Reporting Levels to Screening Objectives in Groundwater, Open Burn and Open Detonation Units at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Water Quality Standard	EPA Maximum Contaminant Levels/Secondary Contaminant Levels[a]	EPA Regional Screening Levels Tap Water (Nov 2012)	DOE Open Burn Suggested Maximum Background (Dec 1998)	LOQ	LOD	DL
SW8260B	Chloroform	67-66-3	µg/L	100	100	--	--	1	0.2	0.12
SW8260B	Chloromethane	74-87-3	µg/L	--	--	190	--	1	0.4	0.25
SW8260B	cis-1,2-Dichloroethene	156-59-2	µg/L	--	70	--	--	1	0.4	0.1
SW8260B	cis-1,3-Dichloropropene*	10061-01-5	µg/L	--	--	--	--	1	0.4	0.22
SW8260B	Cyclohexane*	1735-17-7	µg/L	--	--	--	--	(a)	(a)	(a)
SW8260B	Dibromochloromethane	124-48-1	µg/L	--	100	--	--	1	0.4	0.13
SW8260B	Dichlorodifluoromethane (Freon 12)	75-71-8	µg/L	--	--	190	--	1	0.4	0.16
SW8260B	Ethylbenzene	100-41-4	µg/L	750	700	--	--	1	0.2	0.1
SW8260B	Isopropylbenzene	98-82-8	µg/L	--	--	390	--	1	0.2	0.12
SW8260B	Methyl tert-butyl ether (MTBE)	1634-04-4	µg/L	--	(5)	--	--	2	0.4	0.19
SW8260B	Methylene chloride	75-09-2	µg/L	100	5	--	--	1	0.4	0.35
SW8260B	Methyl Acetate*	79-20-9	µg/L	--	--	--	--	(a)	(a)	(a)
SW8260B	Methly Cyclohexane*	108-87-2	µg/L	--	--	--	--	(a)	(a)	(a)
SW8260B	m-Xylene & p-Xylene	136777-61-2	µg/L	--	10,000	--	--	1	0.8	0.18
SW8260B	Naphthalene	91-20-3	µg/L	30	--	NA	--	1	0.2	0.15
SW8260B	o-Xylene	95-47-6	µg/L	--	10,000	--	--	1	0.4	0.1
SW8260B	Styrene	100-42-5	µg/L	--	100	--	--	1	0.2	0.15
SW8260B	Tetrachloroethene	127-18-4	µg/L	--	5	--	--	1	0.2	0.1
SW8260B	Toluene	108-88-3	µg/L	750	1,000	--	--	1	0.4	0.25
SW8260B	trans-1,2-Dichloroethene	156-60-5	µg/L	--	100	--	--	1	0.4	0.11
SW8260B	trans-1,3-Dichloropropene*	10061-02-6	µg/L	--	--	--	--	1	0.2	0.08
SW8260B	Trichloroethene	79-01-6	µg/L	100	5	--	--	1	0.4	0.13
SW8260B	Trichlorofluoromethane (Freon 11)	75-69-4	µg/L	--	--	1,100	--	1	0.4	0.23
SW8260B	Vinyl chloride	75-01-4	µg/L	1	2	--	--	1	0.4	0.22
SW8260B	1,2-Dichloroethane-d4 (Surrogate)		%	--	--	--	--	--	--	--
SW8260B	4-Bromofluorobenzene (Surrogate)		%	--	--	--	--	--	--	--
SW8260B	Dibromofluoromethane (Surrogate)		%	--	--	--	--	--	--	--
SW8260B	Toluene-d8 (Surrogate)		%	--	--	--	--	--	--	--
SW8270C	1,1-biphenyl	92-52-4	µg/L	--	--	0.83	--	10	NA	5
SW8270C	1,2,4,5-tetrachlorbenzene	95-94-3	µg/L	--	--	1.2	--	10	2.1	0.54
SW8270C	2,4,5-Trichlorophenol	95-95-4	µg/L	--	--	890	--	10	3.0	2
SW8270C	2,4,6-Trichlorophenol	88-06-2	µg/L	--	--	3.5	--	10	3.0	2
SW8270C	2,4-Dichlorophenol	120-83-2	µg/L	--	--	35	--	10	3.0	2.6
SW8270C	2,4-Dimethylphenol	105-67-9	µg/L	--	--	270	--	10	3.0	2.2
SW8270C	2,4-Dinitrotoluene	121-14-2	µg/L	--	--	0.2	--	10	3.0	2
SW8270C	2,6-Dichlorophenol*	87-65-0	µg/L	--	--	--	--	15	3.0	5
SW8270C	2,6-Dinitrotoluene	606-20-2	µg/L	--	--	15	--	10	3.0	2
SW8270C	2-Chloronaphthalene	91-58-7	µg/L	--	--	550	--	10	3.0	1.3
SW8270C	2-Chlorophenol	95-57-8	µg/L	--	--	71	--	10	3.0	1.6
SW8270C	2-Methylphenol	95-48-7	µg/L	--	--	720	--	10	3.0	0.93
SW8270C	2-Nitroaniline	88-74-4	µg/L	--	--	150	--	50	3.0	2
SW8270C	2-Nitrophenol*	88-75-5	µg/L	--	--	--	--	10	3.0	1.9
SW8270C	2,2-oxybis(1-chloropropane)*	52438-91-2	µg/L	--	--	--	--	10	3	1.3
SW8270C	3,3'-Dichlorobenzidine	91-94-1	µg/L	--	--	0.11	--	50	3.0	0.96
SW8270C	3-Methylphenol & 4-Methylphenol	65794-96-9	µg/L	--	--	720	--	30	20	10
SW8270C	3-Nitroaniline*	99-09-2	µg/L	--	--	--	--	50	3.0	1.4
SW8270C	4,6-Dinitro-2-methylphenol	534-52-1	µg/L	--	--	1.2	--	60	20	2.2
SW8270C	4-Bromophenyl phenyl ether*	101-55-3	µg/L	--	--	--	--	10	3.0	1.1
SW8270C	4-Chloro-3-methylphenol	59-50-7	µg/L	--	--	1,100	--	10	3.0	2
SW8270C	4-Chloroaniline	106-47-8	µg/L	--	--	0.32	--	10	3.0	2
SW8270C	4-Chlorophenyl phenyl ether*	7005-72-3	µg/L	--	--	--	--	10	3.0	1.1
SW8270C	4-Nitroaniline	100-01-6	µg/L	--	--	3.3	--	50	3.0	1.5
SW8270C	4-Nitrophenol*	100-02-7	µg/L	--	--	--	--	60	20	6.1
SW8270C	Acetophenone	17537-31-4	µg/L	--	--	1,500	--	10	3	0.78
SW8270C	Azobenzene (as 1,2 Diphenylhydrazine)	103-33-3	µg/L	--	--	0.067	--	10	3.0	0.71
SW8270C	Atrazine	90616-39-8	µg/L	--	--	0.26	--	(a)	(a)	(a)
SW8270C	Benzaldehyde	100-52-7	µg/L	--	--	1,500	--	(a)	(a)	(a)
SW8270C	bis(2-Chloroethoxy)methane	111-91-1	µg/L	--	--	46	--	10	3.0	1
SW8270C	bis(2-Chloroethyl) ether	111-44-4	µg/L	--	--	0.012	--	10	3.0	1.5
SW8270C	bis(2-Ethylhexyl) phthalate	117-81-7	µg/L	--	6	--	--	10	3.0	1
SW8270C	Butyl benzyl phthalate	85-68-7	µg/L	--	--	14	--	10	3.0	1.4
SW8270C	Caprolactam	105-60-2	µg/L	--	--	7,700	--	(a)	(a)	(a)
SW8270C	Carbazole*	86-74-8	µg/L	--	--	--	--	10	3.0	1.2
SW8270C	Dibenzofuran	132-64-9	µg/L	--	--	5.8	--	10	3.0	1.1
SW8270C	Diethyl phthalate	84-66-2	µg/L	--	--	11,000	--	10	3.0	0.93
SW8270C	Dimethyl phthalate*	131-11-3	µg/L	--	--	--	--	10	3.0	0.88
SW8270C	Di-n-butyl phthalate	84-74-2	µg/L	--	--	670	--	10	3.0	1.1
SW8270C	Di-n-octyl phthalate*	117-84-0	µg/L	--	--	--	--	10	3.0	1.5
SW8270C	Hexachlorobenzene	118-74-1	µg/L	--	1	--	--	10	3.0	1.4
SW8270C	Hexachlorobutadiene	87-68-3	µg/L	--	--	0.26	--	10	3.0	1.3
SW8270C	Hexachloroethane	67-72-1	µg/L	--	--	0.79	--	10	3.0	1.4

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Table H-2
Comparison of Reporting Levels to Screening Objectives in Groundwater, Open Burn and Open Detonation Units at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Water Quality Standard	EPA Maximum Contaminant Levels/Secondary Contaminant Levels[a]	EPA Regional Screening Levels Tap Water (Nov 2012)	DOE Open Burn Suggested Maximum Background (Dec 1998)	LOQ	LOD	DL
SW8270C	Hexachlorocyclopentadiene	77-47-4	µg/L		--	22	--	10	3	0.214
SW8270C	Isophorone	78-59-1	µg/L	--	--	67	--	10	3.0	1
SW8270C	Nitrobenzene	98-95-3	µg/L	--	--	0.12	--	10	3.0	1.6
SW8270C	N-Nitrosodimethylamine	62-75-9	µg/L	--	--	0.0004	--	15	3.0	0.96
SW8270C	N-Nitrosodi-n-propylamine	621-64-7	µg/L	--	--	0.0093	--	10	3.0	1.4
SW8270C	N-Nitrosodiphenylamine	86-30-6	µg/L	--	--	10	--	10	3.0	0.54
SW8270C	Pentachlorophenol	87-86-5	µg/L	--	1	--	--	60	20	2
SW8270C	Phenol	108-95-2	µg/L	--	--	4,500	--	10	3.0	1.1
SW8270C	Phenol-d6		%	--	--	--	--	--	--	--
SW8270C	2-Fluorobiphenyl		%	--	--	--	--	--	--	--
SW8270C	Terphenyl-d14		%	--	--	--	--	--	--	--
SW8270C-SIM	1-methylnaphthalene	90-12-0	µg/L	--	--	0.97	--	0.1	0.01	0.006
SW8270C-SIM	2-methylnaphthalene	91-57-6	µg/L	--	--	27	--	0.1	0.01	0.006
SW8270C-SIM	Acenaphthene	83-32-9	µg/L	--	--	400	--	0.1	0.01	0.003
SW8270C-SIM	Acenaphthylene	208-96-8	µg/L	--	--	--	--	0.1	0.01	0.003
SW8270C-SIM	Anthracene	120-12-7	µg/L	--	--	1300	--	0.1	0.01	0.004
SW8270C-SIM	Benzo (a) anthracene	56-55-3	µg/L	--	--	0.029	--	0.1	0.01	0.005
SW8270C-SIM	Benzo (a) pyrene	50-32-8	µg/L	0.7	0.2	--	--	0.1	0.01	0.004
SW8270C-SIM	Benzo (b) fluoranthene	205-99-2	µg/L	--	--	0.029	--	0.1	0.02	0.012
SW8270C-SIM	Benzo (g,h,i) perylene	191-24-2	µg/L	--	--	--	--	0.1	0.01	0.006
SW8270C-SIM	Benzo (k) fluoranthene	207-08-9	µg/L	--	--	0.29	--	0.1	0.01	0.008
SW8270C-SIM	Chrysene	218-01-9	µg/L	--	--	2.9	--	0.1	0.01	0.004
SW8270C-SIM	Dibenzo (a,h) anthracene	53-70-3	µg/L	--	--	0.0029	--	0.1	0.02	0.014
SW8270C-SIM	Fluoranthene	206-44-0	µg/L	--	--	630	--	0.1	0.01	0.004
SW8270C-SIM	Fluorene	86-73-7	µg/L	--	--	220	--	0.1	0.01	0.004
SW8270C-SIM	Indeno (1,2,3-c,d) pyrene	193-39-5	µg/L	--	--	0.029	--	0.1	0.02	0.014
SW8270C-SIM	Naphthalene	91-20-3	µg/L	30		NA	--	0.1	0.01	0.004
SW8270C-SIM	Phenanthrene	85-01-8	µg/L	--	--	--	--	0.1	0.01	0.006
SW8270C-SIM	Pyrene	129-00-0	µg/L	--	--	87	--	0.1	0.01	0.004
SW8290	2,3,7,8-TCDF*	51207-31-9	pg/L	--	--	--	--	10	2.5	EDL
SW8290	2,3,7,8-TCDD*	1746-01-6	pg/L	--	--	--	--	10	2.5	EDL
SW8290	1,2,3,7,8-PeCDF*	57117-41-6	pg/L	--	--	--	--	50	6.5	EDL
SW8290	2,3,4,7,8-PeCDF*	57117-31-4	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,7,8-PeCDD*	40321-76-4	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,4,7,8-HxCDF*	70648-26-9	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,6,7,8-HxCDF*	57117-44-9	pg/L	--	--	--	--	50	12.5	EDL
SW8290	2,3,4,6,7,8-HxCDF*	60851-34-5	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,7,8,9-HxCDF*	72918-21-9	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,4,7,8-HxCDD*	39227-28-6	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,6,7,8-HxCDD*	57653-85-7	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,7,8,9-HxCDD*	19408-74-3	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,4,6,7,8-HpCDF*	67562-39-4	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,4,7,8,9-HpCDF*	55673-89-7	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,4,6,7,8-HpCDD*	35822-46-9	pg/L	--	--	--	--	50	12.5	EDL
SW8290	OCDF*	39001-02-0	pg/L	--	--	--	--	100	25	EDL
SW8290	OCDD*	3268-87-9	pg/L	--	--	--	--	100	50	EDL
SW8330B	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	µg/L	--	--	780	--	0.15	0.05	0.036
SW8330B	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	µg/L	--	--	0.61	--	0.25	0.05	0.036
SW8330B	1,3,5-Trinitrobenzene (1,3,5-TNB)	99-35-4	µg/L	--	--	460	--	0.1	0.05	0.03
SW8330B	1,3-Dinitrobenzene (1,3-DNB)	99-65-0	µg/L	--	--	1.5	--	0.15	0.1	0.05
SW8330B	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	479-45-8	µg/L	--	--	61	--	0.15	0.1	0.05
SW8330B	Nitrobenzene (NB)	98-95-3	µg/L	--	--	0.12	--	0.15	0.1	0.05
SW8330B	2,4,6-Trinitrotoluene (2,4,6-TNT)	118-96-7	µg/L	--	--	2.2	--	0.15	0.1	0.05
SW8330B	4-Amino-2,6-dinitrotoluene (4-Am-DNT)	19406-51-0	µg/L	--	--	30	--	0.15	0.1	0.05
SW8330B	2-Amino-4,6-dinitrotoluene (2-Am-DNT)	35572-78-2	µg/L	--	--	30	--	0.3	0.1	0.1
SW8330B	2,4-Dinitrotoluene (2,4-DNT)	121-14-2	µg/L	--	--	0.2	--	0.15	0.1	0.05
SW8330B	2,6-Dinitrotoluene (2,6-DNT)	606-20-2	µg/L	--	--	15	--	0.15	0.1	0.05
SW8330B	2-Nitrotoluene (2-NT)	88-72-2	µg/L	--	--	0.27	--	1	0.1	0.088
SW8330B	3-Nitrotoluene (3-NT)	99-08-1	µg/L	--	--	1.3	--	0.5	0.1	0.057
SW8330B	4-Nitrotoluene (4-NT)	99-99-0	µg/L	--	--	3.7	--	1	0.1	0.088
SW8330B	Nitroglycerin	55-63-0	µg/L	--	--	1.5	--	1	0.5	0.33
SW8330B	PETN	78-11-5	µg/L	--	--	16	--	1	0.5	0.3
SW7580	White phosphorous	7723-14-0	µg/L	--	--	0.31	--	0.05	0.025	0.015

The laboratory does not analyze for these compounds. The compounds will be tentatively identified based on a computer library search of the sample chromotography. If found, the coumpound concentration will be reported as an estimated value.
The detection limit exceeds most stringent criteria.

[a] Secondary Contaminant Levels are in parentheses
[b] KAFB RCRA permit screening criteria for perchlorate
* Risk based screening levels will be calculated if analyte is detected and toxicological information is available
Constituents with "%" units are surrogates and are not a part of the target analytes.
CAS - Chemical Abstract Service
DL - Detection limit
DOE - Department of Energy
LOD - Limit of detection
LOQ - Limit of quantitation
µg/L - micrograms per liter
mg/L - milligrams per liter
NA - not applicable
pg/L - picograms per liter
RPD - relative percent difference

Table H-3

Comparison of Reporting Levels to Screening Objectives in Soil, Open Burn Unit at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Residential SSG (Feb 2012)	Coyote Test Field Super Group Background Values (surface soil)	Coyote Test Field Super Group Background Values (subsurface soil)	EPA Regional Screening Levels, Residential (Nov 2012)	LOQ	LOD	DL
SW6010B	Antimony	7440-36-0	mg/kg	31.3	3.9	3.9	--	3	2	0.94
SW6010B	Barium	7440-39-3	mg/kg	15,596	130	214	--	2	0.5	0.12
SW6010B	Beryllium	7440-41-7	mg/kg	156	0.65	0.65	--	0.3	0.1	0.03
SW6010B	Cadmium	7440-43-9	mg/kg	70.3	1	0.9	--	0.3	0.1	0.03
SW6010B	Chromium	7440-47-3	mg/kg	117,321/2.97	17.3	12.8	--	1	0.5	0.14
SW6010B	Cobalt	7440-48-4	mg/kg	--	5.2	5.2	23	1	0.5	0.25
SW6010B	Copper	7440-50-8	mg/kg	3,129	15.4	18.2	--	1.5	0.5	0.22
SW6010B	Lead	7439-92-1	mg/kg	400	21.4	11.8	--	1	0.5	0.26
SW6010B	Nickel	7440-02-0	mg/kg	1,564	11.5	11.5	--	1	0.5	0.24
SW6010B	Selenium	7782-49-2	mg/kg	391	1	1	--	4	2.5	1.4
SW6010B	Silver	7440-22-4	mg/kg	391	1	1	--	0.5	0.2	0.09
SW6010B	Tin	7440-31-5	mg/kg	--	10	10	47,000	100	25	11
SW6010B	Vanadium	7440-62-2	mg/kg	391	20.4	21.5	--	2	0.5	0.19
SW6010B	Zinc	7440-66-6	mg/kg	23,464	62	62	--	2	1	0.19
SW6020A	Arsenic	7440-38-2	mg/kg	3.9	5.6	7.4	--	0.5	0.3	0.15
SW6020A	Thallium	7440-28-0	mg/kg	0.78	1.1	1.1	--	0.15	0.1	0.05
SW7471A	Mercury	7439-97-6	mg/kg	15.6/7.82	0.25	0.10	--	0.04	0.012	0.0086
SW6850	Perchlorate	14797-73-0	µg/kg	54,800	--	--	--	5	0.4	0.26
SW7580	White Phosphorus	7723-14-0W	µg/kg	--	--	--	1,600	0.1	0.05	0.015
SW8260B	1,1,1-Trichloroethane	71-55-6	µg/kg	15,609,580	--	--	--	5	1	0.36
SW8260B	1,1,2,2-Tetrachloroethane	79-34-5	µg/kg	8,021	--	--	--	5	1	0.68
SW8260B	1,1,2-Trichloroethane	79-00-5	µg/kg	2,811	--	--	--	5	1	0.44
SW8260B	1,1,2-trichloro-1,1,2-trifluoroethane	76-13-1	µg/kg	72,080,604	--	--	--	10	1	0.83
SW8260B	1,1-Dichloroethane	75-34-3	µg/kg	64,514	--	--	--	5	1	0.29
SW8260B	1,1-Dichloroethene	75-35-4	µg/kg	448,879	--	--	--	5	0.5	0.26
SW8260B	1,2,3-Trichlorobenzene	87-61-6	µg/kg	--	--	--	49,000	5	1	0.75
SW8260B	1,2,3-Trichloropropane	96-18-4	µg/kg	50	--	--	--	5	1	0.76
SW8260B	1,2,4-Trichlorobenzene	120-82-1	µg/kg	72,980	--	--	--	5	1	0.75
SW8260B	1,2,4-Trimethylbenzene	95-63-6	µg/kg	--	--	--	62,000	5	1	0.51
SW8260B	1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	µg/kg	186	--	--	--	10	1	0.88
SW8260B	1,2-Dibromoethane (EDB)	106-93-4	µg/kg	588	--	--	--	10	1	0.27
SW8260B	1,2-Dichlorobenzene	95-50-1	µg/kg	2,306,711	--	--	--	5	1	0.64
SW8260B	1,2-Dichloroethane	107-06-2	µg/kg	7,885	--	--	--	5	1	0.73
SW8260B	1,2-Dichloropropane	78-87-5	µg/kg	15,238	--	--	--	5	1	0.6
SW8260B	1,3,5-Trimethylbenzene	108-67-8	µg/kg	--	--	--	780,000	5	1	0.35
SW8260B	1,3-Dichlorobenzene*	541-73-1	µg/kg	--	--	--	--	5	1	0.3
SW8260B	1,4-Dichlorobenzene	106-46-7	µg/kg	31,731	--	--	--	5	1	0.78
SW8260B	1,4-Dioxane	123-91-1	µg/kg	48,634	--	--	--	250	75	39
SW8260B	2-Butanone (MEK)	78-93-3	µg/kg	37,076,608	--	--	--	10	3	1.4
SW8260B	2-Hexanone	591-78-6	µg/kg	--	--	--	210,000	10	1	0.74
SW8260B	4-Methyl-2-pentanone (MIBK)	108-10-1	µg/kg	51,578	--	--	--	10	1	0.92
SW8260B	Acetone	67-64-1	µg/kg	66,556,733	--	--	--	20	3	1.4
SW8260B	Benzene	71-43-2	µg/kg	15,381	--	--	--	5	1	0.26
SW8260B	Bromochloromethane	74-97-5	µg/kg	--	--	--	160,000	5	1	0.94
SW8260B	Bromodichloromethane	75-27-4	µg/kg	5,411	--	--	--	5	1	0.53
SW8260B	Bromoform	75-25-2	µg/kg	--	--	--	--	5	1	0.4
SW8260B	Bromomethane	74-83-9	µg/kg	16,485	--	--	--	5	3	0.86
SW8260B	Carbon disulfide	75-15-0	µg/kg	1,532,527	--	--	--	10	1	0.49
SW8260B	Carbon tetrachloride	56-23-5	µg/kg	10,833	--	--	--	5	1	0.53
SW8260B	Chlorobenzene	108-90-7	µg/kg	376,370	--	--	--	5	1	0.29
SW8260B	Chloroethane	75-00-3	µg/kg	29,806,983	--	--	--	5	1	0.45
SW8260B	Chloroform	67-66-3	µg/kg	5,864	--	--	--	5	1	0.26
SW8260B	Chloromethane	74-87-3	µg/kg	274,707	--	--	--	5	1	0.5
SW8260B	cis-1,2-Dichloroethene	156-59-2	µg/kg	156,428	--	--	--	5	1	0.89
SW8260B	cis-1,3-Dichloropropene*	10061-01-5	µg/kg	33713	--	--	--	5	1	0.64
SW8260B	Cyclohexane	1735-17-7	µg/kg	--	--	--	7,000,000	(a)	(a)	(a)
SW8260B	Dibromochloromethane	124-48-1	µg/kg	12,127	--	--	--	5	0.5	0.21
SW8260B	Dichlorodifluoromethane (Freon 12)	75-71-8	µg/kg	168,142	--	--	--	5	3	0.89
SW8260B	Ethylbenzene	100-41-4	µg/kg	68,448	--	--	--	5	1	0.34
SW8260B	Isopropylbenzene	98-82-8	µg/kg	2,430,743	--	--	--	5	1	0.52
SW8260B	Methyl Acetate	79-20-9	µg/kg	78,214,000	--	--	--	(a)	(a)	(a)
SW8260B	Methyl Cyclohexane	108-87-2	µg/kg	5,625,911	--	--	--	(a)	(a)	(a)
SW8260B	Methyl tert-butyl ether (MTBE)	1634-04-4	µg/kg	901,073	--	--	--	10	1	0.6
SW8260B	Methylene chloride	75-09-2	µg/kg	409,376	--	--	--	5	1	0.84
SW8260B	m-Xylene & p-Xylene	136777-61-2	µg/kg	774,289	--	--	--	5	1	0.81
SW8260B	Naphthalene	91-20-3	µg/kg	42,976	--	--	--	5	1	0.63
SW8260B	o-Xylene	95-47-6	µg/kg	898,344	--	--	--	5	0.5	0.33
SW8260B	Styrene	100-42-5	µg/kg	7,277,612	--	--	--	5	1	0.31
SW8260B	Tetrachloroethene	127-18-4	µg/kg	7,021	--	--	--	5	1	0.61
SW8260B	Toluene	108-88-3	µg/kg	5,274,400	--	--	--	5	1	0.61
SW8260B	trans-1,2-Dichloroethene	156-60-5	µg/kg	269,586	--	--	--	5	1	0.38
SW8260B	trans-1,3-Dichloropropene*	10061-02-6	µg/kg	33713	--	--	--	5	1	0.75
SW8260B	Trichloroethene	79-01-6	µg/kg	8,767	--	--	--	5	1	0.6
SW8260B	Trichlorofluoromethane (Freon 11)	75-69-4	µg/kg	1,412,976	--	--	--	10	1	0.34
SW8260B	Vinyl chloride	75-01-4	µg/kg	728	--	--	--	5	1	0.36

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Table H-3

Comparison of Reporting Levels to Screening Objectives in Soil, Open Burn Unit at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Residential SSG (Feb 2012)	Coyote Test Field Super Group Background Values (surface soil)	Coyote Test Field Super Group Background Values (subsurface soil)	EPA Regional Screening Levels, Residential (Nov 2012)	LOQ	LOD	DL
SW8270C	1,1-biphenyl	92-52-4	µg/kg	57117	--	--	--	330	NA	165
SW8270C	1,2,4,5-tetrachlorobenzene	95-94-3	µg/kg	18,331	--	--	--	(a)	(a)	(a)
SW8270C	2,4,5-Trichlorophenol	95-95-4	µg/kg	6,110,491	--	--	--	330	167	83
SW8270C	2,4,6-Trichlorophenol	88-06-2	µg/kg	61,105	--	--	--	330	167	84
SW8270C	2,4-Dichlorophenol	120-83-2	µg/kg	183,315	--	--	--	330	167	89
SW8270C	2,4-Dimethylphenol	105-67-9	µg/kg	1,222,098	--	--	--	500	167	167
SW8270C	2,4-Dinitrotoluene	121-14-2	µg/kg	15,689	--	--	--	330	167	89
SW8270C	2,6-Dichlorophenol*	87-65-0	µg/kg	--	--	--	--	500	167	165
SW8270C	2,6-Dinitrotoluene	606-20-2	µg/kg	61,105	--	--	--	330	167	99
SW8270C	2-Chloronaphthalene	91-58-7	µg/kg	6,257,143	--	--	--	330	167	81
SW8270C	2-Chlorophenol	95-57-8	µg/kg	391,071	--	--	--	330	167	88
SW8270C	2-Methylnaphthalene	91-57-6	µg/kg	--	--	--	230,000	330	167	85
SW8270C	2-Methylphenol	95-48-7	µg/kg	--	--	--	3,100,000	330	167	58
SW8270C	2-Nitroaniline	88-74-4	µg/kg	--	--	--	610,000	1600	167	84
SW8270C	2-Nitrophenol*	88-75-5	µg/kg	--	--	--	--	330	167	82
SW8270C	2,2-oxybis(1-chloropropane)*	52438-91-2	µg/kg	--	--	--	--	330	167	54
SW8270C	3,3'-Dichlorobenzidine	91-94-1	µg/kg	10,808	--	--	--	1600	167	94
SW8270C	3-Methylphenol & 4-Methylphenol	65794-96-9	µg/kg	--	--	--	3,100,000	1000	660	330
SW8270C	3-Nitroaniline*	99-09-2	µg/kg	--	--	--	--	1600	333	167
SW8270C	4,6-Dinitro-2-methylphenol	534-52-1	µg/kg	4,888	--	--	--	2000	333	81
SW8270C	4-Bromophenyl phenyl ether*	101-55-3	µg/kg	--	--	--	--	330	167	85
SW8270C	4-Chloro-3-methylphenol	59-50-7	µg/kg	--	--	--	6,100,000	330	167	92
SW8270C	4-Chloroaniline	106-47-8	µg/kg	--	--	--	2,400	330	167	58
SW8270C	4-Chlorophenyl phenyl ether*	7005-72-3	µg/kg	--	--	--	--	330	167	93
SW8270C	4-Nitroaniline	100-01-6	µg/kg	--	--	--	24,000	1600	167	88
SW8270C	4-Nitrophenol*	100-02-7	µg/kg	--	--	--	--	2000	333	280
SW8270C	Acenaphthene	83-32-9	µg/kg	3,440,510	--	--	--	330	167	83
SW8270C	Acenaphthylene*	208-96-8	µg/kg	--	--	--	--	330	167	85
SW8270C	Anthracene	120-12-7	µg/kg	17,202,560	--	--	--	330	167	86
SW8270C	Acetophenone	17537-31-4	µg/kg	7,821,428	--	--	--	(a)	(a)	(a)
SW8270C	Azobenzene (as 1,2 diphenyl hydrazine)	103-33-3	µg/kg	6079	--	--	610	330	167	92
SW8270C	Atrazine	93618-39-8	µg/kg	--	--	--	2,100	(a)	(a)	(a)
SW8270C	Benzaldehyde	100-52-7	µg/kg	--	--	--	7,800,000	(a)	(a)	(a)
SW8270C	Benz(a)anthracene	56-55-3	µg/kg	1,476	--	--	--	330	167	92
SW8270C	Benzo(a)pyrene	50-32-8	µg/kg	147	--	--	--	330	167	94
SW8270C	Benzo(b)fluoranthene	205-99-2	µg/kg	1,476	--	--	--	330	167	95
SW8270C	Benzo(ghi)perylene*	191-24-2	µg/kg	--	--	--	--	330	167	110
SW8270C	Benzo(k)fluoranthene	207-08-9	µg/kg	14,762	--	--	--	330	167	113
SW8270C	bis(2-Chloroethoxy)methane	111-91-1	µg/kg	--	--	--	180,000	330	167	88
SW8270C	bis(2-Chloroethyl) ether	111-44-4	µg/kg	8	--	--	--	330	167	81
SW8270C	bis(2-Ethylhexyl) phthalate	117-81-7	µg/kg	347,387	--	--	--	330	167	98
SW8270C	Butyl benzyl phthalate	85-68-7	µg/kg	--	--	--	260,000	330	167	95
SW8270C	Carbazole*	86-74-8	µg/kg	--	--	--	--	330	167	95
SW8270C	Caprolactam	105-60-2	µg/kg	--	--	--	31,000,000	(a)	(a)	(a)
SW8270C	Chrysene	218-01-9	µg/kg	148,629	--	--	--	330	167	84
SW8270C	Dibenz(a,h)anthracene	53-70-3	µg/kg	147	--	--	--	330	167	102
SW8270C	Dibenzofuran	132-64-9	µg/kg	--	--	--	78,000	330	167	86
SW8270C	Diethyl phthalate	84-66-2	µg/kg	48,883,929	--	--	--	330	167	90
SW8270C	Dimethyl phthalate	131-11-3	µg/kg	611,049,107	--	--	--	330	167	87
SW8270C	Di-n-butyl phthalate	84-74-2	µg/kg	6,110,491	--	--	--	330	167	97
SW8270C	Di-n-octyl phthalate*	117-84-0	µg/kg	--	--	--	--	330	167	97
SW8270C	Fluoranthene	206-44-0	µg/kg	2,293,674	--	--	--	330	167	95
SW8270C	Fluorene	86-73-7	µg/kg	2,293,674	--	--	--	330	167	92
SW8270C	Hexachlorobenzene	118-74-1	µg/kg	3,040	--	--	--	330	167	89
SW8270C	Hexachlorobutadiene	87-68-3	µg/kg	--	--	--	--	330	167	82
SW8270C	Hexachloroethane	67-72-1	µg/kg	42,773	--	--	--	330	167	81
SW8270C	Hexachlorocyclopentadiene	77-47-4	µg/kg	366,000	--	--	--	1600	250	62
SW8270C	Indeno(1,2,3-cd)pyrene	193-39-5	µg/kg	1,476	--	--	--	330	167	96
SW8270C	Isophorone	78-59-1	µg/kg	5,119,394	--	--	--	330	167	93
SW8270C	Naphthalene	91-20-3	µg/kg	42,976	--	--	--	330	167	82
SW8270C	Nitrobenzene	98-95-3	µg/kg	53,500	--	--	--	330	167	76
SW8270C	N-Nitrosodimethylamine	62-75-9	µg/kg	22.5	--	--	--	330	167	96
SW8270C	N-Nitrosodi-n-propylamine	621-64-7	µg/kg	--	--	--	69	330	167	84
SW8270C	N-Nitrosodiphenylamine	86-30-6	µg/kg	992,516	--	--	--	330	167	86
SW8270C	Pentachlorophenol	87-86-5	µg/kg	8,935	--	--	--	330	167	51
SW8270C	2,4,6-Tribromophenol		%	--	--	--	--	--	--	--
SW8270C	2-Flourophenol		%	--	--	--	--	--	--	--
SW8270C	Nitrobenzene-d5		%	--	--	--	--	--	--	--

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Table H-3

Comparison of Reporting Levels to Screening Objectives in Soil, Open Burn Unit at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Residential SSG (Feb 2012)	Coyote Test Field Super Group Background Values (surface soil)	Coyote Test Field Super Group Background Values (subsurface soil)	EPA Regional Screening Levels, Residential (Nov 2012)	LOQ	LOD	DL
SW8290	2,3,7,8-TCDF*	51207-31-9	pg/g	449	--	--	--	1	0.15	EDL
SW8290	2,3,7,8-TCDD	1746-01-6	pg/g	44.9	--	--	--	1	0.15	EDL
SW8290	1,2,3,7,8-PeCDF*	57117-41-6	pg/g	--	--	--	--	5	0.75	EDL
SW8290	2,3,4,7,8-PeCDF*	57117-31-4	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,7,8-PeCDD*	40321-76-4	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,7,8-HxCDF*	70648-26-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,6,7,8-HxCDF*	57117-44-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	2,3,4,6,7,8-HxCDF*	60851-34-5	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,7,8,9-HxCDF*	72918-21-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,7,8-HxCDD*	39227-28-6	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,6,7,8-HxCDD*	57653-85-7	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,7,8,9-HxCDD*	19408-74-3	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,6,7,8-HpCDF*	67562-39-4	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,7,8,9-HpCDF*	55673-89-7	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,6,7,8-HpCDD*	35822-46-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	OCDF*	39001-02-0	pg/g	--	--	--	--	10	1.5	EDL
SW8290	OCDD*	3268-87-9	pg/g	--	--	--	--	10	1.5	EDL
SW8330B	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	mg/kg	3,911	--	--	--	0.25	0.05	0.012
SW8330B	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	mg/kg	58.2	--	--	--	0.25	0.05	0.012
SW8330B	1,3,5-Trinitrobenzene (1,3,5-TNB)	99-35-4	mg/kg	--	--	--	2,200,000	0.25	0.05	0.01
SW8330B	1,3-Dinitrobenzene (1,3-DNB)	99-65-0	mg/kg	--	--	--	6,100	0.25	0.05	0.0042
SW8330B	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	479-45-8	mg/kg	244	--	--	--	0.25	0.05	0.01
SW8330B	Nitrobenzene (NB)	98-95-3	mg/kg	53.5	--	--	--	0.25	0.05	0.0176
SW8330B	2,4,6-Trinitrotoluene (2,4,6-TNT)	118-96-7	mg/kg	39.1	--	--	--	0.25	0.05	0.0194
SW8330B	4-Amino-2,6-dinitrotoluene (4-Am-DNT)	19406-51-0	mg/kg	--	--	--	150,000	0.25	0.05	0.01
SW8330B	2-Amino-4,6-dinitrotoluene (2-Am-DNT)	35572-78-2	mg/kg	--	--	--	150,000	0.25	0.05	0.0125
SW8330B	2,4-Dinitrotoluene (2,4-DNT)	121-14-2	mg/kg	7.15	--	--	--	0.25	0.05	0.0053
SW8330B	2-Nitrotoluene (2-NT)	88-72-2	mg/kg	29.1	--	--	--	0.5	0.05	0.013
SW8330B	3-Nitrotoluene (3-NT)	99-08-1	mg/kg	7.8	--	--	--	0.25	0.05	0.0155
SW8330B	4-Nitrotoluene (4-NT)	99-99-0	mg/kg	244	--	--	--	0.25	0.05	0.0182
SW8330B	Nitroglycerin	55-63-0	mg/kg	6.11	--	--	--	0.5	0.25	0.015
SW8330B	PETN	78-11-5	mg/kg	--	--	--	120,000	0.5	0.25	0.025
SW8330B	3,4-Dinitrotoluene (Surrogate)	610-39-9	%	--	--	--	--	--	--	--

The laboratory does not analyze for these compounds. The compounds will be tentatively identified based on a computer library search of the sample chromotography. If found, the coumpound concentration will be reported as an estimated value.

The detection limit exceeds most stringent criteria.

Constituents with "%" units are surrogates and are not a part of the target analytes.

* Risk based screening levels will be calculated if analyte is detected and toxicological information is available

DL - Detection limit

LOD - Limit of detection

LOQ - Limit of quantitation

µg/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

pg/g - picograms per gram

RPD - relative percent difference

RSD - relative standard deviation for multi-incremental sample collection

SSG - soil screening goal

V:\Kirtland_AFB\GIS\MapFiles\Figure H-3 - Proposed GW Monitoring Well Locations.mxd

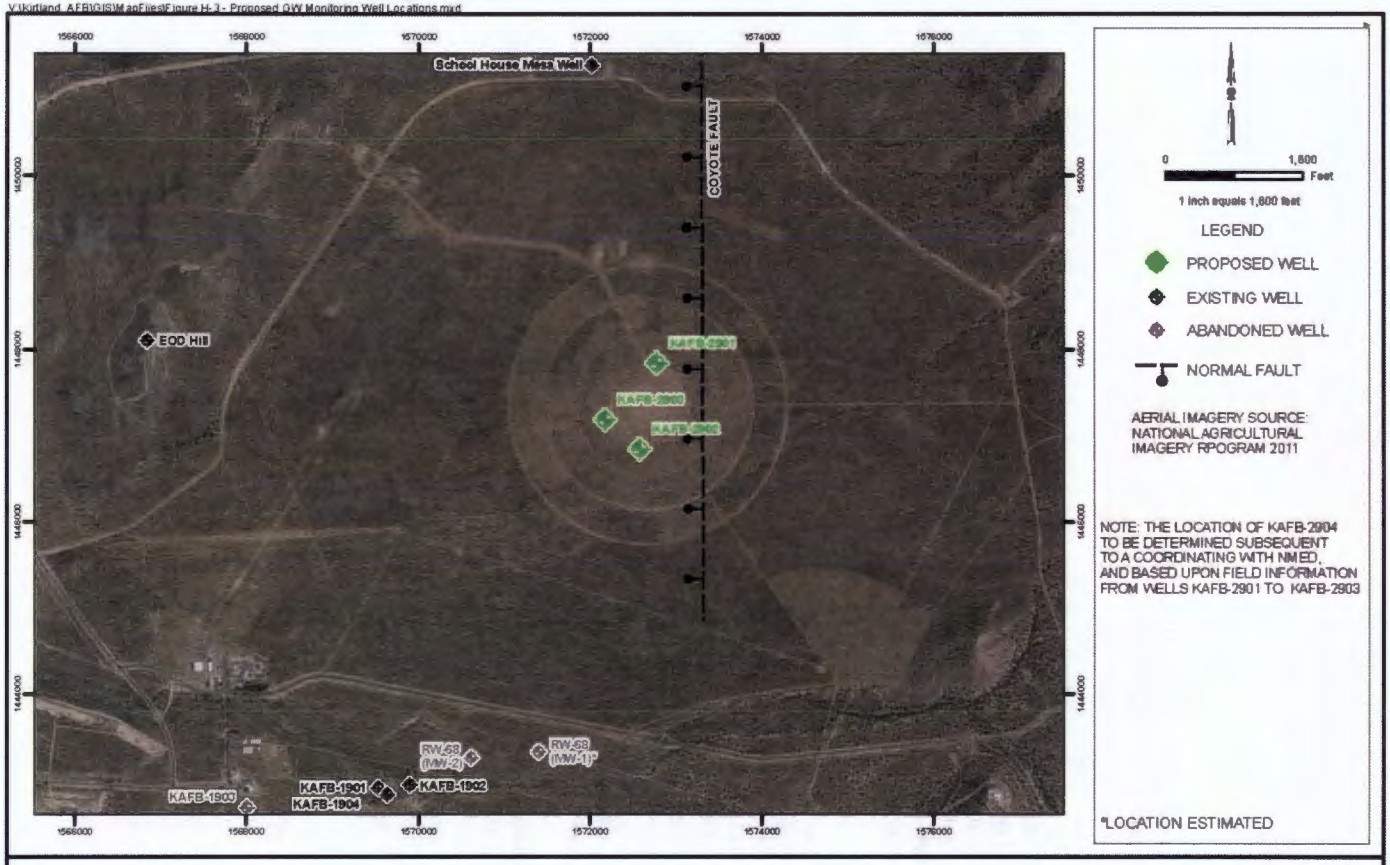

FIGURE H-3
PROPOSED GROUNDWATER MONITORING WELL LOCATIONS
FOR THE OPEN DETONATION UNIT
KIRTLAND AIR FORCE BASE, NEW MEXICO

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~~This work plan was prepared as part of the U.S. Air Force (USAF) Environmental Restoration Program (ERP) under contract number W912DR-09-D-004, Delivery Order DM04, in accordance with the U.S. Army Corps of Engineers (USACE) Performance Work Statement dated 29 July 2011. This work plan has been revised to address NMED comments on the October 2010 Closure Plan for the Open Detonation Unit (USAF, 2010).~~

~~Site Description~~

~~The Open Burn (OB) and OD units are located within the EOD Range at Kirtland AFB. The EOD Range is located in the southeast portion of Kirtland AFB, east of Lovelace Road and south of the former Manzano Base. Figure 1 shows the location of the EOD Range at Kirtland AFB and the collocated OD and OB units within the EOD Range.~~

~~The OD unit consists of a cleared circular area approximately 1,500 ft in diameter and surrounded by an approximately 2-ft-high earthen berm. Detonations were conducted in pits approximately 30 ft long, 15 ft wide, and 12 ft deep within this area. The OD unit was permitted on 20 December 1994 as Permit Number NM9570024423-OD, which allowed 100,000 pounds of net explosive weight to be treated at the OD unit annually. Rocket motors, large caliber munitions, explosive wastes, and firearms were treated at the OD unit. Operations at the OD unit ceased in August 2010.~~

~~The OB unit is collocated with the OD unit and consists of a steel container on a reinforced concrete slab foundation, surrounded by concrete walls on three sides. The 8-inch-thick concrete slab is 30.5 ft long by 10.5 ft wide, and the 1-ft-thick concrete walls are 21.5 ft long, 10.5 ft wide, and 9 ft high. The northern portion of the reinforced concrete pad is level, and a 2-ft-wide by approximately 6-inch-high containment hump is location at the southern extent of the level portion of the pad to prevent run-on to or runoff from the concrete pad. The remaining portion of the concrete slab is sloped gently to the south, which allowed vehicular access to unload wastes for treatment at the OB unit. On the northwest side of the OB unit is a soil berm, measuring approximately 15 ft high and 40 ft long, which protected the unit from shock waves resulting from detonations at the collocated OD unit.~~

~~The steel container has a capacity of approximately 12 cubic yards. It is approximately 11 ft long with an inner height of 4.3 ft and an overall height of 5.25 ft. A heavy steel door is located at one end of the container to facilitate placement of wastes and removal of treatment residues. The OB unit has retractable, galvanized steel cover which covered the unit during nonoperational periods. The cover is slightly inclined to prevent precipitation from entering the unit. The last treatment event conducted at the OB unit was in May 2008.~~

~~*2.1.1.1 Hydrogeologic Setting*~~

The EOD Range is located within the Tijeras fault complex hydrogeologic region at Kirtland AFB (Sandia National Laboratories/New Mexico [SNL/NM], 2011a). The Sandia, Hubbel Springs, and Tijeras faults converge in this area and define eastern edge of the Albuquerque Basin. Within the Tijeras fault complex, a thin layer of alluvium covers bedrock. The hydrogeology in this area is poorly understood due to the complex geology created by the fault systems. On the eastern side of the Tijeras fault complex, the depth to groundwater ranges from about 45 to 325 ft bgs. Most of the monitoring wells in this area are completed in fractured bedrock at relatively shallow depths and produce modest yields of groundwater.

The nearest existing wells to the proposed monitoring well locations include the School House Well approximately 3,500 ft north-northwest of the OD unit; the EOD Hill Well approximately 4,300 ft west-northwest of the OD unit; three wells at Lake Christian (Kirtland AFB Solid Waste Management Unit [SWMU] 6-22), roughly 5,500 ft southeast of the OD unit; and three monitoring wells installed at the Old Burn Site (SNL SWMU 68), approximately 7,000 ft south of the OD unit. Nearby former monitoring well locations include two wells at the Radium Dump/Slag Piles (Kirtland AFB SWMU RW-68); approximately 4,500 ft south-southeast of the OD unit; and one well at Lake Christian (Kirtland AFB SWMU 6-22), roughly 5,500 ft southeast of the OD unit. The existing and former well locations are shown in Figure H~~3~~-4.

All of the nearby wells are completed in water bearing zones of the Paleozoic sedimentary rocks of the Madera Group or Sandia Formation or the underlying Precambrian granite. The available borehole logs and well completion diagrams from the surrounding wells and former well locations indicate that the uppermost groundwater occurs under confined conditions.

The groundwater flow direction in the vicinity of the EOD Range is not well defined and is assumed to mirror the topographic gradient of the land surface. There are several north-south trending faults mapped along the Sandia/Manzanita/Manzano Mountain range front. In the vicinity of the OD unit, one normal fault crosses along the eastern edge of the EOD range, identified as the Coyote Fault in Figure ~~3~~H-4. This fault was encountered during drilling boreholes at the Old Burn Site (SNL SWMU 68), located south of the OD unit (SNL/NM, 2011b). This fault location is important to the OD unit investigation because it likely influences the groundwater flow across the site from east to west and may act as a hydraulic barrier. Comparison of water levels in the upgradient well and the downgradient wells ~~will~~shall provide data on the possible influence the fault has on local groundwater flow. The majority of the EOD Range is located west of the inferred location of the fault. The triangular configuration of the proposed downgradient monitoring wells and the measured groundwater elevations in the wells ~~will~~shall be used to calculate the groundwater flow direction and hydraulic gradient in the uppermost groundwater aquifer across the majority of the site.

The depth to the uppermost water bearing zones at the proposed well locations is expected to range from approximately 100 to 200 ft bgs. The horizontal groundwater flow velocity is estimated to be on the order of 50 to 100 ft/year. Based on a history of at least 40 or more years of activities in the EOD Range area, potential contaminant impacts in groundwater could be expected to have traveled roughly 2,000 to 4,000 ft downgradient based on those flow velocity estimates.

The three proposed well locations were selected in consultation with the ~~NMED-HWB~~Department (Figure H-3). One presumed upgradient and two presumed downgradient locations were selected for installation of the wells. Location of the fourth well ~~will~~shall be determined in consultation with the ~~NMED-HWB~~Department following installation of the three proposed wells based on gradient and flow direction.

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FIGURE H-4
AREA FEATURES AND WELL LOCATIONS
MONITORING WELL INSTALLATION WORK PLAN FOR THE OPEN BURN AND OPEN DETONATION UNITS
KIRTLAND AIR FORCE BASE, NEW MEXICO

2.1.1.2 Investigation Activities

Well installation activities~~Well installation activities will~~shall be conducted in accordance with the *Kirtland Air Force Base, Base-Wide Plans for the Environmental Restoration Program, 2004 Update* (USAF, 2004) and with the ~~*Resource Conservation and Recovery Act* (~~RCRA~~)~~ Permit~~(NMED, 2010)~~. The procedures in Section 3.5 of the RCRA Permit, as well as procedures of the Base-Wide Plans, Standard Operating Procedure (SOP) B1.3: Monitoring Well Installation, ~~will~~shall be adhered to for this project, unless they are specifically modified by this ~~work~~closure plan.

2.1.1.3 Mobilization

The schedule of events for the investigation activities ~~will~~shall commence by drilling and installing three groundwater monitoring wells as shown in Figure H-3~~2~~. Following well installations, the gradient and flow direction ~~will~~shall be established within the investigation area. ~~CH2M HILL personnel~~ The Permitee ~~will~~shall then meet with ~~NMED HWB~~the Department to determine the appropriate location of the fourth groundwater monitoring well. The fourth monitoring well, KAFB-2904, ~~will~~shall be installed and followed directly by the first groundwater monitoring event for the new wells. Quarterly groundwater monitoring ~~will~~shall be conducted according to this ~~work~~closure plan. At the conclusion of the investigation and four quarters of monitoring activities, ~~CH2M HILL~~the Permitee ~~will~~shall provide a report with recommendations based on the data collected from the first four quarters of monitoring.

An exploratory well application permit ~~(Attachment)~~ for each well ~~will~~shall be filed with the New Mexico Office of the State Engineer (NMOSE) in accordance with the Rules and Regulations Governing Well Driller Licensing; Construction, Repair and Plugging of Wells (NMOSE, 2005). The Bernalillo County well installation regulations are not applicable to wells installed on Kirtland AFB. All well locations ~~will~~shall be cleared by Unexploded Ordnance (UXO) support personnel prior to mobilization of drilling activities. An environmental impact analysis ~~will~~shall be performed through the Base Civil Engineering and Natural Resources Request (AF Form 813). A utility clearance of the area ~~will~~shall be performed using Base Civil Engineering Clearance Requests (AF IMT 103), Base Civil Engineer Work Requests (AF IMT 332), and New Mexico One Call services. A surface disturbance permit ~~will~~shall not be required because the total disturbed area of the wells is less than 1 acre.

2.1.1.4 Drilling Method and Sequence

The boreholes ~~will~~shall be installed using air-rotary casing hammer (ARCH) drilling method. This method has been successfully used for the installation of nearby monitoring wells and should facilitate lithologic description of drill cuttings and allow for the observation of soil/bedrock moisture content for identification of groundwater zones. The ARCH drilling method ~~will~~shall be used to advance the boring through the vadose zone and anchor the drive casing in the underlying bedrock.

The specific depths ~~will~~shall be determined in the field based on site conditions such as lithology and presence of groundwater. The following sequence of drilling is anticipated based on known hydrogeologic conditions and drill method capabilities:

1. Initiate boring with the ARCH method using an 8½-inch tri-cone bit and 9-5/8-inch diameter drive casing. Advance the drive casing to the depth of the contact between the alluvium and underlying bedrock.

2. Set the drive casing in the bedrock and continue drilling the borehole using an open hole drilling technique. If dense bedrock conditions are encountered in the boring, a change from a tri-cone bit to a down hole hammer bit may be required.
3. Advance the boring into the uppermost water bearing unit. Complete the borehole approximately 25 ft into the water bearing unit.

During the ARCH drilling activities, the field staff ~~will~~shall monitor for the presence of groundwater by visually inspecting drill cuttings for moisture. If the cuttings become wet, the borehole ~~will~~shall be allowed to sit idle for approximately one hour. A water level probe ~~will~~shall then be lowered into the borehole to assess whether groundwater has accumulated and this information ~~will~~shall be documented on the field log.

Field screening of the soil cuttings for the presence of volatile organic compounds (VOCs) ~~will~~shall be conducted during the drilling process using a portable photo ionization detector (PID) as described in Base-Wide Plans, Appendix B, SOP B3.1: Photo-ionization Detectors and Organic Vapor Analyzers (USAF, 2004). As the boreholes are advanced, the field geologist ~~will~~shall continuously collect soil cuttings to aid in the preparation of lithologic logs. The monitoring well lithologic log ~~will~~shall be completed as described in Base-Wide Plans, Appendix B SOP B1.1: Borehole and Sample Logging. Drill cuttings from ARCH method drilling ~~will~~shall be stored at the well site on plastic sheeting or in roll-off containers and managed as investigation-derived waste (IDW).

Groundwater purged from the boring during borehole advancement and sampling ~~will~~shall be allowed to settle in roll-off bins then transferred to holding tank(s). These plastic holding tanks ~~will~~shall be managed as IDW along with decontamination and well development fluids.

Decontamination of the drill rig, drill tools, sampling equipment, and associated equipment ~~will~~shall be accomplished by steam cleaning prior to drilling each well. Decontamination activities ~~will~~shall be conducted at a central location with water obtained from an approved onsite source. Decontamination fluids ~~will~~shall be contained in polyethylene tanks and managed as IDW.

2.1.1.5 Subsurface Soil Sampling

Soil and rock sampling ~~will~~shall be performed for lithologic description. Subsurface soil laboratory analysis is not proposed as part of this investigation. No soil or rock samples ~~will~~shall be submitted for laboratory analysis.

2.1.1.6 Monitoring Well Construction

Monitoring wells ~~will~~shall be designed and constructed based on the lithology and groundwater elevations encountered at each proposed well location. The well construction details may be subject to change based on the observed field conditions, but procedures and methods ~~will~~shall comply with Section 3.5 of the RCRA Permit and the OSE criteria. The anticipated well constructions details are shown in Figure H-5. The proposed monitoring well design includes the use of 4-inch-inside diameter (ID), Schedule 80 polyvinyl chloride (PVC) casing with a 5-ft well sump, 20-ft of 0.020-inch slot size well screen, and approximately 2 to 3 ft of stickup at the surface. Centralizers ~~will~~shall be used to stabilize the well casing within the borehole at the top and bottom of the screen interval and at a minimum spacing of 40 ft on casing above the top of the well screen.

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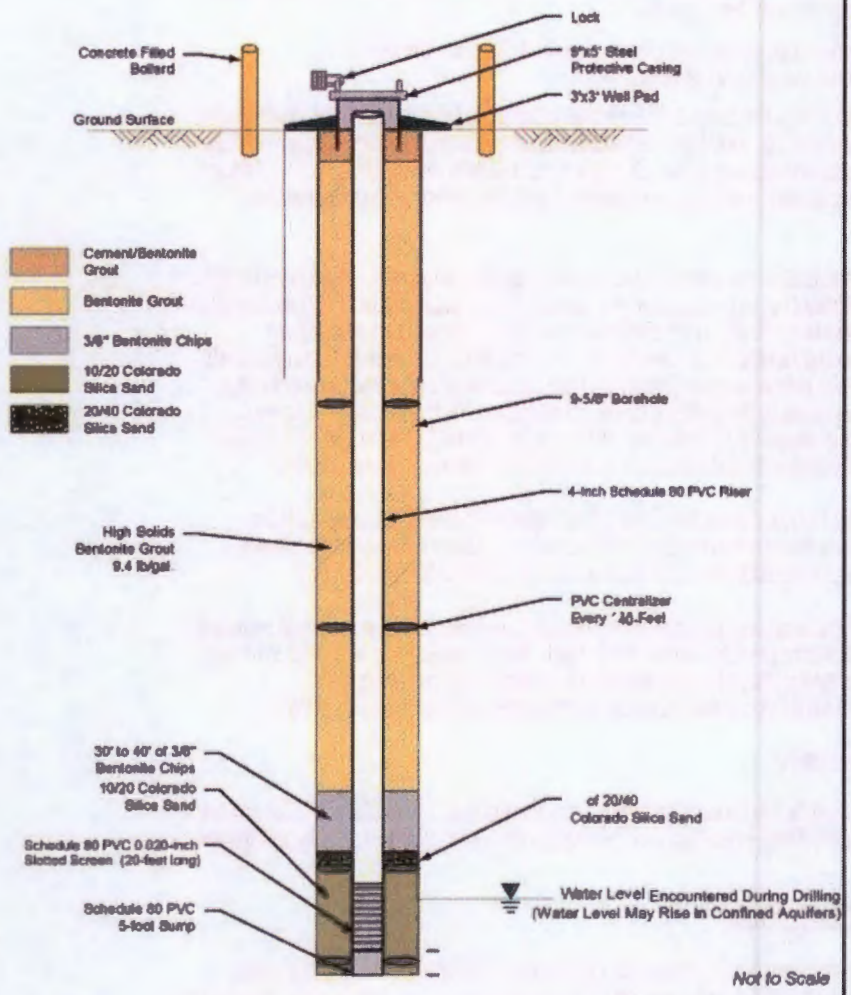

FIGURE H-5
PROPOSED MONITORING WELL DESIGN
MONITORING WELL INSTALLATION WORK PLAN
FOR THE OPEN BURN AND OPEN DETONATION UNITS
KIRTLAND AIR FORCE BASE, NEW MEXICO

Wells ~~will~~shall be completed as follows:

- The sand filter pack type ~~will~~shall be determined based on field observations and ~~will~~shall extend from the bottom of the silt trap to 5 ft above the top of the screen. However, it is anticipated that a filter pack of 10-20 gradation Colorado Silica Sand ~~will~~shall be used in the construction of the monitoring wells. The filter pack sand ~~will~~shall be placed through a tremie pipe. Approximately 2 ft of barrier sand, 100 percent passing an American Society for Testing and Materials (ASTM) U.S. Standard Sieve No. 60, ~~will~~shall be placed above the filter pack to inhibit flow of grout into the filter pack.

- A minimum of 10 ft of bentonite chips or pellets ~~will~~shall be installed above the filter pack through a tremie pipe. The seal ~~will~~shall be hydrated with clean potable water in 6-inch lifts. Setup time for the bentonite ~~will~~shall be at the discretion of the field geologist.

- The annular space above the hydrated bentonite seal ~~will~~shall be backfilled with bentonite slurry. Bentonite slurries are effective in sealing off groundwater units above the screened and sand-packed intervals of a well and are less likely to damage the well casing than bentonite-cement grout. The bentonite slurry ~~will~~shall be installed through a tremie pipe. The bentonite slurry ~~will~~shall extend from the bentonite pellet seal to approximately 50 ft bgs.

- The remaining 50 ft of annular space ~~will~~shall be filled with bentonite-cement grout consisting of 94 pounds of Portland cement, 3 percent by weight sodium bentonite powder, and 7 gallons of contaminant-free water. The bentonite-cement grout ~~will~~shall be placed using a grout pump and tremie pipe to within 5 ft of the land surface. The grout ~~will~~shall be allowed to set for at least 24 hours before well development begins.

- The monitoring wells ~~will~~shall be completed at the surface in accordance with ~~Kirtland AFB~~ specifications as presented in SOP B1.3 of the *Base-Wide Plans, Field Sampling Plan* (FSP) (USAF, 2004). The surface completion ~~will~~shall consist of a 5-foot-long, 9-inch-diameter steel stand pipe with locking cap cemented into a 3-foot-square concrete well pad. Four concrete-filled steel bollards ~~will~~shall be installed at the corners of the well pad to protect the well from vehicle damage.

- At the conclusion of the project, when wells KAFB-2901, KAFB-2902, KAFB-2903, and KAFB-2904 are no longer needed, the wells ~~will~~shall be properly abandoned in compliance with *Rules and Regulations Governing Well Driller Licensing: Construction, Repair and Plugging of Wells* (NMOSE, 2005).

2.1.1.7 Well Development ~~and Sampling~~

Monitoring wells ~~will~~shall be developed using a variety of techniques including swabbing, surging, bailing, air lifting and pumping. Monitoring well development ~~will~~shall adhere to procedures outlined in Base-Wide Plans, Appendix B, SOP B1.4: Monitoring Well Development (USAF, 2004). Monitoring well development ~~will~~shall be performed within one week after well installation but no sooner than 24 hours after grout installation. Groundwater discharged from the wells ~~will~~shall be monitored for pH, temperature, specific conductance, dissolved oxygen, oxidation-reduction (redox) potential, and turbidity. Each monitoring well screen ~~will~~shall be developed until pH and specific conductance stabilize and the water appears substantially free of sediment. The development goal is to reduce the turbidity to less than 10 nephelometric turbidity

units (NTUs) and a less than 10 percent variance in the other parameters observed in the final three readings. However, a final turbidity of less than 100 NTUs is acceptable. If the field parameters have not stabilized after 4 hours of continuous pumping, the well ~~will~~shall be allowed to sit overnight and development ~~will~~shall continue the following day for a maximum of 2 hours. If the turbidity still does not fall below 100 NTUs, the ~~USACE Project Manager~~Permitee ~~will~~shall ~~be contacted and~~seek further direction ~~will be sought~~from the Department.

Proposed monitoring wells KAFB-2901, KAFB-2902, and KAFB-2903 ~~will~~shall be developed and surveyed subsequent to installation. A static groundwater elevation from each surveyed and developed well ~~will~~shall be measured and used to determine the groundwater gradient and flow direction across the OD unit area. This information ~~will~~shall be used to determine the location and design of KAFB-2904.

2.1.1.8 Well Survey

A New Mexico licensed professional surveyor ~~will~~shall survey the horizontal well locations relative to New Mexico State Plane Coordinates and the vertical elevations to the nearest one-hundredth of 1 ft for the newly installed monitoring wells. Surveying ~~will~~shall be conducted in accordance with SOP B1.9 of the Base-Wide Plans FSP (USAF, 2004).

2.1.1.9 Groundwater Gradient Calculations

Depth to water measurements for static conditions ~~will~~shall be collected from monitoring wells KAFB-2901, KAFB-2902, and KAFB-2903 subsequent to well development. These measurements ~~will~~shall be converted to groundwater elevation data using well survey data. These elevations ~~will~~shall be mapped, and gradients ~~will~~shall be calculated perpendicular to the equipotential groundwater contours. The direction and magnitude of groundwater gradients ~~will~~shall provide information that ~~will~~shall be used to propose optimum locations for monitoring well KAFB-2904. ~~Kirtland AFB and CH2MHILL~~The permitee ~~will~~shall consult with the ~~NMED HWB~~Department to determine the final location of KAFB-2904. Groundwater elevations may also be collected from comparable aquifer units from nearby monitoring wells. The previously installed wells surrounding the investigation area include KAFB-1901, KAFB-1902, KAFB-1904, EOD Hill Well, and School House Mesa Well.

2.1.2 Groundwater Sampling and Analysis Plan

Groundwater monitoring ~~will~~shall be performed subsequent to well development at a quarterly frequency for up to eight quarters. Groundwater elevations ~~will~~shall be measured in each well prior to sampling. Groundwater elevations ~~will~~shall be used to determine groundwater flow rate and gradient on a quarterly basis. Well purging methods ~~will~~shall comply with the RCRA Permit Section 6.5.17.4 and groundwater samples ~~will~~shall be analyzed for VOCs, semivolatile organic compounds (SVOCs), explosives, perchlorate, white phosphorus, target analyte list metals, dioxins, and furans, total dissolved solids, alkalinity, anions, cations, and total organic carbon (Table H-4). Data ~~will~~shall be of sufficient precision and quality to meet data quality objectives and to ensure that method detection limits are less than cleanup levels where technologically feasible.

Up to eight consecutive quarters of groundwater monitoring are currently planned at the four monitoring wells. If groundwater contamination from the operation of the OD unit is not detected in the monitoring wells, they ~~will~~shall be properly plugged and abandoned in accordance with NMOSE regulations and ~~NMED~~Department guidance. If groundwater contamination from the

operation of the OD unit is identified, the monitoring wells ~~will~~shall be maintained for the purpose of monitoring corrective action.

Table H-4
Groundwater Monitoring Parameters and Testing Methods
for the Groundwater Investigation of the OD Unit

Analysis	Method	Testing Location	Data Use
Groundwater elevation	Groundwater probe	Field	Groundwater flow direction
pH	pH probe	Field, flow-through cell	General groundwater parameter
Temperature	Digital-thermometer	Field, flow-through cell	General groundwater parameter
Specific conductance	Conductivity meter	Field, flow-through cell	General groundwater parameter
Dissolved oxygen	Dissolved oxygen probe	Field, flow-through cell	Assess aerobic or anaerobic conditions
Oxidation-reduction potential	EH (hydrogen electrode) meter	Field, flow-through cell	Assess conditions for natural attenuation of contaminants
Turbidity	Turbidity meter	Field, flow-through cell	General groundwater parameter
Total dissolved solids	EPA 160.2[a]	Laboratory	General groundwater parameter
Alkalinity	EPA 310.2[a]	Laboratory	General groundwater parameter
Ammonia	EPA350.1[a]	Laboratory	General groundwater parameter
Sulfide	SW9030B[b]	Laboratory	General groundwater parameter
Anions (sulfate, nitrate, nitrite, chloride, bromide and fluoride)	SW9056[b]	Laboratory	General groundwater parameter
Total organic carbon	SW9060[b]	Laboratory	General groundwater parameter
Metals (barium, boron, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, lithium, magnesium, manganese, molybdenum, nickel, potassium, selenium, silver, sodium, strontium, tin, vanadium, zinc, antimony, arsenic, thallium, mercury)	SW6010B[b], SW6020A[b], SW7470A[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Perchlorate	SW6850[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Volatile organic compounds	SW8260B[b], SW8011[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Semivolatile organic compounds	SW8270C[b], SW8270-SIM[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Dioxins and furans	SW8290[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Explosives	SW8330B[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
White ~~phosphrorous~~phosphorous	SW7~~825~~580[b]	Laboratory	Assess potential contamination from OB/OD Unit operations

[a] EPA, 1993.
[b] EPA, 1996.
EPA – U.S. Environmental Protection Agency
OB/OD – Open Burn/Open Detonation

2.1.2.1 Well Purging and Field Measurements

Each monitoring well shall be purged by removing groundwater prior to sampling in order to ensure that fresh formation water is sampled. One to three well-bore volumes ~~will~~shall be purged from each well prior to sampling. A well-bore volume is defined as the volume of water in the saturated filter pack plus the volume of all standing water within the well screen and casing. Purge water ~~will~~shall be contained in polyethylene tanks for subsequent characterization and management as IDW. The following groundwater field parameters ~~will~~shall be measured during well purging: pH, specific conductance, dissolved oxygen concentration, turbidity, redox potential, and temperature. The volume of groundwater purged, the field parameter readings obtained at each time interval, and the instruments used to measure the field parameters shall be recorded on the field monitoring log. Water samples shall be obtained from a well only after the measured values of purge water field parameters have stabilized to within 10 percent for three consecutive measurements or once three well-bore volumes have been purged from the well.

Groundwater samples ~~will~~shall be collected using a pneumatic pump, a submersible electronic pump, or a bailer within eight hours of the completion of well purging. Groundwater in monitoring wells with low recharge rates and that purge dry ~~will~~shall be sampled when the water level in the well has recovered sufficiently to collect the required sample volume. Sampling handling, preservation, and storage shall comply with the RCRA permit requirements of Table H-5. ~~Sample handling, preservation, and storage will comply with the RCRA Permit requirements of Table H-6.~~

2.1.2.2 Laboratory Analysis and Quality Control/Quality Assurance Procedures

Groundwater samples ~~will~~shall be collected from each monitoring well and analyzed for VOCs, SVOCs, explosives, perchlorate, white phosphorus, target analyte list metals, dioxins, and furans, total dissolved solids, alkalinity, anions, cations, and total organic carbon (Table H-4). The proposed suite of parameters and analyses for the groundwater samples is presented in Table ~~2-1~~H-2. The contacted laboratory must meet DoD certification requirements. To ensure that data is of sufficient precision, laboratory method detection limits ~~will~~shall be those shown in the approved OD Unit Closure Plan. To ensure that analytical data is of sufficient quality and that laboratory and field methods are assured of proper quality field quality control samples ~~will~~shall be collected in compliance with the approved OD Unit Closure Plan. Level 4 laboratory data ~~will~~shall be requested and validated by qualified chemists to meet criteria specified by the ~~NMED~~Department and the DoD.

Data reliability ~~will~~shall be ensured by documenting sample management so that analyses are traceable to specific areas of potential contamination and by following a quality assurance/quality control (QA/QC) program that mandates documentation of the precision and accuracy of laboratory analyses, as well as data representativeness, completeness, comparability, and sensitivity.

The QC samples to be collected include: field duplicate samples, trip blanks, and rinsate blanks ~~as discussed in the Open Detonation Unit Closure Plan~~. Sample designations ~~will~~shall follow the ~~Kirtland AFB~~ guidelines as outlined in Section 4.2.1 of the Base-Wide Plans, FSP (USAF, 2004). The well identification numbers assigned to the four new wells for this investigation are: KAFB-2901, KAFB-2902, KAFB-2903, and KAFB-2904. The proposed sample number scheme is presented in Table ~~2-2~~H-6.

Table H-5
Sample Containers, Preservation Techniques, and Holding Times for Soil and Groundwater Samples

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers	Preservation Requirements	Maximum Holding Time
Soil	Metals (including mercury)	SW6010B/ SW6020 and SW7471A	1 gram	250-ml glass or polyethylene	4±2 degrees Celsius (°C)	180 days from date of collection for metals; 28 days from collection to analysis for mercury
Soil	Volatile Organic Compounds (VOCs)	SW8260B/ SW5035	3 different 5-gram aliquots	6 40-milliliters (ml) volatile organic analysis (VOA) vials	Per sample collection: 2 VOA vials with 10-ml water and 1 VOA vial with 10-ml methanol. All vials contain a stir bar. Or 3 VOA vials containing stir bars will have a 5-gram sample aliquot added, seals and frozen on site with dry ice. Samples must remain frozen in shipment and storage at the lab until analysis.	Freeze within 48 hours of arrival at the lab, analyze within 14 days from data of collection Analyze within 14 days from data of collection
Soil	Semivolatile Organic Compounds (SVOCs)	SW8270C	30 grams	250-ml glass	4±2°C	14 days from date of collection to extraction and 40 days from extraction to analysis
Soil	Perchlorate	SW6850	30 grams	250-ml glass	4±2°C	28days
Soil	Explosives	SW8330B	10 grams	250-ml glass	4±2°C	14 days from date of collection to extraction and 40 days from extraction to analysis
Soil	White Phosphorous	SW7580	40 grams	250-ml glass	4±2°C	30 days from date of collection to extraction and analysis
Soil	Dioxins/ Furans	SW8290	30 grams	250-ml glass	4±2°C	30 days from date of collection to extraction and 45 days from extraction to analysis
Groundwater	Dissolved metals (including mercury)	SW6010B/ 6020 and SW7470A	100-ml	1-liter polyethylene	pH < 2 with nitric acid; 4±2°C	28 days from date of collection for Hg, 180 days for others
Groundwater	VOCs	SW8260B	3 40-ml vials	3 40-ml VOA vials	No headspace; 4±2°C	7 days from data of collection
Groundwater	SVOCs	SW8270C	1 liter	2 1-liter amber glass	4±2°C	7 days from date of collection to extraction and 40 days from extraction to analysis
Groundwater	Explosives	SW8330B	1 liter	2 1-liter amber glass	4±2°C	7 days from date of collection to extraction and 40 days from extraction to analysis

Table H-5
Sample Containers, Preservation Techniques, and Holding Times for Soil and Groundwater Samples

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers	Preservation Requirements	Maximum Holding Time
Groundwater	Perchlorate	SW6850	1 liter	1- 250mL precleaned sterile, plastic containers	Field filtered with 1/3 volume headspace to remove and/or minimize microbial and anaerobic bacteria. Store at 4 ± 2 C	28 days
Groundwater	White Phosphorous	SW7580	120 ml	1-liter amber glass	4±2°C	5 days from date of collection to extraction and analysis
Groundwater	Dioxins/ Furans	SW8290	1 liter	2 1-liter amber glass	4±2°C	30 days from date of collection to extraction and 45 days from extraction to analysis
Groundwater	Anions (sulfate, nitrate, nitrite, chloride, bromide and fluoride)	SW9056	100-ml	1-liter polyethylene	4±2°C	28 days from date of collection for all anions except that nitrate and nitrite are 48 hours
Groundwater	Ammonia	E350.1	100-ml	250 ml Poly	4°C pH < 2 with H2SO4	28days
Groundwater	Alkalinity	EPA 310.2	100-ml	250 ml Poly	4°C (share with SW9056)	14 days
Groundwater	Total Organic Carbon	SW9060	100-ml	1-liter polyethylene	4°C pH < 2 with HCL	28 days
Groundwater	Sulfide	SW9030B	500-ml	1-liter polyethylene	4°C Zn acetate NaOH to pH > 9	7 days
Groundwater	Total dissolved solids	EPA 160.2	100-ml	250 ml Poly	4°C	7 days

°C – degrees Celsius
H2SO4S – glycine, sulfate
HCL – hydrochloric acid
mL – milliliters
NaOH – sodium hydroxide
pH – potential of hydrogen
SVOC – Semivolatile organic compound
VOA – volatile organic analysis
VOC – volatile organic compound
Zn – zinc

Table ~~2-2~~H-6
Proposed Groundwater Sample Identification for the Groundwater Investigation of the OD Unit

Sample Identifier[a]	Sample Type
OT29-GW-2901-_____	Normal
OT29-GW-2902-_____	Normal
OT29-GW-2903-_____	Normal
OT29-GW-2904-_____	Normal
OT29-FD-2901-_____	Duplicate
OT29-EB-2902-_____	EquipmentRinsate Blank
OT29-TB-2903-_____	Trip Blank[b]
OT29-MS-2904-_____	Matrix Spike
OT29-MSD-2904-_____	Matrix Spike Duplicate

[a] The six digit sample date ~~will~~shall make up the last portion of the sample identification number
[b] Trip Blanks ~~will~~shall only be analyzed for VOCs

2.1.2.3 Investigation Derived WasteGroundwater Data Analysis

Groundwater laboratory analytical results shall be analyzed to determine if there is statistically significant evidence of contamination at each groundwater monitoring well after each sampling event. The groundwater results shall be analyzed by comparison to baseline constituent concentrations and applicable groundwater standards.

Baseline constituent concentrations for the aquifer shall be calculated using laboratory analytical results for groundwater monitoring well KAFB-2901 and other groundwater monitoring wells completed within the same aquifer unit and located nearby. Groundwater monitoring wells that could potentially be used in the baseline constituent concentration calculations include KAFB-1902, KAFB-1903, KAFB-1904, RW68-01, RW68-02, and groundwater monitoring wells sampled by Sandia National Laboratory/New Mexico. Analysis to determine which of the groundwater monitoring wells are completed within the same aquifer unit shall be completed following installation of monitoring well KAFB-2901.

Baseline constituent concentrations shall be calculated for detected naturally occurring compounds including ammonia, sulfide, anions, metals, and percholorate as listed in Table H-4. Anthropogenic compounds, including VOCs, SVOCs, explosives, dioxins and furans, are assumed to occur at levels less than detection limits. Baseline concentrations shall not be calculated for the anthropogenic compounds.

Baseline constituent concentrations shall be established by calculating a 95 percent upper tolerance limit (UTL) for each of the detected constituents listed above. The 95 percent UTLs shall be calculated following the methodology established as part of the Kirtland AFB Long-Term Monitoring Program (USAF, 2007). The purpose of the UTL approach is to define a constituent concentration from background well data, below which 95 percent of the monitoring well observations fall with a high degree of probability. Once the UTL is determined based on the background monitoring wells, data from downgradient site wells can be compared for evidence of a release by evaluating how the downgradient well results compare to the UTL. If the downgradient well results are greater than the UTL, there is statistical evidence that there has been an increase in the downgradient concentration of the constituent in groundwater. A detailed description of the process to determine baseline concentrations can be found in the *Long-Term Groundwater Monitoring Summary and Baseline Determination Report, Fiscal Year 2005* (USAF, 2007). ~~Soil cuttings recovered during drilling operations are expected to be nonhazardous, native material. The cuttings will be stockpiled on plastic sheet or in roll-off containers at each well site.~~

~~Upon completion of drilling activities, composite samples will be collected from the cuttings and analyzed for the full suite of toxicity characteristic leachate procedure (TCLP) parameters. The full suite of TCLP parameters includes analyses for VOCs, SVOCs, the eight RCRA-listed metals, pesticides, and herbicides along with reactivity, ignitability, and corrosivity. If the sample results indicate the cuttings are nonhazardous waste, the cuttings will be disposed of in the Kirtland AFB construction and demolition (C&D) landfill.~~

~~Decontamination will be conducted on a concrete pad constructed for that purpose (located near Pennsylvania Road, southeast of the Tijeras Arroyo Golf Course) or on plastic sheeting at the site. Wastewater from the equipment decontamination will be stored in plastic holding tanks along with purge water from well development activities and groundwater sampling. IDW water samples will be collected from the tanks and analyzed for VOCs, SVOCs, and RCRA-listed metals. The sample analytical results will be compared to the New Mexico Water Quality Control Commission standards and the Albuquerque Bernalillo County Water Utility Authority standards to determine the appropriate disposal option.~~

~~Site Safety and Health Plan~~

~~All environmental drilling and monitoring activities will be conducted in accordance with the SSHP prepared for the OD Closure Activities.~~

2.1.2.4 Reporting

One well completion report ~~will~~shall be prepared to document the drilling and well installation activities. No laboratory analytical data ~~will~~shall be presented in the well completion report. The well completion report ~~will~~shall be submitted to ~~NMED~~the Department for approval within ~~6~~30 days of the completion of well installation activities. The well installation report ~~will~~shall include the following information:

- Descriptions of the field program including the drilling, well installation, surveying, and IDW management activities;
- Field documentation including soil boring logs, well construction diagrams, well development logs, and survey data.

Field and laboratory data ~~will~~shall be submitted to the ~~NMED~~Department within 90 days after all samples are collected for each quarter.

Periodic groundwater monitoring reports ~~will~~shall be prepared to document quarterly groundwater monitoring results. All validated groundwater laboratory results ~~will~~shall be presented in periodic groundwater monitoring reports which comply with Section 6.2.4.4 of the RCRA Permit. Groundwater analytical results ~~will~~shall be compared to New Mexico water quality control standards and EPA maximum contaminant levels and secondary screening levels to determine if contamination above standards is present in the groundwater monitoring wells. Each quarter of analytical data ~~will~~shall be evaluated for the presence of potential contaminants. The Periodic Groundwater Monitoring Reports for the OD unit ~~will~~shall be prepared annually and following four quarters of groundwater monitoring and submitted within 90 days after the completion of the last quarterly monitoring event. Currently, up to eight consecutive quarters of groundwater monitoring and two Periodic Groundwater Monitoring Reports are planned.

2.1.2.5 Project Schedule

~~Table 2-~~H-~~3~~7 outlines the project schedule for the installation and sampling of groundwater monitoring wells. The monitoring well drilling and installation activities ~~will~~shall be conducted upon approval of the OD Unit Closure Plan~~ and this Monitoring Well Installation Plan~~. The well installation activities ~~will~~shall be documented in a Well Completion Report. Final validated groundwater analytical results from four quarters of groundwater sampling ~~will~~shall be reported in an Annual Groundwater Monitoring Report for the OD unit~~s~~.

Table ~~2-3~~H-7
Proposed Schedule of Activities for Groundwater Monitoring Well Installation for the Closure of the OD Unit

Activity	Duration (calendar days)	Start Date
~~Preparation of Plans~~		
~~Submit Well Installation work plan to NMED~~		~~First Quarter 2013~~
~~NMED Review of work plan~~	~~45~~	~~First Quarter 2013~~
~~Receipt of NMED comments on work plan~~		~~Second Quarter 2013~~
~~Prepare and submit revised work plan~~	~~30~~	~~Upon receipt of comments~~
Field Investigation		
Mobilize drilling equipment	3	15 days following ~~work plan~~Closure Plan
Well installation, development, and surveying collection of IDW soil and water samples	28	Following mobilization
IDW characterization~~,~~ and disposal	45	Following well installation
~~Preparation of Well Completion Report~~		
Initiate Well Completion Report Preparation	630	Upon completion of all well drilling, development, and surveying activities
Submit Well Completion Report to USACE, USAF, and ~~NMED~~the Department	1	630 days following well installation
Quarterly Groundwater Monitoring and Periodic Reporting		
Conduct quarterly groundwater monitoring	3	Following installation of four groundwater monitoring wells and on a quarterly basis
Submit field and laboratory data from monitoring event	1	90 days following collection of groundwater samples on a quarterly basis
Prepare Periodic Groundwater Monitoring Report	90	Following collection of four quarters of groundwater samples
Submit Periodic Groundwater Monitoring Report to ~~USACE, USAF, and NMED~~the Department	1	90 days following collection of fourth quarter groundwater samples

IDW – investigation-derived waste
USACE – United States Army Corps of Engineers
USAF – United States Air Force

2.1.3 Mesa Schoolhouse Well

The Mesa Schoolhouse Well, a Department of Energy/National Nuclear Surety Administration (DOE/NNSA) well authorized under Kirtland AFB permit #PERM/0-K1-91-0010 was monitored for groundwater contamination as part of the December 1994 OD Unit's sampling and analysis plan. This sampling has been discontinued and the wellhead is secure. The well ~~will~~shall remain in place for possible future monitoring by DOE/NNSA

2.2 Sampling, Decontamination Procedures, and PPE

This section describes procedures and methods for soil and liquid sampling applicable to closure activities. While the procedures and methods are specific, other applicable procedures or methods given in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA, 1996; SW-846) may
be used if conditions or experience show the alternate method to be more appropriate, and if approved by the Department. All sampling procedures actually used shall be annotated in the final closure report. Sampling shall be conducted in accordance with procedures given in

"Samplers and Sampling Procedures for Hazardous Waste Streams" (EPA, 1980; EPA 600/2-80-018) or SW-846, as appropriate.

Surface and subsurface soil at the OD Unit shall be characterized by sampling and analysis.

The tools and equipment used during the sampling shall be vacuumed, cleaned with detergent and water, and scraped as necessary to remove any residue. The wash water shall be collected and analyzed for characterization of waste. The vacuums used and their contents shall be containerized and shipped off site as hazardous waste for disposal.

All of the PPE worn by personnel performing closure activities ~~will~~shall be disposable; therefore, all PPE shall be placed into containers and managed as hazardous waste. This waste shall be considered to be contaminated with all of the hazardous waste constituents contained in the wastes that have been treated at the OB Unit and the OD Unit. All contained PPE wastes shall be transported to a permitted facility for disposal.

2.2.1 Soil Sampling

Soil samples shall be conducted on a 25-ft by 25-ft grid spacing from the surface to 15 ft below ground surface at five ft intervals (total of four samples per location). At a minimum, the grid shall encompass all portions of the OD Unit that have hosted or may have hosted a pit used for the treatment of hazardous waste~~.~~ (Figure H-~~4~~6).

Surface soil samples ~~will~~shall be collected approximately 25 ft from the OB Unit. Three samples shall be collected from each side of the OB for a total of 12 surface soil samples. These samples ~~will~~shall characterize potential contamination from the OB Unit that may have migrated onto the OD Unit.

The soil samples shall be analyzed for the parameters listed in Table H-~~2~~3 which include all hazardous constituents of the hazardous wastes that were detonated at the OD Unit. Proposed sample identification numbers are shown in Table H-8.

Surface soil samples (zero to six inches depth) shall be collected with a wooden or Teflon™ trowel or scoop. Disposable sampling tools shall be used. In the event that the Department requests split samples, sufficient soils shall be collected to provide split samples to the Department representatives.

A Veihmeyer soil sampler, auger drill, direct push technology or other appropriate method shall be used to collect subsurface soil samples. Only discrete grab samples shall be collected; no samples shall be composited.

Clean sampling equipment shall be used to collect each sample. Unused, disposable sampling equipment may be presumed clean if still in a factory-sealed wrapper prior to use. Reusable sampling equipment shall be decontaminated after each use by scraping to remove any loose material, washing with a detergent and water solution, rinsing several times with tap water, rinsing with deionized water, and drained of excess water, and air-dried or wiped dry.

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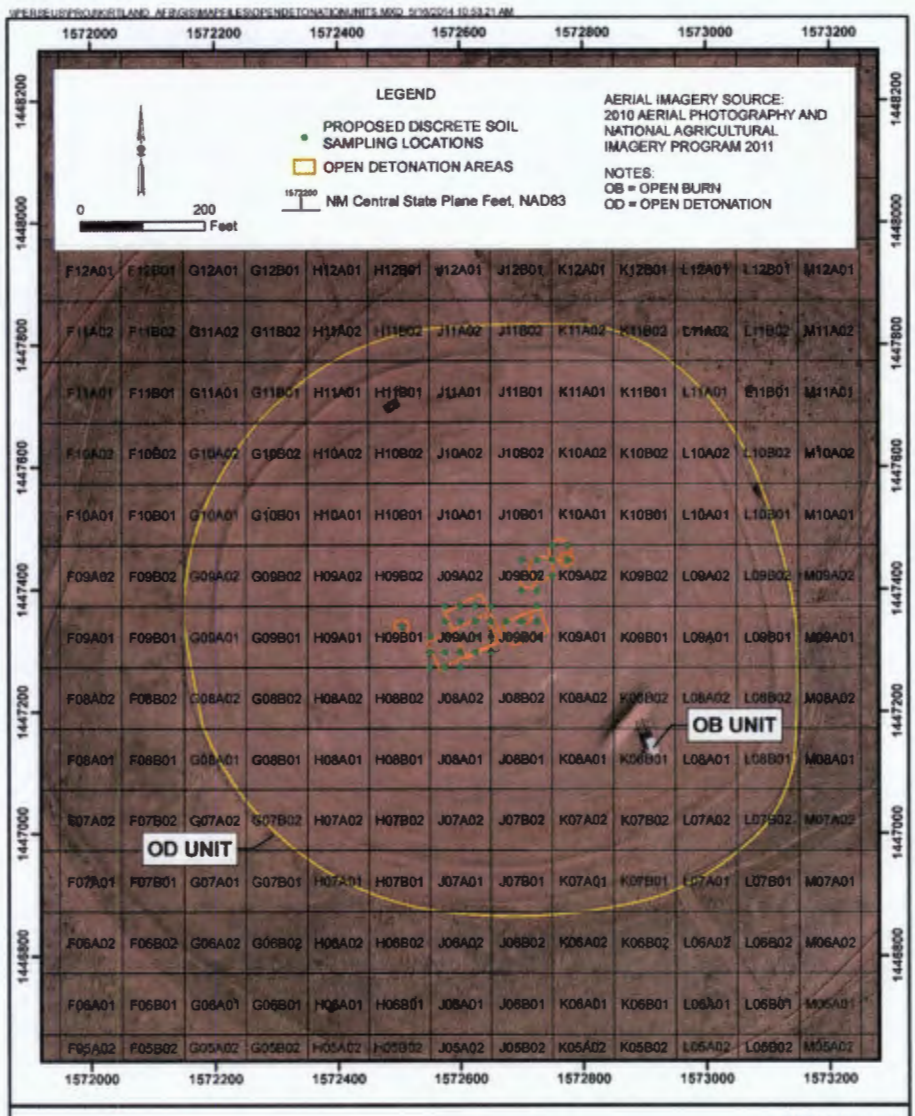

FIGURE H-6
PROPOSED DISCRETE SOIL SAMPLING LOCATIONS
OPEN DETONATION CLOSURE PLAN
KIRTLAND AIR FORCE BASE, NEW MEXICO

Table H-8
Proposed Discrete Soil Samples for the Open Detonation Unit, Kirtland Air Force Base, New Mexico

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Soil Boring	Sample Identification	Depth (feet below ground surface)	Sample Type	**Metals** Methods SW-846 6010B, 6020A, 7471B	**VOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8260B	**SVOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8270C	**Total Explosives** (Per Table D-4 of RCRA Permit) Method SW-846 8330B	**Perchlorate** Method SW-846 6850	**White Phosphorous** Method SW-846 7580	**Dioxins** Method SW-846 8290
H09B1-01	OT29-SO-H09B1-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-H09B01-01-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-H09B01-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-H09B01-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-H09B01-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-01	OT29-SO-J09A1-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-02	OT29-SO-J09A1-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-03	OT29-SO-J09A1-03-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-03-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-03-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-03-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-03-1415	14 - 15	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-03-1415MS	14 - 15	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09A1-03-1415MSD	14 - 15	MS/MSD	X	X	X	X	X	X	X
J09A1-04	OT29-SO-J09A1-04-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-04-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-04-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-04-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-05	OT29-SO-J09A1-05-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09A1-05-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09A1-05-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-05-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-05-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-06	OT29-SO-J09A1-06-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-06-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-06-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-06-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-07	OT29-SO-J09A1-07-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-07-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-07-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-07-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-07-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-08	OT29-SO-J09A1-08-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-08-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-08-0405MS	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09A1-08-0405MSD	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09A1-08-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-08-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-09	OT29-SO-J09A1-09-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-09-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-09-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-09-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-10	OT29-SO-J09A1-10-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-10-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-10-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-10-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-11	OT29-SO-J09A1-11-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09A1-11-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09A1-11-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-11-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-11-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-12	OT29-SO-J09A1-12-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-12-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-12-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-12-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-13	OT29-SO-J09A1-13-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-13-0001MS	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09A1-13-0001MSD	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09A1-13-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-13-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-13-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-13-1415	14 - 15	Normal	X	X	X	X	X	X	X

Table H-8
Proposed Discrete Soil Samples for the Open Detonation Unit, Kirtland Air Force Base, New Mexico

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Soil Boring	Sample Identification	Depth (feet below ground surface)	Sample Type	**Metals** Methods SW-846 6010B, 6020A, 7471B	**VOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8260B	**SVOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8270C	**Total Explosives** (Per Table D-4 of RCRA Permit) Method SW-846 8330B	**Perchlorate** Method SW-846 6850	**White Phosphorous** Method SW-846 7580	**Dioxins** Method SW-846 8290
J09A1-14	OT29-SO-J09A1-14-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-14-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-14-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-14-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-15	OT29-SO-J09A1-15-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09A1-15-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09A1-15-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-15-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-15-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-16	OT29-SO-J09A1-16-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-16-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-16-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-16-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-17	OT29-SO-J09A1-17-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-17-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-17-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-17-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-17-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-18	OT29-SO-J09A1-18-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-18-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-18-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-18-0910MS	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09A1-18-0910MSD	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09A1-18-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-19	OT29-SO-J09A1-19-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-19-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-19-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-19-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-20	OT29-SO-J09A1-20-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-20-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-20-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-20-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-20-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-21	OT29-SO-J09A1-21-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-21-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-21-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-21-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-01	OT29-SO-J09B1-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B1-01-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B1-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-02	OT29-SO-J09B1-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-03	OT29-SO-J09B1-03-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-03-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09B1-03-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09B1-03-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-03-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-04	OT29-SO-J09B1-04-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-04-0001MS	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09B1-04-0001MSD	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09B1-04-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-04-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-04-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-05	OT29-SO-J09B1-05-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-05-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-05-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-05-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-06	OT29-SO-J09B1-06-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-06-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09B1-06-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09B1-06-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-06-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-07	OT29-SO-J09B1-07-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-07-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-07-0405MS	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09B1-07-0405MSD	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09B1-07-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-07-1415	14 - 15	Normal	X	X	X	X	X	X	X

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Table H-8
Proposed Discrete Soil Samples for the Open Detonation Unit, Kirtland Air Force Base, New Mexico

Soil Boring	Sample Identification	Depth (feet below ground surface)	Sample Type	**Metals** Methods SW-846 6010B, 6020A, 7471B	**VOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8260B	**SVOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8270C	**Total Explosives** (Per Table D-4 of RCRA Permit) Method SW-846 8330B	**Perchlorate** Method SW-846 6850	**White Phosphorous** Method SW-846 7580	**Dioxins** Method SW-846 8290
J09B2-01	OT29-SO-J09B2-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-02	OT29-SO-J09B2-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B2-02-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B2-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-03	OT29-SO-J09B2-03-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-03-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-03-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-03-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-04	OT29-SO-J09B2-04-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B2-04-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B2-04-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-04-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-04-1415	14 - 15	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-04-1415MS	14 - 15	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09B2-04-1415MSD	14 - 15	MS/MSD	X	X	X	X	X	X	X
J09B2-05	OT29-SO-J09B2-05-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-05-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-05-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-05-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-06	OT29-SO-J09B2-06-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-06-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-06-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-06-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-07	OT29-SO-J09B2-07-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B2-07-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B2-07-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-07-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-07-0910MS	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09B2-07-0910MSD	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09B2-07-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-08	OT29-SO-J09B2-08-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-08-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-08-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-08-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-09	OT29-SO-J09B2-09-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-09-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-09-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-09-1415	14 - 15	Normal	X	X	X	X	X	X	X
K09A2-01	OT29-SO-K09A2-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-K09A2-01-0405	4 - 5	Normal	X			X	X		
	OT29-FD-K09A2-01-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-K09A2-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-K09A2-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
K09A2-02	OT29-SO-K09A2-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-K09A2-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-K09A2-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-K09A2-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
QC	OT29-WW-RINSATE1	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-RINSATE2	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-RINSATE3	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-RINSATE4	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-TB1	-	Trip Blank		X					
	OT29-WW-TB2	-	Trip Blank		X					
	OT29-WW-TB3	-	Trip Blank		X					
	OT29-WW-TB4	-	Trip Blank		X					
			Total Normal Samples	160	80	80	160	160	80	80
			Total Field Duplicates	16	8	8	16	16	8	8
			Total Matrix Spike/Matrix Spike Duplicates	8	4	4	8	8	4	4
			Total Rinsate Blanks	4	4	4	4	4	4	4
			Total Trip Blanks		4					

MS/MSD - matrix spike/matrix spike duplicate
QC - quality control
RCRA - Resource Conservation and Recovery Act
SVOCs - semivolatile organic compounds
VOCs - volatile organic compounds

2.2.2 Liquid Sampling

Groundwater samples shall be collected from the groundwater monitoring wells installed at the OD Unit. Eight consecutive quarters of groundwater monitoring shall be conducted initially, following installation of the wells. Groundwater samples ~~will~~shall be obtained using methods approved by the Department within eight hours of the completion of well purging. The samples shall be analyzed for the parameters listed in Table H-4, which include all hazardous constituents of the hazardous wastes that were treated at the OD Unit.

Groundwater in monitoring wells with low recharge rates and that purge dry shall be sampled when the water level in the well has recovered sufficiently to collect the required samples. A low-flow bladder pump shall be utilized. Groundwater samples intended for metals analysis shall be submitted to the laboratory for analyses of total metals; the samples ~~will~~shall not be filtered in the field or laboratory.

Glass tubes shall be used to sample liquids, except groundwater. The primary advantage to using this type of sampling device is that the tube can be disposed of after each sample is collected, thus eliminating cross-contamination. Alternatively, a Coliwasa sampler may be used to sample liquids, except groundwater.

2.2.3 Appropriate Sample Containers and Preservatives

Samples shall be placed in clean containers compatible with the intended analysis and shall be properly prepared and preserved to maintain sample integrity. The most recent version of SW-846 lists the proper container, preservative, and holding time for each chemical parameter of interest, and these requirements ~~will~~shall be followed for all samples collected during the closure process. Table H-5 summarizes the sample containers, preservation techniques, and holding times for soil and liquid samples (including groundwater).

2.2.4 Sample Handling and Documentation

Each sample shall be labeled, sealed, and accompanied by a chain-of-custody and a request-for-analysis form. A chain-of-custody form shall be used to track samples from collection through analysis to ensure that the integrity of the samples is protected, and that analytical results can be attributed to specific samples of environmental media or waste. The procedures followed during closure ~~will~~shall be equivalent to those provided in the most current version of SW-846. Important aspects of the procedures are presented below. A chain-of-custody form ~~will~~shall be prepared for all samples collected for laboratory analyses. The form includes:

- Sample identification number;
- Name and signature of sample collector;
- Date and time of sample collection;
- Location at which sample was collected;
- Type of waste (e.g., soil, liquid, etc.);
- Signatures of persons who have had samples in their possession;
- Dates and times of possession.

This form ~~will~~shall be initiated at the point of sample collection and ~~will~~shall then remain with the sample during transfer to the laboratory. The form ~~will~~shall be completed upon receipt at the laboratory and returned to ~~Kirtland AFB~~the Permitee for inclusion in facility operating record. The chain-of-custody form ~~will~~shall include a request-for analysis form that lists all analyses to

be performed for the identified samples and all special instructions relating to sample management or analysis. Any potential hazards posed by the samples shall be listed on the request-for-analysis form.

The sample containers ~~will~~shall be sealed with gummed paper seals attached to the containers in such a way that the seals must be broken in order to open the containers. The seals and sample labels must be completed with a waterproof pen. The sample labels are necessary to prevent misidentification of samples and shall include the following information: a unique sample number; name or initials of sample collector; sample collection date and time; sample location; and, sample type, depth, and description.

A closure sampling field log book ~~will~~shall be kept and ~~will~~shall contain all information pertinent to field surveys and sampling. Sufficient information shall be recorded so that a person can reasonably reconstruct what occurred at a sampling event without relying on a collector's memory. The log book shall have bound and consecutively numbered pages in 8 by 11-inch format. Minimum entries ~~will~~shall include:

Purpose of sample;
Location of sampling;
Name and business address of person making log entry;
Number, type, and volume of sample;
Description of each sampling methodology and equipment used;
Date and time of sample collection;
Sample destination and transporter's name (name of laboratory, UPS, etc.);
Map or photograph of the sampling site;
Field observations (ambient temperature, sky conditions, past 24-hour precipitation, etc.);
Field measurements, if any (pH, flammability, conductivity, explosivity, etc.);
Collector's sample identification number(s);
Signature of person responsible for the log entry.

Documentation of sample acceptance at the laboratory ~~will~~shall be provided following sample screening and log-in. This documentation may consist of signed copies of the chain-of-custody, documentation or a letter detailing the field sample numbers accepted. Corresponding laboratory sample identification numbers ~~will~~shall be provided. The laboratory is required to have procedures for preventing cross contamination of samples and securing sample custody within the laboratory.

2.2.5 Sample Shipping

Samples shall be packaged and shipped to the laboratory in accordance with DOT shipping requirements and in a manner to ensure that the integrity of the samples is protected. The sample containers shall be cushioned to protect against breakage or puncture.

2.2.6 Sample Analysis

Soil, groundwater, and waste samples ~~will~~shall be analyzed by an ELAP-certified laboratory. The analytical laboratory shall have procedures for preventing cross-contamination of samples and securing sample custody within the laboratory. Test methods for analysis of all samples ~~will~~shall be performed according to procedures documented in the most current version of SW-846. Hazardous constituents associated with the regulated wastes treated at the OD Unit are included in these analyses. Analytical methods, detection limits, and instrumentation are provided

in Table H-~~2~~-3 for soil analysis; and in Table H-~~3~~-2 for groundwater analysis. Minimum calibration, operation, and quality control (bias, precision, blank and matrix effects) requirements for laboratory analyses shall be performed as listed in the individual analytical methods of SW-846. All laboratory analyst notebooks, log sheets, instrument printouts, charts, and calculations relevant to analyses of these samples shall be identified and remain accessible. This information may be requested for independent review and validation. If requested by the Department, this information shall be provided by the Permittee.

2.2.7 Quality Assurance/Quality Control Program

Because decisions about closure activities may be based, in part, on analyses of samples, a program to ensure reliability of analytical data is mandatory. Data reliability ~~will~~shall be ensured by documenting sample management so that analyses are traceable to specific areas of potential contamination and by following a quality assurance/quality control (QA/QC) program that mandates documentation of the precision and accuracy of laboratory analyses, as well as data completeness, representativeness, and comparability.

Sampling activities ~~will~~shall include collection of QC samples in addition to field documentation requirements. QC samples to be collected include: duplicate samples, trip blanks, field blanks, and rinsate blanks. Table H-~~5~~-9 summarizes field QC sample requirements.

Blanks and duplicate samples shall be collected to determine potential errors introduced in the data from sample collection and handling activities, laboratory error, and to assess analytical precision. To determine the potential for cross contamination, rinsate blanks consisting of rinsate from decontaminated equipment shall be collected and analyzed. At least one rinsate blank ~~will~~shall be collected for every ten samples collected using non-dedicated sampling equipment. Duplicate samples ~~will~~shall be collected at a frequency of one duplicate sample for every ten field samples. In no case ~~will~~shall less than one rinsate blank or duplicate sample be collected for a sampling effort. Trip blanks ~~will~~shall be collected on a daily basis and included in each shipment of samples that contain VOCs samples. Trip blanks are analyzed for VOCs only and are used to assess possible VOC contamination from outside sources. Trip blanks are shipped from the analytical laboratory and maintained with the sample bottles throughout the sampling process. These blank and duplicate samples ~~will~~shall be identified and treated as separate samples. Acceptance criteria for QA/QC sample analyses ~~will~~shall be compatible with the most recent version of SW-846 or other applicable guidance.

The analytical laboratory shall operate under a QA program plan (QAPP) that meets the requirements of ~~SW-846~~the required methods. QC procedures in the analytical laboratory are guided by the laboratory's QAPP. Laboratory QC samples are required to establish the accuracy and precision of analytical data in order to determine the quality of the data. Table H-~~4~~10- lists laboratory QC procedures by analytical methods.

The analytical laboratory data shall be evaluated using the following criteria:

- Completeness of data deliverable;
- Collection, extraction, and analysis holding times;
- Blank data;
- Laboratory control sample results;
- Matrix spike/matrix spike duplicate results;
- Laboratory duplicate sample results; and
- ~~Overall data assessment and usability.~~

Table H-9
Summary of Field Quality Control Samples

Quality Control Sample Type	Sample Matrix	Applicable Analysis	Frequency	Purpose
Trip blank	Soil/Water	VOCs	One per day, per cooler containing VOC samples	Document any contamination attributable to shipping and field handling procedures
Field Duplicate	Soil/Water	VOCs, SVOCs, Metals, HE, Dioxins/Furans, White Phosphorus, Perchlorate, gGeneral chemistry[a]	Minimum of one per 10 environmental samples per media type	Document precision of the sampling/analysis process
Rinsate blank	Soil/Water	VOCs, SVOCs,[b] metals, HE[b], Dioxins/Furans, White Phosphorus, Perchlorate, gGeneral chemistry[a, b]	One sample per day per media type for non-dedicated sampling equipment	Document whether decontamination of sampling equipment was adequate

[a] General chemistry - total dissolved solids, alkalinity, ammonia, sulfide, total organic carbon, sulfate, nitrate, nitrite, chloride, fluoride, bromide

[b] No rinsate blank is required for total dissolved solids or alkalinity.

HE - high explosives

SVOCs - semivolatile organic compounds

VOCs - volatile organic compounds

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method 7580

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Multipoint ICAL for all analytes (minimum five standards)	Before sample analysis	One of the following options. Option 1: Linear—RSD for each analyte ≤ 20%. Option 2: Linear—least squares regression r >0.995 for each analyte. Option 3: Nonlinear—COD ≥0.99 (six points will be used for second order, seven points will be used for third order).	Correct problem then repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL. Calibration may not be forced through the origin. All quantitation for multicomponent analytes, such as technical chlordane, toxaphene, and Aroclors, must be performed form a five-point calibration. Results may not be quantified from a single point.
Second-source calibration verification	Immediately after each ICAL	All analytes within ± 20% of expected value	Correct problem and verify second-source standard. Rerun second-source verification. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Retention time window position established for each analyte and surrogate	Each ICAL and after the initial daily CCV	Position will be set using the midpoint standard of the ICAL curve. On days when an ICAL is not performed, the CCV is used.	N/A	N/A
Retention time window width established for each analyte and surrogate	At method setup and after major maintenance (for example, column change)	±3 times standard deviation for each analyte retention time from 72-hour study.	N/A	N/A
Retention time window verification for each analyte and surrogate	Each calibration verification	Analyte within established window.	Correct problem, then reanalyze all samples analyzed since the last acceptable retention time check.	**ICV:** Flagging criteria are not appropriate for initial verification. **CCV:** Apply Q-flag to all results for the specific analyte(s) in the sample that are outside the established window.
CCV	Daily, before sample analysis unless ICAL performed on same day, after every 10 samples, and at the end of the analysis sequence	All analytes within ± 15% of expected value (% D).	Correct problem, then rerun. If that fails, repeat ICAL. Reanalyze all samples since last successful calibration verification.	**If reanalysis cannot be performed**, apply Q-flag to all results for the specific analyte(s) >15%D for all samples associated with the calibration verification.
Method blank	One per analytical batch	No analytes detected > ½ LOQ. For common laboratory contaminants no analytes detected > LOQ and see Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and reanalyze method blank and all samples processed with the	Apply "B" flag to all associated positive results for the specific analyte(s), as appropriate. See Worksheet #36, Section 36.2.5.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method 7580

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			contaminated blank.	
LCS for all analytes (must contain all target analytes)	One per analytical batch	Acceptance criteria: Worksheet #15.	Correct problem, then reanalyze. If still out, reprepare and reanalyze the LCS and all samples in the affected batch.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
MS/MSD	One per 20 project samples per matrix as a minimum and as defined on the chain-of-custody form	Acceptance criteria: Worksheet #15.	Assess data to determine whether there is a matrix effect or analytical error. Review LCS for failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made regarding PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: • %R for MS or MSD > upper control limit • %R for MS or MSD < lower control limit • MS/MSD RPD > control limit
Second-column confirmation (not required for Methods 8015B [DRO or GRO]	All positive results	Same as for initial or primary column analysis.	Same as for initial or primary column analysis.	Apply J-flag if RPD > 40% from first column result. Apply Q-flag to all results for the specific analyte(s) in the sample not confirmed.
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[c])	At initial setup and then once per 12-month period or quarterly DL verification	Detection limits established will be ≤ ½ the RL in Worksheet #15 Tables (see 40 CFR, Part 136, Appendix B). For the verification check to be valid, analytes must be detected and identified by method-specified criteria or the verification check must produce a response that is at least 3 times the instrument noise level and greater than the response in the blanks associated with the MDL study.	Continue the MDL study until all criteria are met.	N/A.
LOD determination and verification (see Section D.1.2.1 and Box D-13 of the DoD QSM[c])	At initial setup and verified quarterly (if a laboratory uses multiple instruments for a given method, the LOD must be verified on each)	The apparent signal-to-noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If LOD verification fails, the laboratory must (1) repeat the MDL determination and LOD verification at a higher concentration or (2) perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher	N/A; samples may not be analyzed without a valid LOD.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method 7580

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			concentration.	
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[c])	At initial setup (1) verify LOQ; and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of the DoD QSM[c])	(1) LOQ and associated precision and bias must meet client requirements and be reported; or (2) in the absence of client requirements, must meet LCS control limits (see Box D-14 of the DoD QSM[c]).	If the LOQ verification fails, laboratory must either establish a higher LOQ or modify method to meet client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag "U."
Demonstrate acceptable analyst capability	Before using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of DoD QSM[c])	QC acceptance criteria published by DoD, if available; otherwise, method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for analytes not meeting criteria (see section C.1.f of DoD QSM[c]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by an analyst until capability is demonstrated.

End of Method 7580

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Mass spectrometer tuning check Use bromofluorobenzene (SW8260B) or decafluorotriphenylphosphine (SW8270C)	Before ICAL and calibration verification	Refer to criteria listed in method description.	Retune instrument and verify.	Not appropriate.
GC performance check (8270C only or when SW8270 is used for pesticide analyses)	Daily before analysis of sample or calibration standards	Degradation ≤ 20% for DDT. No visible peak tailing for benzidine or pentachlorophenol (as a default, tailing factors should be less than 2.0).	Correct problem, then repeat performance check.	Not appropriate.
Multipoint ICAL for all analytes (minimum five standards)	Before sample analysis	SPCCs: Average RF ≥ 0.30 (SW8260B), ≥ 0.050 (SW8270C) CCCs: % RSD for RFs ≤ 30% and one of the options below: Option 1: Linear—RSD for each analyte < 15%. Option 2: Linear—linear least squares regression r > 0.995 for each analyte. Option 3: Nonlinear—COD ≥ 0.99 (6 points will be used for second order, 7 points will be used for third order). This is not a preferred option.	Correct problem, then repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL. Calibration may not be forced through the origin.
Second-source calibration verification	Once per ICAL	All analytes within ± 20% of expected value.	Correct problem and verify second-source standard. Rerun second-source verification. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Retention time window position establishment for each analyte and surrogate	Once per ICAL	Position will be set using the midpoint standard of the ICAL curve. On days when an ICAL is not performed, the CCV is used.	N/A.	N/A.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Retention time window verification for each analyte	Each sample	RRT of the analyte within ± 0.06 RRT units of ICAL. Laboratories may update the retention times based on the CCV to account for minor performance fluctuations or after routine system maintenance (e.g., column clipping. With each sample, the RRT will be compared with the most recently updated RRT. If the RRT has changed by more than ±0.06 RRT units since the last update, there has been a significant change in system performance and the laboratory must take appropriate corrective actions as required by the method and rerun the ICAL to re-establish the retention times.	Correct problem then reanalyze all samples analyzed since the last retention time check.	Apply Q-flag to all results for the specific analyte(s) in the sample that are outside the established window.
CCV	Daily, before sample analysis (unless ICAL performed on same day), and after every 12 hours of analysis time	SPCCs: Average RF ≥ 0.30 (SW8260B), ≥ 0.050 (SW8270C) CCCs: % RSD for RFs ≤ 30% and All analytes within ± 20% D of expected value from ICAL.	Correct problem, then rerun CCV. If that fails, repeat ICAL.	Apply Q-flag to all results for the specific analyte(s) > 20% D for all samples associated with the calibration verification.
ISs	Each sample, standard, and QC sample	Retention time ± 30 seconds from retention time of the IS in the ICAL midpoint standard. Extracted ion current profile area within -50% to +100% of area from IS in ICAL mid-point standard.	Inspect mass spectrometer and GC for malfunctions and make corrections as appropriate. Reanalysis of samples analyzed while the system was malfunctioning is mandatory.	Apply Q-flag to all results for analytes associated with a failed IS (unless a matrix effect can be verified), then apply M-flag.
Method blank	One per analytical batch	No analytes detected > ½ LOQ. For common laboratory contaminants, no analytes detected > LOQ. See Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and analyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s), as appropriate. See Worksheet #36, Section 36.2.5.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
LCS for all analytes	One LCS per analytical batch	Acceptance criteria: Worksheet #15.	Correct problem, then reanalyze. If still out, reprepare and reanalyze the LCS and all samples in the affected batch.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
MS/MSD	One per 20 samples per matrix as a minimum and as defined on the chain-of-custody form	Acceptance criteria: Worksheet #15.	Assess data to determine whether there is a matrix effect or analytical error. Analyze LCS for failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made regarding the PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: (1) %R for MS or MSD > upper control limit (2) %R for MS or MSD < lower control limit (3) MS/MSD RPD > control limit
Surrogate spike	Every sample, spiked sample, standard, and method blank	Acceptance criteria: Worksheet #15.	Correct problem, then reprepare and reanalyze the affected samples. If matrix effect is verified, discuss in case narrative.	For the samples: If the %R > UCL for any surrogate, apply J-flag to all positive results for associated analytes. If the %R < LCL for any surrogate, apply J-flag to all positive results for associated analytes and UJ-flag to all associated nondetects. If any surrogate recovery is <10%, apply Q-flag to all results for all associated analytes.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[c])	At initial setup and then once per 12-month period or quarterly DL verification	Detection limits established will be ≤ ½ the RL in Worksheet 15. See 40 CFR, Part 136, Appendix B. All analytes must be detected and identified by method-specified criteria for the for the verification check to be valid, or the verification check must produce a response that is at least 3 times the instrument noise level and greater than the response in the blanks associated with the MDL study.	Continue the MDL study until all criteria are met.	N/A.
LOD determination and verification (see Section D.1.2.1 and Box D-13 of the DoD QSM[c])	At initial setup and verified quarterly (if a laboratory uses multiple instruments for a given method, the LOD must be verified on each)	The apparent signal-to-noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must (1) repeat the detection limit determination and LOD verification at a higher concentration or (2) perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	N/A; samples may not be analyzed without a valid LOD.
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[c])	At initial setup: (1) verify LOQ; and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if a laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of DoD QSM[c]	(1) The LOQ and associated precision and bias must meet client requirements and must be reported or (2) in the absence of client requirements, must meet LCS control limits. See Box D-14 of the DoD QSM[c].	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag "U."
Demonstrate acceptable analyst capability	Before using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of DoD QSM[c])	QC acceptance criteria published by DoD, if available; otherwise method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for those analytes that did not meet criteria (see Section C.1.f of the DoD QSM[c]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by an analyst until capability is demonstrated.

End of Methods SW8260B, SW8270C, and SW8270C (SIM)

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8330B

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Initial multipoint calibration for all analytes (minimum five standards) (ICAL)	Minimum five-point initial calibration for target analytes, lowest concentration standard at or below the reporting limit.	Initial calibration prior to sample analysis	Average RF: RSD <= 20%; Linear: r>0.995, intercept < MDL. Apparent S/N ratio of standard at RL (LOQ) must be at least 5:1.	Evaluate standards, chromatography, and detector response. If problem found with above, correct as appropriate, then repeat initial calibration
Second-source calibration verification	Once per ICAL	All analytes within ± 20% of expected value	Correct problem and verify second source standard. Rerun second source verification. If that fails, correct problem and repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Low standard verification	Immediately following ICAL.	Less than 50 % difference for target analytes;	Evaluate data. If problem (e.g., concentrated standard, plugged injector needle) found, correct, then repeat low-level verification. If still fails, repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
CCV	Daily, before sample analysis unless ICAL performed on same day and every 24 hours of analysis time	All analytes within ± 20% of expected value	Correct problem, rerun CCV. If that fails, repeat initial calibration.	Apply Q-flag to all results for the specific analyte(s) > 30 %D for all samples associated with the calibration verification.
Surrogate spike	**Every sample, spiked sample, standard, and method blank**	**Acceptance criteria: Worksheet #15.**	**Correct problem, then reprepare and reanalyze the affected samples.** **If matrix effect is verified, discuss in case narrative.**	**For the samples:** **If the %R > UCL for any surrogate, apply J-flag to all positive results for associated analytes.** **If the %R < LCL for any surrogate, apply J-flag to all positive results for associated analytes and UJ-flag to all associated nondetects.** **If any surrogate recovery is <10%, apply Q-flag to all results for all associated analytes.**
Method Blank	One per preparation batch	No target analytes ≥ ½ LOQ and > 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater).	Verify instrument clean (evaluate calibration blank & samples prior to method blank), then reanalyze. Evaluate to determine if systematic issue within laboratory, correct, then re-prepare and reanalyze the method blank and all samples processed with the contaminated blank in accordance with DoD QSM requirements	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
LCS for all analytes	One LCS per analytical batch	Acceptance criteria: Table 7-4	Correct problem then reanalyze. If still out, reprep and reanalyze the LCS and all samples in the affected AB.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
Confirmation Analysis	When target analytes detected on the primary column at concentrations > LOD.	Calibration and QC criteria the same as for initial/primary analsyis. Results between primary and secondary column RPD ≤ 40%	Evaluate data, then report with flag to denote RPD > 40%. Narrate obvious matrix issues.	RPD between primary and confirmation analysis ≤ 40%,.
Soil Grinding Blank	When puck mill grinding is performed, one blank between each sample processed.	Blank material ground and subsampled as with the samples. Composited prior to analysis. No target analytes detected at > than 1/2 the LOQ	All blanks are reported, and data is flagged/narrated if the criteria are exceeded.	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements
Grinding Certified Reference Material (CRM)	When puck mill grinding is performed, CRM is ground for every 20 samples ground.	Within the control limits supplied by manufacturer of material	Evaluate the data, narrate any outliers and report.	Manufacturer's acceptance limits.
DL study (as part of the LOD process, reference Section D.1.2.1 of the DoD QSM)	At initial setup and subsequently once per 12-month period or quarterly DL verification checks.	DL established shall meet 40 CFR, Part 136 Appendix B.	Continue to run the DL study until all criteria are passing	N/A
LOD determination and verification (reference Section D.1.2.1 and grey box D-13 of the QSM)	At initial set-up and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must; 1) Repeat the detection limit determination and LOD verification at a higher concentration;or 2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	Not Applicable. Samples may not be analyzed without a valid LOD.
LOQ establishment and verification (reference Section D.1.2.2 and grey box D-14 of the QSM)	At initial setup: 1) Verify LOQ; and 2) Determine precision and bias at the LOQ. Subsequently, verify LOQ quarterly. If a laboratory uses multiple instruments for a given method, the LOQ must be verified on each. See Box D-14.	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or 2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DOD QSM.	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	Not Applicable. Samples may not be analyzed without a valid LOD.
Results reported between DL and LOD and the LOD and the LOQ	None	None	None	Apply F-flag to all results between DL and LOQ. If no Detection determined below the LOD, report to the LOD, flag U.

End of Method SW8330B

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Tuning (Mass Calibration Verification)	Prior to ICAL and after any mass calibration or maintenance is performed.	Quantitation ions within 0.3 m/z of expected mass.	Perform mass calibration on the MS/MS. If required, consult with instrument engineer for further maintenance.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Minimum six-point initial calibration for target analytes, lowest concentration standard at or below the reporting limit	Initial calibration prior to sample analysis	Linear: $r^2 > 0.990$ ($r>0.995$) with intercept ≤ LOD, or Average Response Factor: RSD≤ 20%.	Evaluate standards, chromatography, and mass spectrometer response. If problem found with above, correct as appropriate, then repeat initial calibration.	Evaluate standards, chromatography, and detector response. If problem found with above, correct as appropriate, then repeat initial calibration
Second-source calibration verification	Once per six-point initial calibration	Perchlorate within ±15% of the true value	Evaluate data. If problem (e.g., concentrated standard, plugged transfer line) found, correct, then repeat second source verification. If it still fails, then repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Daily calibration verification	Mid-range standard analyzed before sample analysis, after every 10 samples, and at the end of the sequence.	Perchlorate within ±15% of the true value	Correct problem, then repeat. If still fails, repeat initial calibration	Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.
Limit of Detection verification (LODv) (per batch)	Prior to sample analysis and at the end of the analysis sequence.	Perchlorate within ± 30% of the true value	Correct problem. Evaluate samples. Samples with results > RL (LOQ) may be reported. Samples since the last passing LODv with results ≤ RL (LOQ) must be reanalyzed.	**Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.**
Laboratory Reagent Blank	Prior to ICAL, following samples with overrange concentration of perchlorate, and at the end of the analytical sequence.	No perchlorate detected > LOQ	Reanalyze reagent blank (until no carryover seen), and any samples with perchlorate detections since the contaminated blank.	No target analytes ≥ ½ LOQ
Internal Standard	Every Calibration Standard	ICAL: IS for each standard must be within ± 50% of the average area of the ICAL. ICV, CCV: Within ± 50% of the average area of the ICAL or within ± 50% of the 1st CCV of the run, if the ICAL is not run the same day.	Evaluate the system. Reanalyze/repeat the calibration.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples.
Method Blank	One per preparation batch	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements	Correct problem, then re-extract and reanalyze method blank and all samples processed with the contaminated blank in accordance with DoD QSM requirements	No target analytes ≥ ½ LOQ

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Interference Check Sample (ICS)	One per preparation batch	70% -130%	Reanalyze once. If still outside the acceptance limits, evaluate to determine if cleanup filters or column degradation are suspect, replace appropriate materials and reprepare (filters) or reanalyze (column). Repeat the Interference Threshold Study to deter. If problem still exists, recalibrate.	Recovery as described in DoD Perchlorate Handbook.
IS	During acquisition of calibration standard, samples, and QC check samples	Areas within -50% to +100% of the midpoint of the last ICAL for each sample and QC in accordance with DoD QSM requirements	Inspect LCMS for malfunctions; mandatory reanalysis of samples analyzed while system was malfunctioning in accordance with DoD QSM requirements	Meets all EPA Method requirements
Isotope Ratio $^{35}CL/^{37}CL$	Every sample, batch QC sample and standard	Monitor for either the parent ion at masses 99/101 or the daughter ion at masses 83/85 depending on which ions are quantified.	Re-extract, re-clean, and/or reanalyze affected sample(s). If problem persists, perform post-spike or dilution as appropriate to confirm presence of perchlorate	Theoretical ratio approx. 3.06 Must fall within 2.3 to 3.8
LCS	One LCS per analytical/preparation batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Reanalyze LCS once. If acceptable, report. Otherwise, evaluate and re prepared and reanalyze the LCS and all samples in the associated prep batch for failed analytes, if sufficient sample material is available.	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
MS/MSD	One MS/MSD per batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Identify problem; if not related to matrix interference, re-extract and reanalyze MS/MSD in accordance with DoD QSM requirements	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
DL study (as part of the LOD process, reference Section D.1.2.1 of the DoD QSM)	At initial setup and subsequently once per 12-month period or quarterly DL verification checks.	DL established shall meet 40 CFR, Part 136 Appendix B.	Continue to run the DL study until all criteria are passing	N/A
LOD determination and verification (reference Section D.1.2.1 and grey box D-13 of the QSM)	At initial set-up and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must: 1) Repeat the detection limit determination and LOD verification at a higher concentration; or 2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher	Not Applicable, Samples may not be analyzed without a valid LOD.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			concentration.	
LOQ establishment and verification (reference Section D.1.2.2 and grey box D-14 of the QSM)	At initial setup: 1) Verify LOQ; and 2) Determine precision and bias at the LOQ. Subsequently, verify LOQ quarterly. If a laboratory uses multiple instruments for a given method, the LOQ must be verified on each. See Box D-14.	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or 2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DOD QSM.	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	Not Applicable. Samples may not be analyzed without a valid LOD.
Results reported between DL and LOD and the LOD and the LOQ	None	None	None	Apply F-flag to all results between DL and LOQ. If no Detection determined below the LOD, report to the LOD, flag U.

End of Method SW6850

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Tuning (Mass Calibration Verification)	Prior to ICAL and after any mass calibration or maintenance is performed.	Quantitation ions within 0.3 m/z of expected mass.	Perform mass calibration on the MS/MS. If required, consult with instrument engineer for further maintenance.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Minimum six-point initial calibration for target analytes, lowest concentration standard at or below the reporting limit	Initial calibration prior to sample analysis	Linear: $r^2 > 0.990$ ($r>0.995$) with intercept ≤ LOD, or Average Response Factor: RSD≤ 20%.	Evaluate standards, chromatography, and mass spectrometer response. If problem found with above, correct as appropriate, then repeat initial calibration.	Evaluate standards, chromatography, and detector response. If problem found with above, correct as appropriate, then repeat initial calibration
Second-source calibration verification	Once per six-point initial calibration	Perchlorate within ±15% of the true value	Evaluate data. If problem (e.g., concentrated standard, plugged transfer line) found, correct, then repeat second source verification. If it still fails, then repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Daily calibration verification	Mid-range standard analyzed before sample analysis, after every 10 samples, and at the end of the sequence.	Perchlorate within ±15% of the true value	Correct problem, then repeat. If still fails, repeat initial calibration	Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.
Limit of Detection verification (LODv) (per batch)	Prior to sample analysis and at the end of the analysis sequence.	Perchlorate within ± 30% of the true value	Correct problem. Evaluate samples. Samples with results > RL (LOQ) may be reported. Samples since the last passing LODv with results ≤ RL (LOQ) must be reanalyzed.	Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.
Laboratory Reagent Blank	Prior to ICAL, following samples with overrange concentration of perchlorate, and at the end of the analytical sequence.	No perchlorate detected > LOQ	Reanalyze reagent blank (until no carryover seen), and any samples with perchlorate detections since the contaminated blank.	No target analytes ≥ ½ LOQ
Internal Standard	Every Calibration Standard	ICAL: IS for each standard must be within ± 50% of the average area of the ICAL. ICV, CCV: Within ± 50% of the average area of the ICAL or within ± 50% of the 1st CCV of the run, if the ICAL is not run the same day.	Evaluate the system. Reanalyze/repeat the calibration.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples.
Method Blank	One per preparation batch	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements	Correct problem, then re-extract and reanalyze method blank and all samples processed with the contaminated blank in accordance with DoD QSM requirements	No target analytes ≥ ½ LOQ

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Interference Check Sample (ICS)	One per preparation batch	70% -130%	Reanalyze once. If still outside the acceptance limits, evaluate to determine if cleanup filters or column degradation are suspect, replace appropriate materials and reprepare (filters) or reanalyze (column). Repeat the Interference Threshold Study to deter. If problem still exists, recalibrate.	Recovery as described in DoD Perchlorate Handbook.
IS	During acquisition of calibration standard, samples, and QC check samples	Areas within -50% to +100% of the midpoint of the last ICAL for each sample and QC in accordance with DoD QSM requirements	Inspect LCMS for malfunctions; mandatory reanalysis of samples analyzed while system was malfunctioning in accordance with DoD QSM requirements	Meets all EPA Method requirements
Isotope Ratio $^{35}CL/^{37}CL$	Every sample, batch QC sample and standard	Monitor for either the parent ion at masses 99/101 or the daughter ion at masses 83/85 depending on which ions are quantified.	Re-extract, re-clean, and/or reanalyze affected sample(s). If problem persists, perform post-spike or dilution as appropriate to confirm presence of perchlorate	Theoretical ratio approx. 3.06 Must fall within 2.3 to 3.8
LCS	One LCS per analytical/preparation batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Reanalyze LCS once. If acceptable, report. Otherwise, evaluate and re prepared and reanalyze the LCS and all samples in the associated prep batch for failed analytes, if sufficient sample material is available.	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
MS/MSD	One MS/MSD per batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Identify problem; if not related to matrix interference, re-extract and reanalyze MS/MSD in accordance with DoD QSM requirements	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
DL study (as part of the LOD process, reference Section D.1.2.1 of the DoD QSM)	At initial setup and subsequently once per 12-month period or quarterly DL verification checks.	DL established shall meet 40 CFR, Part 136 Appendix B.	Continue to run the DL study until all criteria are passing	N/A
LOD determination and verification (reference Section D.1.2.1 and grey box D-13 of the QSM)	At initial set-up and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must: 1) Repeat the detection limit determination and LOD verification at a higher concentration; or 2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher	Not Applicable. Samples may not be analyzed without a valid LOD.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			concentration.	
LOQ establishment and verification (reference Section D.1.2.2 and grey box D-14 of the QSM)	At initial setup: 1) Verify LOQ; and 2) Determine precision and bias at the LOQ. Subsequently, verify LOQ quarterly. If a laboratory uses multiple instruments for a given method, the LOQ must be verified on each. See Box D-14.	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or 2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DOD QSM.	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	Not Applicable. Samples may not be analyzed without a valid LOD.
Results reported between DL and LOD and the LOD and the LOQ	None	None	None	Apply F-flag to all results between DL and LOQ. If no Detection determined below the LOD, report to the LOD, flag U.

End of Method SW6850

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW6010B and SW7470A/71A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Instrument detection limit study	At initial setup and after significant change in instrument type, personnel, test method, or sample matrix	Instrument detection limits will be < LOD.	N/A.	N/A.
Linear dynamic range or high-level check standard	Every 6 months	Within ± 10% of true value.	Correct problem, then reanalyze or reset linear range.	Apply J-flag to the specific analyte(s) for all results not within linear range.
ICAL for all analytes (minimum one standard and a blank 3- to 5-point standard preferred)	Daily before sample analysis	If more than one standard is used, correlation coefficient must be ≥ 0.995.	If applicable, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL.
ICV (second source)	Daily after ICAL	All analytes within ± 10% of expected value.	Correct problem and verify second-source standard. Rerun ICV. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
CCV (Instrument Check Standard)	After every 10 samples and at the end of the analysis sequence	All analyte(s) within ± 10% of expected value and RSD of replicate integrations < 5%.	Correct problem, then repeat CCV and reanalyze all samples since last successful calibration verification.	Apply Q-flag to all results for the specific analyte(s) >10 %D for all samples associated with the calibration verification.
Calibration blank	Before beginning a sample run, after every calibration verification	No analytes detected > LOD.	Correct problem, then analyze calibration blank and previous 10 samples.	Apply B-flag to all associated positive results for the specific analyte(s) as appropriate.
Low-level calibration check standard (at or below LOQ)	Daily, after ICAL; not required for multipoint calibration (3 or more points) with low standard at or below LOQ.	Analyte(s) with ± 20% of expected value.	Correct problem, then reanalyze.	No samples may be analyzed without a valid low-level calibration check standard. Low-level calibration check standard should be less than or equal to the LOQ.
Method blank	One per analytical batch	No analytes detected > ½ LOQ. For common laboratory contaminants, no analytes detected > LOQ. See Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and reanalyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s), as appropriate. See Worksheet #36, Section 36.2.5.
ICS	At the beginning of an analytical run	ICS A: All non-spiked analytes < LOD (unless they are a verified trace impurity from one of the spiked analytes). ICS AB: Within ± 20% of expected value.	Terminate analysis; locate and correct problem; reanalyze ICS and all associated samples.	Flagging criteria are not appropriate. No samples may be analyzed without a valid ICS. If corrective action fails, apply Q-flag to the specific analyte(s).

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW6010B and SW7470A/71A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
LCS for all analytes	One per analytical batch	Acceptance criteria: Worksheet #15.	Correct problem then reanalyze. If still out, reprepare and reanalyze the LCS and all samples in the affected batch.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
Dilution test	Each new sample matrix, at least once per analytical batch (only applicable for analytes with concentrations > 50 times LOQ)	Fivefold (1+4) dilution must agree within ± 10% of the original determination.	Add post-digestion spike.	Apply J-flag to all sample results for the specific analyte from the same matrix in the batch if either of following exist: (1) dilution test not run and batch had analyte concentrations >50X LOQ or (2) %D ≥10 and post-digestion spike not performed.
Post-digestion spike addition	When dilution test fails or if an analyte's concentration for all samples in a batch is less than 50 times LOQ (<25 for Method SW7470A/SW7471A)	Recovery within 75–125% of expected results (85-115 for SW7470A/SW7471A).	Check for instrumental problem, then reanalyze post-digestion spike addition if appropriate.	Apply J-flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition. If post-digestion spike addition recovery is < 10%, apply Q-flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition.
MS/MSD	One per 20 samples per matrix as a minimum and as defined on the chain-of-custody form	Acceptance criteria: Worksheet #15.	Assess data to determine whether there is a matrix effect or analytical error. Analyze LCS or failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made regarding PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: (1) %R for MS or MSD > UCL (2) %R for MS or MSD < LCL (3) MS/MSD RPD > control limit
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[c])	At initial setup and then once per 12-month period or quarterly DL verification checks	Detection limits established will be ≤ ½ the RL in Worksheet #15 Tables. See 40 CFR, Part 136, Appendix B. All analytes must be detected and identified by method-specified criteria for the for the verification check to be valid, or the verification check must produce a response that is at least 3X the instrument noise level and greater than the response in the blanks associated with the MDL	Continue the MDL study until all criteria are met.	N/A.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW6010B and SW7470A/71A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
		study.		
LOD determination and verification (reference Section D.1.2.1 and Box D-13 Of the DoD QSM[c])	At initial setup and verified quarterly (if a laboratory uses multiple instruments for a given method, the LOD must be verified on each)	The apparent signal-to-noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must (1) repeat the detection limit determination and LOD verification at a higher concentration; or (2) perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	N/A; samples may not be analyzed without a valid LOD.
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[c])	At initial setup: (1) verify LOQ and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if a laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of the DoD QSM[c]).	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or (2) in the absence of client require-ments, must meet control limits of the LCS. See Box D-14 of the DoD QSM[c].	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag "U."
Demonstrate acceptable analyst capability	Before using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of the DoD QSM[c])	QC acceptance criteria published by DoD, if available; otherwise method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for those analytes that did not meet criteria (see Section C.1.f of the DoD QSM[c]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by analyst until capability is demonstrated.

End of Method SW6010B and SW7470A/71A

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6020A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
MS tuning sample	Before ICAL.	Mass calibration ≤ 0.1 amu from the true value. Resolution <0.9 amu full width at 10% peak height. Stability: RSD ≤ 5% for at least four replicate analyses.	Retune instrument then reanalyze tuning solution.	Not appropriate.
ICAL for all analytes (minimum one standard and a blank)	Daily before sample analysis	If more than one standard is used, correlation coefficient must be ≥ 0.995.	If applicable, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL.
ICV (second source)	After ICAL, before beginning a sample run at a concentration other than used for calibration	All analytes within ± 10% of expected value.	Correct problem and verify second-source standard. Rerun ICV. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
CCV	After every 10 samples and at the end of the analysis sequence—at a concentration near the middle of the calibration range	All analytes within ± 10% of expected value.	Correct problem, then repeat CCV and reanalyze all samples since last successful calibration verification.	Apply Q-flag to all results for the specific analyte(s) >10 %D for all samples associated with the calibration verification.
Calibration blank	Before beginning a sample run, after every 10 samples and at end of the analysis sequence	No analytes detected > LOD.	Correct problem, then analyze calibration blank and previous 10 samples.	Apply B-flag to all associated positive results for the specific analyte(s) as appropriate.
Low-level calibration check standard (at or below LOQ)	Daily, after ICAL Not required if multipoint calibration (3 or more points) with low standard at or below LOQ is performed	All analyte(s) with ± 20% of expected value.	Correct problem then reanalyze.	No samples may be analyzed without a valid low-level calibration check standard. Low-level calibration check standard should be less than or equal to the LOQ.
Linear range calibration (high) check standard	Every 6 months	Analyte within ± 10% of expected value.	Correct problem then reanalyze or reset linear range.	Apply J-flag to the specific analyte(s) for all results not within linear range.
Method blank (Preparation blank)	One per analytical batch	No analytes detected > ½ LOQ For common laboratory contaminants, no analytes detected > LOQ. See Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and analyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s) as appropriate. See Worksheet #36, Section 36.2.5.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6020A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Interference check solutions (ICS-A and ICS-AB)	At the beginning of an analytical run or once during an 12-hour period, whichever is more frequent	**ICS-A:** All non-spiked analytes < LOD (unless they are a verified trace impurity from one of the spiked analytes). **ICS-AB:** Within ± 20% of expected value.	Terminate analysis; locate and correct problem; reanalyze ICS; reanalyze all affected samples.	Flagging criteria are not appropriate. No samples may be analyzed without a valid ICS. If corrective action fails, apply Q-flag to the specific analyte(s).
LCS for all analytes	One LCS per analytical batch	Acceptance criteria: Worksheet #15.	Correct problem then reanalyze. If still out, reprepare and reanalyze the LCS and all samples in the affected batch.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
Dilution test	Each matrix in a analytical batch (only applicable for analytes with concentrations > 100X LOD)	Fivefold (1+4) dilution must agree within ± 10% of the original determination.	Add post-digestion spike.	Apply J-flag to all sample results for the specific analyte from the same matrix in the batch if either of following exist: (1) dilution test not run and batch had analyte concentrations ≥100 times LOD or (2) % D ≥ 10 and post-digestion spike not performed.
Post-digestion spike addition	When dilution test fails or if an analyte's concentration for all samples in a batch is less than 100X LOD	Recovery within 75–125% of expected results.	Dilute the sample; reanalyze post-digestion spike addition.	Apply "J" flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition. If post-digestion spike addition recovery is < 10%, apply "Q" flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition.
MS/MSD	One per 20 samples per matrix	Acceptance criteria: Worksheet #15.	Assess data to determine whether there is a matrix effect or analytical error. Analyze LCS for failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made regarding PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: (1) %R for MS or MSD > UCL, (2) %R for MS or MSD < LCL, or (3) MS/MSD RPD > control limits
ISs	Every sample	IS intensity within 30-120% of intensity of the IS in the ICAL.	Perform corrective action as described in Method SW6020, Section 8.3.	Flagging criteria are not appropriate. No samples may be analyzed without a valid IS response.
Instrument detection limit study	At initial setup	Detection limits established will be ≤ LOD.	None.	N/A. Samples cannot be analyzed without a valid instrument detection limit.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6020A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[c])	At initial setup and then once per 12-month period or quarterly DL verification.	Detection limits established will be ≤ ½ the RL in Worksheet #15 tables. See 40 CFR, Part 136 Appendix B. Analytes must be detected and identified by method-specified criteria for the for the verification check to be valid, or the verification check must produce a response that is at least 3 times the instrument noise level and greater than the response in the blanks associated with the MDL study.	Continue to run the MDL study until all criteria are passing.	N/A.
LOD determination and verification (see Section D.1.2.1 and Box D-13 of the DoD QSM[c])	At initial setup and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must: (1) Repeat the detection limit determination and LOD verification at a higher concentration; or (2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	N/A; samples may not be analyzed without a valid LOD.
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[c])	At initial setup: (1) verify LOQ and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if a laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of the DoD QSM[c])	(1) The LOQ and associated precision and bias must meet client requirements and must be reported; or (2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DoD QSM[c].	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag "U."
Demonstrate acceptable analyst capability	Prior to using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of the DoD QSM[c])	QC acceptance criteria published by DoD, if available; otherwise method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for those analytes that did not meet criteria (see Section C.1.f of the DoD QSM[c]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by an analyst until capability is demonstrated.

End of Method SW6020A

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8290

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
MS tuning check	Before initial calibration or calibration verification and after every 12-hour period	Tune the instrument to meet the minimum resolving power of 10,000 at m/z 304.9824. Ensure that the exact mass of m/z 380.9760 is within 5 ppm of the required value. Monitor the lock mass selected ion current profile.	Retune instrument; verify. Rerun affected samples.	Not appropriate
GC column performance check	Before initial calibration or calibration verification	Peak separation between 2,3,7,8-TCDD and other TCDD isomers valley of ≤ 25%, and First and last eluters of all eight homologue retention time windows identified labeled (F/L) on the chromatogram and Absolute retention times for switching from one homologous series to the next > 10 seconds for all components of the mixture	Correct problem then repeat column performance check.	Flagging criteria are not appropriate.
Initial multipoint calibration for all analytes (minimum five standards) (ICAL)	Before sample analysis, as needed by failure of routine calibration verification standard, or when a new lot is used for standard source of CCV, sample fortification solution (IS), or recovery standards	Ion abundance ratios in accordance with Table 8 of Method SW8290 and S/N ratio > 10 for all target analyte ion current profiles and % RSD ± 20% for 17 unlabeled standards and % RSD ± 30% for the 9 labeled IS.	Correct problem then repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8290

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Routine (continuing) calibration check (Use HRCC-3 calibration standard) (CCV)	At the beginning of each 12-hour period (after successful GC resolution and MS resolution checks), and at the end of 12-hour shift.	Ion abundance ratios in accordance with Table 8, Method SW8290 and RF within ± 20% D for unlabeled standards from mean RF from initial calibration and RF within ± 30% for labeled standards from mean RF from initial calibration **End of run CCV only:** If the RF for an unlabeled or labeled standard fails by ≤ 5% in the final CCV, a new "daily" mean RF may be calculated using the initial and final RF values and used to determine the specific analyte concentrations for all samples analyzed during the shift.	Correct problem, repeat calibration verification standard one more time. If that fails, then repeat initial calibration and reanalyze all samples analyzed since the last successful calibration verification. Evaluation of corresponding labeled/unlabeled standards may impact the corrective action required. **End of run CCV:** If the RF for an unlabeled or labeled standard fails by > 5% in the final CCV, run a new ICAL immediately (within 2 hours) and use the new RF values to process the samples. Alternatively, reanalyze all samples with positive detections.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified. **End of run CCV:** Apply Q-flag to all results for the specific analyte(s) in the sample which are not reprocessed or reanalyzed.
PCDD/PCDF identification	Verify all sample positive detections per Method SW8290	Retention time of sample components in accordance with stated criteria in Method SW8290 (Section 7.8.4.1) and Ion abundance ratios for all analytes, ISs, and recovery standards in accordance with criteria in Method SW8290 (Table 8, Section 7.8.4.2) and S/N ratio of all labeled analytes ≥ 10 times background noise (Method SW8290 Section 7.8.4.3) and S/N ratio of all remaining analyte ions ≥ 2.5 times background noise (Method SW8290 Section 7.8.4.3) and For PCDF, no signal present having a S/N ratio ≥ 2.5 for the corresponding ether (PCDPE) detected at the same retention time (± 2 sec. (Section 7.8.4.4)	Correct problem, then reprep and reanalyze the sample(s) with failed criteria for any of the internal, recovery, or standards. If PCDPE is detected or if sample peaks present do not meet all identification criteria, calculate the EMPC (estimated maximum possible concentration) according to Method SW8290 Section 7.9.5.2.	Flagging criteria are not appropriate. Positive identification of 2,3,7,8-TCDF on the DB-5 or equivalent column must be confirmed on a column capable of isomer specificity (DB-225) (see Method SW8290 Section 3.4). If peak identification criteria are met but ion abundance criteria fail for the analyte and IS, the sample should be presumed to have interfering contaminants. The sample should be rerun or the extract reanalyzed.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8290

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
ISs	Every sample, standard, and QC sample.	Percent recovery for each IS (before any dilutions) within 40–135% (Method SW8290 Section 8.4)	Inspect mass spectrometer and GC for malfunctions. Reanalysis of samples analyzed while the system was malfunctioning is mandatory.	Apply Q-flag to all results for analytes associated with a failed IS unless a matrix effect can be verified, then apply M.
Sample specific estimated detection limit (EDL)	Every sample that indicates non-detects or detections that are < 2.5 times background noise	Method 8290 Section 7.9.5 describes the calculation	N/A	N/A
Sample estimated maximum possible concentration (EMPC)	If PCDPE is detected or if sample peaks present do not meet all ion abundance ratio criteria	Method 8290 Section 7.9.5 describes the calculation	N/A	Apply J-flag to all EMPC values.
Method Blank	Minimum one per preparation batch. A method blank is required after a calibration run and before any sample run.	No analytes detected > ½ LOQ	Assess data and correct problem. If necessary, reprep and analyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s), as appropriate.
MS/MSD	One MS/MSD per every 20 samples per matrix	Acceptance criteria: Tables 7-2 and 7-3	Assess data to determine whether there is a matrix effect or analytical error. Analyze LCS for failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made with respect to the PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: (1) %R for MS or MSD > UCL (2) %R for MS or MSD < LCL, or (3) MS/MSD RPD > CL
Sample duplicate	One per analytical batch. This may be replaced by the MSD.	Acceptance criteria: Tables 7-2 and 7-3	Verify instrument performance, review analytical procedures.	For the specific analyte(s) in parent sample, apply J-flag.
Results reported below the lowest standard	None	None	None	Apply F-flag to all results below the lowest calibration standard.

End of Method SW8290

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods 160.2, 310.2, 350.1, SW9030B, SW9056, and SW9060

QC Check*	Frequency	Criteria	Corrective Action
Multi-point initial calibration (a blank and at least five standards) – does not apply to titrimetric method	Before initial sample analysis, every 24 hours, whenever modifications are made to the analytical system, or when continuing calibration verification fails	Correlation coefficient of linear regression is ≥ 0.995	Correct the problem and repeat the initial calibration.
Second-source calibration verification	Immediately following each initial calibration	Analytes within ±15% (±10% for SW9056) of expected value	Correct the problem and repeat initial calibration.
Calibration blank – does not apply to titrimetric methods	After every Second-source or Continuing calibration verification analysis	No analytes detected at or above the LOQ	Correct the problem, then reanalyze previous 10 samples.
Continuing calibration verification	After every 10 samples and at the end of the analysis sequence	Within ±15% (±10% for SW9056) of expected value	Recalibrate and reanalyze all samples since the last acceptable continuing calibration verification
Method Blank	At least one per analytical batch	No analytes detected at or above the LOQ	Correct the problem and re-prep and reanalyze all associated samples
MS/MSD	One set per 20 project-specific samples. MSD is optional if a laboratory sample duplicate is performed	All analytes within limits specified Limits Worksheet 15	None
Laboratory sample duplicate	Once per analytical batch if MSD not performed	Concentration of reported analytes are > 5 times the reporting limit in either sample and RPD >20%. One sample result < RL and a difference of ±2 times the reporting limit	None
LCS	At least one per analytical batch	All analytes within limits specified limits in Worksheet 15	Correct the problem, and re-prep and reanalyze the LCS and all samples in the analytical batch

*Unless calibration and QC requirements are specified for an individual method.

End of Methods 160.2, 310.2, 350.1, SW9030B, SW9056, and SW9060

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Notes, Acronyms, and Abbreviations

[a]All corrective actions associated with project work ~~will~~shall be documented, and all records ~~will~~shall be maintained by the laboratory.

[b]Flagging criteria ~~will~~shall be applied when acceptance criteria were not met and corrective action was not successful or corrective action was not performed.

[c]DoD. 2010. *Department of Defense (DoD) Quality Systems Manual for Environmental Laboratories*, Version 4.2. October.

% D – percent difference
%R – percent recovery
CCC – calibration check compounds
CCV – continuing calibration verification
COD – coefficient of determination
DL – detection limit
DRO – diesel range organics
GC – gas chromatography
GRO – gasoline range organics
ICAL – initial calibration
ICS – interference check sample
ICV – initial calibration verification
IS – internal standard(s)
LCL – lower confidence limit
LCS – laboratory control sample
LOD – limit of detection
LODv – limit of detection verification
LOQ – limit of quantitation
MDL – method detection limit
MS/MSD – matrix spike/matrix spike duplicate
N/A – not applicable
PQO – practical quantitation objectives
PT – performance testing
QC – quality control
QSM – Quality Systems Manual (DoD)
RF – response factor
RL – reporting limit
RPD – relative percent difference
RRT – relative retention time
RSD – relative standard deviation
SPCC – system performance calibration compounds
UCL – upper confidence limit

End of Table H-10

3. MANAGEMENT OF WASTE FROM CLOSURE ACTIVITIES

Wastes that are expected to be generated during the final closure activities at the OD Unit include: excess soil from sampling; well purge water, drill cuttings, decontamination water; PPE; and excavated soils. To minimize the amount of waste to be generated during closure activities, excess soil cuttings from borings ~~will~~shall be replaced in the auger holes. The volume of liquid waste generated during the cleaning of equipment is to be minimized by using only the smallest amount of wash rinse water necessary to achieve successful decontamination. Solvents ~~will~~shall not be used.

3.1 Waste Management

Wastes associated with closure activities at the OD Unit ~~will~~shall be managed as follows:

- Wastes ~~will~~shall be stored in appropriate containers that are compatible with the wastes and are in good condition.
- If analytical results indicate that the waste is hazardous or the ~~Kirtland AFB~~Permitee project manager determines that the waste ~~will~~shall be classified as hazardous, ~~Kirtland AFB~~the Permitee ~~will~~shall manage the waste in accordance with all applicable regulations in 40 CFR §261-268.
- Waste containers shall remain within the OD Unit boundary under the control of the personnel generating the waste until it is transported for treatment and disposal.
- Waste containers ~~will~~shall be segregated according to the compatibility and chemical waste type.
- Waste ~~will~~shall be stored in containers that remain closed, except when adding or removing wastes.
- Waste containers bearing free liquid ~~will~~shall be provided with secondary containment of sufficient volume to prevent spilled liquids from being released onto the ground.
- Waste containers ~~will~~shall be managed in such a manner as to prevent ruptures and leaks.
- Waste containers ~~will~~shall be labeled appropriately, pending receipt of analytical results. Labels ~~will~~shall be filled out appropriately and marked using permanent marker or pen. Label information ~~will~~shall include waste source, suspected contaminants, contents, depth (if appropriate), the date which accumulation began, and a contact name.

3.2 Waste Characterization

Characterization of the liquid waste and excavated soil generated during the closure of the OD Unit ~~will~~shall be based upon the results of sampling and analysis. Decontamination water ~~will~~shall be analyzed for the constituents listed in Tables H-3. PPE ~~will~~shall be managed ~~as non-hazardous waste and will be managed appropriately~~in accordance with Section 1.4 of this Permit Attachment (H) and applicable state and federal regulations~~-~~.

3.3 Waste Disposal

All wastes from closure activities determined to be hazardous ~~will~~shall be managed in accordance with the Hazardous Waste Management Regulations from the time of generation. Hazardous wastes ~~will~~shall be shipped off-site for treatment and disposal at a permitted RCRA facility.

Wastes characterized as nonhazardous ~~will~~shall be evaluated to determine the appropriate disposal method in accordance with applicable law.

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4. REFERENCES

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~~PERMIT ATTACHMENT H: CLOSURE PLAN~~

~~1.0 INTRODUCTION~~

~~This Closure Plan describes the activities necessary to close the Open Detonation (OD) Unit at the Explosive Ordnance Disposal (EOD) Range, Kirtland Air Force Base (KAFB). Until final closure is complete in accordance with the New Mexico Hazardous Waste Management Regulations and certification of closure has been approved by the Department, a copy of the approved Closure Plan and all approved revisions shall be maintained in the Operating Record. This Closure Plan and any revisions thereof shall be made available, upon request, to the Department.~~

~~If the OD Unit can not be cleaned closed, the Permittee shall amend this plan in accordance with Permit Section 4.2 and implement the new plan upon obtaining approval from the Department.~~

~~1.1. GENERAL CLOSURE INFORMATION~~

~~This Closure Plan has been prepared in accordance with the requirements of 40 C.F.R. § 270.14(b)(13), and 40 C.F.R. Part 264, Subparts G and X.~~

~~1.1.1. Closure Performance Standard~~

~~The OD Unit shall be closed to meet the following performance standards:~~

- ~~Minimize the need for further maintenance;~~
- ~~Control, minimize, or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to ground or surface waters or to the atmosphere; and~~
- ~~Comply with the requirements of 40 C.F.R Subpart G and § 264.601.~~

~~1.1.2. Final Closure Activities~~

~~The Permittee shall notify the Department, in writing, at least 45 calendar days before the date on which final closure of the OD Unit will commence. Partial closure (i.e., closure of just one part of the Unit) shall not occur unless directed otherwise by the Department.~~

~~Final closure shall consist of:~~

1. ~~Removing all structures and equipment used at the OD Unit;~~
2. ~~Removing soil and debris that have contaminant concentrations that pose unacceptable risk to human health or the environment; and~~
3. ~~Sending for treatment and disposal any solid and hazardous waste, including any treatment residues, to a permitted treatment, storage, or disposal facility (TSDF) in accordance with applicable regulatory requirements.~~

~~Final closure shall be complete when:~~

1. ~~All solid and hazardous waste have been treated and disposed of off-site as required by law;~~

2. All structures and all equipment have been removed from the OD Unit;
3. Sampling demonstrates that no unacceptable risk to human health or the environment exists in soil or groundwater at the OD Unit and surrounding areas of the EOD Range that was caused by contamination from the OD Unit;
4. A Certification of Closure and Closure Report have been submitted to the Department; and
5. The Department has approved the Closure Report and Certification of Closure.

1.1.3. Maximum Extent of Operations

Closure activities and any corrective action that may be required shall not be limited to the OD Unit if contamination occurs or could occur beyond the boundary.

1.1.4. Schedule for Closure

Closure of the OD Unit shall comply with the schedule presented in Table H-1.

1.2. CLOSURE REPORT

Upon completion of the closure activities, a Closure Report shall be submitted to the Department with a Certification of Closure (see Permit Section 4.7). The Closure Report shall document the closure activities conducted and contain, at a minimum, the following information:

1. The certification described in Permit Section 4.7;
2. A summary of closure activities;
3. Any significant variance from the approved plan and the reason for the variance;
4. A summary of all sampling data associated with the closure, including analytical results for all field and laboratory quality control samples;
5. A statement indicating whether the quality of data is adequate to support closure in accordance with the Performance Standards of this Closure Plan (see Section 1.1.1 of this Permit Attachment);
6. The location of the file of supporting documentation (e.g., memos, logbooks, laboratory sample analysis data); and
7. Disposal location of all solid and hazardous waste, including decommissioned equipment and structures and any contaminated debris and soil, and any treatment residues.

1.3. CLOSURE PROCEDURES

All hazardous waste present at the OD Unit shall be treated before closure activities commence, provided such waste is authorized to be treated at the OD Unit or, the waste shall be treated and disposed of at an offsite facility as permitted by law. Structures and equipment shall be removed. Structures and equipment shall be dismantled, placed into containers, and managed as solid or hazardous waste, as applicable, and disposed of as permitted by law.

The first phase of closure shall consist of a hazards survey of the OD Unit conducted by qualified health physics and industrial hygiene personnel. The purpose of the survey shall be to locate and remove any "kick-out" (untreated waste, waste fragments, or unexploded ordnance)

~~and to identify potential contamination concerns that may present hazards to workers during closure activities and to specify any control measures necessary to reduce worker risk. This survey shall provide the information necessary for health physics and industrial hygiene personnel to identify worker qualifications, personal protective equipment (PPE), safety awareness, work permits, exposure control programs, and emergency coordination that may be required to perform closure activities. All workers involved in the closure activities shall be required to have training and medical monitoring, in accordance with applicable regulations. Personnel performing closure activities shall be required to wear PPE as specified by health physics and industrial hygiene personnel.~~

~~Surface and subsurface soil and any debris at the OD Unit shall be characterized by sampling and analysis. Soil sampling shall follow the procedures described in Section 1.4 of this Permit Attachment (H). Soil shall be analyzed for the parameters listed in Tables H-2, H-3, and H-4. If sampling and analysis of soil indicates the presence of hazardous waste or hazardous constituents above background levels, a risk assessment shall be conducted based on a residential land use scenario to determine whether the contaminants pose an unacceptable risk to human health or the environment. In lieu of a baseline risk assessment, the Permittee may compare the soil sampling results to the soil screening levels using the procedures listed in the Department's most current version of "Technical Background Document for Development of Soil Screening Levels" (as it may be updated), provided the soil screening levels are based on a residential land use scenario. If the risk assessment demonstrates that the level of contamination is unacceptable, the contaminated soil exhibiting unacceptable risk shall be subject to corrective action under Permit Part 6 and shall be excavated and removed. The excavated soil shall be collected, transferred to containers, and, if applicable, managed and disposed of as hazardous waste.~~

~~The Permittee shall conduct corrective action activities at the OD Unit using the cleanup levels in Permit Section 6.2.3 if corrective action is necessary. Clean up levels shall be based on a residential land use scenario.~~

~~Background soil concentrations for metals are those approved by the Department for the KAFB Facility, and are listed in Table D-4 of Permit Attachment D.~~

~~1.4. SAMPLING, DECONTAMINATION PROCEDURES, AND PPE~~

~~This Section describes procedures and methods for sampling soil and liquid. Other applicable procedures or methods given in the most current version of *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)* (EPA, 1986) and all approved updates) may be used at the time of actual closure if conditions or experience show the alternate method(s) to be more appropriate, and if approved by the Department. All sampling methods and procedures used shall be described in the Closure Report. Sampling of waste shall be conducted in accordance with procedures given below in this Permit Attachment (H) and in *Samplers and Sampling Procedures for Hazardous Waste Streams (EPA, 1980)* or *SW-846*.~~

~~Reusable tools and equipment shall be scraped as necessary to remove any contaminated soil, debris, or residue; cleaned with detergent and water solution; and rinsed with clean water. The wash and rinse water shall be collected and sampled and analyzed for characterization as waste.~~

~~All PPE worn by personnel performing closure activities will be disposable and after use shall be placed into containers and managed as solid or hazardous waste, as applicable.~~

~~1.4.1. Soil Sampling~~

~~Soil samples shall be collected on a 25-foot by 25-foot grid spacing from the surface to 15 feet below ground surface at five-foot intervals (total of four samples per location). At a minimum, the 25-foot by 25-foot grid shall encompass all portions of the OD Unit that have hosted or may have hosted a pit or crater used for the treatment of hazardous waste. Any areas at the OD Unit used for training shall be considered a part of the OD Unit for purposes of establishing the sampling grid.~~

~~The samples shall be analyzed for the parameters listed in Tables H-2, H-3, and H-4, which include the general types of hazardous wastes managed at the OD Unit.~~

~~Surface soil samples (zero to six inches depth) shall be collected with a wooden or Teflon™ trowel or scoop. To collect deeper samples, a Veihmeyer soil sampler, auger drill, direct push technology, or other appropriate method shall be used. Only discrete grab samples shall be collected; no samples shall be composited.~~

~~Clean sampling equipment shall be used to collect each sample. Unused, disposable sampling equipment may be presumed clean if still in a factory-sealed wrapper prior to use. Reusable sampling equipment shall be decontaminated after each use by scraping to remove any loose material, washing with a detergent and water solution, rinsing several times with tap water, rinsing with deionized water, and drained of excess water, and air-dried or wiped dry.~~

~~1.4.2. Liquid Sampling~~

~~A Coliwasa sampler or similar device shall be used to sample liquids (for example, rinse water). As an alternative to the Coliwasa, glass tubes or similar devices may be used to sample liquids.~~

~~1.4.3. Sample Containers and Preservatives~~

~~Samples shall be placed in clean containers compatible with the intended analysis and shall be properly prepared, preserved, documented, labeled, handled, and secured to maintain sample integrity (see Tables H-5 and H-6).~~

~~1.4.4. Sample Handling and Documentation~~

~~Each sample shall be labeled, sealed, and accompanied by a chain-of-custody form and a request-for-analysis form. A chain-of-custody form shall be used to track samples from collection through analysis to ensure that the integrity of the samples is protected. The sample handling and documentation procedures shall be equivalent to those in the most current version of *SW-846*.~~

~~A chain-of-custody form shall be prepared for all samples collected for laboratory analyses. The form shall include at a minimum:~~

1. ~~Sample identification number.~~
2. ~~Name and signature of sample collector.~~
3. ~~Date and time of sample collection.~~
4. ~~Location at which sample was collected.~~
5. ~~Type of sample (e.g., soil, liquid).~~

6. Signatures of persons who have had the samples in their possession.
7. Dates and times of possession.

The form shall be completed upon receipt at the laboratory and the original returned to the Permittee for inclusion in the Operating Record. The request-for-analysis form shall list all analyses to be performed for the samples and all special instructions relating to sample management or analysis. Any potential hazards posed by the samples shall be listed on the request-for-analysis form.

Sample containers shall be sealed with gummed paper seals attached to the containers in such a way that the seals must be broken in order to open the containers. Seals and sample labels shall be completed with a waterproof pen or marker. Sample labels are necessary to prevent misidentification of samples and shall include at minimum the following information:

1. A unique sample identification number.
2. Name or initials of sample collector.
3. Sample collection date and time.
4. Sample location.
5. Sample type, depth, and description.

A field logbook shall be kept and shall contain information pertinent to field surveys and sampling. Sufficient information shall be recorded so that a person can reasonably reconstruct what occurred at a sampling event without relying on a collector's memory. Entries in the logbook for a given sampling event shall, at a minimum, include:

1. Purpose of sampling.
2. Sample locations.
3. Name and business address of person making log entry.
4. Numbers, types, and volumes of samples, including field QC samples.
5. Description of sampling method and equipment used.
6. Date and time of sample collection.
7. Sample destination and transporter's name (for example, name of laboratory, United Parcel Service).
8. Map or photograph of the sampling site.
9. Field observations (for example, ambient temperature, sky conditions, past 24-hour precipitation).
10. Listing of sample identification number(s).
11. Signature of person responsible for the log entry.

~~1.4.5. Sample Shipping~~

~~Samples shall be packaged and shipped to the laboratory in accordance with DOT shipping requirements and in a manner to ensure that the integrity of the samples is protected. The sample containers shall be cushioned to protect against breakage or puncture.~~

~~1.4.6. Sample Analysis~~

~~Samples shall be analyzed at an EPA-certified commercial laboratory. Test methods for analysis of all samples shall be performed according to procedures documented in *SW-846* or other methods approved by the Department. Constituents in the hazardous wastes treated at the OD Unit are to be included in these analyses. Analytical methods and detection limits are listed in Tables H-2 through H-4.~~

~~Calibration, operation, QC (bias, precision, blank and matrix effects), and requirements for laboratory analyses shall be performed as listed in the individual analytical methods of *SW-846*. All laboratory analyst notebooks, log sheets, instrument printouts, charts, and calculations relevant to analyses of these samples shall be identified and remain accessible. This information may be requested by the Department for independent review and validation. If requested by the Department, the information shall be provided by the Permittee to the Department.~~

~~The analytical laboratory shall have procedures for minimizing cross-contamination of samples and securing sample custody within the laboratory.~~

~~1.4.7. Quality Assurance (QA)/Quality Control (QC)~~

~~Because decisions about closure activities shall be based, in part, on analyses of samples, a program to ensure data are of high quality is mandatory. The Permittee shall ensure the high quality of data by documenting sample collection and management. The Permittee shall accomplish this also by following a QA/QC program that mandates documentation of the precision and accuracy of all laboratory analyses, as well as data completeness, representativeness, and comparability.~~

~~Sampling activities shall include the collection of field QC samples and their documentation. QC samples to be collected include equipment blanks, trip blanks, field blanks, and duplicate samples. Table H-7 of this Permit Attachment (H) summarizes the field QC sample requirements.~~

~~Blanks and duplicate samples shall be prepared or collected to monitor the performance of the data collection and analysis process, beginning with sampling and continuing through transportation, storage, and analysis. To document adequate decontamination of sampling equipment, equipment blanks (consisting of deionized water rinsate captured from decontaminated sampling equipment) shall be prepared and analyzed if reusable sampling equipment is employed.~~

~~In the case of samples to be analyzed for volatile organic compounds, in order to document cross-contamination attributable to shipping and handling procedures, trip blanks (consisting of deionized water) shall be prepared, taken to the sampling site, and then shipped to the laboratory along with the other samples to be analyzed for VOCs.~~

~~In the case of samples to be analyzed for volatile organic compounds, field blanks shall also be prepared to document cross-contamination attributable to field conditions. Field blanks (consisting of deionized water) shall be prepared, taken to the sampling site, their containers opened during the sampling of environmental media, and then shipped to the laboratory along with the samples to be analyzed for volatile organic compounds.~~

~~Equipment blanks shall be collected at a frequency of one per sampling day per media type. Duplicate samples shall be collected at a frequency of at least one per every twenty environmental samples per media type. Field and trip blanks shall be collected at a frequency of at least one each per sampling day. Acceptance criteria for QA/QC sample analyses shall be consistent with those for environmental samples as specified in Permit Attachment D, Section 1.3.~~

~~The Permittee shall require that the analytical laboratory operate under a QA Program Plan (QAPP) that meets the requirements of *SW-846*. QC procedures at the analytical laboratory are to be guided by the laboratory's QAPP. Laboratory QC samples are required to evaluate the accuracy and precision of analytical data. The laboratory must analyze and report to the Permittee the results of the following types of laboratory quality control samples: method blanks, duplicates, spikes, matrix spikes and matrix spike duplicates.~~

~~The Permittee shall also validate the data following the procedures in Permit Section 6.5.18.3.~~

~~1.5. MANAGEMENT OF WASTE FROM CLOSURE ACTIVITIES~~

~~Wastes that will be generated during closure activities at the OD Unit include decommissioned structures and equipment, excess soil from sampling, decontamination water, PPE, and possibly contaminated soil and debris and treatment residues.~~

~~1.5.1. Waste Management~~

~~Wastes associated with closure activities at the OD Unit shall also be managed as follows:~~

1. ~~Wastes shall be stored in appropriate containers that are compatible with the wastes and that are in good condition.~~
2. ~~If hazardous or potentially hazardous, the containers shall be labeled as hazardous waste or shall be labeled with the contents of the container. If potentially hazardous waste is determined not to be hazardous waste, the container label shall be changed to indicate that the waste is not hazardous waste.~~
3. ~~Hazardous waste shall be managed in accordance with all applicable regulations in 40 C.F.R. 261-268.~~
4. ~~Waste containers shall remain under the control of the personnel generating the waste.~~
5. ~~Waste containers shall be segregated according to compatibility and chemical waste type.~~
6. ~~Wastes shall be stored in containers that remain closed, except when adding or removing wastes.~~
7. ~~Waste containers bearing free liquid shall be provided with secondary containment of sufficient volume to prevent spilled liquids from being released onto the ground.~~
8. ~~Waste containers shall be managed in such a way as to prevent ruptures and leaks.~~

~~9. Waste containers shall be labeled appropriately, pending receipt of analytical results. Labels shall be marked using a permanent marker or pen. In addition to that required by item #2 of this Section, label information shall include waste source, depth (if appropriate), the date on which accumulation began, and the name and contact information of the generator.~~

~~1.5.2. Waste Characterization~~

~~Characterization of waste generated during closure activities shall be based upon the results of sampling and analysis.~~

~~1.5.3. Waste Disposal~~

~~All wastes from closure activities determined to be hazardous shall be managed in accordance with the Hazardous Waste Management Regulations (HWMR) from the time of generation. Hazardous waste shall be shipped off-site for treatment and disposal at a permitted RCRA Subtitle C facility. Wastes characterized as non-hazardous shall also be managed and disposed of in accordance with applicable law.~~

~~1.6. GROUNDWATER MONITORING WELLS~~

~~Groundwater monitoring wells shall be properly plugged and abandoned in accordance with all regulations and Department guidance, provided groundwater contamination has not occurred. If groundwater contamination has occurred, monitoring wells shall be maintained for the purpose of implementing corrective action. If corrective action is required by the Department, the Permittee shall immediately implement corrective action pursuant to Part 6 of this Permit.~~

~~REFERENCES~~

~~U.S. Environmental Protection Agency (EPA), 1986. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods; 3rd edition, update 3, SW-846, Office of Solid waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.~~

~~U.S. Environmental Protection Agency (EPA), 1980. Samplers and Sampling Procedures for Hazardous Waste Streams; Municipal and Environmental Research Laboratory, U.S. Environmental Protection Agency, Cincinnati, Ohio, EPA-600/2-80-018, January 1980.~~

~~"U.S. Environmental Protection Agency Contract Laboratory Program Statement of Work for Inorganic and Organic Analysis" (EPA, 1990).~~

~~TABLE H-1~~ ~~Closure Schedule~~	
~~Activity~~	~~Time Required~~
~~Advertise for proposals.~~	~~-90 Days~~
~~Notify the Department of receiving final volume of hazardous waste.~~	~~-45 Days~~
~~Receive proposals.~~	~~-30 Days~~
~~Select contractor and award contract.~~	~~-10 Days~~
~~Begin closure activities – field investigation.~~	~~Day 0~~
~~OD Unit structure and equipment removal.~~	~~Day 10~~
~~Conduct soil sampling.~~	~~Day 50~~
~~Obtain analysis of soil samples.~~	~~Day 80~~
~~Soil excavation (if necessary) and verification sampling.~~	~~Day 100~~
~~Final decontamination activities and soil removal (if necessary).~~	~~Day 130~~
~~Submit final report and Closure Certification to the Department.~~	~~180 days after receiving final volume of hazardous waste~~

~~Note: The schedule above indicates calendar days from the beginning of closure activities by which the listed activities shall be completed. Some activities may be conducted simultaneously.~~

~~TABLE H-2~~
~~Maximum Detection Limits and Analytical Methods for Analysis of Metals~~

~~Analyte~~	~~Maximum Detection Limit~~		~~EPA *SW-846*[c] Analytical Method[d]~~
	~~Water (ug/L)[a]~~	~~Soil (mg/kg)[b]~~	
~~Arsenic~~	~~1.0~~	~~1.0~~	~~6010C, 7000B, 7061A~~
~~Antimony~~	~~2.0~~	~~6.0~~	~~6010C, 7000B~~
~~Barium~~	~~2.0~~	~~20.0~~	~~6010C, 7000B~~
~~Beryllium~~	~~0.20~~	~~0.50~~	~~6010C, 7000B~~
~~Cadmium~~	~~0.10~~	~~0.5~~	~~6010C, 7000B~~
~~Chromium~~	~~1.0~~	~~1.0~~	~~6010C, 7000B, 7195, 7196A, 7197~~
~~Cobalt~~	~~1.0~~	~~5.0~~	~~6010C, 7000B~~
~~Copper~~	~~2.0~~	~~2.5~~	~~6010C, 7470A, 7471B~~
~~Lead~~	~~1.0~~	~~1.0~~	~~6010C, 7000B~~
~~Mercury~~	~~0.2~~	~~0.1~~	~~7000B, 7470A, 7471B~~
~~Nickel~~	~~1.0~~	~~4.0~~	~~6010C, 7000B~~
~~Selenium~~	~~2.0~~	~~3.5~~	~~6010C, 7000B, 7741B, 7742~~
~~Silver~~	~~0.20~~	~~1.0~~	~~6010C, 7000B~~
~~Thallium~~	~~1.0~~	~~2.5~~	~~6010C, 7000B~~
~~Tin~~	~~5.0~~	~~5.0~~	~~6010C, 7000B~~
~~Vanadium~~	~~1.0~~	~~5.0~~	~~6010C, 7000B~~
~~Zinc~~	~~2.0~~	~~5.0~~	~~6010C, 7000B~~

~~a – ug/L = micrograms per liter;~~

~~b – mg/kg = milligrams per kilogram (non-aqueous detection limit);~~

~~c – U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, *SW-846*".~~

~~d – Another applicable or newer method may be used with prior NMED approval.~~

~~TABLE H-3~~ ~~Maximum Detection Limits and Analytical Methods~~ ~~for Analysis of VOCs and SVOCs~~		
~~Analyte~~	~~Media~~ ~~(Maximum Detection Limit)~~	
	~~Water~~ ~~(ug/L)[1]~~	~~Soil~~ ~~(ug/kg)[3]~~
~~Volatile Organic Compounds (VOCs)~~ ~~Method SW-846-8260B~~		
~~Acetone~~	~~5.0~~	~~10~~
~~Benzene~~	~~0.50~~	~~5.0~~
~~Bromochloromethane~~	~~0.50~~	~~5.0~~
~~Bromodichloromethane~~	~~0.50~~	~~5.0~~
~~Bromoform~~	~~0.50~~	~~5.0~~
~~Bromomethane~~	~~0.50~~	~~5.0~~
~~Carbon disulfide~~	~~0.50~~	~~5.0~~
~~Carbon tetrachloride~~	~~0.50~~	~~5.0~~
~~Chlorobenzene~~	~~0.50~~	~~5.0~~
~~Chloroethane~~	~~0.50~~	~~5.0~~
~~Chloroform~~	~~0.50~~	~~5.0~~
~~Chloromethane~~	~~0.50~~	~~5.0~~
~~cis-1,2-Dichloroethene~~	~~0.50~~	~~5.0~~
~~cis-1,3-Dichloropropene~~	~~0.50~~	~~5.0~~
~~Cyclohexane~~	~~0.50~~	~~5.0~~
~~Dibromochloromethane~~	~~0.50~~	~~5.0~~
~~Dichlorodifluoromethane~~	~~0.50~~	~~5.0~~
~~Ethylbenzene~~	~~0.50~~	~~5.0~~
~~Isopropylbenzene~~	~~0.50~~	~~5.0~~
~~Methyl acetate~~	~~0.50~~	~~5.0~~
~~Methylcyclohexane~~	~~0.50~~	~~5.0~~
~~Methylene chloride~~	~~0.50~~	~~5.0~~
~~Methyl tert-butyl ether (MTBE)~~	~~0.50~~	~~5.0~~
~~4-Methyl-2-pentanone~~	~~5.0~~	~~10~~
~~Styrene~~	~~0.50~~	~~5.0~~
~~Toluene~~	~~0.50~~	~~5.0~~
~~trans-1,2-Dichloroethene~~	~~0.50~~	~~5.0~~
~~trans-1,3-Dichloropropene~~	~~0.50~~	~~5.0~~
~~Trichloroethene (TCE)~~	~~0.50~~	~~5.0~~
~~Trichlorofluoromethane~~	~~0.50~~	~~5.0~~
~~Tetrachloroethene~~	~~0.50~~	~~5.0~~
~~m,p-Xylene~~	~~0.50~~	~~5.0~~
~~o-Xylene~~	~~0.50~~	~~5.0~~
~~Vinyl chloride~~	~~0.50~~	~~5.0~~
~~1,2-Dibromo-3-chloropropane~~	~~0.50~~	~~5.0~~
~~1,2-Dichlorobenzene~~	~~0.50~~	~~5.0~~
~~1,3-Dichlorobenzene~~	~~0.50~~	~~5.0~~
~~1,4-Dichlorobenzene~~	~~0.50~~	~~5.0~~
~~1,1-Dichloroethane~~	~~0.50~~	~~5.0~~

~~Table H-3 (Continued)~~		
~~Analyte~~	~~Media~~	
	~~Water (ug/L)~~	~~Soil (ug/kg)~~
~~1,2-Dibromoethane~~	~~0.50~~	~~5.0~~
~~1,2-Dichloroethane~~	~~0.50~~	~~5.0~~
~~1,1-Dichloroethene~~	~~0.50~~	~~5.0~~
~~1,2-Dichloropropane~~	~~0.50~~	~~5.0~~
~~1,4-Dioxane~~	~~1.0~~	~~100~~
~~1,1,2,2-Tetrachloroethane~~	~~0.50~~	~~5.0~~
~~1,2,3-Trichlorobenzene~~	~~0.50~~	~~5.0~~
~~1,2,4-Trichlorobenzene~~		~~5.0~~
~~1,1,1-Trichloroethane~~	~~0.50~~	~~5.0~~
~~1,1,2-Trichloroethane~~	~~0.50~~	~~5.0~~
~~1,1,2-Trichloro-1,2,2-trifluoroethane~~	~~0.50~~	~~5.0~~
~~1,2,3-Trichloropropane~~	~~na~~	~~10.0~~
~~1,2,4-Trimethylbenzene~~	~~na~~	~~na~~
~~1,3,5-Trimethylbenzene~~	~~na~~	~~na~~
~~2-Butanone~~	~~5.0~~	~~10~~
~~2-Hexanone~~	~~5.0~~	~~10~~
~~Method SW-846-8011~~		
~~Ethylene dibromide~~	~~0.02~~	~~na~~
~~1,2-dibromo-3-chloropropane~~	~~0.02~~	~~na~~
~~Semi-Volatile Organic Compounds (SVOCs)~~		
~~Method SW-846-8270C~~		
~~Benzaldehyde~~	~~5.0~~	~~170~~
~~Phenol~~	~~5.0~~	~~170~~
~~Bis(2-chloroethyl) ether~~	~~5.0~~	~~170~~
~~2-Chlorophenol~~	~~5.0~~	~~170~~
~~2-Methylphenol~~	~~5.0~~	~~170~~
~~2,2'-Oxybis(1-cholorophropane)~~	~~5.0~~	~~170~~
~~Acetophenone~~	~~5.0~~	~~170~~
~~4-Methylphenol~~	~~5.0~~	~~170~~
~~N-Nitroso-di-n propylamine~~	~~5.0~~	~~170~~
~~Hexachloroethane~~	~~5.0~~	~~170~~
~~Nitrobenzene~~	~~5.0~~	~~170~~
~~Isophorone~~	~~5.0~~	~~170~~
~~2-Nitrophenol~~	~~5.0~~	~~170~~
~~2,4-Dimethylphenol~~	~~5.0~~	~~170~~
~~Bis(2-chloroethoxy) methane~~	~~5.0~~	~~170~~
~~2,4-Dichlorophenol~~	~~5.0~~	~~170~~
~~Naphthalene~~	~~5.0~~	~~170~~
~~4-Chloroaniline~~	~~5.0~~	~~170~~
~~Hexachlorobutadiene~~	~~5.0~~	~~170~~
~~Caprolactam~~	~~5.0~~	~~170~~
~~4-Chloro-3-methylphenol~~	~~5.0~~	~~170~~
~~2-Methylnaphthalene~~	~~5.0~~	~~170~~
~~Hexachlorocyclopentadiene~~	~~5.0~~	~~170~~
~~2,4,6-Trichlorophenol~~	~~5.0~~	~~170~~
~~2,4,5-Trichlorophenol~~	~~5.0~~	~~170~~
~~1,1'-Biphenyl~~	~~5.0~~	~~170~~
~~2-Chloronaphthalene~~	~~5.0~~	~~170~~

~~Table H-3 (Continued)~~		
~~Analyte~~	~~Media~~	
	~~Water (ug/L)~~	~~Soil (ug/kg)~~
~~2-Nitroaniline~~	~~10~~	~~330~~
~~Dimethylphthalate~~	~~5.0~~	~~170~~
~~2,6-Dinitrotoluene~~	~~5.0~~	~~170~~
~~Acenaphthylene~~	~~5.0~~	~~170~~
~~3-Nitroaniline~~	~~10~~	~~330~~
~~Acenaphthene~~	~~5.0~~	~~170~~
~~2,4-Dinitrophenol~~	~~10~~	~~330~~
~~4-Nitrophenol~~	~~10~~	~~330~~
~~Dibenzofuran~~	~~5.0~~	~~170~~
~~2,4-Dinitrotoluene~~	~~5.0~~	~~170~~
~~Diethyl phthalate~~	~~5.0~~	~~170~~
~~Fluorene~~	~~5.0~~	~~170~~
~~4-Chlorophenyl-phenyl ether~~	~~5.0~~	~~170~~
~~4-Nitroaniline~~	~~10~~	~~330~~
~~4,6-Dinitro-2-methylphenol~~	~~10~~	~~330~~
~~N-Nitrosodiphenylamine~~	~~5.0~~	~~170~~
~~1,2,4,5-Tetrachlorobenzene~~	~~5.0~~	~~170~~
~~4-Bromophenyl-phenylether~~	~~5.0~~	~~170~~
~~Hexachlorobenzene~~	~~5.0~~	~~170~~
~~Atrazine~~	~~5.0~~	~~170~~
~~Pentachlorophenol~~	~~5.0~~	~~330~~
~~Phenanthrene~~	~~5.0~~	~~170~~
~~Anthracene~~	~~5.0~~	~~170~~
~~Carbazole~~	~~5.0~~	~~170~~
~~Di-n-butyl phthalate~~	~~5.0~~	~~170~~
~~Fluoranthene~~	~~5.0~~	~~170~~
~~Pyrene~~	~~5.0~~	~~170~~
~~Butyl benzyl phthalate~~	~~5.0~~	~~170~~
~~3,3'-dicholorobenzidine~~	~~5.0~~	~~170~~
~~Benzo(a)anthracene~~	~~5.0~~	~~170~~
~~Chrysene~~	~~5.0~~	~~170~~
~~Bis(2-ethylhexyl) phthalate~~	~~5.0~~	~~170~~
~~Di-n-octyl phthalate~~	~~5.0~~	~~170~~
~~Benzo(b) fluoranthene~~	~~5.0~~	~~170~~
~~Benzo(k) fluoranthene~~	~~5.0~~	~~170~~
~~Benzo(a) pyrene~~	~~5.0~~	~~170~~
~~Indeno(1,2,3,-cd) pyrene~~	~~5.0~~	~~170~~
~~Dibenzo(a,h) anthracene~~	~~5.0~~	~~170~~
~~Benzo(g,h,i)perylene~~	~~5.0~~	~~170~~

~~1. Micrograms per liter = parts per billion~~
~~2. Micrograms per kilogram = parts per billion~~
~~3. not applicable~~

~~TABLE H-4~~ ~~Maximum Detection Limits and Analytical Methods for Analysis of High Explosives and Other Compounds~~			
~~Analyte (Group)~~	~~Maximum Detection Limits[a]~~		~~Analytical Method~~
	~~Soil (mg/kg)~~	~~Water (ug/L)~~	~~EPA *SW-846*[b]~~
~~1,3,5-Trinitrobenzene~~	~~0.25~~	~~7.3~~	~~8330B~~
~~1,3-Dinitrobenzene~~	~~0.25~~	~~4.0~~	~~"~~
~~2,4,6-Trinitrotoluene (TNT)~~	~~0.25~~	~~6.9~~	~~"~~
~~2,4-Dinitrotoluene~~	~~0.25~~	~~5.7~~	~~"~~
~~2,6-Dinitrotoluene~~	~~0.26~~	~~9.4~~	~~"~~
~~2-Amino-4,6-Dinitrotoluene~~	~~0.25~~	~~--~~	~~"~~
~~4-Amino-2,6-Dinitrotoluene~~	~~0.25~~	~~--~~	~~"~~
~~Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)~~	~~0.22~~	~~13.0~~	~~"~~
~~2-Nitrotoluene~~	~~0.25~~	~~12.0~~	~~"~~
~~Nitrobenzene~~	~~0.26~~	~~6.4~~	~~"~~
~~3-Nitrotoluene~~	~~0.25~~	~~7.9~~	~~"~~
~~4-Nitrotoluene~~	~~0.25~~	~~8.5~~	~~"~~
~~Tetryl~~	~~0.65~~	~~4.0~~	~~"~~
~~Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)~~	~~1.0~~	~~14.0~~	~~"~~
~~Nitroglycerin (NG)~~	~~6.1~~	~~3.65~~	~~"~~
~~Perchlorate~~	~~0.010~~	~~0.53~~	~~6850~~
~~White phosphorus~~	~~0.43~~	~~0.008~~	~~7580~~
~~Dioxins and Furans~~	~~0.50~~	~~0.005~~	~~8280B or 8290A~~

~~a. mg/kg = milligrams per kilogram; ug/L = micrograms per liter.~~

~~b. U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, *SW-846*".~~

~~TABLE H-5~~ ~~Sample Containers, Preservation Methods, and Holding Times for Soil Samples~~			
~~Analyte Group~~	~~Container Type[a]~~	~~Preservation Method~~	~~Holding Time[b]~~
~~Metals[c] (except mercury and hexavalent chromium)~~	~~4 oz glass jar with PTFE[d] cap~~	~~Cool to 4 degrees Celsius (°C)~~	~~180 days~~
~~Mercury~~	~~4 oz glass jar with PTFE cap~~	~~Cool to 4°C~~	~~28 days~~
~~Hexavalent chromium~~	~~4 oz glass jar with PTFE cap~~	~~Cool to 4°C~~	~~28 days~~
~~Volatile organic compounds[c]~~	~~4 oz glass jar with PTFE cap~~	~~Cool to 4°C~~	~~14 days~~
~~Semivolatile organic compounds[c]~~	~~4 oz glass jar with PTFE cap~~	~~Cool to 4°C~~	~~14 days~~
~~High explosives[c]~~	~~4 oz glass jar with PTFE cap~~	~~Cool to 4°C~~	~~14 days~~
~~Perchlorate~~	~~4 oz glass jar with PTFE cap~~	~~Cool to 4°C~~	~~28 days~~
~~White Phosphorus~~	~~4 oz glass jar with PTFE cap~~	~~Cool to 4°C~~	~~Indefinite (if preserved at or below 4°C, kept in the dark, and tightly sealed)~~
~~Dioxins and Furans~~	~~250 mL wide mouth amber glass jar with PTFE lid~~	~~Cool to 4°C~~	~~30 days~~

~~a. Other container types may be used depending upon the laboratory or the method used and with prior NMED approval.~~

~~b. Holding time information from U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*.~~

~~c. Volatile and semivolatile organic compounds, metals, and high explosives are listed by respective test method numbers in U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*.~~

~~d. Polytetrafluoroethylene (Teflon™)~~

~~TABLE H-6~~ ~~Sample Containers, Preservation Methods and Holding Times for Liquid Samples~~			
~~Analyte Group~~	~~Container Type[a]~~	~~Preservation Method~~	~~Holding Time[b]~~
~~Metals[c] (except mercury and hexavalent chromium)~~	~~1-liter Polyethylene bottle with PTFE[d] lined cap~~	~~HNO_3[e] to pH <2 and cool to 4 degrees Celsius (°C)~~	~~180 days~~
~~Mercury~~	~~1-liter Polyethylene or Glass bottle with PTFE-lined lid~~	~~HNO_3 to pH <2~~	~~28 days~~
~~Hexavalent chromium~~	~~1-liter Amber Glass jar with PTFE-lined cap~~	~~Cool to 4°C~~	~~24 hours~~
~~Volatile organic compounds[c]~~	~~3 x 40 mL Glass vials with PTFE-lined septum caps~~	~~HCl[f]~~ ~~Cool to 4°C~~	~~14 days~~
~~Semivolatile organic compounds[c] 1 Liter~~	~~2 x 1-liter Amber Glass with PTFE-lined lid~~	~~Cool to 4°C~~	~~7 days~~
~~High explosives[c]~~	~~1-liter Amber Glass with PTFE-lined lid~~	~~Cool to 4°C~~	~~7 days~~
~~Perchlorate~~	~~125-mL Polyethylene bottle with PTFE-lined lid~~	~~Cool to 4°C~~	~~28 days~~
~~White Phosphorus~~	~~500-mL Polyethylene bottle with PTFE-lined lid~~	~~Cool to 4°C, kept in dark storage~~	~~5 days~~
~~Dioxins and Furans~~	~~4 x 1-liter Amber Glass with PTFE-lined lid~~	~~Cool to 4°C~~	~~30 days~~

~~a. Other container types may be used depending upon the laboratory or the method used and with prior NMED approval.~~

~~b. Holding time information from U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*.~~

~~c. Volatile and semivolatile organic compounds, metals, and high explosives are listed by respective test method numbers in U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*.~~

~~d. Polytetrafluoroethylene (Teflon™)~~

~~e. HNO_3 = Nitric acid~~

~~f. HCl = Hydrochloric acid~~

~~TABLE H-7~~
~~Field Quality Control Samples~~

~~Quality Control Sample Type~~	~~Sample Matrix~~	~~Applicable Analyses~~	~~Frequency~~	~~Purpose~~
~~Trip blank~~	~~Water/Soil~~	~~VOCs[a]~~	~~One per day~~	~~Document any contamination attributable to shipping and field handling procedures~~
~~Field blank~~	~~Soil/Water~~	~~VOCs~~	~~One per day~~	~~Document any contamination attributable to field conditions~~
~~Field duplicate~~	~~Soil/Water~~	~~VOCs, SVOCs[b], metals, HE[c], Dioxins and Furans White Phosphorus Perchlorate~~	~~Minimum of one per 20 environmental samples per media type~~	~~Document precision of the sampling/analysis process~~
~~Equipment blank~~	~~Water~~	~~VOCs, SVOCs, metals, HE Dioxins and Furans — White Phosphorus Perchlorate~~	~~One sample per day per media type~~	~~Document whether decontamination of sampling equipment was adequate~~

~~a. VOCs = volatile organic compounds.~~
~~b. SVOCs = semivolatile organic compounds.~~
~~c. HE = High Explosives~~

PERMIT ATTACHMENT I: COMPLIANCE SCHEDULES

1.1 INTRODUCTION

The Permittee shall meet the due dates in the compliance schedules of Tables I-1 through I-3 of this Permit Attachment (I), as well as any other due dates specified in this Permit that are not included in the tables of Permit Attachment I. Table I-1 contains a list of general submittals and their due dates. Table I-2 lists various submittals related to corrective action and their due dates, whereas, Table I-3 lists submittals for corrective action related to specific SWMUs and AOCs and their associated due dates.

Table I-1
General Submittals[a]

Facility Submission Requirements	Due Date
Biennial Report (Permit Section 2.16)	March 1 of every even-numbered year
Waste Minimization Program Certified Report (Permit Section 2.8)	Annually, by December 1
Annual Sampling and Analysis Report for Air (Permit Section 3.3)	Annually by March 31
Permit renewal (Permit Section 1.14)	180 days before Permit expiration
Non-Compliance Oral Report (Permit Section 1.27, item 1)	Within 24 hours of non-compliance activity
Non-Compliance Written Report (Permit Section 1.27, item 2)	Within five days of non-compliance activity
Certification of Construction or Modification (Permit Section 1.26)	Prior to treatment or storage of hazardous waste in the modified portion of the permitted unit
Revised Closure Plan (Permit Sections 4.1 and 4.2)	Within 60 days after discovering that a revised Closure Plan is required in accordance with this Permit, or within 60 days after receiving written notification by the Department whichever is earlier
Notification of Closure (Permit Section 4.3)	45 days prior to closure
Final Closure Report and written Closure Certification (Permit Section 4.7)	Within 60 calendar days from the date of completion of closure of the OD Unit.
Human Risk Screening: Exceedances of SSLs (Permit Attachment D, Section 1.6)	Within 15 days of exceedance
Annual Soil Sampling Report (Permit Attachment D, Section 1.7)	Within 90 days of completion of each sampling event
Monitoring Well Installation Plan ~~(Permit Section 3.5.1)~~	Included as attachment H ~~Within 90 days of the effective date of this Permit~~
Well Completion Report ~~(Permit Section 3.5.1)~~	Within 30 days of completing well installation
Groundwater Sampling and Analysis Plan ~~(Permit Section 3.5.2)~~	~~Within 90 days of the effective date of this Permit~~Included as attachment H

a. Not necessarily all-inclusive listing of required submittals under this Permit

TABLE I-2 Submittal Requirements for Corrective Action	
TYPE OF SUBMITTAL	**DUE DATE**
ANNUAL REPORTS	
Annual Report: Outdoor Testing and Training Activities (Permit Section 6.1.7)	90 days from effective date of this Permit and annually thereafter by March 31 of each year
Quarterly Reports	
Quarterly Progress Reports (Permit Section 6.1.6)	January 31, April 30, July 31, and October 31 of each calendar year
Quarterly Perchlorate Screening Reports (Permit Section 6.4.1.4)	January 31, April 30, July 31, and October 31 of each year for at least 8 consecutive quarters
Other Reports/Submittals	
Offsite Access (Permit Section 6.1.1)	Immediately upon discovery
Field Sampling/Activities (Permit Section 6.1.2)	At least 15 days prior to field sampling or activity
Verbal notification of newly-discovered releases, SWMUs or AOCs (Permit Section 6.1.8)	Within 24 hours after release discovery
Written notification of newly-discovered releases, SWMUs or AOCs (Permit Section 6.1.8)	Within 15 days after release discovery
SWMU Assessment Report (SAR) (Permit Section 6.1.8)	Within 90 days after submitting written notification of a newly-discovered SWMU/AOC
Notification of Land Transfer (Permit Section 6.1.12)	Within 90 days of transfer of the property
Investigation Work Plan (Permit Section 6.2.2.1.1)	Date specified in Table I-3
Investigation Report (Permit Section 6.2.2.1.2)	Schedule provided in Table I-3
Corrective Measures Evaluation (CME) Work Plan (Permit Section 6.2.2.2.2)	Within 90 days of notification by the Department
Corrective Measures Evaluation (CME) Report (Permit Section 6.2.2.2.3)	Within 90 days of completion of CME
Risk Assessment Report (Permit Section 6.2.4.5)	Appended to or in combination with a CME or Investigation Report, or as otherwise specified in a work plan or by the Department in writing
CMI Work Plan (Permit Section 6.2.2.2.7)	Within ninety (90) days after the Department's selection of a final remedy, or as otherwise specified by the Department in writing
CMI Work Plan Progress Report (Permit Section 6.2.2.2.9)	In accordance with the schedule approved in the CMI Work Plan
CMI Report (Permit Section 6.2.2.2.10)	Within 90 days of completion of remedy or ACM
Accelerated Corrective Measures (ACM) Work Plan (Permit Section 6.2.2.2.11.2)	Prior to ACM initiation
ACM CMI Report (Permit Section 6.2.2.2.11.3)	Within ninety (90) days of completion of ACM

Table I-2 (continued)	
Interim Measures Work Plan (Permit Section 6.2.2.2.12.2)	Within 60 days after receiving notification from the Department that interim measures are required, or such other period as stated in the notification
Emergency Interim Measures (Permit Section 6.2.2.2.12.4)	Within three (3) days of discovery that Emergency IM are required
Interim Measures Report (Permit Section 6.2.2.2.12.5)	60 days after completion of Interim Measure or as otherwise specified in the Interim Measures Work Plan
Periodic Monitoring Reports (Permit Section 6.5.17.7	Within 90 days of completion of monitoring fieldwork or in accordance with work plan schedules
General Facility Information (Permit Section 6.2.1.1)	Within 90 days from effective date of this Permit and annually thereafter by March 31 if update needed
Report on Potential Receptors (Permit Section 6.2.1.2)	Within 90 days from effective date of this Permit and no later than March 31 of subsequent years if an update is needed
Surface Water Contamination Assessment Report (Permit Section 6.2.1.3)	Within 90 days after effective date of Permit
Corrective Measures Evaluation (CME) Work Plan: Landfills with contents not removed (Permit Section 6.4.1.1)	Within 180 days after effective date of this Permit
CME Report: Landfills with contents not removed (Permit Section 6.2.2.2.3)	Within 90 days of completion of CME
Military Range Assessment Report (Permit Section 6.4.1.2)	Within 90 days after effective date of Permit

TABLE I-3
Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs)
Requiring Corrective Action

SWMU/ AOC	IRP SITE	DESCRIPTION	REQUIRED SUBMITTAL	
			TYPE	DUE DATE
6-1	LF-001	Landfill #1	Long Term Monitoring and Maintenance Plan	submitted
6-2	LF-002	Landfill #2	Corrective Measures Implementation Report for Cover Construction	submitted
			Corrective Measures Implementation Work Plan for Sewer Line Removal or Abandonment	180 days after effective date of Permit
			Long Term Monitoring and Maintenance Plan	submitted
6-4	LF-008	Landfills #4, 5 and 6	Investigation Work Plan (groundwater selenium)	3/31/11
			Long Term Monitoring and Maintenance Plan	submitted
6-19	OT-029	Open Burn Pit on EOD Range	Investigation Report	12/28/11
6-24	WP-016	Manzano Sewage Treatment Facility	Investigation Report (groundwater)	submitted
MBG	MBG	Manzano Base Groundwater	Investigation Work Plan	3/31/11
6-30	RW-006	Radioactive Burial 11	Investigation Report	submitted
10-2-A	ST-325	Corrosion Control Shop Storm Drain Bldg. 482	Investigation Report	12/28/10
10-2-B	ST-220	Paint Shop, Storm Drain	Investigation Report	12/28/10
10-2-C	ST-220	Plating & Anodizing Bldg. 1001	Investigation Report	submitted
10-2-D	ST-329	Propulsion Branch Floor Drain Bldg. 336	Investigation Report	submitted
10-2-F	ST-325	H-3/H-53 Phase Dock Bldg. 1000 Floor Drains	Investigation Report	12/28/10
10-2-G	ST-331	C-130 Maintenance Shop Bldg. 1009 Storm Sewer	Investigation Report	12/28/10
10-2-H	ST-285	West Storm Sewer System	Investigation Report	12/28/12
10-2-I	ST-286	East Storm Sewer System	Investigation Report	12/28/12
10-7-V	ST-267	Oil/Water Separator Bldg. 57007	Investigation Report	submitted
10-21-B	ST-288	Septic System Bldg. 614	Investigation Report	12/31/12
	ST-289	Septic System Bldg. 617 & 620	Investigation Report	12/31/12
	ST-291	Septic System Bldg. 617	Investigation Report	12/31/12
10-21-C	ST-294	Septic System Bldg. 633	Investigation Report	12/31/12
	ST-298	Septic System Bldg. 730 &734	Investigation Report	12/31/12
	ST-299	Septic System Bldg. 751	Investigation Report	12/31/12

Table I-3
(continued)

SWMU/ AOC	IRP SITE	DESCRIPTION	REQUIRED SUBMITTAL	
			TYPE	DUE DATE
10-21-M	ST-309	Septic System Bldg. 37504	Investigation Report	12/31/12
10-21-N	ST-310	Septic System Bldgs. 37507, 37508 & 37513	Investigation Report	12/31/12
	ST-322	Septic System Bldgs. 37507, 37508 & 37513	Investigation Report	12/31/12
10-21-O	ST-311	Septic System Plant 1 & Bldg. 37501	Investigation Report	12/31/12
10-21-P	ST-312	Septic System Plant 2 & Bldg. 37503	Investigation Report	12/31/12
10-21-Q	ST-313	Septic System Bldgs. 37529 & 37530	Investigation Report	12/31/12
10-21-R	ST-293	Septic System Bldg. 37570	Investigation Report	12/31/12
10-21-S	ST-314	Septic System Bldgs. 48056 & 48059	Investigation Report	12/31/12
10-21-T	ST-316	Septic System CERF Bldgs. 57003 & 57012	Investigation Report	12/31/12
	ST-340	Septic System CERF Bldgs. 57001 & 57002	Investigation Report	submitted
10-21-U	ST-318	Septic System Bldg. 37200	Investigation Report	6/30/13
10-21-V	ST-319	Septic System Bldg. 37541	Investigation Report	6/30/13
10-21-Z	ST-330	Septic System Bldg. 1032	Investigation Report	6/30/13
10-21-AA	ST-333	Septic System SOR Bldg. 66001	Investigation Report	6/30/13
	ST-343	Septic System SOR Bldgs. 66000 & 66008	Investigation Report	6/30/13
	ST-344	Septic System SOR Bldgs. 66042	Investigation Report	6/30/13
ST-70-A	ST-202 & 203	Oil/Water Separator & Sediment Trap Bldgs. 333/334	Investigation Report	submitted
ST-70-B	ST-210	Oil/Water Separator Tank & Drying Rack Bldg. 377	Investigation Report	submitted
ST-70-C	ST-211	Oil/Water Separator Bldg. 381	Investigation Report	submitted
ST-70-D	ST-215 & 216	Oil/Water Separators (2) Bldg. 471	Investigation Report	submitted
ST-70-E	ST-219	Oil/Water Separator Bldgs. 481/482	Investigation Report	submitted
ST-70-F	ST-247	Oil/Water Separator Bldg. 2637	Investigation Report	submitted
ST-70-G	ST-248	Oil/Water Separator Bldg. 20205	Investigation Report	submitted
ST-70-H	ST-258	Oil/Water Separator Bldg. 20375	Investigation Report	submitted
ST-70-I	ST-260	Oil/Water Separator Bldg. 20442	Investigation Report	submitted

Table I-3
(continued)

SWMU/ AOC	IRP SITE	DESCRIPTION	REQUIRED SUBMITTAL	
			TYPE	DUE DATE
ST-73	ST-073	CERF Drain	Investigation Report	submitted
ST-106 and SS-111	ST-106 and SS-111	Bulk Fuels Facility Spill	CME Report	180 days after NMED approves site characterization
DP-067	DP-067	Three Mine Shafts	Investigation Report	6/16/11
DP-088	DP-088	Trestle Site Disposal Area	Investigation Report	6/16/11
WP-026	WP-026	Sewage Lagoons and Golf Course Pond	Investigation Report	submitted
SS-102	SS-102	ARES Test Facility	Investigation Report	6/30/11
RW-68	RW-68	Radium Dump/Slag Pile and Cratering Area	Investigation Report	submitted
TAG	TAG	Tijeras Arroyo Groundwater Area	Investigation Report	submitted
Monitoring Well WYO-4 Area	WYO-4 Well Ground -water Area	TCE contaminated groundwater	Investigation Work Plan	3/31/11
EOD Hill	EOD Hill	Perchlorate contaminated groundwater	Investigation Work Plan	submitted
McCormick Ranch	McCor-mick Ranch	Nitrate contaminated groundwater	Investigation Work Plan	3/31/11

PERMIT ATTACHMENT J: LIST OF HAZARDOUS WASTE MANAGEMENT UNITS

1.0 INTRODUCTION

Table J-1 lists the operating and closed hazardous waste management units at the Facility.

TABLE J-1 Hazardous Waste Management Units
Operating Hazardous Waste Management Units
Open Burn (OB) Treatment Unit (pending closure)
Open Detonation (OD) Treatment Unit
Closed Hazardous Waste Management Units
Hazardous Waste Container Storage Unit (CSU) / Defense Reutilization and Marketing Office Building 1024

PERMIT ATTACHMENT K: LIST OF SWMUS AND AOCS FOR WHICH CORRECTIVE ACTION IS COMPLETE

1.0 INTRODUCTION

Table K-1 lists SWMUs and AOCs for which corrective action is complete without controls.

TABLE K-1
Solid Waste Management Units (SWMUS) and Areas of Concern (AOCS) for which Corrective Action is Complete Without Controls (Granted No Further Action Status)

SWMUs/AOCs			
SWMU/AOC	**IRP SITE**	**DESCRIPTION**	**DATE OF APPROVAL**
6-7	LF-018	Landfill A	8/28/03
6-10	LF-009	Abandoned Landfill	8/28/03
6-15	LF-045	Unnamed Dump	8/28/03
6-16	FT-013	Kirtland Fire Training Area	8/28/03
8-53	ST-335	Paint Shop Floor Drain, Bldg. 20681	8/28/03
8-58	ST-321	Battery Storage Area, Bldg. 57007	8/28/03
10-3	ST-249	Waste Oil Storage Tank, Bldg. 20205	8/28/03
ST-66	ST-066	Trestle Facility Oil Water Separator and Pit	8/28/03
SS-76	SS-076	Fuel Tank Burn Area	8/28/03
SS-83	SS-083	Skeet Range and Landfill Road	8/28/03
ST-326	ST-326	Waste Oil Storage Tank, Bldg. 20375	8/28/03
ST-328	ST-328	Blast Overpressure Site Cesspools	8/28/03
6-A1	RW-021	Radioactive Burial 7	8/03/05
8-49	SS-061	Fuel Shop Waste Battery Storage, Bldg. 20667	8/03/05
LF-56	LF-056	Landfill D	8/03/05
OT-086	OT-086	Former Small Arms Range	8/03/05
RW-085	RW-085	Manzano Maintenance Building	8/03/05
SS-65	SS-065	Horizontal Dipole Drum Rack	8/03/05
SS-082	SS-082	ALECS Facility	8/03/05
SS-103	SS-103	Jet Engine Test Fuel Line	8/03/05
ST-59	ST-059	ART Drum	8/03/05
ST-60	ST-060	ART Pit	8/03/05
6-A2-A	RW-004	Radioactive Holding Tank 4	9/21/05
6-A2-B	RW-005	Radioactive Holding Tank 5	9/21/05
6-A2-C	RW-017	Radioactive Holding Tank 6	9/21/05
6-A2-D	RW-019	Radioactive Holding Tank 8	9/21/05
6-A2-E	RW-023	Radioactive Holding Tank 9	9/21/05

TABLE K-1
(Continued)

SWMU/AOC	IRP SITE	DESCRIPTION	DATE OF APPROVAL
6-8	LF-015	Landfill B	9/21/05
6-29	LF-020	Manzano Landfill	9/21/05
8-13	ST-071	Bldg. 1000/1001 Oil/Water Separator	9/21/05
9-14	ST-270	Buried Caustic Drain Line Bldg. 617	9/21/05
9-15	ST-271	Neutralization Pit Bldg. 617	9/21/05
9-16	ST-272	Evaporation/Infiltration Pond Bldg. 617	9/21/05
10-21-S	ST-353	Bldg. 48057 Septic Tank	9/21/05
	ST-354	Sheep Grooming Septic Tank	9/21/05
SS-69	SS-069	Drum Storage Area	9/21/05
ST-100	ST-100	Coyote Springs Cesspool	9/21/05
ST-341	ST-341	Condensate Tank Bldg. 1033	9/21/05
WP-58	WP-058	East Laundry Bldg. 20451	9/21/05
10-21-OO	ST-355	Riding Stables Residence [Domestic Sewage]	9/21/05
OT-010	OT-010	Radiation Training Sites 5-8	9/21/05
RW-075	RW-075	South Tijeras Radiation Trench	9/21/05
10-7-A	ST-204	Sediment Trap Bldg. 333	11/29/05
	ST-205	Oil/Water Separator Bldg. 333	11/29/05
10-7-B	ST-206	Oil/Water Separator Bldg. 336	11/29/05
	ST-207	Oil/Water Separator Bldg. 336	11/29/05
	ST-208	Oil/Water Separator Bldg. 336	11/29/05
	ST-209	Catch Basin Bldg. 336	11/29/05
10-7-C	ST-212	Oil/Water Separator Bldg. 381	11/29/05
	ST-213	Area Drain Bldg. 381	11/29/05
10-7-D	ST-217	Oil/Water Separator Bldg. 481	11/29/05
10-7-E	ST-218	Oil/Water Separator Bldg. 482	11/29/05
10-7-F	ST-222	Oil/Water Separator Bldg. 1031	11/29/05
	ST-223	Sewage Ejector Unit Bldg. 1031	11/29/05
	ST-224	Area Drain Bldg. 1031	11/29/05
	ST-225	Holding Tank Bldg. 1031	11/29/05
10-7-G	ST-226	Oil/Water Separator Bldg. 1037	11/29/05
	ST-227	Holding Tank Building 1037	11/29/05
10-7-H	ST-228	Area Drain Bldg. 1040	11/29/05
10-7-I	ST-229	Sewage Ejector Unit Bldg. 1043	11/29/05
10-7-J	ST-230	Oil/Water Separator Bldg. 1046	11/29/05
	ST-231	Holding Tank Bldg. 1046	11/29/05
	ST-232	Sewage Ejector Unit Bldg. 1046	11/29/05
	ST-233	Area Drain Bldg. 1046	11/29/05

TABLE K-1
(Continued)

SWMU/AOC	IRP SITE	DESCRIPTION	DATE OF APPROVAL
10-7-K	ST-234	Oil/Water Separator Bldg. 1051	11/29/05
	ST-235	Oil/Water Separator Bldg. 1051	11/29/05
	ST-236	Oil/Water Separator Bldg. 1051	11/29/05
	ST-237	Area Drain Bldg. 1051	11/29/05
10-7-L	ST-238	Oil/Water Separator Bldg. 1056	11/29/05
	ST-239	Oil/Water Separator Bldg. 1056	11/29/05
10-7-M	ST-240	Holding Tank Bldg. 1058	11/29/05
10-7-N	ST-241	Oil/Water Separator Bldg. 1061	11/29/05
10-7-O	ST-244	Oil/Water Separator Bldg. 1064	11/29/05
	ST-245	Holding Tank Bldg. 1064	11/29/05
10-7-P	ST-246	Oil/Water Separator Bldg. 1070	11/29/05
10-7-Q	ST-254	Oil/Water Separator Bldg. 20365	11/29/05
10-7-R	ST-255	Oil/Water Separator Bldg. 20375	11/29/05
	ST-256	Oil/Water Separator Bldg. 20375	11/29/05
	ST-257	Oil/Water Separator Bldg. 20375	11/29/05
10-7-S	ST-259	Oil/Water Separator Bldg. 20422	11/29/05
10-7-T	ST-263	Oil/Water Separator Bldg. 23226	11/29/05
10-7-U	ST-264	Oil/Water Separator Bldg. 30142	11/29/05
6-14	ST-051	Sewage Effluent Line	2/27/06
8-5	ST-201	Oil/Water Separator Bldg. 255	2/27/06
8-6	WP-047	Silver Recovery Unit	2/27/06
8-26	ST-242	Oil/Water Separator Bldg. 1063	2/27/06
	ST-243	Oil/Water Separator Bldg. 1063	2/27/06
8-28	ST-250	Oil/Water Separator Bldg. 20338	2/27/06
8-29	ST-251	Oil/Water Separator Bldg. 20344	2/27/06
8-31-A	ST-252	Oil/Water Separator Bldg. 20348	2/27/06
8-31-B	ST-253	Oil/Water Separator Bldg. 20348	2/27/06
8-41	ST-274	Waste Battery Storage Area Bldg. 20423	2/27/06
8-47	ST-261	Oil/Water Separator (OW/S) Bldg. 20423	2/27/06
8-55	ST-262	Oil/Water Separator CE Bldg. 20698	2/27/06
10-1-A	ST-278	Sanitary Sewer System A	2/27/06
10-1-B	ST-279	Sanitary Sewer System B	2/27/06
10-1-C	ST-280	Sanitary Sewer System C	2/27/06
10-1-D	ST-281	Sanitary Sewer System D	2/27/06
10-1-E	ST-282	Sanitary Sewer System E	2/27/06
10-1-F	ST-283	Sanitary Sewer System F	2/27/06
10-1-G	ST-284	Sanitary Sewer System G	2/27/06
10-1-H	ST-327	Manzano Sanitary Sewer System	2/27/06

TABLE K-1
(Continued)

SWMU/AOC	IRP SITE	DESCRIPTION	DATE OF APPROVAL
6-31	OT-028	McCormick Ranch Range	6/02/06
9-4	ST-276	Waste Accumulation Area Bldg. 617	6/02/06
9-20	SS-062	Waste Accumulation Area Bldg. 909	6/02/06
10-21-B	ST-273	Septic System Bldg. 618	6/02/06
	ST-351	Building 635 Septic Tank	6/02/06
	ST-352	Building 613/614 Septic Tank	6/02/06
DP-099	DP-099	Disposal Pit Bldg. 29015	6/02/06
DP-101	DP-101	Old EOD Disposal Pits	6/02/06
FT-015	FT-015	NMERI Fire Suppression Test Area	6/02/06
LF-268	LF-268	Active Landfill	6/02/06
OT-74	OT-074	Pistol Range Sites	6/02/06
OT-091	OT-091	South Coyote Firing Site	6/02/06
RW-084	RW-084	Manzano Burial Site	6/02/06
SD-090	SD-090	JATO Rocket Motor Disposal Site	6/02/06
SS-078	SS-078	Water Tower Soils	6/02/06
SS-079	SS-079	Building 381 Spill Site	6/02/06
SS-081	SS-081	Detention Pond and Yard Bldg. 907	6/02/06
SS-089	SS-089	Transportation Yard	6/02/06
ST-72	ST-072	MWSA Security Garage Oil/Water Separator, Bldg. 30146	6/02/06
ST-080	ST-080	Auto Hobby Shop Bldg. 30124	6/02/06
ST-347	ST-347	Building 29015 Cesspool	6/02/06
WP-087	WP-087	Grab Site Waste Pile	6/02/06
WP-339	WP-339	Contractor Yard West of Bldg. 20423	6/02/06
6-11	LF-044	Fill Area Southeast of Old Sewage Lagoons (Former LF-044)	7/17/07
ST-064	ST-064	Corps of Engineers (COE) Vehicle Maintenance Yard, (Former ST-337)	7/17/07
ST-108	ST-108	Abandoned JP-4 Fuel Line (ST-108)	7/17/07
SS-77	SS-77	Abandoned Railroad Spur	7/17/07
6-32	FT-014	Manzano Fire Training Area (Former FT-14)	7/17/07
8-35	ST-214	Waste Oil Storage Tank, Building 471 (Former ST-214)	7/17/07
10-21-B	ST-348	Site ST-348, Building 610 Septic Tank	7/17/07
10-21-B	ST-349	Site ST-349, Building 626 Septic Tank	7/17/07
10-2-E	SS-063	Jet Engine Test Cell (Former ST-336)	7/17/07
6-22	OT-046	Lake Christian	7/17/07
LF-107	ST-107	Veterans Administration Demolition Debris Landfill (LF-107)	7/17/07
SS-78-B	SS-078	Water Tower Soils (WT-21871)	7/17/07

TABLE K-1
(Continued)

SWMU/AOC	IRP SITE	DESCRIPTION	DATE OF APPROVAL
SS-78-C	SS-078	Water Tower Soils (WT-2474)	7/17/07
SS-78-D	SS-078	Water Tower Soils (ITRI WTs)	7/17/07
10-21-A	ST-287	Building 525 Septic System	4/29/08
10-21-B	ST-290	Building 619 Septic System	4/29/08
10-21-B	ST-292	Building 622 Septic System	4/29/08
10-21-C	ST-295	Building 638 Septic System	4/29/08
10-21-D	ST-296	Building 702 Septic System	4/29/08
10-21-D	ST-297	Building 707 Septic System	4/29/08
10-21-E	ST-300	Building 20199 Septic System	4/29/08
10-21-F	ST-301	Building 20560 Septic System	4/29/08
10-21-G	ST-302	Building 20599 Septic System	4/29/08
10-21-H	ST-303	Building 20749 Septic System	4/29/08
10-21-I	ST-304	Building 20797 Septic System	4/29/08
10-21-J	ST-305	Building 28054 Septic System	4/29/08
10-21-J	ST-306	Building 28050 Septic System	4/29/08
10-21-K	ST-307	Building 30101 Septic System	4/29/08
10-21-L	ST-308	Building 37511 Septic System	4/29/08
10-21-K	ST-315	Building 30102 Septic System	4/29/08
10-21-T	ST-317	Building 57011 Septic System	4/29/08
10-21-W	ST-320	Building 20149 Septic System	4/29/08
10-21-X	ST-323	Building 29042 Septic System	4/29/08
10-21-Y	ST-324	Building 29051 Septic System	4/29/08
10-21-AA	ST-342	SOR Building 66029 Septic System	4/29/08
10-21-AA	ST-345	SOR Building 66006 Septic System	4/29/08
10-21-BB	ST-346	Trestle Site Septic System	4/29/08
6-3	LF-007	Landfill 3	4/29/08
ST-356	ST-356	Skeet Range Septic Tank [Domestic Sewage]	4/29/08
10-21-X	ST-350	600 Area Field Office Septic Tank [Domestic Sewage]	4/29/08

PERMIT ATTACHMENT L (RESERVED)

(Reserved for Groundwater Sampling and Analysis Plan)

KIRTLAND AIR FORCE BASE
ALBUQUERQUE, NEW MEXICO

Closure Plan for Open Detonation Unit

May 2014

377 MSG/CEIR
2050 Wyoming Blvd. SE
Kirtland AFB, New Mexico 87117-5270

.

40 CFR 270.11
DOCUMENT CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

TOM D. MILLER, Colonel, USAF
Commander, 377th Air Base Wing

This document has been approved for public release in accordance with Department of Defense Directives and Air Force Instructions.

KIRTLAND AIR FORCE BASE
377th Air Base Wing Public Affairs

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Commander, 377th Air Base Wing

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1. INTRODUCTION

This closure plan describes the activities necessary to close the Open Detonation (OD) treatment unit located within the Explosive Ordnance Disposal (EOD) Range at Kirtland Air Force Base (AFB). The OD Unit consists of a cleared circular area approximately 1,000 ft in diameter and surrounded and delineated by an approximately two-foot (ft) high earthen berm. Figures H-1 and H-2 show the location of the EOD Range at Kirtland AFB, and the collocated OD and Open Burn (OB) Units within the EOD Range. Detonations were conducted in pits measuring approximately 30 ft long, 15 wide and 12 ft deep.

Until final closure of the unit is complete in accordance with the New Mexico Hazardous Waste Management Regulations and certification of closure has been approved by the New Mexico Environment Department (the Department), a copy of the approved Closure Plan, and any revisions thereof, shall be maintained in the Operating Record. This Closure Plan, and any revisions thereof, shall be made available, upon request, to the Department.

If the OD Unit cannot be clean-closed, a post-closure care plan addressing the hazardous constituents remaining at the site shall be prepared and submitted to the Department for approval.

The OD Unit is collocated with the OB treatment unit at the EOD Range. The OD and OB Units are scheduled to undergo final closure activities simultaneously. The OB Unit has a separate closure plan, but several elements of the OB and OD Unit closure plans overlap and are noted within the documents. Additionally, there is currently a perchlorate groundwater investigation occurring to the west of the EOD range. This investigation and its results are independent of this OD Unit closure plan.

As per Kirtland AFB's Hazardous Waste Treatment Facility Operating Permit for the Open Detonation Unit (Permit), Attachment I, Table I-3 , SWMU 06-19 (KAFB IRP site OT-29), which is located approximately 20 ft northeast of the present OB structure, requires corrective action. Corrective action at SWMU 06-19 shall comply with the provisions of the Resource Conservation and Recovery Act (RCRA).

1.1 General Closure Information

This closure plan has been prepared in compliance with the requirements of RCRA (42 U.S.C. §§6901 et seq.) and its implementing regulations at 40 CFR Parts 264 and 270 (see 40 CFR Part 264 Subparts G and X and 270.14(b)(13)), and state implementing statutes and regulations under which the state has delegated RCRA authority (see New Mexico Hazardous Waste Act, Chapter 74 Article 4 NMSA 1978 and 20.4.1 NMAC).

1.2 Closure Performance Standard

The OD Unit shall be closed to meet the following performance standards:

- Minimize the need for further maintenance;
- Control, minimize or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to ground water or surface waters or to the atmosphere; and
- Comply with the requirements of 40 CFR Part 264, Subpart G and 40 CFR §264.601.

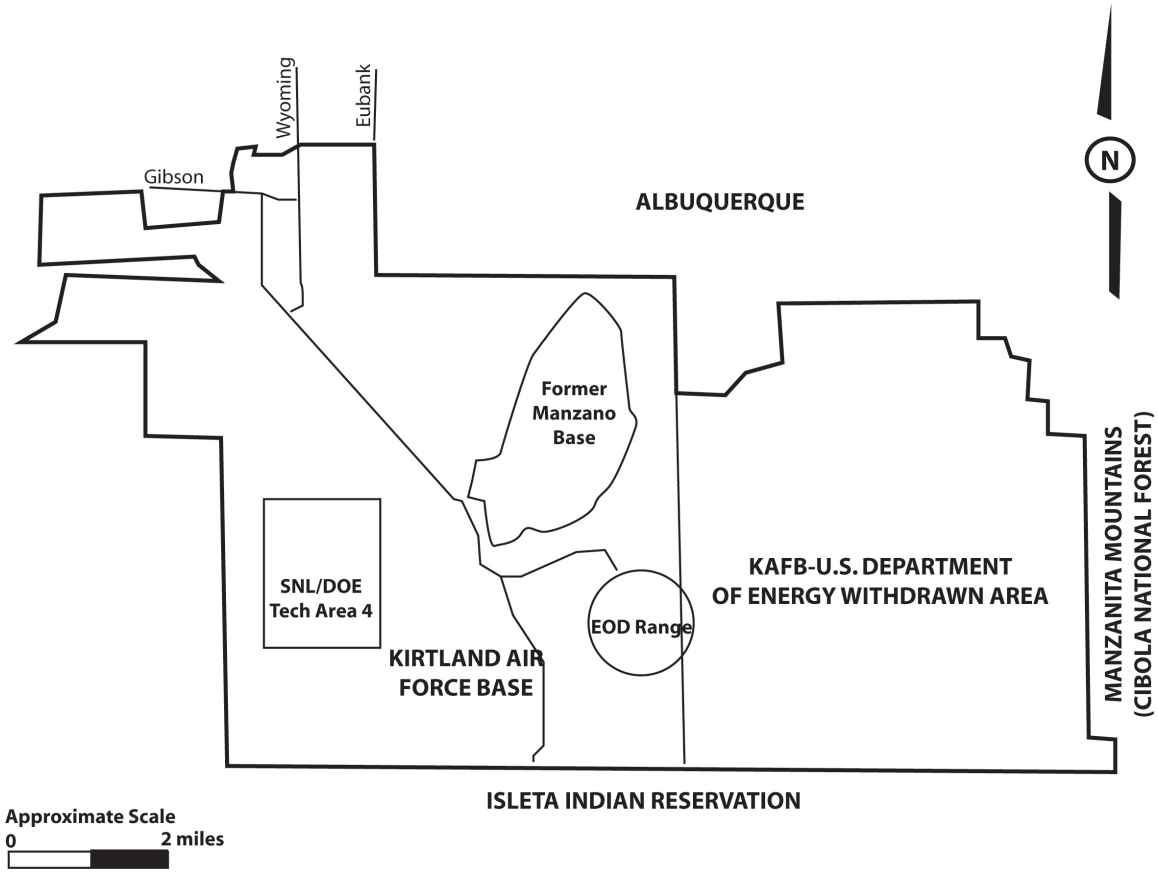

Figure H-1. Location of EOD Range at Kirtland AFB

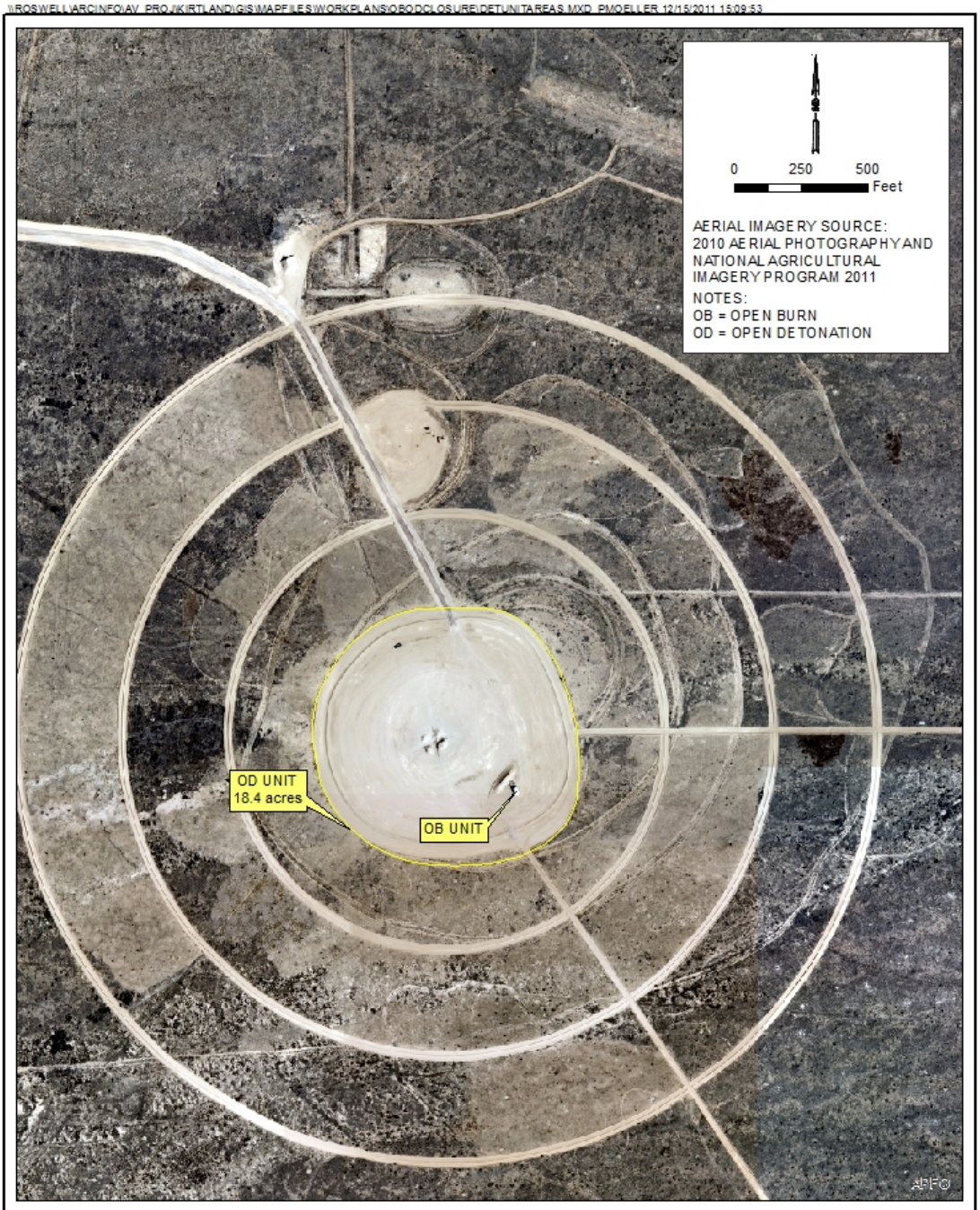

FIGURE H-2
LOCATION OF OPEN BURN AND OPEN DETONATION UNITS
EOD RANGE, KIRTLAND AIR FORCE BASE, NEW MEXICO

1.3 Final Closure Activities

The last treatment event at the OD Unit occurred on 11 August 2010. The Department was notified on 13 August 2010 that, effective immediately, the Permitee had closed the OD Unit for all treatment activities. The Permitee shall notify the Department, in writing, at least 45 calendar days prior to the date that closure activities shall commence.

Final closure activities at the OD Unit shall consist of:

- Installation of four groundwater monitoring wells at the EOD range (one upgradient and three downgradient wells) and eight consecutive quarters of groundwater sampling to determine the presence or absence of groundwater contamination;
- Removing any soil or debris from the OD Unit that have contaminant concentrations which pose unacceptable risk to human health or the environment;
- Sending for treatment and disposal any solid and hazardous waste, including any treatment residues, to a permitted Treatment, Storage, or Disposal Facility (TSDF) in accordance with applicable regulatory requirements.

Final closure for the OD Unit shall be completed when:

- All solid and hazardous waste has been disposed of off-site as required by law;
- Sampling and analysis demonstrates that no unacceptable risk to human health or the environment originating from the OD Unit exists in soil or groundwater;
- A Certification of Closure and Closure Report has been submitted to the Department; and
- The Department has approved the Certification of Closure and Closure Report.

1.4 Maximum Extent of Operations and Maximum Waste Inventory

The OD Unit was previously permitted on 20 December 1994 as Permit# NM9570024423-OD, which allowed 100,000 pounds of net explosive weight (NEW) to be treated at the OD Unit annually. Rocket motors, large caliber munitions, explosive wastes and firearms were treated at the OD Unit. Based on the operating record, the maximum inventory treated at the OD Unit was approximately 316,012 pounds of NEW.

Closure activities and any corrective action that may be required shall not be limited to the OD Unit if contamination has migrated beyond the OD Unit boundary. Any corrective action that may be required because of a release at the OB Unit shall be conducted under the terms and conditions of the 2010 Permit.

1.5 Schedule for Closure

Final closure of the OD Unit shall proceed by the general schedule presented in Table H-1.

Table H-1
Closure Schedule for the Open Detonation Unit at Kirtland AFB

Activity	Time Required
Notify the Department of receiving final volume of hazardous waste at the OD Unit	Completed
Removal of all hazardous waste from the OD Unit	Completed
Department approval of final OD Unit closure plan	TBD
Notify Department of commencement of closure activities	45 days before closure activities begin
Commence closure activities	Day 0
Remove all solid and hazardous waste	Day 90
Commence groundwater monitoring well installations	Day 90
Complete groundwater monitoring well installations	Day 180
Complete all closure activities, except groundwater monitoring	Day 360
Complete 8 quarters of groundwater monitoring	Day 900
Submit Closure Report and certification to Department	Day 960

Note: The schedule above indicates calendar days on which closure activities shall be started or completed subsequent

1.6 Closure Report

Within 60 days of completion of the final closure activities, a closure report shall be submitted to the Department. The report shall document the closure activities conducted and contain, at a minimum, the following information:

- A summary of the closure activities;
- Any significant variance from the approved closure plan and the reason for the variance;
- A summary of sampling data associated with closure, including analytical results for all field and laboratory quality control samples;
- A quality assurance statement on the adequacy of the analyses to support closure;
- The location of the file of supporting documentation (e.g., memos, logbooks, laboratory sample analysis data);
- Disposal location and quantities of all solid and hazardous wastes removed from the OD Unit;
- Certification of the accuracy of the report; and
- Survey plat.

1.7 Survey Plat and Post-Closure Requirements

Upon completion of closure activities at the OD Unit, a survey plat shall be prepared, certified by a professional land surveyor, and submitted with the closure report to the Department. The survey plat shall also be simultaneously filed with the local zoning authority. In the event that the OD Unit cannot be clean closed, a post-closure care plan shall be submitted to the Department for review and approval.

2. CLOSURE PROCEDURES

There is no hazardous waste present at the OD Unit; the last treatment event at the OD Unit occurred on 11 August 2010, and there are no treatment residues remaining. There are no structures or equipment at the OD Unit. (The structures associated with the collocated OB Unit are addressed under the OB Unit closure plan.)

The first phase of closure shall consist of a hazards survey of the OD Unit conducted by qualified contractor health physics and industrial hygiene personnel, which shall include unexploded ordnance (UXO) safety personnel, and Kirtland AFB EOD personnel. The purpose of the survey shall be to locate and remove any "kick-out" (untreated waste, waste fragments, or UXO), and to identify potential contamination concerns that may present hazards to workers during the closure activities and to specify any control measures necessary to reduce worker risk. This survey shall provide the information necessary for health physics, UXO safety, and industrial hygiene personnel to identify worker qualifications, personal protective equipment (PPE), safety awareness, work permits, exposure control programs, and emergency coordination that shall be required to perform closure. Any munitions and explosives of concern (MEC) identified during the hazard survey shall be reported to and handled by Kirtland AFB EOD staff personnel only in accordance with standard operating procedures. All workers involved in the closure activities shall be required to have training and medical monitoring as required by applicable regulations. Personnel performing closure activities shall be required to wear PPE as specified by health physics, UXO safety, and industrial hygiene personnel.

Sufficient sampling and analysis shall be required to demonstrate there are no contaminant concentrations which pose unacceptable risk to human health or the environment. Groundwater and soil samples shall be analyzed for parameters listed in Tables H-2 and H-3 to quantify contamination, if any, originating from the OD Unit.

Surface and subsurface soil at the OD Unit shall be characterized by sampling and analysis. Soil sampling shall follow the procedures described in Section 2.2.1 of this Permit Attachment (H). Soil shall be analyzed for the parameters listed in Table H-3. If sampling and analysis of soil indicates the presence of hazardous waste or hazardous constituents above background levels, a risk assessment shall be conducted based on a residential land-use scenario to determine whether the contaminants pose an unacceptable risk to human health or the environment. In lieu of a baseline risk assessment, the Permittee may compare the soil sampling results to the soil screening levels using the procedures listed in the Department's most current version of "Technical Background Document for Development of Soil Screening Levels," as it may be updated, provided the soil screening levels are based on a residential land-use scenario. If the risk assessment demonstrates that the level of contamination is unacceptable, the contaminated soil exhibiting unacceptable risk shall be subject to corrective action under Permit Part 6 and shall be excavated and removed. The excavated soil shall be collected, transferred to containers, and, if applicable, managed and disposed of as hazardous waste. The Permittee shall conduct corrective action activities at the OD Unit using the cleanup levels in Permit Section 6.2.3 if corrective action is necessary. Clean up levels shall be based on a residential land use scenario. Background soil concentrations for metals are those approved by the Department for the KAFB Facility, and are listed in Table D-4 of Permit Attachment D.

2.1 Monitoring Wells

2.1.1 Installation of New Monitoring Wells

The OD Unit is subject to the environmental performance standards of 40 C.F.R. § 264.601. As such, groundwater monitoring shall be conducted as part of closure activities to demonstrate that operations did not impact groundwater. Four monitoring wells, one upgradient and three downgradient of the OD Unit, shall be installed. The locations of the proposed monitoring wells are presented in Figure H-3.

The wells installed at the OD Unit shall meet the groundwater monitoring requirements of 40 C.F.R. §§ 264.97(a)(2), (b), and (c). Within 30 days of completing well installation, the Permitee shall submit a well completion report to the Department for approval.

Groundwater monitoring wells shall be properly plugged and abandoned in accordance with applicable New Mexico statutes and regulations, provided groundwater contamination has not occurred. If groundwater contamination has occurred, these monitoring wells shall be maintained for the purpose of implementing corrective action. The wells shall not be plugged or abandoned until the Department has approved closure of the OD Unit.

Activities for monitoring well installation are presented in the following paragraphs and include:

- Well locations,
- Drilling specifications,
- Well construction specifications,
- Well development procedures,
- A schedule for implementation and completion of the well installations;
- Preparation and submittal of a well completion report; and
- Groundwater sampling and analysis requirements for eight quarters.

The primary project objective is the installation and sampling of four groundwater monitoring wells, one upgradient and three downgradient of the site, to evaluate the potential groundwater impacts from the operation of the OD unit. The new monitoring wells shall be installed in the vicinity of the OD Unit (Figure H-3). Installation of the monitoring wells shall facilitate groundwater sampling from the uppermost groundwater both up and downgradient of potential source areas associated with the OD unit. Based on data from nearby wells, groundwater at the proposed locations is expected to occur under confined conditions within the Paleozoic sedimentary rocks of the Madera Group or Sandia Formation or the underlying Precambrian granite. The depth to the uppermost water bearing zones at the proposed well locations is expected to range from approximately 100 to 200 feet (ft) below ground surface (bgs). Final well design shall be dependent on field conditions and the placement of the fourth well shall be performed in consultation with the Department.

Table H-2

Comparison of Reporting Levels to Screening Objectives in Groundwater, Open Burn and Open Detonation Units at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Water Quality Standard	EPA Maximum Contaminant Levels/Secondary Contaminant Levels[a]	EPA Regional Screening Levels Tap Water (Nov 2012)	DOE Open Burn Suggested Maximum Background (Dec 1998)	LOQ	LOD	DL
EPA 160.2	Total dissolved solids	NA	mg/L	--	--	--	--	4	2	1
EPA 310.2	Alkalinity	NA	mg/L	--	--	--	--	10	5	2.5
EPA 350.1	Ammonia	7664-41-7	mg/L	--	--	--	--	0.5	0.1	0.049
SW9030B	Sulfide	18496-25-8	mg/L	--	--	--	--	2	0.8	0.4
SW9056	Nitrate	14797-55-8	mg/L	58.4	10	25	4 (as NO2/NO3)	0.5	0.1	0.04
SW9056	Nitrite	14797-65-0	mg/L	3.65	1	1.6	4 (as NO2/NO3)	0.5	0.1	0.05
SW9056	Chloride	16887-00-6	mg/L	--	--	--	--	0.5	0.1	0.05
SW9056	Sulfate	18785-72-3	mg/L	--	--	--	--	0.5	0.1	0.05
SW9056	Fluoride	7782-41-4	mg/L	1.46	--	620	--	0.5	0.1	0.05
SW9056	Bromide	7726-95-6	mg/L	--	--	--	--	0.5	0.1	0.05
SW9060	Total organic carbon	7440-44-0	mg/L	--	--	--	--	1	0.5	0.25
SW6010B	Barium	7440-39-3	µg/L	1,000	2,000	--	120	20	5	0.25
SW6010B	Boron	7440-42-8	µg/L	7,300	--	3100	--	20	5	1
SW6010B	Beryllium	7440-41-7	µg/L	--	4	--	4	3	1	0.3
SW6010B	Cadmium	7440-43-9	µg/L	10	5	--	0.47	3	1	0.5
SW6010B	Calcuim	7440-70-2	µg/L	--	--	--	--	1000	80	35
SW6010B	Chromium	7440-47-3	µg/L	50	100	--	43	10	5	1.2
SW6010B	Cobalt	7440-48-4	µg/L	50	--	--	2.5	10	5	3
SW6010B	Copper	7440-50-8	µg/L	1,000	1,300 (1,000)	--	<50	15	5	2.1
SW6010B	Iron	7439-89-6	µg/L	1,000	300	11000	--	200	100	50
SW6010B	Lead	7439-92-1	µg/L	50	15	--	10	10	5	2.5
SW6010B	Lithium	7439-93-2	µg/L	--	--	31	--	500	25	11
SW6010B	Magnesium	7439-95-4	µg/L	--	--	--	--	500	25	11
SW6010B	Manganese	7439-96-5	µg/L	876	--	320	--	500	25	11
SW6010B	Molybdenum	7439-98-7	µg/L	183	--	78	--	500	25	11
SW6010B	Nickel	7440-02-0	µg/L	--	--	300	28	10	5	2.4
SW6010B	Potasium	9/7/7440	µg/L	--	--	--	--	3000	250	237
SW6010B	Selenium	7782-49-2	µg/L	50	50	--	5	40	25	13
SW6010B	Silver	7440-22-4	µg/L	50	100	--	<10	5	2	0.84
SW6010B	Sodium	7440-23-5	µg/L	--	--	--	--	5000	250	91.6
SW6010B	Strontium	7440-24-6	µg/L	21900	--	9300	--	500	25	11
SW6010B	Tin	7440-31-5	µg/L	--	--	9300	50	50	15	1.7
SW6010B	Vanadium*	7440-62-2	µg/L	--	--	--	13	20	5	1.9
SW6010B	Zinc	7440-66-6	µg/L	10,000	5,000	--	260	20	10	3
SW6020A	Antimony	7440-36-0	µg/L	--	6	--	6	6	4	2
SW6020A	Arsenic	7440-38-2	µg/L	100	10	--	14	3	2	1
SW6020A	Thallium	7440-28-0	µg/L	--	2	--	2	1.5	1	0.5
SW7470A	Mercury	7439-97-6	µg/L	2	2	--	2	0.3	0.1	0.1
SW6850	Perchlorate	14797-73-0	µg/L	4[b]	--	--	--	0.5	0.25	0.082
SW8260B	1,1,1-Trichloroethane	71-55-6	µg/L	60	200	--	--	1	0.4	0.19
SW8260B	1,1,2,2-Tetrachloroethane	79-34-5	µg/L	10	--	--	--	1	0.2	0.09
SW8260B	1,1,2-trichloro-1,1,2-trifluoroethane*	76-13-1	µg/L	--	--	--	--	50	0.4	0.25
SW8260B	1,1,2-Trichloroethane	79-00-5	µg/L	10	5	--	--	1	0.4	0.31
SW8260B	1,1-Dichloroethane	75-34-3	µg/L	25	--	--	--	1	0.2	0.1
SW8260B	1,1-Dichloroethene	75-35-4	µg/L	5	7	--	--	1	0.4	0.14
SW8260B	1,2,3-Trichlorobenzene	87-61-6	µg/L	70	--	--	--	1	0.4	0.14
SW8011	1,2,3-Trichloropropane	96-18-4	µg/L	--	--	0.00065	--	0.2	0.09	0.09
SW8260B	1,2,4-Trichlorobenzene	120-82-1	µg/L	--	70	--	--	1	0.4	0.1
SW8260B	1,2,4-Trimethylbenzene	95-63-6	µg/L	--	--	15	--	1	0.2	0.12
SW8011	1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	µg/L	--	0.2	NA	--	0.02	0.005	0.005
SW8011	1,2-Dibromoethane (EDB)	106-93-4	µg/L	0.1	0.05	NA	--	0.02	0.005	0.0022
SW8260B	1,2-Dichlorobenzene	95-50-1	µg/L	--	600	--	--	1	0.4	0.14
SW8260B	1,2-Dichloroethane	107-06-2	µg/L	10	5	--	--	1	0.4	0.22
SW8260B	1,2-Dichloropropane	78-87-5	µg/L	--	5	--	--	1	0.2	0.15
SW8260B	1,3,5-Trimethylbenzene	108-67-8	µg/L	--	--	87	--	1	0.2	0.14
SW8260B	1,3-Dichlorobenzene*	541-73-1	µg/L	--	--	--	--	1	0.4	0.11
SW8260B	1,4-Dichlorobenzene	106-46-7	µg/L	--	75	--	--	1	0.2	0.13
SW8260B	1,4-Dioxane	123-91-1	µg/L	--	--	0.67	--	1	TBD	0.12
SW8260B	2-Butanone (MEK)	78-93-3	µg/L	--	--	4,900	--	2	0.4	0.35
SW8260B	2-Hexanone	591-78-6	µg/L	--	--	34	--	2	0.4	0.17
SW8260B	4-Methyl-2-pentanone (MIBK)	108-10-1	µg/L	--	--	1,000	--	2	0.4	1
SW8260B	Acetone	67-64-1	µg/L	--	--	12,000	--	10	4	2.1
SW8260B	Benzene	71-43-2	µg/L	10	5	--	--	1	0.2	0.13
SW8260B	Bromochloromethane	74-97-5	µg/L	--	--	83	--	1	0.4	0.14
SW8260B	Bromodichloromethane	75-27-4	µg/L	--	100	--	--	1	0.4	0.14
SW8260B	Bromoform	75-25-2	µg/L	--	100	--	--	1	0.4	0.1
SW8260B	Bromomethane	74-83-9	µg/L	--	--	7	--	1	0.4	0.29
SW8260B	Carbon disulfide	75-15-0	µg/L	--	--	720	--	2	0.2	0.16
SW8260B	Carbon tetrachloride	56-23-5	µg/L	10	5	--	--	1	0.4	0.15
SW8260B	Chlorobenzene	108-90-7	µg/L	--	100	--	--	1	0.2	0.12
SW8260B	Chloroethane	75-00-3	µg/L	--	--	21,000	--	1	0.4	0.34

Table H-2

Comparison of Reporting Levels to Screening Objectives in Groundwater, Open Burn and Open Detonation Units at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Water Quality Standard	EPA Maximum Contaminant Levels/Secondary Contaminant Levels[a]	EPA Regional Screening Levels Tap Water (Nov 2012)	DOE Open Burn Suggested Maximum Background (Dec 1998)	LOQ	LOD	DL
SW8260B	Chloroform	67-66-3	µg/L	100	100	--	--	1	0.2	0.12
SW8260B	Chloromethane	74-87-3	µg/L	--	--	190	--	1	0.4	0.25
SW8260B	cis-1,2-Dichloroethene	156-59-2	µg/L	--	70	--	--	1	0.4	0.1
SW8260B	cis-1,3-Dichloropropene*	10061-01-5	µg/L	--	--	--	--	1	0.4	0.22
SW8260B	Cyclohexane*	1735-17-7	µg/L	--	--	--	--	(a)	(a)	(a)
SW8260B	Dibromochloromethane	124-48-1	µg/L	--	100	--	--	1	0.4	0.13
SW8260B	Dichlorodifluoromethane (Freon 12)	75-71-8	µg/L	--	--	190	--	1	0.4	0.16
SW8260B	Ethylbenzene	100-41-4	µg/L	750	700	--	--	1	0.2	0.1
SW8260B	Isopropylbenzene	98-82-8	µg/L	--	--	390	--	1	0.2	0.12
SW8260B	Methyl tert-butyl ether (MTBE)	1634-04-4	µg/L	--	(5)	--	--	2	0.4	0.19
SW8260B	Methylene chloride	75-09-2	µg/L	100	5	--	--	1	0.4	0.35
SW8260B	Methyl Acetate*	79-20-9	µg/L	--	--	--	--	(a)	(a)	(a)
SW8260B	Methly Cyclohexane*	108-87-2	µg/L	--	--	--	--	(a)	(a)	(a)
SW8260B	m-Xylene & p-Xylene	136777-61-2	µg/L	--	10,000	--	--	1	0.8	0.18
SW8260B	Naphthalene	91-20-3	µg/L	30	--	NA	--	1	0.2	0.15
SW8260B	o-Xylene	95-47-6	µg/L	--	10,000	--	--	1	0.4	0.1
SW8260B	Styrene	100-42-5	µg/L	--	100	--	--	1	0.2	0.15
SW8260B	Tetrachloroethene	127-18-4	µg/L	--	5	--	--	1	0.2	0.1
SW8260B	Toluene	108-88-3	µg/L	750	1,000	--	--	1	0.4	0.25
SW8260B	trans-1,2-Dichloroethene	156-60-5	µg/L	--	100	--	--	1	0.4	0.11
SW8260B	trans-1,3-Dichloropropene*	10061-02-6	µg/L	--	--	--	--	1	0.2	0.08
SW8260B	Trichloroethene	79-01-6	µg/L	100	5	--	--	1	0.4	0.13
SW8260B	Trichlorofluoromethane (Freon 11)	75-69-4	µg/L	--	--	1,100	--	1	0.4	0.23
SW8260B	Vinyl chloride	75-01-4	µg/L	1	2	--	--	1	0.4	0.22
SW8260B	1,2-Dichloroethane-d4 (Surrogate)		%	--	--	--	--	--	--	--
SW8260B	4-Bromofluorobenzene (Surrogate)		%	--	--	--	--	--	--	--
SW8260B	Dibromofluoromethane (Surrogate)		%	--	--	--	--	--	--	--
SW8260B	Toluene-d8 (Surrogate)		%	--	--	--	--	--	--	--
SW8270C	1,1-biphenyl	92-52-4	µg/L	--	--	0.83	--	10	NA	5
SW8270C	1,2,4,5-tetrachlrorbenzene	95-94-3	µg/L	--	--	1.2	--	10	2.1	0.54
SW8270C	2,4,5-Trichlorophenol	95-95-4	µg/L	--	--	890	--	10	3.0	2
SW8270C	2,4,6-Trichlorophenol	88-06-2	µg/L	--	--	3.5	--	10	3.0	2
SW8270C	2,4-Dichlorophenol	120-83-2	µg/L	--	--	35	--	10	3.0	2.6
SW8270C	2,4-Dimethylphenol	105-67-9	µg/L	--	--	270	--	10	3.0	2.2
SW8270C	2,4-Dinitrotoluene	121-14-2	µg/L	--	--	0.2	--	10	3.0	2
SW8270C	2,6-Dichlorophenol*	87-65-0	µg/L	--	--	--	--	15	3.0	5
SW8270C	2,6-Dinitrotoluene	606-20-2	µg/L	--	--	15	--	10	3.0	2
SW8270C	2-Chloronaphthalene	91-58-7	µg/L	--	--	550	--	10	3.0	1.3
SW8270C	2-Chlorophenol	95-57-8	µg/L	--	--	71	--	10	3.0	1.6
SW8270C	2-Methylphenol	95-48-7	µg/L	--	--	720	--	10	3.0	0.93
SW8270C	2-Nitroaniline	88-74-4	µg/L	--	--	150	--	50	3.0	2
SW8270C	2-Nitrophenol*	88-75-5	µg/L	--	--	--	--	10	3.0	1.9
SW8270C	2,2-oxybis(1-chloropropane)*	52438-91-2	µg/L	--	--	--	--	10	3	1.3
SW8270C	3,3'-Dichlorobenzidine	91-94-1	µg/L	--	--	0.11	--	50	3.0	0.96
SW8270C	3-Methylphenol & 4-Methylphenol	65794-96-9	µg/L	--	--	720	--	30	20	10
SW8270C	3-Nitroaniline*	99-09-2	µg/L	--	--	--	--	50	3.0	1.4
SW8270C	4,6-Dinitro-2-methylphenol	534-52-1	µg/L	--	--	1.2	--	60	20	2.2
SW8270C	4-Bromophenyl phenyl ether*	101-55-3	µg/L	--	--	--	--	10	3.0	1.1
SW8270C	4-Chloro-3-methylphenol	59-50-7	µg/L	--	--	1,100	--	10	3.0	2
SW8270C	4-Chloroaniline	106-47-8	µg/L	--	--	0.32	--	10	3.0	2
SW8270C	4-Chlorophenyl phenyl ether*	7005-72-3	µg/L	--	--	--	--	10	3.0	1.1
SW8270C	4-Nitroaniline	100-01-6	µg/L	--	--	3.3	--	50	3.0	1.5
SW8270C	4-Nitrophenol*	100-02-7	µg/L	--	--	--	--	60	20	6.1
SW8270C	Acetophenone	17537-31-4	µg/L	--	--	1,500	--	10	3	0.78
SW8270C	Azobenzene (as 1,2 Diphenylhydrazine)	103-33-3	µg/L	--	--	0.067	--	10	3.0	0.71
SW8270C	Atrazine	93616-39-8	µg/L	--	--	0.26	--	(a)	(a)	(a)
SW8270C	Benzaldehyde	100-52-7	µg/L	--	--	1,500	--	(a)	(a)	(a)
SW8270C	bis(2-Chloroethoxy)methane	111-91-1	µg/L	--	--	46	--	10	3.0	1
SW8270C	bis(2-Chloroethyl) ether	111-44-4	µg/L	--	--	0.012	--	10	3.0	1.5
SW8270C	bis(2-Ethylhexyl) phthalate	117-81-7	µg/L	--	6	--	--	10	3.0	1
SW8270C	Butyl benzyl phthalate	85-68-7	µg/L	--	--	14	--	10	3.0	1.4
SW8270C	Caprolactam	105-60-2	µg/L	--	--	7,700	--	(a)	(a)	(a)
SW8270C	Carbazole*	86-74-8	µg/L	--	--	--	--	10	3.0	1.2
SW8270C	Dibenzofuran	132-64-9	µg/L	--	--	5.8	--	10	3.0	1.1
SW8270C	Diethyl phthalate	84-66-2	µg/L	--	--	11,000	--	10	3.0	0.93
SW8270C	Dimethyl phthalate*	131-11-3	µg/L	--	--	--	--	10	3.0	0.88
SW8270C	Di-n-butyl phthalate	84-74-2	µg/L	--	--	670	--	10	3.0	1.1
SW8270C	Di-n-octyl phthalate*	117-84-0	µg/L	--	--	--	--	10	3.0	1.5
SW8270C	Hexachlorobenzene	118-74-1	µg/L	--	1	--	--	10	3.0	1.4
SW8270C	Hexachlorobutadiene	87-68-3	µg/L	--	--	0.26	--	10	3.0	1.3
SW8270C	Hexachloroethane	67-72-1	µg/L	--	--	0.79	--	10	3.0	1.4

Table H-2

Comparison of Reporting Levels to Screening Objectives in Groundwater, Open Burn and Open Detonation Units at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Water Quality Standard	EPA Maximum Contaminant Levels/Secondary Contaminant Levels[a]	EPA Regional Screening Levels Tap Water (Nov 2012)	DOE Open Burn Suggested Maximum Background (Dec 1998)	LOQ	LOD	DL
SW8270C	Hexachlorocyclopentadiene	77-47-4	µg/L		--	22	--	10	3	0.214
SW8270C	Isophorone	78-59-1	µg/L	--	--	67	--	10	3.0	1
SW8270C	Nitrobenzene	98-95-3	µg/L	--	--	0.12	--	10	3.0	1.6
SW8270C	N-Nitrosodimethylamine	62-75-9	µg/L	--	--	0.0004	--	15	3.0	0.96
SW8270C	N-Nitrosodi-n-propylamine	621-64-7	µg/L	--	--	0.0093	--	10	3.0	1.4
SW8270C	N-Nitrosodiphenylamine	86-30-6	µg/L	--	--	10	--	10	3.0	0.54
SW8270C	Pentachlorophenol	87-86-5	µg/L	--	1	--	--	60	20	2
SW8270C	Phenol	108-95-2	µg/L	--	--	4,500	--	10	3.0	1.1
SW8270C	Phenol-d6		%	--	--	--	--	--	--	--
SW8270C	2-Fluorobiphenyl		%	--	--	--	--	--	--	--
SW8270C	Terphenyl-d14		%	--	--	--	--	--	--	--
SW8270C-SIM	1-methylnaphthalene	90-12-0	µg/L	--	--	0.97	--	0.1	0.01	0.006
SW8270C-SIM	2-methylnaphthalene	91-57-6	µg/L	--	--	27	--	0.1	0.01	0.006
SW8270C-SIM	Acenaphthene	83-32-9	µg/L	--	--	400	--	0.1	0.01	0.003
SW8270C-SIM	Acenaphthylene	208-96-8	µg/L	--	--	--	--	0.1	0.01	0.003
SW8270C-SIM	Anthracene	120-12-7	µg/L	--	--	1300	--	0.1	0.01	0.004
SW8270C-SIM	Benzo (a) anthracene	56-55-3	µg/L	--	--	0.029	--	0.1	0.01	0.005
SW8270C-SIM	Benzo (a) pyrene	50-32-8	µg/L	0.7	0.2	--	--	0.1	0.01	0.004
SW8270C-SIM	Benzo (b) fluoranthene	205-99-2	µg/L	--	--	0.029	--	0.1	0.02	0.012
SW8270C-SIM	Benzo (g,h,i) perylene	191-24-2	µg/L	--	--	--	--	0.1	0.01	0.006
SW8270C-SIM	Benzo (k) fluoranthene	207-08-9	µg/L	--	--	0.29	--	0.1	0.01	0.008
SW8270C-SIM	Chrysene	218-01-9	µg/L	--	--	2.9	--	0.1	0.01	0.004
SW8270C-SIM	Dibenzo (a,h) anthracene	53-70-3	µg/L	--	--	0.0029	--	0.1	0.02	0.014
SW8270C-SIM	Fluoranthene	206-44-0	µg/L	--	--	630	--	0.1	0.01	0.004
SW8270C-SIM	Fluorene	86-73-7	µg/L	--	--	220	--	0.1	0.01	0.004
SW8270C-SIM	Indeno (1,2,3-c,d) pyrene	193-39-5	µg/L	--	--	0.029	--	0.1	0.02	0.014
SW8270C-SIM	Naphthalene	91-20-3	µg/L	30		NA	--	0.1	0.01	0.004
SW8270C-SIM	Phenanthrene	85-01-8	µg/L	--	--	--	--	0.1	0.01	0.006
SW8270C-SIM	Pyrene	129-00-0	µg/L	--	--	87	--	0.1	0.01	0.004
SW8290	2,3,7,8-TCDF*	51207-31-9	pg/L	--	--	--	--	10	2.5	EDL
SW8290	2,3,7,8-TCDD*	1746-01-6	pg/L	--	--	--	--	10	2.5	EDL
SW8290	1,2,3,7,8-PeCDF*	57117-41-6	pg/L	--	--	--	--	50	6.5	EDL
SW8290	2,3,4,7,8-PeCDF*	57117-31-4	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,7,8-PeCDD*	40321-76-4	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,4,7,8-HxCDF*	70648-26-9	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,6,7,8-HxCDF*	57117-44-9	pg/L	--	--	--	--	50	12.5	EDL
SW8290	2,3,4,6,7,8-HxCDF*	60851-34-5	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,7,8,9-HxCDF*	72918-21-9	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,4,7,8-HxCDD*	39227-28-6	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,6,7,8-HxCDD*	57653-85-7	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,7,8,9-HxCDD*	19408-74-3	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,4,6,7,8-HpCDF*	67562-39-4	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,4,7,8,9-HpCDF*	55673-89-7	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,4,6,7,8-HpCDD*	35822-46-9	pg/L	--	--	--	--	50	12.5	EDL
SW8290	OCDF*	39001-02-0	pg/L	--	--	--	--	100	25	EDL
SW8290	OCDD*	3268-87-9	pg/L	--	--	--	--	100	50	EDL
SW8330B	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	µg/L	--	--	780	--	0.15	0.05	0.036
SW8330B	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	µg/L	--	--	0.61	--	0.25	0.05	0.036
SW8330B	1,3,5-Trinitrobenzene (1,3,5-TNB)	99-35-4	µg/L	--	--	460	--	0.1	0.05	0.03
SW8330B	1,3-Dinitrobenzene (1,3-DNB)	99-65-0	µg/L	--	--	1.5	--	0.15	0.1	0.05
SW8330B	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	479-45-8	µg/L	--	--	61	--	0.15	0.1	0.05
SW8330B	Nitrobenzene (NB)	98-95-3	µg/L	--	--	0.12	--	0.15	0.1	0.05
SW8330B	2,4,6-Trinitrotoluene (2,4,6-TNT)	118-96-7	µg/L	--	--	2.2	--	0.15	0.1	0.05
SW8330B	4-Amino-2,6-dinitrotoluene (4-Am-DNT)	19406-51-0	µg/L	--	--	30	--	0.15	0.1	0.05
SW8330B	2-Amino-4,6-dinitrotoluene (2-Am-DNT)	35572-78-2	µg/L	--	--	30	--	0.3	0.1	0.1
SW8330B	2,4-Dinitrotoluene (2,4-DNT)	121-14-2	µg/L	--	--	0.2	--	0.15	0.1	0.05
SW8330B	2,6-Dinitrotoluene (2,6-DNT)	606-20-2	µg/L	--	--	15	--	0.15	0.1	0.05
SW8330B	2-Nitrotoluene (2-NT)	88-72-2	µg/L	--	--	0.27	--	1	0.1	0.088
SW8330B	3-Nitrotoluene (3-NT)	99-08-1	µg/L	--	--	1.3	--	0.5	0.1	0.057
SW8330B	4-Nitrotoluene (4-NT)	99-99-0	µg/L	--	--	3.7	--	1	0.1	0.088
SW8330B	Nitroglycerin	55-63-0	µg/L	--	--	1.5	--	1	0.5	0.33
SW8330B	PETN	78-11-5	µg/L	--	--	16	--	1	0.5	0.3
SW7580	White phosphorous	7723-14-0	µg/L	--	--	0.31	--	0.05	0.025	0.015

The laboratory does not analyze for these compounds. The compounds w ill be tentatively identified based on a computer library search of the sample chromotography. If found, the coumpound concentration w ill be reported as an estimated value.

The detection limit exceeds most stringent criteria.

[a] Secondary Contaminant Levels are in parentheses

[b] KAFB RCRA permit screening criteria for perchlorate

* Risk based screening levels w ill be calculated if analyte is detected and toxicological information is available

Constituents w ith "%" units are surrogates and are not a part of the target analytes.

CAS - Chemical Abstract Service

DL - Detection limit

DOE - Department of Energy

LOD - Limit of detection

LOQ - Limit of quantitation

µg/L - micrograms per liter

mg/L - milligrams per liter

NA - not applicable

pg/L - picograms per liter

RPD - relative percent difference

Table H-3

Comparison of Reporting Levels to Screening Objectives in Soil, Open Burn Unit at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Residential SSG (Feb 2012)	Coyote Test Field Super Group Background Values (surface soil)	Coyote Test Field Super Group Background Values (subsurface soil)	EPA Regional Screening Levels, Residential (Nov 2012)	LOQ	LOD	DL
SW6010B	Antimony	7440-36-0	mg/kg	31.3	3.9	3.9	--	3	2	0.94
SW6010B	Barium	7440-39-3	mg/kg	15,596	130	214	--	2	0.5	0.12
SW6010B	Beryllium	7440-41-7	mg/kg	156	0.65	0.65	--	0.3	0.1	0.03
SW6010B	Cadmium	7440-43-9	mg/kg	70.3	1	0.9	--	0.3	0.1	0.03
SW6010B	Chromium	7440-47-3	mg/kg	117,321/2.97	17.3	12.8	--	1	0.5	0.14
SW6010B	Cobalt	7440-48-4	mg/kg	--	5.2	5.2	23	1	0.5	0.25
SW6010B	Copper	7440-50-8	mg/kg	3,129	15.4	18.2	--	1.5	0.5	0.22
SW6010B	Lead	7439-92-1	mg/kg	400	21.4	11.8	--	1	0.5	0.26
SW6010B	Nickel	7440-02-0	mg/kg	1,564	11.5	11.5	--	1	0.5	0.24
SW6010B	Selenium	7782-49-2	mg/kg	391	1	1	--	4	2.5	1.4
SW6010B	Silver	7440-22-4	mg/kg	391	1	1	--	0.5	0.2	0.09
SW6010B	Tin	7440-31-5	mg/kg	--	10	10	47,000	100	25	11
SW6010B	Vanadium	7440-62-2	mg/kg	391	20.4	21.5	--	2	0.5	0.19
SW6010B	Zinc	7440-66-6	mg/kg	23,464	62	62	--	2	1	0.19
SW6020A	Arsenic	7440-38-2	mg/kg	3.9	5.6	7.4	--	0.5	0.3	0.15
SW6020A	Thallium	7440-28-0	mg/kg	0.78	1.1	1.1	--	0.15	0.1	0.05
SW7471A	Mercury	7439-97-6	mg/kg	15.6/7.82	0.25	0.10	--	0.04	0.012	0.0086
SW6850	Perchlorate	14797-73-0	µg/kg	54,800	--	--	--	5	0.4	0.26
SW7580	White Phosphorus	7723-14-0W	µg/kg	--	--	--	1,600	0.1	0.05	0.015
SW8260B	1,1,1-Trichloroethane	71-55-6	µg/kg	15,609,580	--	--	--	5	1	0.36
SW8260B	1,1,2,2-Tetrachloroethane	79-34-5	µg/kg	8,021	--	--	--	5	1	0.68
SW8260B	1,1,2-Trichloroethane	79-00-5	µg/kg	2,811	--	--	--	5	1	0.44
SW8260B	1,1,2-trichloro-1,1,2-trifluoroethane	76-13-1	µg/kg	72,080,604	--	--	--	10	1	0.83
SW8260B	1,1-Dichloroethane	75-34-3	µg/kg	64,514	--	--	--	5	1	0.29
SW8260B	1,1-Dichloroethene	75-35-4	µg/kg	448,879	--	--	--	5	0.5	0.26
SW8260B	1,2,3-Trichlorobenzene	87-61-6	µg/kg	--	--	--	49,000	5	1	0.75
SW8260B	1,2,3-Trichloropropane	96-18-4	µg/kg	50	--	--	--	5	1	0.76
SW8260B	1,2,4-Trichlorobenzene	120-82-1	µg/kg	72,980	--	--	--	5	1	0.75
SW8260B	1,2,4-Trimethylbenzene	95-63-6	µg/kg	--	--	--	62,000	5	1	0.51
SW8260B	1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	µg/kg	186	--	--	--	10	1	0.88
SW8260B	1,2-Dibromoethane (EDB)	106-93-4	µg/kg	588	--	--	--	10	1	0.27
SW8260B	1,2-Dichlorobenzene	95-50-1	µg/kg	2,306,711	--	--	--	5	1	0.64
SW8260B	1,2-Dichloroethane	107-06-2	µg/kg	7,885	--	--	--	5	1	0.73
SW8260B	1,2-Dichloropropane	78-87-5	µg/kg	15,238	--	--	--	5	1	0.6
SW8260B	1,3,5-Trimethylbenzene	108-67-8	µg/kg	--	--	--	780,000	5	1	0.35
SW8260B	1,3-Dichlorobenzene*	541-73-1	µg/kg	--	--	--	--	5	1	0.3
SW8260B	1,4-Dichlorobenzene	106-46-7	µg/kg	31,731	--	--	--	5	1	0.78
SW8260B	1,4-Dioxane	123-91-1	µg/kg	48,634	--	--	--	250	75	39
SW8260B	2-Butanone (MEK)	78-93-3	µg/kg	37,076,608	--	--	--	10	3	1.4
SW8260B	2-Hexanone	591-78-6	µg/kg	--	--	--	210,000	10	1	0.74
SW8260B	4-Methyl-2-pentanone (MIBK)	108-10-1	µg/kg	51,578	--	--	--	10	1	0.92
SW8260B	Acetone	67-64-1	µg/kg	66,556,733	--	--	--	20	3	1.4
SW8260B	Benzene	71-43-2	µg/kg	15,381	--	--	--	5	1	0.26
SW8260B	Bromochloromethane	74-97-5	µg/kg	--	--	--	160,000	5	1	0.94
SW8260B	Bromodichloromethane	75-27-4	µg/kg	5,411	--	--	--	5	1	0.53
SW8260B	Bromoform	75-25-2	µg/kg	--	--	--	--	5	1	0.4
SW8260B	Bromomethane	74-83-9	µg/kg	16,485	--	--	--	5	3	0.86
SW8260B	Carbon disulfide	75-15-0	µg/kg	1,532,527	--	--	--	10	1	0.49
SW8260B	Carbon tetrachloride	56-23-5	µg/kg	10,833	--	--	--	5	1	0.53
SW8260B	Chlorobenzene	108-90-7	µg/kg	376,370	--	--	--	5	1	0.29
SW8260B	Chloroethane	75-00-3	µg/kg	29,806,983	--	--	--	5	1	0.45
SW8260B	Chloroform	67-66-3	µg/kg	5,864	--	--	--	5	1	0.26
SW8260B	Chloromethane	74-87-3	µg/kg	274,707	--	--	--	5	1	0.5
SW8260B	cis-1,2-Dichloroethene	156-59-2	µg/kg	156,428	--	--	--	5	1	0.89
SW8260B	cis-1,3-Dichloropropene*	10061-01-5	µg/kg	33713	--	--	--	5	1	0.64
SW8260B	Cyclohexane	1735-17-7	µg/kg	--	--	--	7,000,000	(a)	(a)	(a)
SW8260B	Dibromochloromethane	124-48-1	µg/kg	12,127	--	--	--	5	0.5	0.21
SW8260B	Dichlorodifluoromethane (Freon 12)	75-71-8	µg/kg	168,142	--	--	--	5	3	0.89
SW8260B	Ethylbenzene	100-41-4	µg/kg	68,448	--	--	--	5	1	0.34
SW8260B	Isopropylbenzene	98-82-8	µg/kg	2,430,743	--	--	--	5	1	0.52
SW8260B	Methyl Acetate	79-20-9	µg/kg	78,214,000	--	--	--	(a)	(a)	(a)
SW8260B	Methly Cyclohexane	108-87-2	µg/kg	5,625,911	--	--	--	(a)	(a)	(a)
SW8260B	Methyl tert-butyl ether (MTBE)	1634-04-4	µg/kg	901,073	--	--	--	10	1	0.6
SW8260B	Methylene chloride	75-09-2	µg/kg	409,376	--	--	--	5	1	0.84
SW8260B	m-Xylene & p-Xylene	136777-61-2	µg/kg	774,289	--	--	--	5	1	0.81
SW8260B	Naphthalene	91-20-3	µg/kg	42,976	--	--	--	5	1	0.63
SW8260B	o-Xylene	95-47-6	µg/kg	898,344	--	--	--	5	0.5	0.33
SW8260B	Styrene	100-42-5	µg/kg	7,277,612	--	--	--	5	1	0.31
SW8260B	Tetrachloroethene	127-18-4	µg/kg	7,021	--	--	--	5	1	0.61
SW8260B	Toluene	108-88-3	µg/kg	5,274,400	--	--	--	5	1	0.61
SW8260B	trans-1,2-Dichloroethene	156-60-5	µg/kg	269,586	--	--	--	5	1	0.38
SW8260B	trans-1,3-Dichloropropene*	10061-02-6	µg/kg	33713	--	--	--	5	1	0.75
SW8260B	Trichloroethene	79-01-6	µg/kg	8,767	--	--	--	5	1	0.6
SW8260B	Trichlorofluoromethane (Freon 11)	75-69-4	µg/kg	1,412,976	--	--	--	10	1	0.34
SW8260B	Vinyl chloride	75-01-4	µg/kg	728	--	--	--	5	1	0.36

Table H-3

Comparison of Reporting Levels to Screening Objectives in Soil, Open Burn Unit at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Residential SSG (Feb 2012)	Coyote Test Field Super Group Background Values (surface soil)	Coyote Test Field Super Group Background Values (subsurface soil)	EPA Regional Screening Levels, Residential (Nov 2012)	LOQ	LOD	DL
SW8270C	1,1-biphenyl	92-52-4	µg/kg	57117	--	--	--	330	NA	165
SW8270C	1,2,4,5-tetrachlrorbenzene	95-94-3	µg/kg	18,331	--	--	--	(a)	(a)	(a)
SW8270C	2,4,5-Trichlorophenol	95-95-4	µg/kg	6,110,491	--	--	--	330	167	83
SW8270C	2,4,6-Trichlorophenol	88-06-2	µg/kg	61,105	--	--	--	330	167	84
SW8270C	2,4-Dichlorophenol	120-83-2	µg/kg	183,315	--	--	--	330	167	89
SW8270C	2,4-Dimethylphenol	105-67-9	µg/kg	1,222,098	--	--	--	500	167	167
SW8270C	2,4-Dinitrotoluene	121-14-2	µg/kg	15,689	--	--	--	330	167	89
SW8270C	2,6-Dichlorophenol*	87-65-0	µg/kg	--	--	--	--	500	167	165
SW8270C	2,6-Dinitrotoluene	606-20-2	µg/kg	61,105	--	--	--	330	167	99
SW8270C	2-Chloronaphthalene	91-58-7	µg/kg	6,257,143	--	--	--	330	167	81
SW8270C	2-Chlorophenol	95-57-8	µg/kg	391,071	--	--	--	330	167	88
SW8270C	2-Methylnaphthalene	91-57-6	µg/kg	--	--	--	230,000	330	167	85
SW8270C	2-Methylphenol	95-48-7	µg/kg	--	--	--	3,100,000	330	167	58
SW8270C	2-Nitroaniline	88-74-4	µg/kg	--	--	--	610,000	1600	167	84
SW8270C	2-Nitrophenol*	88-75-5	µg/kg	--	--	--	--	330	167	82
SW8270C	2,2-oxybis(1-chloropropane)*	52438-91-2	µg/kg	--	--	--	--	330	167	54
SW8270C	3,3'-Dichlorobenzidine	91-94-1	µg/kg	10,808	--	--	--	1600	167	94
SW8270C	3-Methylphenol & 4-Methylphenol	65794-96-9	µg/kg	--	--	--	3,100,000	1000	660	330
SW8270C	3-Nitroaniline*	99-09-2	µg/kg	--	--	--	--	1600	333	167
SW8270C	4,6-Dinitro-2-methylphenol	534-52-1	µg/kg	4,888	--	--	--	2000	333	81
SW8270C	4-Bromophenyl phenyl ether*	101-55-3	µg/kg	--	--	--	--	330	167	85
SW8270C	4-Chloro-3-methylphenol	59-50-7	µg/kg	--	--	--	6,100,000	330	167	92
SW8270C	4-Chloroaniline	106-47-8	µg/kg	--	--	--	2,400	330	167	58
SW8270C	4-Chlorophenyl phenyl ether*	7005-72-3	µg/kg	--	--	--	--	330	167	93
SW8270C	4-Nitroaniline	100-01-6	µg/kg	--	--	--	24,000	1600	167	88
SW8270C	4-Nitrophenol*	100-02-7	µg/kg	--	--	--	--	2000	333	280
SW8270C	Acenaphthene	83-32-9	µg/kg	3,440,510	--	--	--	330	167	83
SW8270C	Acenaphthylene*	208-96-8	µg/kg	--	--	--	--	330	167	85
SW8270C	Anthracene	120-12-7	µg/kg	17,202,560	--	--	--	330	167	86
SW8270C	Acetophenone	17537-31-4	µg/kg	7,821,428	--	--	--	(a)	(a)	(a)
SW8270C	Azobenzene (as 1,2 diphenyl hydrazine)	103-33-3	µg/kg	6079	--	--	610	330	167	92
SW8270C	Atrazine	93616-39-8	µg/kg	--	--	--	2,100	(a)	(a)	(a)
SW8270C	Benzaldehyde	100-52-7	µg/kg	--	--	--	7,800,000	(a)	(a)	(a)
SW8270C	Benz(a)anthracene	56-55-3	µg/kg	1,476	--	--	--	330	167	92
SW8270C	Benzo(a)pyrene	50-32-8	µg/kg	147	--	--	--	330	167	94
SW8270C	Benzo(b)fluoranthene	205-99-2	µg/kg	1,476	--	--	--	330	167	95
SW8270C	Benzo(ghi)perylene*	191-24-2	µg/kg	--	--	--	--	330	167	110
SW8270C	Benzo(k)fluoranthene	207-08-9	µg/kg	14,762	--	--	--	330	167	113
SW8270C	bis(2-Chloroethoxy)methane	111-91-1	µg/kg	--	--	--	180,000	330	167	88
SW8270C	bis(2-Chloroethyl) ether	111-44-4	µg/kg	6	--	--	--	330	167	81
SW8270C	bis(2-Ethylhexyl) phthalate	117-81-7	µg/kg	347,387	--	--	--	330	167	98
SW8270C	Butyl benzyl phthalate	85-68-7	µg/kg	--	--	--	260,000	330	167	95
SW8270C	Carbazole*	86-74-8	µg/kg	--	--	--	--	330	167	95
SW8270C	Caprolactam	105-60-2	µg/kg	--	--	--	31,000,000	(a)	(a)	(a)
SW8270C	Chrysene	218-01-9	µg/kg	148,629	--	--	--	330	167	84
SW8270C	Dibenz(a,h)anthracene	53-70-3	µg/kg	147	--	--	--	330	167	102
SW8270C	Dibenzofuran	132-64-9	µg/kg	--	--	--	78,000	330	167	86
SW8270C	Diethyl phthalate	84-66-2	µg/kg	48,883,929	--	--	--	330	167	90
SW8270C	Dimethyl phthalate	131-11-3	µg/kg	611,049,107	--	--	--	330	167	87
SW8270C	Di-n-butyl phthalate	84-74-2	µg/kg	6,110,491	--	--	--	330	167	97
SW8270C	Di-n-octyl phthalate*	117-84-0	µg/kg	--	--	--	--	330	167	97
SW8270C	Fluoranthene	206-44-0	µg/kg	2,293,674	--	--	--	330	167	95
SW8270C	Fluorene	86-73-7	µg/kg	2,293,674	--	--	--	330	167	92
SW8270C	Hexachlorobenzene	118-74-1	µg/kg	3,040	--	--	--	330	167	89
SW8270C	Hexachlorobutadiene	87-68-3	µg/kg	--	--	--	--	330	167	82
SW8270C	Hexachloroethane	67-72-1	µg/kg	42,773	--	--	--	330	167	81
SW8270C	Hexachlorocyclopentadiene	77-47-4	µg/kg	366,000	--	--	--	1600	250	62
SW8270C	Indeno(1,2,3-cd)pyrene	193-39-5	µg/kg	1,476	--	--	--	330	167	96
SW8270C	Isophorone	78-59-1	µg/kg	5,119,394	--	--	--	330	167	93
SW8270C	Naphthalene	91-20-3	µg/kg	42,976	--	--	--	330	167	82
SW8270C	Nitrobenzene	98-95-3	µg/kg	53,500	--	--	--	330	167	76
SW8270C	N-Nitrosodimethylamine	62-75-9	µg/kg	22.5	--	--	--	330	167	96
SW8270C	N-Nitrosodi-n-propylamine	621-64-7	µg/kg	--	--	--	69	330	167	84
SW8270C	N-Nitrosodiphenylamine	86-30-6	µg/kg	992,516	--	--	--	330	167	86
SW8270C	Pentachlorophenol	87-86-5	µg/kg	8,935	--	--	--	330	167	51
SW8270C	2,4,6-Tribromophenol		%	--	--	--	--	--	--	--
SW8270C	2-Flourophenol		%	--	--	--	--	--	--	--
SW8270C	Nitrobenzene-d5		%	--	--	--	--	--	--	--

Table H-3

Comparison of Reporting Levels to Screening Objectives in Soil, Open Burn Unit at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Residential SSG (Feb 2012)	Coyote Test Field Super Group Background Values (surface soil)	Coyote Test Field Super Group Background Values (subsurface soil)	EPA Regional Screening Levels, Residential (Nov 2012)	LOQ	LOD	DL
SW8290	2,3,7,8-TCDF*	51207-31-9	pg/g	449	--	--	--	1	0.15	EDL
SW8290	2,3,7,8-TCDD	1746-01-6	pg/g	44.9	--	--	--	1	0.15	EDL
SW8290	1,2,3,7,8-PeCDF*	57117-41-6	pg/g	--	--	--	--	5	0.75	EDL
SW8290	2,3,4,7,8-PeCDF*	57117-31-4	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,7,8-PeCDD*	40321-76-4	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,7,8-HxCDF*	70648-26-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,6,7,8-HxCDF*	57117-44-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	2,3,4,6,7,8-HxCDF*	60851-34-5	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,7,8,9-HxCDF*	72918-21-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,7,8-HxCDD*	39227-28-6	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,6,7,8-HxCDD*	57653-85-7	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,7,8,9-HxCDD*	19408-74-3	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,6,7,8-HpCDF*	67562-39-4	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,7,8,9-HpCDF*	55673-89-7	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,6,7,8-HpCDD*	35822-46-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	OCDF*	39001-02-0	pg/g	--	--	--	--	10	1.5	EDL
SW8290	OCDD*	3268-87-9	pg/g	--	--	--	--	10	1.5	EDL
SW8330B	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	mg/kg	3,911	--	--	--	0.25	0.05	0.012
SW8330B	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	mg/kg	58.2	--	--	--	0.25	0.05	0.012
SW8330B	1,3,5-Trinitrobenzene (1,3,5-TNB)	99-35-4	mg/kg	--	--	--	2,200,000	0.25	0.05	0.01
SW8330B	1,3-Dinitrobenzene (1,3-DNB)	99-65-0	mg/kg	--	--	--	6,100	0.25	0.05	0.0042
SW8330B	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	479-45-8	mg/kg	244	--	--	--	0.25	0.05	0.01
SW8330B	Nitrobenzene (NB)	98-95-3	mg/kg	53.5	--	--	--	0.25	0.05	0.0176
SW8330B	2,4,6-Trinitrotoluene (2,4,6-TNT)	118-96-7	mg/kg	39.1	--	--	--	0.25	0.05	0.0194
SW8330B	4-Amino-2,6-dinitrotoluene (4-Am-DNT)	19406-51-0	mg/kg	--	--	--	150,000	0.25	0.05	0.01
SW8330B	2-Amino-4,6-dinitrotoluene (2-Am-DNT)	35572-78-2	mg/kg	--	--	--	150,000	0.25	0.05	0.0125
SW8330B	2,4-Dinitrotoluene (2,4-DNT)	121-14-2	mg/kg	7.15	--	--	--	0.25	0.05	0.0053
SW8330B	2-Nitrotoluene (2-NT)	88-72-2	mg/kg	29.1	--	--	--	0.5	0.05	0.013
SW8330B	3-Nitrotoluene (3-NT)	99-08-1	mg/kg	7.8	--	--	--	0.25	0.05	0.0155
SW8330B	4-Nitrotoluene (4-NT)	99-99-0	mg/kg	244	--	--	--	0.25	0.05	0.0182
SW8330B	Nitroglycerin	55-63-0	mg/kg	6.11	--	--	--	0.5	0.25	0.015
SW8330B	PETN	78-11-5	mg/kg	--	--	--	120,000	0.5	0.25	0.025
SW8330B	3,4-Dinitrotoluene (Surrogate)	610-39-9	%	--	--	--	--	--	--	--

The laboratory does not analyze for these compounds. The compounds will be tentatively identified based on a computer library search of the sample chromotography. If found, the coumpound concentration will be reported as an estimated value.

The detection limit exceeds most stringent criteria.

Constituents with "%" units are surrogates and are not a part of the target analytes.

* Risk based screening levels will be calculated if analyte is detected and toxicological information is available

DL - Detection limit

LOD - Limit of detection

LOQ - Limit of quantitation

µg/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

pg/g - picograms per gram

RPD - relative percent difference

RSD - relative standard deviation for multi-incremental sample collection

SSG - soil screening goal

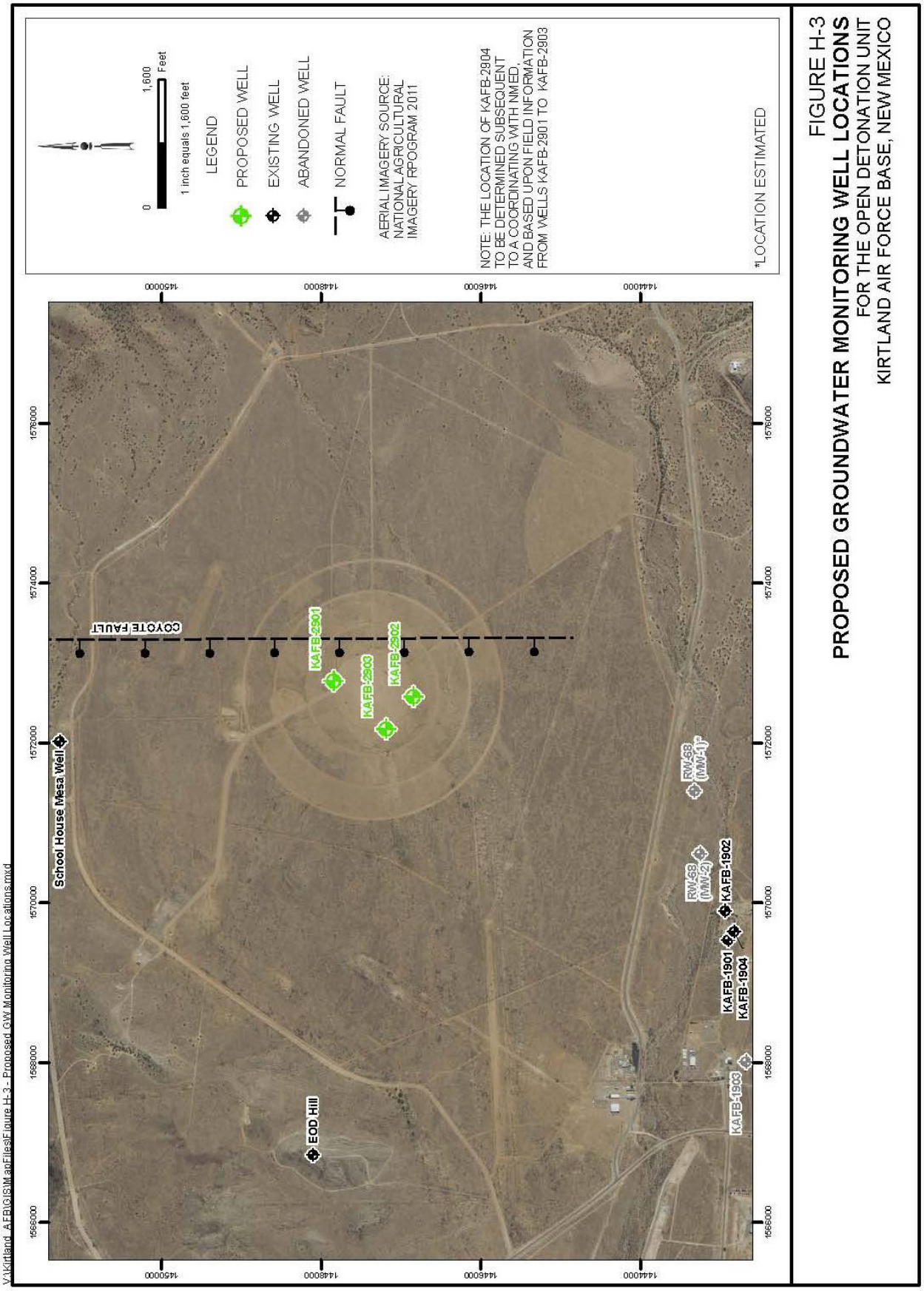

FIGURE H-3
PROPOSED GROUNDWATER MONITORING WELL LOCATIONS
FOR THE OPEN DETONATION UNIT
KIRTLAND AIR FORCE BASE, NEW MEXICO

2.1.1.1 Hydrogeologic Setting

The EOD Range is located within the Tijeras fault complex hydrogeologic region at Kirtland AFB (Sandia National Laboratories/New Mexico [SNL/NM], 2011a). The Sandia, Hubbel Springs, and Tijeras faults converge in this area and define eastern edge of the Albuquerque Basin. Within the Tijeras fault complex, a thin layer of alluvium covers bedrock. The hydrogeology in this area is poorly understood due to the complex geology created by the fault systems. On the eastern side of the Tijeras fault complex, the depth to groundwater ranges from about 45 to 325 ft bgs. Most of the monitoring wells in this area are completed in fractured bedrock at relatively shallow depths and produce modest yields of groundwater.

The nearest existing wells to the proposed monitoring well locations include the School House Well approximately 3,500 ft north-northwest of the OD unit; the EOD Hill Well approximately 4,300 ft west-northwest of the OD unit; three wells at Lake Christian (Kirtland AFB Solid Waste Management Unit [SWMU] 6-22), roughly 5,500 ft southeast of the OD unit; and three monitoring wells installed at the Old Burn Site (SNL SWMU 68), approximately 7,000 ft south of the OD unit. Nearby former monitoring well locations include two wells at the Radium Dump/Slag Piles (Kirtland AFB SWMU RW-68); approximately 4,500 ft south-southeast of the OD unit; and one well at Lake Christian (Kirtland AFB SWMU 6-22), roughly 5,500 ft southeast of the OD unit. The existing and former well locations are shown in Figure H-4.

All of the nearby wells are completed in water bearing zones of the Paleozoic sedimentary rocks of the Madera Group or Sandia Formation or the underlying Precambrian granite. The available borehole logs and well completion diagrams from the surrounding wells and former well locations indicate that the uppermost groundwater occurs under confined conditions.

The groundwater flow direction in the vicinity of the EOD Range is not well defined and is assumed to mirror the topographic gradient of the land surface. There are several north-south trending faults mapped along the Sandia/Manzanita/Manzano Mountain range front. In the vicinity of the OD unit, one normal fault crosses along the eastern edge of the EOD range, identified as the Coyote Fault in Figure H-4. This fault was encountered during drilling boreholes at the Old Burn Site (SNL SWMU 68), located south of the OD unit (SNL/NM, 2011b). This fault location is important to the OD unit investigation because it likely influences the groundwater flow across the site from east to west and may act as a hydraulic barrier. Comparison of water levels in the upgradient well and the downgradient wells shall provide data on the possible influence the fault has on local groundwater flow. The majority of the EOD Range is located west of the inferred location of the fault. The triangular configuration of the proposed downgradient monitoring wells and the measured groundwater elevations in the wells shall be used to calculate the groundwater flow direction and hydraulic gradient in the uppermost groundwater aquifer across the majority of the site.

The depth to the uppermost water bearing zones at the proposed well locations is expected to range from approximately 100 to 200 ft bgs. The horizontal groundwater flow velocity is estimated to be on the order of 50 to 100 ft/year. Based on a history of at least 40 or more years of activities in the EOD Range area, potential contaminant impacts in groundwater could be expected to have traveled roughly 2,000 to 4,000 ft downgradient based on those flow velocity estimates.

The three proposed well locations were selected in consultation with the Department (Figure H-3). One presumed upgradient and two presumed downgradient locations were selected for installation of the wells. Location of the fourth well shall be determined in consultation with the Department following installation of the three proposed wells based on gradient and flow direction.

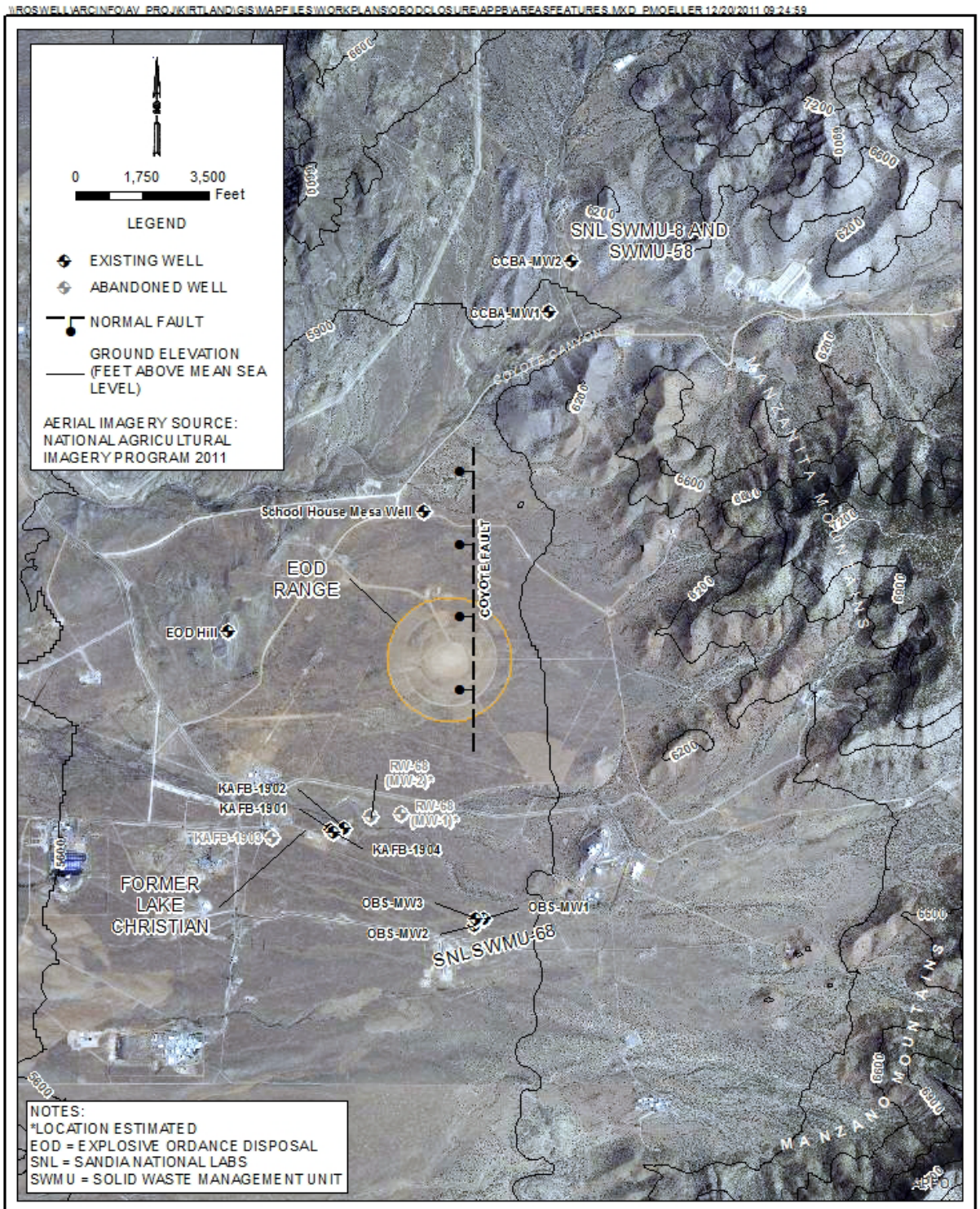

FIGURE H-4
AREA FEATURES AND WELL LOCATIONS
MONITORING WELL INSTALLATION WORK PLAN FOR THE OPEN BURN AND OPEN DETONATION UNITS
KIRTLAND AIR FORCE BASE, NEW MEXICO

2.1.1.2 Investigation Activities

Well installation activities shall be conducted in accordance with the *Kirtland Air Force Base, Base-Wide Plans for the Environmental Restoration Program*, *2004 Update* (USAF, 2004) and with the RCRA Permit. The procedures in Section 3.5 of the RCRA Permit, as well as procedures of the Base-Wide Plans, Standard Operating Procedure (SOP) B1.3: Monitoring Well Installation, shall be adhered to for this project, unless they are specifically modified by this closure plan.

2.1.1.3 Mobilization

The schedule of events for the investigation activities shall commence by drilling and installing three groundwater monitoring wells as shown in Figure H-3. Following well installations, the gradient and flow direction shall be established within the investigation area. The Permitee shall then meet with Department to determine the appropriate location of the fourth groundwater monitoring well. The fourth monitoring well, KAFB-2904, shall be installed and followed directly by the first groundwater monitoring event for the new wells. Quarterly groundwater monitoring shall be conducted according to this closure plan. At the conclusion of the investigation and four quarters of monitoring activities, the Permitee shall provide a report with recommendations based on the data collected from the first four quarters of monitoring.

An exploratory well application permit for each well shall be filed with the New Mexico Office of the State Engineer (NMOSE) in accordance with the Rules and Regulations Governing Well Driller Licensing; Construction, Repair and Plugging of Wells (NMOSE, 2005). The Bernalillo County well installation regulations are not applicable to wells installed on Kirtland AFB. All well locations shall be cleared by Unexploded Ordnance (UXO) support personnel prior to mobilization of drilling activities. An environmental impact analysis shall be performed through the Base Civil Engineering and Natural Resources Request (AF Form 813). A utility clearance of the area shall be performed using Base Civil Engineering Clearance Requests (AF IMT 103), Base Civil Engineer Work Requests (AF IMT 332), and New Mexico One Call services. A surface disturbance permit shall not be required because the total disturbed area of the wells is less than 1 acre.

2.1.1.4 Drilling Method and Sequence

The boreholes shall be installed using air-rotary casing hammer (ARCH) drilling method. This method has been successfully used for the installation of nearby monitoring wells and should facilitate lithologic description of drill cuttings and allow for the observation of soil/bedrock moisture content for identification of groundwater zones. The ARCH drilling method shall be used to advance the boring through the vadose zone and anchor the drive casing in the underlying bedrock.

The specific depths shall be determined in the field based on site conditions such as lithology and presence of groundwater. The following sequence of drilling is anticipated based on known hydrogeologic conditions and drill method capabilities:

1. Initiate boring with the ARCH method using an 8½-inch tri-cone bit and 9-5/8-inch diameter drive casing. Advance the drive casing to the depth of the contact between the alluvium and underlying bedrock.
2. Set the drive casing in the bedrock and continue drilling the borehole using an open hole drilling technique. If dense bedrock conditions are encountered in the boring, a change from a tri-cone bit to a down hole hammer bit may be required.

3. Advance the boring into the uppermost water bearing unit. Complete the borehole approximately 25 ft into the water bearing unit.

During the ARCH drilling activities, the field staff shall monitor for the presence of groundwater by visually inspecting drill cuttings for moisture. If the cuttings become wet, the borehole shall be allowed to sit idle for approximately one hour. A water level probe shall then be lowered into the borehole to assess whether groundwater has accumulated and this information shall be documented on the field log.

Field screening of the soil cuttings for the presence of volatile organic compounds (VOCs) shall be conducted during the drilling process using a portable photo ionization detector (PID) as described in Base-Wide Plans, Appendix B, SOP B3.1: Photo-ionization Detectors and Organic Vapor Analyzers (USAF, 2004). As the boreholes are advanced, the field geologist shall continuously collect soil cuttings to aid in the preparation of lithologic logs. The monitoring well lithologic log shall be completed as described in Base-Wide Plans, Appendix B SOP B1.1: Borehole and Sample Logging. Drill cuttings from ARCH method drilling shall be stored at the well site on plastic sheeting or in roll-off containers and managed as investigation-derived waste (IDW).

Groundwater purged from the boring during borehole advancement and sampling shall be allowed to settle in roll-off bins then transferred to holding tank(s). These plastic holding tanks shall be managed as IDW along with decontamination and well development fluids.

Decontamination of the drill rig, drill tools, sampling equipment, and associated equipment shall be accomplished by steam cleaning prior to drilling each well. Decontamination activities shall be conducted at a central location with water obtained from an approved onsite source. Decontamination fluids shall be contained in polyethylene tanks and managed as IDW.

2.1.1.5 Subsurface Soil Sampling

Soil and rock sampling shall be performed for lithologic description. Subsurface soil laboratory analysis is not proposed as part of this investigation. No soil or rock samples shall be submitted for laboratory analysis.

2.1.1.6 Monitoring Well Construction

Monitoring wells shall be designed and constructed based on the lithology and groundwater elevations encountered at each proposed well location. The well construction details may be subject to change based on the observed field conditions, but procedures and methods shall comply with Section 3.5 of the RCRA Permit and the OSE criteria. The anticipated well constructions details are shown in Figure H-5. The proposed monitoring well design includes the use of 4-inch-inside diameter (ID), Schedule 80 polyvinyl chloride (PVC) casing with a 5-ft well sump, 20-ft of 0.020-inch slot size well screen, and approximately 2 to 3 ft of stickup at the surface. Centralizers shall be used to stabilize the well casing within the borehole at the top and bottom of the screen interval and at a minimum spacing of 40 ft on casing above the top of the well screen.

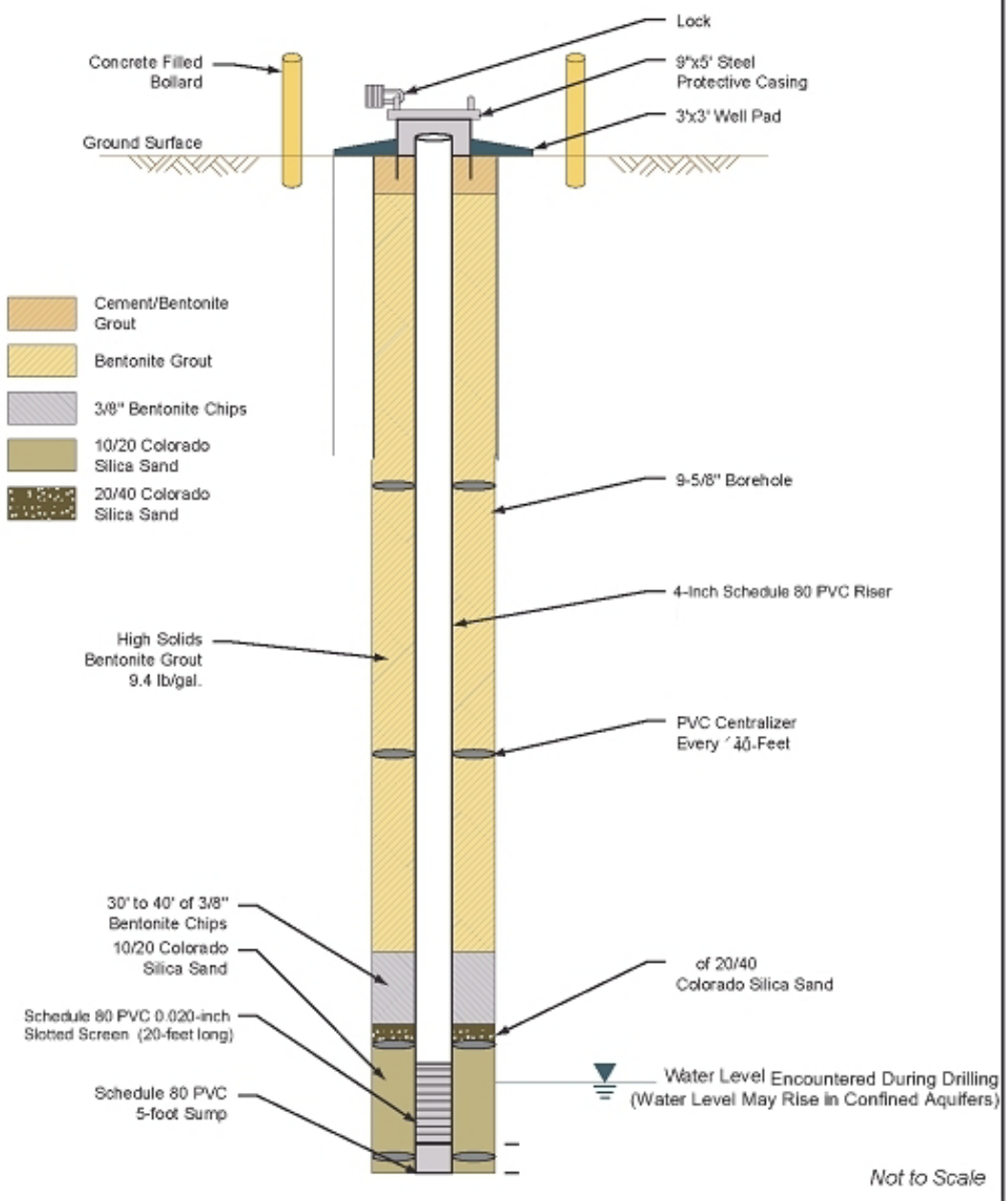

FIGURE H-5
PROPOSED MONITORING WELL DESIGN
MONITORING WELL INSTALLATION WORK PLAN
FOR THE OPEN BURN AND OPEN DETONATION UNITS
KIRTLAND AIR FORCE BASE, NEW MEXICO

Wells shall be completed as follows:

- The sand filter pack type shall be determined based on field observations and shall extend from the bottom of the silt trap to 5 ft above the top of the screen. However, it is anticipated that a filter pack of 10-20 gradation Colorado Silica Sand shall be used in the construction of the monitoring wells. The filter pack sand shall be placed through a tremie pipe. Approximately 2 ft of barrier sand, 100 percent passing an American Society for Testing and Materials (ASTM) U.S. Standard Sieve No. 60, shall be placed above the filter pack to inhibit flow of grout into the filter pack.

- A minimum of 10 ft of bentonite chips or pellets shall be installed above the filter pack through a tremie pipe. The seal shall be hydrated with clean potable water in 6-inch lifts. Setup time for the bentonite shall be at the discretion of the field geologist.

- The annular space above the hydrated bentonite seal shall be backfilled with bentonite slurry. Bentonite slurries are effective in sealing off groundwater units above the screened and sand-packed intervals of a well and are less likely to damage the well casing than bentonite-cement grout. The bentonite slurry shall be installed through a tremie pipe. The bentonite slurry shall extend from the bentonite pellet seal to approximately 50 ft bgs.

- The remaining 50 ft of annular space shall be filled with bentonite-cement grout consisting of 94 pounds of Portland cement, 3 percent by weight sodium bentonite powder, and 7 gallons of contaminant-free water. The bentonite-cement grout shall be placed using a grout pump and tremie pipe to within 5 ft of the land surface. The grout shall be allowed to set for at least 24 hours before well development begins.

- The monitoring wells shall be completed at the surface in accordance with specifications as presented in SOP B1.3 of the *Base-Wide Plans, Field Sampling Plan* (FSP) (USAF, 2004). The surface completion shall consist of a 5-foot-long, 9-inch-diameter steel stand pipe with locking cap cemented into a 3-foot-square concrete well pad. Four concrete-filled steel bollards shall be installed at the corners of the well pad to protect the well from vehicle damage.

- At the conclusion of the project, when wells KAFB-2901, KAFB-2902, KAFB-2903, and KAFB-2904 are no longer needed, the wells shall be properly abandoned in compliance with *Rules and Regulations Governing Well Driller Licensing; Construction, Repair and Plugging of Wells* (NMOSE, 2005).

2.1.1.7 Well Development

Monitoring wells shall be developed using a variety of techniques including swabbing, surging, bailing, air lifting and pumping. Monitoring well development shall adhere to procedures outlined in Base-Wide Plans, Appendix B, SOP B1.4: Monitoring Well Development (USAF, 2004). Monitoring well development shall be performed within one week after well installation but no sooner than 24 hours after grout installation. Groundwater discharged from the wells shall be monitored for pH, temperature, specific conductance, dissolved oxygen, oxidation-reduction (redox) potential, and turbidity. Each monitoring well screen shall be developed until pH and specific conductance stabilize and the water appears substantially free of sediment. The development goal is to reduce the turbidity to less than 10 nephelometric turbidity units (NTUs) and a less than 10 percent variance in the other parameters observed in the final three readings.

However, a final turbidity of less than 100 NTUs is acceptable. If the field parameters have not stabilized after 4 hours of continuous pumping, the well shall be allowed to sit overnight and development shall continue the following day for a maximum of 2 hours. If the turbidity still does not fall below 100 NTUs, the Permitee shall seek further direction from the Department.

Proposed monitoring wells KAFB-2901, KAFB-2902, and KAFB-2903 shall be developed and surveyed subsequent to installation. A static groundwater elevation from each surveyed and developed well shall be measured and used to determine the groundwater gradient and flow direction across the OD unit area. This information shall be used to determine the location and design of KAFB-2904.

2.1.1.8 Well Survey

A New Mexico licensed professional surveyor shall survey the horizontal well locations relative to New Mexico State Plane Coordinates and the vertical elevations to the nearest one-hundredth of 1 ft for the newly installed monitoring wells. Surveying shall be conducted in accordance with SOP B1.9 of the Base-Wide Plans FSP (USAF, 2004).

2.1.1.9 Groundwater Gradient Calculations

Depth to water measurements for static conditions shall be collected from monitoring wells KAFB-2901, KAFB-2902, and KAFB-2903 subsequent to well development. These measurements shall be converted to groundwater elevation data using well survey data. These elevations shall be mapped, and gradients shall be calculated perpendicular to the equipotential groundwater contours. The direction and magnitude of groundwater gradients shall provide information that shall be used to propose optimum locations for monitoring well KAFB-2904. The permitee shall consult with the Department to determine the final location of KAFB-2904. Groundwater elevations may also be collected from comparable aquifer units from nearby monitoring wells. The previously installed wells surrounding the investigation area include KAFB-1901, KAFB-1902, KAFB-1904, EOD Hill Well, and School House Mesa Well.

2.1.2 Groundwater Sampling and Analysis Plan

Groundwater monitoring shall be performed subsequent to well development at a quarterly frequency for up to eight quarters. Groundwater elevations shall be measured in each well prior to sampling. Groundwater elevations shall be used to determine groundwater flow rate and gradient on a quarterly basis. Well purging methods shall comply with the RCRA Permit Section 6.5.17.4 and groundwater samples shall be analyzed for VOCs, semivolatile organic compounds (SVOCs), explosives, perchlorate, white phosphorus, target analyte list metals, dioxins, and furans, total dissolved solids, alkalinity, anions, cations, and total organic carbon (Table H-4). Data shall be of sufficient precision and quality to meet data quality objectives and to ensure that method detection limits are less than cleanup levels where technologically feasible.

Up to eight consecutive quarters of groundwater monitoring are currently planned at the four monitoring wells. If groundwater contamination from the operation of the OD unit is not detected in the monitoring wells, they shall be properly plugged and abandoned in accordance with NMOSE regulations and Department guidance. If groundwater contamination from the operation of the OD unit is identified, the monitoring wells shall be maintained for the purpose of monitoring corrective action.

Table H-4
Groundwater Monitoring Parameters and Testing Methods for the Groundwater Investigation of the OD Unit

Analysis	Method	Testing Location	Data Use
Groundwater elevation	Groundwater probe	Field	Groundwater flow direction
pH	pH probe	Field, flow-through cell	General groundwater parameter
Temperature	Digitalthermometer	Field, flow-through cell	General groundwater parameter
Specific conductance	Conductivity meter	Field, flow-through cell	General groundwater parameter
Dissolved oxygen	Dissolved oxygen probe	Field, flow-through cell	Assess aerobic or anaerobic conditions
Oxidation-reduction potential	EH (hydrogen electrode) meter	Field, flow-through cell	Assess conditions for natural attenuation of contaminants
Turbidity	Turbidity meter	Field, flow-through cell	General groundwater parameter
Total dissolved solids	EPA 160.2[a]	Laboratory	General groundwater parameter
Alkalinity	EPA 310.2[a]	Laboratory	General groundwater parameter
Ammonia	EPA350.1[a]	Laboratory	General groundwater parameter
Sulfide	SW9030B[b]	Laboratory	General groundwater parameter
Anions (sulfate, nitrate, nitrite, chloride, bromide and fluoride)	SW9056[b]	Laboratory	General groundwater parameter
Total organic carbon	SW9060[b]	Laboratory	General groundwater parameter
Metals (barium, boron, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, lithium, magnesium, manganese, molybdenum, nickel, potassium, selenium, silver, sodium, strontium, tin, vanadium, zinc, antimony, arsenic, thallium, mercury)	SW6010B[b], SW6020A[b], SW7470A[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Perchlorate	SW6850[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Volatile organic compounds	SW8260B[b], SW8011[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Semivolatile organic compounds	SW8270C[b], SW8270-SIM[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Dioxins and furans	SW8290[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Explosives	SW8330B[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
White phosphorous	SW7580[b]	Laboratory	Assess potential contamination from OB/OD Unit operations

[a] EPA, 1993.
[b] EPA, 1996.
EPA – U.S. Environmental Protection Agency
OB/OD – Open Burn/Open Detonation

2.1.2.1 Well Purging and Field Measurements

Each monitoring well shall be purged by removing groundwater prior to sampling in order to ensure that fresh formation water is sampled. One to three well-bore volumes shall be purged from each well prior to sampling. A well-bore volume is defined as the volume of water in the saturated filter pack plus the volume of all standing water within the well screen and casing. Purge water shall be contained in polyethylene tanks for subsequent characterization and management as IDW. The following groundwater field parameters shall be measured during well purging: pH, specific conductance, dissolved oxygen concentration, turbidity, redox potential, and temperature. The volume of groundwater purged, the field parameter readings obtained at each time interval, and the instruments used to measure the field parameters shall be recorded on the field monitoring log. Water samples shall be obtained from a well only after the measured values of purge water field parameters have stabilized to within 10 percent for three consecutive measurements or once three well-bore volumes have been purged from the well.

Groundwater samples shall be collected using a pneumatic pump, a submersible electronic pump, or a bailer within eight hours of the completion of well purging. Groundwater in monitoring wells with low recharge rates and that purge dry shall be sampled when the water level in the well has recovered sufficiently to collect the required sample volume. Sampling handling, preservation, and storage shall comply with the RCRA permit requirements of Table H-5.

2.1.2.2 Laboratory Analysis and Quality Control/Quality Assurance Procedures

Groundwater samples shall be collected from each monitoring well and analyzed for VOCs, SVOCs, explosives, perchlorate, white phosphorus, target analyte list metals, dioxins, and furans, total dissolved solids, alkalinity, anions, cations, and total organic carbon (Table H-4). The proposed suite of parameters and analyses for the groundwater samples is presented in Table H-2. The contacted laboratory must meet DoD certification requirements. To ensure that data is of sufficient precision, laboratory method detection limits shall be those shown in the approved OD Unit Closure Plan. To ensure that analytical data is of sufficient quality and that laboratory and field methods are assured of proper quality field quality control samples shall be collected in compliance with the approved OD Unit Closure Plan. Level 4 laboratory data shall be requested and validated by qualified chemists to meet criteria specified by the Department and the DoD.

Data reliability shall be ensured by documenting sample management so that analyses are traceable to specific areas of potential contamination and by following a quality assurance/quality control (QA/QC) program that mandates documentation of the precision and accuracy of laboratory analyses, as well as data representativeness, completeness, comparability, and sensitivity.

The QC samples to be collected include: field duplicate samples, trip blanks, and rinsate blanks. Sample designations shall follow the guidelines as outlined in Section 4.2.1 of the Base-Wide Plans, FSP (USAF, 2004). The well identification numbers assigned to the four new wells for this investigation are: KAFB-2901, KAFB-2902, KAFB-2903, and KAFB-2904. The proposed sample number scheme is presented in Table H-6.

Table H-5
Sample Containers, Preservation Techniques, and Holding Times for Soil and Groundwater Samples

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers	Preservation Requirements	Maximum Holding Time
Soil	Metals (including mercury)	SW6010B/ SW6020 and SW7471A	1 gram	250-ml glass or polyethylene	4±2 degrees Celsius (ºC)	180 days from date of collection for metals; 28 days from collection to analysis for mercury
Soil	Volatile Organic Compounds (VOCs)	SW8260B/ SW5035	3 different 5-gram aliquots	6 40-milliliters (ml) volatile organic analysis (VOA) vials	Per sample collection: 2 VOA vials with 10-ml water and 1 VOA vial with 10-ml methanol. All vials contain a stir bar. Or 3 VOA vials containing stir bars will have a 5-gram sample aliquot added, seals and frozen on site with dry ice. Samples must remain frozen in shipment and storage at the lab until analysis.	Freeze within 48 hours of arrival at the lab, analyze within 14 days from data of collection Analyze within 14 days from data of collection
Soil	Semivolatile Organic Compounds (SVOCs)	SW8270C	30 grams	250-ml glass	4±2ºC	14 days from date of collection to extraction and 40 days from extraction to analysis
Soil	Perchlorate	SW6850	30 grams	250-ml glass	4±2ºC	28days
Soil	Explosives	SW8330B	10 grams	250-ml glass	4±2ºC	14 days from date of collection to extraction and 40 days from extraction to analysis
Soil	White Phosphorous	SW7580	40 grams	250-ml glass	4±2ºC	30 days from date of collection to extraction and analysis
Soil	Dioxins/ Furans	SW8290	30 grams	250-ml glass	4±2ºC	30 days from date of collection to extraction and 45 days from extraction to analysis
Groundwater	Dissolved metals (including mercury)	SW6010B/ 6020 and SW7470A	100-ml	1-liter polyethylene	pH < 2 with nitric acid; 4±2ºC	28 days from date of collection for Hg, 180 days for others
Groundwater	VOCs	SW8260B	3 40-ml vials	3 40-ml VOA vials	No headspace; 4±2ºC	7 days from data of collection
Groundwater	SVOCs	SW8270C	1 liter	2 1-liter amber glass	4±2ºC	7 days from date of collection to extraction and 40 days from extraction to analysis
Groundwater	Explosives	SW8330B	1 liter	2 1-liter amber glass	4±2ºC	7 days from date of collection to extraction and 40 days from extraction to analysis

Table H-5
Sample Containers, Preservation Techniques, and Holding Times for Soil and Groundwater Samples

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers	Preservation Requirements	Maximum Holding Time
Groundwater	Perchlorate	SW6850	1 liter	1- 250mL precleaned sterile, plastic containers	Field filtered with 1/3 volume headspace to remove and/or minimize microbial and anaerobic bacteria. Store at 4 ± 2 C	28 days
Groundwater	White Phosphorous	SW7580	120 ml	1-liter amber glass	4±2ºC	5 days from date of collection to extraction and analysis
Groundwater	Dioxins/ Furans	SW8290	1 liter	2 1-liter amber glass	4±2ºC	30 days from date of collection to extraction and 45 days from extraction to analysis
Groundwater	Anions (sulfate, nitrate, nitrite, chloride, bromide and fluoride)	SW9056	100-ml	1-liter polyethylene	4±2ºC	28 days from date of collection for all anions except that nitrate and nitrite are 48 hours
Groundwater	Ammonia	E350.1	100-ml	250 ml Poly	4°C pH < 2 with H2SO4	28days
Groundwater	Alkalinity	EPA 310.2	100-ml	250 ml Poly	4°C (share with SW9056)	14 days
Groundwater	Total Organic Carbon	SW9060	100-ml	1-liter polyethylene	4°C pH < 2 with HCL	28 days
Groundwater	Sulfide	SW9030B	500-ml	1-liter polyethylene	4°C Zn acetate NaOH to pH > 9	7 days
Groundwater	Total dissolved solids	EPA 160.2	100-ml	250 ml Poly	4°C	7 days

^{0}C – degrees Celsius
H2SO4 – glycine, sulfate
HCL – hydrochloric acid
mL – milliliters
NaOH – sodium hydroxide
pH – potential of hydrogen
SVOC – Semivolatile organic compound
VOA – volatile organic analysis
VOC – volatile organic compound
Zn – zinc

Table H-6
Proposed Groundwater Sample Identification for the Groundwater Investigation of the OD Unit

Sample Identifier[a]	Sample Type
OT29-GW-2901-_____	Normal
OT29-GW-2902-_____	Normal
OT29-GW-2903-_____	Normal
OT29-GW-2904-_____	Normal
OT29-FD-2901-_____	Duplicate
OT29-EB-2902-_____	Rinsate Blank
OT29-TB-2903-_____	Trip Blank[b]
OT29-MS-2904-_____	Matrix Spike
OT29-MSD-2904-_____	Matrix Spike Duplicate

[a] The six digit sample date shall make up the last portion of the sample identification number
[b] Trip Blanks shall only be analyzed for VOCs

2.1.2.3 Groundwater Data Analysis

Groundwater laboratory analytical results shall be analyzed to determine if there is statistically significant evidence of contamination at each groundwater monitoring well after each sampling event. The groundwater results shall be analyzed by comparison to baseline constituent concentrations and applicable groundwater standards.

Baseline constituent concentrations for the aquifer shall be calculated using laboratory analytical results for groundwater monitoring well KAFB-2901 and other groundwater monitoring wells completed within the same aquifer unit and located nearby. Groundwater monitoring wells that could potentially be used in the baseline constituent concentration calculations include KAFB-1902, KAFB-1903, KAFB-1904, RW68-01, RW68-02, and groundwater monitoring wells sampled by Sandia National Laboratory/New Mexico. Analysis to determine which of the groundwater monitoring wells are completed within the same aquifer unit shall be completed following installation of monitoring well KAFB-2901.

Baseline constituent concentrations shall be calculated for detected naturally occurring compounds including ammonia, sulfide, anions, metals, and perchlorate as listed in Table H-4. Anthropogenic compounds, including VOCs, SVOCs, explosives, dioxins and furans, are assumed to occur at levels less than detection limits. Baseline concentrations shall not be calculated for the anthropogenic compounds.

Baseline constituent concentrations shall be established by calculating a 95 percent upper tolerance limit (UTL) for each of the detected constituents listed above. The 95 percent UTLs shall be calculated following the methodology established as part of the Kirtland AFB Long-Term Monitoring Program (USAF, 2007). The purpose of the UTL approach is to define a constituent concentration from background well data, below which 95 percent of the monitoring well observations fall with a high degree of probability. Once the UTL is determined based on the background monitoring wells, data from downgradient site wells can be compared for evidence of a release by evaluating how the downgradient well results compare to the UTL. If the downgradient well results are greater than the UTL, there is statistical evidence that there has been an increase in the downgradient concentration of the constituent in groundwater. A detailed

description of the process to determine baseline concentrations can be found in the *Long-Term Groundwater Monitoring Summary and Baseline Determination Report, Fiscal Year 2005* (USAF, 2007).

2.1.2.4 Reporting

One well completion report shall be prepared to document the drilling and well installation activities. No laboratory analytical data shall be presented in the well completion report. The well completion report shall be submitted to the Department for approval within 30 days of the completion of well installation activities. The well installation report shall include the following information:

- Descriptions of the field program including the drilling, well installation, surveying, and IDW management activities;

- Field documentation including soil boring logs, well construction diagrams, well development logs, and survey data.

Field and laboratory data shall be submitted to the Department within 90 days after all samples are collected for each quarter.

Periodic groundwater monitoring reports shall be prepared to document quarterly groundwater monitoring results. All validated groundwater laboratory results shall be presented in periodic groundwater monitoring reports which comply with Section 6.2.4.4 of the RCRA Permit. Groundwater analytical results shall be compared to New Mexico water quality control standards and EPA maximum contaminant levels and secondary screening levels to determine if contamination above standards is present in the groundwater monitoring wells. Each quarter of analytical data shall be evaluated for the presence of potential contaminants. The Periodic Groundwater Monitoring Reports for the OD unit shall be prepared annually and following four quarters of groundwater monitoring and submitted within 90 days after the completion of the last quarterly monitoring event. Currently, up to eight consecutive quarters of groundwater monitoring and two Periodic Groundwater Monitoring Reports are planned.

2.1.2.5 Project Schedule

Table H-7 outlines the project schedule for the installation and sampling of groundwater monitoring wells. The monitoring well drilling and installation activities shall be conducted upon approval of the OD Unit Closure Plan. The well installation activities shall be documented in a Well Completion Report. Final validated groundwater analytical results from four quarters of groundwater sampling shall be reported in an Annual Groundwater Monitoring Report for the OD unit.

Table H-7
Proposed Schedule of Activities for Groundwater Monitoring Well Installation for the Closure of the OD Unit

Activity	Duration (calendar days)	Start Date
Field Investigation		
Mobilize drilling equipment	3	15 days following Closure Plan approval
Well installation, development, and surveying collection of IDW soil and water samples	28	Following mobilization
IDW characterization and disposal	45	Following well installation
Preparation of Well Completion Report		
Initiate Well Completion Report Preparation	30	Upon completion of all well drilling, development, and surveying activities
Submit Well Completion Report to USACE, USAF, and the Department	1	30 days following well installation
Quarterly Groundwater Monitoring and Periodic Reporting		
Conduct quarterly groundwater monitoring	3	Following installation of four groundwater monitoring wells and on a quarterly basis
Submit field and laboratory data from monitoring event	1	90 days following collection of groundwater samples on a quarterly basis
Prepare Periodic Groundwater Monitoring Report	90	Following collection of four quarters of groundwater samples
Submit Periodic Groundwater Monitoring Report to the Department	1	90 days following collection of fourth quarter groundwater samples
IDW – investigation-derived waste USACE – United States Army Corps of Engineers USAF – United States Air Force		

2.1.3 Mesa Schoolhouse Well

The Mesa Schoolhouse Well, a Department of Energy/National Nuclear Surety Administration (DOE/NNSA) well authorized under Kirtland AFB permit #PERM/0-K1-91-0010 was monitored for groundwater contamination as part of the December 1994 OD Unit's sampling and analysis plan. This sampling has been discontinued and the wellhead is secure. The well shall remain in place for possible future monitoring by DOE/NNSA

2.2 Sampling, Decontamination Procedures, and PPE

This section describes procedures and methods for soil and liquid sampling applicable to closure activities. While the procedures and methods are specific, other applicable procedures or methods given in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA, 1996; SW-846) may be used if conditions or experience show the alternate method to be more appropriate, and if approved by the Department. All sampling procedures actually used shall be annotated in the final closure report. Sampling shall be conducted in accordance with procedures given in "Samplers and Sampling Procedures for Hazardous Waste Streams" (EPA, 1980; EPA 600/2-80-018) or SW-846, as appropriate.

Surface and subsurface soil at the OD Unit shall be characterized by sampling and analysis.

The tools and equipment used during the sampling shall be vacuumed, cleaned with detergent and water, and scraped as necessary to remove any residue. The wash water shall be collected and

analyzed for characterization of waste. The vacuums used and their contents shall be containerized and shipped off site as hazardous waste for disposal.

All of the PPE worn by personnel performing closure activities shall be disposable; therefore, all PPE shall be placed into containers and managed as hazardous waste. This waste shall be considered to be contaminated with all of the hazardous waste constituents contained in the wastes that have been treated at the OB Unit and the OD Unit. All contained PPE wastes shall be transported to a permitted facility for disposal.

2.2.1 Soil Sampling

Soil samples shall be collected on a 25-ft by 25-ft grid spacing from the surface to 15 ft below ground surface at five ft intervals (total of four samples per location). At a minimum, the grid shall encompass all portions of the OD Unit that have hosted or may have hosted a pit used for the treatment of hazardous waste (Figure H-6).

Surface soil samples shall be collected approximately 25 ft from the OB Unit. Three samples shall be collected from each side of the OB for a total of 12 surface soil samples. These samples shall characterize potential contamination from the OB Unit that may have migrated onto the OD Unit.

The soil samples shall be analyzed for the parameters listed in Table H-3 which include all hazardous constituents of the hazardous wastes that were detonated at the OD Unit. Proposed sample identification numbers are shown in Table H-8.

Surface soil samples (zero to six inches depth) shall be collected with a wooden or Teflon™ trowel or scoop. Disposable sampling tools shall be used. In the event that the Department requests split samples, sufficient soils shall be collected to provide split samples to the Department representatives.

A Veihmeyer soil sampler, auger drill, direct push technology or other appropriate method shall be used to collect subsurface soil samples. Only discrete grab samples shall be collected; no samples shall be composited.

Clean sampling equipment shall be used to collect each sample. Unused, disposable sampling equipment may be presumed clean if still in a factory-sealed wrapper prior to use. Reusable sampling equipment shall be decontaminated after each use by scraping to remove any loose material, washing with a detergent and water solution, rinsing several times with tap water, rinsing with deionized water, and drained of excess water, and air-dried or wiped dry.

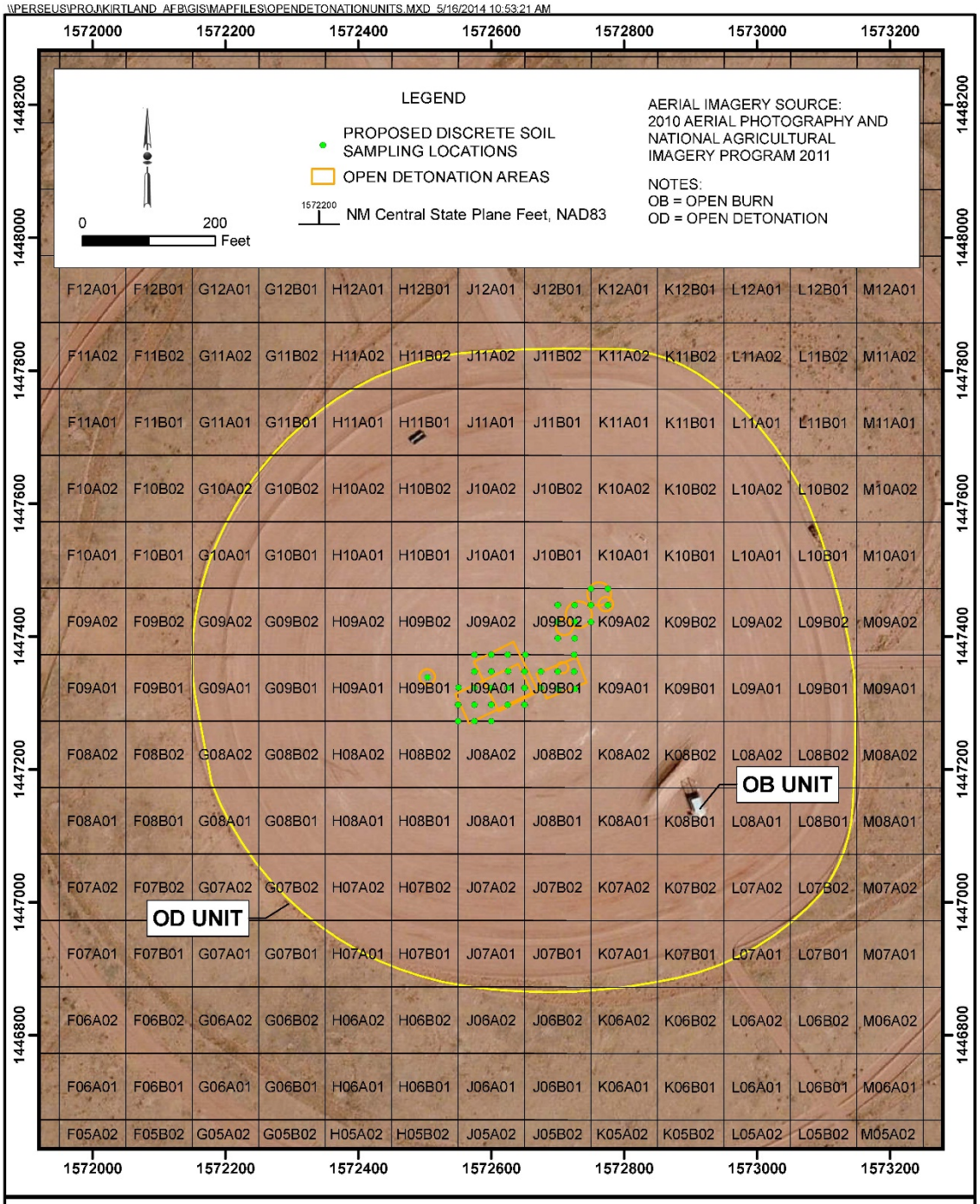

FIGURE H-6
PROPOSED DISCRETE SOIL SAMPLING LOCATIONS
OPEN DETONATION CLOSURE PLAN
KIRTLAND AIR FORCE BASE, NEW MEXICO

Table H-8
Proposed Discrete Soil Samples for the Open Detonation Unit, Kirtland Air Force Base, New Mexico

Soil Boring	Sample Identification	Depth (feet below ground surface)	Sample Type	**Metals** Methods SW-846 6010B, 6020A, 7471B	**VOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8260B	**SVOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8270C	**Total Explosives** (Per Table D-4 of RCRA Permit) Method SW-846 8330B	**Perchlorate** Method SW-846 6850	**White Phosphorous** Method SW-846 7580	**Dioxins** Method SW-846 8290
H09B1-01	OT29-SO-H09B1-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-H09B01-01-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-H09B01-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-H09B01-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-H09B01-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-01	OT29-SO-J09A1-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-02	OT29-SO-J09A1-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-03	OT29-SO-J09A1-03-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-03-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-03-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-03-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-03-1415	14 - 15	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-03-1415MS	14 - 15	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09A1-03-1415MSD	14 - 15	MS/MSD	X	X	X	X	X	X	X
J09A1-04	OT29-SO-J09A1-04-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-04-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-04-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-04-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-05	OT29-SO-J09A1-05-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09A1-05-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09A1-05-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-05-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-05-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-06	OT29-SO-J09A1-06-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-06-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-06-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-06-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-07	OT29-SO-J09A1-07-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-07-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-07-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-07-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-07-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-08	OT29-SO-J09A1-08-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-08-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-08-0405MS	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09A1-08-0405MSD	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09A1-08-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-08-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-09	OT29-SO-J09A1-09-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-09-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-09-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-09-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-10	OT29-SO-J09A1-10-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-10-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-10-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-10-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-11	OT29-SO-J09A1-11-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09A1-11-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09A1-11-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-11-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-11-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-12	OT29-SO-J09A1-12-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-12-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-12-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-12-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-13	OT29-SO-J09A1-13-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-13-0001MS	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09A1-13-0001MSD	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09A1-13-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-13-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-13-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-13-1415	14 - 15	Normal	X	X	X	X	X	X	X

Table H-8
Proposed Discrete Soil Samples for the Open Detonation Unit, Kirtland Air Force Base, New Mexico

Soil Boring	Sample Identification	Depth (feet below ground surface)	Sample Type	**Metals** Methods SW-846 6010B, 6020A, 7471B	**VOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8260B	**SVOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8270C	**Total Explosives** (Per Table D-4 of RCRA Permit) Method SW-846 8330B	**Perchlorate** Method SW-846 6850	**White Phosphorous** Method SW-846 7580	**Dioxins** Method SW-846 8290
J09A1-14	OT29-SO-J09A1-14-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-14-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-14-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-14-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-15	OT29-SO-J09A1-15-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09A1-15-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09A1-15-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-15-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-15-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-16	OT29-SO-J09A1-16-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-16-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-16-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-16-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-17	OT29-SO-J09A1-17-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-17-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-17-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-17-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-17-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-18	OT29-SO-J09A1-18-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-18-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-18-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-18-0910MS	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09A1-18-0910MSD	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09A1-18-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-19	OT29-SO-J09A1-19-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-19-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-19-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-19-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-20	OT29-SO-J09A1-20-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-20-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-20-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-20-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-20-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-21	OT29-SO-J09A1-21-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-21-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-21-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-21-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-01	OT29-SO-J09B1-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B1-01-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B1-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-02	OT29-SO-J09B1-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-03	OT29-SO-J09B1-03-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-03-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09B1-03-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09B1-03-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-03-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-04	OT29-SO-J09B1-04-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-04-0001MS	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09B1-04-0001MSD	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09B1-04-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-04-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-04-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-05	OT29-SO-J09B1-05-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-05-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-05-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-05-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-06	OT29-SO-J09B1-06-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-06-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09B1-06-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09B1-06-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-06-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-07	OT29-SO-J09B1-07-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-07-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-07-0405MS	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09B1-07-0405MSD	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09B1-07-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-07-1415	14 - 15	Normal	X	X	X	X	X	X	X

Table H-8
Proposed Discrete Soil Samples for the Open Detonation Unit, Kirtland Air Force Base, New Mexico

Soil Boring	Sample Identification	Depth (feet below ground surface)	Sample Type	**Metals** Methods SW-846 6010B, 6020A, 7471B	**VOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8260B	**SVOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8270C	**Total Explosives** (Per Table D-4 of RCRA Permit) Method SW-846 8330B	**Perchlorate** Method SW-846 6850	**White Phosphorous** Method SW-846 7580	**Dioxins** Method SW-846 8290
J09B2-01	OT29-SO-J09B2-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-02	OT29-SO-J09B2-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B2-02-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B2-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-03	OT29-SO-J09B2-03-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-03-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-03-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-03-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-04	OT29-SO-J09B2-04-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B2-04-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B2-04-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-04-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-04-1415	14 - 15	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-04-1415MS	14 - 15	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09B2-04-1415MSD	14 - 15	MS/MSD	X	X	X	X	X	X	X
J09B2-05	OT29-SO-J09B2-05-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-05-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-05-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-05-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-06	OT29-SO-J09B2-06-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-06-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-06-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-06-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-07	OT29-SO-J09B2-07-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B2-07-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B2-07-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-07-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-07-0910MS	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09B2-07-0910MSD	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09B2-07-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-08	OT29-SO-J09B2-08-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-08-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-08-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-08-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-09	OT29-SO-J09B2-09-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-09-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-09-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-09-1415	14 - 15	Normal	X	X	X	X	X	X	X
K09A2-01	OT29-SO-K09A2-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-K09A2-01-0405	4 - 5	Normal	X			X	X		
	OT29-FD-K09A2-01-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-K09A2-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-K09A2-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
K09A2-02	OT29-SO-K09A2-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-K09A2-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-K09A2-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-K09A2-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
QC	OT29-WW-RINSATE1	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-RINSATE2	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-RINSATE3	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-RINSATE4	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-TB1	-	Trip Blank		X					
	OT29-WW-TB2	-	Trip Blank		X					
	OT29-WW-TB3	-	Trip Blank		X					
	OT29-WW-TB4	-	Trip Blank		X					
			Total Normal Samples	160	80	80	160	160	80	80
			Total Field Duplicates	16	8	8	16	16	8	8
			Total Matrix Spike/Matrix Spike Duplicates	8	4	4	8	8	4	4
			Total Rinsate Blanks	4	4	4	4	4	4	4
			Total Trip Blanks		4					

MS/MSD - matrix spike/matrix spike duplicate
QC - quality control
RCRA - Resource Conservation and Recovery Act
SVOCs - semivolatile organic compounds
VOCs - volatile organic compounds

2.2.2 Liquid Sampling

Groundwater samples shall be collected from the groundwater monitoring wells installed at the OD Unit. Eight consecutive quarters of groundwater monitoring shall be conducted initially, following installation of the wells. Groundwater samples shall be obtained using methods approved by the Department within eight hours of the completion of well purging. The samples shall be analyzed for the parameters listed in Table H-4, which include all hazardous constituents of the hazardous wastes that were treated at the OD Unit.

Groundwater in monitoring wells with low recharge rates and that purge dry shall be sampled when the water level in the well has recovered sufficiently to collect the required samples. A low-flow bladder pump shall be utilized. Groundwater samples intended for metals analysis shall be submitted to the laboratory for analyses of total metals; the samples shall not be filtered in the field or laboratory.

Glass tubes shall be used to sample liquids, except groundwater. The primary advantage to using this type of sampling device is that the tube can be disposed of after each sample is collected, thus eliminating cross-contamination. Alternatively, a Coliwasa sampler may be used to sample liquids, except groundwater.

2.2.3 Appropriate Sample Containers and Preservatives

Samples shall be placed in clean containers compatible with the intended analysis and shall be properly prepared and preserved to maintain sample integrity. The most recent version of SW-846 lists the proper container, preservative, and holding time for each chemical parameter of interest, and these requirements shall be followed for all samples collected during the closure process. Table H-5 summarizes the sample containers, preservation techniques, and holding times for soil and liquid samples (including groundwater).

2.2.4 Sample Handling and Documentation

Each sample shall be labeled, sealed, and accompanied by a chain-of-custody and a request-for-analysis form. A chain-of-custody form shall be used to track samples from collection through analysis to ensure that the integrity of the samples is protected, and that analytical results can be attributed to specific samples of environmental media or waste. The procedures followed during closure shall be equivalent to those provided in the most current version of SW-846. Important aspects of the procedures are presented below. A chain-of-custody form shall be prepared for all samples collected for laboratory analyses. The form includes:

- • Sample identification number;
- • Name and signature of sample collector;
- • Date and time of sample collection;
- • Location at which sample was collected;
- • Type of waste (e.g., soil, liquid, etc.);
- • Signatures of persons who have had samples in their possession;
- • Dates and times of possession.

This form shall be initiated at the point of sample collection and shall then remain with the sample during transfer to the laboratory. The form shall be completed upon receipt at the laboratory and returned to the Permitee for inclusion in facility operating record. The chain-of-

custody form shall include a request-for analysis form that lists all analyses to be performed for the identified samples and all special instructions relating to sample management or analysis. Any potential hazards posed by the samples shall be listed on the request-for-analysis form.

The sample containers shall be sealed with gummed paper seals attached to the containers in such a way that the seals must be broken in order to open the containers. The seals and sample labels must be completed with a waterproof pen. The sample labels are necessary to prevent misidentification of samples and shall include the following information: a unique sample number; name or initials of sample collector; sample collection date and time; sample location; and, sample type, depth, and description.

A closure sampling field log book shall be kept and shall contain all information pertinent to field surveys and sampling. Sufficient information shall be recorded so that a person can reasonably reconstruct what occurred at a sampling event without relying on a collector's memory. The log book shall have bound and consecutively numbered pages in 8 by 11-inch format. Minimum entries shall include:

- Purpose of sample;
- Location of sampling;
- Name and business address of person making log entry;
- Number, type, and volume of sample;
- Description of each sampling methodology and equipment used;
- Date and time of sample collection;
- Sample destination and transporter's name (name of laboratory, UPS, etc.);
- Map or photograph of the sampling site;
- Field observations (ambient temperature, sky conditions, past 24-hour precipitation, etc.);
- Field measurements, if any (pH, flammability, conductivity, explosivity, etc.);
- Collector's sample identification number(s);
- Signature of person responsible for the log entry.

Documentation of sample acceptance at the laboratory shall be provided following sample screening and log-in. This documentation may consist of signed copies of the chain-of-custody, documentation or a letter detailing the field sample numbers accepted. Corresponding laboratory sample identification numbers shall be provided. The laboratory is required to have procedures for preventing cross contamination of samples and securing sample custody within the laboratory.

2.2.5 Sample Shipping

Samples shall be packaged and shipped to the laboratory in accordance with DOT shipping requirements and in a manner to ensure that the integrity of the samples is protected. The sample containers shall be cushioned to protect against breakage or puncture.

2.2.6 Sample Analysis

Soil, groundwater, and waste samples shall be analyzed by an ELAP-certified laboratory. The analytical laboratory shall have procedures for preventing cross-contamination of samples and securing sample custody within the laboratory. Test methods for analysis of all samples shall be performed according to procedures documented in the most current version of SW-846. Hazardous constituents associated with the regulated wastes treated at the OD Unit are included in these analyses. Analytical methods, detection limits, and instrumentation are provided in

Table H-3 for soil analysis; and in Table H-2 for groundwater analysis. Minimum calibration, operation, and quality control (bias, precision, blank and matrix effects) requirements for laboratory analyses shall be performed as listed in the individual analytical methods of SW-846. All laboratory analyst notebooks, log sheets, instrument printouts, charts, and calculations relevant to analyses of these samples shall be identified and remain accessible. This information may be requested for independent review and validation. If requested by the Department, this information shall be provided by the Permitee.

2.2.7 Quality Assurance/Quality Control Program

Because decisions about closure activities may be based, in part, on analyses of samples, a program to ensure reliability of analytical data is mandatory. Data reliability shall be ensured by documenting sample management so that analyses are traceable to specific areas of potential contamination and by following a quality assurance/quality control (QA/QC) program that mandates documentation of the precision and accuracy of laboratory analyses, as well as data completeness, representativeness, and comparability.

Sampling activities shall include collection of QC samples in addition to field documentation requirements. QC samples to be collected include: duplicate samples, trip blanks, field blanks, and rinsate blanks. Table H-9 summarizes field QC sample requirements.

Blanks and duplicate samples shall be collected to determine potential errors introduced in the data from sample collection and handling activities, laboratory error, and to assess analytical precision. To determine the potential for cross contamination, rinsate blanks consisting of rinsate from decontaminated equipment shall be collected and analyzed. At least one rinsate blank shall be collected for every ten samples collected using non-dedicated sampling equipment. Duplicate samples shall be collected at a frequency of one duplicate sample for every ten field samples. In no case shall less than one rinsate blank or duplicate sample be collected for a sampling effort. Trip blanks shall be collected on a daily basis and included in each shipment of samples that contain VOCs samples. Trip blanks are analyzed for VOCs only and are used to assess possible VOC contamination from outside sources. Trip blanks are shipped from the analytical laboratory and maintained with the sample bottles throughout the sampling process. These blank and duplicate samples shall be identified and treated as separate samples. Acceptance criteria for QA/QC sample analyses shall be compatible with the most recent version of SW-846 or other applicable guidance.

The analytical laboratory shall operate under a QA program plan (QAPP) that meets the requirements of the required methods. QC procedures in the analytical laboratory are guided by the laboratory's QAPP. Laboratory QC samples are required to establish the accuracy and precision of analytical data in order to determine the quality of the data. Table H-10- lists laboratory QC procedures by analytical methods.

The analytical laboratory data shall be evaluated using the following criteria:

- Completeness of data deliverable;
- Collection, extraction, and analysis holding times;
- Blank data;
- Laboratory control sample results;
- Matrix spike/matrix spike duplicate results;
- Laboratory duplicate sample results; and
- Overall data assessment and usability.

Table H-9
Summary of Field Quality Control Samples

Quality Control Sample Type	Sample Matrix	Applicable Analysis	Frequency	Purpose
Trip blank	Soil/Water	VOCs	One per day, per cooler containing VOC samples	Document any contamination attributable to shipping and field handling procedures
Field Duplicate	Soil/Water	VOCs, SVOCs, Metals, HE, Dioxins/Furans, White Phosphorus, Perchlorate, general chemistry[a]	Minimum of one per 10 environmental samples per media type	Document precision of the sampling/analysis process
Rinsate blank	Soil/Water	VOCs, SVOCs, metals, HE, Dioxins/Furans, White Phosphorus, Perchlorate, general chemistry[a, b]	One sample per day per media type for non-dedicated sampling equipment	Document whether decontamination of sampling equipment was adequate

[a] General chemistry - total dissolved solids, alkalinity, ammonia, sulfide, total organic carbon, sulfate, nitrate, nitrite, chloride ,fluoride, bromide

[b] No rinsate blank is required for total dissolved solids or alkalinity

HE - high explosives

SVOCs - semivolatile organic compounds

VOCs - volatile organic compounds

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method 7580

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Multipoint ICAL for all analytes (minimum five standards)	Before sample analysis	One of the following options. Option 1: Linear—RSD for each analyte ≤ 20%. Option 2: Linear—least squares regression r ≥0.995 for each analyte. Option 3: Nonlinear—COD ≥0.99 (six points will be used for second order, seven points will be used for third order) .	Correct problem then repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL. Calibration may not be forced through the origin. All quantitation for multicomponent analytes, such as technical chlordane, toxaphene, and Aroclors, must be performed form a five-point calibration. Results may not be quantified from a single point.
Second-source calibration verification	Immediately after each ICAL	All analytes within ± 20% of expected value	Correct problem and verify second-source standard. Rerun second-source verification. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Retention time window position established for each analyte and surrogate	Each ICAL and after the initial daily CCV	Position will be set using the midpoint standard of the ICAL curve. On days when an ICAL is not performed, the CCV is used.	N/A	N/A
Retention time window width established for each analyte and surrogate	At method setup and after major maintenance (for example, column change)	±3 times standard deviation for each analyte retention time from 72-hour study.	N/A	N/A
Retention time window verification for each analyte and surrogate	Each calibration verification	Analyte within established window.	Correct problem, then reanalyze all samples analyzed since the last acceptable retention time check.	**ICV:** Flagging criteria are not appropriate for initial verification. **CCV:** Apply Q-flag to all results for the specific analyte(s) in the sample that are outside the established window.
CCV	Daily, before sample analysis unless ICAL performed on same day, after every 10 samples, and at the end of the analysis sequence	All analytes within ± 15% of expected value (% D).	Correct problem, then rerun. If that fails, repeat ICAL. Reanalyze all samples since last successful calibration verification.	**If reanalysis cannot be performed,** apply Q-flag to all results for the specific analyte(s) >15%D for all samples associated with the calibration verification.
Method blank	One per analytical batch	No analytes detected > ½ LOQ. For common laboratory contaminants no analytes detected > LOQ and see Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and reanalyze method blank and all	Apply “B” flag to all associated positive results for the specific analyte(s), as appropriate. See Worksheet #36, Section 36.2.5.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method 7580

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			samples processed with the contaminated blank.	
LCS for all analytes (must contain all target analytes)	One per analytical batch	Acceptance criteria: Worksheet #15.	Correct problem, then reanalyze. If still out, reprepare and reanalyze the LCS and all samples in the affected batch.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
MS/MSD	One per 20 project samples per matrix as a minimum and as defined on the chain-of-custody form	Acceptance criteria: Worksheet #15.	Assess data to determine whether there is a matrix effect or analytical error. Review LCS for failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an eval-uation can be made regarding PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: • %R for MS or MSD > upper control limit • %R for MS or MSD < lower control limit • MS/MSD RPD > control limit
Second-column confirmation (not required for Methods 8015B [DRO or GRO]	All positive results	Same as for initial or primary column analysis.	Same as for initial or primary column analysis.	Apply J-flag if RPD > 40% from first column result. Apply Q-flag to all results for the specific analyte(s) in the sample not confirmed.
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[c])	At initial setup and then once per 12-month period or quarterly DL verification	Detection limits established will be ≤ ½ the RL in Worksheet #15 Tables (see 40 CFR, Part 136, Appendix B). For the verification check to be valid, analytes must be detected and identified by method-specified criteria or the verification check must produce a response that is at least 3 times the instrument noise level and greater than the response in the blanks associated with the MDL study.	Continue the MDL study until all criteria are met.	N/A.
LOD determination and verifi-cation (see Section D.1.2.1 and Box D-13 of the DoD QSM[c])	At initial setup and verified quarterly (if a laboratory uses multiple instruments for a given method, the LOD must be verified on each)	The apparent signal-to-noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If LOD verification fails, the laboratory must (1) repeat the MDL determination and LOD verification at a higher concentration or (2) perform and pass two consecutive LOD verifications at a higher concentration. The LOD is	N/A; samples may not be analyzed without a valid LOD.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method 7580

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			set at the higher concentration.	
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[c])	At initial setup (1) verify LOQ; and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of the DoD QSM[c])	(1) LOQ and associated precision and bias must meet client requirements and be reported; or (2) in the absence of client requirements, must meet LCS control limits (see Box D-14 of the DoD QSM[c]).	If the LOQ verification fails, laboratory must either establish a higher LOQ or modify method to meet client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag "U."
Demonstrate acceptable analyst capability	Before using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of DoD QSM[c])	QC acceptance criteria published by DoD, if available; otherwise, method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for analytes not meeting criteria (see section C.1.f of DoD QSM[c]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by an analyst until capability is demonstrated.

End of Method 7580

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Mass spectrometer tuning check Use bromofluorobenzene (SW8260B) or decafluorotriphenylphosphine (SW8270C)	Before ICAL and calibration verification	Refer to criteria listed in method description.	Retune instrument and verify.	Not appropriate.
GC performance check (8270C only or when SW8270 is used for pesticide analyses)	Daily before analysis of sample or calibration standards	Degradation ≤ 20% for DDT. No visible peak tailing for benzidine or pentachlorophenol (as a default, tailing factors should be less than 2.0).	Correct problem, then repeat performance check.	Not appropriate.
Multipoint ICAL for all analytes (minimum five standards)	Before sample analysis	SPCCs: Average RF ≥ 0.30 (SW8260B), ≥ 0.050 (SW8270C) CCCs: % RSD for RFs ≤ 30% and one of the options below; Option 1: Linear—RSD for each analyte < 15%. Option 2: Linear—linear least squares regression r > 0.995 for each analyte. Option 3: Nonlinear—COD ≥ 0.99 (6 points will be used for second order, 7 points will be used for third order). This is not a preferred option.	Correct problem, then repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL. Calibration may not be forced through the origin.
Second-source calibration verification	Once per ICAL	All analytes within ± 20% of expected value.	Correct problem and verify second-source standard. Rerun second-source verification. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Retention time window position establishment for each analyte and surrogate	Once per ICAL	Position will be set using the midpoint standard of the ICAL curve. On days when an ICAL is not performed, the CCV is used.	N/A.	N/A.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Retention time window verification for each analyte	Each sample	RRT of the analyte within ± 0.06 RRT units of ICAL. Laboratories may update the retention times based on the CCV to account for minor performance fluctuations or after routine system maintenance (e.g., column clipping. With each sample, the RRT will be compared with the most recently updated RRT. If the RRT has changed by more than ±0.06 RRT units since the last update, there has been a significant change in system performance and the laboratory must take appropriate corrective actions as required by the method and rerun the ICAL to re-establish the retention times.	Correct problem then reanalyze all samples analyzed since the last retention time check.	Apply Q-flag to all results for the specific analyte(s) in the sample that are outside the established window.
CCV	Daily, before sample analysis (unless ICAL performed on same day), and after every 12 hours of analysis time	SPCCs: Average RF ≥ 0.30 (SW8260B), ≥ 0.050 (SW8270C) CCCs: % RSD for RFs ≤ 30% and All analytes within ± 20% D of expected value from ICAL.	Correct problem, then rerun CCV. If that fails, repeat ICAL.	Apply Q-flag to all results for the specific analyte(s) > 20% D for all samples associated with the calibration verification.
ISs	Each sample, standard, and QC sample	Retention time ± 30 seconds from retention time of the IS in the ICAL midpoint standard. Extracted ion current profile area within -50% to +100% of area from IS in ICAL mid-point standard.	Inspect mass spectrometer and GC for malfunctions and make corrections as appropriate. Reanalysis of samples analyzed while the system was malfunctioning is mandatory.	Apply Q-flag to all results for analytes associated with a failed IS (unless a matrix effect can be verified), then apply M-flag.
Method blank	One per analytical batch	No analytes detected > ½ LOQ. For common laboratory contaminants, no analytes detected > LOQ. See Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and analyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s), as appropriate. See Worksheet #36, Section 36.2.5.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
LCS for all analytes	One LCS per analytical batch	Acceptance criteria: Worksheet #15.	Correct problem, then reanalyze. If still out, reprepare and reanalyze the LCS and all samples in the affected batch.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
MS/MSD	One per 20 samples per matrix as a minimum and as defined on the chain-of-custody form	Acceptance criteria: Worksheet #15.	Assess data to determine whether there is a matrix effect or analytical error. Analyze LCS for failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made regarding the PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: (1) %R for MS or MSD > upper control limit (2) %R for MS or MSD < lower control limit (3) MS/MSD RPD > control limit
Surrogate spike	Every sample, spiked sample, standard, and method blank	Acceptance criteria: Worksheet #15.	Correct problem, then reprepare and reanalyze the affected samples. If matrix effect is verified, discuss in case narrative.	For the samples: If the %R > UCL for any surrogate, apply J-flag to all positive results for associated analytes. If the %R < LCL for any surrogate, apply J-flag to all positive results for associated analytes and UJ-flag to all associated nondetects. If any surrogate recovery is <10%, apply Q-flag to all results for all associated analytes.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[C])	At initial setup and then once per 12-month period or quarterly DL verification	Detection limits established will be ≤ ½ the RL in Worksheet 15. See 40 CFR, Part 136, Appendix B. All analytes must be detected and identified by method-specified criteria for the for the verification check to be valid, or the verification check must produce a response that is at least 3 times the instrument noise level and greater than the response in the blanks associated with the MDL study.	Continue the MDL study until all criteria are met.	N/A.
LOD determination and verification (see Section D.1.2.1 and Box D-13 of the DoD QSM[C])	At initial setup and verified quarterly (if a laboratory uses multiple instruments for a given method, the LOD must be verified on each)	The apparent signal-to-noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must (1) repeat the detection limit determination and LOD verification at a higher concentration or (2) perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	N/A; samples may not be analyzed without a valid LOD.
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[C])	At initial setup: (1) verify LOQ; and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if a laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of DoD QSM[C]	(1) The LOQ and associated precision and bias must meet client requirements and must be reported or (2) in the absence of client requirements, must meet LCS control limits. See Box D-14 of the DoD QSM[C].	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag "U."
Demonstrate acceptable analyst capability	Before using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of DoD QSM[C])	QC acceptance criteria published by DoD, if available; otherwise method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for those analytes that did not meet criteria (see Section C.1.f of the DoD QSM[C]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by an analyst until capability is demonstrated.

End of Methods SW8260B, SW8270C, and SW8270C (SIM)

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8330B

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Initial multipoint calibration for all analytes (minimum five standards) (ICAL)	Minimum five-point initial calibration for target analytes, lowest concentration standard at or below the reporting limit.	Initial calibration prior to sample analysis	Average RF: RSD </= 20%; Linear: r>0.995, intercept < MDL. Apparent S/N ratio of standard at RL (LOQ) must be at least 5:1.	Evaluate standards, chromatography, and detector response. If problem found with above, correct as appropriate, then repeat initial calibration
Second-source calibration verification	Once per ICAL	All analytes within ± 20% of expected value	Correct problem and verify second source standard. Rerun second source verification. If that fails, correct problem and repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Low standard verification	Immediately following ICAL.	Less than 50 % difference for target analytes;	Evaluate data. If problem (e.g., concentrated standard, plugged injector needle) found, correct, then repeat low-level verification. If still fails, repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
CCV	Daily, before sample analysis unless ICAL performed on same day and every 24 hours of analysis time	All analytes within ± 20% of expected value	Correct problem, rerun CCV. If that fails, repeat initial calibration.	Apply Q-flag to all results for the specific analyte(s) > 30 %D for all samples associated with the calibration verification.
Surrogate spike	**Every sample, spiked sample, standard, and method blank**	**Acceptance criteria: Worksheet #15.**	**Correct problem, then reprepare and reanalyze the affected samples.** **If matrix effect is verified, discuss in case narrative.**	**For the samples:** **If the %R > UCL for any surrogate, apply J-flag to all positive results for associated analytes.** **If the %R < LCL for any surrogate, apply J-flag to all positive results for associated analytes and UJ-flag to all associated nondetects.** **If any surrogate recovery is <10%, apply Q-flag to all results for all associated analytes.**
Method Blank	One per preparation batch	No target analytes ≥ ½ LOQ and > 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater).	Verify instrument clean (evaluate calibration blank & samples prior to method blank), then reanalyze. Evaluate to determine if systematic issue within laboratory, correct, then re-prepare and reanalyze the method blank and all samples processed with the contaminated blank in accordance with DoD QSM requirements	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8330B

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
LCS for all analytes	One LCS per analytical batch	Acceptance criteria: Table 7-4	Correct problem then reanalyze. If still out, reprep and reanalyze the LCS and all samples in the affected AB.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
Confirmation Analysis	When target analytes detected on the primary column at concentrations > LOD.	Calibration and QC criteria the same as for initial/primary analsyis. Results between primary and secondary column RPD ≤ 40%	Evaluate data, then report with flag to denote RPD > 40%. Narrate obvious matrix issues.	RPD between primary and confirmation analysis ≤ 40%..
Soil Grinding Blank	When puck mill grinding is performed, one blank between each sample processed.	Blank material ground and subsampled as with the samples. Composited prior to analysis. No target analytes detected at > than 1/2 the LOQ	All blanks are reported, and data is flagged/narrated if the criteria are exceeded.	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements
Grinding Certified Reference Material (CRM)	When puck mill grinding is performed, CRM is ground for every 20 samples ground.	Within the control limits supplied by manufacturer of material	Evaluate the data, narrate any outliers and report.	Manufacturer's acceptance limits.
DL study (as part of the LOD process, reference Section D.1.2.1 of the DoD QSM)	At initial setup and subsequently once per 12-month period or quarterly DL verification checks.	DL established shall meet 40 CFR, Part 136 Appendix B.	Continue to run the DL study until all criteria are passing	N/A
LOD determination and verification (reference Section D.1.2.1 and grey box D-13 of the QSM)	At initial set-up and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must: 1) Repeat the detection limit determination and LOD verification at a higher concentration;or 2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	Not Applicable, Samples may not be analyzed without a valid LOD.
LOQ establishment and verification (reference Section D.1.2.2 and grey box D-14 of the QSM)	At initial setup: 1) Verify LOQ; and 2) Determine precision and bias at the LOQ. Subsequently, verify LOQ quarterly. If a laboratory uses multiple instruments for a given method, the LOQ must be verified on each. See Box D-14.	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or 2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DOD QSM.	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	Not Applicable, Samples may not be analyzed without a valid LOD.
Results reported between DL and LOD and the LOD and the LOQ	None	None	None	Apply F-flag to all results between DL and LOQ. If no Detection determined below the LOD, report to the LOD, flag U.

End of Method SW8330B

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Tuning (Mass Calibration Verification)	Prior to ICAL and after any mass calibration or maintenance is performed.	Quantitation ions within 0.3 m/z of expected mass.	Perform mass calibration on the MS/MS. If required, consult with instrument engineer for further maintenance.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Minimum six-point initial calibration for target analytes, lowest concentration standard at or below the reporting limit	Initial calibration prior to sample analysis	Linear: $r^2 > 0.990$ ($r>0.995$) with intercept ≤ LOD, or Average Response Factor: RSD≤ 20%.	Evaluate standards, chromatography, and mass spectrometer response. If problem found with above, correct as appropriate, then repeat initial calibration.	Evaluate standards, chromatography, and detector response. If problem found with above, correct as appropriate, then repeat initial calibration
Second-source calibration verification	Once per six-point initial calibration	Perchlorate within ±15% of the true value	Evaluate data. If problem (e.g., concentrated standard, plugged transfer line) found, correct, then repeat second source verification. If it still fails, then repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Daily calibration verification	Mid-range standard analyzed before sample analysis, after every 10 samples, and at the end of the sequence.	Perchlorate within ±15% of the true value	Correct problem, then repeat. If still fails, repeat initial calibration	Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.
Limit of Detection verification (LODv) (per batch)	Prior to sample analysis and at the end of the analysis sequence.	Perchlorate within ± 30% of the true value	Correct problem. Evaluate samples. Samples with results > RL (LOQ) may be reported. Samples since the last passing LODv with results ≤ RL (LOQ) must be reanalyzed.	**Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.**
Laboratory Reagent Blank	Prior to ICAL, following samples with overrange concentration of perchlorate, and at the end of the analytical sequence.	No perchlorate detected > LOQ	Reanalyze reagent blank (until no carryover seen), and any samples with perchlorate detections since the contaminated blank.	No target analytes ≥ ½ LOQ
Internal Standard	Every Calibration Standard	ICAL: IS for each standard must be within ± 50% of the average area of the ICAL. ICV, CCV: Within ± 50% of the average area of the ICAL or within ± 50% of the 1st CCV of the run, if the ICAL is not run the same day.	Evaluate the system. Reanalyze/repeat the calibration.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples.
Method Blank	One per preparation batch	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements	Correct problem, then re-extract and reanalyze method blank and all samples processed with the contaminated blank in accordance with DoD QSM requirements	No target analytes ≥ ½ LOQ

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Interference Check Sample (ICS)	One per preparation batch	70% -130%	Reanalyze once. If still outside the acceptance limits, evaluate to determine if cleanup filters or column degradation are suspect, replace appropriate materials and reprepare (filters) or reanalyze (column). Repeat the Interference Threshold Study to deter. If problem still exists, recalibrate.	Recovery as described in DoD Perchlorate Handbook.
IS	During acquisition of calibration standard, samples, and QC check samples	Areas within -50% to +100% of the midpoint of the last ICAL for each sample and QC in accordance with DoD QSM requirements	Inspect LCMS for malfunctions; mandatory reanalysis of samples analyzed while system was malfunctioning in accordance with DoD QSM requirements	Meets all EPA Method requirements
Isotope Ratio $^{35}CL/^{37}CL$	Every sample, batch QC sample and standard	Monitor for either the parent ion at masses 99/101 or the daughter ion at masses 83/85 depending on which ions are quantified.	Re-extract, re-clean, and/or reanalyze affected sample(s). If problem persists, perform post-spike or dilution as appropriate to confirm presence of perchlorate	Theoretical ratio approx. 3.06 Must fall within 2.3 to 3.8
LCS	One LCS per analytical/preparation batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Reanalyze LCS once. If acceptable, report. Otherwise, evaluate and re prepared and reanalyze the LCS and all samples in the associated prep batch for failed analytes, if sufficient sample material is available.	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
MS/MSD	One MS/MSD per batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Identify problem; if not related to matrix interference, re-extract and reanalyze MS/MSD in accordance with DoD QSM requirements	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
DL study (as part of the LOD process, reference Section D.1.2.1 of the DoD QSM)	At initial setup and subsequently once per 12-month period or quarterly DL verification checks.	DL established shall meet 40 CFR, Part 136 Appendix B.	Continue to run the DL study until all criteria are passing	N/A
LOD determination and verification (reference Section D.1.2.1 and grey box D-13 of the QSM)	At initial set-up and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must: 1) Repeat the detection limit determination and LOD verification at a higher concentration; or 2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD	Not Applicable, Samples may not be analyzed without a valid LOD.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			is set at the higher concentration.	
LOQ establishment and verification (reference Section D.1.2.2 and grey box D-14 of the QSM)	At initial setup: 1) Verify LOQ; and 2) Determine precision and bias at the LOQ. Subsequently, verify LOQ quarterly. If a laboratory uses multiple instruments for a given method, the LOQ must be verified on each. See Box D-14.	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or 2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DOD QSM.	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	Not Applicable, Samples may not be analyzed without a valid LOD.
Results reported between DL and LOD and the LOD and the LOQ	None	None	None	Apply F-flag to all results between DL and LOQ. If no Detection determined below the LOD, report to the LOD, flag U.

End of Method SW6850

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Tuning (Mass Calibration Verification)	Prior to ICAL and after any mass calibration or maintenance is performed.	Quantitation ions within 0.3 m/z of expected mass.	Perform mass calibration on the MS/MS. If required, consult with instrument engineer for further maintenance.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Minimum six-point initial calibration for target analytes, lowest concentration standard at or below the reporting limit	Initial calibration prior to sample analysis	Linear: $r^2 > 0.990$ ($r>0.995$) with intercept ≤ LOD, or Average Response Factor: RSD≤ 20%.	Evaluate standards, chromatography, and mass spectrometer response. If problem found with above, correct as appropriate, then repeat initial calibration.	Evaluate standards, chromatography, and detector response. If problem found with above, correct as appropriate, then repeat initial calibration
Second-source calibration verification	Once per six-point initial calibration	Perchlorate within ±15% of the true value	Evaluate data. If problem (e.g., concentrated standard, plugged transfer line) found, correct, then repeat second source verification. If it still fails, then repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Daily calibration verification	Mid-range standard analyzed before sample analysis, after every 10 samples, and at the end of the sequence.	Perchlorate within ±15% of the true value	Correct problem, then repeat. If still fails, repeat initial calibration	Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.
Limit of Detection verification (LODv) (per batch)	Prior to sample analysis and at the end of the analysis sequence.	Perchlorate within ± 30% of the true value	Correct problem. Evaluate samples. Samples with results > RL (LOQ) may be reported. Samples since the last passing LODv with results ≤ RL (LOQ) must be reanalyzed.	Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.
Laboratory Reagent Blank	Prior to ICAL, following samples with overrange concentration of perchlorate, and at the end of the analytical sequence.	No perchlorate detected > LOQ	Reanalyze reagent blank (until no carryover seen), and any samples with perchlorate detections since the contaminated blank.	No target analytes ≥ ½ LOQ
Internal Standard	Every Calibration Standard	ICAL: IS for each standard must be within ± 50% of the average area of the ICAL. ICV, CCV: Within ± 50% of the average area of the ICAL or within ± 50% of the 1st CCV of the run, if the ICAL is not run the same day.	Evaluate the system. Reanalyze/repeat the calibration.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples.
Method Blank	One per preparation batch	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements	Correct problem, then re-extract and reanalyze method blank and all samples processed with the contaminated blank in accordance with DoD QSM requirements	No target analytes ≥ ½ LOQ

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Interference Check Sample (ICS)	One per preparation batch	70% -130%	Reanalyze once. If still outside the acceptance limits, evaluate to determine if cleanup filters or column degradation are suspect, replace appropriate materials and reprepare (filters) or reanalyze (column). Repeat the Interference Threshold Study to deter. If problem still exists, recalibrate.	Recovery as described in DoD Perchlorate Handbook.
IS	During acquisition of calibration standard, samples, and QC check samples	Areas within -50% to +100% of the midpoint of the last ICAL for each sample and QC in accordance with DoD QSM requirements	Inspect LCMS for malfunctions; mandatory reanalysis of samples analyzed while system was malfunctioning in accordance with DoD QSM requirements	Meets all EPA Method requirements
Isotope Ratio $^{35}CL/^{37}CL$	Every sample, batch QC sample and standard	Monitor for either the parent ion at masses 99/101 or the daughter ion at masses 83/85 depending on which ions are quantified.	Re-extract, re-clean, and/or reanalyze affected sample(s). If problem persists, perform post-spike or dilution as appropriate to confirm presence of perchlorate	Theoretical ratio approx. 3.06 Must fall within 2.3 to 3.8
LCS	One LCS per analytical/preparation batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Reanalyze LCS once. If acceptable, report. Otherwise, evaluate and re prepared and reanalyze the LCS and all samples in the associated prep batch for failed analytes, if sufficient sample material is available.	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
MS/MSD	One MS/MSD per batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Identify problem; if not related to matrix interference, re-extract and reanalyze MS/MSD in accordance with DoD QSM requirements	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
DL study (as part of the LOD process, reference Section D.1.2.1 of the DoD QSM)	At initial setup and subsequently once per 12-month period or quarterly DL verification checks.	DL established shall meet 40 CFR, Part 136 Appendix B.	Continue to run the DL study until all criteria are passing	N/A
LOD determination and verification (reference Section D.1.2.1 and grey box D-13 of the QSM)	At initial set-up and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must: 1) Repeat the detection limit determination and LOD verification at a higher concentration; or 2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD	Not Applicable, Samples may not be analyzed without a valid LOD.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			is set at the higher concentration.	
LOQ establishment and verification (reference Section D.1.2.2 and grey box D-14 of the QSM)	At initial setup: 1) Verify LOQ; and 2) Determine precision and bias at the LOQ. Subsequently, verify LOQ quarterly. If a laboratory uses multiple instruments for a given method, the LOQ must be verified on each. See Box D-14.	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or 2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DOD QSM.	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	Not Applicable, Samples may not be analyzed without a valid LOD.
Results reported between DL and LOD and the LOD and the LOQ	None	None	None	Apply F-flag to all results between DL and LOQ. If no Detection determined below the LOD, report to the LOD, flag U.

End of Method SW6850

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW6010B and SW7470A/71A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Instrument detection limit study	At initial setup and after significant change in instrument type, personnel, test method, or sample matrix	Instrument detection limits will be < LOD.	N/A.	N/A.
Linear dynamic range or high-level check standard	Every 6 months	Within ± 10% of true value.	Correct problem, then reanalyze or reset linear range.	Apply J-flag to the specific analyte(s) for all results not within linear range.
ICAL for all analytes (minimum one standard and a blank 3- to 5-point standard preferred)	Daily before sample analysis	If more than one standard is used, correlation coefficient must be ≥ 0.995.	If applicable, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL.
ICV (second source)	Daily after ICAL	All analytes within ± 10% of expected value.	Correct problem and verify second-source standard. Rerun ICV. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
CCV (Instrument Check Standard)	After every 10 samples and at the end of the analysis sequence	All analyte(s) within ± 10% of expected value and RSD of replicate integrations < 5%.	Correct problem, then repeat CCV and reanalyze all samples since last successful calibration verification.	Apply Q-flag to all results for the specific analyte(s) >10 %D for all samples associated with the calibration verification.
Calibration blank	Before beginning a sample run, after every calibration verification	No analytes detected > LOD.	Correct problem, then analyze calibration blank and previous 10 samples.	Apply B-flag to all associated positive results for the specific analyte(s) as appropriate.
Low-level calibration check standard (at or below LOQ)	Daily, after ICAL; not required for multipoint calibration (3 or more points) with low standard at or below LOQ.	Analyte(s) with ± 20% of expected value.	Correct problem, then reanalyze.	No samples may be analyzed without a valid low-level calibration check standard. Low-level calibration check standard should be less than or equal to the LOQ.
Method blank	One per analytical batch	No analytes detected > ½ LOQ. For common laboratory contaminants, no analytes detected > LOQ. See Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and reanalyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s), as appropriate. See Worksheet #36, Section 36.2.5.
ICS	At the beginning of an analytical run	ICS A: All non-spiked analytes < LOD (unless they are a verified trace impurity from one of the spiked analytes). ICS AB: Within ± 20% of expected value.	Terminate analysis; locate and correct problem; reanalyze ICS and all associated samples.	Flagging criteria are not appropriate. No samples may be analyzed without a valid ICS. If corrective action fails, apply Q-flag to the specific analyte(s).

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW6010B and SW7470A/71A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
LCS for all analytes	One per analytical batch	Acceptance criteria: Worksheet #15.	Correct problem then reanalyze. If still out, reprepare and reanalyze the LCS and all samples in the affected batch.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
Dilution test	Each new sample matrix, at least once per analytical batch (only applicable for analytes with concentrations > 50 times LOQ)	Fivefold (1+4) dilution must agree within ± 10% of the original determination.	Add post-digestion spike.	Apply J-flag to all sample results for the specific analyte from the same matrix in the batch if either of following exist: (1) dilution test not run and batch had analyte concentrations >50X LOQ or (2) %D ≥10 and post-digestion spike not performed.
Post-digestion spike addition	When dilution test fails or if an analyte's concentration for all samples in a batch is less than 50 times LOQ (<25 for Method SW7470A/SW7471A)	Recovery within 75–125% of expected results (85-115 for SW7470A/SW7471A).	Check for instrumental problem, then reanalyze post-digestion spike addition if appropriate.	Apply J-flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition. If post-digestion spike addition recovery is < 10%, apply Q-flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition.
MS/MSD	One per 20 samples per matrix as a minimum and as defined on the chain-of-custody form	Acceptance criteria: Worksheet #15.	Assess data to determine whether there is a matrix effect or analytical error. Analyze LCS or failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made regarding PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: (1) %R for MS or MSD > UCL (2) %R for MS or MSD < LCL (3) MS/MSD RPD > control limit
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[c])	At initial setup and then once per 12-month period or quarterly DL verification checks	Detection limits established will be ≤ ½ the RL in Worksheet #15 Tables. See 40 CFR, Part 136, Appendix B. All analytes must be detected and identified by method-specified criteria for the for the verification check to be valid, or the verification check must produce a response that is at least 3X the instrument noise level and greater than the response in the blanks	Continue the MDL study until all criteria are met.	N/A.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW6010B and SW7470A/71A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
		associated with the MDL study.		
LOD determination and verification (reference Section D.1.2.1 and Box D-13 Of the DoD QSM[c])	At initial setup and verified quarterly (if a laboratory uses multiple instruments for a given method, the LOD must be verified on each)	The apparent signal-to-noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must (1) repeat the detection limit determination and LOD verification at a higher concentration; or (2) perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	N/A; samples may not be analyzed without a valid LOD.
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[c])	At initial setup: (1) verify LOQ and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if a laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of the DoD QSM[c]).	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or (2) in the absence of client require-ments, must meet control limits of the LCS. See Box D-14 of the DoD QSM[c].	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag “U.”
Demonstrate acceptable analyst capability	Before using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of the DoD QSM[c])	QC acceptance criteria published by DoD, if available; otherwise method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for those analytes that did not meet criteria (see Section C.1.f of the DoD QSM[c]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by analyst until capability is demonstrated.

End of Method SW6010B and SW7470A/71A

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6020A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
MS tuning sample	Before ICAL.	Mass calibration ≤ 0.1 amu from the true value. Resolution <0.9 amu full width at 10% peak height. Stability: RSD ≤ 5% for at least four replicate analyses.	Retune instrument then reanalyze tuning solution.	Not appropriate.
ICAL for all analytes (minimum one standard and a blank)	Daily before sample analysis	If more than one standard is used, correlation coefficient must be ≥ 0.995.	If applicable, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL.
ICV (second source)	After ICAL, before beginning a sample run at a concentration other than used for calibration	All analytes within ± 10% of expected value.	Correct problem and verify second-source standard. Rerun ICV. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
CCV	After every 10 samples and at the end of the analysis sequence—at a concentration near the middle of the calibration range	All analytes within ± 10% of expected value.	Correct problem, then repeat CCV and reanalyze all samples since last successful calibration verification.	Apply Q-flag to all results for the specific analyte(s) >10 %D for all samples associated with the calibration verification.
Calibration blank	Before beginning a sample run, after every 10 samples and at end of the analysis sequence	No analytes detected > LOD.	Correct problem, then analyze calibration blank and previous 10 samples.	Apply B-flag to all associated positive results for the specific analyte(s) as appropriate.
Low-level calibration check standard (at or below LOQ)	Daily, after ICAL Not required if multipoint calibration (3 or more points) with low standard at or below LOQ is performed	All analyte(s) with ± 20% of expected value.	Correct problem then reanalyze.	No samples may be analyzed without a valid low-level calibration check standard. Low-level calibration check standard should be less than or equal to the LOQ.
Linear range calibration (high) check standard	Every 6 months	Analyte within ± 10% of expected value.	Correct problem then reanalyze or reset linear range.	Apply J-flag to the specific analyte(s) for all results not within linear range.
Method blank (Preparation blank)	One per analytical batch	No analytes detected > ½ LOQ For common laboratory contaminants, no analytes detected > LOQ. See Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and analyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s) as appropriate. See Worksheet #36, Section 36.2.5.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6020A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Interference check solutions (ICS-A and ICS-AB)	At the beginning of an analytical run or once during an 12-hour period, whichever is more frequent	**ICS-A:** All non-spiked analytes < LOD (unless they are a verified trace impurity from one of the spiked analytes). **ICS-AB:** Within ± 20% of expected value.	Terminate analysis; locate and correct problem; reanalyze ICS; reanalyze all affected samples.	Flagging criteria are not appropriate. No samples may be analyzed without a valid ICS. If corrective action fails, apply Q-flag to the specific analyte(s).
LCS for all analytes	One LCS per analytical batch	Acceptance criteria: Worksheet #15.	Correct problem then reanalyze. If still out, reprepare and reanalyze the LCS and all samples in the affected batch.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
Dilution test	Each matrix in a analytical batch (only applicable for analytes with concentrations ≥ 100X LOD)	Fivefold (1+4) dilution must agree within ± 10% of the original determination.	Add post-digestion spike.	Apply J-flag to all sample results for the specific analyte from the same matrix in the batch if either of following exist: (1) dilution test not run and batch had analyte concentrations ≥100 times LOD or (2) % D ≥ 10 and post-digestion spike not performed.
Post-digestion spike addition	When dilution test fails or if an analyte's concentration for all samples in a batch is less than 100X LOD	Recovery within 75–125% of expected results.	Dilute the sample; reanalyze post-digestion spike addition.	Apply "J" flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition. If post-digestion spike addition recovery is < 10%, apply "Q" flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition.
MS/MSD	One per 20 samples per matrix	Acceptance criteria: Worksheet #15.	Assess data to determine whether there is a matrix effect or analytical error. Analyze LCS for failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made regarding PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: (1) %R for MS or MSD > UCL, (2) %R for MS or MSD < LCL, or (3) MS/MSD RPD > control limits
ISs	Every sample	IS intensity within 30-120% of intensity of the IS in the ICAL.	Perform corrective action as described in Method SW6020, Section 8.3.	Flagging criteria are not appropriate. No samples may be analyzed without a valid IS response.
Instrument detection limit study	At initial setup	Detection limits established will be ≤ LOD.	None.	N/A. Samples cannot be analyzed without a valid instrument detection limit.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6020A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[c])	At initial setup and then once per 12-month period or quarterly DL verification.	Detection limits established will be ≤ ½ the RL in Worksheet #15 tables. See 40 CFR, Part 136 Appendix B. Analytes must be detected and identified by method-specified criteria for the for the verification check to be valid, or the verification check must produce a response that is at least 3 times the instrument noise level and greater than the response in the blanks associated with the MDL study.	Continue to run the MDL study until all criteria are passing.	N/A.
LOD determination and verification (see Section D.1.2.1 and Box D-13 of the DoD QSM[c])	At initial setup and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must: (1) Repeat the detection limit determination and LOD verification at a higher concentration; or (2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	N/A; samples may not be analyzed without a valid LOD.
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[c])	At initial setup: (1) verify LOQ and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if a laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of the DoD QSM[c])	(1) The LOQ and associated precision and bias must meet client requirements and must be reported; or (2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DoD QSM[c].	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag "U."
Demonstrate acceptable analyst capability	Prior to using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of the DoD QSM[c])	QC acceptance criteria published by DoD, if available; otherwise method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for those analytes that did not meet criteria (see Section C.1.f of the DoD QSM[c]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by an analyst until capability is demonstrated.

End of Method SW6020A

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8290

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
MS tuning check	Before initial calibration or calibration verification and after every 12-hour period	Tune the instrument to meet the minimum resolving power of 10,000 at m/z 304.9824. Ensure that the exact mass of m/z 380.9760 is within 5 ppm of the required value. Monitor the lock mass selected ion current profile.	Retune instrument; verify. Rerun affected samples.	Not appropriate
GC column performance check	Before initial calibration or calibration verification	Peak separation between 2,3,7,8-TCDD and other TCDD isomers valley of ≤ 25%. and First and last eluters of all eight homologue retention time windows identified labeled (F/L) on the chromatogram and Absolute retention times for switching from one homologous series to the next > 10 seconds for all components of the mixture	Correct problem then repeat column performance check.	Flagging criteria are not appropriate.
Initial multipoint calibration for all analytes (minimum five standards) (ICAL)	Before sample analysis, as needed by failure of routine calibration verification standard, or when a new lot is used for standard source of CCV, sample fortification solution (IS), or recovery standards	Ion abundance ratios in accordance with Table 8 of Method SW8290 and S/N ratio ≥ 10 for all target analyte ion current profiles and % RSD ± 20% for 17 unlabeled standards and % RSD ± 30% for the 9 labeled IS.	Correct problem then repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8290

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Routine (continuing) calibration check (Use HRCC-3 calibration standard) (CCV)	At the beginning of each 12-hour period (after successful GC resolution and MS resolution checks), and at the end of 12-hour shift.	Ion abundance ratios in accordance with Table 8, Method SW8290 and RF within ± 20% D for unlabeled standards from mean RF from initial calibration and RF within ± 30% for labeled standards from mean RF from initial calibration **End of run CCV only:** If the RF for an unlabeled or labeled standard fails by ≤ 5% in the final CCV, a new "daily" mean RF may be calculated using the initial and final RF values and used to determine the specific analyte concentrations for all samples analyzed during the shift.	Correct problem, repeat calibration verification standard one more time. If that fails, then repeat initial calibration and reanalyze all samples analyzed since the last successful calibration verification. Evaluation of corresponding labeled/unlabeled standards may impact the corrective action required. **End of run CCV:** If the RF for an unlabeled or labeled standard fails by > 5% in the final CCV, run a new ICAL immediately (within 2 hours) and use the new RF values to process the samples. Alternatively, reanalyze all samples with positive detections.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified. **End of run CCV:** Apply Q-flag to all results for the specific analyte(s) in the sample which are not reprocessed or reanalyzed.
PCDD/PCDF identification	Verify all sample positive detections per Method SW8290	Retention time of sample components in accordance with stated criteria in Method SW8290 (Section 7.8.4.1) and Ion abundance ratios for all analytes, ISs, and recovery standards in accordance with criteria in Method SW8290 (Table 8, Section 7.8.4.2) and S/N ratio of all labeled analytes ≥ 10 times background noise (Method SW8290 Section 7.8.4.3) and S/N ratio of all remaining analyte ions ≥ 2.5 times background noise (Method SW8290 Section 7.8.4.3) and For PCDF, no signal present having a S/N ratio ≥ 2.5 for the corresponding ether (PCDPE) detected at the same retention time (± 2 sec, (Section 7.8.4.4)	Correct problem, then reprep and reanalyze the sample(s) with failed criteria for any of the internal, recovery, or standards. If PCDPE is detected or if sample peaks present do not meet all identification criteria, calculate the EMPC (estimated maximum possible concentration) according to Method SW8290 Section 7.9.5.2.	Flagging criteria are not appropriate. Positive identification of 2,3,7,8-TCDF on the DB-5 or equivalent column must be confirmed on a column capable of isomer specificity (DB-225) (see Method SW8290 Section 3.4). If peak identification criteria are met but ion abundance criteria fail for the analyte and IS, the sample should be presumed to have interfering contaminants. The sample should be rerun or the extract reanalyzed.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8290

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
ISs	Every sample, standard, and QC sample.	Percent recovery for each IS (before any dilutions) within 40–135% (Method SW8290 Section 8.4)	Inspect mass spectrometer and GC for malfunctions. Reanalysis of samples analyzed while the system was malfunctioning is mandatory.	Apply Q-flag to all results for analytes associated with a failed IS unless a matrix effect can be verified, then apply M.
Sample specific estimated detection limit (EDL)	Every sample that indicates non-detects or detections that are < 2.5 times background noise	Method 8290 Section 7.9.5 describes the calculation	N/A	N/A
Sample estimated maximum possible concentration (EMPC)	If PCDPE is detected or if sample peaks present do not meet all ion abundance ratio criteria	Method 8290 Section 7.9.5 describes the calculation	N/A	Apply J-flag to all EMPC values.
Method Blank	Minimum one per preparation batch. A method blank is required after a calibration run and before any sample run.	No analytes detected > ½ LOQ	Assess data and correct problem. If necessary, reprep and analyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s), as appropriate.
MS/MSD	One MS/MSD per every 20 samples per matrix	Acceptance criteria: Tables 7-2 and 7-3	Assess data to determine whether there is a matrix effect or analytical error. Analyze LCS for failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made with respect to the PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: (1) %R for MS or MSD > UCL (2) %R for MS or MSD < LCL, or (3) MS/MSD RPD > CL
Sample duplicate	One per analytical batch. This may be replaced by the MSD.	Acceptance criteria: Tables 7-2 and 7-3	Verify instrument performance, review analytical procedures.	For the specific analyte(s) in parent sample, apply J-flag.
Results reported below the lowest standard	None	None	None	Apply F-flag to all results below the lowest calibration standard.

End of Method SW8290

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods 160.2, 310.2, 350.1, SW9030B, SW9056, and SW9060

QC Check*	Frequency	Criteria	Corrective Action
Multi-point initial calibration (a blank and at least five standards) – does not apply to titrimetric method	Before initial sample analysis, every 24 hours, whenever modifications are made to the analytical system, or when continuing calibration verification fails	Correlation coefficient of linear regression is ≥ 0.995	Correct the problem and repeat the initial calibration.
Second-source calibration verification	Immediately following each initial calibration	Analytes within ±15% (±10% for SW9056) of expected value	Correct the problem and repeat initial calibration.
Calibration blank – does not apply to titrimetric methods	After every Second-source or Continuing calibration verification analysis	No analytes detected at or above the LOQ	Correct the problem, then reanalyze previous 10 samples.
Continuing calibration verification	After every 10 samples and at the end of the analysis sequence	Within ±15% (±10% for SW9056) of expected value	Recalibrate and reanalyze all samples since the last acceptable continuing calibration verification
Method Blank	At least one per analytical batch	No analytes detected at or above the LOQ	Correct the problem and re-prep and reanalyze all associated samples
MS/MSD	One set per 20 project-specific samples. MSD is optional if a laboratory sample duplicate is performed	All analytes within limits specified Limits Worksheet 15	None
Laboratory sample duplicate	Once per analytical batch if MSD not performed	Concentration of reported analytes are > 5 times the reporting limit in either sample and RPD >20%. One sample result < RL and a difference of ±2 times the reporting limit	None
LCS	At least one per analytical batch	All analytes within limits specified limits in Worksheet 15	Correct the problem, and re-prep and reanalyze the LCS and all samples in the analytical batch
*Unless calibration and QC requirements are specified for an individual method.			

End of Methods 160.2, 310.2, 350.1, SW9030B, SW9056, and SW9060

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Notes, Acronyms, and Abbreviations

[a]All corrective actions associated with project work shall be documented, and all records shall be maintained by the laboratory.

[b]Flagging criteria shall be applied when acceptance criteria were not met and corrective action was not successful or corrective action was not performed.

[c]DoD. 2010. *Department of Defense* (*DoD) Quality Systems Manual for Environmental Laboratories*. Version 4.2. October.

% D – percent difference
%R – percent recovery
CCC – calibration check compounds
CCV – continuing calibration verification
COD – coefficient of determination
DL – detection limit
DRO – diesel range organics
GC – gas chromatography
GRO – gasoline range organics
ICAL – initial calibration
ICS – interference check sample
ICV – initial calibration verification
IS – internal standard(s)
LCL – lower confidence limit
LCS – laboratory control sample
LOD – limit of detection
LODv – limit of detection verification
LOQ – limit of quantitation
MDL – method detection limit
MS/MSD – matrix spike/matrix spike duplicate
N/A – not applicable
PQO – practical quantitation objectives
PT – performance testing
QC – quality control
QSM – Quality Systems Manual (DoD)
RF – response factor
RL – reporting limit
RPD – relative percent difference
RRT – relative retention time
RSD – relative standard deviation
SPCC – system performance calibration compounds
UCL – upper confidence limit

End of Table H-10

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3. MANAGEMENT OF WASTE FROM CLOSURE ACTIVITIES

Wastes that are expected to be generated during the final closure activities at the OD Unit include: excess soil from sampling; well purge water, drill cuttings, decontamination water; PPE; and excavated soils. To minimize the amount of waste to be generated during closure activities, excess soil cuttings from borings shall be replaced in the auger holes. The volume of liquid waste generated during the cleaning of equipment is to be minimized by using only the smallest amount of wash rinse water necessary to achieve successful decontamination. Solvents shall not be used.

3.1 Waste Management

Wastes associated with closure activities at the OD Unit shall be managed as follows:

- Wastes shall be stored in appropriate containers that are compatible with the wastes and are in good condition.
- If analytical results indicate that the waste is hazardous or the Permitee project manager determines that the waste shall be classified as hazardous, the Permitee shall manage the waste in accordance with all applicable regulations in 40 CFR §261-268.
- Waste containers shall remain within the OD Unit boundary under the control of the personnel generating the waste until it is transported for treatment and disposal.
- Waste containers shall be segregated according to the compatibility and chemical waste type.
- Waste shall be stored in containers that remain closed, except when adding or removing wastes.
- Waste containers bearing free liquid shall be provided with secondary containment of sufficient volume to prevent spilled liquids from being released onto the ground.
- Waste containers shall be managed in such a manner as to prevent ruptures and leaks.
- Waste containers shall be labeled appropriately, pending receipt of analytical results. Labels shall be filled out appropriately and marked using permanent marker or pen. Label information shall include waste source, suspected contaminants, contents, depth (if appropriate), the date which accumulation began, and a contact name.

3.2 Waste Characterization

Characterization of the liquid waste and excavated soil generated during the closure of the OD Unit shall be based upon the results of sampling and analysis. Decontamination water shall be analyzed for the constituents listed in Tables H-3. PPE shall be handled in accordance with Section 1.4 of this Permit Attachment (H) and applicable state and federal regulations.

3.3 Waste Disposal

All wastes from closure activities determined to be hazardous shall be managed in accordance with the Hazardous Waste Management Regulations from the time of generation. Hazardous wastes shall be shipped off-site for treatment and disposal at a permitted RCRA facility. Wastes characterized as nonhazardous shall be evaluated to determine the appropriate disposal method in accordance with applicable law.

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KIRTLAND AIR FORCE BASE ALBUQUERQUE, NEW MEXICO

Closure Plan for Open Detonation Unit

May 2014

377 MSG/CEIR
2050 Wyoming Blvd. SE
Kirtland AFB, New Mexico 87117-5270

.

40 CFR 270.11
DOCUMENT CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

TOM D. MILLER, Colonel, USAF
Commander, 377th Air Base Wing

This document has been approved for public release in accordance with Department of Defense Directives and Air Force Instructions.

KIRTLAND AIR FORCE BASE
377th Air Base Wing Public Affairs

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1. INTRODUCTION

This closure plan describes the activities necessary to close the Open Detonation (OD) treatment unit located within the Explosive Ordnance Disposal (EOD) Range at Kirtland Air Force Base (AFB). The OD Unit consists of a cleared circular area approximately ~~1,500~~ 1,000 ft in diameter and surrounded and delineated by an approximately two-foot (ft) high earthen berm. Figures H-1 and H-2 show the location of the EOD Range at Kirtland AFB, and the collocated OD and Open Burn (OB) Units within the EOD Range. Detonations were conducted in pits measuring approximately 30 ft long, 15 wide and 12 ft deep.

Until final closure of the unit is complete in accordance with the New Mexico Hazardous Waste Management Regulations and certification of closure has been approved by the New Mexico Environment Department (~~NMED or~~ the Department), a copy of the approved Closure Plan, and any revisions thereof, shall be maintained in the Operating Record. This Closure Plan, and any revisions thereof, shall be made available, upon request, to the Department.

If the OD Unit cannot be clean-closed, a post-closure care plan addressing the hazardous constituents remaining at the site shall be prepared and submitted to the Department for approval.

The OD Unit is collocated with the OB treatment unit at the EOD Range. The OD and OB Units are scheduled to undergo final closure activities simultaneously. The OB Unit has a separate closure plan, but several elements of the OB and OD Unit closure plans overlap and are noted within the documents. Additionally, there is currently a perchlorate groundwater investigation occurring to the west of the EOD range. This investigation and its results are independent of this OD Unit closure plan.

As per Kirtland AFB's Hazardous Waste Treatment Facility Operating Permit for the Open Detonation Unit (Permit), Attachment I, Table I-3 , SWMU 06-19 (KAFB IRP site OT-29), which is located approximately 20 ft northeast of the present OB structure, requires corrective action. Corrective action at SWMU 06-19 shall comply with the provisions of the Resource Conservation and Recovery Act (RCRA).

1.1 General Closure Information

This closure plan has been prepared in compliance with the requirements of RCRA (42 U.S.C. §§6901 et seq.) and its implementing regulations at 40 CFR Parts 264 and 270 (see 40 CFR Part 264 Subparts G and X and 270.14(b)(13)), and state implementing statutes and regulations under which the state has delegated RCRA authority (see New Mexico Hazardous Waste Act, Chapter 74 Article 4 NMSA 1978 and 20.4.1 NMAC).

1.2 Closure Performance Standard

The OD Unit shall be closed to meet the following performance standards:

- Minimize the need for further maintenance;
- Control, minimize or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to ground water or surface waters or to the atmosphere; and
- Comply with the requirements of 40 CFR Part 264, Subpart G and 40 CFR §264.601.

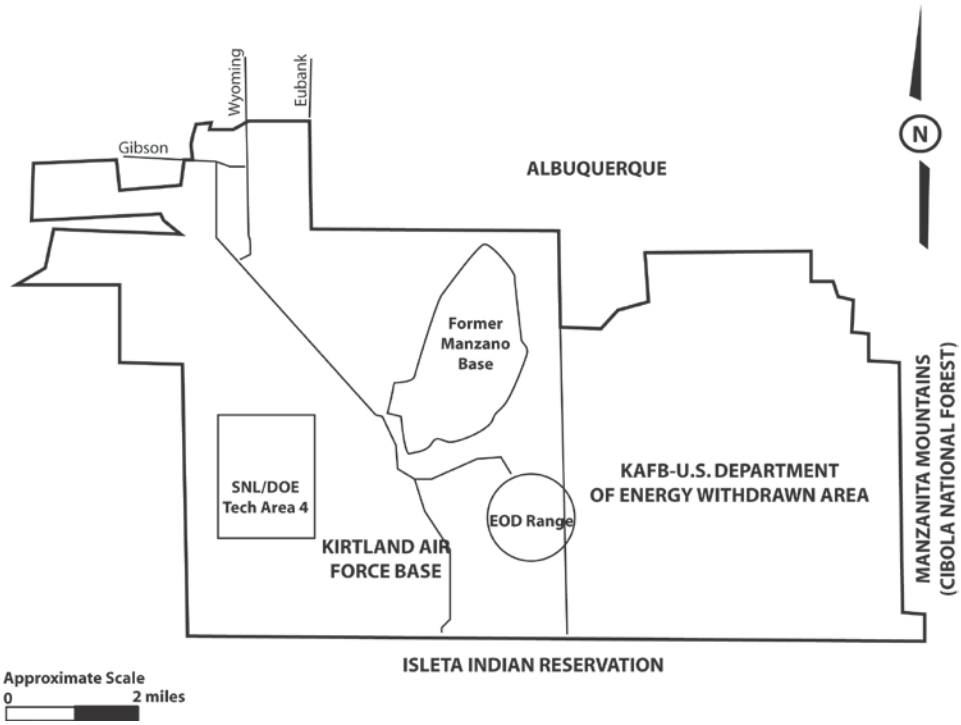

Figure H-1. Location of EOD Range at Kirtland AFB

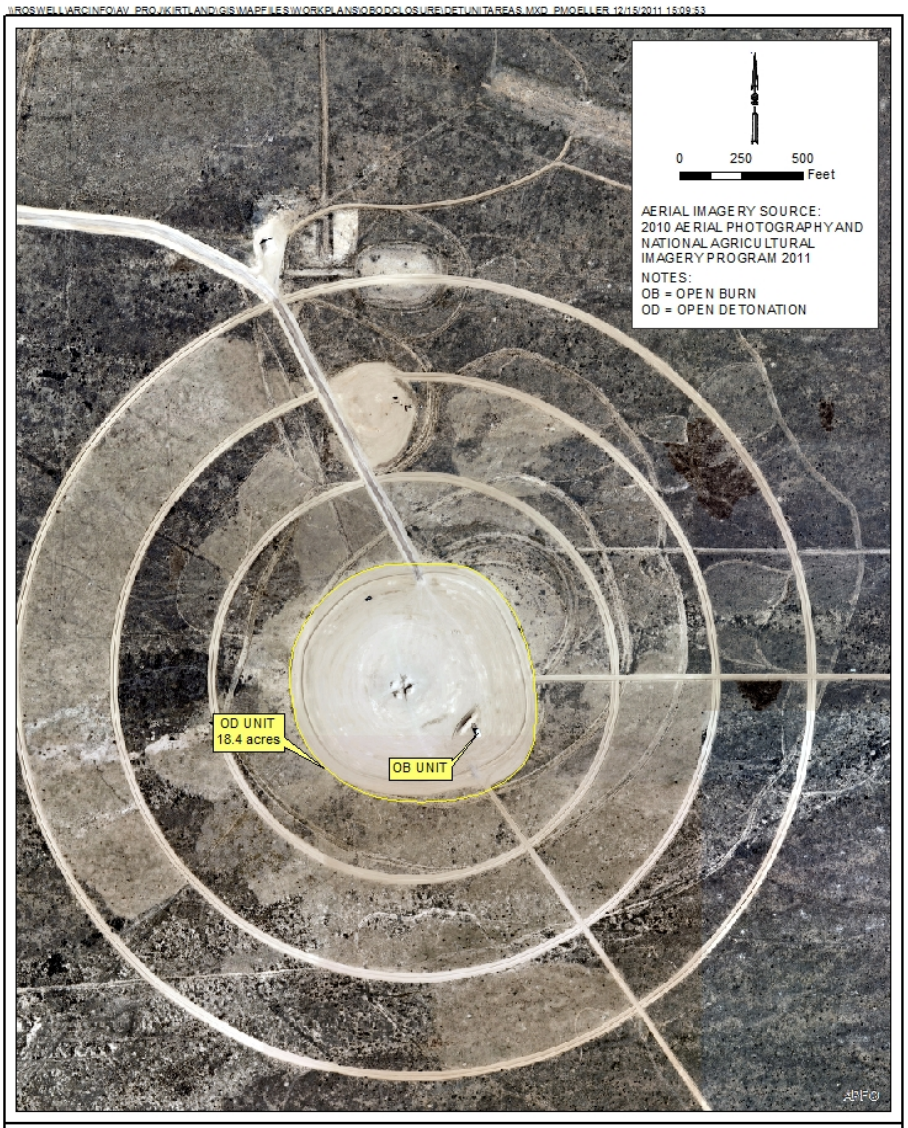

FIGURE H-2
LOCATION OF OPEN BURN AND OPEN DETONATION UNITS
EOD RANGE, KIRTLAND AIR FORCE BASE, NEW MEXICO

1.3 Final Closure Activities

The last treatment event at the OD Unit occurred on 11 August 2010. The Department was notified on 13 August 2010 that, effective immediately, ~~Kirtland AFB~~the Permitee had closed the OD Unit for all treatment activities~~.~~. The Permittee shall notify the Department, in writing, at least 45 calendar days prior to the date that closure activities shall commence.

Final closure activities at the OD Unit shall consist of:

- Installation of four groundwater monitoring wells at the EOD range (one upgradient and three downgradient wells) and eight consecutive quarters of groundwater sampling to determine the presence or absence of groundwater contamination;
- Removing any soil or debris from the OD Unit that have contaminant concentrations which pose unacceptable risk to human health or the environment;
- Sending for treatment and disposal any solid and hazardous waste, including any treatment residues, to a permitted Treatment, Storage, or Disposal Facility (TSDF) in accordance with applicable regulatory requirements.

Final closure for the OD Unit shall be completed when:

- All solid and hazardous waste has been disposed of off-site as required by law;
- Sampling and analysis demonstrates that no unacceptable risk to human health or the environment originating from the OD Unit exists in soil or groundwater;
- A Certification of Closure and Closure Report has been submitted to the Department; and
- The Department has approved the Certification of Closure and Closure Report.

1.4 Maximum Extent of Operations and Maximum Waste Inventory

The OD Unit was previously permitted on 20 December 1994 as Permit# NM9570024423-OD, which allowed 100,000 pounds of net explosive weight (NEW) to be treated at the OD Unit annually. Rocket motors, large caliber munitions, explosive wastes and firearms were treated at the OD Unit. Based on the operating record, the maximum inventory treated at the OD Unit was approximately 316,012 pounds of NEW.

Closure activities and any corrective action that may be required shall not be limited to the OD Unit if contamination has migrated beyond the OD Unit boundary. Any corrective action that may be required because of a release at the OB Unit shall be conducted under the terms and conditions of the 2010 Permit. ~~This will allow for an efficient closure of the OB Unit.~~

1.5 Schedule for Closure

Final closure of the OD Unit shall proceed by the general schedule presented in Table H-1.

Table H-1
Closure Schedule for the Open Detonation Unit at Kirtland AFB

Activity	Time Required
Notify the Department of receiving final volume of hazardous waste at the OD Unit	Completed
Removal of all hazardous waste from the OD Unit	Completed
Department approval of final OD Unit closure plan	TBD
Notify Department of commencement of closure activities	45 days before closure activities begin
Commence closure activities	Day 0
Remove all solid and hazardous waste	Day 90
Commence groundwater monitoring well installations	Day 90
Complete groundwater monitoring well installations	Day 180
Complete all closure activities, except groundwater monitoring	Day 360
Complete 8 quarters of groundwater monitoring	Day 900
Submit Closure Report and certification to ~~NMED~~Department	Day 960

Note: The schedule above indicates calendar days on which closure activities shall be started or completed subsequent

1.6 Closure Report

Within 60 days of completion of the final closure activities, a closure report shall be submitted to the Department. The report shall document the closure activities conducted and contain, at a minimum, the following information:

- A summary of the closure activities;
- Any significant variance from the approved closure plan and the reason for the variance;
- A summary of sampling data associated with closure, including analytical results for all field and laboratory quality control samples;
- A quality assurance statement on the adequacy of the analyses to support closure;
- The location of the file of supporting documentation (e.g., memos, logbooks, laboratory sample analysis data);
- Disposal location and quantities of all solid and hazardous wastes removed from the OD Unit;
- Certification of the accuracy of the report; and
- Survey plat.

1.7 Survey Plat and Post-Closure Requirements

Upon completion of closure activities at the OD Unit, a survey plat shall be prepared, certified by a professional land surveyor, and submitted with the closure report to the Department. The survey plat shall also be simultaneously filed with the local zoning authority. In the event that the OD Unit cannot be clean closed, a post-closure care plan shall be submitted to the Department for review and approval.

2. CLOSURE PROCEDURES

There is no hazardous waste present at the OD Unit; the last treatment event at the OD Unit occurred on 11 August 2010, and there are no treatment residues remaining. There are no structures or equipment at the OD Unit. (The structures associated with the collocated OB Unit are addressed under the OB Unit closure plan.)

The first phase of closure shall consist of a hazards survey of the OD Unit conducted by qualified contractor health physics and industrial hygiene personnel, which ~~will~~shall include unexploded ordnance (UXO) safety personnel, and Kirtland AFB EOD personnel. The purpose of the survey shall be to locate and remove any "kick-out" (untreated waste, waste fragments, or UXO), and to identify potential contamination concerns that may present hazards to workers during the closure activities and to specify any control measures necessary to reduce worker risk. This survey ~~will~~shall provide the information necessary for health physics, UXO safety, and industrial hygiene personnel to identify worker qualifications, personal protective equipment (PPE), safety awareness, work permits, exposure control programs, and emergency coordination that ~~will~~shall be required to perform closure. Any munitions and explosives of concern (MEC) identified during the hazard survey ~~will~~shall be reported to and handled by Kirtland AFB EOD staff personnel only in accordance with standard operating procedures. All workers involved in the closure activities ~~will~~shall be required to have training and medical monitoring as required by applicable regulations. Personnel performing closure activities ~~will~~shall be required to wear PPE as specified by health physics, UXO safety, and industrial hygiene personnel.

Sufficient sampling and analysis shall be required to demonstrate there are no contaminant concentrations which pose unacceptable risk to human health or the environment. ~~Soil and groundwater~~ Groundwater and soil samples shall be analyzed for parameters listed in Tables H-2 and H-3 to quantify contamination, if any, originating from the OD Unit.

~~Groundwater sampling results shall be compared to the New Mexico Water Quality Control Commission water quality standards and the Federal Safe Drinking Water Act maximum contaminant levels (MCLs), included in Table H-3. If the levels of hazardous constituents in the groundwater exceed the water quality standards or MCLs, a risk assessment shall be prepared. If the risk assessment demonstrates that the level of contamination is unacceptable, the groundwater shall be subject to corrective action, and a corrective action work plan subject to NMED review and approval shall be developed. For perchlorate, Kirtland AFB will apply the Office of the Under Secretary of Defense *Perchlorate Release Management Policy* dated 22 April 2009.~~

Surface and subsurface soil at the OD Unit shall be characterized by sampling and analysis. Soil sampling shall follow the procedures described in Section 2.2.1 of this Permit Attachment (H). Soil shall be analyzed for the parameters listed in Table H-~~2~~3. If sampling and analysis of soil indicates the presence of hazardous waste or hazardous constituents above background levels, a risk assessment shall be conducted based on a residential land-use scenario to determine whether the contaminants pose an unacceptable risk to human health or the environment. In lieu of a baseline risk assessment, the Permittee may compare the soil sampling results to the soil screening levels using the procedures listed in the Department's most current version of "Technical Background Document for Development of Soil Screening Levels," as ~~amended~~it may be updated, provided the soil screening levels are based on a residential land-use scenario. If the risk assessment demonstrates that the level of contamination is unacceptable, the contaminated soil exhibiting unacceptable risk shall be subject to corrective action under Permit Part 6 and shall be excavated and removed. The excavated soil shall be collected, transferred to containers, and, if

applicable, managed and disposed of as hazardous waste. The Permittee shall conduct corrective action activities at the OD Unit using the cleanup levels in Permit Section 6.2.3 if corrective action is necessary. Clean up levels shall be based on a residential land use scenario. Background soil concentrations for metals are those approved by the Department for the KAFB Facility, and are listed in Table D-4 of Permit Attachment D.

2.1 Monitoring Wells

2.1.1 Installation of New Monitoring Wells

The OD Unit is subject to the environmental performance standards of 40 C.F.R. § 264.601. As such, groundwater monitoring shall be conducted as part of closure activities to demonstrate that operations did not impact groundwater. Four monitoring wells, one upgradient and three downgradient of the OD Unit, shall be installed. The locations of the proposed monitoring wells are presented in Figure H-3.

~~A monitoring well installation plan is included as Attachment 1 to this Closure Plan. The Monitoring Well Installation Plan addresses:~~

- ~~Well locations,~~
- ~~Drilling specifications,~~
- ~~Well construction specifications,~~
- ~~Well development procedures,~~
- ~~A schedule for implementation and completion of the well installations;~~
- ~~Preparation and submittal of a well completion report; and~~
- ~~Groundwater sampling and analysis requirements for eight quarters.~~

~~In addition, t~~The wells installed at the OD Unit shall meet the groundwater monitoring requirements of 40 C.F.R. §§ 264.97(a)(2), (b), and (c). Within 30 days of completing well installation, ~~Kirtland AFB~~the Permitee shall submit a well completion report to the Department for approval.

Groundwater monitoring wells shall be properly plugged and abandoned in accordance with applicable New Mexico statutes and regulations, provided groundwater contamination has not occurred. If groundwater contamination has occurred, these monitoring wells shall be maintained for the purpose of implementing corrective action. The wells shall not be plugged or abandoned until the Department has approved closure of the OD Unit.

~~A~~ Activities for monitoring well installation ~~plan is included as Attachment 1 to this Closure Plan. The Monitoring Well Installation Plan addresses~~are presented in the following paragraphs and include:

- Well locations,
- Drilling specifications,
- Well construction specifications,
- Well development procedures,
- A schedule for implementation and completion of the well installations;
- Preparation and submittal of a well completion report; and

- Groundwater sampling and analysis requirements for eight quarters.

~~This work plan describes the proposed monitoring well installation and sampling activities near the Open Detonation (OD) unit on Kirtland Air Force Base (AFB), New Mexico.~~ The primary project objective is the installation and sampling of four groundwater monitoring wells, one upgradient and three downgradient of the site, to evaluate the potential groundwater impacts from the operation of the OD unit. ~~The general site location is shown in Figure 1.~~

The new monitoring wells ~~will~~shall be installed in the vicinity of the OD Unit (Figure H-3). ~~The proposed monitoring well locations are shown on Figure 2.~~ Installation of the monitoring wells ~~will~~shall facilitate groundwater sampling from the uppermost groundwater both up and downgradient of potential source areas associated with the OD unit. Based on data from nearby wells, groundwater at the proposed locations is expected to occur under confined conditions within the Paleozoic sedimentary rocks of the Madera Group or Sandia Formation or the underlying Precambrian granite. The depth to the uppermost water bearing zones at the proposed well locations is expected to range from approximately 100 to 200 feet (ft) below ground surface (bgs). Final well design ~~will~~shall be dependent on field conditions and the placement of the fourth well ~~will~~shall be performed in consultation with the ~~New Mexico Environment~~ Department~~ Hazardous Waste Bureau (NMED-HWB)~~.

Table H-2

Comparison of Reporting Levels to Screening Objectives in Groundwater, Open Burn and Open Detonation Units at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Water Quality Standard	EPA Maximum Contaminant Levels/Secondary Contaminant Levels[a]	EPA Regional Screening Levels Tap Water (Nov 2012)	DOE Open Burn Suggested Maximum Background (Dec 1998)	LOQ	LOD	DL
EPA 160.2	Total dissolved solids	NA	mg/L	--	--	--	--	10	5	15
EPA 310.2	Alkalinity	14797-65-0	mg/L	--	--	--	--	10	5	2.5
EPA 350.1	Ammonia	7664-41-7	mg/L	--	--	--	--	0.5	0.1	0.049
SW9030B	Sulfide	18496-25-8	mg/L	58.4	10	25	4 (as NO2/NO3)	0.5	0.1	0.04
SW9056	Nitrate	14797-55-8	mg/L	585	10	25	4 (as NO2/NO3)	0.5	0.1	0.05
SW9056	Nitrite	14797-65-0	mg/L	3.65	1	1.6	4 (as NO2/NO3)	0.5	0.1	0.05
SW9056	Chloride	16887-00-6	mg/L	--	--	--	--	0.5	0.1	0.05
SW9056	Sulfate	18785-72-3	mg/L	1.46	--	620	--	0.5	0.1	0.05
SW9056	Fluoride	14797-73-0	mg/L	1.46	--	620	--	0.5	0.1	0.05
SW9056	Bromide	7782-41-4	mg/L	--	--	--	--	0.5	0.1	0.05
SW9060	Total organic carbon	7726-95-6	mg/L	1,000	2,000	--	120	1	0.5	0.25
SW6010B	Barium	7440-39-3	µg/L	7,300	2,000	3100	120	20	5	0.25
SW6010B	Beryllium	7440-42-8	µg/L	7,300	4	3100	4	20	5	0.13
SW6010B	Cadmium	7440-41-7	µg/L	10	5	--	0.47	3	1	0.5
SW6010B	Calcium	7440-43-9	µg/L	10	5	--	0.47	1000	80	35
SW6010B	Chromium	7440-70-2	µg/L	50	100	--	43	1000	80	35
SW6010B	Cobalt	7440-47-3	µg/L	50	100	--	2.5	10	5	1.2
SW6010B	Copper	7440-48-4	µg/L	1,000	1,300 (1,000)	--	250	15	5	2.1
SW6010B	Iron	7440-50-8	µg/L	1,000	1,300 (1,000)	11000	<50	200	100	50
SW6010B	Lead	7439-89-6	µg/L	150	15	11000	10	10	5	2.5
SW6010B	Lithium	7439-92-1	µg/L	50	15	31	10	500	25	11
SW6010B	Magnesium	7439-93-2	µg/L	--	--	31	--	500	25	11
SW6010B	Manganese	7439-95-4	µg/L	876	--	320	--	500	25	11
SW6010B	Molybdenum	7439-96-5	µg/L	183	--	78	--	500	25	11
SW6010B	Nickel	7439-98-7	µg/L	183	--	300	28	500	25	11
SW6010B	Potassium	7440-02-0	µg/L	--	--	300	28	3000	250	237
SW6010B	Selenium	7440-09-7	µg/L	50	50	--	5	3000	250	237
SW6010B	Silver	7782-49-2	µg/L	50	100	--	<10	5	2	0.84
SW6010B	Sodium	7440-22-4	µg/L	50	100	--	<10	5000	250	91.6
SW6010B	Strontium	7440-23-5	µg/L	21900	--	9300	--	500	25	11
SW6010B	Tin	7440-24-6	µg/L	21900	--	9300	50	50	15	1.7
SW6010B	Vanadium*	7440-31-5	µg/L	--	--	9300	50	50	15	1.7
SW6010B	Zinc	7440-62-2	µg/L	10,000	5,000	--	260	20	10	3
SW6020A	Antimony	7440-66-6	µg/L	10,000	5,000	--	260	20	10	3
SW6020A	Arsenic	7440-36-0	µg/L	100	10	--	14	2	2	1
SW6020A	Thallium	7440-38-2	µg/L	100	10	--	14	3	2	1
SW7470A	Mercury	7440-28-0	µg/L	2	2	--	2	0.3	0.1	0.1
SW6850	Perchlorate	7439-97-6	µg/L	4[b]	2	--	2	0.5	0.1	0.1
SW8260B	1,1,1-Trichloroethane	14797-73-0	µg/L	4[b]	200	--	--	0.5	0.25	0.082
SW8260B	1,1,2,2-Tetrachloroethane	71-55-6	µg/L	60	200	--	--	1	0.4	0.19
SW8260B	1,1,2-trichloro-1,1,2-trifluoroethane*	79-34-5	µg/L	10	--	--	--	1	0.2	0.09
SW8260B	1,1,2-trichloroethane	76-13-1	µg/L	10	5	--	--	50	0.4	0.25
SW8260B	1,1-Dichloroethane	75-34-3	µg/L	25	5	--	--	1	0.4	0.31
SW8260B	1,1-Dichloroethene	75-35-4	µg/L	5	7	--	--	1	0.4	0.14
SW8260B	1,2,3-Trichlorobenzene	87-61-6	µg/L	70	--	0.00065	--	1	0.4	0.14
SW8011	1,2,3-Trichloropropane	96-18-4	µg/L	--	--	0.00065	--	0.2	0.09	0.09
SW8260B	1,2,4-Trimethylbenzene	95-63-6	µg/L	--	--	15	--	1	0.2	0.12
SW8260B	1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	µg/L	--	0.2	NA	--	0.02	0.005	0.005
SW8011	1,2-Dibromoethane (EDB)	106-93-4	µg/L	0.1	0.05	NA	--	0.02	0.005	0.0022
SW8260B	1,2-Dichloroethane	107-06-2	µg/L	10	5	--	--	1	0.4	0.22
SW8260B	1,2-Dichlorobenzene	95-50-1	µg/L	--	600	--	--	1	0.4	0.14
SW8260B	1,2-Dichloropropane	78-87-5	µg/L	--	5	--	--	1	0.2	0.15
SW8260B	1,3,5-Trimethylbenzene	108-67-8	µg/L	--	--	87	--	1	0.2	0.14
SW8260B	1,3-Dichlorobenzene*	541-73-1	µg/L	--	--	--	--	1	0.4	0.11
SW8260B	1,4-Dichlorobenzene	106-46-7	µg/L	--	75	--	--	1	0.2	0.13
SW8260B	1,4-Dioxane	123-91-1	µg/L	--	--	0.67	--	1	TBD	0.12
SW8260B	2-Butanone (MEK)	78-93-3	µg/L	--	--	4,900	--	2	0.4	0.35
SW8260B	2-Hexanone	591-78-6	µg/L	--	--	34	--	2	0.4	0.17
SW8260B	4-Methyl-2-pentanone (MIBK)	108-10-1	µg/L	--	--	1,000	--	2	0.4	1
SW8260B	Acetone	67-64-1	µg/L	--	--	12,000	--	10	4	2.1
SW8260B	Benzene	71-43-2	µg/L	10	5	--	--	1	0.2	0.13
SW8260B	Bromochloromethane	74-97-5	µg/L	--	--	83	--	1	0.4	0.14
SW8260B	Bromodichloromethane	75-27-4	µg/L	--	100	--	--	1	0.4	0.14
SW8260B	Bromoform	75-25-2	µg/L	--	100	--	--	1	0.4	0.1
SW8260B	Bromomethane	74-83-9	µg/L	--	--	7	--	1	0.4	0.29
SW8260B	Carbon disulfide	75-15-0	µg/L	--	--	720	--	2	0.2	0.16
SW8260B	Carbon tetrachloride	56-23-5	µg/L	10	5	--	--	1	0.4	0.15
SW8260B	Chlorobenzene	108-90-7	µg/L	--	100	--	--	1	0.2	0.12
SW8260B	Chloroethane	75-00-3	µg/L	--	--	21,000	--	1	0.4	0.34

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Table H-2

Comparison of Reporting Levels to Screening Objectives in Groundwater, Open Burn and Open Detonation Units at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Water Quality Standard	EPA Maximum Contaminant Levels/Secondary Contaminant Levels[a]	EPA Regional Screening Levels Tap Water (Nov 2012)	DOE Open Burn Suggested Maximum Background (Dec 1998)	LOQ	LOD	DL
SW8260B	Chloroform	67-66-3	µg/L	100	100	--	--	1	0.2	0.12
SW8260B	Chloromethane	74-87-3	µg/L	--	--	190	--	1	0.4	0.25
SW8260B	cis-1,2-Dichloroethene	156-59-2	µg/L	--	70	--	--	1	0.4	0.1
SW8260B	cis-1,3-Dichloropropene*	10061-01-5	µg/L	--	--	--	--	1	0.4	0.22
SW8260B	Cyclohexane*	1735-17-7	µg/L	--	--	--	--	(a)	(a)	(a)
SW8260B	Dibromochloromethane	124-48-1	µg/L	--	100	--	--	1	0.4	0.13
SW8260B	Dichlorodifluoromethane (Freon 12)	75-71-8	µg/L	--	--	190	--	1	0.4	0.16
SW8260B	Ethylbenzene	100-41-4	µg/L	750	700	--	--	1	0.2	0.1
SW8260B	Isopropylbenzene	98-82-8	µg/L	--	--	390	--	1	0.2	0.12
SW8260B	Methyl tert-butyl ether (MTBE)	1634-04-4	µg/L	--	(5)	--	--	2	0.4	0.19
SW8260B	Methylene chloride	75-09-2	µg/L	100	5	--	--	1	0.4	0.35
SW8260B	Methyl Acetate*	79-20-9	µg/L	--	--	--	--	(a)	(a)	(a)
SW8260B	Methly Cyclohexane*	108-87-2	µg/L	--	--	--	--	(a)	(a)	(a)
SW8260B	m-Xylene & p-Xylene	136777-61-2	µg/L	--	10,000	--	--	1	0.8	0.18
SW8260B	Naphthalene	91-20-3	µg/L	30	--	NA	--	1	0.2	0.15
SW8260B	o-Xylene	95-47-6	µg/L	--	10,000	--	--	1	0.4	0.1
SW8260B	Styrene	100-42-5	µg/L	--	100	--	--	1	0.2	0.15
SW8260B	Tetrachloroethene	127-18-4	µg/L	--	5	--	--	1	0.2	0.1
SW8260B	Toluene	108-88-3	µg/L	750	1,000	--	--	1	0.4	0.25
SW8260B	trans-1,2-Dichloroethene	156-60-5	µg/L	--	100	--	--	1	0.4	0.11
SW8260B	trans-1,3-Dichloropropene*	10061-02-6	µg/L	--	--	--	--	1	0.2	0.08
SW8260B	Trichloroethene	79-01-6	µg/L	100	5	--	--	1	0.4	0.13
SW8260B	Trichlorofluoromethane (Freon 11)	75-69-4	µg/L	--	--	1,100	--	1	0.4	0.23
SW8260B	Vinyl chloride	75-01-4	µg/L	1	2	--	--	1	0.4	0.22
SW8260B	1,2-Dichloroethane-d4 (Surrogate)		%	--	--	--	--	--	--	--
SW8260B	4-Bromofluorobenzene (Surrogate)		%	--	--	--	--	--	--	--
SW8260B	Dibromofluoromethane (Surrogate)		%	--	--	--	--	--	--	--
SW8260B	Toluene-d8 (Surrogate)		%	--	--	--	--	--	--	--
SW8270C	1,1-biphenyl	92-52-4	µg/L	--	--	0.83	--	10	NA	5
SW8270C	1,2,4,5-tetrachlrorbenzene	95-94-3	µg/L	--	--	1.2	--	10	2.1	0.54
SW8270C	2,4,5-Trichlorophenol	95-95-4	µg/L	--	--	890	--	10	3.0	2
SW8270C	2,4,6-Trichlorophenol	88-06-2	µg/L	--	--	3.5	--	10	3.0	2
SW8270C	2,4-Dichlorophenol	120-83-2	µg/L	--	--	35	--	10	3.0	2.6
SW8270C	2,4-Dimethylphenol	105-67-9	µg/L	--	--	270	--	10	3.0	2.2
SW8270C	2,4-Dinitrotoluene	121-14-2	µg/L	--	--	0.2	--	10	3.0	2
SW8270C	2,6-Dichlorophenol*	87-65-0	µg/L	--	--	--	--	15	3.0	5
SW8270C	2,6-Dinitrotoluene	606-20-2	µg/L	--	--	15	--	10	3.0	2
SW8270C	2-Chloronaphthalene	91-58-7	µg/L	--	--	550	--	10	3.0	1.3
SW8270C	2-Chlorophenol	95-57-8	µg/L	--	--	71	--	10	3.0	1.6
SW8270C	2-Methylphenol	95-48-7	µg/L	--	--	720	--	10	3.0	0.93
SW8270C	2-Nitroaniline	88-74-4	µg/L	--	--	150	--	50	3.0	2
SW8270C	2-Nitrophenol*	88-75-5	µg/L	--	--	--	--	10	3.0	1.9
SW8270C	2,2-oxybis(1-chloropropane)*	52438-91-2	µg/L	--	--	--	--	10	3	1.3
SW8270C	3,3'-Dichlorobenzidine	91-94-1	µg/L	--	--	0.11	--	50	3.0	0.96
SW8270C	3-Methylphenol & 4-Methylphenol	65794-96-9	µg/L	--	--	720	--	30	20	10
SW8270C	3-Nitroaniline*	99-09-2	µg/L	--	--	--	--	50	3.0	1.4
SW8270C	4,6-Dinitro-2-methylphenol	534-52-1	µg/L	--	--	1.2	--	60	20	2.2
SW8270C	4-Bromophenyl phenyl ether*	101-55-3	µg/L	--	--	--	--	10	3.0	1.1
SW8270C	4-Chloro-3-methylphenol	59-50-7	µg/L	--	--	1,100	--	10	3.0	2
SW8270C	4-Chloroaniline	106-47-8	µg/L	--	--	0.32	--	10	3.0	2
SW8270C	4-Chlorophenyl phenyl ether*	7005-72-3	µg/L	--	--	--	--	10	3.0	1.1
SW8270C	4-Nitroaniline	100-01-6	µg/L	--	--	3.3	--	50	3.0	1.5
SW8270C	4-Nitrophenol*	100-02-7	µg/L	--	--	--	--	60	20	6.1
SW8270C	Acetophenone	17537-31-4	µg/L	--	--	1,500	--	10	3	0.78
SW8270C	Azobenzene (as 1,2 Diphenylhydrazine)	103-33-3	µg/L	--	--	0.067	--	10	3.0	0.71
SW8270C	Atrazine	93616-39-8	µg/L	--	--	0.26	--	(a)	(a)	(a)
SW8270C	Benzaldehyde	100-52-7	µg/L	--	--	1,500	--	(a)	(a)	(a)
SW8270C	bis(2-Chloroethoxy)methane	111-91-1	µg/L	--	--	46	--	10	3.0	1
SW8270C	bis(2-Chloroethyl) ether	111-44-4	µg/L	--	--	0.012	--	10	3.0	1.5
SW8270C	bis(2-Ethylhexyl) phthalate	117-81-7	µg/L	--	6	--	--	10	3.0	1
SW8270C	Butyl benzyl phthalate	85-68-7	µg/L	--	--	14	--	10	3.0	1.4
SW8270C	Caprolactam	105-60-2	µg/L	--	--	7,700	--	(a)	(a)	(a)
SW8270C	Carbazole*	86-74-8	µg/L	--	--	--	--	10	3.0	1.2
SW8270C	Dibenzofuran	132-64-9	µg/L	--	--	5.8	--	10	3.0	1.1
SW8270C	Diethyl phthalate	84-66-2	µg/L	--	--	11,000	--	10	3.0	0.93
SW8270C	Dimethyl phthalate*	131-11-3	µg/L	--	--	--	--	10	3.0	0.88
SW8270C	Di-n-butyl phthalate	84-74-2	µg/L	--	--	670	--	10	3.0	1.1
SW8270C	Di-n-octyl phthalate*	117-84-0	µg/L	--	--	--	--	10	3.0	1.5
SW8270C	Hexachlorobenzene	118-74-1	µg/L	--	1	--	--	10	3.0	1.4
SW8270C	Hexachlorobutadiene	87-68-3	µg/L	--	--	0.26	--	10	3.0	1.3
SW8270C	Hexachloroethane	67-72-1	µg/L	--	--	0.79	--	10	3.0	1.4

Table H-2
Comparison of Reporting Levels to Screening Objectives in Groundwater, Open Burn and Open Detonation Units at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Water Quality Standard	EPA Maximum Contaminant Levels/Secondary Contaminant Levels[a]	EPA Regional Screening Levels Tap Water (Nov 2012)	DOE Open Burn Suggested Maximum Background (Dec 1998)	LOQ	LOD	DL
SW8270C	Hexachlorocyclopentadiene	77-47-4	µg/L		--	22	--	10	3	0.214
SW8270C	Isophorone	78-59-1	µg/L	--	--	67	--	10	3.0	1
SW8270C	Nitrobenzene	98-95-3	µg/L	--	--	0.12	--	10	3.0	1.6
SW8270C	N-Nitrosodimethylamine	62-75-9	µg/L	--	--	0.0004	--	15	3.0	0.96
SW8270C	N-Nitrosodi-n-propylamine	621-64-7	µg/L	--	--	0.0093	--	10	3.0	1.4
SW8270C	N-Nitrosodiphenylamine	86-30-6	µg/L	--	--	10	--	10	3.0	0.54
SW8270C	Pentachlorophenol	87-86-5	µg/L	--	1	--	--	60	20	2
SW8270C	Phenol	108-95-2	µg/L	--	--	4,500	--	10	3.0	1.1
SW8270C	Phenol-d6		%	--	--	--	--	--	--	--
SW8270C	2-Fluorobiphenyl		%	--	--	--	--	--	--	--
SW8270C	Terphenyl-d14		%	--	--	--	--	--	--	--
SW8270C-SIM	1-methylnaphthalene	90-12-0	µg/L	--	--	0.97	--	0.1	0.01	0.006
SW8270C-SIM	2-methylnaphthalene	91-57-6	µg/L	--	--	27	--	0.1	0.01	0.006
SW8270C-SIM	Acenaphthene	83-32-9	µg/L	--	--	400	--	0.1	0.01	0.003
SW8270C-SIM	Acenaphthylene	208-96-8	µg/L	--	--	--	--	0.1	0.01	0.003
SW8270C-SIM	Anthracene	120-12-7	µg/L	--	--	1300	--	0.1	0.01	0.004
SW8270C-SIM	Benzo (a) anthracene	56-55-3	µg/L	--	--	0.029	--	0.1	0.01	0.005
SW8270C-SIM	Benzo (a) pyrene	50-32-8	µg/L	0.7	0.2	--	--	0.1	0.01	0.004
SW8270C-SIM	Benzo (b) fluoranthene	205-99-2	µg/L	--	--	0.029	--	0.1	0.02	0.012
SW8270C-SIM	Benzo (g,h,i) perylene	191-24-2	µg/L	--	--	--	--	0.1	0.01	0.006
SW8270C-SIM	Benzo (k) fluoranthene	207-08-9	µg/L	--	--	0.29	--	0.1	0.01	0.008
SW8270C-SIM	Chrysene	218-01-9	µg/L	--	--	2.9	--	0.1	0.01	0.004
SW8270C-SIM	Dibenzo (a,h) anthracene	53-70-3	µg/L	--	--	0.0029	--	0.1	0.02	0.014
SW8270C-SIM	Fluoranthene	206-44-0	µg/L	--	--	630	--	0.1	0.01	0.004
SW8270C-SIM	Fluorene	86-73-7	µg/L	--	--	220	--	0.1	0.01	0.004
SW8270C-SIM	Indeno (1,2,3-c,d) pyrene	193-39-5	µg/L	--	--	0.029	--	0.1	0.02	0.014
SW8270C-SIM	Naphthalene	91-20-3	µg/L	30		NA	--	0.1	0.01	0.004
SW8270C-SIM	Phenanthrene	85-01-8	µg/L	--	--	--	--	0.1	0.01	0.006
SW8270C-SIM	Pyrene	129-00-0	µg/L	--	--	87	--	0.1	0.01	0.004
SW8290	2,3,7,8-TCDF*	51207-31-9	pg/L	--	--	--	--	10	2.5	EDL
SW8290	2,3,7,8-TCDD*	1746-01-6	pg/L	--	--	--	--	10	2.5	EDL
SW8290	1,2,3,7,8-PeCDF*	57117-41-6	pg/L	--	--	--	--	50	6.5	EDL
SW8290	2,3,4,7,8-PeCDF*	57117-31-4	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,7,8-PeCDD*	40321-76-4	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,4,7,8-HxCDF*	70648-26-9	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,6,7,8-HxCDF*	57117-44-9	pg/L	--	--	--	--	50	12.5	EDL
SW8290	2,3,4,6,7,8-HxCDF*	60851-34-5	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,7,8,9-HxCDF*	72918-21-9	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,4,7,8-HxCDD*	39227-28-6	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,6,7,8-HxCDD*	57653-85-7	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,7,8,9-HxCDD*	19408-74-3	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,4,6,7,8-HpCDF*	67562-39-4	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,4,7,8,9-HpCDF*	55673-89-7	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,4,6,7,8-HpCDD*	35822-46-9	pg/L	--	--	--	--	50	12.5	EDL
SW8290	OCDF*	39001-02-0	pg/L	--	--	--	--	100	25	EDL
SW8290	OCDD*	3268-87-9	pg/L	--	--	--	--	100	50	EDL
SW8330B	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	µg/L	--	--	780	--	0.15	0.05	0.036
SW8330B	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	µg/L	--	--	0.61	--	0.25	0.05	0.036
SW8330B	1,3,5-Trinitrobenzene (1,3,5-TNB)	99-35-4	µg/L	--	--	460	--	0.1	0.05	0.03
SW8330B	1,3-Dinitrobenzene (1,3-DNB)	99-65-0	µg/L	--	--	1.5	--	0.15	0.1	0.05
SW8330B	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	479-45-8	µg/L	--	--	61	--	0.15	0.1	0.05
SW8330B	Nitrobenzene (NB)	98-95-3	µg/L	--	--	0.12	--	0.15	0.1	0.05
SW8330B	2,4,6-Trinitrotoluene (2,4,6-TNT)	118-96-7	µg/L	--	--	2.2	--	0.15	0.1	0.05
SW8330B	4-Amino-2,6-dinitrotoluene (4-Am-DNT)	19406-51-0	µg/L	--	--	30	--	0.15	0.1	0.05
SW8330B	2-Amino-4,6-dinitrotoluene (2-Am-DNT)	35572-78-2	µg/L	--	--	30	--	0.3	0.1	0.1
SW8330B	2,4-Dinitrotoluene (2,4-DNT)	121-14-2	µg/L	--	--	0.2	--	0.15	0.1	0.05
SW8330B	2,6-Dinitrotoluene (2,6-DNT)	606-20-2	µg/L	--	--	15	--	0.15	0.1	0.05
SW8330B	2-Nitrotoluene (2-NT)	88-72-2	µg/L	--	--	0.27	--	1	0.1	0.088
SW8330B	3-Nitrotoluene (3-NT)	99-08-1	µg/L	--	--	1.3	--	0.5	0.1	0.057
SW8330B	4-Nitrotoluene (4-NT)	99-99-0	µg/L	--	--	3.7	--	1	0.1	0.088
SW8330B	Nitroglycerin	55-63-0	µg/L	--	--	1.5	--	1	0.5	0.33
SW8330B	PETN	78-11-5	µg/L	--	--	16	--	1	0.5	0.3
SW7580	White phosphorous	7723-14-0	µg/L	--	--	0.31	--	0.05	0.025	0.015

The laboratory does not analyze for these compounds. The compounds will be tentatively identified based on a computer library search of the sample chromotography. If found, the coumpound concentration will be reported as an estimated value.
The detection limit exceeds most stringent criteria.

[a] Secondary Contaminant Levels are in parentheses
[b] KAFB RCRA permit screening criteria for perchlorate
* Risk based screening levels will be calculated if analyte is detected and toxicological information is available
Constituents with "%" units are surrogates and are not a part of the target analytes.
CAS - Chemical Abstract Service
DL - Detection limit
DOE - Department of Energy
LOD - Limit of detection
LOQ - Limit of quantitation
µg/L - micrograms per liter
mg/L - milligrams per liter
NA - not applicable
pg/L - picograms per liter
RPD - relative percent difference

Table H-3

Comparison of Reporting Levels to Screening Objectives in Soil, Open Burn Unit at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Residential SSG (Feb 2012)	Coyote Test Field Super Group Background Values (surface soil)	Coyote Test Field Super Group Background Values (subsurface soil)	EPA Regional Screening Levels, Residential (Nov 2012)	LOQ	LOD	DL
SW6010B	Antimony	7440-36-0	mg/kg	31.3	3.9	3.9	--	3	2	0.94
SW6010B	Barium	7440-39-3	mg/kg	15,596	130	214	--	2	0.5	0.12
SW6010B	Beryllium	7440-41-7	mg/kg	156	0.65	0.65	--	0.3	0.1	0.03
SW6010B	Cadmium	7440-43-9	mg/kg	70.3	1	0.9	--	0.3	0.1	0.03
SW6010B	Chromium	7440-47-3	mg/kg	117,321/2.97	17.3	12.8	--	1	0.5	0.14
SW6010B	Cobalt	7440-48-4	mg/kg	--	5.2	5.2	23	1	0.5	0.25
SW6010B	Copper	7440-50-8	mg/kg	3,129	15.4	18.2	--	1.5	0.5	0.22
SW6010B	Lead	7439-92-1	mg/kg	400	21.4	11.8	--	1	0.5	0.26
SW6010B	Nickel	7440-02-0	mg/kg	1,564	11.5	11.5	--	1	0.5	0.24
SW6010B	Selenium	7782-49-2	mg/kg	391	1	1	--	4	2.5	1.4
SW6010B	Silver	7440-22-4	mg/kg	391	1	1	--	0.5	0.2	0.09
SW6010B	Tin	7440-31-5	mg/kg	--	10	10	47,000	100	25	11
SW6010B	Vanadium	7440-62-2	mg/kg	391	20.4	21.5	--	2	0.5	0.19
SW6010B	Zinc	7440-66-6	mg/kg	23,464	62	62	--	2	1	0.19
SW6020A	Arsenic	7440-38-2	mg/kg	3.9	5.6	7.4	--	0.5	0.3	0.15
SW6020A	Thallium	7440-28-0	mg/kg	0.78	1.1	1.1	--	0.15	0.1	0.05
SW7471A	Mercury	7439-97-6	mg/kg	15.6/7.82	0.25	0.10	--	0.04	0.012	0.0086
SW6850	Perchlorate	14797-73-0	µg/kg	54,800	--	--	--	5	0.4	0.26
SW7580	White Phosphorus	7723-14-0W	µg/kg	--	--	--	1,600	0.1	0.05	0.015
SW8260B	1,1,1-Trichloroethane	71-55-6	µg/kg	15,609,580	--	--	--	5	1	0.36
SW8260B	1,1,2,2-Tetrachloroethane	79-34-5	µg/kg	8,021	--	--	--	5	1	0.68
SW8260B	1,1,2-Trichloroethane	79-00-5	µg/kg	2,811	--	--	--	5	1	0.44
SW8260B	1,1,2-trichloro-1,1,2-trifluoroethane	76-13-1	µg/kg	72,080,604	--	--	--	10	1	0.83
SW8260B	1,1-Dichloroethane	75-34-3	µg/kg	64,514	--	--	--	5	1	0.29
SW8260B	1,1-Dichloroethene	75-35-4	µg/kg	448,879	--	--	--	5	0.5	0.26
SW8260B	1,2,3-Trichlorobenzene	87-61-6	µg/kg	--	--	--	49,000	5	1	0.75
SW8260B	1,2,3-Trichloropropane	96-18-4	µg/kg	50	--	--	--	5	1	0.76
SW8260B	1,2,4-Trichlorobenzene	120-82-1	µg/kg	72,980	--	--	--	5	1	0.75
SW8260B	1,2,4-Trimethylbenzene	95-63-6	µg/kg	--	--	--	62,000	5	1	0.51
SW8260B	1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	µg/kg	186	--	--	--	10	1	0.88
SW8260B	1,2-Dibromoethane (EDB)	106-93-4	µg/kg	588	--	--	--	10	1	0.27
SW8260B	1,2-Dichlorobenzene	95-50-1	µg/kg	2,306,711	--	--	--	5	1	0.64
SW8260B	1,2-Dichloroethane	107-06-2	µg/kg	7,885	--	--	--	5	1	0.73
SW8260B	1,2-Dichloropropane	78-87-5	µg/kg	15,238	--	--	--	5	1	0.6
SW8260B	1,3,5-Trimethylbenzene	108-67-8	µg/kg	--	--	--	780,000	5	1	0.35
SW8260B	1,3-Dichlorobenzene*	541-73-1	µg/kg	--	--	--	--	5	1	0.3
SW8260B	1,4-Dichlorobenzene	106-46-7	µg/kg	31,731	--	--	--	5	1	0.78
SW8260B	1,4-Dioxane	123-91-1	µg/kg	48,634	--	--	--	250	75	39
SW8260B	2-Butanone (MEK)	78-93-3	µg/kg	37,076,608	--	--	--	10	3	1.4
SW8260B	2-Hexanone	591-78-6	µg/kg	--	--	--	210,000	10	1	0.74
SW8260B	4-Methyl-2-pentanone (MIBK)	108-10-1	µg/kg	51,578	--	--	--	10	1	0.92
SW8260B	Acetone	67-64-1	µg/kg	66,556,733	--	--	--	20	3	1.4
SW8260B	Benzene	71-43-2	µg/kg	15,381	--	--	--	5	1	0.26
SW8260B	Bromochloromethane	74-97-5	µg/kg	--	--	--	160,000	5	1	0.94
SW8260B	Bromodichloromethane	75-27-4	µg/kg	5,411	--	--	--	5	1	0.53
SW8260B	Bromoform	75-25-2	µg/kg	--	--	--	--	5	1	0.4
SW8260B	Bromomethane	74-83-9	µg/kg	16,485	--	--	--	5	3	0.86
SW8260B	Carbon disulfide	75-15-0	µg/kg	1,532,527	--	--	--	10	1	0.49
SW8260B	Carbon tetrachloride	56-23-5	µg/kg	10,833	--	--	--	5	1	0.53
SW8260B	Chlorobenzene	108-90-7	µg/kg	376,370	--	--	--	5	1	0.29
SW8260B	Chloroethane	75-00-3	µg/kg	29,806,983	--	--	--	5	1	0.45
SW8260B	Chloroform	67-66-3	µg/kg	5,864	--	--	--	5	1	0.26
SW8260B	Chloromethane	74-87-3	µg/kg	274,707	--	--	--	5	1	0.5
SW8260B	cis-1,2-Dichloroethene	156-59-2	µg/kg	156,428	--	--	--	5	1	0.89
SW8260B	cis-1,3-Dichloropropene*	10061-01-5	µg/kg	33713	--	--	--	5	1	0.64
SW8260B	Cyclohexane	1735-17-7	µg/kg	--	--	--	7,000,000	(a)	(a)	(a)
SW8260B	Dibromochloromethane	124-48-1	µg/kg	12,127	--	--	--	5	0.5	0.21
SW8260B	Dichlorodifluoromethane (Freon 12)	75-71-8	µg/kg	168,142	--	--	--	5	3	0.89
SW8260B	Ethylbenzene	100-41-4	µg/kg	68,448	--	--	--	5	1	0.34
SW8260B	Isopropylbenzene	98-82-8	µg/kg	2,430,743	--	--	--	5	1	0.52
SW8260B	Methyl Acetate	79-20-9	µg/kg	78,214,000	--	--	--	(a)	(a)	(a)
SW8260B	Methly Cyclohexane	108-87-2	µg/kg	5,625,911	--	--	--	(a)	(a)	(a)
SW8260B	Methyl tert-butyl ether (MTBE)	1634-04-4	µg/kg	901,073	--	--	--	10	1	0.6
SW8260B	Methylene chloride	75-09-2	µg/kg	409,376	--	--	--	5	1	0.84
SW8260B	m-Xylene & p-Xylene	136777-61-2	µg/kg	774,289	--	--	--	5	1	0.81
SW8260B	Naphthalene	91-20-3	µg/kg	42,976	--	--	--	5	1	0.63
SW8260B	o-Xylene	95-47-6	µg/kg	898,344	--	--	--	5	0.5	0.33
SW8260B	Styrene	100-42-5	µg/kg	7,277,612	--	--	--	5	1	0.31
SW8260B	Tetrachloroethene	127-18-4	µg/kg	7,021	--	--	--	5	1	0.61
SW8260B	Toluene	108-88-3	µg/kg	5,274,400	--	--	--	5	1	0.61
SW8260B	trans-1,2-Dichloroethene	156-60-5	µg/kg	269,586	--	--	--	5	1	0.38
SW8260B	trans-1,3-Dichloropropene*	10061-02-6	µg/kg	33713	--	--	--	5	1	0.75
SW8260B	Trichloroethene	79-01-6	µg/kg	8,767	--	--	--	5	1	0.6
SW8260B	Trichlorofluoromethane (Freon 11)	75-69-4	µg/kg	1,412,976	--	--	--	10	1	0.34
SW8260B	Vinyl chloride	75-01-4	µg/kg	728	--	--	--	5	1	0.36

Table H-3
Comparison of Reporting Levels to Screening Objectives in Soil, Open Burn Unit at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Residential SSG (Feb 2012)	Coyote Test Field Super Group Background Values (surface soil)	Coyote Test Field Super Group Background Values (subsurface soil)	EPA Regional Screening Levels, Residential (Nov 2012)	LOQ	LOD	DL
SW8270C	1,1-biphenyl	92-52-4	µg/kg	57117	--	--	--	330	NA	165
SW8270C	1,2,4,5-tetrachlrorbenzene	95-94-3	µg/kg	18,331	--	--	--	(a)	(a)	(a)
SW8270C	2,4,5-Trichlorophenol	95-95-4	µg/kg	6,110,491	--	--	--	330	167	83
SW8270C	2,4,6-Trichlorophenol	88-06-2	µg/kg	61,105	--	--	--	330	167	84
SW8270C	2,4-Dichlorophenol	120-83-2	µg/kg	183,315	--	--	--	330	167	89
SW8270C	2,4-Dimethylphenol	105-67-9	µg/kg	1,222,098	--	--	--	500	167	167
SW8270C	2,4-Dinitrotoluene	121-14-2	µg/kg	15,689	--	--	--	330	167	89
SW8270C	2,6-Dichlorophenol*	87-65-0	µg/kg	--	--	--	--	500	167	165
SW8270C	2,6-Dinitrotoluene	606-20-2	µg/kg	61,105	--	--	--	330	167	99
SW8270C	2-Chloronaphthalene	91-58-7	µg/kg	6,257,143	--	--	--	330	167	81
SW8270C	2-Chlorophenol	95-57-8	µg/kg	391,071	--	--	--	330	167	88
SW8270C	2-Methylnaphthalene	91-57-6	µg/kg	--	--	--	230,000	330	167	85
SW8270C	2-Methylphenol	95-48-7	µg/kg	--	--	--	3,100,000	330	167	58
SW8270C	2-Nitroaniline	88-74-4	µg/kg	--	--	--	610,000	1600	167	84
SW8270C	2-Nitrophenol*	88-75-5	µg/kg	--	--	--	--	330	167	82
SW8270C	2,2-oxybis(1-chloropropane)*	52438-91-2	µg/kg	--	--	--	--	330	167	54
SW8270C	3,3'-Dichlorobenzidine	91-94-1	µg/kg	10,808	--	--	--	1600	167	94
SW8270C	3-Methylphenol & 4-Methylphenol	65794-96-9	µg/kg	--	--	--	3,100,000	1000	660	330
SW8270C	3-Nitroaniline*	99-09-2	µg/kg	--	--	--	--	1600	333	167
SW8270C	4,6-Dinitro-2-methylphenol	534-52-1	µg/kg	4,888	--	--	--	2000	333	81
SW8270C	4-Bromophenyl phenyl ether*	101-55-3	µg/kg	--	--	--	--	330	167	85
SW8270C	4-Chloro-3-methylphenol	59-50-7	µg/kg	--	--	--	6,100,000	330	167	92
SW8270C	4-Chloroaniline	106-47-8	µg/kg	--	--	--	2,400	330	167	58
SW8270C	4-Chlorophenyl phenyl ether*	7005-72-3	µg/kg	--	--	--	--	330	167	93
SW8270C	4-Nitroaniline	100-01-6	µg/kg	--	--	--	24,000	1600	167	88
SW8270C	4-Nitrophenol*	100-02-7	µg/kg	--	--	--	--	2000	333	280
SW8270C	Acenaphthene	83-32-9	µg/kg	3,440,510	--	--	--	330	167	83
SW8270C	Acenaphthylene*	208-96-8	µg/kg	--	--	--	--	330	167	85
SW8270C	Anthracene	120-12-7	µg/kg	17,202,560	--	--	--	330	167	86
SW8270C	Acetophenone	17537-31-4	µg/kg	7,821,428	--	--	--	(a)	(a)	(a)
SW8270C	Azobenzene (as 1,2 diphenyl hydrazine)	103-33-3	µg/kg	6079	--	--	610	330	167	92
SW8270C	Atrazine	93616-39-8	µg/kg	--	--	--	2,100	(a)	(a)	(a)
SW8270C	Benzaldehyde	100-52-7	µg/kg	--	--	--	7,800,000	(a)	(a)	(a)
SW8270C	Benz(a)anthracene	56-55-3	µg/kg	1,476	--	--	--	330	167	92
SW8270C	Benzo(a)pyrene	50-32-8	µg/kg	147	--	--	--	330	167	94
SW8270C	Benzo(b)fluoranthene	205-99-2	µg/kg	1,476	--	--	--	330	167	95
SW8270C	Benzo(ghi)perylene*	191-24-2	µg/kg	--	--	--	--	330	167	110
SW8270C	Benzo(k)fluoranthene	207-08-9	µg/kg	14,762	--	--	--	330	167	113
SW8270C	bis(2-Chloroethoxy)methane	111-91-1	µg/kg	--	--	--	180,000	330	167	88
SW8270C	bis(2-Chloroethyl) ether	111-44-4	µg/kg	6	--	--	--	330	167	81
SW8270C	bis(2-Ethylhexyl) phthalate	117-81-7	µg/kg	347,387	--	--	--	330	167	98
SW8270C	Butyl benzyl phthalate	85-68-7	µg/kg	--	--	--	260,000	330	167	95
SW8270C	Carbazole*	86-74-8	µg/kg	--	--	--	--	330	167	95
SW8270C	Caprolactam	105-60-2	µg/kg	--	--	--	31,000,000	(a)	(a)	(a)
SW8270C	Chrysene	218-01-9	µg/kg	148,629	--	--	--	330	167	84
SW8270C	Dibenz(a,h)anthracene	53-70-3	µg/kg	147	--	--	--	330	167	102
SW8270C	Dibenzofuran	132-64-9	µg/kg	--	--	--	78,000	330	167	86
SW8270C	Diethyl phthalate	84-66-2	µg/kg	48,883,929	--	--	--	330	167	90
SW8270C	Dimethyl phthalate	131-11-3	µg/kg	611,049,107	--	--	--	330	167	87
SW8270C	Di-n-butyl phthalate	84-74-2	µg/kg	6,110,491	--	--	--	330	167	97
SW8270C	Di-n-octyl phthalate*	117-84-0	µg/kg	--	--	--	--	330	167	97
SW8270C	Fluoranthene	206-44-0	µg/kg	2,293,674	--	--	--	330	167	95
SW8270C	Fluorene	86-73-7	µg/kg	2,293,674	--	--	--	330	167	92
SW8270C	Hexachlorobenzene	118-74-1	µg/kg	3,040	--	--	--	330	167	89
SW8270C	Hexachlorobutadiene	87-68-3	µg/kg	--	--	--	--	330	167	82
SW8270C	Hexachloroethane	67-72-1	µg/kg	42,773	--	--	--	330	167	81
SW8270C	Hexachlorocyclopentadiene	77-47-4	µg/kg	366,000	--	--	--	1600	250	62
SW8270C	Indeno(1,2,3-cd)pyrene	193-39-5	µg/kg	1,476	--	--	--	330	167	96
SW8270C	Isophorone	78-59-1	µg/kg	5,119,394	--	--	--	330	167	93
SW8270C	Naphthalene	91-20-3	µg/kg	42,976	--	--	--	330	167	82
SW8270C	Nitrobenzene	98-95-3	µg/kg	53,500	--	--	--	330	167	76
SW8270C	N-Nitrosodimethylamine	62-75-9	µg/kg	22.5	--	--	--	330	167	96
SW8270C	N-Nitrosodi-n-propylamine	621-64-7	µg/kg	--	--	--	69	330	167	84
SW8270C	N-Nitrosodiphenylamine	86-30-6	µg/kg	992,516	--	--	--	330	167	86
SW8270C	Pentachlorophenol	87-86-5	µg/kg	8,935	--	--	--	330	167	51
SW8270C	2,4,6-Tribromophenol		%	--	--	--	--	--	--	--
SW8270C	2-Flourophenol		%	--	--	--	--	--	--	--
SW8270C	Nitrobenzene-d5		%	--	--	--	--	--	--	--

Table H-3

Comparison of Reporting Levels to Screening Objectives in Soil, Open Burn Unit at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Residential SSG (Feb 2012)	Coyote Test Field Super Group Background Values (surface soil)	Coyote Test Field Super Group Background Values (subsurface soil)	EPA Regional Screening Levels, Residential (Nov 2012)	LOQ	LOD	DL
SW8290	2,3,7,8-TCDF*	51207-31-9	pg/g	449	--	--	--	1	0.15	EDL
SW8290	2,3,7,8-TCDD	1746-01-6	pg/g	44.9	--	--	--	1	0.15	EDL
SW8290	1,2,3,7,8-PeCDF*	57117-41-6	pg/g	--	--	--	--	5	0.75	EDL
SW8290	2,3,4,7,8-PeCDF*	57117-31-4	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,7,8-PeCDD*	40321-76-4	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,7,8-HxCDF*	70648-26-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,6,7,8-HxCDF*	57117-44-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	2,3,4,6,7,8-HxCDF*	60851-34-5	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,7,8,9-HxCDF*	72918-21-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,7,8-HxCDD*	39227-28-6	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,6,7,8-HxCDD*	57653-85-7	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,7,8,9-HxCDD*	19408-74-3	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,6,7,8-HpCDF*	67562-39-4	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,7,8,9-HpCDF*	55673-89-7	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,6,7,8-HpCDD*	35822-46-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	OCDF*	39001-02-0	pg/g	--	--	--	--	10	1.5	EDL
SW8290	OCDD*	3268-87-9	pg/g	--	--	--	--	10	1.5	EDL
SW8330B	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	mg/kg	3,911	--	--	--	0.25	0.05	0.012
SW8330B	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	mg/kg	58.2	--	--	--	0.25	0.05	0.012
SW8330B	1,3,5-Trinitrobenzene (1,3,5-TNB)	99-35-4	mg/kg	--	--	--	2,200,000	0.25	0.05	0.01
SW8330B	1,3-Dinitrobenzene (1,3-DNB)	99-65-0	mg/kg	--	--	--	6,100	0.25	0.05	0.0042
SW8330B	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	479-45-8	mg/kg	244	--	--	--	0.25	0.05	0.01
SW8330B	Nitrobenzene (NB)	98-95-3	mg/kg	53.5	--	--	--	0.25	0.05	0.0176
SW8330B	2,4,6-Trinitrotoluene (2,4,6-TNT)	118-96-7	mg/kg	39.1	--	--	--	0.25	0.05	0.0194
SW8330B	4-Amino-2,6-dinitrotoluene (4-Am-DNT)	19406-51-0	mg/kg	--	--	--	150,000	0.25	0.05	0.01
SW8330B	2-Amino-4,6-dinitrotoluene (2-Am-DNT)	35572-78-2	mg/kg	--	--	--	150,000	0.25	0.05	0.0125
SW8330B	2,4-Dinitrotoluene (2,4-DNT)	121-14-2	mg/kg	7.15	--	--	--	0.25	0.05	0.0053
SW8330B	2-Nitrotoluene (2-NT)	88-72-2	mg/kg	29.1	--	--	--	0.5	0.05	0.013
SW8330B	3-Nitrotoluene (3-NT)	99-08-1	mg/kg	7.8	--	--	--	0.25	0.05	0.0155
SW8330B	4-Nitrotoluene (4-NT)	99-99-0	mg/kg	244	--	--	--	0.25	0.05	0.0182
SW8330B	Nitroglycerin	55-63-0	mg/kg	6.11	--	--	--	0.5	0.25	0.015
SW8330B	PETN	78-11-5	mg/kg	--	--	--	120,000	0.5	0.25	0.025
SW8330B	3,4-Dinitrotoluene (Surrogate)	610-39-9	%	--	--	--	--	--	--	--

The laboratory does not analyze for these compounds. The compounds will be tentatively identified based on a computer library search of the sample chromotography. If found, the coumpound concentration will be reported as an estimated value.

The detection limit exceeds most stringent criteria.

Constituents with "%" units are surrogates and are not a part of the target analytes.

* Risk based screening levels will be calculated if analyte is detected and toxicological information is available

DL - Detection limit

LOD - Limit of detection

LOQ - Limit of quantitation

µg/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

pg/g - picograms per gram

RPD - relative percent difference

RSD - relative standard deviation for multi-incremental sample collection

SSG - soil screening goal

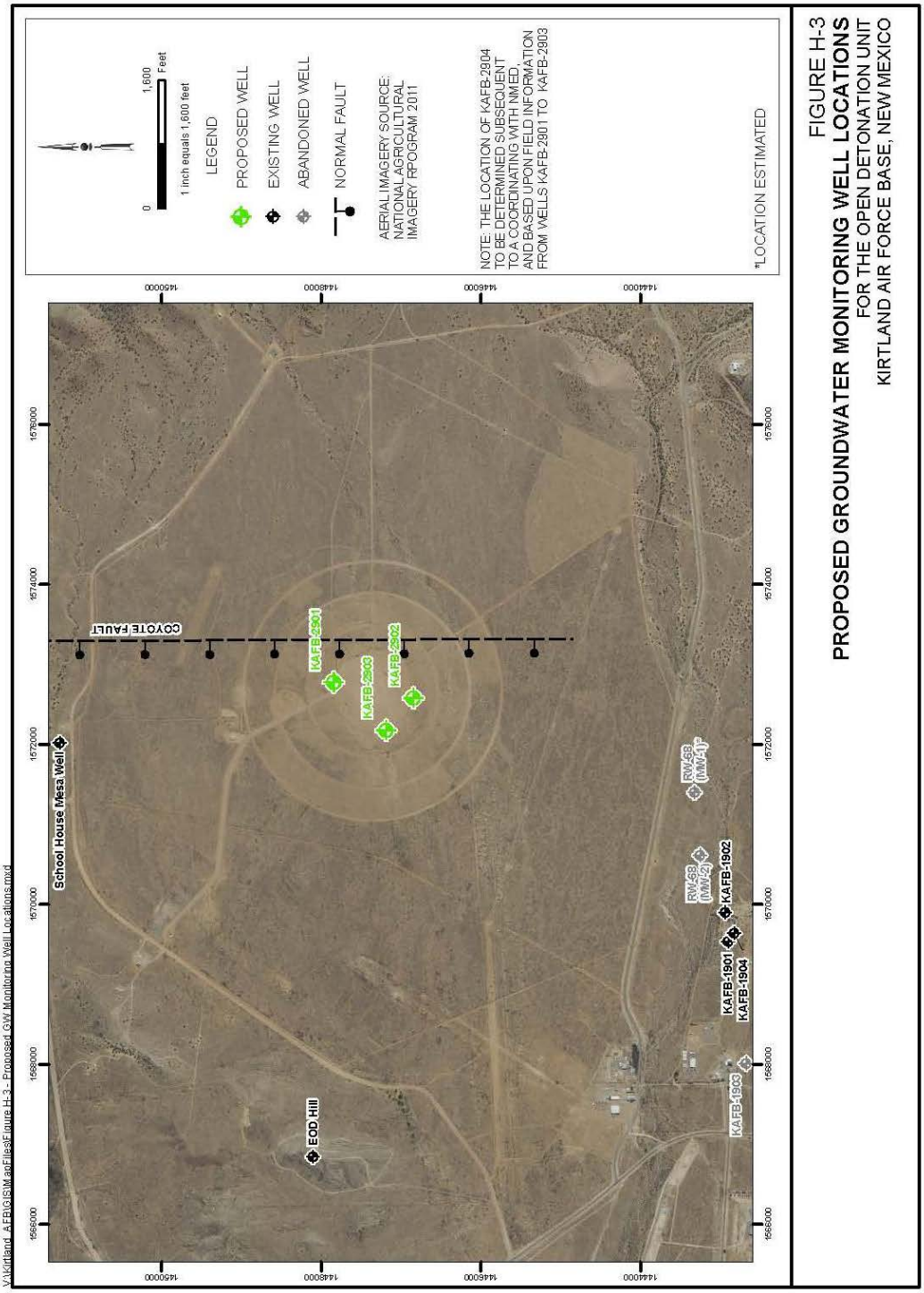

FIGURE H-3
PROPOSED GROUNDWATER MONITORING WELL LOCATIONS
FOR THE OPEN DETONATION UNIT
KIRTLAND AIR FORCE BASE, NEW MEXICO

V:\Kirtland_AFB\GIS\Maps\Figure H-3 - Proposed GW Monitoring Well Locations.mxd

~~This work plan was prepared as part of the U.S. Air Force (USAF) Environmental Restoration Program (ERP) under contract number W912DR-09-D-004, Delivery Order DM04, in accordance with the U.S. Army Corps of Engineers (USACE) Performance Work Statement dated 29 July 2011. This work plan has been revised to address NMED comments on the October 2010 Closure Plan for the Open Detonation Unit (USAF, 2010).~~

~~Site Description~~

~~The Open Burn (OB) and OD units are located within the EOD Range at Kirtland AFB. The EOD Range is located in the southeast portion of Kirtland AFB, east of Lovelace Road and south of the former Manzano Base. Figure 1 shows the location of the EOD Range at Kirtland AFB and the collocated OD and OB units within the EOD Range.~~

~~The OD unit consists of a cleared circular area approximately 1,500 ft in diameter and surrounded by an approximately 2-ft-high earthen berm. Detonations were conducted in pits approximately 30 ft long, 15 ft wide, and 12 ft deep within this area. The OD unit was permitted on 20 December 1994 as Permit Number NM9570024423-OD, which allowed 100,000 pounds of net explosive weight to be treated at the OD unit annually. Rocket motors, large caliber munitions, explosive wastes, and firearms were treated at the OD unit. Operations at the OD unit ceased in August 2010.~~

~~The OB unit is collocated with the OD unit and consists of a steel container on a reinforced concrete slab foundation, surrounded by concrete walls on three sides. The 8-inch-thick concrete slab is 30.5 ft long by 10.5 ft wide, and the 1-ft-thick concrete walls are 21.5 ft long, 10.5 ft wide, and 9 ft high. The northern portion of the reinforced concrete pad is level, and a 2-ft-wide by approximately 6-inch-high containment hump is location at the southern extent of the level portion of the pad to prevent run-on to or runoff from the concrete pad. The remaining portion of the concrete slab is sloped gently to the south, which allowed vehicular access to unload wastes for treatment at the OB unit. On the northwest side of the OB unit is a soil berm, measuring approximately 15 ft high and 40 ft long, which protected the unit from shock waves resulting from detonations at the collocated OD unit.~~

~~The steel container has a capacity of approximately 12 cubic yards. It is approximately 11 ft long with an inner height of 4.3 ft and an overall height of 5.25 ft. A heavy steel door is located at one end of the container to facilitate placement of wastes and removal of treatment residues. The OB unit has retractable, galvanized steel cover which covered the unit during nonoperational periods. The cover is slightly inclined to prevent precipitation from entering the unit. The last treatment event conducted at the OB unit was in May 2008.~~

~~*2.1.1.1 Hydrogeologic Setting*~~

The EOD Range is located within the Tijeras fault complex hydrogeologic region at Kirtland AFB (Sandia National Laboratories/New Mexico [SNL/NM], 2011a). The Sandia, Hubbel Springs, and Tijeras faults converge in this area and define eastern edge of the Albuquerque Basin. Within the Tijeras fault complex, a thin layer of alluvium covers bedrock. The hydrogeology in this area is poorly understood due to the complex geology created by the fault systems. On the eastern side of the Tijeras fault complex, the depth to groundwater ranges from about 45 to 325 ft bgs. Most of the monitoring wells in this area are completed in fractured bedrock at relatively shallow depths and produce modest yields of groundwater.

The nearest existing wells to the proposed monitoring well locations include the School House Well approximately 3,500 ft north-northwest of the OD unit; the EOD Hill Well approximately 4,300 ft west-northwest of the OD unit; three wells at Lake Christian (Kirtland AFB Solid Waste Management Unit [SWMU] 6-22), roughly 5,500 ft southeast of the OD unit; and three monitoring wells installed at the Old Burn Site (SNL SWMU 68), approximately 7,000 ft south of the OD unit. Nearby former monitoring well locations include two wells at the Radium Dump/Slag Piles (Kirtland AFB SWMU RW-68); approximately 4,500 ft south-southeast of the OD unit; and one well at Lake Christian (Kirtland AFB SWMU 6-22), roughly 5,500 ft southeast of the OD unit. The existing and former well locations are shown in Figure H~~3~~-4.

All of the nearby wells are completed in water bearing zones of the Paleozoic sedimentary rocks of the Madera Group or Sandia Formation or the underlying Precambrian granite. The available borehole logs and well completion diagrams from the surrounding wells and former well locations indicate that the uppermost groundwater occurs under confined conditions.

The groundwater flow direction in the vicinity of the EOD Range is not well defined and is assumed to mirror the topographic gradient of the land surface. There are several north-south trending faults mapped along the Sandia/Manzanita/Manzano Mountain range front. In the vicinity of the OD unit, one normal fault crosses along the eastern edge of the EOD range, identified as the Coyote Fault in Figure ~~3~~H-4. This fault was encountered during drilling boreholes at the Old Burn Site (SNL SWMU 68), located south of the OD unit (SNL/NM, 2011b). This fault location is important to the OD unit investigation because it likely influences the groundwater flow across the site from east to west and may act as a hydraulic barrier. Comparison of water levels in the upgradient well and the downgradient wells ~~will~~shall provide data on the possible influence the fault has on local groundwater flow. The majority of the EOD Range is located west of the inferred location of the fault. The triangular configuration of the proposed downgradient monitoring wells and the measured groundwater elevations in the wells ~~will~~shall be used to calculate the groundwater flow direction and hydraulic gradient in the uppermost groundwater aquifer across the majority of the site.

The depth to the uppermost water bearing zones at the proposed well locations is expected to range from approximately 100 to 200 ft bgs. The horizontal groundwater flow velocity is estimated to be on the order of 50 to 100 ft/year. Based on a history of at least 40 or more years of activities in the EOD Range area, potential contaminant impacts in groundwater could be expected to have traveled roughly 2,000 to 4,000 ft downgradient based on those flow velocity estimates.

The three proposed well locations were selected in consultation with the ~~NMED-HWB~~Department (Figure H-3). One presumed upgradient and two presumed downgradient locations were selected for installation of the wells. Location of the fourth well ~~will~~shall be determined in consultation with the ~~NMED-HWB~~Department following installation of the three proposed wells based on gradient and flow direction.

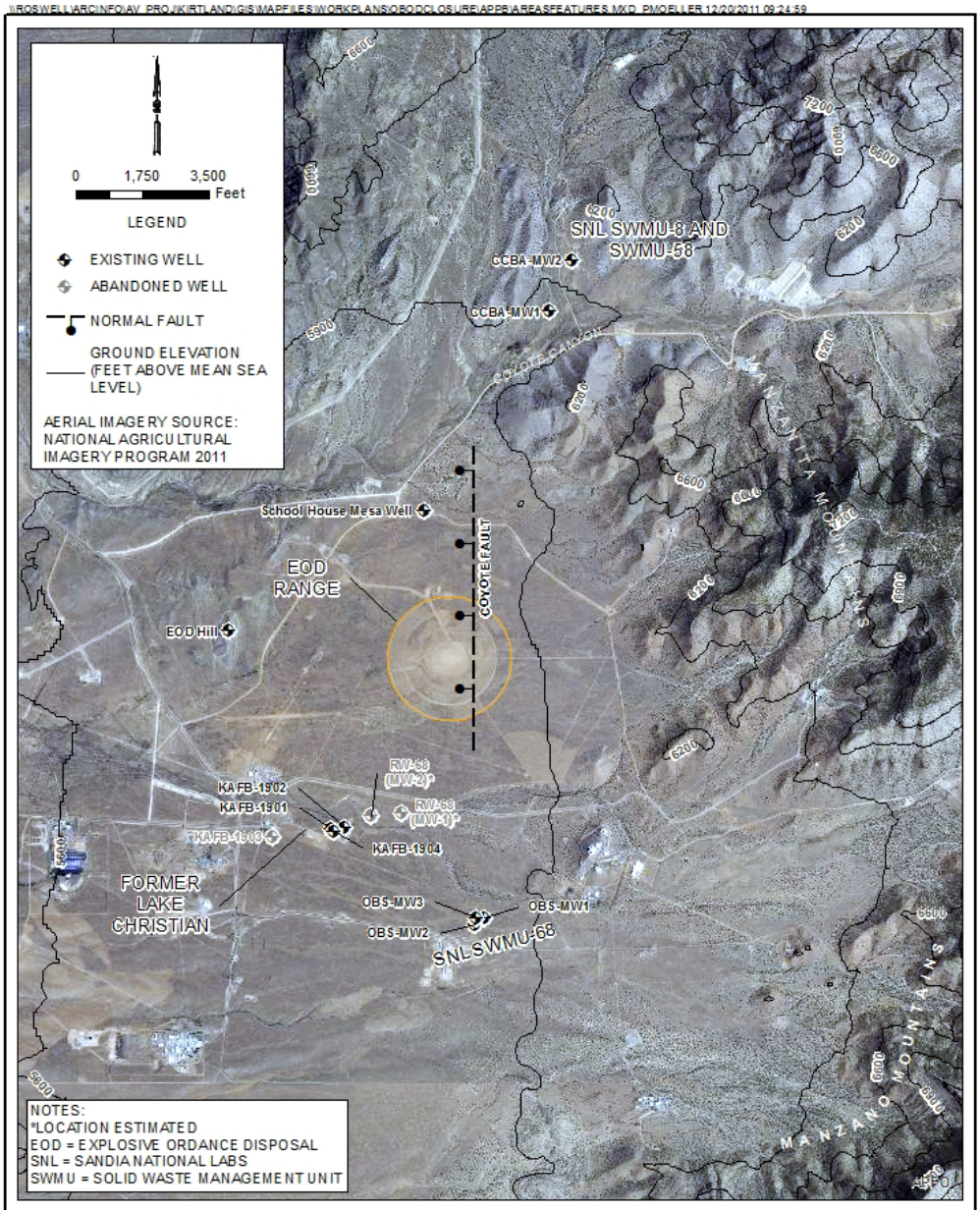

FIGURE H-4
AREA FEATURES AND WELL LOCATIONS
MONITORING WELL INSTALLATION WORK PLAN FOR THE OPEN BURN AND OPEN DETONATION UNITS
KIRTLAND AIR FORCE BASE, NEW MEXICO

2.1.1.2 Investigation Activities

Well installation activities ~~will~~shall be conducted in accordance with the *Kirtland Air Force Base, Base-Wide Plans for the Environmental Restoration Program, 2004 Update* (USAF, 2004) and with the ~~*Resource Conservation and Recovery Act* (~~RCRA~~)~~ Permit~~ (NMED, 2010)~~. The procedures in Section 3.5 of the RCRA Permit, as well as procedures of the Base-Wide Plans, Standard Operating Procedure (SOP) B1.3: Monitoring Well Installation, ~~will~~shall be adhered to for this project, unless they are specifically modified by this ~~work~~closure plan.

2.1.1.3 Mobilization

The schedule of events for the investigation activities ~~will~~shall commence by drilling and installing three groundwater monitoring wells as shown in Figure H-3~~2~~. Following well installations, the gradient and flow direction ~~will~~shall be established within the investigation area. ~~CH2M HILL personnel~~ The Permitee ~~will~~shall then meet with ~~NMED-HWB~~Department to determine the appropriate location of the fourth groundwater monitoring well. The fourth monitoring well, KAFB-2904, ~~will~~shall be installed and followed directly by the first groundwater monitoring event for the new wells. Quarterly groundwater monitoring ~~will~~shall be conducted according to this ~~work~~closure plan. At the conclusion of the investigation and four quarters of monitoring activities, ~~CH2M HILL~~the Permitee ~~will~~shall provide a report with recommendations based on the data collected from the first four quarters of monitoring.

An exploratory well application permit ~~(Attachment)~~ for each well ~~will~~shall be filed with the New Mexico Office of the State Engineer (NMOSE) in accordance with the Rules and Regulations Governing Well Driller Licensing; Construction, Repair and Plugging of Wells (NMOSE, 2005). The Bernalillo County well installation regulations are not applicable to wells installed on Kirtland AFB. All well locations ~~will~~shall be cleared by Unexploded Ordnance (UXO) support personnel prior to mobilization of drilling activities. An environmental impact analysis ~~will~~shall be performed through the Base Civil Engineering and Natural Resources Request (AF Form 813). A utility clearance of the area ~~will~~shall be performed using Base Civil Engineering Clearance Requests (AF IMT 103), Base Civil Engineer Work Requests (AF IMT 332), and New Mexico One Call services. A surface disturbance permit ~~will~~shall not be required because the total disturbed area of the wells is less than 1 acre.

2.1.1.4 Drilling Method and Sequence

The boreholes ~~will~~shall be installed using air-rotary casing hammer (ARCH) drilling method. This method has been successfully used for the installation of nearby monitoring wells and should facilitate lithologic description of drill cuttings and allow for the observation of soil/bedrock moisture content for identification of groundwater zones. The ARCH drilling method ~~will~~shall be used to advance the boring through the vadose zone and anchor the drive casing in the underlying bedrock.

The specific depths ~~will~~shall be determined in the field based on site conditions such as lithology and presence of groundwater. The following sequence of drilling is anticipated based on known hydrogeologic conditions and drill method capabilities:

1. Initiate boring with the ARCH method using an 8½-inch tri-cone bit and 9-5/8-inch diameter drive casing. Advance the drive casing to the depth of the contact between the alluvium and underlying bedrock.

2. Set the drive casing in the bedrock and continue drilling the borehole using an open hole drilling technique. If dense bedrock conditions are encountered in the boring, a change from a tri-cone bit to a down hole hammer bit may be required.

3. Advance the boring into the uppermost water bearing unit. Complete the borehole approximately 25 ft into the water bearing unit.

During the ARCH drilling activities, the field staff ~~will~~shall monitor for the presence of groundwater by visually inspecting drill cuttings for moisture. If the cuttings become wet, the borehole ~~will~~shall be allowed to sit idle for approximately one hour. A water level probe ~~will~~shall then be lowered into the borehole to assess whether groundwater has accumulated and this information ~~will~~shall be documented on the field log.

Field screening of the soil cuttings for the presence of volatile organic compounds (VOCs) ~~will~~shall be conducted during the drilling process using a portable photo ionization detector (PID) as described in Base-Wide Plans, Appendix B, SOP B3.1: Photo-ionization Detectors and Organic Vapor Analyzers (USAF, 2004). As the boreholes are advanced, the field geologist ~~will~~shall continuously collect soil cuttings to aid in the preparation of lithologic logs. The monitoring well lithologic log ~~will~~shall be completed as described in Base-Wide Plans, Appendix B SOP B1.1: Borehole and Sample Logging. Drill cuttings from ARCH method drilling ~~will~~shall be stored at the well site on plastic sheeting or in roll-off containers and managed as investigation-derived waste (IDW).

Groundwater purged from the boring during borehole advancement and sampling ~~will~~shall be allowed to settle in roll-off bins then transferred to holding tank(s). These plastic holding tanks ~~will~~shall be managed as IDW along with decontamination and well development fluids.

Decontamination of the drill rig, drill tools, sampling equipment, and associated equipment ~~will~~shall be accomplished by steam cleaning prior to drilling each well. Decontamination activities ~~will~~shall be conducted at a central location with water obtained from an approved onsite source. Decontamination fluids ~~will~~shall be contained in polyethylene tanks and managed as IDW.

2.1.1.5 Subsurface Soil Sampling

Soil and rock sampling ~~will~~shall be performed for lithologic description. Subsurface soil laboratory analysis is not proposed as part of this investigation. No soil or rock samples ~~will~~shall be submitted for laboratory analysis.

2.1.1.6 Monitoring Well Construction

Monitoring wells ~~will~~shall be designed and constructed based on the lithology and groundwater elevations encountered at each proposed well location. The well construction details may be subject to change based on the observed field conditions, but procedures and methods ~~will~~shall comply with Section 3.5 of the RCRA Permit and the OSE criteria. The anticipated well constructions details are shown in Figure H-5~~4~~. The proposed monitoring well design includes the use of 4-inch-inside diameter (ID), Schedule 80 polyvinyl chloride (PVC) casing with a 5-ft well sump, 20-ft of 0.020-inch slot size well screen, and approximately 2 to 3 ft of stickup at the surface. Centralizers ~~will~~shall be used to stabilize the well casing within the borehole at the top and bottom of the screen interval and at a minimum spacing of 40 ft on casing above the top of the well screen.

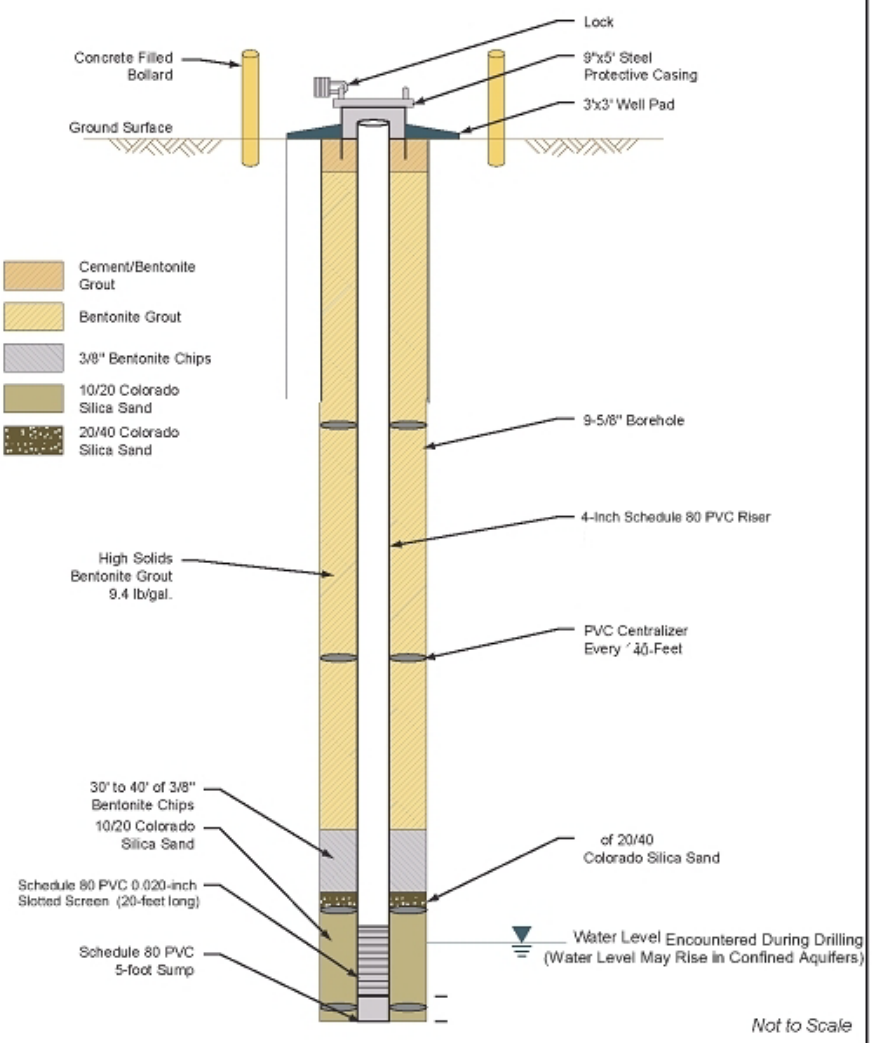

FIGURE H-5
PROPOSED MONITORING WELL DESIGN
MONITORING WELL INSTALLATION WORK PLAN
FOR THE OPEN BURN AND OPEN DETONATION UNITS
KIRTLAND AIR FORCE BASE, NEW MEXICO

Wells ~~will~~shall be completed as follows:

- The sand filter pack type ~~will~~shall be determined based on field observations and ~~will~~shall extend from the bottom of the silt trap to 5 ft above the top of the screen. However, it is anticipated that a filter pack of 10-20 gradation Colorado Silica Sand ~~will~~shall be used in the construction of the monitoring wells. The filter pack sand ~~will~~shall be placed through a tremie pipe. Approximately 2 ft of barrier sand, 100 percent passing an American Society for Testing and Materials (ASTM) U.S. Standard Sieve No. 60, ~~will~~shall be placed above the filter pack to inhibit flow of grout into the filter pack.

- A minimum of 10 ft of bentonite chips or pellets ~~will~~shall be installed above the filter pack through a tremie pipe. The seal ~~will~~shall be hydrated with clean potable water in 6-inch lifts. Setup time for the bentonite ~~will~~shall be at the discretion of the field geologist.

- The annular space above the hydrated bentonite seal ~~will~~shall be backfilled with bentonite slurry. Bentonite slurries are effective in sealing off groundwater units above the screened and sand-packed intervals of a well and are less likely to damage the well casing than bentonite-cement grout. The bentonite slurry ~~will~~shall be installed through a tremie pipe. The bentonite slurry ~~will~~shall extend from the bentonite pellet seal to approximately 50 ft bgs.

- The remaining 50 ft of annular space ~~will~~shall be filled with bentonite-cement grout consisting of 94 pounds of Portland cement, 3 percent by weight sodium bentonite powder, and 7 gallons of contaminant-free water. The bentonite-cement grout ~~will~~shall be placed using a grout pump and tremie pipe to within 5 ft of the land surface. The grout ~~will~~shall be allowed to set for at least 24 hours before well development begins.

- The monitoring wells ~~will~~shall be completed at the surface in accordance with ~~Kirtland AFB~~ specifications as presented in SOP B1.3 of the *Base-Wide Plans, Field Sampling Plan* (FSP) (USAF, 2004). The surface completion ~~will~~shall consist of a 5-foot-long, 9-inch-diameter steel stand pipe with locking cap cemented into a 3-foot-square concrete well pad. Four concrete-filled steel bollards ~~will~~shall be installed at the corners of the well pad to protect the well from vehicle damage.

- At the conclusion of the project, when wells KAFB-2901, KAFB-2902, KAFB-2903, and KAFB-2904 are no longer needed, the wells ~~will~~shall be properly abandoned in compliance with *Rules and Regulations Governing Well Driller Licensing; Construction, Repair and Plugging of Wells* (NMOSE, 2005).

2.1.1.7 Well Development ~~and Sampling~~

Monitoring wells ~~will~~shall be developed using a variety of techniques including swabbing, surging, bailing, air lifting and pumping. Monitoring well development ~~will~~shall adhere to procedures outlined in Base-Wide Plans, Appendix B, SOP B1.4: Monitoring Well Development (USAF, 2004). Monitoring well development ~~will~~shall be performed within one week after well installation but no sooner than 24 hours after grout installation. Groundwater discharged from the wells ~~will~~shall be monitored for pH, temperature, specific conductance, dissolved oxygen, oxidation-reduction (redox) potential, and turbidity. Each monitoring well screen ~~will~~shall be developed until pH and specific conductance stabilize and the water appears substantially free of sediment. The development goal is to reduce the turbidity to less than 10 nephelometric turbidity

units (NTUs) and a less than 10 percent variance in the other parameters observed in the final three readings. However, a final turbidity of less than 100 NTUs is acceptable. If the field parameters have not stabilized after 4 hours of continuous pumping, the well ~~will~~shall be allowed to sit overnight and development ~~will~~shall continue the following day for a maximum of 2 hours. If the turbidity still does not fall below 100 NTUs, the ~~USACE Project Manager~~Permitee ~~will~~shall ~~be contacted and~~seek further direction ~~will be sought~~from the Department.

Proposed monitoring wells KAFB-2901, KAFB-2902, and KAFB-2903 ~~will~~shall be developed and surveyed subsequent to installation. A static groundwater elevation from each surveyed and developed well ~~will~~shall be measured and used to determine the groundwater gradient and flow direction across the OD unit area. This information ~~will~~shall be used to determine the location and design of KAFB-2904.

2.1.1.8 Well Survey

A New Mexico licensed professional surveyor ~~will~~shall survey the horizontal well locations relative to New Mexico State Plane Coordinates and the vertical elevations to the nearest one-hundredth of 1 ft for the newly installed monitoring wells. Surveying ~~will~~shall be conducted in accordance with SOP B1.9 of the Base-Wide Plans FSP (USAF, 2004).

2.1.1.9 Groundwater Gradient Calculations

Depth to water measurements for static conditions ~~will~~shall be collected from monitoring wells KAFB-2901, KAFB-2902, and KAFB-2903 subsequent to well development. These measurements ~~will~~shall be converted to groundwater elevation data using well survey data. These elevations ~~will~~shall be mapped, and gradients ~~will~~shall be calculated perpendicular to the equipotential groundwater contours. The direction and magnitude of groundwater gradients ~~will~~shall provide information that ~~will~~shall be used to propose optimum locations for monitoring well KAFB-2904. ~~Kirtland AFB and CH2MHILL~~The permitee ~~will~~shall consult with the ~~NMED-HWB~~Department to determine the final location of KAFB-2904. Groundwater elevations may also be collected from comparable aquifer units from nearby monitoring wells. The previously installed wells surrounding the investigation area include KAFB-1901, KAFB-1902, KAFB-1904, EOD Hill Well, and School House Mesa Well.

2.1.2 Groundwater Sampling and Analysis Plan

Groundwater monitoring ~~will~~shall be performed subsequent to well development at a quarterly frequency for up to eight quarters. Groundwater elevations ~~will~~shall be measured in each well prior to sampling. Groundwater elevations ~~will~~shall be used to determine groundwater flow rate and gradient on a quarterly basis. Well purging methods ~~will~~shall comply with the RCRA Permit Section 6.5.17.4 and groundwater samples ~~will~~shall be analyzed for VOCs, semivolatile organic compounds (SVOCs), explosives, perchlorate, white phosphorus, target analyte list metals, dioxins, and furans, total dissolved solids, alkalinity, anions, cations, and total organic carbon (Table H-4). Data ~~will~~shall be of sufficient precision and quality to meet data quality objectives and to ensure that method detection limits are less than cleanup levels where technologically feasible.

Up to eight consecutive quarters of groundwater monitoring are currently planned at the four monitoring wells. If groundwater contamination from the operation of the OD unit is not detected in the monitoring wells, they ~~will~~shall be properly plugged and abandoned in accordance with

NMOSE regulations and ~~NMED~~Department guidance. If groundwater contamination from the operation of the OD unit is identified, the monitoring wells ~~will~~shall be maintained for the purpose of monitoring corrective action.

Table H-4
~~.~~ Groundwater Monitoring Parameters and Testing Methods
for the Groundwater Investigation of the OD Unit

Analysis	Method	Testing Location	Data Use
Groundwater elevation	Groundwater probe	Field	Groundwater flow direction
pH	pH probe	Field, flow-through cell	General groundwater parameter
Temperature	Digital~~-~~thermometer	Field, flow-through cell	General groundwater parameter
Specific conductance	Conductivity meter	Field, flow-through cell	General groundwater parameter
Dissolved oxygen	Dissolved oxygen probe	Field, flow-through cell	Assess aerobic or anaerobic conditions
Oxidation-reduction potential	EH (hydrogen electrode) meter	Field, flow-through cell	Assess conditions for natural attenuation of contaminants
Turbidity	Turbidity meter	Field, flow-through cell	General groundwater parameter
Total dissolved solids	EPA 160.2[a]	Laboratory	General groundwater parameter
Alkalinity	EPA 310.2[a]	Laboratory	General groundwater parameter
Ammonia	EPA350.1[a]	Laboratory	General groundwater parameter
Sulfide	SW9030B[b]	Laboratory	General groundwater parameter
Anions (sulfate, nitrate, nitrite, chloride, bromide and fluoride)	SW9056[b]	Laboratory	General groundwater parameter
Total organic carbon	SW9060[b]	Laboratory	General groundwater parameter
Metals (barium, boron, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, lithium, magnesium, manganese, molybdenum, nickel, potassium, selenium, silver, sodium, strontium, tin, vanadium, zinc, antimony, arsenic, thallium, mercury)	SW6010B[b], SW6020A[b], SW7470A[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Perchlorate	SW6850[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Volatile organic compounds	SW8260B[b], SW8011[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Semivolatile organic compounds	SW8270C[b], SW8270-SIM[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Dioxins and furans	SW8290[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Explosives	SW8330B[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
White ~~phosphrorous~~phosphorous	SW7~~825~~580[b]	Laboratory	Assess potential contamination from OB/OD Unit operations

[a] EPA, 1993.
[b] EPA, 1996.
EPA – U.S. Environmental Protection Agency
OB/OD – Open Burn/Open Detonation

2.1.2.1 Well Purging and Field Measurements

Each monitoring well shall be purged by removing groundwater prior to sampling in order to ensure that fresh formation water is sampled. One to three well-bore volumes ~~will~~shall be purged from each well prior to sampling. A well-bore volume is defined as the volume of water in the saturated filter pack plus the volume of all standing water within the well screen and casing. Purge water ~~will~~shall be contained in polyethylene tanks for subsequent characterization and management as IDW. The following groundwater field parameters ~~will~~shall be measured during well purging: pH, specific conductance, dissolved oxygen concentration, turbidity, redox potential, and temperature. The volume of groundwater purged, the field parameter readings obtained at each time interval, and the instruments used to measure the field parameters shall be recorded on the field monitoring log. Water samples shall be obtained from a well only after the measured values of purge water field parameters have stabilized to within 10 percent for three consecutive measurements or once three well-bore volumes have been purged from the well.

Groundwater samples ~~will~~shall be collected using a pneumatic pump, a submersible electronic pump, or a bailer within eight hours of the completion of well purging. Groundwater in monitoring wells with low recharge rates and that purge dry ~~will~~shall be sampled when the water level in the well has recovered sufficiently to collect the required sample volume. Sampling handling, preservation, and storage shall comply with the RCRA permit requirements of Table H-5. ~~Sample handling, preservation, and storage will comply with the RCRA Permit requirements of Table H-6.~~

2.1.2.2 Laboratory Analysis and Quality Control/Quality Assurance Procedures

Groundwater samples ~~will~~shall be collected from each monitoring well and analyzed for VOCs, SVOCs, explosives, perchlorate, white phosphorus, target analyte list metals, dioxins, and furans, total dissolved solids, alkalinity, anions, cations, and total organic carbon (Table H-4). The proposed suite of parameters and analyses for the groundwater samples is presented in Table ~~2-1~~H-2. The contacted laboratory must meet DoD certification requirements. To ensure that data is of sufficient precision, laboratory method detection limits ~~will~~shall be those shown in the approved OD Unit Closure Plan. To ensure that analytical data is of sufficient quality and that laboratory and field methods are assured of proper quality field quality control samples ~~will~~shall be collected in compliance with the approved OD Unit Closure Plan. Level 4 laboratory data ~~will~~shall be requested and validated by qualified chemists to meet criteria specified by the ~~NMED~~Department and the DoD.

Data reliability ~~will~~shall be ensured by documenting sample management so that analyses are traceable to specific areas of potential contamination and by following a quality assurance/quality control (QA/QC) program that mandates documentation of the precision and accuracy of laboratory analyses, as well as data representativeness, completeness, comparability, and sensitivity.

The QC samples to be collected include: field duplicate samples, trip blanks, and rinsate blanks ~~as discussed in the Open Detonation Unit Closure Plan~~. Sample designations ~~will~~shall follow the ~~Kirtland AFB~~ guidelines as outlined in Section 4.2.1 of the Base-Wide Plans, FSP (USAF, 2004). The well identification numbers assigned to the four new wells for this investigation are: KAFB-2901, KAFB-2902, KAFB-2903, and KAFB-2904. The proposed sample number scheme is presented in Table ~~2-2~~H-6.

Table H-5
Sample Containers, Preservation Techniques, and Holding Times for Soil and Groundwater Samples

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers	Preservation Requirements	Maximum Holding Time
Soil	Metals (including mercury)	SW6010B/ SW6020 and SW7471A	1 gram	250-ml glass or polyethylene	4±2 degrees Celsius (ºC)	180 days from date of collection for metals; 28 days from collection to analysis for mercury
Soil	Volatile Organic Compounds (VOCs)	SW8260B/ SW5035	3 different 5-gram aliquots	6 40-milliliters (ml) volatile organic analysis (VOA) vials	Per sample collection: 2 VOA vials with 10-ml water and 1 VOA vial with 10-ml methanol. All vials contain a stir bar. Or 3 VOA vials containing stir bars will have a 5-gram sample aliquot added, seals and frozen on site with dry ice. Samples must remain frozen in shipment and storage at the lab until analysis.	Freeze within 48 hours of arrival at the lab, analyze within 14 days from data of collection Analyze within 14 days from data of collection
Soil	Semivolatile Organic Compounds (SVOCs)	SW8270C	30 grams	250-ml glass	4±2ºC	14 days from date of collection to extraction and 40 days from extraction to analysis
Soil	Perchlorate	SW6850	30 grams	250-ml glass	4±2ºC	28days
Soil	Explosives	SW8330B	10 grams	250-ml glass	4±2ºC	14 days from date of collection to extraction and 40 days from extraction to analysis
Soil	White Phosphorous	SW7580	40 grams	250-ml glass	4±2ºC	30 days from date of collection to extraction and analysis
Soil	Dioxins/ Furans	SW8290	30 grams	250-ml glass	4±2ºC	30 days from date of collection to extraction and 45 days from extraction to analysis
Groundwater	Dissolved metals (including mercury)	SW6010B/ 6020 and SW7470A	100-ml	1-liter polyethylene	pH < 2 with nitric acid; 4±2ºC	28 days from date of collection for Hg, 180 days for others
Groundwater	VOCs	SW8260B	3 40-ml vials	3 40-ml VOA vials	No headspace; 4±2ºC	7 days from data of collection
Groundwater	SVOCs	SW8270C	1 liter	2 1-liter amber glass	4±2ºC	7 days from date of collection to extraction and 40 days from extraction to analysis
Groundwater	Explosives	SW8330B	1 liter	2 1-liter amber glass	4±2ºC	7 days from date of collection to extraction and 40 days from extraction to analysis

Table H-5
Sample Containers, Preservation Techniques, and Holding Times for Soil and Groundwater Samples

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers	Preservation Requirements	Maximum Holding Time
Groundwater	Perchlorate	SW6850	1 liter	1- 250mL precleaned sterile, plastic containers	Field filtered with 1/3 volume headspace to remove and/or minimize microbial and anaerobic bacteria. Store at 4 ± 2 C	28 days
Groundwater	White Phosphorous	SW7580	120 ml	1-liter amber glass	4±2ºC	5 days from date of collection to extraction and analysis
Groundwater	Dioxins/ Furans	SW8290	1 liter	2 1-liter amber glass	4±2ºC	30 days from date of collection to extraction and 45 days from extraction to analysis
Groundwater	Anions (sulfate, nitrate, nitrite, chloride, bromide and fluoride)	SW9056	100-ml	1-liter polyethylene	4±2ºC	28 days from date of collection for all anions except that nitrate and nitrite are 48 hours
Groundwater	Ammonia	E350.1	100-ml	250 ml Poly	4°C pH < 2 with H2SO4	28days
Groundwater	Alkalinity	EPA 310.2	100-ml	250 ml Poly	4°C (share with SW9056)	14 days
Groundwater	Total Organic Carbon	SW9060	100-ml	1-liter polyethylene	4°C pH < 2 with HCL	28 days
Groundwater	Sulfide	SW9030B	500-ml	1-liter polyethylene	4°C Zn acetate NaOH to pH > 9	7 days
Groundwater	Total dissolved solids	EPA 160.2	100-ml	250 ml Poly	4°C	7 days

^{0}C – degrees Celsius
H2SO4S – glycine, sulfate
HCL – hydrochloric acid
mL – milliliters
NaOH – sodium hydroxide
pH – potential of hydrogen
SVOC – Semivolatile organic compound
VOA – volatile organic analysis
VOC – volatile organic compound
Zn – zinc

Table ~~2-2~~H-6
Proposed Groundwater Sample Identification for the Groundwater Investigation of the OD Unit

Sample Identifier[a]	**Sample Type**
OT29-GW-2901-_____	Normal
OT29-GW-2902-_____	Normal
OT29-GW-2903-_____	Normal
OT29-GW-2904-_____	Normal
OT29-FD-2901-_____	Duplicate
OT29-EB-2902-_____	~~Equipment~~Rinsate Blank
OT29-TB-2903-_____	Trip Blank[b]
OT29-MS-2904-_____	Matrix Spike
OT29-MSD-2904-_____	Matrix Spike Duplicate

[a] The six digit sample date ~~will~~shall make up the last portion of the sample identification number
[b] Trip Blanks ~~will~~shall only be analyzed for VOCs

2.1.2.3 ~~Investigation Derived Waste~~Groundwater Data Analysis

Groundwater laboratory analytical results shall be analyzed to determine if there is statistically significant evidence of contamination at each groundwater monitoring well after each sampling event. The groundwater results shall be analyzed by comparison to baseline constituent concentrations and applicable groundwater standards.

Baseline constituent concentrations for the aquifer shall be calculated using laboratory analytical results for groundwater monitoring well KAFB-2901 and other groundwater monitoring wells completed within the same aquifer unit and located nearby. Groundwater monitoring wells that could potentially be used in the baseline constituent concentration calculations include KAFB-1902, KAFB-1903, KAFB-1904, RW68-01, RW68-02, and groundwater monitoring wells sampled by Sandia National Laboratory/New Mexico. Analysis to determine which of the groundwater monitoring wells are completed within the same aquifer unit shall be completed following installation of monitoring well KAFB-2901.

Baseline constituent concentrations shall be calculated for detected naturally occurring compounds including ammonia, sulfide, anions, metals, and percholorate as listed in Table H-4. Anthropogenic compounds, including VOCs, SVOCs, explosives, dioxins and furans, are assumed to occur at levels less than detection limits. Baseline concentrations shall not be calculated for the anthropogenic compounds.

Baseline constituent concentrations shall be established by calculating a 95 percent upper tolerance limit (UTL) for each of the detected constituents listed above. The 95 percent UTLs shall be calculated following the methodology established as part of the Kirtland AFB Long-Term Monitoring Program (USAF, 2007). The purpose of the UTL approach is to define a constituent concentration from background well data, below which 95 percent of the monitoring well observations fall with a high degree of probability. Once the UTL is determined based on the background monitoring wells, data from downgradient site wells can be compared for evidence of a release by evaluating how the downgradient well results compare to the UTL. If the downgradient well results are greater than the UTL, there is statistical evidence that there has been an increase in the downgradient concentration of the constituent in groundwater. A detailed description of the process to determine baseline concentrations can be found in the *Long-Term Groundwater Monitoring Summary and Baseline Determination Report, Fiscal Year 2005* (USAF, 2007). ~~Soil cuttings recovered during drilling operations are expected to be nonhazardous, native material. The cuttings will be stockpiled on plastic sheet or in roll-off containers at each well site.~~

~~Upon completion of drilling activities, composite samples will be collected from the cuttings and analyzed for the full suite of toxicity characteristic leachate procedure (TCLP) parameters. The full suite of TCLP parameters includes analyses for VOCs, SVOCs, the eight RCRA-listed metals, pesticides, and herbicides along with reactivity, ignitability, and corrosivity. If the sample results indicate the cuttings are nonhazardous waste, the cuttings will be disposed of in the Kirtland AFB construction and demolition (C&D) landfill.~~

~~Decontamination will be conducted on a concrete pad constructed for that purpose (located near Pennsylvania Road, southeast of the Tijeras Arroyo Golf Course) or on plastic sheeting at the site. Wastewater from the equipment decontamination will be stored in plastic holding tanks along with purge water from well development activities and groundwater sampling. IDW water samples will be collected from the tanks and analyzed for VOCs, SVOCs, and RCRA-listed metals. The sample analytical results will be compared to the New Mexico Water Quality Control Commission standards and the Albuquerque Bernalillo County Water Utility Authority standards to determine the appropriate disposal option.~~

~~Site Safety and Health Plan~~

~~All environmental drilling and monitoring activities will be conducted in accordance with the SSHP prepared for the OD Closure Activities.~~

2.1.2.4 Reporting

One well completion report ~~will~~shall be prepared to document the drilling and well installation activities. No laboratory analytical data ~~will~~shall be presented in the well completion report. The well completion report ~~will~~shall be submitted to ~~NMED~~the Department for approval within ~~6~~30 days of the completion of well installation activities. The well installation report ~~will~~shall include the following information:

- Descriptions of the field program including the drilling, well installation, surveying, and IDW management activities;
- Field documentation including soil boring logs, well construction diagrams, well development logs, and survey data.

Field and laboratory data ~~will~~shall be submitted to the ~~NMED~~Department within 90 days after all samples are collected for each quarter.

Periodic groundwater monitoring reports ~~will~~shall be prepared to document quarterly groundwater monitoring results. All validated groundwater laboratory results ~~will~~shall be presented in periodic groundwater monitoring reports which comply with Section 6.2.4.4 of the RCRA Permit. Groundwater analytical results ~~will~~shall be compared to New Mexico water quality control standards and EPA maximum contaminant levels and secondary screening levels to determine if contamination above standards is present in the groundwater monitoring wells. Each quarter of analytical data ~~will~~shall be evaluated for the presence of potential contaminants. The Periodic Groundwater Monitoring Reports for the OD unit ~~will~~shall be prepared annually and following four quarters of groundwater monitoring and submitted within 90 days after the completion of the last quarterly monitoring event. Currently, up to eight consecutive quarters of groundwater monitoring and two Periodic Groundwater Monitoring Reports are planned.

2.1.2.5 Project Schedule

Table ~~2-H-3~~7 outlines the project schedule for the installation and sampling of groundwater monitoring wells. The monitoring well drilling and installation activities ~~will~~shall be conducted upon approval of the OD Unit Closure Plan~~ and this Monitoring Well Installation Plan~~. The well installation activities ~~will~~shall be documented in a Well Completion Report. Final validated groundwater analytical results from four quarters of groundwater sampling ~~will~~shall be reported in an Annual Groundwater Monitoring Report for the OD unit~~s~~.

Table ~~2-3~~H-7
Proposed Schedule of Activities for Groundwater Monitoring Well Installation for the Closure of the OD Unit

Activity	Duration (calendar days)	Start Date
~~Preparation of Plans~~		
~~Submit Well Installation work plan to NMED~~		~~First Quarter 2013~~
~~NMED Review of work plan~~	~~45~~	~~First Quarter 2013~~
~~Receipt of NMED comments on work plan~~		~~Second Quarter 2013~~
~~Prepare and submit revised work plan~~	~~30~~	~~Upon receipt of comments~~
Field Investigation		
Mobilize drilling equipment	3	15 days following ~~work plan~~Closure Plan
Well installation, development, and surveying collection of IDW soil and water samples	28	Following mobilization
IDW characterization~~,~~ and disposal	45	Following well installation
Preparation of Well Completion Report		
Initiate Well Completion Report Preparation	~~6~~30	Upon completion of all well drilling, development, and surveying activities
Submit Well Completion Report to USACE, USAF, and ~~NMED~~the Department	1	~~6~~30 days following well installation
Quarterly Groundwater Monitoring and Periodic Reporting		
Conduct quarterly groundwater monitoring	3	Following installation of four groundwater monitoring wells and on a quarterly basis
Submit field and laboratory data from monitoring event	1	90 days following collection of groundwater samples on a quarterly basis
Prepare Periodic Groundwater Monitoring Report	90	Following collection of four quarters of groundwater samples
Submit Periodic Groundwater Monitoring Report to ~~USACE, USAF, and NMED~~the Department	1	90 days following collection of fourth quarter groundwater samples

IDW – investigation-derived waste
USACE – United States Army Corps of Engineers
USAF – United States Air Force

~~2.1.2~~2.1.3 Mesa Schoolhouse Well

The Mesa Schoolhouse Well, a Department of Energy/National Nuclear Surety Administration (DOE/NNSA) well authorized under Kirtland AFB permit #PERM/0-K1-91-0010 was monitored for groundwater contamination as part of the December 1994 OD Unit's sampling and analysis plan. This sampling has been discontinued and the wellhead is secure. The well ~~will~~shall remain in place for possible future monitoring by DOE/NNSA

2.2 Sampling, Decontamination Procedures, and PPE

This section describes procedures and methods for soil and liquid sampling applicable to closure activities. While the procedures and methods are specific, other applicable procedures or methods given in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA, 1996; SW-846) may
be used if conditions or experience show the alternate method to be more appropriate, and if approved by the Department. All sampling procedures actually used shall be annotated in the final closure report. Sampling shall be conducted in accordance with procedures given in

"Samplers and Sampling Procedures for Hazardous Waste Streams" (EPA, 1980; EPA 600/2-80-018) or SW-846, as appropriate.

Surface and subsurface soil at the OD Unit shall be characterized by sampling and analysis.

The tools and equipment used during the sampling shall be vacuumed, cleaned with detergent and water, and scraped as necessary to remove any residue. The wash water shall be collected and analyzed for characterization of waste. The vacuums used and their contents shall be containerized and shipped off site as hazardous waste for disposal.

All of the PPE worn by personnel performing closure activities ~~will~~shall be disposable; therefore, all PPE shall be placed into containers and managed as hazardous waste. This waste shall be considered to be contaminated with all of the hazardous waste constituents contained in the wastes that have been treated at the OB Unit and the OD Unit. All contained PPE wastes shall be transported to a permitted facility for disposal.

2.2.1 Soil Sampling

Soil samples shall be conducted on a 25-ft by 25-ft grid spacing from the surface to 15 ft below ground surface at five ft intervals (total of four samples per location). At a minimum, the grid shall encompass all portions of the OD Unit that have hosted or may have hosted a pit used for the treatment of hazardous waste~~.~~ (Figure H-~~4~~6).

Surface soil samples ~~will~~shall be collected approximately 25 ft from the OB Unit. Three samples shall be collected from each side of the OB for a total of 12 surface soil samples. These samples ~~will~~shall characterize potential contamination from the OB Unit that may have migrated onto the OD Unit.

The soil samples shall be analyzed for the parameters listed in Table H-~~2~~ 3 which include all hazardous constituents of the hazardous wastes that were detonated at the OD Unit. Proposed sample identification numbers are shown in Table H-8.

Surface soil samples (zero to six inches depth) shall be collected with a wooden or Teflon™ trowel or scoop. Disposable sampling tools shall be used. In the event that the Department requests split samples, sufficient soils shall be collected to provide split samples to the Department representatives.

A Veihmeyer soil sampler, auger drill, direct push technology or other appropriate method shall be used to collect subsurface soil samples. Only discrete grab samples shall be collected; no samples shall be composited.

Clean sampling equipment shall be used to collect each sample. Unused, disposable sampling equipment may be presumed clean if still in a factory-sealed wrapper prior to use. Reusable sampling equipment shall be decontaminated after each use by scraping to remove any loose material, washing with a detergent and water solution, rinsing several times with tap water, rinsing with deionized water, and drained of excess water, and air-dried or wiped dry.

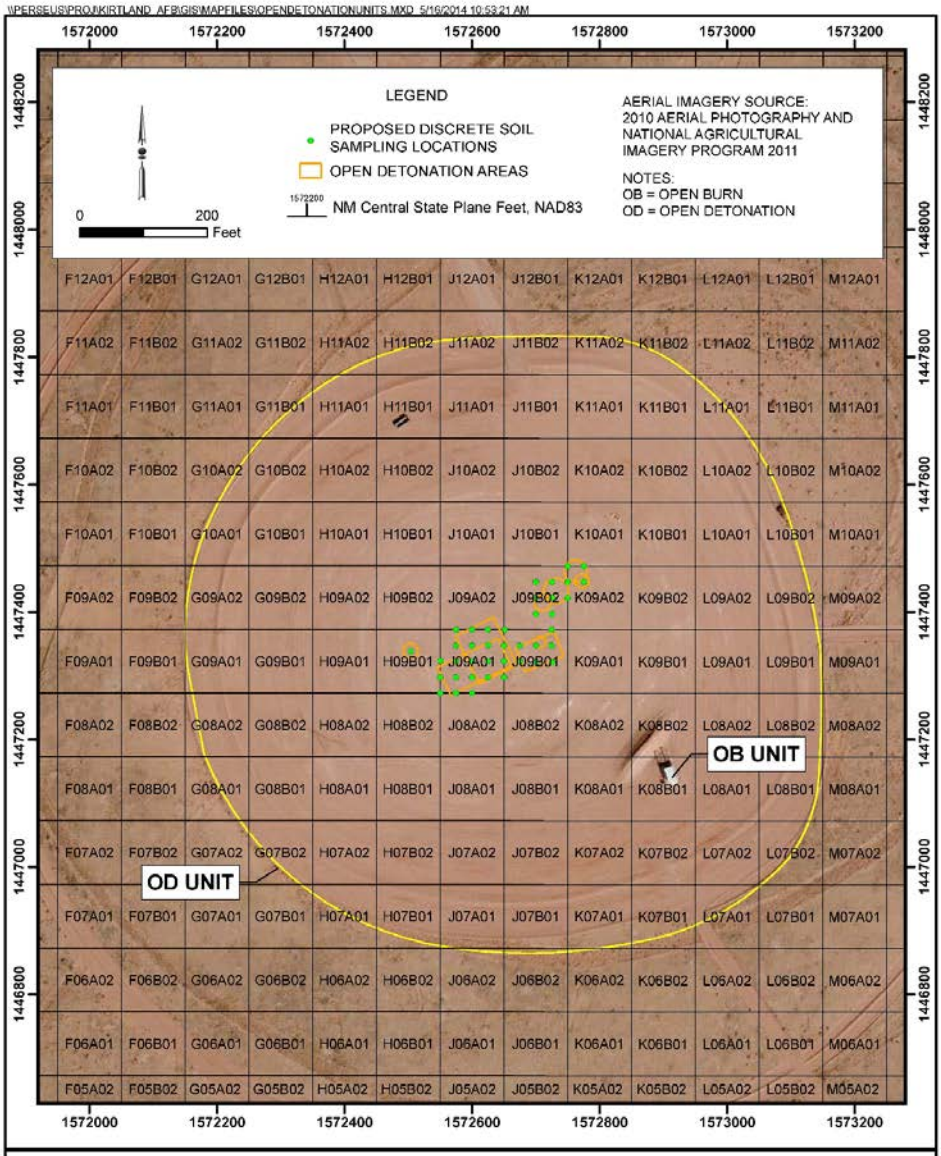

FIGURE H-6
PROPOSED DISCRETE SOIL SAMPLING LOCATIONS
OPEN DETONATION CLOSURE PLAN
KIRTLAND AIR FORCE BASE, NEW MEXICO

Table H-8
Proposed Discrete Soil Samples for the Open Detonation Unit, Kirtland Air Force Base, New Mexico

Soil Boring	Sample Identification	Depth (feet below ground surface)	Sample Type	**Metals** Methods SW-846 6010B, 6020A, 7471B	**VOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8260B	**SVOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8270C	**Total Explosives** (Per Table D-4 of RCRA Permit) Method SW-846 8330B	**Perchlorate** Method SW-846 6850	**White Phosphorous** Method SW-846 7580	**Dioxins** Method SW-846 8290
H09B1-01	OT29-SO-H09B1-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-H09B01-01-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-H09B01-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-H09B01-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-H09B01-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-01	OT29-SO-J09A1-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-02	OT29-SO-J09A1-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-03	OT29-SO-J09A1-03-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-03-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-03-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-03-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-03-1415	14 - 15	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-03-1415MS	14 - 15	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09A1-03-1415MSD	14 - 15	MS/MSD	X	X	X	X	X	X	X
J09A1-04	OT29-SO-J09A1-04-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-04-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-04-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-04-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-05	OT29-SO-J09A1-05-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09A1-05-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09A1-05-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-05-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-05-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-06	OT29-SO-J09A1-06-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-06-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-06-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-06-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-07	OT29-SO-J09A1-07-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-07-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-07-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-07-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-07-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-08	OT29-SO-J09A1-08-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-08-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-08-0405MS	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09A1-08-0405MSD	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09A1-08-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-08-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-09	OT29-SO-J09A1-09-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-09-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-09-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-09-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-10	OT29-SO-J09A1-10-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-10-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-10-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-10-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-11	OT29-SO-J09A1-11-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09A1-11-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09A1-11-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-11-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-11-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-12	OT29-SO-J09A1-12-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-12-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-12-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-12-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-13	OT29-SO-J09A1-13-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-13-0001MS	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09A1-13-0001MSD	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09A1-13-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-13-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-13-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-13-1415	14 - 15	Normal	X	X	X	X	X	X	X

Table H-8
Proposed Discrete Soil Samples for the Open Detonation Unit, Kirtland Air Force Base, New Mexico

Soil Boring	Sample Identification	Depth (feet below ground surface)	Sample Type	**Metals** Methods SW-846 6010B, 6020A, 7471B	**VOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8260B	**SVOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8270C	**Total Explosives** (Per Table D-4 of RCRA Permit) Method SW-846 8330B	**Perchlorate** Method SW-846 6850	**White Phosphorous** Method SW-846 7580	**Dioxins** Method SW-846 8290
J09A1-14	OT29-SO-J09A1-14-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-14-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-14-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-14-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-15	OT29-SO-J09A1-15-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09A1-15-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09A1-15-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-15-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-15-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-16	OT29-SO-J09A1-16-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-16-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-16-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-16-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-17	OT29-SO-J09A1-17-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-17-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-17-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-17-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-17-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-18	OT29-SO-J09A1-18-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-18-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-18-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-18-0910MS	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09A1-18-0910MSD	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09A1-18-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-19	OT29-SO-J09A1-19-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-19-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-19-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-19-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-20	OT29-SO-J09A1-20-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-20-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-20-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-20-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-20-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-21	OT29-SO-J09A1-21-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-21-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-21-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-21-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-01	OT29-SO-J09B1-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B1-01-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B1-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-02	OT29-SO-J09B1-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-03	OT29-SO-J09B1-03-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-03-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09B1-03-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09B1-03-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-03-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-04	OT29-SO-J09B1-04-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-04-0001MS	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09B1-04-0001MSD	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09B1-04-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-04-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-04-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-05	OT29-SO-J09B1-05-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-05-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-05-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-05-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-06	OT29-SO-J09B1-06-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-06-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09B1-06-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09B1-06-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-06-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-07	OT29-SO-J09B1-07-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-07-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-07-0405MS	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09B1-07-0405MSD	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09B1-07-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-07-1415	14 - 15	Normal	X	X	X	X	X	X	X

Table H-8
Proposed Discrete Soil Samples for the Open Detonation Unit, Kirtland Air Force Base, New Mexico

Soil Boring	Sample Identification	Depth (feet below ground surface)	Sample Type	**Metals** Methods SW-846 6010B, 6020A, 7471B	**VOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8260B	**SVOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8270C	**Total Explosives** (Per Table D-4 of RCRA Permit) Method SW-846 8330B	**Perchlorate** Method SW-846 6850	**White Phosphorous** Method SW-846 7580	**Dioxins** Method SW-846 8290
J09B2-01	OT29-SO-J09B2-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-02	OT29-SO-J09B2-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B2-02-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B2-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-03	OT29-SO-J09B2-03-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-03-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-03-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-03-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-04	OT29-SO-J09B2-04-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B2-04-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B2-04-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-04-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-04-1415	14 - 15	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-04-1415MS	14 - 15	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09B2-04-1415MSD	14 - 15	MS/MSD	X	X	X	X	X	X	X
J09B2-05	OT29-SO-J09B2-05-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-05-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-05-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-05-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-06	OT29-SO-J09B2-06-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-06-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-06-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-06-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-07	OT29-SO-J09B2-07-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B2-07-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B2-07-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-07-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-07-0910MS	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09B2-07-0910MSD	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09B2-07-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-08	OT29-SO-J09B2-08-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-08-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-08-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-08-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-09	OT29-SO-J09B2-09-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-09-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-09-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-09-1415	14 - 15	Normal	X	X	X	X	X	X	X
K09A2-01	OT29-SO-K09A2-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-K09A2-01-0405	4 - 5	Normal	X			X	X		
	OT29-FD-K09A2-01-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-K09A2-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-K09A2-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
K09A2-02	OT29-SO-K09A2-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-K09A2-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-K09A2-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-K09A2-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
QC	OT29-WW-RINSATE1	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-RINSATE2	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-RINSATE3	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-RINSATE4	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-TB1	-	Trip Blank		X					
	OT29-WW-TB2	-	Trip Blank		X					
	OT29-WW-TB3	-	Trip Blank		X					
	OT29-WW-TB4	-	Trip Blank		X					
			Total Normal Samples	160	80	80	160	160	80	80
			Total Field Duplicates	16	8	8	16	16	8	8
			Total Matrix Spike/Matrix Spike Duplicates	8	4	4	8	8	4	4
			Total Rinsate Blanks	4	4	4	4	4	4	4
			Total Trip Blanks		4					

MS/MSD - matrix spike/matrix spike duplicate
QC - quality control
RCRA - Resource Conservation and Recovery Act
SVOCs - semivolatile organic compounds
VOCs - volatile organic compounds

2.2.2 Liquid Sampling

Groundwater samples shall be collected from the groundwater monitoring wells installed at the OD Unit. Eight consecutive quarters of groundwater monitoring shall be conducted initially, following installation of the wells. Groundwater samples ~~will~~shall be obtained using methods approved by the Department within eight hours of the completion of well purging. The samples shall be analyzed for the parameters listed in Table H-~~3~~4, which include all hazardous constituents of the hazardous wastes that were treated at the OD Unit.

Groundwater in monitoring wells with low recharge rates and that purge dry shall be sampled when the water level in the well has recovered sufficiently to collect the required samples. A low-flow bladder pump shall be utilized. Groundwater samples intended for metals analysis shall be submitted to the laboratory for analyses of total metals; the samples ~~will~~shall not be filtered in the field or laboratory.

Glass tubes shall be used to sample liquids, except groundwater. The primary advantage to using this type of sampling device is that the tube can be disposed of after each sample is collected, thus eliminating cross-contamination. Alternatively, a Coliwasa sampler may be used to sample liquids, except groundwater.

2.2.3 Appropriate Sample Containers and Preservatives

Samples shall be placed in clean containers compatible with the intended analysis and shall be properly prepared and preserved to maintain sample integrity. The most recent version of SW-846 lists the proper container, preservative, and holding time for each chemical parameter of interest, and these requirements ~~will~~shall be followed for all samples collected during the closure process. Table H-~~4~~ 5 summarizes the sample containers, preservation techniques, and holding times for soil and liquid samples (including groundwater).

2.2.4 Sample Handling and Documentation

Each sample shall be labeled, sealed, and accompanied by a chain-of-custody and a request-for-analysis form. A chain-of-custody form shall be used to track samples from collection through analysis to ensure that the integrity of the samples is protected, and that analytical results can be attributed to specific samples of environmental media or waste. The procedures followed during closure ~~will~~shall be equivalent to those provided in the most current version of SW-846. Important aspects of the procedures are presented below. A chain-of-custody form ~~will~~shall be prepared for all samples collected for laboratory analyses. The form includes:

- • Sample identification number;
- • Name and signature of sample collector;
- • Date and time of sample collection;
- • Location at which sample was collected;
- • Type of waste (e.g., soil, liquid, etc.);
- • Signatures of persons who have had samples in their possession;
- • Dates and times of possession.

This form ~~will~~shall be initiated at the point of sample collection and ~~will~~shall then remain with the sample during transfer to the laboratory. The form ~~will~~shall be completed upon receipt at the laboratory and returned to ~~Kirtland AFB~~the Permitee for inclusion in facility operating record.

The chain-of-custody form ~~will~~shall include a request-for analysis form that lists all analyses to be performed for the identified samples and all special instructions relating to sample management or analysis. Any potential hazards posed by the samples shall be listed on the request-for-analysis form.

The sample containers ~~will~~shall be sealed with gummed paper seals attached to the containers in such a way that the seals must be broken in order to open the containers. The seals and sample labels must be completed with a waterproof pen. The sample labels are necessary to prevent misidentification of samples and shall include the following information: a unique sample number; name or initials of sample collector; sample collection date and time; sample location; and, sample type, depth, and description.

A closure sampling field log book ~~will~~shall be kept and ~~will~~shall contain all information pertinent to field surveys and sampling. Sufficient information shall be recorded so that a person can reasonably reconstruct what occurred at a sampling event without relying on a collector's memory. The log book shall have bound and consecutively numbered pages in 8 by 11-inch format. Minimum entries ~~will~~shall include:

- Purpose of sample;
- Location of sampling;
- Name and business address of person making log entry;
- Number, type, and volume of sample;
- Description of each sampling methodology and equipment used;
- Date and time of sample collection;
- Sample destination and transporter's name (name of laboratory, UPS, etc.);
- Map or photograph of the sampling site;
- Field observations (ambient temperature, sky conditions, past 24-hour precipitation, etc.);
- Field measurements, if any (pH, flammability, conductivity, explosivity, etc.);
- Collector's sample identification number(s);
- Signature of person responsible for the log entry.

Documentation of sample acceptance at the laboratory ~~will~~shall be provided following sample screening and log-in. This documentation may consist of signed copies of the chain-of-custody, documentation or a letter detailing the field sample numbers accepted. Corresponding laboratory sample identification numbers ~~will~~shall be provided. The laboratory is required to have procedures for preventing cross contamination of samples and securing sample custody within the laboratory.

2.2.5 Sample Shipping

Samples shall be packaged and shipped to the laboratory in accordance with DOT shipping requirements and in a manner to ensure that the integrity of the samples is protected. The sample containers shall be cushioned to protect against breakage or puncture.

2.2.6 Sample Analysis

Soil, groundwater, and waste samples ~~will~~shall be analyzed by an ELAP-certified laboratory. The analytical laboratory shall have procedures for preventing cross-contamination of samples and securing sample custody within the laboratory. Test methods for analysis of all samples ~~will~~shall be performed according to procedures documented in the most current version of SW-

846. Hazardous constituents associated with the regulated wastes treated at the OD Unit are included in these analyses. Analytical methods, detection limits, and instrumentation are provided in Table H-~~2~~ 3 for soil analysis; and in Table H-~~3~~ 2 for groundwater analysis. Minimum calibration, operation, and quality control (bias, precision, blank and matrix effects) requirements for laboratory analyses shall be performed as listed in the individual analytical methods of SW-846. All laboratory analyst notebooks, log sheets, instrument printouts, charts, and calculations relevant to analyses of these samples shall be identified and remain accessible. This information may be requested for independent review and validation. If requested by the Department, this information shall be provided by the Permittee.

2.2.7 Quality Assurance/Quality Control Program

Because decisions about closure activities may be based, in part, on analyses of samples, a program to ensure reliability of analytical data is mandatory. Data reliability ~~will~~shall be ensured by documenting sample management so that analyses are traceable to specific areas of potential contamination and by following a quality assurance/quality control (QA/QC) program that mandates documentation of the precision and accuracy of laboratory analyses, as well as data completeness, representativeness, and comparability.

Sampling activities ~~will~~shall include collection of QC samples in addition to field documentation requirements. QC samples to be collected include: duplicate samples, trip blanks, field blanks, and rinsate blanks. Table H-~~5~~ 9 summarizes field QC sample requirements.

Blanks and duplicate samples shall be collected to determine potential errors introduced in the data from sample collection and handling activities, laboratory error, and to assess analytical precision. To determine the potential for cross contamination, rinsate blanks consisting of rinsate from decontaminated equipment shall be collected and analyzed. At least one rinsate blank ~~will~~shall be collected for every ten samples collected using non-dedicated sampling equipment. Duplicate samples ~~will~~shall be collected at a frequency of one duplicate sample for every ten field samples. In no case ~~will~~shall less than one rinsate blank or duplicate sample be collected for a sampling effort. Trip blanks ~~will~~shall be collected on a daily basis and included in each shipment of samples that contain VOCs samples. Trip blanks are analyzed for VOCs only and are used to assess possible VOC contamination from outside sources. Trip blanks are shipped from the analytical laboratory and maintained with the sample bottles throughout the sampling process. These blank and duplicate samples ~~will~~shall be identified and treated as separate samples. Acceptance criteria for QA/QC sample analyses ~~will~~shall be compatible with the most recent version of SW-846 or other applicable guidance.

The analytical laboratory shall operate under a QA program plan (QAPP) that meets the requirements of ~~SW-846~~the required methods. QC procedures in the analytical laboratory are guided by the laboratory's QAPP. Laboratory QC samples are required to establish the accuracy and precision of analytical data in order to determine the quality of the data. Table H-~~4~~10- lists laboratory QC procedures by analytical methods.

The analytical laboratory data shall be evaluated using the following criteria:

- Completeness of data deliverable;
- Collection, extraction, and analysis holding times;
- Blank data;
- Laboratory control sample results;

- Matrix spike/matrix spike duplicate results;
- Laboratory duplicate sample results; and
- Overall data assessment and usability.

Table H-9
Summary of Field Quality Control Samples

Quality Control Sample Type	Sample Matrix	Applicable Analysis	Frequency	Purpose
Trip blank	Soil/Water	VOCs	One per day, per cooler containing VOC samples	Document any contamination attributable to shipping and field handling procedures
Field Duplicate	Soil/Water	VOCs, SVOCs, Metals, HE, Dioxins/Furans, White Phosphorus, Perchlorate, gGeneral chemistry[a]	Minimum of one per 10 environmental samples per media type	Document precision of the sampling/analysis process
Rinsate blank	Soil/Water	VOCs, SVOCs, [b], metals, HE[c], Dioxins/Furans, White Phosphorus, Perchlorate, gGeneral chemistry[a, b]	One sample per day per media type for non-dedicated sampling equipment	Document whether decontamination of sampling equipment was adequate

[a] General chemistry - total dissolved solids, alkalinity, ammonia, sulfide, total organic carbon, sulfate, nitrate, nitrite, chloride , fluoride, bromide

[b] No rinsate blank is required for total dissolved solids or alkalinity.

HE - high explosives

SVOCs - semivolatile organic compounds

VOCs - volatile organic compounds

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method 7580

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Multipoint ICAL for all analytes (minimum five standards)	Before sample analysis	One of the following options. Option 1: Linear—RSD for each analyte ≤ 20%. Option 2: Linear—least squares regression r >0.995 for each analyte. Option 3: Nonlinear—COD ≥0.99 (six points will be used for second order, seven points will be used for third order) .	Correct problem then repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL. Calibration may not be forced through the origin. All quantitation for multicomponent analytes, such as technical chlordane, toxaphene, and Aroclors, must be performed form a five-point calibration. Results may not be quantified from a single point.
Second-source calibration verification	Immediately after each ICAL	All analytes within ± 20% of expected value	Correct problem and verify second-source standard. Rerun second-source verification. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Retention time window position established for each analyte and surrogate	Each ICAL and after the initial daily CCV	Position will be set using the midpoint standard of the ICAL curve. On days when an ICAL is not performed, the CCV is used.	N/A	N/A
Retention time window width established for each analyte and surrogate	At method setup and after major maintenance (for example, column change)	±3 times standard deviation for each analyte retention time from 72-hour study.	N/A	N/A
Retention time window verification for each analyte and surrogate	Each calibration verification	Analyte within established window.	Correct problem, then reanalyze all samples analyzed since the last acceptable retention time check.	**ICV:** Flagging criteria are not appropriate for initial verification. **CCV:** Apply Q-flag to all results for the specific analyte(s) in the sample that are outside the established window.
CCV	Daily, before sample analysis unless ICAL performed on same day, after every 10 samples, and at the end of the analysis sequence	All analytes within ± 15% of expected value (% D).	Correct problem, then rerun. If that fails, repeat ICAL. Reanalyze all samples since last successful calibration verification.	**If reanalysis cannot be performed,** apply Q-flag to all results for the specific analyte(s) >15%D for all samples associated with the calibration verification.
Method blank	One per analytical batch	No analytes detected > ½ LOQ. For common laboratory contaminants no analytes detected > LOQ and see Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and reanalyze method blank and all samples processed with the	Apply "B" flag to all associated positive results for the specific analyte(s), as appropriate. See Worksheet #36, Section 36.2.5.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method 7580

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			contaminated blank.	
LCS for all analytes (must contain all target analytes)	One per analytical batch	Acceptance criteria: Worksheet #15.	Correct problem, then reanalyze. If still out, reprepare and reanalyze the LCS and all samples in the affected batch.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
MS/MSD	One per 20 project samples per matrix as a minimum and as defined on the chain-of-custody form	Acceptance criteria: Worksheet #15.	Assess data to determine whether there is a matrix effect or analytical error. Review LCS for failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an eval-uation can be made regarding PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: • %R for MS or MSD > upper control limit • %R for MS or MSD < lower control limit • MS/MSD RPD > control limit
Second-column confirmation (not required for Methods 8015B [DRO or GRO]	All positive results	Same as for initial or primary column analysis.	Same as for initial or primary column analysis.	Apply J-flag if RPD > 40% from first column result. Apply Q-flag to all results for the specific analyte(s) in the sample not confirmed.
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[c])	At initial setup and then once per 12-month period or quarterly DL verification	Detection limits established will be ≤ ½ the RL in Worksheet #15 Tables (see 40 CFR, Part 136, Appendix B). For the verification check to be valid, analytes must be detected and identified by method-specified criteria or the verification check must produce a response that is at least 3 times the instrument noise level and greater than the response in the blanks associated with the MDL study.	Continue the MDL study until all criteria are met.	N/A.
LOD determination and verifi-cation (see Section D.1.2.1 and Box D-13 of the DoD QSM[c])	At initial setup and verified quarterly (if a laboratory uses multiple instruments for a given method, the LOD must be verified on each)	The apparent signal-to-noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If LOD verification fails, the laboratory must (1) repeat the MDL determination and LOD verification at a higher concentration or (2) perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher	N/A; samples may not be analyzed without a valid LOD.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method 7580

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			concentration.	
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[c])	At initial setup (1) verify LOQ; and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of the DoD QSM[c])	(1) LOQ and associated precision and bias must meet client requirements and be reported; or (2) in the absence of client requirements, must meet LCS control limits (see Box D-14 of the DoD QSM[c]).	If the LOQ verification fails, laboratory must either establish a higher LOQ or modify method to meet client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag "U."
Demonstrate acceptable analyst capability	Before using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of DoD QSM[c])	QC acceptance criteria published by DoD, if available; otherwise, method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for analytes not meeting criteria (see section C.1.f of DoD QSM[c]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by an analyst until capability is demonstrated.

End of Method 7580

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Mass spectrometer tuning check Use bromofluorobenzene (SW8260B) or decafluorotriphenylphosphine (SW8270C)	Before ICAL and calibration verification	Refer to criteria listed in method description.	Retune instrument and verify.	Not appropriate.
GC performance check (8270C only or when SW8270 is used for pesticide analyses)	Daily before analysis of sample or calibration standards	Degradation ≤ 20% for DDT. No visible peak tailing for benzidine or pentachlorophenol (as a default, tailing factors should be less than 2.0).	Correct problem, then repeat performance check.	Not appropriate.
Multipoint ICAL for all analytes (minimum five standards)	Before sample analysis	SPCCs: Average RF ≥ 0.30 (SW8260B), ≥ 0.050 (SW8270C) CCCs: % RSD for RFs ≤ 30% and one of the options below; Option 1: Linear—RSD for each analyte < 15%. Option 2: Linear—linear least squares regression r > 0.995 for each analyte. Option 3: Nonlinear—COD ≥ 0.99 (6 points will be used for second order, 7 points will be used for third order). This is not a preferred option.	Correct problem, then repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL. Calibration may not be forced through the origin.
Second-source calibration verification	Once per ICAL	All analytes within ± 20% of expected value.	Correct problem and verify second-source standard. Rerun second-source verification. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Retention time window position establishment for each analyte and surrogate	Once per ICAL	Position will be set using the midpoint standard of the ICAL curve. On days when an ICAL is not performed, the CCV is used.	N/A.	N/A.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Retention time window verification for each analyte	Each sample	RRT of the analyte within ± 0.06 RRT units of ICAL. Laboratories may update the retention times based on the CCV to account for minor performance fluctuations or after routine system maintenance (e.g., column clipping. With each sample, the RRT will be compared with the most recently updated RRT. If the RRT has changed by more than ±0.06 RRT units since the last update, there has been a significant change in system performance and the laboratory must take appropriate corrective actions as required by the method and rerun the ICAL to re-establish the retention times.	Correct problem then reanalyze all samples analyzed since the last retention time check.	Apply Q-flag to all results for the specific analyte(s) in the sample that are outside the established window.
CCV	Daily, before sample analysis (unless ICAL performed on same day), and after every 12 hours of analysis time	SPCCs: Average RF ≥ 0.30 (SW8260B), ≥ 0.050 (SW8270C) CCCs: % RSD for RFs ≤ 30% and All analytes within ± 20% D of expected value from ICAL.	Correct problem, then rerun CCV. If that fails, repeat ICAL.	Apply Q-flag to all results for the specific analyte(s) > 20% D for all samples associated with the calibration verification.
ISs	Each sample, standard, and QC sample	Retention time ± 30 seconds from retention time of the IS in the ICAL midpoint standard. Extracted ion current profile area within -50% to +100% of area from IS in ICAL mid-point standard.	Inspect mass spectrometer and GC for malfunctions and make corrections as appropriate. Reanalysis of samples analyzed while the system was malfunctioning is mandatory.	Apply Q-flag to all results for analytes associated with a failed IS (unless a matrix effect can be verified), then apply M-flag.
Method blank	One per analytical batch	No analytes detected > ½ LOQ. For common laboratory contaminants, no analytes detected > LOQ. See Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and analyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s), as appropriate. See Worksheet #36, Section 36.2.5.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
LCS for all analytes	One LCS per analytical batch	Acceptance criteria: Worksheet #15.	Correct problem, then reanalyze. If still out, reprepare and reanalyze the LCS and all samples in the affected batch.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
MS/MSD	One per 20 samples per matrix as a minimum and as defined on the chain-of-custody form	Acceptance criteria: Worksheet #15.	Assess data to determine whether there is a matrix effect or analytical error. Analyze LCS for failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made regarding the PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: (1) %R for MS or MSD > upper control limit (2) %R for MS or MSD < lower control limit (3) MS/MSD RPD > control limit
Surrogate spike	Every sample, spiked sample, standard, and method blank	Acceptance criteria: Worksheet #15.	Correct problem, then reprepare and reanalyze the affected samples. If matrix effect is verified, discuss in case narrative.	For the samples: If the %R > UCL for any surrogate, apply J-flag to all positive results for associated analytes. If the %R < LCL for any surrogate, apply J-flag to all positive results for associated analytes and UJ-flag to all associated nondetects. If any surrogate recovery is <10%, apply Q-flag to all results for all associated analytes.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[c])	At initial setup and then once per 12-month period or quarterly DL verification	Detection limits established will be ≤ ½ the RL in Worksheet 15. See 40 CFR, Part 136, Appendix B. All analytes must be detected and identified by method-specified criteria for the for the verification check to be valid, or the verification check must produce a response that is at least 3 times the instrument noise level and greater than the response in the blanks associated with the MDL study.	Continue the MDL study until all criteria are met.	N/A.
LOD determination and verification (see Section D.1.2.1 and Box D-13 of the DoD QSM[c])	At initial setup and verified quarterly (if a laboratory uses multiple instruments for a given method, the LOD must be verified on each)	The apparent signal-to-noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must (1) repeat the detection limit determination and LOD verification at a higher concentration or (2) perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	N/A; samples may not be analyzed without a valid LOD.
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[c])	At initial setup: (1) verify LOQ; and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if a laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of DoD QSM[c]	(1) The LOQ and associated precision and bias must meet client requirements and must be reported or (2) in the absence of client requirements, must meet LCS control limits. See Box D-14 of the DoD QSM[c].	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag "U."
Demonstrate acceptable analyst capability	Before using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of DoD QSM[c])	QC acceptance criteria published by DoD, if available; otherwise method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for those analytes that did not meet criteria (see Section C.1.f of the DoD QSM[c]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by an analyst until capability is demonstrated.

End of Methods SW8260B, SW8270C, and SW8270C (SIM)

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8330B

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Initial multipoint calibration for all analytes (minimum five standards) (ICAL)	Minimum five-point initial calibration for target analytes, lowest concentration standard at or below the reporting limit.	Initial calibration prior to sample analysis	Average RF: RSD <= 20%; Linear: r>0.995, intercept < MDL. Apparent S/N ratio of standard at RL (LOQ) must be at least 5:1.	Evaluate standards, chromatography, and detector response. If problem found with above, correct as appropriate, then repeat initial calibration
Second-source calibration verification	Once per ICAL	All analytes within ± 20% of expected value	Correct problem and verify second source standard. Rerun second source verification. If that fails, correct problem and repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Low standard verification	Immediately following ICAL.	Less than 50 % difference for target analytes:	Evaluate data. If problem (e.g., concentrated standard, plugged injector needle) found, correct, then repeat low-level verification. If still fails, repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
CCV	Daily, before sample analysis unless ICAL performed on same day and every 24 hours of analysis time	All analytes within ± 20% of expected value	Correct problem, rerun CCV. If that fails, repeat initial calibration.	Apply Q-flag to all results for the specific analyte(s) > 30 %D for all samples associated with the calibration verification.
Surrogate spike	**Every sample, spiked sample, standard, and method blank**	**Acceptance criteria: Worksheet #15.**	**Correct problem, then reprepare and reanalyze the affected samples.** **If matrix effect is verified, discuss in case narrative.**	**For the samples:** **If the %R > UCL for any surrogate, apply J-flag to all positive results for associated analytes.** **If the %R < LCL for any surrogate, apply J-flag to all positive results for associated analytes and UJ-flag to all associated nondetects.** **If any surrogate recovery is <10%, apply Q-flag to all results for all associated analytes.**
Method Blank	One per preparation batch	No target analytes ≥ ½ LOQ and > 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater).	Verify instrument clean (evaluate calibration blank & samples prior to method blank), then reanalyze. Evaluate to determine if systematic issue within laboratory, correct, then re-prepare and reanalyze the method blank and all samples processed with the contaminated blank in accordance with DoD QSM requirements	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
LCS for all analytes	One LCS per analytical batch	Acceptance criteria: Table 7-4	Correct problem then reanalyze. If still out, reprep and reanalyze the LCS and all samples in the affected AB.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
Confirmation Analysis	When target analytes detected on the primary column at concentrations > LOD.	Calibration and QC criteria the same as for initial/primary analsyis. Results between primary and secondary column RPD ≤ 40%	Evaluate data, then report with flag to denote RPD > 40%. Narrate obvious matrix issues.	RPD between primary and confirmation analysis ≤ 40%..
Soil Grinding Blank	When puck mill grinding is performed, one blank between each sample processed.	Blank material ground and subsampled as with the samples. Composited prior to analysis. No target analytes detected at > than 1/2 the LOQ	All blanks are reported, and data is flagged/narrated if the criteria are exceeded.	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements
Grinding Certified Reference Material (CRM)	When puck mill grinding is performed, CRM is ground for every 20 samples ground.	Within the control limits supplied by manufacturer of material	Evaluate the data, narrate any outliers and report.	Manufacturer's acceptance limits.
DL study (as part of the LOD process, reference Section D.1.2.1 of the DoD QSM)	At initial setup and subsequently once per 12-month period or quarterly DL verification checks.	DL established shall meet 40 CFR, Part 136 Appendix B.	Continue to run the DL study until all criteria are passing	N/A
LOD determination and verification (reference Section D.1.2.1 and grey box D-13 of the QSM)	At initial set-up and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must: 1) Repeat the detection limit determination and LOD verification at a higher concentration;or 2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	Not Applicable, Samples may not be analyzed without a valid LOD.
LOQ establishment and verification (reference Section D.1.2.2 and grey box D-14 of the QSM)	At initial setup: 1) Verify LOQ; and 2) Determine precision and bias at the LOQ. Subsequently, verify LOQ quarterly. If a laboratory uses multiple instruments for a given method, the LOQ must be verified on each. See Box D-14.	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or 2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DOD QSM.	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	Not Applicable, Samples may not be analyzed without a valid LOD.
Results reported between DL and LOD and the LOD and the LOQ	None	None	None	Apply F-flag to all results between DL and LOQ. If no Detection determined below the LOD, report to the LOD, flag U.

End of Method SW8330B

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Tuning (Mass Calibration Verification)	Prior to ICAL and after any mass calibration or maintenance is performed.	Quantitation ions within 0.3 m/z of expected mass.	Perform mass calibration on the MS/MS. If required, consult with instrument engineer for further maintenance.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Minimum six-point initial calibration for target analytes, lowest concentration standard at or below the reporting limit	Initial calibration prior to sample analysis	Linear: r^2 > 0.990 (r>0.995) with intercept ≤ LOD, or Average Response Factor: RSD≤ 20%.	Evaluate standards, chromatography, and mass spectrometer response. If problem found with above, correct as appropriate, then repeat initial calibration.	Evaluate standards, chromatography, and detector response. If problem found with above, correct as appropriate, then repeat initial calibration
Second-source calibration verification	Once per six-point initial calibration	Perchlorate within ±15% of the true value	Evaluate data. If problem (e.g., concentrated standard, plugged transfer line) found, correct, then repeat second source verification. If it still fails, then repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Daily calibration verification	Mid-range standard analyzed before sample analysis, after every 10 samples, and at the end of the sequence.	Perchlorate within ±15% of the true value	Correct problem, then repeat. If still fails, repeat initial calibration	Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.
Limit of Detection verification (LODv) (per batch)	Prior to sample analysis and at the end of the analysis sequence.	Perchlorate within ± 30% of the true value	Correct problem. Evaluate samples. Samples with results ≥ RL (LOQ) may be reported. Samples since the last passing LODv with results ≤ RL (LOQ) must be reanalyzed.	**Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.**
Laboratory Reagent Blank	Prior to ICAL, following samples with overrange concentration of perchlorate, and at the end of the analytical sequence.	No perchlorate detected > LOQ	Reanalyze reagent blank (until no carryover seen), and any samples with perchlorate detections since the contaminated blank.	No target analytes ≥ ½ LOQ
Internal Standard	Every Calibration Standard	ICAL: IS for each standard must be within ± 50% of the average area of the ICAL. ICV, CCV: Within ± 50% of the average area of the ICAL or within ± 50% of the 1st CCV of the run, if the ICAL is not run the same day.	Evaluate the system. Reanalyze/repeat the calibration.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples.
Method Blank	One per preparation batch	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements	Correct problem, then re-extract and reanalyze method blank and all samples processed with the contaminated blank in accordance with DoD QSM requirements	No target analytes ≥ ½ LOQ

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Interference Check Sample (ICS)	One per preparation batch	70% -130%	Reanalyze once. If still outside the acceptance limits, evaluate to determine if cleanup filters or column degradation are suspect, replace appropriate materials and reprepare (filters) or reanalyze (column). Repeat the Interference Threshold Study to deter. If problem still exists, recalibrate.	Recovery as described in DoD Perchlorate Handbook.
IS	During acquisition of calibration standard, samples, and QC check samples	Areas within -50% to +100% of the midpoint of the last ICAL for each sample and QC in accordance with DoD QSM requirements	Inspect LCMS for malfunctions; mandatory reanalysis of samples analyzed while system was malfunctioning in accordance with DoD QSM requirements	Meets all EPA Method requirements
Isotope Ratio $^{35}CL/^{37}CL$	Every sample, batch QC sample and standard	Monitor for either the parent ion at masses 99/101 or the daughter ion at masses 83/85 depending on which ions are quantified.	Re-extract, re-clean, and/or reanalyze affected sample(s). If problem persists, perform post-spike or dilution as appropriate to confirm presence of perchlorate	Theoretical ratio approx. 3.06 Must fall within 2.3 to 3.8
LCS	One LCS per analytical/preparation batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Reanalyze LCS once. If acceptable, report. Otherwise, evaluate and re prepared and reanalyze the LCS and all samples in the associated prep batch for failed analytes, if sufficient sample material is available.	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
MS/MSD	One MS/MSD per batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Identify problem; if not related to matrix interference, re-extract and reanalyze MS/MSD in accordance with DoD QSM requirements	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
DL study (as part of the LOD process, reference Section D.1.2.1 of the DoD QSM)	At initial setup and subsequently once per 12-month period or quarterly DL verification checks.	DL established shall meet 40 CFR, Part 136 Appendix B.	Continue to run the DL study until all criteria are passing	N/A
LOD determination and verification (reference Section D.1.2.1 and grey box D-13 of the QSM)	At initial set-up and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must: 1) Repeat the detection limit determination and LOD verification at a higher concentration; or 2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher	Not Applicable, Samples may not be analyzed without a valid LOD.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			concentration.	
LOQ establishment and verification (reference Section D.1.2.2 and grey box D-14 of the QSM)	At initial setup: 1) Verify LOQ; and 2) Determine precision and bias at the LOQ. Subsequently, verify LOQ quarterly. If a laboratory uses multiple instruments for a given method, the LOQ must be verified on each. See Box D-14.	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or 2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DOD QSM.	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	Not Applicable. Samples may not be analyzed without a valid LOD.
Results reported between DL and LOD and the LOD and the LOQ	None	None	None	Apply F-flag to all results between DL and LOQ. If no Detection determined below the LOD, report to the LOD, flag U.

End of Method SW6850

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Tuning (Mass Calibration Verification)	Prior to ICAL and after any mass calibration or maintenance is performed.	Quantitation ions within 0.3 m/z of expected mass.	Perform mass calibration on the MS/MS. If required, consult with instrument engineer for further maintenance.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Minimum six-point initial calibration for target analytes, lowest concentration standard at or below the reporting limit	Initial calibration prior to sample analysis	Linear: r^2 > 0.990 (r>0.995) with intercept ≤ LOD, or Average Response Factor: RSD≤ 20%.	Evaluate standards, chromatography, and mass spectrometer response. If problem found with above, correct as appropriate, then repeat initial calibration.	Evaluate standards, chromatography, and detector response. If problem found with above, correct as appropriate, then repeat initial calibration
Second-source calibration verification	Once per six-point initial calibration	Perchlorate within ±15% of the true value	Evaluate data. If problem (e.g., concentrated standard, plugged transfer line) found, correct, then repeat second source verification. If it still fails, then repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Daily calibration verification	Mid-range standard analyzed before sample analysis, after every 10 samples, and at the end of the sequence.	Perchlorate within ±15% of the true value	Correct problem, then repeat. If still fails, repeat initial calibration	Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.
Limit of Detection verification (LODv) (per batch)	Prior to sample analysis and at the end of the analysis sequence.	Perchlorate within ± 30% of the true value	Correct problem. Evaluate samples. Samples with results ≥ RL (LOQ) may be reported. Samples since the last passing LODv with results ≤ RL (LOQ) must be reanalyzed.	Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.
Laboratory Reagent Blank	Prior to ICAL, following samples with overrange concentration of perchlorate, and at the end of the analytical sequence.	No perchlorate detected > LOQ	Reanalyze reagent blank (until no carryover seen), and any samples with perchlorate detections since the contaminated blank.	No target analytes ≥ ½ LOQ
Internal Standard	Every Calibration Standard	ICAL: IS for each standard must be within ± 50% of the average area of the ICAL. ICV, CCV: Within ± 50% of the average area of the ICAL or within ± 50% of the 1st CCV of the run, if the ICAL is not run the same day.	Evaluate the system. Reanalyze/repeat the calibration.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples.
Method Blank	One per preparation batch	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements	Correct problem, then re-extract and reanalyze method blank and all samples processed with the contaminated blank in accordance with DoD QSM requirements	No target analytes ≥ ½ LOQ

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Interference Check Sample (ICS)	One per preparation batch	70% -130%	Reanalyze once. If still outside the acceptance limits, evaluate to determine if cleanup filters or column degradation are suspect, replace appropriate materials and reprepare (filters) or reanalyze (column). Repeat the Interference Threshold Study to deter. If problem still exists, recalibrate.	Recovery as described in DoD Perchlorate Handbook.
IS	During acquisition of calibration standard, samples, and QC check samples	Areas within -50% to +100% of the midpoint of the last ICAL for each sample and QC in accordance with DoD QSM requirements	Inspect LCMS for malfunctions; mandatory reanalysis of samples analyzed while system was malfunctioning in accordance with DoD QSM requirements	Meets all EPA Method requirements
Isotope Ratio $^{35}CL/^{37}CL$	Every sample, batch QC sample and standard	Monitor for either the parent ion at masses 99/101 or the daughter ion at masses 83/85 depending on which ions are quantified.	Re-extract, re-clean, and/or reanalyze affected sample(s). If problem persists, perform post-spike or dilution as appropriate to confirm presence of perchlorate	Theoretical ratio approx. 3.06 Must fall within 2.3 to 3.8
LCS	One LCS per analytical/preparation batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Reanalyze LCS once. If acceptable, report. Otherwise, evaluate and re prepared and reanalyze the LCS and all samples in the associated prep batch for failed analytes, if sufficient sample material is available.	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
MS/MSD	One MS/MSD per batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Identify problem; if not related to matrix interference, re-extract and reanalyze MS/MSD in accordance with DoD QSM requirements	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
DL study (as part of the LOD process, reference Section D.1.2.1 of the DoD QSM)	At initial setup and subsequently once per 12-month period or quarterly DL verification checks.	DL established shall meet 40 CFR, Part 136 Appendix B.	Continue to run the DL study until all criteria are passing	N/A
LOD determination and verification (reference Section D.1.2.1 and grey box D-13 of the QSM)	At initial set-up and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must: 1) Repeat the detection limit determination and LOD verification at a higher concentration; or 2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher	Not Applicable, Samples may not be analyzed without a valid LOD.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			concentration.	
LOQ establishment and verification (reference Section D.1.2.2 and grey box D-14 of the QSM)	At initial setup: 1) Verify LOQ; and 2) Determine precision and bias at the LOQ. Subsequently, verify LOQ quarterly. If a laboratory uses multiple instruments for a given method, the LOQ must be verified on each. See Box D-14.	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or 2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DOD QSM.	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	Not Applicable. Samples may not be analyzed without a valid LOD.
Results reported between DL and LOD and the LOD and the LOQ	None	None	None	Apply F-flag to all results between DL and LOQ. If no Detection determined below the LOD, report to the LOD, flag U.

End of Method SW6850

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW6010B and SW7470A/71A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Instrument detection limit study	At initial setup and after significant change in instrument type, personnel, test method, or sample matrix	Instrument detection limits will be < LOD.	N/A.	N/A.
Linear dynamic range or high-level check standard	Every 6 months	Within ± 10% of true value.	Correct problem, then reanalyze or reset linear range.	Apply J-flag to the specific analyte(s) for all results not within linear range.
ICAL for all analytes (minimum one standard and a blank 3- to 5-point standard preferred)	Daily before sample analysis	If more than one standard is used, correlation coefficient must be ≥ 0.995.	If applicable, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL.
ICV (second source)	Daily after ICAL	All analytes within ± 10% of expected value.	Correct problem and verify second-source standard. Rerun ICV. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
CCV (Instrument Check Standard)	After every 10 samples and at the end of the analysis sequence	All analyte(s) within ± 10% of expected value and RSD of replicate integrations < 5%.	Correct problem, then repeat CCV and reanalyze all samples since last successful calibration verification.	Apply Q-flag to all results for the specific analyte(s) >10 %D for all samples associated with the calibration verification.
Calibration blank	Before beginning a sample run, after every calibration verification	No analytes detected > LOD.	Correct problem, then analyze calibration blank and previous 10 samples.	Apply B-flag to all associated positive results for the specific analyte(s) as appropriate.
Low-level calibration check standard (at or below LOQ)	Daily, after ICAL; not required for multipoint calibration (3 or more points) with low standard at or below LOQ.	Analyte(s) with ± 20% of expected value.	Correct problem, then reanalyze.	No samples may be analyzed without a valid low-level calibration check standard. Low-level calibration check standard should be less than or equal to the LOQ.
Method blank	One per analytical batch	No analytes detected > ½ LOQ. For common laboratory contaminants, no analytes detected > LOQ. See Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and reanalyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s), as appropriate. See Worksheet #36, Section 36.2.5.
ICS	At the beginning of an analytical run	ICS A: All non-spiked analytes < LOD (unless they are a verified trace impurity from one of the spiked analytes). ICS AB: Within ± 20% of expected value.	Terminate analysis; locate and correct problem; reanalyze ICS and all associated samples.	Flagging criteria are not appropriate. No samples may be analyzed without a valid ICS. If corrective action fails, apply Q-flag to the specific analyte(s).

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW6010B and SW7470A/71A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
LCS for all analytes	One per analytical batch	Acceptance criteria: Worksheet #15.	Correct problem then reanalyze. If still out, reprepare and reanalyze the LCS and all samples in the affected batch.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
Dilution test	Each new sample matrix, at least once per analytical batch (only applicable for analytes with concentrations > 50 times LOQ)	Fivefold (1+4) dilution must agree within ± 10% of the original determination.	Add post-digestion spike.	Apply J-flag to all sample results for the specific analyte from the same matrix in the batch if either of following exist: (1) dilution test not run and batch had analyte concentrations >50X LOQ or (2) %D ≥10 and post-digestion spike not performed.
Post-digestion spike addition	When dilution test fails or if an analyte's concentration for all samples in a batch is less than 50 times LOQ (<25 for Method SW7470A/SW7471A)	Recovery within 75–125% of expected results (85-115 for SW7470A/SW7471A).	Check for instrumental problem, then reanalyze post-digestion spike addition if appropriate.	Apply J-flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition. If post-digestion spike addition recovery is < 10%, apply Q-flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition.
MS/MSD	One per 20 samples per matrix as a minimum and as defined on the chain-of-custody form	Acceptance criteria: Worksheet #15.	Assess data to determine whether there is a matrix effect or analytical error. Analyze LCS or failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made regarding PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: (1) %R for MS or MSD > UCL (2) %R for MS or MSD < LCL (3) MS/MSD RPD > control limit
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[c])	At initial setup and then once per 12-month period or quarterly DL verification checks	Detection limits established will be ≤ ½ the RL in Worksheet #15 Tables. See 40 CFR, Part 136, Appendix B. All analytes must be detected and identified by method-specified criteria for the for the verification check to be valid, or the verification check must produce a response that is at least 3X the instrument noise level and greater than the response in the blanks associated with the MDL	Continue the MDL study until all criteria are met.	N/A.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW6010B and SW7470A/71A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
		study.		
LOD determination and verification (reference Section D.1.2.1 and Box D-13 Of the DoD QSM[c])	At initial setup and verified quarterly (if a laboratory uses multiple instruments for a given method, the LOD must be verified on each)	The apparent signal-to-noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must (1) repeat the detection limit determination and LOD verification at a higher concentration; or (2) perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	N/A; samples may not be analyzed without a valid LOD.
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[c])	At initial setup: (1) verify LOQ and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if a laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of the DoD QSM[c]).	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or (2) in the absence of client require-ments, must meet control limits of the LCS. See Box D-14 of the DoD QSM[c].	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag "U."
Demonstrate acceptable analyst capability	Before using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of the DoD QSM[c])	QC acceptance criteria published by DoD, if available; otherwise method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for those analytes that did not meet criteria (see Section C.1.f of the DoD QSM[c]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by analyst until capability is demonstrated.

End of Method SW6010B and SW7470A/71A

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6020A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
MS tuning sample	Before ICAL.	Mass calibration ≤ 0.1 amu from the true value. Resolution <0.9 amu full width at 10% peak height. Stability: RSD ≤ 5% for at least four replicate analyses.	Retune instrument then reanalyze tuning solution.	Not appropriate.
ICAL for all analytes (minimum one standard and a blank)	Daily before sample analysis	If more than one standard is used, correlation coefficient must be ≥ 0.995.	If applicable, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL.
ICV (second source)	After ICAL, before beginning a sample run at a concentration other than used for calibration	All analytes within ± 10% of expected value.	Correct problem and verify second-source standard. Rerun ICV. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
CCV	After every 10 samples and at the end of the analysis sequence—at a concentration near the middle of the calibration range	All analytes within ± 10% of expected value.	Correct problem, then repeat CCV and reanalyze all samples since last successful calibration verification.	Apply Q-flag to all results for the specific analyte(s) >10 %D for all samples associated with the calibration verification.
Calibration blank	Before beginning a sample run, after every 10 samples and at end of the analysis sequence	No analytes detected > LOD.	Correct problem, then analyze calibration blank and previous 10 samples.	Apply B-flag to all associated positive results for the specific analyte(s) as appropriate.
Low-level calibration check standard (at or below LOQ)	Daily, after ICAL Not required if multipoint calibration (3 or more points) with low standard at or below LOQ is performed	All analyte(s) with ± 20% of expected value.	Correct problem then reanalyze.	No samples may be analyzed without a valid low-level calibration check standard. Low-level calibration check standard should be less than or equal to the LOQ.
Linear range calibration (high) check standard	Every 6 months	Analyte within ± 10% of expected value.	Correct problem then reanalyze or reset linear range.	Apply J-flag to the specific analyte(s) for all results not within linear range.
Method blank (Preparation blank)	One per analytical batch	No analytes detected > ½ LOQ For common laboratory contaminants, no analytes detected > LOQ. See Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and analyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s) as appropriate. See Worksheet #36, Section 36.2.5.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6020A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Interference check solutions (ICS-A and ICS-AB)	At the beginning of an analytical run or once during an 12-hour period, whichever is more frequent	**ICS-A:** All non-spiked analytes < LOD (unless they are a verified trace impurity from one of the spiked analytes). **ICS-AB:** Within ± 20% of expected value.	Terminate analysis; locate and correct problem; reanalyze ICS; reanalyze all affected samples.	Flagging criteria are not appropriate. No samples may be analyzed without a valid ICS. If corrective action fails, apply Q-flag to the specific analyte(s).
LCS for all analytes	One LCS per analytical batch	Acceptance criteria: Worksheet #15.	Correct problem then reanalyze. If still out, reprepare and reanalyze the LCS and all samples in the affected batch.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
Dilution test	Each matrix in a analytical batch (only applicable for analytes with concentrations > 100X LOD)	Fivefold (1+4) dilution must agree within ± 10% of the original determination.	Add post-digestion spike.	Apply J-flag to all sample results for the specific analyte from the same matrix in the batch if either of following exist: (1) dilution test not run and batch had analyte concentrations ≥100 times LOD or (2) % D ≥ 10 and post-digestion spike not performed.
Post-digestion spike addition	When dilution test fails or if an analyte's concentration for all samples in a batch is less than 100X LOD	Recovery within 75–125% of expected results.	Dilute the sample; reanalyze post-digestion spike addition.	Apply "J" flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition. If post-digestion spike addition recovery is < 10%, apply "Q" flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition.
MS/MSD	One per 20 samples per matrix	Acceptance criteria: Worksheet #15.	Assess data to determine whether there is a matrix effect or analytical error. Analyze LCS for failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made regarding PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: (1) %R for MS or MSD > UCL, (2) %R for MS or MSD < LCL, or (3) MS/MSD RPD > control limits
ISs	Every sample	IS intensity within 30-120% of intensity of the IS in the ICAL.	Perform corrective action as described in Method SW6020, Section 8.3.	Flagging criteria are not appropriate. No samples may be analyzed without a valid IS response.
Instrument detection limit study	At initial setup	Detection limits established will be ≤ LOD.	None.	N/A. Samples cannot be analyzed without a valid instrument detection limit.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6020A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[c])	At initial setup and then once per 12-month period or quarterly DL verification.	Detection limits established will be ≤ ½ the RL in Worksheet #15 tables. See 40 CFR, Part 136 Appendix B. Analytes must be detected and identified by method-specified criteria for the for the verification check to be valid, or the verification check must produce a response that is at least 3 times the instrument noise level and greater than the response in the blanks associated with the MDL study.	Continue to run the MDL study until all criteria are passing.	N/A.
LOD determination and verification (see Section D.1.2.1 and Box D-13 of the DoD QSM[c])	At initial setup and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must: (1) Repeat the detection limit determination and LOD verification at a higher concentration; or (2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	N/A; samples may not be analyzed without a valid LOD.
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[c])	At initial setup: (1) verify LOQ and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if a laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of the DoD QSM[c])	(1) The LOQ and associated precision and bias must meet client requirements and must be reported; or (2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DoD QSM[c].	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag "U."
Demonstrate acceptable analyst capability	Prior to using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of the DoD QSM[c])	QC acceptance criteria published by DoD, if available; otherwise method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for those analytes that did not meet criteria (see Section C.1.f of the DoD QSM[c]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by an analyst until capability is demonstrated.

End of Method SW6020A

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8290

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
MS tuning check	Before initial calibration or calibration verification and after every 12-hour period	Tune the instrument to meet the minimum resolving power of 10,000 at m/z 304.9824. Ensure that the exact mass of m/z 380.9760 is within 5 ppm of the required value. Monitor the lock mass selected ion current profile.	Retune instrument; verify. Rerun affected samples.	Not appropriate
GC column performance check	Before initial calibration or calibration verification	Peak separation between 2,3,7,8-TCDD and other TCDD isomers valley of ≤ 25%. and First and last eluters of all eight homologue retention time windows identified labeled (F/L) on the chromatogram and Absolute retention times for switching from one homologous series to the next > 10 seconds for all components of the mixture	Correct problem then repeat column performance check.	Flagging criteria are not appropriate.
Initial multipoint calibration for all analytes (minimum five standards) (ICAL)	Before sample analysis, as needed by failure of routine calibration verification standard, or when a new lot is used for standard source of CCV, sample fortification solution (IS), or recovery standards	Ion abundance ratios in accordance with Table 8 of Method SW8290 and S/N ratio > 10 for all target analyte ion current profiles and % RSD ± 20% for 17 unlabeled standards and % RSD ± 30% for the 9 labeled IS.	Correct problem then repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8290

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Routine (continuing) calibration check (Use HRCC-3 calibration standard) (CCV)	At the beginning of each 12-hour period (after successful GC resolution and MS resolution checks), and at the end of 12-hour shift.	Ion abundance ratios in accordance with Table 8, Method SW8290 and RF within ± 20% D for unlabeled standards from mean RF from initial calibration and RF within ± 30% for labeled standards from mean RF from initial calibration **End of run CCV only:** If the RF for an unlabeled or labeled standard fails by ≤ 5% in the final CCV, a new "daily" mean RF may be calculated using the initial and final RF values and used to determine the specific analyte concentrations for all samples analyzed during the shift.	Correct problem, repeat calibration verification standard one more time. If that fails, then repeat initial calibration and reanalyze all samples analyzed since the last successful calibration verification. Evaluation of corresponding labeled/unlabeled standards may impact the corrective action required. **End of run CCV:** If the RF for an unlabeled or labeled standard fails by > 5% in the final CCV, run a new ICAL immediately (within 2 hours) and use the new RF values to process the samples. Alternatively, reanalyze all samples with positive detections.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified. **End of run CCV:** Apply Q-flag to all results for the specific analyte(s) in the sample which are not reprocessed or reanalyzed.
PCDD/PCDF identification	Verify all sample positive detections per Method SW8290	Retention time of sample components in accordance with stated criteria in Method SW8290 (Section 7.8.4.1) and Ion abundance ratios for all analytes, ISs, and recovery standards in accordance with criteria in Method SW8290 (Table 8, Section 7.8.4.2) and S/N ratio of all labeled analytes ≥ 10 times background noise (Method SW8290 Section 7.8.4.3) and S/N ratio of all remaining analyte ions ≥ 2.5 times background noise (Method SW8290 Section 7.8.4.3) and For PCDF, no signal present having a S/N ratio ≥ 2.5 for the corresponding ether (PCDPE) detected at the same retention time (± 2 sec, (Section 7.8.4.4)	Correct problem, then reprep and reanalyze the sample(s) with failed criteria for any of the internal, recovery, or standards. If PCDPE is detected or if sample peaks present do not meet all identification criteria, calculate the EMPC (estimated maximum possible concentration) according to Method SW8290 Section 7.9.5.2.	Flagging criteria are not appropriate. Positive identification of 2,3,7,8-TCDF on the DB-5 or equivalent column must be confirmed on a column capable of isomer specificity (DB-225) (see Method SW8290 Section 3.4). If peak identification criteria are met but ion abundance criteria fail for the analyte and IS, the sample should be presumed to have interfering contaminants. The sample should be rerun or the extract reanalyzed.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8290

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
ISs	Every sample, standard, and QC sample.	Percent recovery for each IS (before any dilutions) within 40–135% (Method SW8290 Section 8.4)	Inspect mass spectrometer and GC for malfunctions. Reanalysis of samples analyzed while the system was malfunctioning is mandatory.	Apply Q-flag to all results for analytes associated with a failed IS unless a matrix effect can be verified, then apply M.
Sample specific estimated detection limit (EDL)	Every sample that indicates non-detects or detections that are < 2.5 times background noise	Method 8290 Section 7.9.5 describes the calculation	N/A	N/A
Sample estimated maximum possible concentration (EMPC)	If PCDPE is detected or if sample peaks present do not meet all ion abundance ratio criteria	Method 8290 Section 7.9.5 describes the calculation	N/A	Apply J-flag to all EMPC values.
Method Blank	Minimum one per preparation batch. A method blank is required after a calibration run and before any sample run.	No analytes detected > ½ LOQ	Assess data and correct problem. If necessary, reprep and analyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s), as appropriate.
MS/MSD	One MS/MSD per every 20 samples per matrix	Acceptance criteria: Tables 7-2 and 7-3	Assess data to determine whether there is a matrix effect or analytical error. Analyze LCS for failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made with respect to the PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: (1) %R for MS or MSD > UCL (2) %R for MS or MSD < LCL, or (3) MS/MSD RPD > CL
Sample duplicate	One per analytical batch. This may be replaced by the MSD.	Acceptance criteria: Tables 7-2 and 7-3	Verify instrument performance, review analytical procedures.	For the specific analyte(s) in parent sample, apply J-flag.
Results reported below the lowest standard	None	None	None	Apply F-flag to all results below the lowest calibration standard.

End of Method SW8290

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods 160.2, 310.2, 350.1, SW9030B, SW9056, and SW9060

QC Check*	Frequency	Criteria	Corrective Action
Multi-point initial calibration (a blank and at least five standards) – does not apply to titrimetric method	Before initial sample analysis, every 24 hours, whenever modifications are made to the analytical system, or when continuing calibration verification fails	Correlation coefficient of linear regression is ≥ 0.995	Correct the problem and repeat the initial calibration.
Second-source calibration verification	Immediately following each initial calibration	Analytes within ±15% (±10% for SW9056) of expected value	Correct the problem and repeat initial calibration.
Calibration blank – does not apply to titrimetric methods	After every Second-source or Continuing calibration verification analysis	No analytes detected at or above the LOQ	Correct the problem, then reanalyze previous 10 samples.
Continuing calibration verification	After every 10 samples and at the end of the analysis sequence	Within ±15% (±10% for SW9056) of expected value	Recalibrate and reanalyze all samples since the last acceptable continuing calibration verification
Method Blank	At least one per analytical batch	No analytes detected at or above the LOQ	Correct the problem and re-prep and reanalyze all associated samples
MS/MSD	One set per 20 project-specific samples. MSD is optional if a laboratory sample duplicate is performed	All analytes within limits specified Limits Worksheet 15	None
Laboratory sample duplicate	Once per analytical batch if MSD not performed	Concentration of reported analytes are > 5 times the reporting limit in either sample and RPD >20%. One sample result < RL and a difference of ±2 times the reporting limit	None
LCS	At least one per analytical batch	All analytes within limits specified limits in Worksheet 15	Correct the problem, and re-prep and reanalyze the LCS and all samples in the analytical batch

*Unless calibration and QC requirements are specified for an individual method.

End of Methods 160.2, 310.2, 350.1, SW9030B, SW9056, and SW9060

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Notes, Acronyms, and Abbreviations

[a]All corrective actions associated with project work ~~will~~shall be documented, and all records ~~will~~shall be maintained by the laboratory.

[b]Flagging criteria ~~will~~shall be applied when acceptance criteria were not met and corrective action was not successful or corrective action was not performed.

[c]DoD. 2010. *Department of Defense (DoD) Quality Systems Manual for Environmental Laboratories*. Version 4.2. October.

% D – percent difference	LODv – limit of detection verification
%R – percent recovery	LOQ – limit of quantitation
CCC – calibration check compounds	MDL – method detection limit
CCV – continuing calibration verification	MS/MSD – matrix spike/matrix spike duplicate
COD – coefficient of determination	N/A – not applicable
DL – detection limit	PQO – practical quantitation objectives
DRO – diesel range organics	PT – performance testing
GC – gas chromatography	QC – quality control
GRO – gasoline range organics	QSM – Quality Systems Manual (DoD)
ICAL – initial calibration	RF – response factor
ICS – interference check sample	RL – reporting limit
ICV – initial calibration verification	RPD – relative percent difference
IS – internal standard(s)	RRT – relative retention time
LCL – lower confidence limit	RSD – relative standard deviation
LCS – laboratory control sample	SPCC – system performance calibration compounds
LOD – limit of detection	UCL – upper confidence limit

End of Table H-10

3. MANAGEMENT OF WASTE FROM CLOSURE ACTIVITIES

Wastes that are expected to be generated during the final closure activities at the OD Unit include: excess soil from sampling; well purge water, drill cuttings, decontamination water; PPE; and excavated soils. To minimize the amount of waste to be generated during closure activities, excess soil cuttings from borings ~~will~~shall be replaced in the auger holes. The volume of liquid waste generated during the cleaning of equipment is to be minimized by using only the smallest amount of wash rinse water necessary to achieve successful decontamination. Solvents ~~will~~shall not be used.

3.1 Waste Management

Wastes associated with closure activities at the OD Unit ~~will~~shall be managed as follows:

- Wastes ~~will~~shall be stored in appropriate containers that are compatible with the wastes and are in good condition.
- If analytical results indicate that the waste is hazardous or the ~~Kirtland AFB~~Permitee project manager determines that the waste ~~will~~shall be classified as hazardous, ~~Kirtland AFB~~the Permitee ~~will~~shall manage the waste in accordance with all applicable regulations in 40 CFR §261-268.
- Waste containers shall remain within the OD Unit boundary under the control of the personnel generating the waste until it is transported for treatment and disposal.
- Waste containers ~~will~~shall be segregated according to the compatibility and chemical waste type.
- Waste ~~will~~shall be stored in containers that remain closed, except when adding or removing wastes.
- Waste containers bearing free liquid ~~will~~shall be provided with secondary containment of sufficient volume to prevent spilled liquids from being released onto the ground.
- Waste containers ~~will~~shall be managed in such a manner as to prevent ruptures and leaks.
- Waste containers ~~will~~shall be labeled appropriately, pending receipt of analytical results. Labels ~~will~~shall be filled out appropriately and marked using permanent marker or pen. Label information ~~will~~shall include waste source, suspected contaminants, contents, depth (if appropriate), the date which accumulation began, and a contact name.

3.2 Waste Characterization

Characterization of the liquid waste and excavated soil generated during the closure of the OD Unit ~~will~~shall be based upon the results of sampling and analysis. Decontamination water ~~will~~shall be analyzed for the constituents listed in Tables H-3. PPE ~~will~~shall be handled ~~as non-hazardous waste and will be managed appropriately~~in accordance with Section 1.4 of this Permit Attachment (H) and applicable state and federal regulations~~-~~.

3.3 Waste Disposal

All wastes from closure activities determined to be hazardous ~~will~~shall be managed in accordance with the Hazardous Waste Management Regulations from the time of generation. Hazardous wastes ~~will~~shall be shipped off-site for treatment and disposal at a permitted RCRA facility.

Wastes characterized as nonhazardous ~~will~~shall be evaluated to determine the appropriate disposal method in accordance with applicable law.

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HAZARDOUS WASTE TREATMENT

FACILITY OPERATING PERMIT

EPA ID No. NM9570024423

issued to

UNITED STATES AIR FORCE

for the

OPEN DETONATION UNIT

located at

KIRTLAND AIR FORCE BASE

BERNALILLO COUNTY, NEW MEXICO

issued by

NEW MEXICO ENVIRONMENT DEPARTMENT

HAZARDOUS WASTE BUREAU

2905 RODEO PARK DRIVE EAST, BUILDING I

SANTA FE, NEW MEXICO 87505

July 2010

I. PREAMBLE

A. SUMMARY

Kirtland Air Force Base (AFB) hereby submits a request to modify the Hazardous Waste Treatment Facility Operating Permit (Renewal Permit)(hereinafter defined) issued by New Mexico Environment Department (NMED) in July 2010 for an Open Detonation (OD) Treatment Unit EPA ID# NM9570024423 (this request is hereinafter described as the "November PMR"), pursuant to Section 74-4-4.2.G(2) of the New Mexico Hazardous Waste Act ("HWA"), 40 CFR §§ 270.41 -.42 and Sections 20.4.1.900-.901 of the New Mexico Administrative Code (NMAC).

Kirtland AFB made a business decision to cease operations of the OD Unit and pursue closure of the OD Unit and its co-located Open Bum (OB) Treatment Unit approximately forty years earlier than anticipated in furtherance of NMED's stated goal of eliminating OD of hazardous waste at Kirtland AFB as soon as practicable. This decision and its resulting effects provide both legal bases and practical justifications for modifying the Renewal Permit. The resulting changes to the facts and circumstances surrounding the OD Unit and its permit provide cause for modification under 40 CFR § 270.41(a)(l)-(2), because new information that was not available at the time of either the permit renewal application or permit issuance and material and substantial alterations to activities have occurred. Kirtland AFB's reasons for making its decision to cease operations of the OD Unit and pursue closure were partially based on the fact that because of facts and circumstances beyond its control, Kirtland AFB would not be able to comply with the compliance schedules outlined in the Renewal Permit. These events and circumstances, including, but not limited to the budgetary allocation process of the Federal government, present continuing obstacles making it practically impossible for Kirtland AFB to comply with the Renewal Permit and therefore provide cause for modification of the Renewal Permit under 40 CFR § 270.41(a)(4).

In addition, the resulting effects of ceasing treatment operation and seeking closure 40 years prior to the anticipated closure date and in furtherance of NMED's stated goal of eliminating OD hazardous waste at Kirtland AFB as soon as practicable, provide several practical reasons for modifying the Renewal Permit. Ceasing treatment at the permitted treatment unit and pursuing closure of that unit and its co-located OB Unit make the scope and resulting costs of the Renewal Permit's compliance, reporting and corrective action requirements unnecessarily expansive, broad, invasive and expensive.

Furthermore, the OD Unit is small, comprising a circular area with a diameter of roughly 1,500 feet, an insignificant geographic area in relation to the entire installation of 80.56 square miles at Kirtland AFB. The fact that Kirtland AFB applied for a renewal permit to continue operating a small OD Unit does not logically warrant base-wide application of the Renewal Permit corrective action requirements after Kirtland AFB ceased treating hazardous waste at the OD Unit. NMED has corrective action authority under the HSWA module from the 1990 Kirtland

Treatment, Storage and Disposal (TSD) Permit, sufficient to address individual releases and necessary corrective action requirements. NMED as recently as April 2010 asserted this authority under the HSWA Module and can continue to use this authority to require and oversee necessary corrective action at the base.

Moreover, Kirtland AFB believes that several facts and issues related to the Renewal Permit's issuance provide the bases for modification. Specifically, NMED's process time for the renewal application (from December 2004 until July 2010) was unreasonably long and seemingly in violation of NMED's statutory mandate in § 74-4-4.2(C) NMSA 1978. In fact, NMED's processing took longer than the entire term of the Renewal Permit. NMED also failed to provide Kirtland AFB with any notice of its issuance. This fact is particularly troublesome in light of the mandated closure of the OB Unit and Kirtland AFB's repeated submission of closure plans for the OD and OB Units pursuant to an executed settlement agreement between the parties and NMED' s directives. Kirtland AFB also believes that the record reflects that NMED failed to adequately address Kirtland AFB's comments to the Draft OB/OD Renewal Permit submitted to the NMED-HWB on 14 June 2007. Kirtland AFB further believes that several items included in the Renewal Permit and NMED determinations with respect to the Renewal Permit were not reasonably justified or supported by the record. Finally, Kirtland AFB believes that NMED failed to follow relevant laws, rules and guidance with respect to certain aspects of the Renewal Permit.

Accordingly, Kirtland AFB believes that facts related to the OD Unit, the reasons for and effects of Kirtland AFB' s decision to withdraw its renewal application and pursue closure of the units, as well as facts and issues related to the Renewal Permit issuance provide the basis for modification of the Renewal Permit under HWA § 74-4-4.2.0(2); 40 CFR §§ 270.41 -.42 and NMAC §§ 20.4.1.900-.901. In general, Kirtland AFB requests that the Renewal Permit be modified in scope and application to focus exclusively on closure of the OB and OD Units and corrective action activities related to those Units. Kirtland AFB also has specific requests with respect to many of the provisions contained in the Renewal Permit. Kirtland AFB' s general and specific bases for this November PMR are explained in detail below.

Kirtland AFB also hereby requests a stay of any and all enforcement and deliverable dates contained in the Renewal Permit pending a final agency decision by NMED on this November PMR.

Kirtland continues to challenge whether the Renewal Permit is in effect and NMED's recent determination on Kirtland AFB' s 8 October 2010 PMR request for approval of the revised closure plan and expressly reserves any and all legal rights with respect to these issues. Kirtland also expressly reserves all legal rights in response to final agency decisions made by NMED in its 12 November 2010 correspondence denying approval of the OD Unit closure plan.

B. RELEVANT FACTS

Kirtland AFB historically operated under three RCRA permits: a TSD permit; an OD treatment permit; and an OB treatment permit. EPA issued the TSD permit in July 1990 and the HSWA Module for the same in October 1990. In February 2000, Kirtland AFB submitted a renewal application for the TSD permit, which was deemed to be administratively complete. In late 2004, Kirtland AFB applied for closure of the TSD Permit. Kirtland AFB submitted a closure report for the TSD Permit in July 2005 and NMED declared the TSD Facility clean closed in August 2005. However, Kirtland AFB and NMED-HWB never closed the HSWA Module, which continues to cover investigation and clean-up of SWMU's across Kirtland AFB. This Module is updated annually as new solid waste management units (SWMUs) are identified. The HSWA Module has been utilized as recently as April 2010, when it was identified in initial correspondence between NMED and Kirtland AFB concerning an issue related to a fuel spill at Kirtland AFB.

NMED issued the OD Treatment Unit Permit to Kirtland AFB in December 1994. NMED issued the OB Treatment Unit Permit in July 1995. On 14 May 2004, Kirtland AFB timely submitted a permit renewal application for both the OB and OD Treatment Units. Kirtland AFB submitted a revised permit renewal application for the OD and OB Units in December 2005. ("Renewal Application"). On 16 April 2007, NMED issued a draft OD/OB Permit ("Draft OB/OD Renewal Permit"), a fact sheet ("Fact Sheet") and a notice announcing a 60-day public comment period. Kirtland AFB timely submitted three sets of comments to the Draft Renewal OB/OD Permit on 14 June 2007. Other comments were submitted from the Water Utility Authority, Water Quality Advisory Board and Water Utility Authority of Albuquerque Bernalillo County, as well as two interested citizens. On 12 July 2007, by letter to interested citizens, NMED extended the public comment period to the Draft OB/OD Renewal Permit with respect to paragraph 5.2.4, therein, entitled Sanitary Sewer Line.

On 22 May 2009, NMED issued a compliance order and proposed civil penalty to Kirtland AFB with respect to the OB Unit. To resolve the issues raised by the compliance order and proposed civil penalty, NMED and Kirtland AFB entered into a settlement agreement on 25 September 2009. By letter dated 30 October 2009, pursuant to the settlement agreement between NMED and Kirtland AFB, the USAF withdrew its application to renew the OB Unit. ("OB Unit Withdrawal Letter"). The OB Unit Withdrawal Letter also requested that the Draft Permit be revised to reflect the withdrawal of the request for continued operation of the OB unit. Also pursuant to the settlement agreement between NMED and Kirtland AFB, Kirtland submitted closure plans for both the OD Unit and OB Unit in February 2010, which were deemed administratively complete by NMED in April 2010. NMED subsequently withdrew its approval of the OB and OD Unit closure plans for failure to comply with public notice requirements. Kirtland AFB issued a notice of public hearing on 18 June 2010, setting a hearing date of 7 July 2010 and submitted a revised closure plan

on 21 June 2010. On 15 July 2010, Kirtland AFB notified NMED of its compliance with the public hearing requirements.

Also on July 15, 2010, NMED issued its responses to comments on the Draft OB/OD Permit, an interested person letter, a Final Order for a final hazardous waste facility permit and a renewal permit for the OD unit ("Renewal Permit"). According to the Final Order cover letter enclosing the Renewal Permit, the Renewal Permit was to become effective 16 August 2010. Kirtland AFB reviewed the Renewal Permit, NMED's responses to comments and the Final Order. For a variety ofreasons, it made the business decision to withdraw the Renewal Application, cease operations of the OD Unit and submit revised closure plans for both the OB and OD units. Accordingly, on 13 August 2010, Kirtland AFB submitted a letter to NMED withdrawing its application for the Renewal Permit prior to the effective date of the Renewal Permit ("Withdrawal Letter").

NMED officials soon thereafter contacted Kirtland AFB representatives and requested a meeting to discuss Kirtland AFB's Withdrawal Letter. This meeting was held 30 August 2010. The 30 August 2010 meeting revealed divergent views on several issues, including whether the renewal permit was effective and whether Kirtland AFB provided a timely notice of closure for the OD Unit. NMED requested that Kirtland AFB submit a letter to clarify certain issues related to Kirtland AFB's 13 August 2010 letter. Kirtland AFB submitted a clarification letter on 20 September 2010.

On 5 October 2010, Kirtland AFB submitted a cover letter and closure plans for the OB Unit and OD Unit. The cover letter indicated that the closure plans were being submitted as Class 3 modifications to the 1994 OD Permit and 1995 OB Permit ("October 2010 PMR").

On 8 October 2010, NMED issued a letter to Kirtland AFB stating in substantive part that the Renewal Permit is in effect and NMED will take any and all action to enforce such permit. On 12 November 2010, NMED issued a letter deciding that it will not consider the Class 3 modification submitted by Kirtland AFB with respect to the closure plan for the OD Unit, because it views closure of the OD Unit as covered exclusively by the Renewal Permit, but will consider only the closure plan for the OB Unit.

II. MODIFICATION REQUEST 1 - EXTENSION OF DUE DATES FOR DELIVERABLES PENDING NMED DETERMINATION ON THIS NOVEMBER PMR.

As provided by 40 CFR §270.33, Kirtland AFB is allowed to terminate its receipt and treatment of hazardous waste at the OD Unit on Kirtland AFB rather than continue to operate and meet permit requirements. Upon ceasing operations, an alternative schedule of compliance may be issued if, as the applicant/permittee, Kirtland AFB ceased operations before non-compliance with any interim or final compliance schedules specified in the permit. On 13 August 2010, Kirtland AFB terminated its receipt and

treatment of hazardous waste at the OD Unit prior to any non-compliance associated with the Permit. Notice of this action was provided by letter to the NMED-HWB, which notice comports with the requirement of 40 CFR §270.33(b)(4).

Accordingly, Kirtland AFB hereby requests the Renewal Permit be modified to amend the Renewal Permit by replacing the operational compliance schedule with the compliance schedule set forth in the revised OD Unit closure plan submitted to the NMED-HWB on 8 October 2010 and attached as Exhibit A to this November PMR. Additionally, Kirtland AFB requests, that until a decision is rendered on this November PMR that all deliverable due dates within the Permit's compliance schedule be stayed until ninety (90) days subsequent to the issuance of NMED's determination on this November PMR.

III. MODIFICATION REQUEST 2 - STAY OF ENFORCEMENT PENDING NMED DETERMINATION OF THIS NOVEMBER PMR.

As discussed above in Modification Request 1, on 13 August 2010 Kirtland AFB terminated the receipt and treatment of hazardous waste at the OD Unit. Additionally, the termination of operations at the OD Unit occurred prior to any non-compliance associated with the Renewal Permit. Accordingly, Kirtland AFB hereby requests that any and/or all enforcement of the requirements set forth in the Renewal Permit be stayed pending the issuance of a decision on the modification requests contained herein.

IV. MODIFICATION REQUEST 3 -AMENDMENTS TO THE RENEWAL PERMIT INCORPORATING THE 8 OCTOBER 2010 REVISED CLOSURE PLAN

A. REQUESTED MODIFICATIONS: PERMIT PART 1 -GENERAL PERMIT REQUIREMENTS

I. Title Page

Requested Modification: Change to read "... Hazardous Waste Treatment Operating Permit. . ."

Justification for Request: Throughout the permit, the term Facility has been used to identify both Kirtland AFB as a whole and the OD Unit as separate treatment unit. However, since the Permit Application was submitted for the treatment of hazardous waste at the OD Unit, the Title should identify the specific treatment unit permitted.

2. Section 1.0, Page 13: Introduction

Requested Modification: "This Permit Part (I) contains general requirements pertaining to hazardous waste management at the Open Detonation (OD) Unit at Kirtland Air Force Base (AFB) Facility. . ."

Justification for Request:

Effective 13 August 2010, Kirtland AFB terminated the receipt and treatment of hazardous waste at the OD Unit. Accordingly, references to treatment and corrective actions should be deleted, in that the provisions of 40 CFR §264 pertaining to operating treatment, storage or disposal (TSD) facilities are inapplicable to closure activities. Additionally, as per §74-4-4.2(B) NMSA 1978, permits contain corrective action measures only for releases of hazardous waste or constituents from a solid waste management unit (SWMU). Since there has not been a release from the OD Unit, any reference to treatment and corrective actions should be deleted.

3. Section 1.3, Page 13: Permitted Activity

Requested Modification: Change section to read "The OD Unit is classified as a miscellaneous unit under 40 CFR Part 264 Subpart X. This Permit establishes standards for the closure and sets forth the requirements for corrective action to address releases of hazardous waste and hazardous constituents into the environment at the OD Unit pursuant to the HWA and the HWMR."

Justification for Request: Since the receipt and treatment of hazardous waste has been terminated at the OD Unit, the operational compliance requirements of 20.4.1 NMAC and 40 CFR Part 264 are inapplicable. Therefore they should be deleted. Corrective action requirements are only required if a release has occurred (§74-4-4.2(B) NMSA 1978). Therefore, since there has not been a release of hazardous wastes or hazardous constituents from the OD Unit, corrective actions should not listed in the permit. "At the OD Unit" was added to clarify and differentiate from hazardous releases in other parts of Kirtland AFB that may be addressed by CERCLA or RCRA corrective action under the HSWA Module.

4. Section 1.4, Page 14: Compliance with Permit.

Requested Modification: Change to section to read "Compliance with this Permit during its term constitutes compliance, for purposes of enforcement, with 40 CFR Parts 260 through 273 . . ."

Requested Modification: See justification statement discussion in amendments 2 and 3 above.

5. Section 1.8, Page 16: Definitions

Requested Modification: Insert the following definition for "Open Detonation Unit: the area circular in shape with a diameter of approximately 1,500 feet where detonation treatment events take place (See Permit, Page 110)."

Justification for Request: The Permit as written only defines the term "Facility," which is used to refer to Kirtland AFB. "Facility" is sometimes used throughout the Permit when discussing sections of the Permit which should only apply to the OD Unit.

6. Section 1.10, Page 17: Term of the Permit

Requested Modification: "This Permit shall be effective for a fixed period of I 0 years in accordance with 40 CFR § 270.50(a), subject to Permit Sections 1.5, 1.12 and 1.15.

Justification for Request: In NMED's Response to Comments on the Draft Permit, the justification given for shortening the permit term to 3 years was "so that changes to the technology for the treatment ofreactive and ignitable hazardous wastes can be initiated at Kirtland AFB." Because Kirtland AFB has notified the NMED of its intent to close the OD Unit and discontinue the treatment of hazardous waste, the shortening of the permit term is no longer relevant. The Renewal Permit term should be increased to the standard I 0 years, which term was granted in the 1995 OD Permit and is consistent with the 40 CFR § 270.50(a).

7. Section 1.11, Page 17: Alternative Assessment for Waste Treatment

Requested Modification: Delete this section regarding the alternative assessment for waste treatment.

Justification for Request: Effective 13 August 2010, Kirtland AFB terminated its receipt and treatment of hazardous waste at the OD Unit, as well as providing written notice to the NMED-HWB. An alternative assessment for waste treatment is no longer needed when there is no waste being treated.

8. Section 1.13, Pages 19: Transfer of Land Ownership

Requested Modification: Change to read ". . . ownership of any land that is part of the OD Unit (See also Permit § 6.1.12). . ." wherever Facility appears in this Section.

Justification for Request: It appears that the term "Facility," which is defined as all contiguous land at Kirtland AFB, was incorrectly inserted expanding applicability to non-OD Unit acres.

9. Section 1.23.I, Page 21: Representative Sampling

Requested Modification: Change to read "The Permittee shall take representative closure samples and measurements in accordance with the procedures in this permit and 40 CFR Part 270. This includes, but is not limited to, sampling and analysis of waste, treatment residue, soil, groundwater, and spills. To obtain . . ."

Justification for Request: See justification statement discussion in amendments 2 and 3 above.

10. Section 1.23.1.l, Page 21: Monitoring Records Contents

Requested Modification: Change to read ". . . Monitoring records shall contain:
I. The dates . . ."

Justification for Request: See justification statement discussion in amendments 2 and 3 above.

11. Section 1.29, Page 25:

Corrective Action Requested

Modification: Delete Section.

Justification for Request: See justification statement discussion in amendments 2 and 3 above.

B. REQUESTED MODIFICATIONS: PERMIT PART 2 - GENERAL FACILITY REQUIREMENTS

12. Sections – All, Pages 30 through 45

Requested Modification: Change "Facility" to "OD Unit" or "Treatment Unit" throughout Permit Part 2.

Justification for Request: Throughout Part 2, the term Facility has been used to identify both Kirtland AFB as a whole and the OD Unit as separate treatment unit. However, since the Permit Application was submitted for the treatment of hazardous waste at the OD Unit, the term "OD Unit" should be referenced in that it is the specific treatment unit subject to the Permit.

13. Permit Part 2, Page 30: General Facility Requirements

Requested Modification: Change to read "General OD Unit Requirements"

Justification for Request: See justification statement for amendment 12 above. Also, the term "facility," which is defined as all contiguous land at Kirtland AFB, was apparently incorrectly inserted expanding applicability to non-OD Unit acres.

14. Section 2.2, Page 30: Inspections

Requested Modification: Delete this section.

Justification for Request: The inspection requirements identified in Section 2.2 apply to operational treatment units. Since Kirtland AFB closed the OD unit to the receipt and treatment of hazardous wastes on 13 August 2010, the identified requirements for inspection malfunctions, deterioration, operator errors, discharges, equipment testing and maintenance, etc., are no longer applicable. See justification statement discussion in amendments 2 and 3 above.

15. Section 2.3, Page 31: Personnel Training

Requested Modification: Change this section to read: "The Permittee shall follow the personnel training procedures for the OD Unit closure activities specified in Renewal Permit Attachment G."

Justification for Request: As set forth in this Section and Attachment G, the identified personnel training ". . . is to prepare personnel to conduct operations at the OD Unit . . ." However, since the OD Unit has been closed to the receipt and treatment of hazardous wastes since 13 August 2010 and Kirtland AFB has filed a request for OD Unit closure, this requirement should only apply to closure plan activities. See justification statement discussion in amendments 2 and 3 above.

16. Section 2.4.1, Page 31: Required Equipment

Requested Modification: Delete paragraph 2 discussing an internal communications and/or alarm system for the OD Unit.

Justification for Request: The internal communications and/or alarm system requirement provided OD Unit personnel the capability of immediate emergency contact during treatment operations. However, since the OD Unit has been closed for the receipt and treatment of hazardous wastes and is scheduled for closure, this requirement is no longer applicable. See justification statement discussion in amendments 2 and 3 above.

17. Section 2.4.3, Page 32: Required Aisle Space

Requested Modification: Delete this section.

Justification for Request: The aisle spacing requirements of 40 CFR § 264.35 do not apply to the OD Unit.

18. Section 2.4.4, Page 32: Arrangements with Local Authorities

Requested Modification: Delete this section.

Justification for request: This requirement for potential emergency response by local authorities during OD Unit treatment activities is no longer applicable, in that the unit has been closed to the receipt and treatment of hazardous waste eliminating the need for emergency response activities. See justification statement discussion in amendments 2 and 3 above.

19. Section 2.45, Pages 32-33: Preventive Procedures, Structures and Equipment

Requested Modification: Delete this section.

Justification for request: The requirements set forth in this section apply to operational OD Units. However, since this unit has been closed to the receipt and treatment of hazardous wastes since 13 August 20I0, this requirement is no longer applicable.

20. Section 2.5.4, Page 34: Emergency Coordinator

Requested Modification: Delete 3rd sentence in Paragraph lland last sentence in Paragraph 2.

Justification for request: The requirements identified for deletion apply to operational OD Units. However, since the OD Unit has been closed to the receipt and treatment of hazardous wastes since 13 August 200, this requirement is no longer applicable.

21. Section 2.6, Pages 34-37: Waste Characterization

Requested Modification: Delete sections 2.6.l through 2.6.5.1.

Justification for request: The sections identified for deletion apply to treating hazardous wastes at operational OD Units. However, since the OD Unit has been closed to the receipt and treatment of hazardous wastes since 13 August 2010, this

waste characterization requirement is no longer applicable. See justification statement discussion in amendments 2 and 3 above.

22. Section 2.7, Pages 38-40: Waste Management

Requested Modification: Delete section 2.7.1.

Justification for request: Each of the subsections identified for deletion specifically pertain to treating hazardous waste at the OD Unit. However, since the OD Unit has been closed to the receipt and treatment of hazardous wastes since 13 August 2010, these waste management requirements are no longer applicable. See justification statement discussion in amendments 2 and 3 above.

23. Section 2.7.2.2, Page 40: Treatment Facility Requirements

Requested Modification: Change section title to read "OD Unit Treatment Requirements." Change section to read "Treatment residues generated at the OD Unit are subject to LDR requirements, as well as other applicable 40 CFR Parts 260 through 273 requirements, as applicable, and this permit."

Justification for request: See justification statement discussion in amendments 2 and 3 above.

24. Section 2.8, Page 40: Waste Minimization

Requested Modification: Change to read ". . . hazardous wastes that are generated at the OD Unit to the degree . . ." and change all references to "facility with the term "OD Unit."

Justification for request: The requirement applies to operations at the OD Unit, not the Facility, as defined. See justification statement discussion in amendment 12 above.

25. Section 2.12, Page 42: Air Emissions From The OD Unit

Requested Modification: Change the section to read "During OD Unit closure, the Permittee shall comply . . . and as required by Permit Section 3.3 . . . The Permittee shall maintain all records. . ."

Justification for request: On 13 August 2010, Kirtland AFB terminated the receipt and treatment of wastes at the OD Unit. 40 CFR Part 264 Subpart BB is not applicable, in that it only applies to owners/operators that treat, store or dispose of hazardous wastes. See justification statement discussion in amendments 2 and 3 above.

26. Section 2.20, Page 43: Additional Reports

Requested Modification: Delete

section.

Justification for request: This requirement is applicable to the OD Unit, not SWMU's or Areas of Concern (AOC) base wide. Also, since the OD Unit has been closed to the receipt and treatment of hazardous wastes since 13 August 2010, there will be no additional wastes received at the OD Unit to be reported to the NMED-HWB. See justification statement discussion in amendments 2 and 3 above.

27. Table 2-1, Page 44: Off-Site Generators

Requested Modification: Delete Table 2-1.

Justification for request: Since the OD Unit has been closed to the receipt and treatment of hazardous wastes since 13 August 2010, there will be no additional wastes received at the OD Unit from off-site generators. See justification statement discussion in amendments 2 and 3 above.

C. REQUESTED MODIFICATIONS: PERMIT PART 3 - OPEN DETONATION UNIT

28. Section 3.0, Page 46: Introduction

Requested Modification: Change to read "This Permit Part 3 contains soil and groundwater monitoring requirement for the OD Unit."

Justification for request: See the justification statement discussion in amendments 2 and 3 above.

29. Section 3.1, Page 46: Authorized Waste and Maximum Quantity of Waste

Requested Modification: Change to read 'The Permittee no longer treats hazardous waste and has initiated the OD Unit closure process. As of 13 August 2010, there are no hazardous wastes received or treated at the OD Unit. No hazardous wastes have been or are stored at the OD Unit."

Justification for request: The limitations placed on the explosive weights by the NMED were overly limiting and did not justify the expense of continuing to operate the Renewal Permit. Kirtland AFB submitted a revised closure plan to the NMED-HWB for review and approval.

30. Section 3.2.1, Paragraph 1, Page 46: General Requirements

Requested Modification: Change to read 'The Permittee shall maintain the OD Unit. . ."

Justification for request: On 13 August 2010, Kirtland AFB submitted its notice of intent to close the OD Unit, which closure for the receipt and treatment of hazardous waste has occurred. Accordingly, there are no further design, construction or operation requirements.

31. Section 3.2.1, Paragraph 2, Page 46: General Requirements

Requested Modification: Change to read 'The Permittee shall mark the boundary of the EOD Range with signs or structures. . ."

Justification for request: The OD Unit is clearly discemable, in that the OD Unit is graded and bounded by a storm water berm. The EOD Range is required to have signs and/or structures preventing entry by unauthorized personnel, both of which meet the requirements of 40 CFR §264.14(b).

32. Section 3.2.3.1, Page 46: Hours of Operation

Requested Modification: Change to read "The Permittee will conduct OD Unit closure activities between sunrise and sunset."

Justification for request: See justification statement discussion in amendments 2 and 3 above.

33. Section 3.2.3.2, Page 47: Weather Conditions

Requested Modification: Change to read "The Permittee will discontinue OD Unit closure activities when the Albuquerque Environmental Health Department (AEHD) issues high wind stop work advisories."

Justification for request: See justification statement discussion in amendments 2 and 3 above.

34. Section 3.2.3.3, Page 47: Range Fire

Requested Modification: Change to read 'The Permittee no longer conducts treatment operations at the OD Unit. Closure activities will be conducted in a manner to minimize the risk of fire danger."

Justification for request: Effective 13 August 2010, Kirtland AFB terminated the receipt and treatment of hazardous waste at the OD Unit. Accordingly, references to treatment and corrective actions have been deleted, in that the provisions of 40 CFR §264 pertaining to operating treatment, storage or disposal (TSD) facilities are inapplicable to closure activities. Also, the EOD Range has adequate fire breaks and contingency measures to contain a range fire, even if extreme fire conditions have been established.

35. Section 3.2.3.4, Page 47: Other Restrictions

Requested Modification: Change to read "As of 13 August 2010, the Permittee no longer receives or treats hazardous waste at the OD Unit."

Justification for request: Effective 13 August 2010, Kirtland AFB terminated the receipt and treatment of hazardous waste at the OD Unit. Accordingly, references to treatment and corrective actions have been deleted, in that the provisions of 40 CFR §264 pertaining to operating treatment, storage or disposal (TSD) facilities are inapplicable to closure activities.

36. Section 3.2.4.1, Page 47: Personnel Safety

Requested Modification: Change to read "As of 13 August 2010, the Permittee no longer receives or treats hazardous waste at the OD Unit. A Health and Safety Plan will be developed for the OD Unit closure activities, which is designed to ensure personnel safety".

Justification for request: Effective 13 August 2010, Kirtland AFB terminated the receipt and treatment of hazardous waste at the OD Unit. Accordingly, references to treatment and corrective actions have been deleted, in that the provisions of 40 CFR §264 pertaining to operating treatment, storage or disposal (TSD) facilities are inapplicable to closure activities.

37. Section 3.2.4.2, Page 48: Safety Precautions

Requested Modification: Change to read "The Permittee shall conduct all OD Unit closure activities in accordance . . ."

Justification for request: Effective 13 August 2010, Kirtland AFB terminated the receipt and treatment of hazardous waste at the OD Unit. Accordingly, references to treatment and corrective actions have been deleted, in that the provisions of 40 CFR §264 pertaining to operating treatment, storage or disposal (TSD) facilities are inapplicable to closure activities.

38. Section 3.2.5.1, Page 48: Accumulated Precipitation

Requested Modification: Change to read "To avoid accumulated precipitation, the Permittee will fill in all pits that may accumulate standing water."

Justification for request: On 13 August 2010, Kirtland AFB submitted its notice of intent to close the OD Unit, which closure for the receipt and treatment of hazardous waste has occurred. On 8 October 2010, Kirtland AFB submitted a revised OD Unit closure plan, which will require all pits to be filled.

39. Section 3.2.5.2, Page 48: Untreated Waste (Kick-Out) and Treatment Residues

Requested Modification: Delete current text and insert OD Unit Closure Plan language to read: "The first phase of closure will consist of a hazards survey of the OD Unit conducted by qualified contractor health physics and industrial hygiene personnel, which will include unexploded ordnance (UXO) safety personnel and Kirtland AFB EOD Personnel. The purpose of the survey shall be to locate and remove any "kick-out" (untreated waste, waste fragments or UXO), and to identify potential contamination concerns that may present hazards to workers during the closure activities and to specify control measures necessary to reduce worker risk. The survey will provide the information necessary to identify worker qualifications, protective equipment (PPE), safety awareness, work permits, exposure control programs and emergency coordination required to complete closure. Any munitions and/or explosives of concern (MEC) identified during the hazard survey will be reported to and handled by Kirtland AFB EOD staff personnel accordance with standard operating procedures."

Justification for request: Since the receipt and treatment of hazardous waste has been terminated at the OD Unit, the operational compliance requirements of 20.4.1 NMAC and 40 CFR Part 264 are inapplicable. Therefore they have been deleted.

40. Section 3.3, Page 48: Air Monitoring

Requested Modification: Change to read "The Permittee shall conduct all OD Unit closure activities in accordance with AEHD air program requirements."

Justification for request: On 8 October 2010, Kirtland AFB submitted a revised OD Unit closure plan as a Class 3 permit modification to the NMED-HWB for consideration and approval. The closure plan was prepared in compliance with

the requirements of the Resource Conservation Recovery Act (RCRA) (42 U.S.C. §§6901 et seq.) and its implementing regulations at 40 CFR Parts 264 and 270 (see 40 CFR Part 264 Subparts G and X and 270.14(b)(l3)), and state implementing statutes and regulations under which the state has delegated RCRA authority (see New Mexico Hazardous Waste Act, Chapter 74 Article 4 NMSA 1978 and 20.4.1 NMAC).

The closure plan is designed to: 1) minimize the need for further maintenance; 2) control, minimize or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to ground water or surface waters or to the atmosphere; and 3) comply with the requirements of 40 CFR Part 264, Subpart G and 40 CFR §264.601.

Also, see justification statement discussion in amendments 2 and 3 above.

41. Section 3.4, Page 48: Soil Monitoring

Requested Modification: Change to read "OD Unit closure soil sampling and human risk screening will be performed in accordance with the NMED-HWB approved closure plan."

Justification for request: See justification statement discussion in amendment 40 above.

42. Section 3.5, Page 49: Groundwater Monitoring

Requested Modification: Delete all text and replace with "Installation of monitoring wells and subsequent groundwater sampling and analysis protocol will be accomplished as part of the OD Unit closure activities, in accordance with Attachment H, Closure Plan for Open Detonation Unit. ."

Justification for request: See justification statement discussion in amendment 40 above.

43. Section 3.6.1, Page 51: Additional Waste Characterization Requirements for Air Emissions

Requested Modification: Change to read "The Permittee shall characterize hazardous waste generated as a result of OD Unit closure to insure compliance with . . ."

Justification for request: See justification statement discussion in amendment 40 above.

44. Section 3.6.2, Page 51: Equipment Containing or Contacting Hazardous Waste

Requested Modification: Change to read "Each piece of equipment used during OD Unit closure activities that contains or contacts hazardous waste. . ."

Justification for request: See justification statement discussion in amendment 40 above.

45. Section 3.7, Page 51: Pre-Treatment Preparation

Requested Modification: Change to read "As of 13 August 2010, the Permittee no longer receives or treats hazardous waste at the OD Unit."

Justification for request: See justification statement discussion in amendment 40 above.

46. Section 3.8, Page 51-52: Transportation of Waste To The OD Unit and Container Specifications

Requested Modification: Delete section.

Justification for request: As of 13 August 2010, the Permittee no longer receives or treats hazardous waste at the OD Unit. See justification statement discussion in amendment 40 above.

47. Section 3.9, Page 52: Waste Staging

Requested Modification: Delete section.

Justification for request: As of 13 August 2010, the Permittee no longer receives or treats hazardous waste at the OD Unit. See justification statement discussion in amendment 40 above.

48. Section 3.10, Page 52: Waste Treatment

Requested Modification: Change to read "As of 13 August 2010, the Permittee no longer receives or treats hazardous waste at the OD Unit."

Justification for request: See justification statement discussion in amendment 40 above.

49. Section 3.11, Page 52: Post Treatment

Requested Modification: Delete

section.

Justification for request: As of 13 August 2010, the Permittee no longer receives or treats hazardous waste at the OD Unit. See justification statement discussion in amendment 40 above.

D. REQUESTED MODIFICATIONS: PERMIT PART 4 - CLOSURE

50. Section 4.2, Pages 53 and 54: Clean Closure

Requested Modification: Change to read "The Permittee shall close the OD Unit by removing all hazardous waste residues and hazardous constituents and all structures and equipment from the OD Unit and demonstrating that no unacceptable risk to human health and the environment exists in soil or groundwater at the OD Unit (clean closure).
However, if the OD Unit cannot be clean closed, post closure care is required and the closure plan shall be amended in accordance with Permit Section 4.1, and corrective action shall be immediately implemented to remediate contamination to protect human health and the environment pursuant to the requirements of Permit Part 6. Closure of the OD Unit will not be approved by the Department while corrective action is required for the OD Unit.

51. Section 4.4, Pages 54 and 55: Time Allowed For Closure

Requested Modification: Change to read ". . . as applicable. The Permittee shall complete closure activities for the OD Unit following the schedule and requirements set forth in the closure plan, Permit Attachment H, and as required by this Permit Part."

E. REQUESTED MODIFICATIONS: PERMIT PART 5 -POST CLOSURE

52. Section 5.0, Page 56: Post-Closure Care

Requested Modification: If the OD Unit cannot be clean closed pursuant to Permit Section 4.2, then the OD until shall be subject to the requirements of 40 C.F.R 264.603 for post-closure care. If post-closure care is required, the Permittee shall submit a post-closure care permit application to the Department within 180 days of the Department's approval of closure of the OD Unit.

F. REQUESTED MODIFICATIONS: PERMIT PART 6 - CORRECTIVE ACTION

53. Sections -All, Pages 57 throughl 09:

Requested Modification: Change all effective dates to the effective date of the modified permit.

Justification for request: No enforcement prior to 90 days from the effective date of final Department action on this PMR.

54. Sections – All, Pages 57 through 109:

Requested Modification: Delete all references to monitoring media associated with SWMU's or AOC's.

Justification for request: Modified title of Part 6 to reflect that this section should only apply to the OD Unit. See the justification statements discussed in amendments 1 and 3 above.

55. Section -Part 6 Title, Page 57

Requested Modification: Change to read: "Corrective Action Requirements for OD Unit Closure".

Justification for request: Only corrective actions related to the OD Unit are included in the permit. See the justification statement discussion in amendment 1 above.

56. Section 6.0, Page 57: Introduction

Requested Modification: Change to read: ". . . to protect human health and the environment from all releases of hazardous waste or hazardous constituents from the OD Unit."

Justification for request: Only those activities related to the OD Unit are addressed in the permit. See the justification statement discussion in amendments 2 and 3 above.

57. Section 6.1.2, Page 57: Field Activities

Requested Modification: Delete this entire section.

Justification for request: Notifying the NMED in writing before any field sampling, other field activities, or implementation of work plans is an extra requirement in excess ofrequirements of the Hazardous Waste Act. 40 CFR 270.30(i) regarding inspection and entry states that Kirtland AFB must allow entry to the Department at reasonable times, and that the Department may sample or monitor at reasonable times.

58. Section 6.1.3, Page 57: Record Preservation

Requested Modification: Change to read: ". . . written notice that clean closure has been accomplished for the OD Unit, the Permittee . . . this permit for closure."

Justification for request: Only those records related to the OD Unit closure are addressed in the permit. See justification statement discussion in amendments 2 and 3 above.

59. Section 6.1.4, Page 57: Releases Beyond Facility Boundary

Requested Modification: Delete this section.

Justification for request: On 13 August 2010, Kirtland AFB terminated the receipt and treatment of hazardous waste at the OD Unit, as well as providing notice to the NMED-HWB of its intent to close the OD Unit. Since there have been no releases from the OD Unit, this section is inapplicable. See justification statement discussion in amendments 2 and 3 above.

60. Section 6.1.6, page 58: Quarterly Progress Reports

Requested Modification: Change to read: "...summarizing clean closure corrective action activities for the OD Unit conducted pursuant to this Permit . . . Each report shall summarize the OD Unit clean closure activities for the quarter . . "

Justification for request: On 13 August 2010, Kirtland AFB terminated the receipt and treatment of hazardous waste at the OD Unit, as well as providing notice to the NMED-HWB of its intent to close the OD Unit. Therefore, only those reports related to the OD Unit closure are addressed in the permit. See justification statement discussion in amendments 2 and 3 above.

61. Section 6.1.7, Page 58: List of SWMUs and AOCs and Annual Reporting of Outdoor Activities

Requested Modification: Delete this entire section.

Justification for request: As written, this section exceeds the authority granted in §74-4-4.2(B) NMSA 1978. §74-4-4.2(B) NMSA requires the NMED-HWB to require corrective action for all releases of hazardous waste from any SWMU. As identified in 55 FR 30808, EPA considers a SWMU as a site where solid waste, to include hazardous waste, has been placed. Similarly, an AOC is a site where a release of hazardous waste has occurred. This section is attempting to require Kirtland AFB to investigate and monitor test and training activities and sites that might have some type of release at some point of time in the future, clearly disregarding the legal pre-requisite of an existing release before such requirements can apply.

Additionally, 40 CFR Subpart M, which was adopted and incorporated in the Title 20 NMAC without exception, specifically states that military munitions are not solid wastes if used for their intended purposes, including training and testing. Since military munitions used for training and testing purposes are not solid wastes, their use can not constitute a release of hazardous waste. Thus, Kirtland AFB test and training sites can not be classified as SWMU's or AOC's solely on

the basis of the use of military munitions, in that SWMU's or AOC's do not exist unless there has been the release or probable release of hazardous wastes.

62. Section 6.1.9, Pages 59 and 60: Determination of Corrective Action Complete (No Further Action)

Requested Modification: Delete this entire section.

Justification for request: This section does not apply to the OD Unit, in that the OD Unit is planned for clean closure. See justification statement discussion in amendment 67 above.

63. Section 6.1.10, Health and Safety Plan

Requested Modification: Change the section to read "The Permittee shall develop an OD Unit Closure Activity Health and Safety Plan as part of the closure activities at the OD Unit. The OD Unit Closure Activity Health and Safety Plan shall be in accordance with: 1. National . . . §§ 1910 and 1926 and 7. Other . . ."

Justification for request: Only health and safety requirements related to the OD Unit are addressed in the permit and KAFB operates under the OSHA Voluntary Protection Program; state and local requirements are not applicable.

64. Section 6.1.11, Page 61: Community Relations Plan

Requested Modification: Delete entire section.

Justification for request: There is no requirement in the CFR to have a Community Relations Plan for an Open Detonation Unit permit. Any permit modifications for the OD Unit are subject to the public notification requirements of 40 CFR §270.42.

65. Section 6.1.12, Page 61: Land Transfer

Requested Modification: Change to read: "In transferring land included in the OD Unit to another entity..."

Justification for request: Only land transfers associated with the OD Unit are addressed in the permit.

66. Section 6.1.13, Page 62: Abandoned Septic Systems

Requested Modification: Delete entire section.

Justification for request: There are no septic systems at the OD Unit.

67. Section 6. 2.1.1, Page 62: General Facility Information

Requested Modification: Change section heading to read "General OD Unit Information" and change "facility" to "OD Unit" throughout the section.

Justification for request: This information is site-specific, and requiring the information for the entire Facility is too open-ended. Only information related to the OD Unit should be addressed in the Renewal Permit. See justification statement discussion in amendment 67 above.

68. Section 6. 2.1. 2, Page 62: Potential Human Receptors Information

Requested Modification: Change "Facility" to "OD Unit" throughout section.

Justification for request: This information is site-specific, and requiring the information for the entire Facility is too open-ended. Only information related to the OD Unit should be addressed in the Renewal Permit. See justification statement discussion in amendment 67 above.

69. Section 6. 2.1.3, Pages 62 and 63: Information on Surface Water

Requested Modification: Delete this section.

Justification for request: There are no surface water bodies associated with or located at the OD Unit or EOD Range. Only information related to the OD Unit should be addressed in the Renewal Permit. See justification statement discussion in amendment 67 above.

70. Section 6.2.2, Pages 63 through 69: Corrective Action Procedures

Requested Modification: Delete entire section.

Justification for request: Corrective action procedures are not applicable to the OD Unit, which will be clean closed. Only procedures applicable to the OD Unit should be addressed in the Renewal Permit. See justification statement discussion in amendments 2, 3 and 67 above.

71. Section 6.2.3, Page 69: Cleanup Levels

Requested Modification: Change section to read: "The Permittee shall adhere to the requirements of this Permit Section (6.2.3) for implementing and completing cleanup of groundwater and soil at the OD Unit."

Justification for request: Only cleanup levels related to the OD Unit should be addressed in the Renewal Permit. No surface waters are associated with or located on the OD Unit or EOD Range. See justification statement discussion in amendments 2, 3 and 67 above.

72. Section 6.2.3.1, Page 69: Cleanup Levels for Contaminants in Groundwater (other than Perchlorate)

Requested Modification: Change section to read: "Groundwater sampling results will be compared to the Federal Safe Drinking Water Act maximum contaminant levels (MCL's). If the levels of hazardous constituents in the groundwater exceed the MCLs, a risk assessment will be prepared for each of the constituents exceeding the MCL. If the risk assessment demonstrates that the level of contamination is unacceptable under CERCLA or RCRA, the groundwater shall be subject to corrective action, and a corrective action work plan subject to NMED review and approval will be developed."

Justification for request: Change reflects the language contained in the revised OD Unit closure plan submitted to the NMED-HWB on 08 October 2010.

73. Section 6.2.3.2, Page 69: Cleanup Levels for Perchlorate in Groundwater

Requested Modification: Change section to read "If the New Mexico WQCC adopts a perchlorate groundwater standard greater than or equal to 15 ug/L (ppb), the Permittee shall initiate remediation through its CERCLA authority based on a risk assessment and a residential use scenario."

Justification for request: As written, this section exceeds the authority granted to the NMED-HWB. As per §74-4(A) NMSA 1978, the New Mexico Environmental Improvement Board, and by extension the NMED-HWB, are only allowed to establish requirements that are "equivalent to and no more stringent than federal regulations adopted by the [EPA] pursuant to the federal [RCRA] of 1976, as amended. §74-4(A)(l) also denies the NMED-HWAB the authority to identify and list hazardous wastes that have not been listed and/or designated as hazardous wastes by the EPA. At this time, the EPA has not listed and/or designated perchlorate as a hazardous waste. Additionally, § 20.6.2.3103 NMAC contains no established contaminated level for perchlorate. Finally, both EPA and the Department of Defense as a policy matter have guidance recommending an interim perchlorate action level of 15 ppb.

74. Section 6.2.3.3, Page 69: Cleanup Levels for Soil Contaminants (Other than PCBs and Lead)

Requested Modification: Change section to read: "Inorganic soil contaminant concentrations will be compared to background levels. For other constituents, background will be considered to be the most current NMED residential soil screening level (SSL) or EPA Regional Screening Levels (RSLs). If analysis shows that the soil contains contaminant concentrations that are above the appropriate residential SSL or RSL, additional soils will be excavated, removed, and supplementary conformation samples collected and analyzed, or a risk assessment will be prepared for each constituent exceeding the appropriate residential SSL or RSL."

Justification for request: Change reflects the language in the revised OD Unit Closure Plan submitted to the NMED-HWB on 08 October 2010.

75. Section 6.2.3.4, Page 70: Cleanup Levels for PCBs in Soil

Requested Modification: Delete entire section.

Justification for request: PCB contamination is not a concern at the OD Unit. Additionally, no regulatory requirement is cited for the PCB soil cleanup level.

76. Section 6.2.3.5, Page 70: Cleanup Levels for Lead in Soil

Requested Modification: Please insert the standard used to establish the 400 mg/kg cleanup level for lead in soil.

Justification for request: Appropriate regulatory citation should be present in the permit to avoid arbitrary direction on cleanup levels.

77. Section 6.2.3.6, Page 70: Cleanup Levels for Surface Water

Requested Modification: Delete entire section.

Justification for request: There are no surface waters at the OD Unit. See justification statement discussion in amendments 2, 3 and 67 above.

78. Section 6.2.3.7, Page 70: Ecological Risk Evaluation and Cleanup Levels

Requested Modification: Change section to read: "Ecological risk shall be evaluated for the OD Unit if clean closure cannot be achieved."

Justification for request: Only risk evaluation related to the OD Unit should be addressed in the Renewal Permit. See justification statement discussion in amendments 2, 3 and 67 above.

79. Section 6.2.3.8, Page 70: Requests for Variance from Cleanup Levels

Requested Modification: Change to read "The Permittee may request a variance from a particular cleanup level. If the Permittee requests a variance from a cleanup level, the Permittee shall submit documentation to the Department that achievement of the cleanup level is impracticable . . . Such action shall include, but is not limited to, completion of a site-specific risk assessment and identification of alternate cleanup levels."

Justification for request: There are no surface waters at the OD Unit. Only variance procedures related to OD Unit cleanup levels should be addressed in the Renewal Permit. See justification statement discussion in amendments 2, 3 and 67 discussed above.

80. Section 6.2.4, Pages 71 through 78: Reporting Requirements

Requested Modification: Delete subsections 6.2.4.2, Investigation Work Plans; 6.2.4.3 Investigation Reports; 6.2.4.6 CME Work Plans; 6.2.4.7 CME Reports; 6.2.4.8 CMI Work Plans; 6.2.4.9 CMI Work Plan Progress Reports; and 6.2.4.10, CMI Reports.

Justification for request: Only reporting requirements related to the OD Unit should be addressed in the Renewal Permit. See justification statement discussion in amendments 2, 3 and 67 discussed above.

81. Section 6.3, Page 78: Compliance Schedule Tables

Requested Modification: Delete entire section.

Justification for request: There is no compliance schedule for the OD Unit. The compliance schedules referred to in Attachment I are not related to closure of the OD Unit. The revised OD Unit closure plan identifies the closure schedule for the OD Unit. See justification statement discussion in amendments 2, 3 and 67 discussed above.

82. Section 6.4, Pages Special Requirements for Information Submittals and Corrective Measures

Requested Modification: Delete entire section.

Justification for request: There are no special requirement information submittals related to the OD Unit, in that:

1. the OD Unit contains no landfills and, as stated in the revised OD Unit closure plan, will be clean closed.

2) the section is also inconsistent with the NMED's adoption of the Military Munitions Rule (MMR) contained in 40 CPR Part 266, Subpart M. As discussed in amendment 67 above, the expenditure of military munitions for their intended purposes exclude them from RCRA regulation, until which time DoD declares them a waste. Also, the Military Munitions Range Program is a CERCLA program and does not fall under the regulatory authority of the NMED/HWB.

3. Groundwater contamination outside of the OD Unit is regulated under the HSWA module associated with the 2005 closure of the Kirtland AFB TSDF storage permit.

4. See the perchlorate justification statement discussed for amendment 79 above.

5. The sanitary sewer line at LF-002 does not contain a regulated hazardous waste, in that domestic sewage is excluded under 40 CPR § 261.4(a)(l).

83. Section 6.5, Pages 80 and 81: Technical Requirements

Requested Modification: Replace all references to SWMUs and AOCs with "OD Unit".

Justification for request: Only technical requirements related to the OD Unit should be addressed in the Renewal Permit. See justification statement discussion in amendments 2, 3 and 67 above.

84. Section 6.5.2, Page 81: Documentation of Field Activities

Requested Modification: Change to read "Daily OD Unit closure activities, including . . ."

Justification for request: Only closure activities associated with the OD Unit should be addressed in the Renewal Permit. See justification statement discussion in amendments 2, 3 and 67 above.

85. Section 6.5.17, Page 92: Technical Requirements for Groundwater Investigation

Requested Modification: Change to read "The Permittee . . .originating from the OD Unit to determine . . ."

Justification for request: See justification statement discussion in amendments 2, 3 and 67 above.

86. Section 6.5.17.8, Page 96: Springs

Requested Modification: Delete entire section.

Justification for request: There are no springs at the OD Unit.

G. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "A" - GENERAL FACILITY INFORMATION

87. Section 1.0, Page 110: Introduction

Requested Modification: Delete 2"d sentence "It also presents general information on wastes treated at the OD Unit."

Justification for request: As of 13 August 20I0, Kirtland AFB terminated the receipt and treatment of wastes at the OD Unit.

88. Section I.I, General Description of the Facility and the EOD Range

Requested Modification: Change title to read: "General Description of Kirtland AFB and the EOD Range." Change 1st sentence to read "Kirtland AFB, which is owned and operated by the U.S. Air Force (the Permittee)..."

Justification for request: The change in text is more accurate and is more consistent with the remainder of the Renewal Permit.

89. Section 1.2, Pages 110 and 111: Purpose of the OD Treatment Unit

Requested Modification: Change all tenses to past tense.

Justification for request: Past tense will indicate that wastes are no longer treated at the OD Unit.

90. Section 1.3, Page 111: Routes of Travel

Requested Modification: Delete last sentence: "The roads along which wastes are transported to the EOD Range within KAFB include... Demolition Range Road."

Justification for request: Wastes are no longer transported to the EOD Range.

H. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "B" - LIST OF AUTHORIZED HAZARDOUS WASTES

91. Section 1.0, Pages 113 through 118: Introduction

Requested Modification: Delete the entire section and Table B-1.

Justification for request: The OD Unit is closed to the receipt and treatment of hazardous wastes. Thus, there are no hazardous wastes authorized at the OD Unit.

I. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "C"-WASTE ANALYSIS PLAN

92. Sections 1.0 through 1.5, Pages 119 through 124: All Sections

Requested Modification: Delete Attachment C.

Justification for request: The OD Unit is closed to the receipt and treatment of hazardous wastes. Thus, no waste analysis plan is required.

J. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "D"-ANNUAL SOIL SAMPLING AND ANALYSIS PLAN

93. Sections 1.0 through 1.7, Pages 125 through 137: All Sections

Requested Modification: Delete Attachment D.

Justification for request: The OD Unit is closed to the receipt and treatment of hazardous wastes. Thus, no annual soil sampling is required. Soil sampling for OD Unit closure activities is addressed in the revised OD Unit Closure Plan.

K. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "E"-INSPECTION PLAN

94. Sections 1.3, Page 139: Table E-1, Inspection Schedule for the OD Unit

Requested Modification: Delete items 6 (Is the OD Unit clear of explosives from previous treatment activities including the loading and unloading areas?), 16 (Is there standing water in a pit or crater at the OD Unit?), and 17 (Is there kick out or treatment residues following OD operations?).

Change all frequencies tied to treatment operations to "monthly."

Justification for request: Treatment operations no longer occur and the 3 identified inspection items are no longer applicable. Inspections will be conducted monthly.

L. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "F"-CONTINGENCY PLAN

95. Section 1.3, Page 140: Characteristics of Waste Managed at the OD Unit

Requested Modification: Change to read: "On 13 August 2010, the Permittee terminated the receipt and treatment of wastes at the OD Unit. The formerly treated reactive (D003) and ignitable (DOOi) hazardous wastes included explosives, propellants, and pyrotechnics."

Justification for request: Changed to reflect that treatment operations no longer occur at the OD Unit.

96. Section 1.5, Page 141: Emergency Coordinator

Requested Modification: Change first paragraph to read: "An EC (see Table F-1 of this Permit Attachment) shall be on call during OD Unit closure activities to coordinate emergency response measures. The EC shall be thoroughly familiar with this Contingency Plan, this Permit, characteristics of the hazardous waste formerly managed at the OD Unit, the closure activities being conducted at the OD Unit, the location of the Operating Record at the OD Unit, and the EOD Range layout.

Justification for request: Changed to reflect that treatment operations no longer occur at the OD Unit.

97. Section 1.6.l, Page 142: Spills

Requested Modification: Delete 2nd sentence "If any hazardous waste is spilled during transfer to a treatment unit, transfer of the waste shall be discontinued immediately."

Justification for request: Changed to reflect that treatment operations and waste transfers no longer occur at the OD Unit.

98. Section 1.6.5.2, Page 143: Evacuation Route

Requested Modification: Change section to read: "The map shall be posted at the EOD Range personnel bunker."

Justification for request: Changed to reflect that treatment operations no longer occur at the OD Unit.

99. Section 1.8.2, Page 144: Post-Emergency or Incident Reports

Requested Modification: Change item #3 to read: "The notification shall address the fact that closure activities will not continue until cleanup procedures are completed and that all emergency equipment is cleaned and fit for its intended use."

Justification for request: Change to reflect that treatment operations no longer occur at the OD Unit.

100. Section 1.8.3, Page 145: Table F-1, Emergency Coordinator Contact Information for the OD Unit

Requested Modification: Strike the home phone number of Mr. D. Brent Wilson and replace with his 24-hour cell phone number (505-401-1197).

List Alternate EC: Mr. H. Bo Bohannon, Address: Building 20684 2050 Wyoming Blvd SE KAFB, NM 87117 Office: (505) 846-7911 24-Hour Cell Phone: (505) 270-5080

Justification for request: As discussed in KAFB's letter to the NMED on 28 Feb 2010 requesting a modification to the contingency plan, the Freedom of Information Act exempts releasing employee's unlisted home phone numbers. Mr. Wilson's cell phone number can be called 24 hours per day. Also, Mr. H. Bohannon serves as the alternate EC.

101. Section 1.8.3, Page 146: Table F-2, Type and Location of Emergency Equipment Available for Use at the OD Unit

Requested Modification: Replace all contact numbers with the KCP number: 911 or (505) 846-3777.

Justification for request: As discussed in KAFB's letter to the NMED on 28 Feb 2010 requesting a modification to the contingency plan, all emergency equipment is available by contacting the Kirtland AFB Command Post, which eliminates the multiple contact numbers.

M. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT G-PERSONNEL TRAINING PLAN

102. Section 1.0, Page 148: Introduction

Requested Modification: Change section to read: "The primary objective of the training program shall be to prepare personnel to support closure operations at the Open Detonation (OD) Unit in a safe and environmentally sound manner and in compliance with this Permit and the New Mexico Hazardous Waste Management Regulations (HWMR), 20.4.l NMAC. To achieve this objective, the program provides personnel with training relevant to their positions.

All personnel shall complete initial training prior to participating in OD Unit closure activities. Personnel shall not work at the OD Unit until they have completed training on the Contingency Plan (Permit Attachment F). Personnel

shall be given, at a minimum, a basic understanding of the regulatory requirements of hazardous waste management, this Permit, and emergency response procedures. Personnel shall receive additional classroom and on-the-job training designed specifically to teach them how to perform their duties safely and in conformance with regulatory requirements and this Permit. All personnel shall receive the required training prior to being allowed to work unsupervised."

Justification for request: Changed to reflect that treatment operations no longer occur at the OD Unit.

103. Section 1.1, Page 148: Training Program

Requested Modification: Change section to read: "Training for EOD unit personnel is the overall responsibility of the EOD Flight Chief. Training includes formal classroom sessions, on-the-job training, and review of written procedures and plans. A summary of the training program for personnel is shown in Table G-1."

Justification for request: Training on the Renewal Permit requirements and procedures for OD Unit closure will be taught by other qualified personnel, not by EOD technicians.

104. Section 1.1.2, Page 148: Relevance of Training to Job Position

Requested Modification: Change section to read: "The training program shall provide employees with training to respond effectively to emergencies at the OD Unit. Personnel shall receive relevant training on the requirements of this Permit (including Contingency Plan implementation) and OD Unit closure activities (including emergency procedures, equipment, and systems)."

Justification for request: Changed to reflect that treatment operations no longer occur at the OD Unit.

105. Section 1.3, Pages 149 and 150: Table G-1, Training Program for the OD Unit

Requested Modification: Change "Content" of "Relevant In-House Training" to read:

"General Overview of Procedures to Perform Closure at the OD Unit; Range Operation; Safety Practices; Security; Range Inspections; Preventive Procedures, Structures, and Equipment"

Justification for request: Changed to reflect that treatment operations no longer occur at the OD Unit.

N. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "H" - CLOSURE PLAN

106. Sections 1.0 through 1.6, Pages 151 through 168: All Sections

Requested Modification: Replace sections 1.0 through 1.6 and Tables H-1 through H-7 with the revised OD Unit closure plan that was submitted to the NMED-HWB by Kirtland AFB on 8 October 2010.

Justification for request: The revised closure plan reflects changes in the timetable for closure of the OD Unit, as well as the processes and procedures to be following in completing a compliant clean closure at the OD Unit.

1. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "I" - COMPLIANCE SCHEDULES

113. Section 1.0, Page 169: Introduction

Requested Modification: Change section to read: "The Permittee shall meet the due dates in the compliance schedules of Tables 1-1 and 1-2 of this Permit Attachment (1), as well as any other due dates specified in this Permit that are not included in the tables of Permit Attachment I. Table 1-1 contains a list of general submittals and their due dates. Table 1-2 lists various submittals related to OD Unit corrective action and their due dates."

Justification for request: Compliance schedules not applicable to the OD Unit should not be addressed in the Renewal Permit. See justification statement discussion in amendments 2, 3 and 67.

114. Section 1.0, Page 170: Table 1-1, General Submittals

Requested Modification: Remove schedules for: Waste Minimization Program Certified Report; Annual Sampling and Analysis Report for Air Permit; Annual Soil Sampling Report; Monitoring Well Installation Plan; Well Completion Report; Groundwater Sampling and Analysis Plan

Justification for request: KAFB submitted its intent to close the OD Unit on 13 August 2010 and discontinue the treatment of waste, which either eliminates the need for these requirements or moves them to the submitted closure plan for the OD Unit. See justification statement discussion in amendments 2, 3 and 67 above.

115 Section 1.0, Pages 171 and 172: Table I-2, Submittal Requirements for Corrective Action

Requested Modification: Delete the following submittals and corresponding due dates: Annual Report: Outdoor Testing and Training Activities (Permit Section 6.1.7); Field Sampling/Activities (Permit Section 6.1.2); Verbal Notification of newly-discovered releases, SWMUs, or AOCs (Permit Section 6.1.8); Written Notification of newly-discovered releases, SWMUs, or AOCs (Permit Section 6.1.8); SWMU Assessment Report (SAR) (Permit Section 6.1.8); Investigation Work Plan (Permit Section 6.2.2.1.1); Investigation Report (Permit Section 6.2.2.1.2); Corrective Measures Evaluation (CME) Work Plan (Permit Section 6.2.2.2.2); Corrective Measures Evaluation (CME) Report (Permit Section 6.2.2.2.3); Risk Assessment Report (Permit Section 6.2.4.5); CMI Work Plan (Permit Section 6.2.2.2.7); CMI Work Plan Progress Report (Permit Section 6.2.2.2.9); CMI Report (Permit Section 6.2.2.2.1O); Accelerated Corrective Measures (ACM) Work Plan (Permit Section 6.2.2.2.11.2); ACM CMI Report (Permit Section 6.2.2.2.11.3); Interim Measures Work Plan (Permit Section 6.2.2.2.12.2); Interim Measures Report (Permit Section 6.2.2.2.12.5); Emergency Interim Measures (Permit Section 6.2.2.2.12.4); Corrective Measures Evaluation (CME) Work Plan: Landfills with Contents Not Removed (Permit Section 6.4.1.1); Military Range Assessment Report (Permit Section 6.4.1.2)

Justification for request: Changes reflect other modifications requested in other sections of the Renewal Permit.

116. Section 1.0, Pages 173 through 175: Table I-3, Solid Waste Management Units (SWMUs) and Ares of Concern (AOCs) Requiring Corrective Action

Requested Modification: Delete table.

Justification for request: These SWMUs and AOCs are not applicable to the OD Unit Renewal Permit. See justification statement discussion in amendments 2, 3 and 67 above.

P. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "J" -LIST OF HAZARDOUS WASTE MANGEMENT UNITS

117. Section 1.0, Page 176: Table J-1, Hazardous Waste Management Units

Requested Modification: Revise table to reflect open detonation unit is pending closure.

Justification for request: KAFB submitted a revised closure plan for the OD Unit on 08 October 2010.

Q. REQUESTED MODIFICATIONS: PERMIT ATTACHMENT "K" - LIST OF SWMU's and AOC's FOR WHICH CORRECTIVE ACTION IS COMPLETE

118. Section 1.0, Pages 177 through 181: Introduction and Tables

Requested Modification: Delete Attachment K.

Justification for request: These SWMUs and AOCs are not applicable to the OD Unit Renewal Permit. See justification statement discussion in amendments 2, 3 and 67.

IV. MODIFICATION REQUEST 3 - TEMPORARY AUTHORIZATION TO IMPLEMENT OD UNIT CLOSURE.

As provided by 40 CFR §270.42(e), Kirtland AFB is allowed to submit a Class 3 permit modification request for temporary authorization to "facilitate timely implementation of closure [ ] activities," provided the authorization is necessary to achieve the closure before action may be taken on a modification request. Upon receipt of a request for a temporary authorization to implement closure, the NMED-HWB may grant the request for a term of one hundred eighty (180) days, with the option of an additional one hundred eighty (180) if determined to be warranted to continue the closure activity.

Accordingly, Kirtland AFB requests temporary authorization to implement the revised closure plan filed with the NMED-HWB on 8 October 2010.

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 377TH AIR BASE WING (AFMC)
KIRTLAND AIR FORCE BASE NEW MEXICO

Colonel Robert L. Maness
377 ABW/CC
2000 Wyoming Blvd SE
Kirtland AFB, NM 87117-5000

NOV 16 2010

RECEIVED
NOV 20[redacted]
[redacted] Hazardous Waste Bureau

Mr. James Bearzi
Chief, Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505

Dear Mr. Bearzi:

As per your previous request, I am acknowledging receipt of your 12 October 2010 letter discussing the Open Detonation (OD) Unit Operating Permit (Permit), EPA ID No. NM9570024423, and closure plan at Kirtland Air Force Base (AFB). As stated in your letter, you indicate that Kirtland AFB must either implement the Peml.it closure plan found in Permit Attachment H or submit a Class 3 Permit Modification Request (PMR) seeking to amend the closure plan.

Accordingly, Kirtland AFB is hereby submitting this Class 3 PMR as allowed in 40 CFR § 270.42, § 74-4-4.2 NMSA 1978 and § 1.12.l of the Permit. In addition to requesting to amend various portions of the Permit, including the closure plan found at Attachment H, the modification request also requests a stay of enforcement, extension of due dates for deliverables and a 40 CFR §270.42(e) request for temporary authorization to facilitate timely implementation of closure activities pending NMED determination of this PMR. By submitting this Class 3 PMR, Kirtland AFB is not waiving its argument concerning the invalidity of the 2010 Open Detonation Unit Operating Permit.

However, as we move forward through this process of developing and implementing the final Permit closure plan to close the unit approximately forty (40) years ahead of the previously anticipated closure date, Kirtland AFB will work closely with your office to ensure the final closure plan and closure activities comply with all statutory and regulatory closure requirements.

If you have any questions, please contact Mr. John Pike, Environmental Management Chief, at (505) 846-8546.

Sincerely,

ROBERT L. MANESS, Colonel, USAF
Commander

cc:
John Kieling, NMED
Will Moats, NMED

HAZARDOUS WASTE TREATMENT FACILITY OPERATING PERMIT
EPA ID No. NM9570024423

issued to

UNITED STATES AIR FORCE

for the

OPEN DETONATION UNIT

located at

KIRTLAND AIR FORCE BASE
BERNALILLO COUNTY, NEW MEXICO

issued by the

NEW MEXICO ENVIRONMENT DEPARTMENT
HAZARDOUS WASTE BUREAU
2905 RODEO PARK DRIVE EAST, BUILDING 1
SANTA FE, NEW MEXICO, 87505

July 2010

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ACRONYMS AND ABBREVIATIONS

ACM accelerated corrective measure
AK acceptable knowledge
AOC area of concern ARCH
air rotary casing hammer
ASTM American Society for Testing and Materials
CAC Corrective Action Complete
CERCLA Comprehensive Environmental Response, Compensation, and Liability Act
C.F.R. Code of Federal Regulations
CMI corrective measures implementation
CME corrective measures evaluation
DQOs data quality objectives
DOT United States Department of Transportation
EC Emergency Coordinator
ECO-SSLs Ecological Soil Screening Levels (EPA)
EOD explosive ordnance disposal
EPA U.S. Environmental Protection Agency
GC/ECD gas chromatograph/electron-capture device
GC/MS gas chromatograph/mass spectrometry
HE high explosive(s)
HI hazard index
HWA New Mexico Hazardous Waste Act
HWB Hazardous Waste Bureau
HWMR New Mexico Hazardous Waste Management Regulations
HQ hazard quotient
ICP inductively coupled plasma
IDW investigation derived waste
KAFB Kirtland Air Force Base
KCP KAFB Command Post
kg kilogram
LDR land disposal restrictions
m^3 cubic meters
MCL maximum contaminant level
mg milligram
mg/kg milligram per kilogram
mg/L milligram per liter

mL	milliliter
MS/MSD	matrix spike/matrix spike duplicate
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMSA	New Mexico Statutes Annotated
OD	open detonation
PCBs	polychlorinated biphenyls
PPE	personal protective equipment
QA	quality assurance
QAPP	quality assurance program plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA facility investigation
RPD	relative percent difference
RSL	regional screening level SAP
	sampling and analysis plan
SAR	SWMU Assessment Report
SSAP	Soil Sampling and Analysis
Plan SSL	soil screening levels
SVOC	semi-volatile organic compound
SWMU	solid waste management unit
TAG	Tijeras Arroyo Groundwater
TKN	total Kjeldahl nitrogen
TSDF	treatment, storage and disposal facility
UCL	upper confidence limit of the mean
ug	microgram
ug/L	microgram per liter
UHC	underlying hazardous constituent
U.S.C.	United States Code
UXO	unexploded ordnance
VOC	volatile organic compound
WQCC	New Mexico Water Quality Control Commission
XRF	x-ray fluorescence

PERMIT PART 1: GENERAL PERMIT REQUIREMENTS

1.0 INTRODUCTION

This Permit Part (1) contains general requirements pertaining to hazardous waste management and treatment at the Open Detonation (OD) Unit and corrective action at the Kirtland Air Force Base (KAFB) Facility (see Figures 1-1 and 1-2, of this Permit Part, for a map view of the Facility and an aerial view of the OD Unit), as permitted under the New Mexico Hazardous Waste Act (HWA), New Mexico Statutes Annotated (NMSA) 1978, §§ 74-4-1 to 74-4-14.

1.1. LEGAL AUTHORITY

Pursuant to § 74-4-10 of the HWA, the New Mexico Environment Department (the Department) issues this Permit to the U.S. Air Force, hereafter referred to as the Permittee, the owner and operator of the OD Unit, with U.S. Environmental Protection Agency (EPA) ID Number NMD9570024423, located in Bernalillo County, New Mexico.

Section 6001 of the Resource Conservation and Recovery Act (RCRA) provides, in part, that "each department, agency, and instrumentality of the executive branch of the Federal Government (1) having jurisdiction over any solid waste management facility or disposal site, or (2) engaged in any activity resulting, or which may result, in the disposal or management of solid waste or hazardous waste shall be subject to, and comply with, all Federal, State, interstate, and local requirements, both substantive and procedural, respecting control and abatement of solid waste or hazardous waste disposal and management in the same manner, and to the same extent, as any person is subject to such requirements." [42 U.S.C. § 6961].

1.2. ENFORCEMENT

Any violation of any requirement of this Permit may subject the Permittee, and its officers, employees, successors, and assigns, to a compliance order under § 74-4-10 of the HWA or § 3008(a) of RCRA, 42 U.S.C. § 6928(a); to an injunction under § 74-4-10 of the HWA, § 3008(a) of RCRA, 42 U.S.C. § 6928(a), or § 7002(a) of RCRA, 42 U.S.C. § 6972(a); to civil penalties under § 74-4-10 of the HWA, § 3008(a) and (g) of RCRA, 42 U.S.C. § 6928(a) and (g), or § 7002(a) of RCRA, 42 U.S.C. § 6972(a); to criminal penalties under § 74-4-11 of the HWA or § 3008(d), (e), and (f) of RCRA, 42 U.S.C. § 6928(d), (e), and (f); or to some combination of the foregoing. The list of authorities in this Permit Section (1.2) is not exhaustive, and the Department reserves the right to take any action authorized by the law to enforce the requirements of this Permit.

1.3. PERMITTED ACTIVITY

This Permit authorizes the Permittee to treat hazardous wastes at the OD Unit, and establishes the general and specific standards for these activities, as required by the HWA and the Hazardous Waste Management Regulations (HWMR) 20.4.1 New Mexico Administrative Code (NMAC). The OD Unit is classified as a miscellaneous unit under 40 C.F.R. Part 264 Subpart X. This Permit also establishes standards for closure and sets forth the requirements for corrective action to address releases of hazardous waste and hazardous constituents into the environment pursuant to the HWA and the HWMR.

The Permittee shall not treat, without a permit, hazardous wastes at any other location at this Facility, except as provided in 40 C.F.R. § 270.1(c)(2).

The Permittee shall not store for more than 90 days any hazardous waste at any location at this Facility except as provided in 40 C.F.R. § 262.34(b).

This Permit does not authorize the treatment of firearms or contraband that are not reactive or ignitable hazardous waste.

1.4. COMPLIANCE WITH PERMIT

Compliance with this Permit during its term constitutes compliance, for purposes of enforcement, with 40 C.F.R. Parts 264 and 268, only for those management practices specifically authorized by this Permit. The Permittee must also comply with 40 C.F.R. Parts 260 through 273 to the extent the requirements of those sections are applicable. The Permittee must also comply with all applicable self-implementing provisions imposed by statute or rule. Compliance with this Permit shall not constitute a defense to any order issued or any action brought under HWA, NMSA 1978, § 74-4-10(E), § 74-4-10.1, or § 74-4-13; RCRA § 3008(a), § 3008(h), § 3013,
§ 7002, or § 7003; the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C. §§ 9601 to 9675, or any other law providing for protection of public health or the environment.

This Permit does not convey any property rights of any sort or any exclusive privilege, nor does this Permit authorize any injury to persons or property, any invasion of other private rights, or any infringement of State or local laws or regulations in accordance with 40 C.F.R. § 270.4(b) and (c) and § 270.30(g).

1.5. EFFECT OF INACCURACIES IN PERMIT APPLICATION

This Permit is based on the information submitted in the Part B Permit application dated December 2005 and subsequent information, referred to as the Application. Any inaccuracies found in the Application may be grounds for the termination, revocation and reissuance, or modification of this Permit pursuant to 40 C.F.R. § 270.43(a)(2). Where and when the Permittee becomes aware that it failed to submit any relevant facts in the Application, or submitted incorrect information in the Application or in any report to the Department, it shall promptly submit such facts or corrected information pursuant to 40 C.F.R. § 270.30(l)(11).

1.6. PERMIT CITATIONS

Whenever the Permit cites a provision of 20.4.1 NMAC or 40 C.F.R. or Part or Section of this Permit, the Permit shall be deemed to incorporate the citation by reference, including all subordinate provisions of the cited provision, and make binding the full text of the cited provision.

Hazardous waste management regulations are frequently cited throughout this Permit. The Federal hazardous waste management regulations, 40 C.F.R. Parts 260 through 273, are generally cited rather than the New Mexico Hazardous Waste Management Regulations, 20.4.1 NMAC. The Federal regulations are cited because only the Federal regulations set forth the

detailed regulatory requirements; the State regulations incorporate by reference, with certain exceptions, the Federal regulations in their entirety. Citing only the federal regulations also serves to avoid encumbering each citation with references to two sets of regulations. However, it is the State regulations that are legally applicable and enforceable. Therefore, for the purpose of this Permit, and enforcement of its terms and requirements, all references to provisions of Federal regulations that have been incorporated into the State regulations shall be deemed to include the State incorporation of those provisions.

1.7. SEVERABILITY

The provisions of the Permit are severable, and if any provision of this Permit, or any application of any provision of this Permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this Permit shall not be affected thereby.

1.8. DEFINITIONS

For purposes of this Permit, terms used herein shall have the same meanings as those in HWA, RCRA, and their implementing regulations, unless this Permit specifically provides otherwise. Where a term is not defined in HWA, RCRA, pursuant regulations, or this Permit, the meaning associated with such a term shall be defined by a standard dictionary reference or the generally accepted scientific or industrial meaning of the term.

"Area of Concern" (AOC) means any area of the Facility under the control or ownership of the Permittee, which is not a solid waste management unit where a release of a hazardous waste or hazardous constituent has occurred, or is suspected to have occurred regardless of the frequency or duration of the release. An area of concern includes areas and structures at which releases of hazardous waste or hazardous constituents were not fully remediated, including one time and accidental events.

"Corrective Measures" means all corrective action necessary to protect human health and the environment for all releases of hazardous waste or hazardous constituents from any Solid Waste Management Unit or AOC at the Facility, regardless of the time at which waste was placed in the unit, as required under § 74-4-4.2(B) of the HWA and 40 C.F.R. § 264.101. Corrective Measures may address releases to air, soil, sediment, surface water, or groundwater.

"Days" refers to calendar days unless specified otherwise in this Permit.

"Department" means the New Mexico Environment Department and any successor agencies.

"EOD" means Explosives Ordnance Disposal

"**EPA**" means the United States Environmental Protection Agency and any successor agencies.

"Extent of contamination" means the horizontal and vertical area in which the concentrations of waste or hazardous constituents in the environmental media being investigated are above detection limits or background concentrations indicative of the region, whichever is appropriate, as determined by the Department.

"Facility" or "KAFB" means Kirtland Air Force Base, including all contiguous land, structures, other appurtenances, and improvements on the land. For the purpose of implementing corrective action under 40 C.F.R. § 264.101, RCRA § 3008(h), or the HWA, NMSA 1978, § 74-4-10(E),

the Facility includes all contiguous property under the control of the owner or operator seeking a permit under the HWA.

"Hazardous constituent" means any constituent identified in Appendix VIII of 40 C.F.R. Part 261, or any constituent identified in Appendix IX of 40 C.F.R. Part 264, incorporated by 20.4.1 NMAC.

"Hazardous waste" means a solid waste that is not excluded from regulation under 40 C.F.R. § 261.4(b), and that either is listed in 40 C.F.R. Part 261, Subpart D, exhibits any of the characteristics identified in 40 C.F.R. Part 261, Subpart C, or is a mixture of solid waste and one or more wastes listed in 40 C.F.R. Part 261, Subpart D. However, for purposes of corrective action, "hazardous waste" shall have the meaning set forth in the HWA, § 74-4-3(K).

"**Hazardous waste regulations**" or "**Hazardous Waste Management Regulations**" means the New Mexico Hazardous Waste Management Regulations, 20.4.1 NMAC and all provisions of 40 C.F.R. Parts 260 through 273 incorporated therein.

"**Interim measures**" means actions necessary to minimize or prevent the further migration of contaminants and limit actual or potential human and environmental exposure to contaminants while long-term corrective action remedies are evaluated and, if necessary, implemented.

"NMED" means New Mexico Environment Department.

"Off-site source" means a generator of Hazardous Waste located within the United States but outside the Permittee's Facility.

"**Open Detonation**" means the treatment of ignitable or reactive hazardous waste in accordance with the requirements of this Permit. Treatment by open detonation is accomplished by the detonation of hazardous waste in open pits using a counter charge to initiate the explosion.

"**Permit**" means this Permit, issued to the Permittee for the Facility, pursuant to the HWA and the New Mexico Hazardous Waste Management Regulations to conduct corrective action and to operate the OD Unit at the Facility, EPA ID No. NM9570024423, as it may be modified or amended.

"**Permittee**" means U.S. Air Force, a part of the U.S. Department of Defense, which is a Department in the U.S. Government, and any successor.

"**RCRA**" means the Resource Conservation and Recovery Act of 1980, as amended, 42 U.S.C. §§ 6901 to 6992k.

"**Release**" means any spilling, leaking, pouring, emitting, emptying, discharging, injecting, pumping, escaping, leaching, dumping, or disposing of any hazardous waste or hazardous constituents into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles containing hazardous waste or hazardous constituents).

"Remediation waste" means all solid and hazardous wastes, and all media (including groundwater, surface water, soil, and sediment) and debris, which contain listed hazardous wastes or which exhibit a hazardous waste characteristic, that are managed for the purpose of implementing corrective action requirements. Remediation wastes may originate from releases that extend beyond the Facility boundaries.

"Secretary" means the Secretary of the New Mexico Environment Department or his designee or authorized representative.

"**Solid waste**" means a solid waste as defined in the HWA, § 74-4-3(O).

"Solid waste management unit" (**SWMU**) means any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at the Facility at which solid wastes have been routinely and systematically released.

1.9. THE COMPLETE PERMIT

The complete Permit consists of the regulations incorporated by reference into this Permit (see Permit Section 1.6), the Permit requirements in Permit Parts 1 through 6, and Permit Attachments A through L:

Part 1	-	General Permit Requirements
Part 2	-	General Facility Requirements
Part 3	-	Open Detonation Unit
Part 4	-	Closure
Part 5	-	Post Closure
Part 6	-	Corrective Action
Attachment A	-	General Facility Information
Attachment B	-	List of Authorized Hazardous Wastes
Attachment C	-	Waste Analysis Plan
Attachment D	-	Annual Soil Sampling and Analysis Plan
Attachment E	-	Inspection Plan
Attachment F	-	Contingency Plan
Attachment G	-	Personnel Training Plan
Attachment H	-	Closure Plan
Attachment I	-	Compliance Schedules
Attachment J	-	List of Hazardous Waste Management Units
Attachment K	-	List of SWMUs and AOCs for which Corrective Action is Complete
Attachment L	-	Reserved for Groundwater Sampling and Analysis Plan

1.10. TERM OF THE PERMIT

This Permit shall be effective for a fixed period of 3 years in accordance with 40 C.F.R. § 270.50(a), subject to Permit Sections 1.5, 1.12 and 1.15.

1.11. ALTERNATIVE ASSESSMENT FOR WASTE TREATMENT

The Permittee shall submit an alternative treatment assessment report to the Department no later than the first anniversary of the effective date of this Permit. The report shall document the

Permittee's evaluation of the range of possible treatment technologies for waste that is authorized for treatment by open detonation under this Permit. The assessment report shall include identification and discussion of the alternative treatment technologies and for the technologies presented models of air emissions, contaminant dispersal, and risk to human and ecological receptors. Each alternative treatment technology, including open detonation, shall be evaluated for cost and the technology's ability to protect human health and the environment to include, but not be limited to the:

1. Ability of the technology to reduce or control emissions,
2. Ability of the technology to monitor emissions,
3. Ability of the technology to control noise, and
4. Ability of the technology to control ground vibrations.

The purpose of the alternative treatment assessment shall be to phase out open detonation of hazardous waste at the Facility as soon as practicable.

1.12. PERMIT ACTIONS

1.12.1. Permit Modification, Suspension, Revocation, and Termination

1. This Permit may be modified, suspended, revoked or terminated for cause in accordance with the provisions of HWA, NMSA 1978, § 74-4-4.2 and 40 C.F.R. §§ 270.41 through 270.43. The filing of a request by the Permittee for a Permit modification or the notification of planned changes or anticipated noncompliance or, if suspension, or revocation is ordered by the Department, shall not stay any Permit requirement, in accordance with 40 C.F.R. § 270.30(f).
2. If at any time for any of the reasons specified in 40 C.F.R. § 270.41, the Department determines that modification of this Permit is necessary, the Department may initiate a Permit modification or require the Permittee to request a Permit modification.
3. The Permittee may request permit modifications in accordance with 40 C.F.R. § 270.42. All applicable requirements specified in 40 C.F.R. § 270.42 and 20.4.1.900 NMAC shall be followed.
4. Modifications to the Permit do not constitute a reissuance of the Permit.

1.12.2. Unclassified Permit Modifications

Unless a permit modification is explicitly listed in Appendix I of 40 C.F.R. 270.42 as a Class 1 or 2 permit modification, the Permittee shall not submit the proposed permit modification as a Class 1 or 2 permit modification. The Permittee may only submit such a permit modification request as a Class 3 modification, or may request a determination from the Department that the proposed permit modification be reviewed and approved as a Class 1 or 2 modification pursuant to the requirements specified in 40 C.F.R. 270.42(d)(1).

1.13. TRANSFER OF LAND OWNERSHIP

The Permittee shall submit a permit modification request, in compliance with all requirements of 40 C.F.R. § 270.42, at least 180 calendar days prior to the proposed effective date of transfer of

ownership of any land which is part of the Facility (see also Permit Section 6.1.12). The permit modification request may be submitted as a Class 3 permit modification, or the Permittee may request a determination that the modification is a Class 1 or 2 pursuant to the requirements of 40 C.F.R. § 270.42(d). In addition to the requirements of 40 C.F.R. § 270.42, a permit modification request for transfer of land that is part of the Facility shall:

1. Identify the boundaries of the land proposed for transfer;
2. Describe the location and identity of any existing or prior SWMU, AOC, or hazardous waste management unit on the land proposed for transfer;
3. Describe any known or suspected presence of hazardous waste or hazardous constituents in soil, groundwater, or any other media at any depth within the boundaries of the land proposed for transfer;
4. Describe the status of any past, present, or planned investigations or remediation of any release of hazardous waste or hazardous constituents within the boundaries of the land proposed for transfer;
5. Include a revised map of the Facility;
6. Propose and describe all provisions necessary to ensure that the Permittee can meet the corrective action obligations, the HWA, and the Hazardous Waste Management Regulations (e.g., covenants, deed restrictions, proposed replacement of monitoring wells or enforceable agreements for access to monitoring wells on transferred land) [40 C.F.R. § 264.101; 40 C.F.R. §§ 270.30(l)(1), 270.32(b) and 270.42; and 20.4.1.901 NMAC]; and
7. Describe all measures taken to comply with § 120(h) of CERCLA, 42 U.S.C. § 9620(h).

1.14. PERMIT RENEWAL

If the Permittee wishes to continue the activities authorized by this Permit after the expiration date of this Permit, in accordance with 40 C.F.R. § 270.30(b), the Permittee must apply for and obtain a new permit. The Permittee may request renewal of this Permit by submitting an application for a new permit at least 180 calendar days before the expiration date of this Permit as required by 40 C.F.R. § 270.10(h).

1.15. CONTINUATION OF EXPIRING PERMIT

Pursuant to 40 C.F.R. § 270.51, if the Permittee has submitted a timely and complete application for renewal of this Permit as specified in 40 C.F.R. §§ 270.10, 270.11, 270.12 (as applicable), and §§ 270.13 through 270.29 (as applicable), this Permit shall remain in effect until the effective date of the new permit if, through no fault of the Permittee, the Department has not issued a new permit on or before the expiration date of this Permit. [40 C.F.R. § 270.51].

1.16. TRANSFER OF PERMIT

The Permittee may only transfer this Permit after providing notice to and receiving approval from the Department. The prospective new owner or operator must file a disclosure statement with the Department as specified at HWA, NMSA 1978, § 74-4-4.7. The Department may require modification or revocation and reissuance of this Permit in accordance with 40 C.F.R.

§ 270.40(b) and § 270.41(b)(2).

Before transferring ownership or operation of the Facility or any SWMUs or AOCs during its operating life, the Permittee shall notify the new owner or operator in writing of the requirements of 40 C.F.R. Part 264, and Part 270, and the HWA, pursuant to 40 C.F.R. § 264.12(c), and 40 C.F.R. § 270.30(l)(3), and shall provide the Department with a copy of this notice.

1.17. PERMIT REVIEW

The Department may review this Permit at any time after the effective date of Permit issuance, and may modify this Permit as necessary pursuant to § 74-4-4.2 of the HWA and 40 C.F.R. §§ 270.41, 270.50(b), and 270.50(d). Such modification shall not extend the effective term of this Permit as specified in requirements of Permit Section 1.10.

1.18. NEED TO HALT OR REDUCE ACTIVITY NOT A DEFENSE

It shall not be a defense for the Permittee in an enforcement action that it would have been necessary for the Permittee to halt or reduce the permitted activities in order to maintain compliance with the terms of this Permit. [40 C.F.R. § 270.30(c)].

1.19. DUTY TO MITIGATE

In the event of noncompliance with this Permit, the Permittee shall take all reasonable steps to minimize releases to the environment, and shall carry out such measures as are reasonable to prevent significant adverse impacts on human health or the environment. [40 C.F.R. § 270.30(d)].

1.20. PROPER OPERATION AND MAINTENANCE

The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the requirements of this Permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance/quality control procedures. This requirement includes the operation of back-up or auxiliary facilities or similar systems when necessary to achieve compliance with the requirements of this Permit. [40 C.F.R. § 270.30(e)].

1.21. DUTY TO PROVIDE INFORMATION

The Permittee shall furnish to the Department, within a reasonable time as specified by the Department, any relevant information which the Department may request to determine whether cause exists for modifying, revoking, reissuing, or terminating this Permit, or to determine compliance with this Permit. The Permittee shall also furnish to the Department, upon request, copies of records required to be kept by this Permit. [40 C.F.R. § 264.74(a), and 40 C.F.R. § 270.30(h)].

The Permit requirements of this Section (1.21) shall not be construed to limit, in any manner, the Department's authority under the HWA, NMSA 1978, § 74-4-4.3, or RCRA § 3007(a), 40 C.F.R. § 270.30(i), or any other applicable law or regulation.

1.22. INSPECTION AND ENTRY

In accordance with 40 C.F.R. § 270.30(i), the Permittee shall allow the Department, or authorized representatives, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter at reasonable times into the Permittee's premises where the regulated facility or activity is located or conducted, or where records must be kept under the requirements of this Permit;
2. Have access to and copy, at reasonable times, any records that must be kept under the requirements of this Permit;
3. Inspect at reasonable times the Facility, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Permit; and
4. Sample or monitor at reasonable times, for the purposes of assuring Permit compliance or as otherwise authorized by RCRA or HWA, any substances or parameters at any location, including waste, air, soil, sediment, surface water, and groundwater at the Facility.

The Permit requirements of this Section (1.22) shall not be construed to limit, in any manner, the Department's authority under the HWA, NMSA 1978, § 74-4-4.3, or RCRA, § 3007(a), 40 C.F.R. § 270.30(i), or any other applicable law or regulation.

1.23. MONITORING AND RECORDS

1.23.1. Representative Sampling

The Permittee shall take representative samples and measurements in accordance with the procedures in this Permit and 40 C.F.R. § 264.13(a)(1). All samples and measurements taken by the Permittee under any requirement in this Permit shall be representative of the waste, media, equipment or structure being sampled. This includes, but is not limited to, sampling and analysis of waste, treatment residues, soil, groundwater, spills, and includes sampling of media for purposes of conducting corrective action pursuant to Part 6 of this Permit. To obtain a representative sample of a waste stream the Permittee shall use an appropriate method from Appendix I of 40 C.F.R. Part 261 or an equivalent method approved by the Department. Laboratory methods must be those specified in the current edition of the EPA publication *Test Methods for Evaluating Solid Waste Physical/Chemical Methods SW-846*, or an equivalent method, as specified in the *Waste Analysis Plan* in Permit Attachment C. [40 C.F.R. § 270.30(j)(1)]. At a minimum, these analyses shall contain all of the information which must be known to treat, store, or dispose of the wastes properly. [40 C.F.R § 264.73(b)].

1.23.1.1. Monitoring Records Contents

Monitoring records, including those required for corrective action under Part 6 of this Permit, shall contain:

1. The dates, exact place, and times of sampling or measurements;
2. The names of the individuals who performed the sampling or measurements;
3. The name and address of the laboratory that performed the analysis;

4. The date on which analyses were performed;
5. The analytical techniques or methods used;
6. The results of such analyses including units of measurement;
7. Calibration data;
8. Quality control data;
9. Detection limits;
10. Data qualifiers; and
11. Data validation results.

[40 C.F.R. § 270.30(j)(3)].

1.23.2. Operating Record

The Permittee shall maintain a written Operating Record at the EOD Shop and the EM Branch Office as required by 40 C.F.R. § 264.73. The Permittee shall maintain all records in the Operating Record until completion of closure and, if necessary, post closure care, unless specified otherwise in this Permit. The retention period for all records is extended automatically during the course of any unresolved enforcement action regarding the Facility, or as may be requested by the Department, as required by 40 C.F.R. § 264.74(b). The Permittee shall make the Operating Record available at all reasonable times for inspection by any officer, employee, or authorized representative of the Department or EPA, upon request, or shall furnish copies of documents within the record, as required by 40 C.F.R. § 264.74.

The following operating records and documents shall be maintained at the Facility EOD Shop:

1. A current copy of this Permit including the closure plan (Permit Attachment H);
2. A written Operating Record that describes:
    a. The type and quantity of each hazardous waste received and treated at the OD Unit, and the date the hazardous waste was treated,
    b. The location of hazardous waste at the OD Unit,
    c. The method(s) of treatment of hazardous waste,
    d. Training records for EOD personnel,
    e. Written inspection log and schedule;
3. Training records for former EOD employees (maintained for a minimum of three years from the date the employee last worked at the OD Unit);
4. Current training records (including refresher seminars) for current EOD employees;
5. Inspection logs for the last three years;
6. A copy of the Contingency Plan;
7. A copy of the Waste Analysis Plan;
8. The name(s), address(es), and telephone number(s) of the Emergency Coordinator(s) and all such information for persons designated as alternate Emergency Coordinators;
9. A list of all equipment listed in Permit Attachment F, as required by 40 C.F.R. Part 264, Subpart C; and

10. A current file of pertinent material safety data sheets and records of all wastes that have been treated at the OD Unit.

The following operating records and documents shall be maintained at the Facility EM Branch Office:

1. Treatment facility notices and certifications;
2. Storage facility notices and certifications;
3. Air emissions records;
4. Correspondence and other documents from government agencies;
5. Notices to off-site generators;
6. Waste minimization certification.
7. Manifest documents for hazardous waste shipped off-site;
8. A copy of the Hazardous Waste Biennial Report;
9. Copies of unmanifested waste reports;
10. Copy of the Contingency Plan for the OD Unit and any revisions to the plan;
11. Waste characterization information and data;
12. A copy of the Waste Analysis Plan;
13. Reports of any incidents that required activation of the Contingency Plan;
14. Records of soil and groundwater monitoring, testing, analytical data, and any corrective actions taken to prevent or mitigate releases of hazardous waste or hazardous constituents to the environment;
15. All documents related to corrective action including, but not limited to, work plans, reports, and sampling and analysis plans;
16. The Permit Application;
17. Inspection Plan set forth in Permit Attachment E;
18. Closure Plan set forth in Permit Attachment H, as required by 40 C.F.R. § 264.112(a), and this Permit; and
19. All monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation;

A current copy of the Contingency Plan shall also be maintained at the EOD Range personnel bunker, and the KAFB Command Post.

1.24. REPORTING PLANNED CHANGES

The Permittee shall give advance notice to the Department as soon as possible, but no less than one week in advance of any planned physical alterations or additions to the OD Unit. [40 C.F.R. § 270.30(l)(1)]. Some alterations or additions may be subject to the requirements of Permit Section 1.12.

1.25. REPORTING ANTICIPATED NONCOMPLIANCE

The Permittee shall give advance notice to the Department as soon as possible, but no less than

one week in advance of any planned physical alterations or additions to the OD Unit or of any activities, which may result in noncompliance with the requirements of this Permit. [40 C.F.R. § 270.30(l)(2)]. Some alterations or additions may be subject to the requirements of Permit Section 1.12.

1.26. CERTIFICATION OF CONSTRUCTION OR MODIFICATION

If the OD Unit is modified, the Permittee shall not treat or analyze hazardous waste in the modified portion of the OD Unit, except as provided in 40 C.F.R. § 270.42, unless the following requirements have been satisfied:

1. The Permittee has submitted to the Department, by certified mail or hand delivery, a letter signed by the Permittee and an independent professional engineer registered in New Mexico stating that the modification meets the requirements of this Permit; and
2. The Department has:
    a. Inspected the modified or newly constructed portion of the OD Unit and finds it meets the requirements of this Permit; or
    b. Waived the inspection or, within 15 calendar days from the date of receipt of the letter required by paragraph 1, has not notified the Permittee of its intent to inspect.

[40 C.F.R. § 270.30(1)(2)].

1.27. TWENTY-FOUR HOUR AND SUBSEQUENT REPORTING

1. **Oral Report -** The Permittee shall report to the Department any noncompliance which may endanger human health or the environment. Any such information shall be reported orally within 24 hours from the time the Permittee becomes aware of the circumstances. The oral report shall include:
    a. Information concerning release of any hazardous waste or constituents that may cause an endangerment to public drinking water supplies; and
    b. Any information about a release or discharge of hazardous waste or hazardous constituent or of a fire or explosion which could threaten the environment or human health including:
        i. A description of the noncompliance and its cause;
        ii. The name, address, and telephone number of the owner, operator, and name of responsible official;
        iii. The name, address, and telephone number of the Facility;
        iv. The period of the occurrence including exact date and time and, if the noncompliance has not been corrected, the anticipated time it is expected to continue;
        v. The name and quantity of materials involved;
        vi. The extent of injuries, if any;

vii. An assessment of actual or potential hazards to the environment and human health at and outside the Facility, where this is applicable;

viii. The estimated quantity and disposition of recovered material that resulted from the incident; and

ix. The steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

[40 C.F.R. § 270.30(l)(6)(i and ii)].

2. **Non-Compliance Written Report -** The Permittee shall also submit a written report within five calendar days from the time the Permittee becomes aware of the circumstance of any noncompliance. The written report shall contain the information required for an oral report under this Permit Section (1.27).

The Department may extend the time for submitting the written report up to 15 calendar days upon written request by the Permittee prior to the end of the five calendar days allowed under Permit Section 1.27.2. [40 C.F.R. § 270.30(l)(6)(iii)].

1.28. REPORTS REQUIRED BY THE CONTINGENCY PLAN

If any incident requires implementation of the Contingency Plan provided in Permit Attachment F, the Permittee shall comply with the reporting requirements of 40 C.F.R. § 264.56(d).

1.29. CORRECTIVE ACTION

Corrective action required pursuant to 40 C.F.R. § 264.101, shall continue under this Permit for any period necessary to comply with the requirements specified in Part 6 of this Permit.

1.30. ADMISSIBILITY OF DATA

The Permittee waives any objection to the admissibility as evidence of any data required by this Permit in any administrative or judicial action to enforce a condition of this Permit.

1.31. OTHER NONCOMPLIANCE

The Permittee shall report all instances of noncompliance not otherwise required to be reported under this Permit at the time monitoring reports are submitted. The reports shall contain the information listed in Permit Section 1.27.1. [40 C.F.R. § 270.30(l)(10)].

1.32. SIGNATORY AND CERTIFICATION REQUIREMENTS

The Permittee shall sign and certify all applications, reports, or other information submitted to the Department or required by this Permit, in accordance with 40 C.F.R. § 270.11(a)(3).

The Permittee shall provide, upon request by the Department, notification and certification statements associated with the treatment of hazardous wastes in compliance with 40 C.F.R. § 268.7 and § 268.9.

1.33. MONITORING REPORTS

The Permittee shall submit Monitoring Reports to the Department as specified in the

requirements of Permit Sections 1.23 and 1.36. [40 C.F.R. § 270.30(l)(4)].

1.34. COMPLIANCE SCHEDULES

Reports of compliance or noncompliance with this Permit, any progress reports on activities conducted under this Permit, and interim and final requirements contained in any compliance schedule of this Permit shall be submitted to the Department no later than 14 calendar days following each schedule date set forth in this Permit. [40 C.F.R. § 270.30(l)(5)].

1.35. INFORMATION REPOSITORY

Upon written notification, the Department may require the Permittee to establish and maintain an information repository at any time, based on the factors set forth in 40 C.F.R. § 124.33(b) and 40 C.F.R. § 270.30(m). The information repository shall be governed by the provisions in 40 C.F.R. § 124.33(c).

1.36. REPORTS, NOTIFICATIONS, AND INFORMATION SUBMITTALS TO THE DEPARTMENT

The Permittee shall submit to the Department by certified mail or hand delivery all reports, notifications, or other submittals that are required by this Permit to be sent or given to the Department, at the following address:

Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

Telephone Number: (505) 476-6000
Facsimile Number: (505) 476-6030

Two hard (paper) copies and one electronic copy of these plans, reports, notifications, or other submissions shall be submitted to the Department.

1.37. POINTS OF CONTACT FOR THE FACILITY

Points of contact for the Facility during the term of the Permit are identified below.

Base Commander
377 ABW/CC
2000 Wyoming Blvd. SE
Kirtland AFB, NM 87117-5606

and

Director
Environmental Management
377 MSG/CEANR
2050 Wyoming Blvd. SE

Kirtland AFB, NM 87117-5270

All reports required by the permit shall be signed by a principal executive officer or their duly authorized representatives in accordance with 40 C.F.R. § 270.11(b).

The Permittee shall inform the Department in writing of changes in its principal executive officers (or their duly authorized representatives) within 30 days of the changes, and Emergency Coordinators and their telephone numbers and addresses within 15 calendar days of the changes. Changes to the principal executive officers (or their duly authorized representatives) are not permit modifications. Changes in name, address, or phone number for Emergency Coordinators are Class 1 permit modifications under 40 C.F.R § 270.42.

1.38. WORK PLANS AND OTHER DELIVERABLE DOCUMENTS

All documents that the Permittee prepares under the terms of this Permit and submits to the Department that are subject to the requirements of 20.4.2 NMAC shall be subject to the procedures set forth therein. Documents requiring Department approval that are not subject to the requirements of 20.4.2 NMAC may be reviewed and approved, approved with modifications or directions, disapproved, denied, or rejected by the Department.

Upon the Department's written approval, all submittals and associated schedules shall become enforceable under this Permit in accordance with the terms of the Department's written approval, and such documents as approved, shall control over any contrary or conflicting requirements of this Permit.

This provision does not affect any public process that is otherwise required by this Permit, the HWA, or its implementing regulations.

Failure to submit any of the work plans, schedules, reports, and other deliverable documents that the Permittee is required to prepare under this Permit in substantial compliance with this Permit, and according to the schedules or deadlines in this Permit, may subject the Permittee to enforcement action under § 74-4-10 of the HWA, or other applicable provisions of law, which may include fines, civil penalties, or suspension or revocation of the Permit.

Any noncompliance with approved plans and schedules shall be noncompliance with this Permit. The Department may grant extensions of written requests for due dates for submittals of reports and other deliverables, provided that the Permittee includes a written justification showing good cause and a proposed schedule for submittal.

1.39. CONFIDENTIAL INFORMATION

The Permittees may claim that any information required by this Permit or otherwise submitted to the Department is confidential pursuant to the provisions of §§ 74-4-4.3(D) and (F) of the HWA and 40 CFR §§ 260.2 and 270.12.

Figure 1-1

Figure 1-2

PERMIT PART 2: GENERAL FACILITY REQUIREMENTS

2.0 INTRODUCTION

Permit Part 2 contains general requirements applicable to the Facility.

2.1. SECURITY

In order to prevent the unknowing entry and to minimize the possibility of unauthorized entry of persons into the OD Unit, the Permittee shall comply with the security provisions and procedures described in this Permit Section (2.1), and in Permit Attachment A, and as required by 40 C.F.R. § 264.14.

The entrance gate to the EOD Range (see Figure 2-1, this Permit Part) shall be locked except when EOD personnel enter the area for inspections or for treatment operations, or for purposes of conducting repairs or maintenance to the OD Unit, or for conducting military training.

Warning signs shall be posted at the entrance gate and at a maximum spacing of 300-foot intervals along the fence. The signs shall be legible from a distance of 25 feet and shall be large enough to be seen from any approach toward the EOD Range. The warning signs shall state “Danger--Explosive Disposal Range--Keep Out” in English and Spanish. A sign indicating "No Smoking" in English and Spanish shall be placed conspicuously at the entrance to the EOD Range.

During treatment operations, the gate shall remain open in case emergency vehicle access is required; however, unauthorized entry must be prevented.

2.2. INSPECTIONS

The Permittee shall inspect the OD Unit for malfunctions and deterioration, operator errors, and discharges which may cause a release of hazardous waste or hazardous constituents into the environment or a threat to human health, as required by 40 C.F.R. § 264.15, and according to the Inspection Plan (Permit Attachment E). The Permittee shall remedy any such deterioration or malfunction, operator error, or discharge, as required by 40 C.F.R. § 264.15(c). Inspections shall be conducted often enough to identify problems in time to correct them before they harm human health or the environment. The Permittee shall maintain records of all such inspections in the Operating Record, as required by 40 C.F.R. § 264.15(d).

Pursuant to the miscellaneous unit requirements found in 40 C.F.R. Part 264 Subpart X, inspections must meet the inspection requirements in 40 C.F.R. § 264.15 and the equipment testing and maintenance requirements in 40 C.F.R. § 264.33, as well as any additional requirements needed to protect human health and the environment. The OD Unit inspection procedures for communication and fire-protection equipment shall include provisions for equipment testing and maintenance to ensure that the equipment will function properly in an emergency.

If an inspection of the OD Unit reveals that a non-emergency problem has developed, remedial action, including repairs, maintenance, and replacement, shall be completed as soon as practicable to protect human health and the environment and to preclude further damage and to reduce the need for emergency repairs. If a hazard appears imminent or if a hazardous situation

already exists, operations at the OD Unit shall stop, and remedial action shall be initiated immediately. These measures to implement remedial actions shall satisfy the requirements of 40 C.F.R. § 264.15(c). Any remedial action taken pursuant to an inspection shall be noted on the inspection log in accordance with 40 C.F.R. § 264.15(d).

In accordance with 40 C.F.R. § 264.15(b)(1), a written schedule shall be followed at the OD Unit to routinely inspect for problems or potential problems with safety and emergency equipment, security devices, and operating and other equipment for preventing, detecting, or responding to hazards to the environment or human health. The Permittee shall use an inspection log based on the schedule shown in Table E-1 to document inspection of all items listed on Table E-1**.** The inspection logs shall include the date and time of the inspection, the name of the inspector, a notation of the observations made, and the date and nature of any repairs or other remedial actions taken.

2.3. PERSONNEL TRAINING

The Permittee shall follow the personnel training procedures specified in Permit Attachment G. [40 C.F.R. § 264.16].

The Permittee shall comply with 40 C.F.R. § 264.16(d) by maintaining the following documentation at the Facility: a job title for each position and the name of each employee filling each position; a written description for each position including the requisite skill, education, or other qualifications, and duties; and a written description of introductory and continuing training for each person filling each position.

2.4. PREPAREDNESS AND PREVENTION

2.4.1. Required Equipment

As required by 40 C.F.R. § 264.32, the OD Unit shall be equipped with or personnel shall have access to adequate emergency equipment, which includes an internal communication equipment or alarm system, telephone or two-way radio, fire extinguishers, and fire control, spill control, and decontamination equipment. The emergency equipment available for use at the OD Unit is summarized in Tables F-2 and F-3 in the Contingency Plan under Permit Attachment F.

An internal communications or alarm system capable of providing immediate emergency instructions (voice or signal) to Facility personnel shall be available on-site. In addition, a telephone or two-way radio capable of summoning emergency assistance shall also be available on-site. Treatment activities at the OD Unit shall be conducted only after notifying the KAFB Command Post (KCP).

All vehicles used at the OD Unit shall carry a portable fire extinguisher and a shovel. At least two portable fire extinguishers and at least two shovels shall also be kept at the EOD personnel bunker for response to fires or spills.

Appropriate personal protective equipment shall be available for use at the OD Unit to clean up spills should any occur.

Eyewash solutions shall be included in the first-aid kits carried in the vehicles used at the OD Unit.

The KAFB Fire Department shall be on call during treatment operations to provide fire fighters, tanker trucks equipped with water at adequate volume and pressure to extinguish fires at the OD Unit, and other fire-fighting equipment, if any fires should occur.

2.4.2. Testing and Maintenance of Equipment

The Permittee shall test and maintain the equipment specified in the Contingency Plan in Permit Attachment F, as necessary, to assure its proper operation in time of emergency, as required by 40 C.F.R. § 264.33.

All communications systems, fire protection equipment, and decontamination equipment associated with the OD Unit shall, at a minimum, be tested and maintained according to the inspection schedule set forth in Permit Attachment E. Damaged or defective emergency equipment, communications equipment, fire protection equipment, and decontamination equipment shall be repaired or replaced immediately upon discovery.

2.4.3. Required Aisle Space

At a minimum, the Permittee shall maintain enough aisle space to allow the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to any area of the OD Unit, as required by 40 C.F.R. § 264.35.

2.4.4. Arrangements with Local Authorities

The Permittee shall attempt to enter into coordination agreements for emergency response, i.e., medical, ambulance, and fire protection services, with the City of Albuquerque Fire Department, the Bernalillo County Fire Department, the Albuquerque Police Department, and Albuquerque Regional Medical Center, as described in the Contingency Plan (Permit Attachment F), and as required by 40 C.F.R. § 264.37. Copies of all such agreements and documentation showing any unsuccessful attempts to enter into such an agreement shall be maintained at the Facility EM Branch Office as part of the Operating Record.

The Permittee shall provide the Chiefs of the City of Albuquerque Fire Department (AFD) and the Bernalillo County Fire Department (BCFD) with information that would ensure that emergency response personnel are at all times familiar with the potential hazards in performing their duties associated with the hazardous wastes at OD Unit. This information shall at a minimum include:

1. Waste types, *e.g.*, ignitable, reactive, corrosive;
2. Waste names that identify principle hazardous chemical constituents;
3. Approximate quantities of each waste type; and
4. General location of wastes types.

The Permittee shall annually sign a certification stating that the AFD and BCFD have been provided with this information. These certification statements shall be maintained in the Facility EOD Shop as part of the Operating Record.

2.4.5. Preventive Procedures, Structures, and Equipment

Descriptions of the preventive procedures, structures, and equipment at the OD Unit are

presented below. Adherence to the procedures and proper use of the structures and equipment shall be done to prevent hazards associated with unloading operations, prevent runoff from escaping hazardous waste management areas, prevent contamination of water supplies, mitigate the effects of equipment failures and power outages, prevent undue exposure of personnel to hazardous waste, prevent releases of hazardous wastes or hazardous constituents to soil, sediment, surface water, and groundwater, and prevent unacceptable releases of contaminants to the atmosphere.

Only properly trained personnel shall transport waste to the OD Unit for treatment. Unloading of the waste may be performed only by EOD Technicians/Specialists either manually or with appropriate heavy equipment, such as forklifts. At the OD Unit, vehicles shall park adjacent to the pit where the waste is to be treated, and the waste shall then be unloaded and placed into the pit. Additionally, personnel involved in waste management at the OD Unit shall be knowledgeable about the physical and chemical properties of the waste managed and shall take all precautions, as necessary, to ensure that wastes are managed safely.

Engineering and operational controls shall ensure that run-on and run-off are minimized to protect human health and the environment. A two-foot high earthen berm shall surround the OD Unit to prevent run-off from the OD Unit from flowing to other areas outside of the treatment area.

Because no electrical power is supplied to the EOD Range, equipment used at the OD Unit for unloading or placement of wastes (i.e., forklifts) is self-contained. If such heavy equipment experiences failure, the equipment shall be repaired or replacement equipment shall be obtained immediately.

Personnel exposure shall be minimized by restricting the handling of hazardous waste. EOD Technicians/Specialists shall wear appropriate protective clothing, which may include safety glasses. In case of exposure to the hazardous waste, first aid equipment, which includes eyewash solutions, shall be readily available.

Operations at the OD Unit shall be conducted in a manner to prevent any releases that may have adverse effects on human health or the environment due to migration of waste constituents in the air as required under 40 C.F. R. § 264.601(c). Treatment at the OD Unit shall be performed under the requirements in the applicable permit obtained from the City of Albuquerque Environmental Health Department Air Pollution Control Division and under the requirements of this Permit.

The Permittee shall clear and keep clear, at all times, all combustible materials, including wood, grass, brush, and trees located within 200 feet of the OD Unit. The cleared area shall be bladed routinely to minimize fire danger, and a series of at least three concentric firebreaks (at least 20-feet wide each) shall be maintained.

2.5. CONTINGENCY PLAN

2.5.1. Implementation of the Plan

The Permittee shall immediately implement the Contingency Plan contained in Permit Attachment F, whenever there is a release of hazardous waste or hazardous constituents or there is a fire or explosion that could threaten human health or the environment, as required by

40 C.F.R. § 264.51(b).

2.5.2. Copies of the Plan

The Permittee shall maintain copies of the current Contingency Plan and all revisions and amendments to the plan at the EOD Shop and at the EOD Range bunker as required by 40 C.F.R. § 264.53(a). The Permittee shall provide copies of the current Contingency Plan and all revisions and amendments to the plan to the Department and to each entity with which the Permittee has an emergency agreement pursuant to the Permit requirements of Permit Section 2.4.4, as required by
40 C.F.R. § 264.53(b).

2.5.3. Amendments to the Plan

The Permittee shall review at least annually and immediately amend, if necessary, the Contingency Plan, as required by 40 C.F.R. § 264.54.

2.5.4. Emergency Coordinator

Either the Emergency Coordinator (EC) or an alternate EC, as specified in Permit Attachment F, shall be available at all times in case of an emergency. The EC and alternate EC shall be thoroughly familiar with the Contingency Plan and shall have the authority to commit the resources needed to implement the Contingency Plan. [40 C.F.R. § 264.55]. In the event of an imminent or actual emergency, the EC shall activate the internal emergency alarm or emergency communication device, notify the appropriate State or local government agencies and implement other procedures, as required by 40 C.F.R. § 264.56, and as described in Permit Attachment F (*Contingency Plan*).

The Permittee shall submit to the Department a revised Table F-1, Permit Attachment F, within 30 days of the issuance of this Permit. The revised table shall contain the following emergency coordinator contact information in compliance with 40 C.F.R. 264.52(d): names, office addresses, and the home and office telephone numbers of all persons qualified to act as an EC. When more than one person is listed, one must be named as the primary EC and the others must be listed in the order in which they will assume responsibility as alternates. The Permittee shall not treat any hazardous waste at the OD Unit until this Permit requirement is fully satisfied as determined by the Department.

2.6. WASTE CHARACTERIZATION

2.6.1. General Requirements

The Permittee shall not treat any hazardous waste at the OD Unit unless the hazardous waste has been characterized pursuant to the requirements of this Permit. [40 C.F.R. Part 264 and 40 C.F.R. Part 268]. The Permittee shall characterize waste as required under the Permit requirements of Permit Section 2.6.3 by sampling and analysis or by use of acceptable knowledge (AK) of the process that generated the waste, as appropriate.

2.6.2. Characterization of Waste by Acceptable Knowledge

"Acceptable Knowledge" means generator knowledge of the process that generated a waste,

including but not limited to process knowledge, waste analysis data from generators of similar wastes, and facility records of analysis that is used by a generator to characterize wastes.

Acceptable knowledge may be used as the sole method to characterize waste only when the waste is generated from a process that is consistent and well-documented. Documentation of the process must include information that meets all characterization requirements of this Permit, including the requirement to determine the status of the waste for the purposes of the RCRA Land Disposal Restrictions (LDRs) as specified in the Permit requirements of Permit Section 2.6.3.2.

The Permittee shall maintain documentation used to support acceptable knowledge of a waste stream in the Operating Record in accordance with 40 C.F.R. § 268.7(a)(6) and 40 C.F.R. § 264.73(b)(3). This documentation must be readily retrievable upon request during a Department or United States Environmental Protection Agency (EPA) inspection, and must be maintained in the Operating Record for a minimum of three years from the date the waste was last managed at the Facility. For each waste stream characterized by acceptable knowledge, the Permittee shall maintain in the Operating Record, at a minimum, the following process knowledge information.

1. The location where the waste stream is generated,
2. The waste stream volume and time period of generation,
3. A description of the waste generating process, and
4. All material inputs or other information that identifies the chemical content, physical properties and physical form of the waste stream.

2.6.3. Characterization by Sampling and Analysis

2.6.3.1. Sampling

The Permittee shall establish and utilize a Sampling and Analysis Plan (SAP) for each waste stream for which sampling is required. The SAP shall identify the appropriate sampling methods to characterize the waste stream in accordance with the requirements of Permit Section 2.6.1. The Permittee shall maintain the SAP and all documents showing compliance with the SAP, in the Operating Record for a minimum of three years from the date the waste was last managed at the Facility.

The SAP shall identify the sample container types, preservation techniques, and holding times for each waste sampled. The SAP must conform to the most recent version of EPA's publication *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, (Publication SW-846) Chapter 9, Sampling Plan.* The SAP must ensure collection of a representative sample of waste by means that preserve its original physical form and composition, and the SAP shall ensure that sample collection meets the quality assurance objectives required in Section 1.3 of Permit Attachment D. The number of samples of each waste shall be sufficient to demonstrate that the Upper Confidence Limit of the mean (UCL), based on at least a 95% confidence level, is less than the applicable regulatory threshold.

2.6.3.2. Laboratory Analysis

The SAP shall identify the appropriate laboratory analytical methods to characterize the waste

stream in accordance with the Permit requirements of Permit Section 2.6.1. The Permittee shall perform or obtain laboratory analysis of wastes in accordance with the requirements of this Permit, and the *Waste Analysis Plan* (WAP) contained in Permit Attachment C. The SAP shall include the appropriate laboratory analytical methods, detection limits, and reporting limits. The Permittee shall maintain the SAP in the Operating Record.

To use any alternative analytical method, the Permittee must submit to the Department a petition for approval of such method in accordance with 40 C.F.R. § 260.21.

If the Permittee uses an independent contract laboratory to perform analyses, the Permittee shall inform the laboratory in writing that it must operate under the waste analysis requirements set forth in this Permit.

When using laboratory analysis as part of a hazardous waste determination, the Permittee shall require the laboratory to report concentrations of *all* hazardous constituents that the analytical test method is capable of measuring as identified in analytical method specific tables in the most current version of the EPA's *Test Method for Evaluating Solid Wastes (SW-846), Chapter 2*. When using laboratory analysis to demonstrate that the waste meets its applicable Land Disposal Restriction (LDR) treatment standard concentrations (specified at 40 C.F.R. § 268.40), the Permittee shall demonstrate that the analytical method detection limit is not higher than the treatment standard for each hazardous constituent that can reasonably be expected to be present.

2.6.3.3. Quality Assurance/Quality Control (QA/QC)

The Permittee shall perform and record all waste characterization QA/QC procedures in accordance with SW-846 for the data used to support waste characterizations required under this Permit. The precision, accuracy, completeness, comparability, and representativeness of the analytical data shall be addressed. The Permittee shall maintain a record of all QA/QC determinations in a manner traceable to specific wastes in the Operating Record.

When performing waste sampling required under this Permit, the Permittee shall use the applicable sample collection QA/QC procedures specified in EPA's *Field QA and QC Requirements Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, (Publication SW-846)*, *Chapter 1*, *Section 3.4*, including, but not limited to those dealing with equipment preparation and field equipment maintenance, calibration, and cleaning. The SAP shall identify and the Permittee shall collect the appropriate number of quality control samples associated with each waste sampled.

When performing laboratory analysis required under this Permit, method blanks, laboratory duplicates, and other laboratory control samples shall be analyzed to assess the quality of the data resulting from laboratory analytical programs. The results of both field and laboratory quality control data shall be reported to the Department with the results of waste characterization samples.

2.6.4. Re-evaluation of Characterization Information

The Permittee shall re-evaluate the characterization of routinely generated wastes to ensure that the characterization remains accurate and up to date for subsequent batches of waste, in compliance with 40 C.F.R. § 264.13(b)(4). The results of the re-evaluation shall be thoroughly documented and placed in the Operating Record.

The Permittee shall perform re-evaluation of a waste in accordance with these minimum requirements:

1. Re-evaluation shall be performed at least annually to verify the accuracy of initial characterization. For wastes originally characterized through sampling and analysis, re-evaluation shall be achieved using the same sampling and analysis methods used in the initial analysis unless otherwise required by the Department. For wastes characterized through acceptable knowledge of waste generation processes, re-evaluation may be achieved through a review of that information supporting acceptable knowledge.
2. Re-evaluation shall be performed whenever there is a change in waste-generating processes. Any information that indicates a change in the process that generates the waste and may affect the waste shall cause the waste to be re-characterized.
3. Re-evaluation shall be performed when the Permittee is notified by an off-site facility receiving hazardous waste from the Facility that the characterization of the waste received at the receiving facility does not match a pre-approved waste analysis certification or accompanying waste manifest or shipping paper. The Permittee shall notify the Department within 24 hours of its receipt of such a discrepancy notice.

2.6.5. Characterization of Specific Wastes

2.6.5.1. Waste Received From Off-Site

The Permittee shall obtain a detailed chemical and physical analysis of any hazardous waste received at the Facility from an off-site facility, in compliance with 40 C.F.R. § 264.13(c). This characterization may be in the form of documented acceptable knowledge if all applicable waste characterization requirements specified in this Permit are met and documented. This includes, but is not limited to, identification of underlying hazardous constituents.

The Permittee shall physically examine the shipment of waste from the off-site facility at the time of acceptance for correct documentation, including appropriate waste container identification and labeling. The Permittee shall not accept at the Facility a hazardous waste shipment from an off-site facility without Uniform Hazardous Waste Manifests and LDR Notification Forms, as applicable. If discrepancies are found for waste shipped to the Facility, the Permittee shall immediately return the waste to the generator.

2.6.5.2. Waste to Be Shipped Off-Site

Prior to shipping any hazardous waste off-site, the Permittee shall characterize the waste as necessary for treatment and disposal and to ensure proper packaging, labeling, marking, and placarding in accordance with the Department of Transportation regulations at 49 C.F.R. Parts 172, 173, 178, and 179.

2.6.5.3. Remediation Waste

The Permittee shall characterize remediation waste (as defined at 40 C.F.R. § 260.10) in compliance with all waste characterization requirements in this Permit. The characterization information shall be included in the Operating Record, shall be maintained as required under Permit Section 1.23.2, and include at a minimum: a hazardous waste determination, an identification of all applicable hazardous waste numbers, a LDR status determination, the origin

of the waste and how it was subsequently managed, the time and circumstances of the release that created the waste, and any investigation or other reports describing the release.

2.6.5.4. Additional Characterization Requirements for Containerized Waste

The Permittee shall characterize hazardous wastes placed inside containers, including over packed drums, to ensure that the wastes do not react dangerously with, decompose, or ignite sorbent material in the container, in compliance with 40 C.F.R. § 264.316(c), and to ensure that the wastes are not incompatible or reactive with one another, in compliance with 40 C.F.R. § 264.316(d) and § 264.316(e). The Permittee shall characterize laboratory packs, if they are intended to undergo the alternative treatment standards at 40 C.F.R. § 268.42(c), to determine whether they contain any prohibited hazardous wastes.

2.6.6. Records of Waste Characterization

The Permittee shall record and maintain in the Operating Record the results of waste analyses and waste determinations performed by acceptable knowledge, and sampling and analysis, as specified in this Permit Part (2) in compliance with 40 C.F.R. §§ 264.73(b)(3), (b)(7), (b)(10), (b)(15), and (b)(16), and copies of notices and certifications required in Permit Sections 2.7.2.1 and 2.7.2.2. The requirement to record and maintain in the Operating Record the results of waste analyses, waste determinations, and copies of notices and certifications applies to solid wastes even when the hazardous characteristic is removed prior to disposal, or when waste is excluded from the definition of hazardous or solid waste under 40 C.F.R. § 261.2 through § 261.6, or exempted from Subtitle C regulation, subsequent to the point of generation. [40 C.F.R. § 268.7(a)(8)].

2.7. WASTE MANAGEMENT

2.7.1. Authorized Wastes and Waste Sources

2.7.1.1. Permitted Waste

The Permittee shall not treat at the OD Unit any wastes not included in the *List of Authorized Hazardous Wastes* under Permit Attachment B.

2.7.1.2. Prohibited Waste

The Permittee shall not treat any radioactive or mixed waste, any waste containing polychlorinated biphenyls, or any other wastes not listed in the *List of Authorized Hazardous Wastes* contained in Permit Attachment B. The Permittee shall not treat hazardous wastes by any other means not authorized by this Permit.

2.7.1.3. Waste from Foreign Sources

The Permittee shall not accept hazardous wastes from a foreign source (a hazardous waste source outside the United States).

2.7.1.4. Waste from Off-site Sources

The Permittee shall receive from off-site sources only hazardous waste that are to be treated at the OD Unit and only if such receipt is in compliance with the requirements of this Permit. The

Permittee shall receive for treatment at the OD Unit only the hazardous wastes listed in Permit Attachment B (*List of Authorized Hazardous Wastes*) and only from the sources listed in Table 2-1 of this Permit Part.

2.7.1.5. Incompatible Wastes

Incompatible wastes shall not be managed at the OD Unit.

2.7.2. Provisions for Complying with LDR Requirements

The Permittee shall comply with the restrictions for land disposal at 40 C.F.R. Part 268.

The Permittee shall not arrange for the disposal at an off-site land disposal facility any hazardous waste restricted from land disposal under 40 C.F.R. Part 268, unless:

1. The waste meets treatment standards specified in 40 C.F.R. § 268.40, § 268.41, § 268.42, or § 268.43; or
2. A variance from the treatment standards has been granted pursuant to 40 C.F.R. § 268.44.

This Permit does not authorize land disposal of hazardous waste at any location at the Facility.

2.7.2.1. Generator Requirements

Generators of hazardous waste must determine, based on the characteristics of the waste at the point of generation, if the waste must be treated before it can be land disposed.

Generators are required to send a one-time written notice to the Facility for the treatment of hazardous waste at the OD Unit for each exact type of waste stream. This includes the Permittee as a "generator" of waste to be treated at the OD Unit. A copy of the one-time notice shall be maintained at the EM Branch Office. The notice shall include:

1. The applicable EPA Hazardous Waste Numbers and the manifest number of the initial shipment;
2. A statement that the waste is subject to LDRs;
3. The UHCs and their concentrations in the wastes, if any;
4. The applicable treatability group category (normally as a non-wastewater);
5. Waste code subdivisions based on waste-specific criteria, if appropriate; and
6. Waste analysis data, if appropriate.

For wastes that do not meet treatment standards, the one-time written notice shall include the generator paperwork requirements information referenced in 40 C.F.R. § 268.7(a)(2).

For wastes that meet treatment standards at the original point of generation, the one-time notice shall include the generator paperwork regulatory requirements information and the certification statement referenced in 40 C.F.R. § 268.7(a)(3).

All of the supporting data used to determine that a waste is restricted from land disposal, either based on acceptable knowledge of waste generation processes or on sampling and analysis of the waste, shall be retained at the EM Branch Office, as required in 40 C.F.R. § 268.7(a)(6).

2.7.2.2. Treatment Facility Requirements

Treatment residues generated at the OD Unit are subject to LDR requirements, as well as other applicable requirements in 40 C.F.R. Parts 261-263 and this Permit.

If an analysis indicates that a treatment residue does not fully meet the treatment standards for hazardous waste in 40 C.F.R. § 268.40 and universal treatment standards of 40 C.F.R. § 268.48, the residue shall be sent to an offsite facility for additional treatment, including any necessary treatment of UHCs to meet the applicable standards, and disposal. The Permittee must comply with the notice and certification requirements in accordance with 40 C.F.R. § 268.7(b)(5) as well as Permit Section 2.6.5.2 and any other applicable requirements of this Permit. Untreated waste that is a result of kick-out may be collected and retreated at the OD Unit.

If analysis indicates that a treatment residue meets the treatment standards, it shall be sent offsite for disposal. In accordance with 40 C.F.R. § 268.7(b)(3) and (4), a notification and certification signed by an authorized representative shall be submitted to the offsite treatment facility with the initial shipment of treatment residue.

If a waste is determined to be no longer hazardous, a one-time notification and certification shall be placed in the files at the EM Branch Office, as required by 40 C.F.R. § 268.9(d). The notification and certification shall be updated if the process or operation generating the waste changes and/or if the Subtitle D facility receiving the waste changes. The notification shall include:

1. The name and address of the Subtitle D facility receiving the waste shipment; and

2. A description of the waste (e.g., the treatment residue) as initially generated, including EPA Hazardous Waste Number(s), treatability group(s), and UHCs.

An authorized Facility representative shall sign the certification.

2.8. WASTE MINIMIZATION

The Permittee shall submit to the Department a report annually by December 1, for the year ending the previous September 30, certifying that the Permittee has a program in place to reduce the volume and toxicity of all hazardous wastes that are generated by the Facility to the degree determined to be economically practicable, and that the proposed method of treatment is the practicable method currently available to the Permittee which minimizes the present and future threat to human health and the environment [see 40 C.F.R. § 264.73(b)(9)]. This certified report must include these items:

1. Any written policy or statement that outlines goals, objectives, and methods for source reduction and recycling of hazardous waste at the Facility;
2. Any employee training or incentive programs designed to identify and implement source reduction and recycling opportunities for all hazardous wastes;
3. Any source reduction or recycling measures implemented in the last five years or planned for the near future;

4. An itemized list of the dollar amounts of capital expenditures (plant and equipment) and operating costs devoted to source reduction and recycling of hazardous waste;
5. A discussion of factors that have prevented implementation of source reduction or recycling;
6. Sources of information on source reduction or recycling received at the Facility (e.g., local government, trade associations and suppliers);
7. An investigation of additional waste minimization efforts that could be implemented at the Facility, which investigation shall analyze the potential for reducing the quantity and toxicity of each waste stream through production process change, production reformulation, recycling, and all other appropriate means, including an assessment of the technical feasibility, cost, and potential waste reduction for each option;
8. A flow chart or table detailing all hazardous wastes the Facility produces, by quantity and type, and by building or area, and program if consistent with security considerations; and
9. A demonstration of the need to use those processes which produce a particular hazardous waste due to a lack of alternative processes, available technology, or available materials that would produce less volume of hazardous waste.

The Permittee shall include the report in the Operating Record.

2.9. IMPERMISSIBLE DILUTION

The Permittee shall not dilute a restricted waste as a substitute for treatment. [40 C.F.R. § 268.3]. Impermissible dilution to avoid an applicable treatment standard includes, but is not limited to, the addition of solid waste to reduce a hazardous constituent's concentration, or an ineffective treatment method that does not destroy, remove, or permanently immobilize hazardous constituents. Aggregating or mixing wastes as part of a legitimate treatment process are not considered impermissible dilution for purposes of this Permit requirement.

2.10. DUST SUPPRESSION

The Permittee shall not use waste or used oil or any other material which is contaminated with dioxin, polychlorinated biphenyls (PCBs), or any other hazardous waste, other than a waste identified solely on the basis of ignitability, for dust suppression or road treatment. [40 C.F.R. § 266.23(b)].

2.11. IGNITABLE AND REACTIVE WASTES

The Permittee shall take precautions to prevent accidental ignition or reaction of ignitable or reactive wastes, as required by 40 C.F.R. § 264.17.

Ignitable or reactive wastes shall be located at least 50 feet from the boundary of the OD Unit at all times and shall be protected from any sources of ignition, such as open flames, or reaction with other wastes or products, and shall be separated and protected from welding activities, hot surfaces, frictional heat, and sources of sparks.

Only containers made of or lined with materials that will not react with and are otherwise compatible with the waste to be managed shall be used to contain waste.

2.12. AIR EMISSIONS FROM THE OD UNIT

The Permittee shall comply with all air emission limitations and air monitoring requirements for the OD Unit set forth in the air quality permit for the OD Unit issued by the City of Albuquerque Environmental Health Department and as required by Permit Section 3.3. The Permittee shall also comply with the applicable requirements of 40 C.F.R. Part 264, Subpart BB. The Permittee shall maintain all records relating to the air quality permit in the Operating Record for the Facility.

2.13. OFF-SITE SHIPMENTS

Prior to shipping any hazardous waste off-site, the Permittee shall comply with all applicable generator requirements at 40 C.F.R. Part 262, as required by 40 C.F.R. §§ 262.10(h) and 264.71(c).

2.14. STORAGE OF RESTRICTED WASTE

The Permittee shall comply with 40 C.F.R. Part 268, Subpart E for any storage of hazardous waste restricted from land disposal under 40 C.F.R. Part 268, Subpart C.

2.15. MANIFEST SYSTEM

The Permittee shall comply with the manifest requirements of 40 C.F.R. § 264.71 and § 264.72. With the exception of waste shipments from conditionally exempt small quantity generators, the Permittee shall not accept for treatment any hazardous waste from an off-site source without an accompanying manifest.

If the Permittee accepts any hazardous wastes for treatment from an off-site facility without an accompanying manifest, if required, or without an accompanying shipping paper as described in 40 C.F.R. § 264.76, the Permittee shall prepare and submit an Unmanifested Waste Report to the Department within 15 calendar days after receiving the waste. The report shall include the following.

1. EPA identification number, name, and address of the off-site facility;
2. The date the Facility received the waste;
3. EPA identification number, name, and address of the generator and transporter;
4. A description and the quantity of each unmanifested hazardous waste received;
5. The method of treatment for each hazardous waste;
6. The certification signed by an authorized representative of the Facility; and
7. An explanation of why the waste was unmanifested, if known.

2.16. BIENNIAL REPORT

The Permittee shall prepare and submit to the Department two copies of a biennial report by March 1 of each even numbered year, as required by 40 C.F.R. § 264.75. The report shall document Facility activities during the previous calendar year and shall include.

1. EPA identification number, name, and address of the Facility;
2. The calendar years covered by the report;

3. A description and the quantity of each hazardous waste type the Facility received or generated that year;
4. The method of treatment for each hazardous waste type;
5. A description of the efforts undertaken during the year to reduce the volume and toxicity of waste generated;
6. A description of the changes in volume and toxicity of waste actually achieved during the year in comparison to previous years to the extent such information is available for the years prior to 1984; and
7. Treatment notices and their certifications signed by responsible Facility representatives.

2.17. LIABILITY INSURANCE REQUIREMENTS

Pursuant to 40 C.F.R. § 264.140(c), as a Federal entity, the Permittee is exempt from the requirement to have and to maintain liability coverage for sudden and accidental occurrences as specified at 40 C.F.R. § 264.147(a).

2.18. INCAPACITY OF OWNERS OR OPERATORS, GUARANTORS, OR FINANCIAL INSTITUTIONS

Pursuant to 40 C.F.R. § 264.140(c), as a department of the federal government, the Permittee is exempt from the requirement to notify the Department of the commencement of bankruptcy as specified at 40 C.F.R. § 264.148.

2.19. DISCLOSURE STATEMENT

Pursuant to NMSA 1978, § 74-4-4.7(F)(1), as a department of the federal government, the Permittee is not required to file a disclosure statement.

2.20. ADDITIONAL REPORTS

In accordance with the requirements of 40 C.F.R. § 264.77, the Permittee shall also report the following to the Department.

1. Releases of hazardous waste, hazardous constituents or contaminants, or any fires at or within 0.25 mile of the OD Unit or any SWMU or AOC,
2. Manifest discrepancies that cannot be resolved within 15 calendar days after receiving the waste,
3. Occurrences, if any, when hazardous waste is transported to the OD Unit in a container in noncompliance with regulatory requirements and the requirements of this Permit,
4. Treatment unit closures (40 C.F.R. §§ 264.77(b) and 264.115).

Table 2-1 **Off-Site Generators**
New Mexico State Police
Albuquerque Police Department
Bernalillo County Sheriff's Office
Sandia National Laboratories/New Mexico
Kirtland Air Force Base
University of New Mexico
New Mexico Institute of Mining and Technology

Figure 2-1

PERMIT PART 3: OPEN DETONATION UNIT

3.0 INTRODUCTION

This Permit Part (3) contains requirements that set forth the authorized waste types and maximum quantities of hazardous waste allowed to be treated at the Open Detonation (OD) Unit. It also contains other requirements, including those related to the design, construction, and operation of the Unit, and soil and groundwater monitoring.

3.1. AUTHORIZED WASTE AND MAXIMUM QUANTITY OF WASTE

The Permittee shall not treat more than 1,500 lbs of wastes per treatment event, 18,000 lbs per calendar year, or 180,000 lbs for the term of the Permit. The Permittee shall not treat more than the above quantities, except in case of an emergency and only after authorization by the Department. The Permittee shall not treat any wastes that are not authorized under Permit Attachment B.

3.2. DESIGN, CONSTRUCTION, OPERATION, AND MAINTENANCE

3.2.1. General Requirements

The Permittee shall design, construct, operate, and maintain the OD Unit in accordance with the requirements of this Permit to minimize noise and the possibility of an accidental fire, explosion, or any sudden or nonsudden release of hazardous waste or hazardous constituents into air, soil, sediment, surface water, or groundwater which could threaten human health or the environment, as required by 40 C.F.R. §§ 264.31 and 264.601.

The Permittee shall mark the boundary of the OD Unit with signs or structures such that the boundary is clearly discernible.

3.2.2. Run-Off and Run-On Controls

The Permittee shall design, construct, operate, and maintain run-off control systems (protective berm) at the OD Unit to prevent precipitation run-off from leaving the Unit and the migration of hazardous waste or hazardous constituents off-Unit, as required by 40 C.F.R. § 264.601(b).

The Permittee shall design, construct, operate, and maintain run-on control systems (protective berm) at the OD Unit to prevent precipitation from entering the Unit as overland run-on, as required by 40 C.F.R. § 264.601(b).

3.2.3. Restrictions on Operations

3.2.3.1. Hours of Operation

The Permittee shall conduct treatment operations only between sunrise and sunset, except in an emergency [see 40 C.F.R. § 264.1(g)(8)(i)(D)]. If the Permittee conducts treatment operations in response to an emergency before sunrise or after sunset on a given day, the Permittee shall notify the Department of this fact in writing within 3 days of conducting such treatment.

3.2.3.2. Weather Conditions

Treatment operations shall not be conducted during adverse climatic conditions. Operations shall not be conducted if lightning is within 10 miles (16 kilometers) of the OD Unit, when the cloud ceiling is less than 1,000 feet or when visibility is less than five miles.

The Permittee shall not conduct treatment operations when wind speed exceeds 15 miles per hour (24 kilometers per hour).

The Permittee shall not conduct treatment operations when a thunderstorm is imminent or within 10 miles (16 kilometers) of the OD Unit, or during a snowstorm, a dust storm, or sandstorm.

3.2.3.3. Range Fire

The Permittee shall not conduct treatment operations when extreme fire hazard conditions exist or if a range fire has the potential to reach the boundary of the Explosive Ordnance Disposal (EOD) Range.

3.2.3.4. Other Restrictions

Wastes shall be treated promptly upon transport to and acceptance at the OD Unit.

The Permittee shall cease treatment operations immediately upon the discovery of an unsafe situation including but not limited to an aircraft in dangerous proximity to the EOD Range or loss of communication with the EOD Shop.

The Emergency Coordinator (EC) shall remain on site at the personnel bunker for the duration of the treatment operation.

Waste shall not be stored at the OD Unit and shall be present at the Unit only during a planned treatment operation.

If a treatment event at the OD Unit is aborted, the waste shall be immediately sent back to the generator.

The maximum extent of hazardous waste operations at the OD Unit shall be confined to the OD Unit.

3.2.4. Operation Safety

3.2.4.1. Personnel Safety

When escorted visitors are present to observe treatment operations, there shall be at least one EOD Technician or Specialist present for every three visitors.

The Permittee shall not conduct treatment operations if unauthorized personnel are within 1500 feet of the OD Unit. The Permittee shall ensure that at least two authorized persons are present during any treatment operation.

Following a treatment operation, no personnel shall enter the OD Unit until the explosive ordnance Team Chief/Range Safety Officer determines that it is safe to enter.

3.2.4.2. Safety Precautions

The Permittee shall conduct all treatment operations in accordance with all the safety precautions required by this Permit.

3.2.5. Maintenance

3.2.5.1. Accumulated Precipitation

The Permittee shall not allow standing water in any pit (crater). The Permittee shall remove any standing water within 24 hours after a precipitation event, or within 24 hours of when impassible access roads become passable should inclement weather preclude access to the OD Unit. The Permittee shall analyze any water removed from the OD Unit to determine whether it is a hazardous waste in accordance with the *Waste Analysis Plan* (Permit Attachment C), and shall manage it appropriately.

3.2.5.2. Untreated Waste (Kick-Out) and Treatment Residues

Within 24 hours after each treatment operation, the Permittee shall inspect the entire OD Unit area for untreated waste (kick-out) or treatment residues (such as shrapnel, metal fragments) originating from treatment operations. This inspection shall be conducted only after it has been determined that it is safe for the purpose of conducting inspections. Any untreated waste or treatment residues shall be placed in appropriate containers and managed as hazardous waste or solid waste, as appropriate. Kick-out and treatment residues shall not be stored at the OD Unit.

3.3. AIR MONITORING

The Permittee shall evaluate the potential impact of the air pollutants on human health before, during, and after treatment operations by screening and assessment, in compliance with 40 C.F.R. § 264.601(c)(5). The Permittee shall not proceed with a treatment event if meteorological conditions or ambient air quality conditions do not meet the requirements of the City of Albuquerque air quality permit for the OD Unit and the requirements of this Permit Part.

The Permittee shall specify in an annual sampling and analysis report on air quality the types and schedules of air monitoring required by the Albuquerque Environmental Health Department, and the instrumentation required. The Permittee shall submit this report to the Department and include in the report any air monitoring data from the previous calendar year, and estimated monthly emissions based on the amounts of waste treated. The report is due by March 31 of each calendar year.

3.4. SOIL MONITORING AND HUMAN RISK SCREENING

The Permittee shall conduct an annual soil sampling and analysis program in accordance with Permit Attachment D, and as required by 40 C.F.R. § 264.601(b).

In order to monitor soil contamination resulting from open detonation operations at the OD Unit, the Permittee shall implement the *Soil Sampling and Analysis Plan* (SSAP), which is described in Permit Attachment D.

Installation of monitoring wells and subsequent groundwater sampling and analysis protocol will be accomplished as part of the OD Unit closure activities, in accordance with Attachment H, Closure Plan for Open Detonation Unit.

3.6. ORGANIC AIR EMISSIONS REQUIREMENTS

This Permit Section contains requirements for air emissions.

3.6.1. Additional Waste Characterization Requirements for Air Emissions

The Permittee shall characterize hazardous waste to ensure compliance with applicable emission requirements of 40 C.F.R. Part 264, Subpart BB.

3.6.2. Equipment Containing or Contacting Hazardous Waste

Each piece of equipment that contains or contacts hazardous wastes with organic concentrations of at least 10 percent by weight shall be marked in such a manner that it can be distinguished readily from other pieces of equipment in accordance with 40 C.F.R. § 264.1050(d).

Pursuant to 40 C.F.R. § 264.1050(f), equipment that contains or contacts hazardous waste with an organic concentration of at least 10 percent by weight for less than 300 hours per calendar year is excluded from the requirements of 40 C.F.R. §§ 264.1052 through 264.1060 if it is identified, as required in 40 C.F.R. § 264.1064(g)(6). Such equipment shall be identified in writing in a log that shall be kept with the Operating Record in accordance with 40 C.F.R. § 264.1064(g)(6). The information required pursuant to 40 C.F.R. § 264.1064(k)(1), (2), (3) shall also be recorded in a log that is kept with the Operating Record.

The Permittee shall comply with all applicable requirements of 40 C.F.R. §§ 264.1052 through 264.1060 for any equipment that contains or contacts hazardous waste with an organic concentration of at least 10 percent by weight for 300 or more hours per calendar year. The log shall note the total time elapsed that any equipment contains or contacts hazardous waste with an organic concentration of at least 10 percent by weight.

3.7. PRE-TREATMENT PREPARATION

Prior to a treatment operation, upon arrival at the OD Unit, an inspection of the OD Unit shall be conducted. The range flag shall be raised. The Team Chief shall then identify the designated EC and brief other EOD team members and escorted visitors (if present) on the treatment operation to be performed, required safety precautions, emergency procedures, and instruct all those present to be watchful for unsafe conditions at all times.

3.8. TRANSPORTATION OF WASTE TO THE OD UNIT AND CONTAINER SPECIFICATIONS

Hazardous wastes shall be packaged for transport to the OD Unit in appropriate containers that provide protection equivalent to U.S. Department of Transportation (DOT)-authorized containers. Appropriate containers include:

- Reinforced ammunition containers;
- Strong fiberboard boxes; or
- Strong, cleated wooden boxes.

Waste to be treated shall be transported to the OD Unit only on the day of the planned treatment event. Waste containers shall be secured to the vehicle during transport. Vehicles transporting hazardous wastes for treatment shall bear the appropriate “Explosives” placard and/or other necessary placards at the front, on both sides, and at the rear of the vehicle. These signs may be covered or removed when the vehicle no longer carries the hazardous wastes. Each transport vehicle shall, at minimum, carry one ABC-type portable fire extinguisher that is in operational

condition. Each transport vehicle shall have equipment to communicate with the KAFB Command Post and the emergency coordinator.

3.9. WASTE STAGING

Hazardous wastes shall only be transported to the OD Unit and unloaded and staged for treatment by appropriately trained EOD personnel. Wastes shall be treated as soon as possible after arrival at the OD Unit, provided the requirements of this Permit are met.

Outer waste containers are to be removed, and the waste placed into a pit (crater) for treatment by qualified EOD personnel. Outer containers may be returned to the generator for reuse. Outer and inner containers shall be managed appropriately as waste if not reusable.

If waste is placed in the OD Unit for treatment and site conditions are deemed unsafe to treat the waste, the waste shall be immediately removed and sent back to the generator.

3.10. WASTE TREATMENT

Prior to the treatment of hazardous waste, the Team Chief shall ensure that the EOD Range is clear of unauthorized personnel, that aircraft are not approaching, and that unauthorized vehicles and persons are not within or in the vicinity of the EOD Range as required under Section 3.2.4.1 of this Permit Part. The Team Chief shall also ensure that all persons at the EOD Range have relocated to the personnel bunker. In addition, the Team Chief shall obtain wind-speed information at or near the personnel bunker. The Team Chief shall also ensure that treatment operations comply with all restrictions in this Permit, including Permit Section 3.2.3.

Treatment of waste in the OD Unit shall be performed using explosives to countercharge the hazardous waste. Ignition of the explosives shall be done from the personnel bunker.

3.11. POST TREATMENT

After a treatment operation, the Permittee shall comply with the requirements of Permit Section 3.2.5.2, Permit Section 2.2, Permit Section 2.6.5.2, and any other requirement of this Permit applicable to post-treatment of waste.

The EOD Team Chief or his designee shall be responsible for clearing any misfires, should one occur. In such an event, a second qualified person shall serve as a safety backup for the EOD Team Chief.

If complete destruction of hazardous wastes is not achieved at the OD Unit, these wastes shall be treated again or shall be removed for appropriate treatment and disposed of at an off-site facility.

PERMIT PART 4: CLOSURE

4.0 GENERAL CLOSURE REQUIREMENTS

After receipt of the last hazardous waste to be treated at the OD Unit, or if required to cease operations as specified in Permit Section 1.10 and Permit Section 4.4, the Permittee shall close the OD Unit following the procedures described in the *Closure Plan* (Permit Attachment H), this Permit, and as required by 40 C.F.R. § 264.111.

4.1. SUBMITTAL OF REVISED CLOSURE PLAN

The Permittee shall submit to the Department for approval a revised Closure Plan within 60 days after discovering that a revised Closure Plan is required in accordance with this Permit, or the regulations at 40 C.F.R. § 264.112(c), or within 60 days after receiving written notification by the Department whichever is earlier. The Permittee shall amend the Closure Plan whenever changes in circumstances necessitate a modification of the Closure Plan, as required by 40 C.F.R.
§ 264.112(c). The Permittee shall amend the Closure Plan for any other reasons set forth in 40 C.F.R. 264.112(c) or if there are changes in state law that affect the Closure Plan. The Permittee shall comply with all the requirements of 40 C.F.R. 264.112(c) in amending the Closure Plan.

When amending or revising the Closure Plan, the Permittee shall submit to the Department for approval detailed, and as necessary, updated procedures and methods describing the procedures and sampling methods to verify removal of all structures and equipment and removal of treatment residues and any hazardous or solid wastes. At a minimum, the Permittee shall include in the revised Closure Plan:

1. Unit history and description, identifying, at a minimum, the following:
    a. Constituents of concern, including all hazardous waste and hazardous constituents managed at the Unit, listed by category of constituent subject to the same sampling methods,
    b. Spills or other releases of hazardous waste and hazardous constituents during operation of the Unit, and
    c. Visible staining or other conditions indicating potential release locations;
2. Proposed procedures for removal of all structures and equipment;
3. Proposed sample locations;
4. Sample methods, equipment, and procedures;
5. Analytes and analytical methods;
6. Detection limits;
7. QA/QC procedures; and
8. Sample management and preservation procedures.

4.2. CLEAN CLOSURE

The Permittee shall close the OD Unit by removing all hazardous waste residues and hazardous constituents and all structures and equipment from the OD Unit and demonstrating that no unacceptable risk to human health and the environment exists in soil or groundwater at the OD Unit clean closure).

4.3. However, if the OD Unit cannot be clean closed, post-closure care is required (see permit Part 5) the Closure Plan shall be amended in accordance with Permit Section 4.1, and corrective action shall be immediately implemented to remediate contamination to protect human health and the environment pursuant to the requirements of Permit Part 6. Closure of the OD Unit will not be approved by the Department while corrective action is required for the OD unit. NOTIFICATION OF CLOSURE

The Permittee shall notify the Department in writing at least 45 calendar days prior to the date on which it expects to begin closure of the OD Unit, as required by 40 C.F.R. § 264.112(d).

4.4. TIME ALLOWED FOR CLOSURE

Within 90 calendar days after the final volume of hazardous waste is received at the OD Unit, the Permittee shall remove all treatment residues and all other hazardous and solid waste from the Unit. The waste shall be sent to an off-site permitted treatment or disposal facility, as applicable. The Permittee shall complete closure activities for the OD Unit following the schedule and requirements set forth in the Closure Plan, Permit Attachment H, and as required by this Permit Part. \

If this Permit is terminated, or if the Facility is otherwise ordered, by judicial decree or final order under the HWA or § 3008 of RCRA, to cease treating hazardous wastes or to close the OD Unit, then the Permittee shall close the Unit in accordance with the deadlines established in 40 C.F.R. § 264.113.

4.5. DISPOSAL/DECONTAMINATION OF EQUIPMENT, STRUCTURES, AND SOILS

The Permittee shall remove and dispose of all equipment and structures, and shall decontaminate soil, as specified in the Closure Plan, Permit Attachment H. [40 C.F.R. § 264.114].

4.6. MANAGEMENT OF REMEDIATION WASTE

By removing hazardous waste or hazardous constituents or contaminated media during closure activities, the Permittee becomes a generator of hazardous waste, and shall manage that waste in accordance with all applicable requirements of 40 C.F.R. Part 262.

4.7. CERTIFICATION OF CLOSURE

Within 60 calendar days from the date of completion of closure of the OD Unit, the Permittee shall submit to the Department a final closure report and written certification signed by the Permittee and an independent professional engineer registered in the State of New Mexico, that the OD Unit was closed as required by the procedures specified in the Closure Plan (Permit Attachment H) and this Permit. [40 C.F.R. § 264.115].

4.8. FINANCIAL RESPONSIBILITY

4.8.1. Cost Estimate for Closure

Pursuant to 40 C.F.R. § 264.140(c), as a department of the federal government, the Permittee is exempt from the requirement to provide a cost estimate for closure as specified at 40 C.F.R. § 264.142.

4.8.2. Financial Assurance for Closure

Pursuant to 40 C.F.R. § 264.140(c), as a department of the federal government, the Permittee is exempt from the requirement to submit a signed duplicate original of the closure financial assurance instrument as specified at 40 C.F.R. § 264.143.

PERMIT PART 5: POST CLOSURE

5.0 POST-CLOSURE CARE

If the OD Unit cannot be clean closed pursuant to Permit Section 4.2, then the OD Unit shall be subject to the requirements of 40 C.F.R 264.603 for post-closure care. If post-closure care is required, the Permittee shall submit a post-closure care permit application to the Department with 180 days of the Department's approval of closure of the OD Unit.

PERMIT PART 6: CORRECTIVE ACTION

6.0 INTRODUCTION

Pursuant to § 3004(u) and (v) of RCRA, 42 U.S.C. § 6924(u) and (v); NMSA 1978, § 74-4-4.2(B) and 40 C.F.R. Part 264, Subparts F and G, the Permittee shall implement corrective action as necessary to protect human health and the environment from all releases of hazardous waste or hazardous constituents from operating or closed hazardous waste management units, and from any releases of hazardous waste or hazardous constituents from any Solid Waste Management Unit (SWMU) or Area of Concern (AOC) at the Facility.

6.1. GENERAL PROVISIONS

6.1.1. Offsite Access

To the extent any requirement of this Permit, including any work plan approved under this Permit, requires access to property not owned or controlled by the Permittee, the Permittee shall use its best efforts to obtain access from the present owners of such property to conduct required activities. In the event that access is not obtained when necessary, the Permittee shall immediately notify the Department in writing regarding its best efforts and its failure to obtain such access.

6.1.2. Field Activities

The Permittee shall notify the Department in writing of any field sampling or other field activities undertaken pursuant to any work plan or requirement of this Permit, and shall provide the Department the opportunity to collect split samples upon request by the Department. For such sampling or other field activities, the Permittee shall provide the Department with as much advance notice as is practicable, but no less than 15 days prior to the conduct of such sampling.

The Permittee shall notify the Department in writing a minimum of 15 days prior to the implementation of any work plan required under this Permit. Notification of sampling or other field activities may be made by email, fax, or letter.

6.1.3. Record Preservation

Until 10 years after the Permittee's receipt of the Department's written notice that corrective action has been completed for all SWMUs and AOCs listed on Table I-3 of Permit Attachment I, the Permittee shall maintain all records, documents, data, and other information that are required to be prepared under this Permit for corrective action.

6.1.4. Releases Beyond Facility Boundary

The Permittee shall notify the Department orally, within 24 hours of discovery, of any release of hazardous waste or hazardous constituent that has the potential to migrate beyond the Facility boundary or has migrated beyond the Facility boundary.

In the event that a hazardous waste or a hazardous constituent migrates beyond the Facility boundary, the Permittee shall implement corrective actions beyond the Facility property boundary as necessary to protect human health and the environment, unless the Permittee can

demonstrate to the Department that, despite the Permittee's best efforts, the Permittee is unable to obtain the necessary permission to undertake such actions. The Permittee is not relieved of any responsibility to clean up a release that has migrated beyond the Facility boundary where offsite access has been denied. On-site measures to address such releases will be determined on a case-by-case basis and will be subject to the approval of the Department.

6.1.5. Work Plans and Other Deliverable Documents

All work plans, schedules, reports, and other deliverable documents that the Permittee is required to prepare under this Part (6) shall be submitted to the Department for review and approval as detailed in Permit Section 1.38.

6.1.6. Quarterly Progress Reports

The Permittee shall submit to the Department quarterly reports summarizing all corrective action activities conducted pursuant to this Permit by January 31, April 30, July 31, and October 31 of each year. Each report shall summarize the corrective action activities for the quarter (i.e., 3 month time period) ending the month preceding the due date of the report. The content of these reports shall include the information specified in Permit Section 6.2.4.1.

6.1.7. Lists of SWMUs and AOCs and Annual Reporting of Outdoor Activities

Plate 1 is a map showing the locations of SWMUs and AOCs at the Facility. Corrective action is required for all SWMUs and AOCs identified in Table I-3 of Permit Attachment I. Table K-1 of Permit Attachment K contains a listing of all SWMUs and AOCs for which the Department has determined that corrective action is complete without controls.

Given the need to monitor current and future activities that could lead to creation of new SWMUs and AOCs, the Permittee shall submit to the Department an annual report containing a brief summary of outdoor testing and training activities. The report shall list the name, location, and a general description of the type or types of testing (e.g., firing site, explosives testing, drop testing, burn testing) and training conducted at each outdoor area. The first annual report shall be submitted to the Department within 90 days of the effective date of this Permit; subsequent reports shall be submitted annually thereafter by March 31 of each year.

6.1.8. Newly discovered SWMUs, AOCs, and Releases

The Permittee shall notify the Department orally, within 24 hours of discovery, of any newly identified SWMU or AOC. Within 15 days after the discovery of any newly identified or suspected SWMU or AOC, the Permittee shall notify the Department in writing of such discovery. The notification shall include, at a minimum, the location of the SWMU or AOC and all available information pertaining to the nature of any release of contaminants from the SWMU or AOC, including the contaminants that were released, the magnitude of the release, and the media affected by the release.

Within 90 days after submitting such written notification, the Permittee shall submit to the Department for approval a SWMU Assessment Report (SAR) for each newly identified or suspected SWMU or AOC. At a minimum, the report shall provide the following information, to the extent available:

1. Location of each newly identified or suspected SWMU or AOC on a topographic map of appropriate scale;
2. Designation of type and function of each newly identified or suspected SWMU or AOC;
3. General dimensions, capacities and structural description of each newly identified or suspected SWMU or AOC (including any available plans and drawings);
4. Dates of operation for each newly identified or suspected SWMU or AOC;
5. Identification of all wastes that have been managed at or in each newly identified or suspected SWMU or AOC, including any available data on hazardous constituents in the waste; and
6. All available information pertaining to any release of contaminants from each newly identified or suspected SWMU or AOC, including analytical data for groundwater, soil, sediment, rock, air, and surface water.

Based on the results of the report and any other relevant information, the Department will determine the need for further investigations at the SWMUs or AOCs covered in the report, including the need for an investigation report. The Department may also require corrective measures of the SWMU or AOC, based on a finding that releases of contaminants have occurred, are occurring, or are likely to occur.

Within 15 days after the discovery of any previously unknown release of a contaminant into soil, sediment, surface water, or groundwater, the Permittee shall notify the Department in writing of such discovery. Based on the results of the report and any other relevant information, the Department may determine that further investigation of the release of contaminants is needed, including the need for an Investigation Report. The Department may also require corrective measures, based on a finding that releases of contaminants have occurred, are occurring, or are likely to occur from the unit.

6.1.9. Determination of Corrective Action Complete (No Further Action)

Based on the results of an Investigation Report or other relevant information, the Permittee may submit a request to the Department for a Class 3 permit modification under 40 C.F.R. § 270.42(c) to terminate corrective action for a specific SWMU or AOC. This permit modification request must contain information demonstrating that there are no releases of hazardous waste including hazardous constituents from a particular SWMU or AOC at the Facility that pose a threat to human health or the environment, as well as any additional information required in 40 C.F.R. § 270.42(c).

A determination of Corrective Action Complete shall not preclude the Department from requiring continued or periodic monitoring of air, sediment, soil, groundwater, or surface water, when site-specific circumstances indicate that releases of hazardous waste or hazardous constituents may occur or have occurred, and it is necessary to protect human health or the environment.

A determination of Corrective Action Complete shall not preclude the Department from requiring further investigations, studies, or remediation at a later date, if new information or subsequent analysis indicates a release or likelihood of a release from a SWMU or AOC at the Facility that may pose a threat to human health or the environment. In such a case, the Department may initiate a modification to the Permit according to the requirements of Permit Section 1.12.1.

6.1.10. Health and Safety Plan

The Permittee shall maintain a Facility Health and Safety Plan, which shall include:

1. A description of the Facility including availability of resources such as roads, water supply, electricity and telephone service;
2. A description of the known hazards and evaluation of the risks associated with each activity conducted, including, but not limited to, on and off-site exposure to contaminants during implementation of interim or final corrective measures, site characterization, or monitoring activities;
3. A list of key personnel and alternates who are responsible for site safety, response operations, and protection of public health;
4. A delineation of the work area;
5. A description of levels of protection to be worn by personnel in the work area;
6. Procedures established to control site access;
7. Decontamination procedures for personnel and equipment;
8. Site emergency procedures;
9. Emergency medical care procedures for injuries and toxicological problems;
10. Requirements for an environmental field-monitoring program;
11. Routine and special training requirements for responders; and
12. Procedures for protecting workers from weather-related problems.

The Facility Health and Safety Plan shall be in accordance with:

1. National Institute of Occupational Safety and Health (NIOSH) Occupation Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);
2. EPA Order 1440.1 - Respiratory Protection;
3. EPA Order 1440.3 - Health and Safety Requirements for Employees engaged in Field Activities;
4. Facility Contingency Plans included in this Permit;
5. EPA Operating Safety Guide (1984);
6. Occupational Safety and Health Administration regulations, particularly 29 C.F.R. § 1910 and 1926;
7. State and local regulations; and
8. Other applicable EPA guidance.

6.1.11. Community Relations Plan

The Permittee shall maintain a plan for dissemination of information to the public regarding investigation and remediation activities and results. The plan shall:

1. Require the creation and maintenance of an active mailing list of interested parties, to be updated annually, including those on the official mailing list in accordance with 40 C.F.R. § 124.10;
2. Require informal meetings, including briefings and workshops as appropriate, with the public and local officials before and during the corrective action process, which shall be held at least twice every calendar year for as long as corrective action is required;
3. Require that news releases, fact sheets, work plan submittals, report submittals, and publicly available quarterly progress reports that explain the progress and conclusions of investigations and clean-ups be timely posted on the Permittee's website and timely provided to interested citizen groups and the public as requested;
4. Require the creation and maintenance of a public information repository and reading room;
5. Require that public tours and briefings be conducted to inform and to listen to public concerns, and to answer questions related to environmental monitoring, characterization, and remediation;
6. Require immediate written and, if possible, oral notification to affected parties of any discovered off-site release that could impact them; and
7. Require that interested community groups be notified of and be given opportunities to observe field data gathering activities conducted during the corrective action process (notices shall specify the time and need for any required safety and security training).

6.1.12. Land Transfer

In transferring land to another entity, the Permittee shall comply with the terms of § 120(h) of CERCLA, as amended, 42 U.S.C. § 9620(h), and as implemented in 40 C.F.R. Part 373. These provisions apply to any property owned by the Permittee on which any hazardous substance was stored for one year or more, known to have been released, or disposed of, subject to the limitations of 40 C.F.R. § 373.2. Consistent with CERCLA § 120(h)(3)(A), the Permittee shall include in any deed that transfers property, the information required by CERCLA § 120(h)(3)(A)(i), the covenant required by CERCLA § 120(h)(3)(A)(ii), and the access clause required by CERCLA § 120(h)(3)(A)(iii). The Permittee may defer the requirement of § 120(h)(3)(A)(ii)(I), consistent with the terms of CERCLA § 120(h)(3)(C).

For any deed transferring title from the Permittee that contains a restriction on future land use, the Permittee shall, within 90 days of transfer of the property, notify the Department of the transfer and identify for the Department the location of the property that is the subject of the transfer.

6.1.13. Abandoned Septic Systems

In addition to the corrective action specified in this Permit, the Permittee shall close all abandoned septic systems in accordance with the Department's Liquid Waste Disposal System Regulations 20.7.3.307 NMAC.

6.2. SPECIAL REQUIREMENTS

6.2.1. Special Information Submittals

6.2.1.1. General Facility Information

The Permittee shall submit in a report to the Department, within 90 days of the effective date of this Permit, the following information:

1. Maps and tables indicating the surveyed coordinates and locations of all existing springs, wells, and surface water gaging stations;
2. Water-level contour map of known radii-of-effects from pumping of municipal and Facility supply wells;
3. Water level data presented graphically and in tabular format; and
4. Maps showing the boundaries of all Facility SWMUs and AOCs.

This report is a one-time submittal, unless new information becomes available; in that case, the report shall be updated and resubmitted at least annually by March 31 of each year for each case that new information becomes available.

6.2.1.2. Potential Human Receptors Information

The Permittee shall, within 90 days of the effective date of this Permit, submit a report to the Department describing human populations that are susceptible to contaminant exposure from the Facility. At a minimum, the following information shall be gathered and reported:

1. Local uses and possible future uses of groundwater, including:
   a). Type of use (for example., potable, domestic, agricultural, residential, industrial, municipal) and
   b). Locations of all groundwater wells, names of owners or tenants at those locations, and current use of those wells within one mile of the Facility; and
2. Human use of or access to the Facility and adjacent lands, including but not limited to recreational, residential, commercial, and industrial.

This report is a one-time submittal, unless new information becomes available; in which case, the report shall be updated and resubmitted at least annually by March 31 of each year for each case that new information becomes available.

6.2.1.3. Information on Surface Water

The Permittee shall submit a report to the Department pertaining to surface water bodies at the Facility, within 90 days of the effective date of this Permit. The report shall at minimum include:

1. A description of each surface water body, including location (Coyote Springs and associated wetlands are examples of surface water at the Facility); and
2. A description of the chemistry of the surface waters, including pH, temperature, total dissolved solids, total suspended solids, alkalinity, conductivity, dissolved oxygen, total organic carbon, and any specific contaminant concentrations.

6.2.2. Corrective Action Procedures

The corrective action process for a given SWMU or AOC begins with a site investigation to characterize any releases of contaminants. If there has been a release of hazardous waste or hazardous constituents into the environment and corrective action is necessary to protect human health or the environment from the release, corrective measures shall be conducted at the contaminated site to remove or isolate the contaminants that pose the human health or environmental risk. Verification sampling is required to determine if cleanup levels have been successfully achieved.

6.2.2.1. Site Investigations

The Permittee shall conduct a site investigation for each SWMU and AOC listed on Table I-3 of Permit Attachment I. The Department may determine that further investigation is needed at any SWMU or AOC at the Facility. If the Department determines that such further investigation is needed, it will notify the Permittee in writing.

The Permittee shall perform the site investigations only in accordance with approved Investigation Work Plans.

6.2.2.1.1. Investigation Work Plans

The Permittee shall submit to the Department for approval an Investigation Work Plan, in the format and with the content described in Permit Section 6.2.4.2, for each SWMU and AOC needing further investigation, including those listed on Table I-3 of Permit Attachment I. An individual Investigation Work Plan may cover several SWMUs or AOCs. The Investigation Work Plans shall be submitted by the date specified in the Department's written notification or in accordance with the schedule in Table I-3 of Permit Attachment I. Additional characterization required by the Department that is not already covered in an approved Investigation Work Plan, or that is not addressed during implementation of field activities conducted under an existing approved Investigation Work Plan, shall be proposed in a supplemental Investigation Work Plan submitted to the Department for approval. The supplemental Investigation Work Plan may reference a prior approved Investigation Work Plan and any corresponding Investigation Report for background information.

6.2.2.1.2. Investigation Reports

The Permittee shall submit to the Department for approval an Investigation Report, in the format and with the content described in Permit Section 6.2.4.3, that presents the results of field activities, summarizes the data collected, and presents the recommendations and conclusions of each investigation conducted pursuant to an approved Investigation Work Plan. An individual Investigation Report may cover several SWMUs or AOCs.

6.2.2.2. Corrective Measures

6.2.2.2.1. General

The Department will require corrective measures if the Department determines, based on an Investigation Report or other relevant information available to the Department, that there has been a release of hazardous waste or hazardous constituents into the environment and that corrective action is necessary to protect human health or the environment from such a release. Upon making such a determination, the Department will notify the Permittee in writing.

6.2.2.2.2. CME Work Plans

If the Department requires corrective measures, the Permittee shall submit to the Department for approval a Corrective Measures Evaluation (CME) Work Plan, in the format and with the content described in Permit Section 6.2.4.6, within 90 days of notification by the Department that a CME Work Plan is required or by such other due date as is stated in the notification. The CME Work Plan shall contain a schedule to conduct the CME. Upon approval of the CME Work Plan by the Department, the Permittee shall implement the work plan.

The CME shall evaluate potential remedial alternatives and shall recommend a preferred remedy that will be protective of human health and the environment and that will attain the appropriate cleanup levels.

6.2.2.2.3. CME Reports

The Permittee shall submit a CME Report, in the format and with the content described in Permit Section 6.2.4.7, to the Department within 90 days of completion of the CME. When the Department determines that there are no deficiencies in the CME Report, the Department will seek and consider public comment prior to selecting a remedy.

In selecting a remedy, the Department may select a remedy for a particular SWMU or AOC that encompasses several separate actions. The use of the term “remedy” refers to all such actions.

6.2.2.2.4. Cleanup Standards

The Permittee shall evaluate corrective measures and propose a preferred remedy that is capable of achieving the cleanup levels outlined in Permit Section 6.2.3 including, as applicable, any approved alternate cleanup goals established by a risk assessment.

6.2.2.2.5. Remedy Evaluation Criteria

6.2.2.2.5.1. Threshold Criteria

The Permittee shall evaluate each of the remedy alternatives against the following threshold criteria. To be selected, the remedy alternative must:

1. Be protective of human health and the environment;
2. Attain media cleanup standards within a reasonable timeframe;
3. Control the source or sources of releases so as either to reduce to the extent practicable, or to eliminate, further releases of hazardous waste or hazardous constituents that may

pose a threat to human health and the environment; and

4. Comply with applicable standards for management of wastes.

6.2.2.2.5.2. Remedial Alternative Evaluation Criteria

The Permittee shall evaluate each of the remedial alternatives for the factors described in this Permit Section (6.2.2.2.5.2). These factors shall be balanced in proposing a preferred remedy.

Long-Term Reliability and Effectiveness

The remedy shall be evaluated for long-term reliability and effectiveness. This factor includes consideration of the magnitude of risks that will remain after implementation of the remedy; the extent of long-term monitoring, or other management that will be required after implementation of the remedy; the uncertainties associated with leaving wastes in place; and the potential for failure of the remedy. The Permittee shall give preference to a remedy that reduces risks with little long-term management and that has proven effective under similar conditions.

Reduction of Toxicity, Mobility, or Volume

The remedy shall be evaluated for its effectiveness in reducing the toxicity, mobility, and volume of hazardous wastes and hazardous constituents. The Permittee shall give preference to a remedy that will more completely, permanently, and promptly reduce the toxicity, mobility, and volume of hazardous wastes and hazardous constituents.

Short-Term Effectiveness

The remedy shall be evaluated for its short-term effectiveness in reducing the toxicity, mobility, and volume of hazardous wastes and hazardous constituents. This factor includes considerations of the short-term reduction in existing risks that the remedy would achieve; the time needed to achieve that reduction; and the short-term risks that might be posed to the community, workers, and the environment during implementation of the remedy. The Permittee shall give preference to a remedy that quickly reduces short-term risks, without creating significant additional risks.

Implementability

The remedy shall be evaluated for its implementability or the difficulty of implementing the remedy. This factor includes consideration of potential installation and construction difficulties; operation and maintenance difficulties; difficulties with cleanup technology; permitting and approval requirements; and the availability of necessary equipment, services, expertise, and waste storage and disposal capacity. The Permittee shall give preference to a remedy that can be implemented quickly and easily, and poses fewer and lesser difficulties.

Cost

The remedy shall be evaluated for its cost. This factor includes a consideration of both capital costs, and operation and maintenance costs. Capital costs shall include, without limitation, construction and installation costs; equipment costs; land development costs; and indirect costs including management costs, engineering costs, legal fees, permitting fees, startup and shakedown costs, and contingency allowances. Operation and maintenance costs shall include,

without limitation, operating labor and materials costs; maintenance labor and materials costs; replacement costs; utilities; monitoring and reporting costs; administrative costs; indirect costs; and contingency allowances. All costs shall be calculated based on their net present value. The Permittee shall give preference to a remedy that is less costly, but does not sacrifice protection of human health and the environment.

6.2.2.2.6. Remedy Selection

Upon deeming the CME Report to be complete, the Department will select a proposed remedy or remedies for the SWMU or AOC. The Department may propose a different remedy from that recommended by the Permittee in the CME Report. The Department will issue a Statement of Basis for the proposed remedy, and will receive public comment on the remedy. The public comment period will extend for at least 45 days from the date of the public notice of the Statement of Basis. As provided in 20.4.1.901(A)(5)(a) through (c) and 20.4.1.901(B)(5), the Department will provide an opportunity for a public hearing on the proposed remedy, at which all interested persons will be given a reasonable chance to submit data, views or arguments orally or in writing and to examine witnesses testifying at the hearing. The comment period will automatically be extended to the close of the public hearing, if a hearing is held. The public hearing will follow the requirements under 20.4.1.901.F NMAC. The Department will select a final remedy and issue a response to public comments to all commenters, after the end of the public comment period. In selecting a remedy, the Department will follow the public participation requirements applicable to remedy selection under 20.4.1.901 NMAC and 40 C.F.R. Part 270.

6.2.2.2.7. CMI Work Plans

Within 90 days after the Department's selection of a final remedy, or as otherwise specified by the Department in writing, the Permittee shall submit to the Department for approval a Corrective Measures Implementation (CMI) Work Plan describing the design, construction, operation, maintenance, and performance monitoring for the selected remedy, and a schedule for its implementation. The CMI Work Plan shall be submitted to the Department for review in accordance with the requirements in Permit Section 1.38. Upon approval of the work plan by the Department, the Permittee shall implement the work plan.

The CMI Work Plan shall, at a minimum, include the elements found in the format provided in Permit Section 6.2.4.8.

6.2.2.2.8. Corrective Measures Implementation

The Permittee shall implement the final remedy selected by the Department according to the approved CMI Work Plan and implementation schedule.

6.2.2.2.9. Progress Reports

The Permittee shall submit to the Department progress reports in accordance with the schedule approved in the CMI Work Plan. The progress reports shall, at a minimum, include the information specified in Permit Section 6.2.4.9.

6.2.2.2.10. CMI Reports

Within 90 days after completion of a remedy, the Permittee shall submit to the Department for approval a CMI Report. The CMI Report shall include the information specified in Permit Section 6.2.4.10.

6.2.2.2.11. Accelerated Cleanup Process

6.2.2.2.11.1. General

If the Permittee identifies a corrective measure that, if implemented voluntarily, will reduce risks to human health and the environment to levels acceptable to the Department, will reduce cost or will achieve cleanup of a SWMU or AOC ahead of schedule, the Permittee may implement the corrective measure as provided in this Permit Section, in lieu of the process established in Permit Section 6.2.2.2.12.4. The accelerated cleanup process shall be used only at sites to implement presumptive remedies at small-scale and relatively simple sites where groundwater contamination is not a component of the accelerated cleanup, where the remedy is considered likely to be the final remedy for the site, and where the field work will be accomplished within 180 days of the commencement of field activities.

6.2.2.2.11.2. ACM Work Plans

The Permittee shall submit to the Department for approval a proposed Accelerated Corrective Measures (ACM) Work Plan, which shall include the following:

1. A description of the proposed remedial action, including details of the unit or activity that is subject to the requirements of this Permit;
2. An explanation of how the proposed cleanup action is consistent with the overall corrective action objectives and requirements of this Permit;
3. The sampling and analytical methods and procedures for characterization and remediation verification; and schedule for implementation and reporting on the proposed cleanup action.

The Permittee shall obtain approval of an ACM Work Plan from the Department prior to implementation of the work. The Permittee shall prepare the ACM Work Plan in accordance with the requirements of this Permit Section (6.2.2.2.11.2), and shall include a proposed implementation schedule. In accordance with Permit Section 1.38, if the Department disapproves the ACM Work Plan, the Department will notify the Permittee in writing of the work plan deficiencies and will specify a due date for submittal of a revised ACM Work Plan.

6.2.2.2.11.3. ACM Implementation

The Permittee shall implement the accelerated cleanup measure according to the approved ACM Work Plan. Within 90 days of completion of the ACM, the Permittee shall submit to the Department for approval a CMI Report that is written in a format in accordance with Permit Section 6.2.4.10. If upon review, the Department identifies any deficiencies in the CMI Report, the Department will notify the Permittee in writing and will specify a due date for submittal of a revised CMI Report.

6.2.2.2.12. Interim Measures

6.2.2.2.12.1. General

The Department may require interim measures, if the Department determines that such measures are necessary, to reduce or prevent migration of hazardous wastes or hazardous constituents that have, or may result in, an unacceptable human or environmental receptor exposure to hazardous wastes or hazardous constituents while long-term corrective action remedies are being evaluated and implemented. Upon making such determination, the Department will notify the Permittee in writing. Alternatively, the Permittee may identify the need to implement interim measures and may submit an Interim Measures Work Plan in writing to the Department for approval. The Permittee may initiate emergency interim measures without prior approval of the Department pursuant to Permit Section 6.2.2.2.12.4.

6.2.2.2.12.2. Interim Measures Work Plans

Within 60 days after receiving notification from the Department that interim measures are required, or such other period as stated in the notification, the Permittee shall submit to the Department for approval an Interim Measures Work Plan. The Interim Measures Work Plan shall include the same elements as specified in Permit Section 6.2.4.8.

6.2.2.2.12.3. Interim Measures Implementation

The Permittee shall implement the interim measures in accordance with an approved Interim Measures Work Plan and implementation schedule unless the Permittee is implementing an emergency interim measures without prior Department approval in accordance with Permit Section 6.2.2.12.4.

6.2.2.2.12.4. Emergency Interim Measures

The Permittee may determine during implementation of site investigation activities that emergency interim measures are necessary to address an immediate threat of harm to human health or the environment. The Permittee shall notify the Department within three business days of discovery of the facts giving rise to the threat, and shall propose emergency interim measures to address the threat. If the Department approves the emergency interim measures in writing, the Permittee may implement the proposed emergency interim measures without submitting an Interim Measures Work Plan. If circumstances arise resulting in an immediate threat to human health or the environment such that initiation of emergency interim measures are necessary prior to obtaining written approval from the Department, the Permittee shall notify the Department within one business day of taking the emergency interim measure. The notification shall contain a description of the emergency situation, the types and quantities of contaminants involved, the emergency interim measures taken, and contact information for the emergency coordinator who handled the situation. The notification shall also include a written statement justifying the need to take the emergency action without prior written approval from the Department.

6.2.2.2.12.5. Interim Measures Reports

Within 60 days after completion of interim measures, or as otherwise specified in the implementation schedule contained in the approved Interim Measures Work Plan, the Permittee

shall submit to the Department for approval an Interim Measures Report summarizing the results of the interim measures, that shall include copies of the results of all field screening, monitoring, sampling, analyses, and other data generated as part of the interim measures implementation. The Interim Measures Report shall include the same elements as specified in Permit Section 6.2.4.10.

6.2.3. Cleanup Levels

The Permittee shall adhere to the requirements of this Permit Section (6.2.3) for implementing and completing cleanup of groundwater, surface water, and soil at all SWMUs and AOCs at the Facility. All proposed cleanup levels will be subject to the Department's review and approval.

6.2.3.1. Cleanup Levels for Contaminants in Groundwater (other than Perchlorate)

The cleanup levels for groundwater shall be the New Mexico Water Quality Control Commission (WQCC) water quality standards (20.6.2.3103 and 20.6.2.4103 NMAC) and the drinking water maximum contaminant levels (MCLs) adopted by EPA under the Federal Safe Drinking Water Act (42 U.S.C. §§ 300f to 300j-26). If both a WQCC standard and a Maximum Contaminant Level (MCL) have been established for a contaminant, then the most stringent of the two levels shall be the cleanup level for that contaminant.

If a WQCC standard or MCL has not been established for a contaminant, the EPA Regional Screening Level (RSL) (EPA, 2009) for tap water shall be used as the cleanup level. If an RSL for tap water does not exist for a contaminant, and toxicological information is available, the Permittee shall propose a cleanup level based on a residential scenario, a total target human health excess cancer risk level of 10^{-5}, and for non-carcinogenic contaminants a HQ of one (1.0).

6.2.3.2. Cleanup Levels for Perchlorate in Groundwater

As described in Permit Section 6.4.1.4, the Permittee shall determine the nature extent, and rate of migration of any perchlorate contamination in groundwater. If the New Mexico WQCC adopts a groundwater standard for perchlorate, or if EPA adopts a MCL for perchlorate, then the standard or MCL will become the cleanup level. Pending WQCC or EPA adoption of a groundwater standard or MCL, if perchlorate is detected in groundwater at a concentration greater than or equal to 4 ug/L, the Permittee shall, through a Corrective Measures Study, propose a cleanup level based on a risk assessment using a Hazards Index of 1.0 and a residential-use scenario. The proposed cleanup level shall be subject to approval by the Department.

6.2.3.3. Cleanup Levels for Soil Contaminants (Other than PCBs and Lead)

For contaminants in soil (other than PCBs and lead), the Permittee shall propose a cleanup level based on a total human health excess cancer risk level of 10^{-5}, and for noncarcinogenic contaminants a total HQ of one (1.0) for residential land use. Alternatively, the Permittee may propose cleanup levels using the screening levels and procedures listed in the Department's most current version of "*Technical Background Document for Development of Soil Screening Levels*" (as it may be updated) for a residential land use scenario.

6.2.3.4. Cleanup Levels for Polychlorinated Biphenyls (PCBs) in Soil

For PCB contamination in soil, the Permittee shall propose a cleanup level based on the Department's Position Paper "*Risk-based Remediation of Polychlorinated Biphenyls at RCRA Corrective Action Sites*" (March 2000), as it may be updated. The soil cleanup level for PCBs is either a default concentration of 1.00 milligram per kilogram (mg/kg) or a risk-based PCB concentration level established through performing a human-health risk assessment assuming a residential land use scenario.

6.2.3.5. Cleanup Levels for Lead in Soil

The lead concentration in soil shall not exceed 400 mg/kg.

6.2.3.6. Cleanup Levels for Surface Water

The Permittee shall comply with the surface water quality standards outlined in the Clean Water Act (33 U.S.C. §§ 1251 to 1387), the New Mexico WQCC Regulations (20.6.2 NMAC), and the State of New Mexico Standards for Interstate and Intrastate Surface Waters (20.6.4 NMAC), and the procedures for alternate abatement standards (20.6.2.4103 NMAC).

6.2.3.7. Ecological Risk Evaluation and Cleanup Levels

Ecological risk shall be evaluated for any SWMU or AOC where there has been a release of contaminants. The Permittee shall evaluate ecological risk and propose a cleanup level derived using the methods in the Department's most current version of *"Guidance for Assessing Ecological Risks Posed by Chemicals: Screening-Level Ecological Risk Assessment"* (March 2000, as it may be updated). The Permittee may use EPA's ECO-SSLs (EPA, 2005) with Department approval if a substance is not addressed in the Department's guidance on ecological risk.

6.2.3.8. Requests for Variance from Cleanup Levels

The Permittee may request a variance from a particular cleanup level. The nature of the request shall differ depending on whether a WQCC standard is involved. If a WQCC standard is involved, the Permittee may request an alternative abatement standard in accordance with the process specified in the WQCC Regulations at 20.6.2.4103.E and F NMAC.

For all other instances in which the Permittee requests a variance from a cleanup level, the Permittee shall submit a demonstration to the Department that achievement of the cleanup level is impracticable. In making such demonstration, the Permittee may propose consideration of such factors as technical or physical infeasibility of the project, ineffectiveness of proposed solutions, cost of the project, potential hazards to workers or to the public, and any other basis that may support a finding of project impracticability. In addition to demonstrating the basis for its impracticability request, the Permittee's written submittal shall propose the action to be taken by the Permittee if the Department approves the impracticability demonstration. Such action shall include, but is not limited to, completion of a site-specific risk assessment and identification of alternate clean-up levels. The proposed alternative cleanup level will be subject to the Department's review and approval.

6.2.4. Reporting Requirements

The purpose of this Permit Section (6.2.4) is to provide reporting requirements for corrective action activities required under this Permit. This Permit Section is not intended to provide reporting requirements for every potential type of activity conducted at the Facility; therefore, other formats or types of reports may be necessary or better suited for some activities. Described below are general reporting requirements and formats for Quarterly Reports, Investigation Work Plans, Investigation Reports, periodic monitoring reports, risk assessment reports, CME Work Plans, CME Reports, CMI Work Plans, CMI Work Plan Progress Reports, and CMI Reports. All Work Plans and Reports shall be prepared with technical and regulatory input from the Department. All Work Plans and Reports shall be submitted to the Department in the form of one electronic copy in a format acceptable to the Department and two paper copies.

6.2.4.1. Quarterly Reporting

Quarterly reports, as specified in Permit Section 6.1.6 shall include the following information:

1. A description of the work completed and an estimate of the percentage of total planned work completed;
2. Summaries of all findings, including summaries of laboratory data;
3. Summaries of all problems or potential problems encountered during the reporting period and actions taken to rectify problems;
4. Planned work for the next reporting period;
5. Summaries of contacts pertaining to corrective action with representatives of the local community, public interest groups, or State government during the reporting period;
6. Changes in key project personnel during the reporting period;
7. Summaries of any variances from approved investigation or remediation work plans; and
8. Brief summaries of any periodic monitoring reports prepared in accordance with the requirements in Permit Section 6.2.4.4.

6.2.4.2. Investigation Work Plans

The Permittee shall prepare an Investigation Work Plan using the format set forth below. All research, locations, depths and methods of exploration, field procedures, analytical requirements, data collection methods, and schedules shall be included in a work plan. Required sections for an Investigation Work Plan are:

1. Title Page and Signature Block (for the name, title, and organization of the preparer and the responsible Facility representative);
2. Executive Summary (Abstract);
3. Table of Contents;
4. Introduction;
5. Background Information;
6. Site Conditions;
7. Scope of Activities;
8. Investigation Methods;

9. Monitoring and Sampling;
10. Schedule;
11. Tables;
12. Figures; and
13. Appendices (e.g., Investigation–Derived Waste Management Plan).

The Permittee may insert figures and tables within the text sections of a work plan instead of in a separate section.

6.2.4.3. Investigation Reports

The Permittee shall prepare an Investigation Report using the format set forth below. This Permit Section (6.2.4.3) describes the minimum requirements for reporting. All data collected during investigation of a SWMU or AOC shall be included in the Investigation Report. Requirements for an RFI report are:

1. Title Page and Signature Block (for the name, title and organization of the preparer and the responsible Facility representative);
2. Executive Summary (Abstract);
3. Table of Contents;
4. Introduction;
5. Background Information;
6. Scope of Activities;
7. Field Investigation Results – Including, but not limited to (as applicable): surface conditions, subsurface conditions, monitoring well construction, boring or excavation abandonment, groundwater conditions, materials testing results, and pilot testing results;
8. Regulatory Criteria;
9. Site Contamination – Including as applicable, but not limited to: soil, rock and sediment sampling analytical results, soil, rock and sediment sample field screening results, groundwater sampling results, surface water sampling results, and subsurface vapor sampling results; and conclusions;
10. Conclusions and Recommendations;
11. Tables - An explanation shall be provided on each table for all abbreviations, symbols, acronyms, and qualifiers;
12. Figures - All map figures shall include an accurate bar scale and a north arrow, other types of figures shall include a bar scale, if appropriate, and an explanation shall be provided on each figure for all abbreviations, symbols, acronyms, and qualifiers; and,
13. Appendices - Including, as appropriate, field methods, boring/test pit logs and well construction diagrams, chemical analytical reports, and other appendices as required by the Department.

The Permittee may insert figures and tables within the text sections of an investigation report instead of in a separate section.

6.2.4.4. Periodic Monitoring Reports

The Permittee shall prepare a Periodic Monitoring Report using the format set forth below. The reports shall present the results of periodic or routine groundwater and remediation system monitoring at the Facility. All data collected during each monitoring and sampling event in the reporting period shall be included in a periodic monitoring report. In general, interpretation of data should be presented only in the background, conclusions, and recommendations sections of a report. The other text sections of a report should be reserved for presentation of facts and data without interpretation or qualifications. Requirements for a Periodic Monitoring Report are:

1. Title Page and Signature Block (for the name, title and organization of the preparer and the responsible Facility representative);
2. Executive Summary (Abstract);
3. Table of Contents;
4. Introduction;
5. Scope of Activities;
6. Regulatory Criteria;
7. Monitoring Results;
8. Conclusions and Recommendations;
9. Tables - An explanation shall be provided on each table for all abbreviations, symbols, acronyms, and qualifiers;
10. Figures - All map figures shall include an accurate bar scale and a north arrow; other types of figures shall include a bar scale, if appropriate, and an explanation shall be provided on each figure for all abbreviations, symbols, acronyms, and qualifiers; and,
11. Appendices - Including, as appropriate, field methods, boring/test pit logs and well construction diagrams, chemical analytical reports, and other appendices as required by the Department.

The Permittee may insert figures and tables within the text sections of a periodic monitoring report instead of in a separate section.

6.2.4.5. Risk Assessment Reports

The Permittee shall prepare a Risk Assessment Report using the format set forth below. Risk Assessment Reports may be appended to or combined with a CME Report or an Investigation Report to create a single document for a given SWMU or AOC. Human health and ecological risk assessments should be presented in separate sections, but the general risk assessment outline applicable to both sections is provided below. The conceptual site model shall be discussed in all risk assessments. Requirements for a Risk Assessment Report are:

1. Title Page and Signature Block (for the name, title and organization of the preparer and the responsible Facility representative);
2. Executive Summary (Abstract);
3. Table of Contents;
4. Introduction;

5. Background Information -- Including site description and sampling results;
6. Conceptual Site and Risk Exposure Models;
7. Risk Screening Results;
8. Conclusions and Recommendations;
9. Tables;
10. Figures; and
11. Appendices.

A section in the risk assessment report shall summarize the analytical results of sampling at the SWMU or AOC. It shall include a description of the history of releases of contaminants, the known and possible sources of contamination, the vertical and lateral extent of contamination present in each medium, and a discussion of any uncertainties that are associated with contaminant characterization. Sources that are no longer considered to be ongoing but represent the point of origination for contaminants transported to other locations shall be included. This section shall reference any pertinent figures, data summary tables, and references in other reports. References made to other reports shall include page number, table numbers, and figure numbers for the referenced information. Page numbers for references made to other reports may be presented in a formal reference section of a risk assessment report. Summaries of data for each contaminant shall include the maximum value detected, the detection limit, and the upper confidence limit of the mean (UCL) based on a 95% confidence level (if applicable to the data set) with a notation for the statistical method used to calculate the UCL. Background values used for comparison to inorganic constituents and discussion of how “non-detect” analytical results were handled in the statistical analysis of data shall also be included.

Another section in the report shall present the conceptual site and risk exposure models. It shall include information on the expected fate and transport of contaminants detected at the SWMU or AOC. The discussion of fate and transport shall address potential migration of each contaminant in each medium, potential breakdown products and their migration, and anticipated pathways of exposure for human or ecological receptors. Diagrammatic representations of the conceptual site and risk exposure models shall appear in the figures section of the document. For human health risk assessments, the conceptual site and risk exposure models shall include the current and foreseeable future land use (such as industrial or recreational) for all risk assessments. Cleanup levels for the Facility shall be based on a residential land-use scenario, even if the current use of the land is for other scenarios.

All values for exposure parameters and the source of those values shall be included in table format and presented in the Tables section of the document. Conceptual site and risk exposure models presented for ecological risk assessments shall identify assessment endpoints and measurement receptors for the SWMU or AOC. The discussion of the models shall explain how the measurement receptors are protective of the ecological receptors.

If risk screening is utilized, a section in the report shall present the actual screening values used for each contaminant for comparison to all applicable human health and ecological risk screening levels. Other regulatory levels that are applicable to screening the site, such as drinking water MCLs or WQCC standards shall also be included in this section.

For risk assessments a section of the report shall present risk values, HQs, and hazard indexes

(HI) for human health under projected future land use and residential scenarios and any site-specific scenarios. A similar section shall also present for each contaminant the HQ for each ecological receptor.

Finally, a section shall also be included in the report that contains a discussion of qualitative, semi-quantitative, and quantitative uncertainty in the risk assessment and provides estimates of the potential impact of the various uncertainties. Appendices may include the results of statistical analyses of data sets and comparisons of data, full sets of results of all sampling investigations at the site, or other data as appropriate.

6.2.4.6. CME Work Plans

The Permittee shall prepare a CME Work Plan using the format set forth below. Required sections for a CME Work Plan are:

1. Title Page and Signature Block (for the name, title, and organization of the preparer and the responsible Facility representative);
2. Executive Summary;
3. Table of Contents;
4. Introduction;
5. Background Information;
6. Identification of Potential Remedies;
7. Analysis of Potential Remedies;
8. Proposed Remedy;
9. Schedule to complete CME;
10. Estimated Cost to Conduct CME;
11. Qualifications of Personnel who will conduct the CME;
12. Tables;
13. Figures; and
14. Appendices.

The Permittee may insert figures and tables within the text sections of a CME Work Plan instead of in a separate section.

6.2.4.7. CME Reports

The Permittee shall prepare a CME Report using the format set forth below. Investigation summaries, site condition descriptions, corrective action goals, corrective action options, selection criteria, and schedules shall be included in the CME Report. At a minimum, detections of contaminants encountered during site investigations shall be presented in table format with an accompanying site map showing sample locations. The required format for CME Reports is:

1. Title Page and Signature Block (for the name, title and organization of the preparer and the responsible Facility representative);
2. Executive Summary (Abstract);
3. Table of Contents;

4. Introduction;
5. Background Information;
6. Site Conditions -- Including, as appropriate, surface, subsurface, and groundwater conditions;
7. Potential Receptors -- Including sources, pathways, and receptors;
8. Regulatory Criteria;
9. Identification of Corrective Measures Options;
10. Evaluation of Corrective Measures Options -- Including the required information in Permit Section 6.2.2.2.5.2;
11. Selection of a proposed preferred remedy;
12. Design Criteria to Meet Cleanup Objectives;
13. Schedule;
14. Tables;
15. Figures; and
16. Appendices.

The Permittee may insert figures and tables within the text sections of a CME Report instead of in a separate section.

A CME Report shall include the following information:

1. A description of the location, status, and current use of the site;
2. A description of the history of site operations, including an identification of hazardous and solid wastes managed at the site, and any releases of hazardous waste or hazardous constituents;
3. A description of site surface conditions;
4. A description of site subsurface conditions;
5. A description of on-site and any off-site contamination in all affected media;
6. An identification and description of all sources of contaminants;
7. An identification and description of contaminant migration pathways;
8. An identification and description of potential contaminant receptors;
9. An identification and description of applicable cleanup standards or other regulatory criteria;
10. An identification and description of remedial alternatives;
11. Remedial alternative pilot or bench scale testing results, if applicable;
12. A detailed evaluation and rating of each of the remedial alternatives, applying the criteria set forth in Permit Section 6.2.2.2.5.2;
13. An identification of a proposed preferred remedy;
14. Basic design criteria of the proposed preferred remedy; and
15. A schedule for implementation of the proposed preferred remedy.

6.2.4.8. CMI Work Plans

The Permittee shall prepare a CMI Work Plan using the format set forth below. The CMI Work Plan shall provide details on the design, construction, operation, maintenance, and performance monitoring for the selected remedy, and a schedule for implementation. The CMI Work Plan shall, at a minimum, include as necessary depending on the type of remedy to be implemented:

1. A description of the selected remedy;
2. A description of the remediation system objectives;
3. An identification and description of the qualifications of key persons, consultants, and contractors that will be implementing the remedy;
4. Detailed engineering design drawings and systems specifications for all elements of the remedy;
5. A construction quality assurance plan;
6. An operation and maintenance plan, if applicable;
7. The results of any remedy pilot tests, such as landfill cover test plots;
8. A schedule for submission to the Administrative Authority of periodic progress reports
9. A schedule for implementation of the remedy; and
10. A health and safety plan.

6.2.4.9. CMI Work Plan Progress Reports

The Permittee shall make progress reports on the execution of the CMI Work Plan to the Department, as described in this Permit Section (6.2.4.9). At a minimum, a progress report shall include the following information:

1. A description of the remedy work completed during the reporting period;
2. A summary of problems, potential problems, or delays encountered during the reporting period;
3. A description of actions taken to eliminate or mitigate the problems, potential problems, or delays;
4. A discussion of the remedial work projected for the next reporting period, including all sampling events;
5. Copies of the results of all monitoring, including sampling and laboratory analyses, and any other data generated during the reporting period; and
6. Copies of all waste disposal records generated during the reporting period.

6.2.4.10. CMI Reports

A CMI Report shall, at a minimum, include the following information.

1. A summary of the work completed;
2. A statement, signed by a registered professional engineer, that the remedy has been completed in accordance with the Department approved CMI Work Plan for the remedy;
3. As-built drawings and specifications signed and stamped by a registered professional engineer;

4. Copies of the results of all monitoring, including sampling and laboratory analyses, and other data generated during the remedy implementation, if not previously submitted in a progress report; and
5. Copies of all waste disposal records, if not previously submitted in a progress report.

6.2.4.11. Certification

Pursuant to 40 C.F.R. § 270.11(d)(1), all corrective action documents shall include a certification, signed by a responsible official of the Facility, stating:

> I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

6.3. COMPLIANCE SCHEDULE TABLES

The Permittee shall meet the specified compliance schedules for all actions and deliverables required by this Permit. Corrective action is required for all SWMUs and AOCs identified in Table I-3 of Permit Attachment I.

6.4. SPECIAL REQUIREMENTS FOR INFORMATION SUBMITTALS AND CORRECTIVE MEASURES

6.4.1. Special Investigation Requirements

6.4.1.1. Landfills to Be Closed with Waste Left in Place

For each landfill that the Permittee proposes to leave all or a portion of the contents of the landfill in place, the Permittee shall implement the corrective action procedures set forth in Permit Section 6.2.2. Within 180 days after the effective date of this Permit, the Permittee shall submit to the Department for approval in accordance with Permit Section 6.2.4.6 a CME Work Plan for each such landfill unless a CME Work Plan has been previously submitted to the Department for the landfill.

6.4.1.2. Military Munitions Ranges

The Permittee has conducted operations at areas that were used to research, develop, test, and evaluate military munitions and explosives, and other ordnance, or weapons systems, or to train military personnel in their use and handling. The Facility contains numerous military ranges where explosives are and were used for the purpose of conducting military exercises, munitions testing, research development, and demonstrations. These military ranges may include firing lines and positions, maneuver areas, firing lanes, test pads, impact areas, simulator sites, training

sites, research facilities, and buffer zones.

This Permit Section (6.4.1.2) applies to military munitions that meet the statutory definition of "solid waste" in NMSA 1978, 74-4-3(M), whether or not they also meet the regulatory definition of "solid waste" in 40 C.F.R. § 261.2.

Within 90 days of the effective date of this Permit, the Permittee shall submit to the Department for approval a Military Range Assessment Report that contains the following information:

1. A list of all active, inactive, and closed military ranges located on Facility property;
2. A list of any military ranges located on property that has been transferred from the Facility to another federal, private, or other entity;
3. An identification of those military ranges that are active, inactive, or closed;
4. For each inactive and closed military range, a description of the current use of the property;
5. Maps (or a map) that clearly illustrate the boundaries of all active, inactive, and closed military ranges, including transferred ranges, and the map must also illustrate any buffer zone around the ranges;
6. A qualitative assessment of the nature and extent of contamination at each active, inactive, and closed military range, including the potential risk to human health and the environment from the military munitions and other contamination;
7. A recommendation for further investigation necessary to fully characterize the nature and extent of the contamination on each of the active, inactive, and closed military ranges; and
8. A proposed schedule for implementation of the recommended investigation.

6.4.1.3. Areas with Groundwater Contamination

Groundwater contamination or the potential for groundwater contamination has been identified at the following areas:

1. Tijeras Arroyo Groundwater (TAG) Area – trichloroethylene (TCE) and nitrate;
2. Landfills #4, #5, and #6, LF-008 (SWMU 6-4)–potential for contamination by selenium and TCE;
3. Manzano Base Groundwater – TCE;
4. Sewage Lagoons and Golf Course Pond, WP-026 – TCE, nitrate;
5. Manzano Sewage Treatment Facility, WP-16 (SWMU 6-24) – potential for contamination;
6. Monitoring well WYO-4 area – TCE;
7. McCormick Ranch -- Nitrate;
8. Bulk Fuels Facility, ST-106 and SS-111 -- Fuel (JP-4, JP-8, and Aviation Gas) Contamination; and
9. EOD Hill – perchlorate contamination.

The Permittee shall complete an Investigation Work Plan, Investigation Report, or CME Report

for each of the nine areas of groundwater contamination in accordance with the compliance schedules in Table I-3 of Permit Attachment I. The Permittee shall complete a CME Report for each area of groundwater contamination that requires remediation, as determined by the Department. In addition, Permittee shall investigate other areas of the Facility, in addition to those listed above, where the Department determines that either groundwater is contaminated or there is potential for groundwater contamination.

6.4.1.4. Perchlorate Screening in Groundwater

Monitoring for perchlorate is required for eight consecutive quarters in groundwater monitoring wells installed at the Facility after the effective date of this Permit and in the following existing wells or their replacements: KAFB-1001 through KAFB-1007 (McCormick Ranch/Range wells), KAFB-1901 through KAFB-1904 (Lake Christian wells), and EOD Hill well. The Department reserves the right to include additional wells for perchlorate monitoring. The Permittee shall report all monitoring results on January 31, April 30, July 31, and October 31 of each year for at least 8 consecutive quarters to the Department, unless the Department agrees in writing to a longer reporting period.

The Permittee shall determine the nature, extent, and rate of migration of any perchlorate contamination in groundwater at the Facility and, if necessary, down gradient of the Facility. The detection limit for the monitoring of perchlorate in groundwater shall not exceed 1 ug/L.

If perchlorate is detected in a groundwater at a concentration greater than or equal to 1 ug/L in a groundwater monitoring well, monitoring of perchlorate in such well must continue at a frequency determined by the Department. The frequency shall not exceed one year.

6.4.1.5. Sanitary Sewer Line at LF-002 (SWMU 6-2)

The sanitary sewer line that passes through LF-002 shall be removed in accordance with the Department's instructions (letters from NMED to Carl Lanz: July 16, 2004; September 13, 2004; and March 10, 2005). Instead of removing the sanitary sewer line, the Permittee may abandon the sanitary sewer line in place, provided that the sewage within the line is completely drained when the line is abandoned. The sewer line shall be taken out of service within two years of the effective date of this Permit.

Within 180 days after the effective date of this Permit, the Permittee shall submit to the Department for approval - in accordance with Permit Section 6.2.2.2.7 - a CMI Work Plan with a schedule for removing or abandoning the sewer line. After completion of the work, the Permittee shall augment the CMI Report for LF-002 by describing the removal or abandonment of the sewer line.

6.5. TECHNICAL REQUIREMENTS

The methods used to conduct investigation, remediation, and monitoring activities shall be sufficient to fulfill the requirements of this Permit, and to provide accurate and representative data for the evaluation of site conditions, the nature, concentration, rate of migration, and extent of contamination, and for remedy selection and implementation, where necessary. The methods presented in this Permit are minimum requirements for environmental investigation and sampling, and are not intended to include all methods that may be necessary to fulfill the

requirements of this Permit. The methods for conducting investigations, corrective actions, and monitoring at the Facility must be determined based on the conditions and contaminants that exist at each SWMU or AOC.

The Permittee shall provide a description of investigation, sampling or analytical methods and procedures in documents submitted to the Department that includes sufficient detail to evaluate the quality of the acquired data. The Department must approve any proposed combinations of SWMUs and AOCs that are grouped for the purpose of site investigation, remediation, and/or monitoring activities.

6.5.1. Standard Operating Procedures

The Permittee may reference relevant Facility Standard Operating Procedures, provided that copies of these procedures are also submitted to the Department for review. If any requirement or procedure in a Standard Operating Procedure is found by the Department to be unacceptable for reasons including, but not limited to, that the requirement or procedure will or could prevent the acquisition of representative and reliable sampling results, the requirement or procedure shall be replaced by the Permittee with a different requirement or procedure that is acceptable to the Department.

6.5.2. Documentation of Field Activities

Daily field activities, including observations and field procedures, shall be recorded on appropriate forms. The original field forms shall be retained at the Facility and made available to the Department upon request. Completed forms shall be maintained in a bound and sequentially numbered field file (logbook) for reference. Indelible ink shall be used to record all field activities. Photographic documentation of field activities shall be performed, as appropriate. The daily record of field activities shall include, at minimum:

1. SWMU or AOC designation;
2. Date;
3. Time of personnel arrival and departure;
4. Field investigation team members who are present, including subcontractors and visitors;
5. Weather conditions;
6. Daily activities conducted and times of performance;
7. Observations;
8. Record of samples collected with sample designations and locations specified;
9. Photographic log;
10. Field monitoring data, including health and safety monitoring if conditions arise that threaten worker or public safety, or the environment;
11. Equipment used and calibration records, if appropriate;
12. List of additional data sheets and maps completed;
13. An inventory of the waste generated and the method of storage and/or disposal; and
14. Signature of personnel completing the field record.

6.5.3. Decontamination Procedures

The objective of the decontamination procedures described below is to minimize the potential for cross-contamination. A designated area shall be established for decontamination of drilling equipment, reusable sampling equipment, and well materials. Drilling rigs and other equipment shall be decontaminated prior to entering a SWMU or AOC. Drilling equipment or other exploration equipment that may come in contact with a borehole shall be decontaminated by steam cleaning, by hot-water pressure washing, or by another method approved by the Department prior to drilling each boring.

Sampling or measurement equipment, including but not limited to, stainless steel sampling tools, split-barrel or core samplers, well development or purging equipment, groundwater quality measurement instruments, and water level measurement instruments, shall be decontaminated in accordance with the following procedures or other methods approved by the Department before each sampling event:

1. Brush equipment with a wire or other suitable brush, if necessary or practicable, to remove large particulate matter;
2. Rinse with potable tap water;
3. Wash with non-phosphate detergent or other detergent approved by the Department (e.g., Fantastik™ and Liqui-Nox®) followed by a tap water rinse;
4. Rinse with 0.1 M nitric acid to remove trace metals, if necessary, followed by a tap water rinse;
5. Rinse with methanol to remove organic compounds, if necessary;
6. Rinse with potable tap water; and
7. Double rinse with deionized water.

All decontamination solutions shall be collected and stored temporarily as Investigation Derived Waste (IDW) as described in Permit Section 6.5.7. Decontamination procedures and the cleaning agents used shall be documented in the daily field log.

6.5.4. Field Equipment Calibration Procedures

Field equipment requiring calibration shall be calibrated before use in the field to known standards, in accordance with the manufacturers' recommended schedules and procedures. Calibration measurements shall be recorded in the daily field logs. If field equipment becomes inoperable, its use shall be discontinued until the necessary repairs are made. In the interim, a properly calibrated replacement instrument shall be used.

6.5.5. Sample Handling, Shipping, and Custody Requirements

The Permittee shall follow all procedures for sampling activities that are detailed in this Permit Section.

6.5.5.1. Sample Handling

At a minimum, the following procedures shall be used at all times when collecting samples during investigation, corrective action, and monitoring activities:

1. Neoprene, nitrile, or other protective gloves shall be worn when collecting samples. New disposable gloves shall be used to collect samples. If any glove is contaminated by touching the sampled material, or other material that could contaminate or dilute the sample, the glove shall be replaced before taking another sample;
2. All samples collected of each medium shall be transferred into clean containers with the exception of soil, rock, and sediment samples obtained in brass sleeves or in Encore™ samplers. Sample container volumes and preservation methods shall be in accordance with EPA SW-846 and established industry practices; and
3. Sample labels and documentation shall be completed for each sample following procedures included in the site-specific work plans that are to be approved by the Department. Immediately after the samples are collected, they shall be stored either in a cooler with ice or by other appropriate storage method until they are delivered to the analytical laboratory. Chain-of-custody procedures, as described in this Permit Section (6.5.5.1) and Section 1.3.2.4 of Permit Attachment C shall be followed for all samples collected. All samples shall be submitted to the laboratory in an appropriate timeframe that will allow the laboratory to conduct the specified analyses within the method holding times.

6.5.5.2. Sample Shipment Procedures

Shipment procedures shall include:

1. Individual sample containers shall be packed to prevent breakage, and transported in a sealed cooler with ice or other suitable coolant or as otherwise approved by the Department. Any drainage hole at the bottom of the cooler shall be sealed and secured to prevent leakage;
2. Each cooler or other container shall be delivered in a timely manner to the analytical laboratory;
3. Glass bottles shall be separated in the shipping container by cushioning material to prevent breakage;
4. Plastic containers shall be protected from possible puncture during shipping using cushioning material;
5. The chain-of-custody form and analytical request form shall be shipped inside the sealed storage container to be delivered to the laboratory; and
6. Chain-of-custody seals (signed and dated) shall be used to seal individual sample containers and the sample-shipping container in conformance with EPA guidance.

6.5.5.3. Sample Custody

All samples collected for analysis shall be recorded in the field report or data sheets. Chain-of-custody forms shall be completed prior to the transfer of samples off-site, and shall accompany the samples during shipment to the laboratory. Upon receipt of the samples at the laboratory, the custody seals will be broken by laboratory personnel, the chain-of-custody form shall be signed as received by the laboratory, and the conditions of the samples shall be recorded on the form. The original chain-of-custody form shall remain with the laboratory and copies shall be returned to the relinquishing party. The Permittee shall maintain copies of all chain-of-custody forms

generated as part of sampling activities. Copies of the chain-of-custody records (either paper copies or electronically scanned in PDF format) shall be included with final reports submitted to the Department.

A chain-of-custody form shall be used to track samples from collection through analysis to ensure the integrity of analytical results. A chain-of-custody form shall include:

1. Sample identification number;
2. Signature of sample collector;
3. Date and time of sample collection;
4. Location at which sample was collected;
5. Type of media sampled (e.g., soil);
6. Type of preservation;
7. Analysis required;
8. Signature of all persons that have had custody of the samples;
9. Dates and times of possession; and
10. Signature, date and time of breaking the custody seal.

An individual in custody of any sample must comply with the procedures identified in SW-846 Chapter Nine (EPA, 1986) and those included here.

6.5.5.4. Sample Labels

Sample labels or tags are necessary to prevent misidentification. Gummed paper labels or tags are adequate and shall include at a minimum:

1. Sample identification number;
2. Name or initial of collector;
3. Sample location;
4. Sample date and time;
5. Analytical method or parameter to be analyzed for (e.g., VOCs, SVOCs, metals);
6. Preservation method; and
7. Other remarks.

Labels shall be affixed to sample containers before sampling, and they shall be immediately completed with the above information after the samples are collected.

The Permittee shall adhere to the following field custody procedures:

1. When collecting samples, as few people as possible should handle them;
2. Sampling personnel are responsible for the care and custody of samples until they are transferred or properly dispatched to the laboratory in accordance with the procedures described herein; and
3. Sample tags or labels shall be completed for each sample using waterproof ink, or covered by transparent waterproof tape.

6.5.6. In-Situ Testing and Other Tests

In-situ permeability tests, remediation system pilot tests, stream flow tests, and other tests conducted to evaluate site, surface, and subsurface conditions shall be designed to accommodate specific site conditions and to achieve test objectives. The testing methods must be approved, in writing, by the Department prior to implementation. The tests shall be conducted in accordance with Department, EPA, United States Geological Survey, ASTM International (ASTM - http://www.astm.org/) or other methods generally accepted by industry that will allow information representative of site conditions to be obtained. Detailed logs of all relevant site conditions and measurements shall be made during the testing events. A summary of the general test results, including unexpected or unusual test results and equipment failures or testing limitations shall be reported to the Department. The summary shall be presented in a format acceptable to the Department and in general accordance with the report formats outlined in Permit Section 6.2.4.

6.5.7. Collection and Management of Investigation Derived Waste

IDW includes, but is not limited to, general refuse, drill cuttings, excess sample material, water (e.g., decontamination, development and purge), spent materials, and used disposable equipment generated during the course of investigation, corrective action, or monitoring activities. All IDW shall be properly characterized and disposed of in accordance with Permit Attachment C (Waste Analysis Plan) and all federal, state, and local laws and regulations for storage, labeling, handling, transport, and disposal of waste. The Permittee shall include a description of the anticipated IDW management process as part of any work plan submitted to the Department for approval.

All waste generated during sampling and decontamination activities shall be temporarily stored in containers appropriate for the waste.

6.5.8. Surveying Sample, Well, and Site Feature Locations

The horizontal and vertical coordinates of the top of each monitoring well casing and the ground surface elevation at each monitoring well location shall be determined by a registered New Mexico professional land surveyor or licensed Professional Engineer. Horizontal coordinates shall be measured in accordance with the State Plane Coordinate System (NMSA 1978, 47-1-49-56 [Repl. Pamp. 1993]). The surveys shall be conducted in accordance with 12.8.2 NMAC -- *Minimum Standards for Surveying in New Mexico*. Horizontal positions shall be measured to the nearest 0.1 foot, and vertical elevations shall be measured to the nearest 0.01 foot. The Permittee shall prepare site map(s), certified by a registered New Mexico professional land surveyor or licensed Professional Engineer, presenting all surveyed locations and elevations of wells and relevant site features and structures for submittal with all associated reports to the Department.

Site attributes (e.g., soil sample locations, sediment sample locations, springs, outfalls, pertinent structures, monitoring stations, as well as staked-out sampling grids), shall be located by using the global positioning system (GPS), an electronic total station with prism reflectors, transit with stadia rod or tape, or a combination of these surveying systems, or by a registered New Mexico Registered Land Surveyor or licensed Professional Engineer using the methods described in the paragraph above. Horizontal locations of site attributes shall be measured to the nearest 1.0-foot.

The Permittee shall provide the Department with a statement of accuracy for survey data upon request.

6.5.9. Requirements for Exploratory and Well Installation Borings and Exploratory Excavations

Borings shall be completed at locations specified in this Permit or as approved by the Department in Investigation Work Plans. The Department may require additional exploratory or well borings as needed to ensure protection of human health and the environment. Any additional boring locations will be determined, and approved, by the Department. The anticipated depths and locations of exploratory and well borings shall be specified in work plans submitted to the Department for approval prior to the start of the field activities.

Borings that are not completed as permanent groundwater or soil-vapor monitoring wells shall be properly abandoned. Borings completed as either groundwater monitoring or soil-vapor wells shall be completed in accordance with the requirements described in this Permit Section (6.5.9).

Exploratory and monitoring well borings shall be drilled using the most effective, proven, and practicable method for recovery of undisturbed samples and potential contaminants. The drilling method selected must be approved by the Department prior to the start of field activities. Based on the drilling conditions, the borings shall be completed using one of the following methods:

1. Hollow-stem auger;
2. Air rotary;
3. Mud rotary (generally will not be approved by the Department);
4. Percussion hammer;
5. Dual wall air rotary;
6. Direct Push Technology;
7. Cable tool;
8. Sonic; or
9. Air Rotary Casing Hammer (ARCH).

Hollow-stem auger or Direct Push Technology drilling methods are preferred if vapor-phase or volatile organic compound (VOC) contamination is known or suspected to be present. Air rotary, hollow stem auger, percussion hammer, dual wall air rotary, direct push technology, cable tool or sonic drilling are preferred for borings intersecting the saturated zone of any aquifer. The type of drilling fluids or additives used, if necessary, must be approved by the Department prior to the start of drilling activities. The use of drilling fluids, especially other than air and potable water, is discouraged.

All drilling equipment shall be in good working condition and capable of performing the assigned task. Drilling rigs and equipment shall be operated by properly trained, experienced, and responsible crews. The Permittee is responsible for ensuring that contaminants from another site or facility are not introduced into the SWMU or AOC under investigation due to equipment malfunction or poor equipment decontamination. Drilling equipment shall be properly decontaminated before initiation of drilling for each boring.

Exploratory borings shall be advanced to the depths specified or approved by the Department. The Permittee shall propose drilling depths in the site-specific work plans submitted for each subject area where subsurface investigations are needed. Unless otherwise specified in this Permit or approved by the Department in work plans, the borings shall be advanced to the following minimum depths (see also Permit Section 6.5.11):

1. In all borings, 25 feet below the deepest detected contamination;
2. Twenty-five feet below the base of disposal units;
3. Five feet below the base of shallow structures such as piping or building sumps, or other building structures; and
4. Depths specified by the Department based on regional, or on SWMU or AOC specific data needs.

The Permittee shall notify the Department as early as practicable if conditions arise or are encountered that do not allow the advancement of borings to the depths specified or approved by the Department so that alternative actions may be approved. Precautions shall be taken to prevent the migration of contaminants between geologic, hydrologic, or other identifiable zones during drilling and well installation activities. Contaminant zones shall be isolated from other zones encountered in the borings.

The drilling and sampling shall be conducted under the direction of a qualified engineer or geologist who shall maintain a detailed log of the materials and conditions encountered in each boring. Both sample information and visual observations of the cuttings and core samples shall be recorded on a boring log. Known site features and/or site survey grid markers shall be used as references to locate each boring prior to surveying the location. The boring locations shall be located to the nearest foot of their planned location, and locations shall be recorded on a scaled site map upon completion of each boring.

Trenching and other exploratory excavation methods shall follow the applicable general procedures outlined in this Permit. Methods proposed by the Permittee for exploratory excavation and sampling at any SWMU or AOC shall be included in a site-specific Investigation Work Plan submitted to the Department.

6.5.10. Requirements for Geophysical Surveys

Where necessary, the Permittee shall conduct geophysical surveys to locate underground utilities, pipelines, drums, debris, and other buried features, including buried waste, in the shallow subsurface. The methods used to conduct the surveys, such as magnetometer, ground penetrating radar, resistivity, or other methods, shall be selected based on the characteristics of the site and the possible or suspected underground features. Results of the surveys shall be included in Investigation Reports submitted to the Department.

The Department may require the Permittee to excavate test pits or trenches to identify targets located by geophysical surveys.

The Permittee shall conduct geophysical logging of boreholes using techniques such as acoustic televiewer, spinner flow, acoustic velocity/full wave form acoustic, density/porosity, gamma, neutron, single point resistance or electric (long/short normal or inductance) methods as required by the Department.

6.5.11. Requirements for Deep Subsurface Soil, Rock, and Sediment Sampling

Deep subsurface samples are those collected at depths that generally require the use of power equipment. Relatively undisturbed discrete soil and rock samples shall be obtained, where possible, during the advancement of each boring for the purpose of logging, field screening, and analytical testing. Generally, samples shall be collected at the following intervals and depths:

1. At five-foot intervals, ten-foot intervals, continuously, or as approved by the Department;
2. At the depth immediately below the base of the disposal unit or facility structure;
3. At the maximum depth of each boring or excavation;
4. At the depths of contacts or first encounter with geologic units of different lithology, structural or textural characteristics, or of relatively higher or lower permeability that are observed during drilling or excavating;
5. At depths where soil or rock types are more likely to sorb or retain contaminants as compared to surrounding lithologic units;
6. At the depth of the first encounter of any saturated zones;
7. At intervals suspected of being source or contaminated zones; and
8. At other intervals approved or required by the Department.

Additional samples may be obtained from any depth based on field observations. A split-barrel sampler lined with brass sleeves, a coring device, or other method approved by the Department shall be used to obtain samples during the drilling of each boring.

A split barrel sampler lined with brass sleeves is the preferred sampling method for borehole soil and sediment; a coring device is the preferred sampling method for rock sampling. The following procedures should be followed if a split barrel sampler is used. Upon recovery of the sample, the brass sleeves shall be removed from the split barrel sampler, and the open ends of the sleeves covered with Teflon tape or foil and sealed with plastic caps fastened to the sleeves with tape for shipment to an analytical laboratory. If brass sleeves are not used, a portion of the sample shall be placed in clean containers for laboratory analysis. The remaining portions of the sample shall be used for field screening and logging, as described in Permit Sections 6.5.13 and 6.5.15, respectively.

Discrete samples shall be collected for field screening and laboratory analyses. For analyses other than that for VOCs and semivolatile organic compounds (SVOCs), the Permittee may submit site-specific, alternative methods for homogenization of samples in the field to the Department for review and written approval.

Samples to be submitted for laboratory analyses shall be selected based upon: 1) the results of the field screening or mobile laboratory analyses; 2) the position of the sample relative to

groundwater, suspected releases, or site structures; 3) the sample location relative to former or altered site features or structures; 4) the stratigraphy encountered in the boring; and 5) the specific objectives and requirements of this Permit and the approved work plan for the SWMU or AOC under investigation. The proposed number of samples and analytical parameters shall be included as part of the site-specific work plan submitted to the Department for approval prior to the start of field investigation activities.

6.5.12. Surface and Shallow Subsurface Soil and Sediment Sampling Procedures

Surface soil samples are those collected at depths of 0 to 6 inches. Shallow subsurface samples are those collected at depths that do not require the use of power equipment. Surface and shallow subsurface soil and sediment samples shall be collected in accordance with the procedures described below.

Samples that are collected for analyses other than for VOCs or SVOCs shall be obtained using a hand-held stainless steel coring device, Shelby tube, thin-wall sampler, or other device approved by the Department. The samples shall be transferred to clean containers for submittal to the laboratory.

Samples obtained for VOC or SVOC analysis shall be collected using Shelby tubes, thin-wall samplers, or other device approved by the Department. The ends of the samplers shall be lined with Teflon tape or aluminum foil and sealed with plastic caps fastened to the sleeves with tape for shipment to the analytical laboratory.

6.5.13. Field Screening of Soil, Rock, and Sediment Samples

Samples shall be screened in the field for the presence of contaminants, if required by the Investigation Work Plan or other sampling and analysis plan. Field screening results shall be recorded on the exploratory boring and excavation logs or other field logs. Field screening results are used as a general guideline to determine the nature and extent of possible contamination. In addition, screening results shall be used to aid in the selection of soil, rock, sediment, and vapor-phase samples for laboratory analysis.

The primary screening methods to be used shall include:

1) Visual examination;
2) Headspace vapor screening for VOCs; and
3) Metals screening using X-ray fluorescence (XRF).

Additional screening for characteristics such as pH, high explosives, or for other specific compounds using field test kits shall be conducted where appropriate.

Headspace vapor screening shall target VOCs and shall be conducted by placing a soil, sediment, or rock sample in a plastic sample bag or a foil-sealed container, allowing head space for ambient air. The container shall be sealed and then shaken gently to expose the sample to the air trapped in the container. The sealed container shall be allowed to rest for a minimum of five minutes while vapor concentrations equilibrate. Vapor concentrations present within the headspace will then be measured by inserting the probe of the monitoring instrument into a small opening in the bag or through the foil. The maximum value and the ambient air temperature shall be recorded on the log for each sample. A photo-ionization detector equipped with a 10.6

or higher electron volt (eV) lamp, combustible gas indicator, or other instrument approved by the Department shall be used for VOC field screening. The limitations, precision, and calibration procedures of the monitoring instrument to be used for VOC field screening shall be included in the Investigation Work Plan prepared for each SWMU or AOC.

XRF shall target metals. XRF screening requires proper sample preparation and instrument calibration. Sample preparation and instrument calibration procedures shall be documented in the field logs. The methods and procedures for sample preparation and instrument calibration shall be approved by the Department prior to the start of field activities.

The Permittee shall record on the field logs all conditions capable of influencing the results of field screening. The Permittee shall submit to the Department a report detailing any conditions potentially influencing field screening results. This report shall be included in any report where the field screening results are presented.

At a minimum, the Permittee shall submit the samples with the greatest apparent degree of contamination, based on field observations and field screening, for laboratory analysis. In addition, the Permittee shall submit the samples with no or little apparent contamination, based on field screening, for laboratory analysis if the intention is to confirm that the base (or other depth interval) of a boring or other sample location is not contaminated.

6.5.14. Field Quality Control for Soil, Rock, and Sediment Sampling

The Permittee shall collect Quality Control (QC) samples to monitor the quality of sample collection and laboratory analysis.

Field duplicates shall consist of two samples either split from the same sample device or collected sequentially. Field duplicates shall be collected at a rate of at least 10 percent of the total number of environmental samples submitted for analysis. At a minimum, one duplicate sample shall always be collected and analyzed for the appropriate contaminants.

The Permittee shall prepare and analyze equipment blanks from all sampling apparatus at a frequency of at least five percent of the total number of samples submitted for analysis. Equipment blanks shall be generated by rinsing decontaminated sampling equipment with deionized water, and capturing the rinsate water in an appropriate sample container.

In the case of VOC analyses, the Permittee shall prepare and analyze field blanks at a frequency of at least one per day for each medium sampled at each SWMU, AOC, or other site.

Reagent blanks shall be prepared and analyzed if chemical analytical procedures requiring reagents are employed in the field as part of the investigation or monitoring program.

Each type of QC sample shall be submitted for laboratory analyses, and analyzed in the same batch that the environmental samples they represent.

6.5.15. Logging of Soil, Rock, and Sediment Samples

The physical characteristics of soil, rock, and sediment samples, such as mineralogy, ASTM soil classification, American Geological Institute rock classification, moisture content, texture, color, presence of stains or odors, field screening results, depth, location, method of sample collection, and other observations shall be recorded in a field log. Samples shall be visually inspected and

the soil, sediment, or rock type classified in general accordance with ASTM D2487 (Unified Soil Classification System) and ASTM D2488 (Standard Practice for Description and Identification of Soils), or American Geological Institute Methods for soil and rock classification or in other ways approved by the Department. Detailed logs shall be completed in the field by a qualified geologist. Additional information, such as the presence of water-bearing zones and any unusual or notable conditions encountered during drilling shall be recorded on the logs. Field boring logs, test pit logs, and field well construction diagrams shall be converted to a format acceptable for use in final reports submitted to the Department.

6.5.16. Requirements for Soil-Vapor Monitoring

Samples of subsurface vapors shall be collected from vapor monitoring points where required by the Department. The Permittee shall, as required by the Department, collect soil-vapor samples for field measurement of:

1. Percent oxygen;
2. Organic vapors (using a photo-ionization detector with a 10.6 eV lamp, a combustible vapor indicator or other method approved by the Department);
3. Percent carbon dioxide;
4. Static subsurface pressure; and
5. Other parameters, such as carbon monoxide and hydrogen sulfide.

The Permittee also shall collect soil-vapor samples for laboratory analysis of the following:

1. Percent moisture;
2. VOCs; and
3. Other analytes required by the Department.

When collecting soil-vapor samples for laboratory or field analysis, the Permittee shall continually monitor the concentrations of soil vapor from a given monitoring point with an appropriate field instrument (e.g., photoionization detector). The Permittee shall collect soil-vapor samples after the field instrument readings have stabilized and after the sampling tubing and soil-vapor monitoring well have been appropriately purged to remove all stagnant vapor. Soil-vapor samples for laboratory analysis shall be collected using SUMMA canisters[1] or other sample collection method approved by the Department. The samples shall be analyzed for VOC concentrations by EPA Method TO-15 (as it may be updated) or equivalent VOC analytical method approved by the Department.

In the field, soil-vapor measurements, the date and time of each measurement, and the type and

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1 The term "SUMMA" Canister is a trademark that refers to electropolished, passivated stainless steel vacuum sampling devices, such as TO canisters, SilcoCans, MiniCans, etc, which are cleaned, evacuated, and used to collect whole-air samples for laboratory analysis

serial number of field instrument used shall be recorded in a field log book. The method used to obtain soil-vapor field measurements and samples must be approved by the Department in writing prior to the start of monitoring.

Soil vapor wells shall not be installed with the use of any fluids. Soil vapor wells may be completed by backfilling with native materials. If a soil vapor well is installed as a permanent monitoring point, the Permittee shall not sample the well before the expiration of the 24-hour equilibration period following completion of installation. Information on the design and construction of soil-vapor monitoring wells shall be recorded as for groundwater monitoring wells (Permit Section 6.5.17.10) as applicable.

Soil-vapor monitoring wells shall be designed and constructed in a manner that will yield high-quality samples. The design and depth of installation must be approved by the Department.

6.5.17. Technical Requirements for Groundwater Investigations

The Permittee shall conduct investigations of groundwater in accordance with Department approved work plans to fully characterize the nature, vertical and lateral extent, concentration, rate of migration, fate, and transport of groundwater contamination originating from the Facility to determine the need for, and scope of, corrective action. The investigation shall include an evaluation of the physical, biological, and chemical factors influencing the transport of hazardous constituents and other contaminants in groundwater. The Permittee shall implement the groundwater investigation requirements in accordance with the requirements set forth in this Permit Section (6.5.17) and in approved work plans. All data shall be collected according to Department, EPA and industry accepted methods and procedures, and in accordance with this Permit Section (6.5.17) and any other requirements of this Permit.

6.5.17.1. Objectives

The Permittee shall implement groundwater investigations to determine the following as required by the Department:

1. Nature, extent, rate of migration, and concentration of historical and current releases of contaminants to groundwater;
2. Fate and transport, including boundary conditions, of contaminants releases within groundwater;
3. The depth to groundwater, water table elevations, potentiometric surfaces, and any seasonal variations;
4. Groundwater flow directions and velocities;
5. Migration of groundwater across hydrostratigraphic and structural boundaries;
6. Watershed and regional water balance information for evaluating contaminant fate and transport including:
    - recharge and discharge locations, rates, and volumes,
    - evapotranspiration data,
    - stream-flow data;

7. Water supply well pumping influences, including data for wells not owned by the Permittee, if available;
8. Saturated and unsaturated hydraulic-conductivity ($K_{x,y,z}$), porosity, effective porosity, permeability, transmissivity, particle-size, storage coefficients, and estimated fracture/secondary porosity;
9. Contaminant concentrations in soil, rock, sediment, air, and vapor; and absorption coefficients (K_ds);
10. Changes in groundwater chemistry and the causes;
11. Regional and perched aquifer boundaries;
12. Geologic, hydrostratigraphic, and structural relationships; and,
13. General water chemistry.

In selecting a site for a new well, the Permittee shall consider paleotopography, fracture density and orientation, source areas, contaminant characteristics, geologic structures, groundwater flow direction, and the known occurrences of groundwater. All existing and newly installed wells and piezometers shall be surveyed in accordance with the requirements described in Permit Section 6.5.8.

6.5.17.2. Groundwater Levels

The Permittee shall obtain groundwater levels in all wells from which the Permittee is collecting groundwater samples and from other wells as specified by the Department, the schedule for which shall be provided in the Investigation Work Plans or other work plans.

Groundwater levels shall be measured in monitoring wells at frequencies required by the Department and within 24 hours from the start of monitoring the water level in the first well, unless another time frame is specified in the work plan and approved by the Department. Groundwater levels also shall be obtained prior to purging for any sampling event. Measurement data and the date and time of each measurement shall be recorded on a field log. The depth to groundwater shall be measured to the nearest 0.01 foot. The depth to groundwater shall be recorded relative to the surveyed well casing rim or other surveyed datum, as appropriate.

6.5.17.3. Groundwater Sampling

Initial groundwater samples shall be obtained from newly-installed monitoring wells within 30 days after completion of well development. Subsequent groundwater monitoring and sampling shall be conducted at frequencies approved by the Department. All monitoring wells specified in a Department approved Investigation Work Plan shall be sampled within 21 calendar days from the start of the groundwater sampling event. The Permittee shall sample all groundwater in all wells as specified in a Department-approved Investigation Work Plan. Any requests for variances from the approved groundwater sampling plan or schedule shall be submitted to the Department in writing 90 days prior to the start of scheduled monitoring and sampling events.

Groundwater samples shall be collected from all saturated zones including from exploratory borings that are not intended to be completed as monitoring wells prior to abandonment of the borings.

In addition to other required analyses, water samples shall be analyzed in accordance with approved work plans for one or more of the following general chemistry parameters in Table 6-1 below. The Department will specify through approved work plans which parameters in Table 6-1 that the Permittee must analyze for in water samples.

TABLE 6-1.
Groundwater General Chemistry Parameters

nitrate/nitrite	sulfate	chloride	sodium
dissolved CO2	alkalinity	carbonate/bicarbonate	boron
fluoride	manganese	calcium	silicon
ferric/ferrous iron	ammonia	potassium	phosphorus/phosphate
strontium	lithium	magnesium	molybdenum
Total Kjeldahl Nitrogen (TKN)	total organic carbon	suspended sediment concentration*	
total dissolved solids	bromide	stable isotopes (as required by the Department)	
Other parameters indicating oxidation/reduction conditions			
Eh	pH	dissolved oxygen	specific conductivity
dissolved manganese		dissolved iron	
sulfide		alkalinity	
temperature			

*ASTM Method D3977-97 standard test for determining sediment concentration in water samples

6.5.17.4. Well Purging

All screened zones in each monitoring well shall be purged by removing groundwater prior to sampling in order to ensure that fresh formation water is sampled. Purge volumes shall be as required by the Department. Field parameters that shall be monitored while purging are: groundwater pH, specific conductance, dissolved oxygen concentrations, turbidity, redox potential, and temperature. Field parameters shall be recorded at intervals approved by the Department. Measuring instruments are to be approved by the Department and are to be specified in the Investigation Work Plan or other sampling and analysis plan. The volume of groundwater purged, the readings obtained at each interval, and the instruments used shall be recorded on the field monitoring log. Water samples shall be obtained from a well only after the measured values of purge water field parameters have stabilized to within 10 percent for three consecutive measurements and after purging at least 75 percent of one well-bore volume. A well-bore volume is herein defined as the volume of water in the saturated filter pack plus the volume of all standing water within the well screen and casing including the sump. The Permittee may submit to the Department for approval, a written request for a variance from the described method of well purging for individual wells no later than 90 days prior to scheduled

sampling activities.

6.5.17.5. Groundwater Sample Collection

Groundwater samples shall be obtained using methods approved by the Department within eight hours of the completion of well purging. Groundwater in monitoring wells with low recharge rates and that purge dry shall be sampled when the water level in the well has recovered sufficiently to collect the required samples. Sample collection methods shall be documented in field monitoring logs. The samples shall be transferred to appropriate clean containers. Sample handling and chain-of-custody procedures that shall be implemented are described in Permit Sections 6.5.5. Decontamination procedures shall be established and, implemented, for non-dedicated water sampling equipment as described in Permit Section 6.5.3.

Groundwater samples intended for metals analysis shall be submitted to the laboratory for analyses of total metals; the samples shall not be filtered in the field or laboratory, unless the Department requires analyses for dissolved metals concentrations. If dissolved metals concentrations are required by the Department, the Permittee shall obtain groundwater samples for dissolved metals analysis; said samples shall be filtered using disposable in-line filters with a 0.45 micron or other mesh size approved by the Department.

6.5.17.6. Field QC for Groundwater Sampling

Field duplicates, field blanks, equipment rinsate blanks, reagent blanks, and trip blanks (the latter required for VOC analyses only) shall be collected or prepared and analyzed for quality control purposes. The samples shall be managed as described in Permit Section 6.5.5.

Field duplicates shall consist of two samples collected sequentially. Field duplicate samples shall be collected and analyzed at a frequency of at least 10 percent of the total number of environmental samples submitted for analysis. At a minimum, one duplicate sample per sampling event shall always be collected and analyzed.

In the case of VOC analyses, field blanks shall be prepared and analyzed at a frequency of no less than one per day per SWMU or AOC. Field blanks shall be generated by filling sample containers in the field with deionized water and submitting the field blank, along with the groundwater samples, to an analytical laboratory.

Equipment blanks shall be prepared and analyzed at a rate of at least five percent of the total number of environmental samples submitted for analysis, but no less than one equipment blank per sampling day. Equipment blanks shall be generated by rinsing decontaminated sampling equipment with deionized water, and capturing the rinsate water in an appropriate clean container. The equipment blank then shall be submitted with the groundwater samples to the analytical laboratory for the same analyses as the environmental samples.

Reagent blanks may be required by the Department if chemical analyses requiring the use of chemical reagents are conducted in the field during water sampling activities. Reagent blanks shall be prepared and analyzed at a frequency of at least 10 percent of the total number of media samples, but no less than one per day per SWMU or AOC.

Trip blanks shall be prepared using deionized water. Trip blanks shall be managed exactly the same as environmental samples. Trip blanks shall accompany sampling personnel into the field

throughout sampling activities, and then shall be placed into a shipping container with environmental samples for shipment to the analytical laboratory. Trip blanks shall be analyzed at a frequency of one for each shipping container holding samples for VOC analysis.

6.5.17.7. Periodic Monitoring Report

The Permittee shall submit to the Department periodic monitoring reports providing the results of the monitoring and sampling of groundwater, surface water, and springs over the previous reporting period. The reports shall be prepared in accordance with Permit Section 6.2.4.4. The reports shall be submitted within 90 days after completion of the monitoring fieldwork or in accordance with the schedule set forth in the approved monitoring work plans.

6.5.17.8. Springs

The sampling and analysis requirements for groundwater found in this Permit shall also apply to springs. Additionally:

1. Springs shall be sampled as close to the point of discharge as possible and shall be sampled at the same locations during each sampling event. If field conditions change, the spring shall be sampled as close to the original location as possible, and the Permittee shall notify the Department in the periodic monitoring report that the sampling location for the spring has changed;
2. The sampling point for each spring shall be located in accordance with the survey methods described in Permit Section 6.5.8 or by other survey methods approved by the Department;
3. Spring water flow rates shall be measured. In addition, as required by the Department, pH, specific conductance, dissolved oxygen, turbidity, temperature, and oxidation-reduction potential of the spring water shall be measured during each sampling event;
4. Spring samples shall be submitted to an analytical laboratory for analyses of the general chemistry parameters listed in Permit Section 6.5.17.3, as required by the Department and in accordance with approved work plans; and
5. The Permittee shall perform the same field QC procedures as are described in Permit Section 6.5.17.6 and Section 1.3 of Permit Attachment D for groundwater.

6.5.17.9. Surface Water

Surface water samples shall be collected using methods approved by the Department. Samples shall be collected and placed into clean containers. Field parameters and the methods and instruments used to measure them shall be approved by the Department prior to conducting surface water sampling. The sampling and monitoring techniques used and the measurements obtained shall be recorded in field monitoring logs. Stream flow rates shall be measured in conjunction with surface water sampling events.

The Permittee shall perform the same field QC procedures as are detailed in Permit Section 6.5.17.6 and Section 1.3 of Permit Attachment D for groundwater.

6.5.17.10. Groundwater Monitoring Well Construction Requirements

Groundwater monitoring wells shall be designed and constructed in a manner that will yield high

quality samples, ensure that the well will last the duration of the project or other specified time period, and ensure that the well will not serve as a conduit for hazardous constituents to migrate between different stratigraphic units or aquifers. The design and construction of groundwater monitoring wells shall comply with the guidelines established in various RCRA guidance, including, but not limited to:

1. EPA, *RCRA Groundwater Monitoring Technical Enforcement Guidance Document*, OSWER-9950.1, September, 1986; and
2. Aller, L., Bennett, T.W., Hackett, G., Petty, R.J., Lehr, J.H., Sedoris, H., Nielsen, D.M., and Denne, J.E., *Handbook of Suggested Practices for the Design and Installation of Groundwater Monitoring Wells*, EPA 600/4-89/034, 1989.

All well construction and installation shall be conducted in accordance with this Permit Section (6.5.17.10) of this Part and in accordance with approved work plans. All monitoring and sampling shall be conducted in accordance with Permit Section 6.5.17 and in accordance with approved work plans.

The Department must approve in writing all drilling locations, monitoring well and piezometer construction and installation details, sampling depths, and abandonment activities prior to the start of these activities.

6.5.17.10.1. Drilling Methods

A variety of methods are available for drilling monitoring wells. While the selection of the drilling procedure is usually based on the site-specific geologic conditions, the following issues shall be considered:

1. Drilling shall be performed in a manner that minimizes impacts to the natural properties of the subsurface materials;
2. Drilling shall be performed in a manner that contamination and cross-contamination of groundwater and aquifer materials is avoided;
3. The drilling method shall allow for the collection of representative samples of rock, unconsolidated sediment, and soil;
4. The drilling method shall allow the Permittee to determine when the appropriate location for the screened interval(s) has been encountered;
5. The drilling method shall allow for the proper placement of a filter pack and annular sealant for each monitored zone, and the borehole diameter shall be at least four inches larger in diameter than the nominal diameter of the well casing and screen to allow adequate space for emplacement of the filter pack and annular sealants;
6. The drilling method shall also allow for the collection of representative groundwater samples, and drilling fluids, including air, shall be used only when minimal impact to the surrounding formation and groundwater can be ensured (in general the Department discourages the use of drilling mud and drilling additives for groundwater monitoring well installations); and,
7. Requirements specified in Permit Section 6.5.9.

Justification for the drilling method used must be provided in writing to the Department for approval prior to well installations.

6.5.17.10.2. Monitoring Wells and Piezometers Construction

The Permittee shall submit to the Department for approval work plans for construction of wells and piezometers that meet the following requirements:

1. If required by the Department, well and piezometer borings targeting the contact between alluvium and bedrock shall be advanced to a minimum depth of five feet below the alluvium-bedrock interface;
2. Samples of sediment, bedrock, soil, and soil vapor shall be collected as appropriate for hydraulic and soil property testing and for analysis to determine the presence of hazardous waste and constituents at depths or intervals approved by the Department;
3. Samples shall at a minimum be obtained from each boring between the ground surface and one foot below the ground surface (0.0-1.0 foot interval), at subsequent five-foot intervals, at any alluvium-bedrock contact, and at the maximum depth of each boring. For sites where drilling depths exceed 50 feet, the Permittee may propose for Department approval alternative sampling intervals in work plans;
4. Field screening and chemical analyses of collected samples shall be conducted in accordance with Permit Section 6.5.13 and in accordance with approved work plans;
5. Groundwater, soil, soil vapor, rock, and sediment samples collected during drilling activities shall be delivered to an analytical laboratory for the required analyses;
6. No borehole shall be left open or cased with temporary casing for longer than five days;
7. The Department may impose specific requirements for well construction, require borings to be extended to the regional aquifer, or require the drilling of additional borings that intersect perched saturated zones or the regional aquifer based on investigation results;
8. The proposed locations, depths and details of drilling, sampling, and well construction shall be described in work plans prepared in accordance with this Permit Section (6.5.17.10.2) and Permit Section 6.2.4.2 or other document approved by the Department prior to well installation;
9. Geophysical measurements shall be collected from the borings in accordance with Permit Section 6.5.10 and as required by the Department;
10. Where appropriate, the borings shall be monitored for the presence of vapor-phase hazardous constituents prior to well construction; and
11. Based on the results of subsurface soil-vapor monitoring, the Department may require that the Permittee construct the wells to accommodate subsurface soil-vapor monitoring in addition to groundwater monitoring and sampling.

6.5.17.10.3. Well and Piezometer Construction Materials

Well and piezometers construction materials shall be selected based on the goals and objectives of the proposed monitoring program and the geologic conditions at the site. When selecting

construction materials, the primary concern shall be selecting materials that will not contribute to or remove hazardous waste or constituents from groundwater samples. Other factors to be considered include the tensile strength, compressive strength, and collapse strength of the materials; the length of time the monitoring well or piezometer will be in service; and the material's resistance to chemical and microbiological corrosion.

6.5.17.10.4. Design and Construction of Screens and Filter Packs

Screens and filter packs shall be designed to allow accurate sampling of the saturated zone that the well is intended to sample, minimize the passage of formation materials (turbidity) into the well, and ensure sufficient structural integrity to prevent the collapse of the intake structure.

The filter pack shall be installed in a manner that prevents bridging and particle-size segregation. Filter packs shall be installed by the tremie pipe method. At least two inches of filter pack material shall be installed between the screen and the borehole wall, and two feet of filter pack material shall extend above the top of the screen. A minimum of six inches and a maximum of two feet of filter pack material shall also be placed under the bottom of the screen to provide a firm footing. The precise volume of filter pack material required shall be calculated and recorded before placement, and the actual volume used shall be determined and recorded during construction. Any significant discrepancy between the calculated and actual volume shall be explained. Prior to installing the filter pack annular seal, a one to two-foot layer of chemically inert fine sand shall be placed over the filter pack to prevent the intrusion of annular sealants into the filter pack. The use of pre-fabricated screens and filter packs shall be approved in advance of well installation by the Department.

6.5.17.10.5. Design and Construction of Annular Seals

The annular space between the casing and the borehole wall shall be properly sealed to prevent cross-contamination. The materials used for annular sealants shall be chemically inert with respect to the highest anticipated concentration of chemical constituents expected in the groundwater. The precise volume of annular sealant required shall be calculated and recorded before placement, and the actual volume shall be determined and recorded during construction. Any significant discrepancy between the calculated volume and the actual volume shall be explained.

During construction, an annular seal shall be placed on top of the filter pack. This seal shall normally consist of a high solids (10 to 30 percent) bentonite material in the form of bentonite pellets, granular bentonite, or bentonite chips. The seal shall be placed in the annulus through a tremie pipe. A tamping device shall be used to ensure that the seal is emplaced at the proper depth. The bentonite seal shall be placed above the filter pack with a minimum of two-foot vertical thickness. The bentonite seal shall be allowed to completely hydrate in conformance with the manufacturer's specifications prior to installing the overlying annular grout seal.

A grout seal shall be installed on top of the filter pack seal. The grout shall be placed into the annular space by the tremie pipe method, from the top of the filter pack annular seal to within a few feet of the ground surface; however, the grout shall be installed at intervals necessary to allow it time to cure and not damage the filter pack or filter pack annular seal during installation of the grout. The tremie pipe shall be equipped with a side discharge port (or bottom discharge for grouting at depths greater than 100 ft) to minimize damage to the filter pack or filter pack

annular seal during grout placement. The grout seal shall be allowed to cure for a minimum of 24 hours before the concrete surface pad is installed. All grouts shall be prepared in accordance with the manufacturer's specifications. High solids (30 percent) bentonite grouts shall have a minimum density of ten pounds per gallon (as measured by a mud balance) to ensure proper setup. Cement grouts shall be mixed using six and one-half to seven gallons of water per 94-pound bag of Type I Portland cement. Bentonite (five to 10 percent) may be added to delay the setting time and reduce the shrinkage of the grout.

6.5.17.10.6. Well and Piezometer Development Methods

All monitoring wells and piezometers shall be developed to create an effective filter pack around the screen, correct damage to the formation caused by drilling, remove residual drilling mud or other drilling additives, if present, and fine particles from the formation near the borehole, and assist in restoring the original water quality of the aquifer in the vicinity of the well or piezometer. Monitoring wells and piezometers shall be developed until the column of water in each well or piezometer is free of visible sediment, and the pH, temperature, turbidity, and specific conductance have stabilized to within 10%.

If a well or piezometer is pumped dry, the water level shall be allowed to sufficiently recover before the next development period is initiated.

Approval shall be obtained from the Department prior to introducing air, water, or other fluids into a well or piezometer for the purpose of development. If water is introduced to a borehole during drilling and completion, then at minimum the same volume of water shall be removed from the well or piezometer during development. In addition, the volume of water withdrawn from or introduced into a well or piezometer during development shall be recorded.

6.5.17.10.7. Surface Completion Methods

Monitoring wells and piezometers may be completed either as flush-mounted wells or piezometers, or as above-ground completions. A surface seal shall be installed over the grout seal and extended vertically up the well annulus to the land surface. The lower end of the surface seal shall extend a minimum of one foot below the frost line to prevent damage from frost heaving. The composition of the surface seal shall be neat cement or concrete. In above-ground completions wherein the well casing rises or sticks up above ground level, a three-foot square by four-inch thick concrete surface pad shall be installed around the well immediately after the protective casing is installed. The surface pad shall be sloped so that drainage will be off the pad and away from the protective casing. In addition, a minimum of one inch of the finished pad shall be below grade or ground elevation to prevent washing and undermining by soil erosion.

Protective casing with a locking cover shall be installed around the well or piezometer casing (stickup or riser) to prevent damage or unauthorized entry. The protective casing shall be anchored in the concrete surface pad below the frost line and extend at least several inches above the casing stickup. A weep hole shall be drilled into the protective casing just above the top of the concrete surface pad to prevent water from accumulating and freezing inside the protective casing. A cap shall be placed on the well riser to prevent the entry of foreign materials into the well or piezometer, and a lock shall be installed on the cover of the protective casing to provide security against tampering. If a well or piezometer is located in an area that receives vehicular

traffic, a minimum of three bumper guards consisting of steel pipes three to four inches in diameter and a minimum of five-feet in length shall be installed next to the concrete surface pad. The bumper guards shall be installed to a minimum depth of two feet below the ground surface in a concrete footing and extend a minimum of three feet above ground surface. The pipes that form the bumper guards shall be filled with concrete to provide additional strength, and shall be painted a bright color to make them readily visible.

If flush-mounted completions are required (e.g., in active roadway areas), a protective structure such as a traffic-rated utility vault or meter box shall be installed around the casing. In addition, measures should be taken to prevent the accumulation of surface water in the protective structure and around the well or piezometer intake. These measures shall include outfitting the protective structure with a steel lid or manhole cover that has a rubber seal or gasket, and ensuring that the bond between the cement surface seal and the protective structure is watertight. A lock shall be installed on the lid or cover of the protective structure to prevent unauthorized access to the well or piezometer.

6.5.17.10.8. Well and Piezometer Completion Reports

For each monitoring well or piezometer completed under this Permit, the Permittee shall submit to the Department a completion summary report within 30 days of completing installation which shall include a construction log and diagram, a boring log, and a development log. The construction log and diagram and the boring log shall contain at a minimum the information required under Permit Section 6.5.17.10.10.Well or piezometer development must be completed within 30 days of installation.

6.5.17.10.9. Well or Piezometer Abandonment

Wells and piezometers shall be abandoned when they are no longer required to address corrective action requirements or when they are damaged beyond repair; however, no well or piezometer shall be abandoned without prior approval by the Department. Well abandonment must comply with current State Engineer well abandonment guidance (19.27.4.30 and 31 NMAC)

For wells and piezometers with small diameter casing (i.e., two-inch or less), abandonment shall be accomplished by over drilling with a large diameter hollow-stem auger. After the well or piezometer has been over drilled, the casing and grout shall be removed from the ground with a drill rig, and the remaining filter pack shall be drilled out. The open borehole shall then be pressure-grouted via the tremie pipe method from the bottom of the borehole to the ground surface. After the grout has cured, the top two feet of the borehole shall be filled with concrete to insure a secure surface seal.

For larger-diameter wells (i.e. greater than 2-inch), the Permittee may attempt to remove the well casing or grout the well in place. To abandon a well or piezometer in place, a tremie pipe shall be placed at the lowest point in the well or piezometer (i.e., at the bottom of the screen or in the sump). The entire well or piezometer shall then be pressure grouted from the bottom upward to force grout out through the screen into the filter pack and up the inside of the casing, sealing off all breaks and holes in the casing. Once the well or piezometer is grouted, the casing shall be cut off even with the ground surface and covered with concrete.

6.5.17.10.10. Well and Piezometer Construction Diagrams, Logs, and Boring Logs

Information on the design, construction, and development of each monitoring well or piezometer shall be recorded. Construction and boring logs and diagrams shall include the following information:

1. Well, boring or piezometer name/number;
2. Date/time of construction;
3. Borehole diameter and casing diameter;
4. Surveyed location coordinates;
5. Total depth, expressed both as depth below ground surface and elevation above sea level;
6. Name of drilling contractor;
7. Casing length;
8. Casing materials;
9. Casing and screen joint type;
10. Screened intervals, expressed both as depth(s) below ground surface and elevation(s) above sea level;
11. Screen materials;
12. Screen slot size and design;
13. Filter-pack material and size;
14. Filter-pack volume (calculated and actual);
15. Filter-pack placement method;
16. Filter-pack interval(s), expressed both as depth(s) below ground surface and elevation(s) above sea level;
17. Annular sealant composition;
18. Annular sealant placement method;
19. Annular sealant volume (calculated and actual);
20. Annular sealant interval, expressed both as depth below ground surface and elevation above sea level;
21. Surface sealant composition;
22. Surface seal placement method;
23. Surface sealant volume (calculated and actual);
24. Surface sealant interval, expressed both as depth below ground surface and elevation above sea level;
25. Surface seal and well apron design and construction;
26. Development procedure and turbidity measurements;
27. Well development purge volume(s) and stabilization parameter measurements;
28. Type, design, and construction of protective casing;
29. Type of cap and lock;

30. Ground surface elevation above sea level;
31. Survey reference point elevation above sea level on well casing;
32. Top of casing elevation above sea level;
33. Top of protective steel casing elevation above sea level;
34. Drilling method(s); and
35. Types, quantities, and dates/times that additives were introduced, if any.

6.5.18. Laboratory Analyses Requirements for all Environmental Media

The Permittee shall submit all samples for laboratory analysis to laboratories within the EPA Contract Laboratory Program. The laboratories shall use the most recent EPA and industry-accepted extraction and analytical methods as the testing methods for each medium sampled.

The Permittee shall submit a list of analytes and analytical methods to the Department for review and written approval as part of each site-specific investigation, corrective action, or monitoring work plan. The analyte detection limit for each analytical method shall be less than applicable background or regulatory cleanup level as applicable. Analyses conducted with detection limits that are greater than applicable background or regulatory cleanup levels as applicable shall be considered data quality exceptions, and the reasons for use of the elevated detection limits shall be reported to the Department; results based on these data quality exceptions may not be accepted by the Department. All analytical data (including non-detects, estimated values, and detects) shall be included in the electronic copy of the Investigation Report or other report in Microsoft™ Excel format with any qualifiers as attached from the analytical laboratory. The Permittee shall not censor data based on detection limits, quantitation limits, or measurement uncertainty. The Permittee shall also report whether any dilution of the sample was needed prior to laboratory analysis, and the amount of dilution, if any. The Department will not accept J-coded (estimated) results for samples requiring dilution prior to laboratory analysis.

6.5.18.1. Laboratory QA/QC Requirements

The following requirements for laboratory QA/QC procedures shall be considered the minimum QA/QC standards for the laboratories employed by the Permittee. The Permittee shall provide to the Department the names of the contract analytical laboratories within 45 days of awarding a contract for analytical services to any contract laboratory. The Permittee shall maintain copies of laboratory QA/QC manuals in the Operating Record and they shall be subject to inspection by the Department.

6.5.18.1.1. Quality Assurance

The Permittee shall ensure that contract analytical laboratories maintain internal quality assurance programs in accordance with EPA and industry-accepted practices and procedures. At a minimum, the laboratories shall use a combination of standards, blanks, surrogates, duplicates, matrix spike/matrix spike duplicates (MS/MSD), and other laboratory control samples to assess data quality. The laboratories shall establish control limits for individual chemicals or groups of chemicals based on the long-term performance of the test methods. In addition, the laboratories shall establish internal QA/QC procedures that meet EPA's laboratory certification requirements. Specific procedures to be completed are identified in the following sections. If a laboratory is

unable or unwilling to meet the requirements of this Permit, the Permittee shall select a different laboratory that can and will meet the requirements.

6.5.18.1.2. Equipment Calibration Procedures and Frequency

The laboratories' equipment calibration procedures, calibration frequency, and calibration standards shall be in accordance with the EPA test method requirements and documented in quality assurance and standard operating procedures manuals. All instruments and equipment used by laboratories shall be operated, calibrated, and maintained according to manufacturers' guidelines and recommendations. Operation, calibration, and maintenance shall be performed by personnel who have been properly trained in these procedures. A routine schedule and record of instrument calibration and maintenance shall be kept on file at the laboratories.

6.5.18.1.3. Laboratory QC Samples

Analytical procedures shall be evaluated for quality by analyzing reagent blanks or method blanks, surrogates, MS/MSDs, and laboratory duplicates, as appropriate for each method. Laboratory QC samples and frequency of analysis are documented in EPA test methods. At a minimum, laboratories shall analyze laboratory blanks, MS/MSDs, and laboratory duplicates at a frequency of at least one in 20 for all batch runs requiring EPA test methods and at a frequency of at least one in 10 for non-EPA test methods. All laboratory quality control data reported with the Facility's sample analysis results must be related to the analysis of the Facility's samples.

6.5.18.2. Laboratory Deliverables

Laboratory analytical data packages shall be prepared in accordance with EPA-established Level III or IV analytical support protocols. The following shall be provided in the analytical laboratory reports submitted to the Permittee either electronically or in hard (paper) copy:

1. Transmittal letter, including information about the receipt of samples, the testing methods performed, any deviations from the required procedures, any problems encountered in the analysis of samples, any data quality exceptions and qualifiers, and any corrective actions taken by the laboratory relative to the quality of the data contained in the report;
2. Holding times and requirements;
3. Sample analytical results, including sampling date; date of sample extraction or preparation; date of sample analysis; dilution factors and test method identification; soil, rock, or sediment sample results in consistent units (such as mg/kg in dry-weight basis); water sample results in consistent units (such as milligrams/liter); soil-vapor sample results in consistent units (such as ug/m^3); and detection limits; results shall be reported for all samples, including field duplicates, blanks, and other QC samples;
4. Method blank results, including detection limits;
5. Surrogate recovery results and corresponding control limits for samples and method blanks (organic analyses only);
6. MS/MSD concentrations, percent recoveries, relative percent differences (RPDs), and corresponding control limits;
7. Laboratory duplicate results, including RPDs and corresponding control limits;

8. Sample chain-of-custody documentation;
9. Instrument calibration; and
10. Discussion of completeness.

The following data deliverables for organic compounds shall also be required from the laboratory:

1. A cover letter referencing the analytical procedure used and discussing any analytical problems, deviations, and modifications, including signature from authority representative certifying to the quality and authenticity of data as reported;
2. Data qualification in conformance with EPA protocol, and definition of data descriptor codes;
3. Reconstructed ion chromatograms for gas chromatograph/mass spectrometry (GC/MS) analyses for each sample and standard calibration;
4. Selected ion chromatograms and mass spectra of detected target analytes (GC/MS) for each sample and calibration with associated library/reference spectra;
5. Gas chromatograph/electron-capture device (GC/ECD) and/or gas chromatograph/flame ionization detector (GC/FID) chromatograms for each sample and standard calibration;
6. Raw data quantification reports for each sample and calibrations, including areas and retention times for analytes, surrogates, and internal standards;
7. A calibration data summary reporting calibration range used and a measure of linearity (include decafluorotriphenylphosphine and p-bromofluorobenzene spectra and compliance with tuning criteria for GC/MS);
8. Final extract volumes (and dilutions required), sample size, wet-to-dry weight ratios, and instrument practical detection/quantitation limit for each analyte;
9. Analyte concentrations with reporting units identified, including data qualification in conformance with the CLP Statement of Work, including definition of data descriptor codes; and
10. Report of tentatively identified compounds with comparison of mass spectra to library/reference spectra.

The following data deliverables for inorganic compounds shall also be required from the laboratory.

1. A cover letter referencing the procedure used and discussing any analytical problems, deviations, and modifications, including signature from authority representative certifying to the quality and authenticity of data as reported;
2. Results of all method QA/QC checks, including inductively coupled plasma (ICP) Interference Check Sample and ICP serial dilution results;
3. Raw data quantification report for each sample;
4. A calibration data summary reporting calibration range used and a measure of linearity, where appropriate; and
5. Final digestate volumes (and dilutions required), sample size, and wet-to-dry weight ratios.

The Permittee shall present summary tables of these data and Level II QC results to the Department in reports or other documents prepared in accordance with Permit Section 6.2.4. Raw analytical data, including calibration curves, instrument calibration data, data calculation work sheets, and other laboratory supporting data for samples from this project, shall be compiled and kept on file at the Facility for reference. The Permittee shall make all data available to the Department upon request.

6.5.18.3. Review of Field and Laboratory QC Data for all Media

6.5.18.3.1. General QC Review Process

The Permittee shall require the laboratory to notify the Permittee of data quality exceptions within three working days of discovery in order to allow for sample re-analysis, if possible. The Permittee shall contact the Department within three working days of receipt of the laboratory notification of data quality exceptions to discuss the implications to the sampling data, and to determine whether the data will still be considered acceptable or if sample re-analysis or resampling is necessary. The Permittee shall summarize the results of this discussion with Department personnel in a letter. The Permittee shall submit the letter to the Department by fax or electronic mail within five working days of the conclusion of the data quality discussion and shall mail the original signed copy of the letter to the Department within 10 days of the conclusion of the data quality discussion.

The Permittee shall evaluate all sample data, and all field and laboratory QC results for acceptability. Each group of samples shall be evaluated using data validation guidelines contained in EPA guidance documents, the latest version of SW-846, and industry-accepted methods and procedures. Additionally, the Permittee shall evaluate all data for compliance with the following parameters:

1. Representativeness -- the Permittee shall implement procedures to assure representative samples are collected and analyzed, such as repeated measurements of the same parameter at the same location over several distinct sampling events. The Permittee shall note any procedures or variations that may affect the collection or analysis of representative samples and shall qualify the data accordingly;
2. Comparability -- to assure comparability of data, the Permittee shall implement standard collection and analytical procedures, and shall report analytical results in appropriate units for comparison with other data (e.g., past studies, comparable sites, screening levels, and cleanup standards). Any procedure or variation that may affect comparability shall be noted, and the data shall be qualified appropriately;
3. Completeness -- the Permittee shall evaluate all laboratory data for completeness with respect to data quality objectives. The degree of completeness shall be reported with the data in any reports in which the data are referenced;
4. Accuracy -- the Permittee shall evaluate all data for accuracy with respect to percent recovered of spiked samples. Results shall be reported for each analyte in any report in which the data are cited; and
5. Precision -- the Permittee shall evaluate all data for precision with respect to RPDs of duplicate samples. Results shall be reported for each analyte in any report in which the data are cited.

6.5.18.3.2. Review of Laboratory Reporting, Documentation, Data Reduction, and Corrective Action Process

Upon receipt of each laboratory data package, the Permittee shall evaluate the data against the criteria outlined in this Permit. Any deviation from the established criteria shall be noted and the data will be qualified appropriately. A full review and discussion of QC data and all data qualifiers shall be submitted with Investigation Reports or other reports prepared in accordance with Permit Section 6.2.4. Data validation procedures for all samples shall include review of the following, as appropriate:

1. Holding times;
2. Detection limits;
3. Field equipment rinsate blanks;
4. Field blanks;
5. Field duplicates;
6. Trip blanks;
7. Reagent blanks;
8. Laboratory duplicates;
9. Laboratory blanks;
10. Laboratory matrix spikes;
11. Laboratory matrix spike duplicates;
12. Surrogate recoveries; and
13. Representativeness, comparability, completeness, accuracy, and precision as required in Permit Section 6.5.18.3.1 above.

If quality control problems are encountered, appropriate corrective action shall be implemented. All corrective action shall be defensible and the corrected data shall be qualified as appropriate or rejected.

6.5.18.3.2.1. Blanks

The analytical results of field blanks and equipment blanks shall be reviewed to evaluate ambient site conditions and the adequacy of equipment decontamination, respectively. The analytical results of trip blanks shall be reviewed to evaluate the possibility for contamination of samples resulting from improperly cleaned sample containers or transport containers. The analytical results of laboratory blanks shall be reviewed to evaluate the possibility of contamination of a sample caused by analytical procedures. If reagent blanks are required, the analytical results of reagent blanks shall be reviewed to evaluate whether the reagents were contaminated prior to use. If contaminants are detected in any blanks, the sample data shall be qualified, as appropriate.

6.5.18.3.2.2. Field and Laboratory Duplicates

RPDs for field and laboratory duplicates shall be calculated and reported.

6.5.18.3.2.3. Laboratory Spikes

Percent recovered for laboratory spikes shall be calculated and reported.

6.5.18.3.2.4. Holding Times

The Permittee shall review the sampling, extraction, and analysis dates to confirm that extraction and analyses were completed within the recommended holding times, as specified by EPA protocol. Appropriate data qualifiers shall be noted if holding times were exceeded.

REFERENCES

New Mexico Environment Department (NMED), 2000. Guidance for Assessing Ecological Risks Posed by Chemicals: Screening-Level Ecological Risk Assessment, as updated, New Mexico Environment Department, Santa Fe, New Mexico, March 2000.

New Mexico Environment Department (NMED), 2009. Technical Background Document for Development of Soil Screening Levels, Rev. V, New Mexico Environment Department, Santa Fe, New Mexico, December 2009.

U.S. Environmental Protection Agency (EPA), 1980. Samplers and Sampling Procedures for Hazardous Waste Streams; Municipal and Environmental Research Laboratory, U.S. Environmental Protection Agency, Cincinnati, Ohio, EPA-600/2-80-018, January 1980.

U.S. Environmental Protection Agency (EPA), 1986. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods; 3rd edition, update 3, SW-846, Office of Solid waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 2005. Guidance for Developing Ecological Screening Levels, Office of Solid waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C., OSWER Directive 9825.7-55, Revised February 2005.

U.S. Environmental Protection Agency (EPA), 2009. Regional Screening Levels for Chemical Contaminants at Superfund Sites, December, 2009.

U.S. Environmental Protection Agency (EPA), 1996. Soil Screening Guidance: User's Guide, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C., EPA-9355.4-23, July 1996.

PERMIT ATTACHMENT A: GENERAL FACILITY INFORMATION

1.0 INTRODUCTION

This Permit Attachment (A) presents a general description of Kirtland Air Force Base (KAFB-the Facility) and KAFB's Explosive Ordnance Disposal (EOD) Range. It also presents general information on wastes treated at the Open Detonation (OD) Unit.

1.1. GENERAL DESCRIPTION OF THE FACILITY AND THE EOD RANGE

KAFB, which is owned and operated by the U.S. Department of Defense (the Permittee), is located in Bernalillo County, adjacent to Albuquerque in north-central New Mexico. An estimated 24,000 people are employed at the Facility and at the U.S. Department of Energy and with other tenants located within the Facility. The Facility comprises an area of approximately 52,233 acres (about 82 square miles). The location of KAFB is shown on Figure 1-1 (Permit Part 1). The central mission of KAFB is the administration of defense programs for the U.S. Department of Defense.

The OD Unit is located on the EOD Range in the south-central portion of KAFB. The EOD Range is southeast of the former Manzano Base, east of Demolition Range Road, and approximately two miles north of the southern perimeter of KAFB (Figure 1-1, Permit Part 1). The OD Unit is circular in shape with a diameter of 1,500 feet Figure 2-1, Permit Part 2). Typical excavations (craters, pits) where treatment takes place are rectangular and are about 30 feet long, 15 feet wide and about 12 feet deep. The EOD Range occupies generally flat, gently west-sloping land located between the Rio Grande Valley to the west and the base of the Manzano Mountains to the east. The nearest major surface water body is the Rio Grande, located about 10 miles west of the EOD Range.

1.2. PURPOSE OF THE OD TREATMENT UNIT

The Permittee treats hazardous wastes by open detonation at the OD Unit located at the EOD Range, which is located in a remote, sparsely populated area within the KAFB Facility boundary. The wastes treated at the OD Unit are assigned U.S. Environmental Protection Agency (EPA) Hazardous Waste Numbers D001 (ignitability) and/or D003 (reactivity). The wastes may also carry EPA Hazard Waste Numbers D002 (corrosivity), D005, D007, D008, and D009 (toxicity characteristic metals), D018 (benzene), D030 (2,4-dinitrotoluene), D034 (hexachloroethane), and D040 (trichloroethylene) and various underlying hazardous constituents. Wastes may be stabilized with safing fluids (i.e., a substance, such as hydraulic fluid or diesel fuel, with a specific gravity between a liquid and a solid used to desensitize explosives, making them safer to handle).

Treatment is performed by detonating explosives to countercharge hazardous wastes to remove their characteristics of reactivity and/or ignitability. The frequency of operations at the OD Unit varies, as treatment events are conducted on an as-needed basis.

All hazardous waste treated by the OD Unit has the potential to detonate or is a propellant. In accordance with 40 C.F.R. § 261.23(a)(6), the high explosive (HE) waste streams are capable of detonation if subjected to a strong initiating source or if heated under confinement. The remaining waste streams have the potential to detonate because they are explosives as defined in

49 C.F.R. §173.53, pursuant to 40 C.F.R. §261.23(a)(8). As stated in Chapter 7, Section 7.3, of SW-846 (EPA, 1986), as amended, the definition of reactivity "is intended to identify wastes that, because of their extreme instability and tendency to react violently or explode, pose a problem at all stages of the waste management process."

HE, when accidentally exposed to even a small initiating source such as friction, a pinch point, electrical discharge, heat, or impact, can potentially detonate. HEs typically managed at the OD Unit have detonation velocities averaging four to six miles per second and pressures as high as 300,000 times atmospheric pressure for short periods. Fickett and Davis (1979) explain that a good solid explosive converts energy at a rate of 10^{10} watts per square centimeter at its detonation front.

1.3. ROUTES OF TRAVEL

A system of interior roads, shown on Figure 1-1 (Permit Part 1), is maintained at KAFB. About 78 total miles of roadway exist, of which about 33 miles are paved.

Traffic access to and egress from the OD Unit is along the roads shown on Figure 1-1 (Permit Part 1). The roads along which wastes are transported to the EOD Range within KAFB include Southgate Avenue, Hardin Boulevard, Pennsylvania Street, Wyoming Boulevard, Lovelace Road, and Demolition Range Road.

1.4. SECURITY

1.4.1. Introduction

The following paragraphs describe the site-wide and OD Unit-specific security provisions at the KAFB Facility that shall be implemented to prevent unknowing or unauthorized entry of persons or livestock onto the OD Unit. Additional requirements are found in Permit Section 2.1.

1.4.2. Barriers and Means to Control Entry

The OD Unit, situated within the EOD Range is located within KAFB, which has 24-hour security surveillance and controls entry at all times to the Facility through entrance gates. Access to the KAFB Facility is provided through five controlled entrance gates. Access control procedures are designed to ensure that only properly identified and authorized persons, vehicles, and property are allowed entrance to and exit from KAFB. Surveillance is provided by KAFB Security Police, who continuously monitor and control entry inside the KAFB perimeter. The major duties of the KAFB security personnel are to control vehicle, personnel, and material access/egress. KAFB is enclosed by a 7.5-foot chain-link fence and by barbed wire fence. During non-working hours, security personnel routinely patrol the KAFB perimeter fence.

A fence is also located along the perimeter of the EOD Range. A gate is located at the entrance road to the EOD Range and OD Unit. The locations of the security fence and the access gate for the EOD Range and OD Unit are shown on Figure 2-1, in Permit Part 2.

Only personnel with appropriate clearance and escorted visitors are allowed access to the EOD Range. Vehicles and personnel entering the EOD Range are subject to search by security personnel. The EOD Range and OD Unit are surrounded by a three-strand barbed-wire fence, which limits any traffic through or other access to these areas.

REFERENCES

U.S. Environmental Protection Agency (EPA), 1986. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods; 3rd edition, update 3, SW-846, Office of Solid waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

W. Fickett and W. Davis, 1979. Detonation: University of California Press, Berkeley, CA.

PERMIT ATTACHMENT B: LIST OF AUTHORIZED HAZARDOUS WASTES

1.0 INTRODUCTION

Table B-1 lists the hazardous wastes that the Permittee is authorized to treat at the Open Detonation (OD) Unit. Wastes carrying Environmental Protection Agency (EPA) Hazardous Waste Numbers D002, D005, D007 through D009, D018, D030, D034, and D040 shall not be treated at the OD Unit unless, at the point of generation, the wastes are also reactive and/or ignitable. Wastes that are not reactive and/or ignitable shall not be mixed with reactive or ignitable wastes for the purpose of generating a hazardous waste that is authorized for treatment at the OD Unit. Hazardous wastes that are not authorized by this Permit for treatment shall not be accepted by the Facility for treatment and shall be returned to the generator. The Permittee shall also comply with Permit Section 2.7.

TABLE B-1 List of Hazardous Wastes Authorized to be Treated at the OD Unit	
Common and/or Chemical Name – Symbol	**EPA Hazardous Waste Number(s)**
ALSC, HNS	D001, D003
ALSC (RDX)	D001, D003
Amatol (AN, TNT)	D001, D003
Ammonium Nitrate (AN)	D003
Ammonium Perchlorate (AP)	D003
Ammonium Picrate	D001, D003
ANFO	D001, D003
APEX 1220	D001, D003
APEX 1320	D001, D003
ARTEC (HMX-water)	D001, D003
ATX-M	D001, D003
ATX 25RM Slurry	D001, D003
AWH Shape Charge	D001, D003
Baratol (HE)	D001, D003, D005
Barium Nitrate	D001, D003, D005
Barium Peroxide	D001, D003, D005
Barium Potassium Nitrate	D001, D003, D005
Barium Soluble Compounds	D001, D003, D005
BCTK Explosives	D001, D003
Benzene	D001, D018
BKN03 Propellant	D001, D003
Black Powder (Low Explosive)	D001, D003
Blasting Agent	D001, D003
Chromium	D007
CLSC (Copper Linear Shaped Charge)	D001, D003
Composition A (HE)	D001, D003
Composition B (HE)	D001, D003
Composition B/Baratol Mixture (HE)	D001, D003, D005
Composition C4 Class 3 (HE)	D001, D003
Cordite (Double-base gum)	D001, D003
CP (2-[5-cyanotetrazolato] pentamine cobalt (III) perchlorate)	D001, D003
Cyclonite (HE, RDX)	D001, D003
Cyclotol (RDX, TNT)	D001, D003
C-1 Detasheet	D001, D003
C-3	D001, D003
C-4	D001, D003
C-6 Discs	D001, D003
DACP Powder	D001, D003
TABLE B-1	

(continued)	
Common and/or Chemical Name - Symbol	**EPA Hazardous Waste Number(s)**
Detaflex	D003
Detasheet A	D001, D003
Detasheet A4	D001, D003
Detasheet A5	D001, D003
Detasheet C	D001, D003
Detasheet C1	D001, D003
Detasheet C2	D001, D003
Detasheet C3	D001, D003
Detasheet C4	D001, D003
Detasheet C5	D001, D003
Detasheet C6	D001, D003
Detasheet D	D001, D003
Detasheet L	D001, D003
DetCord (PETN)	D001, D003
Detonators	D001, D003, D008
Detonators EBW	D001, D003
Detonators HBW, Ensign Bickford	D001, D003
Dinitrotoluene (DNT)	D001, D003, D030
Dipicrylamide	D001, D003
DBX	D003
Diazodinitrophenol (DDNP)	D003
Double Base Smokeless Powder	D001, D003
DNP	D001, D003
DNPT	D003
Dynamite	D003
Ednatol	D003
EL-506A (HE, PETN)	D001, D003
EL-506D (HE, PETN)	D001, D003
Extex 3003	D001, D003
Extex 8003	D001, D003
Explosive D	D001, D003
Explosive Piston Motors	D003
Flex Linear Shaped Charge	D001, D003, D008
Gas Pressure Generator	D001, D003
Heat Powder	D001, D003
Hexachlorethane (HC Smoke)	D034
Hexanitroazobenzene	D001, D003
HMX (octogen) High Melting Explosive	D001, D003
HNAB	D001, D003
Hexanitrostilbene (HNS)	D001, D003
TABLE B-1	

(continued)	
Common and/or Chemical Name - Symbol	**EPA Hazardous Waste Number(s)**
HNS I	D001, D003
HNS II	D001, D003
HNS Titanium Powder	D001, D003
Holex 2506	D001, D003
Improved Military Rifle (IMR) propellant 4350	D001
IMR 4064	D001
Iremite 60	D001, D003
Iremite 80	D001, D003
Iragel	D001, D003
Ireco Booster 2-C, 3-C, 4-C	D001, D003
Iron Perchlorate	D003
Iron Potassium Perchlorate	D003
JPN Propellant	D001, D003
Kinestik Part A, B	D001, D003
Lead Azide (HE)	D001, D003, D008
Lead Case Flexible Linear Shaped Charge	D001, D003, D008
Lead Mononitraresorcinate (LMNR)	D001, D003, D008
Lead Sulfocyanate	D001, D003, D008
Lead Styphnate (HE)	D001, D003, D008
LX-04	D001, D003
LX-10	D001, D003
LX-13	D001, D003
LX-14	D001, D003
LX-15	D001, D003
LX-16	D001, D003
LX-17	D001, D003
M-6 Propellant	D001, D003
M-77 Water Gel Explosives	D001, D003, D005
MDF (RDX, HNS)	D001, D003
Mercury Fulminate (HE)	D001, D003, D009
Minol	D001, D003
N-5 Sheet Propellant	D001, D003
Nitrocellulose	D001, D003
Nitroglycerin	D001, D003
Nitroguanidine	D001, D003
Nitromethane	D001, D003
NQ	D001, D003
Octol LGE Cast	D001, D003
PBX 9010	D001, D003
PBX 9205	D001, D003
TABLE B-1	

(continued)	
Common and/or Chemical Name - Symbol	**EPA Hazardous Waste Number(s)**
PBX 9404	D001, D003
PBX 9407	D001, D003
PBX 9504	D001, D003
PBXN-5	D001, D003
PBXN-6	D001, D003
PBXN-301	D001, D003
Pentaerythritol Tetranitrate (PETN) (HE)	D001, D003
PETN/Titanium Mix	D001, D003
PETN Zirconium	D001, D003
PETRIN	D001, D003
Pentolite (PETN/TNT) (HE)	D001, D003
Photo Flash Powder (simulators)	D001, D003
Picric Acid	D001, D002, D003
Picritol	D001, D003
Plain Wave Generator (PBX 9404)	D001, D003
Plasticized White Phosphorous	D001
Plasticizer	D001, D003
Polysulfide Prepolymer	D001, D003
Potassium Chlorate	D003
Potassium Nitrate	D003
Potassium Perchlorate (initiator)	D001, D003
Primacord (PETN)	D001, D003
Propellant HPC-95, HPC-60	D001, D003
Propellant M-30, M1, M6	D001, D003
Propellant MC-1951	D001, D003
Propellant (TPH1207C)	D001, D003
RDX	D001, D003
RDX #5	D001, D003
Red Phosphorous	D001
RL-5-X Detcord	D001, D003
Rocket Motor Double Base Propellant	D001, D003
RP-2	D001
RP-87	D001
Separation Explosives (RDX)	D001, D003
Semtex	D001, D003
Smokeless Powder	D003
Sodium Azide	D001, D003
Sodium Nitrate	D003
Strontium Nitrate	D003
Strontium Peroxide	D003
TABLE B-1	

(continued)	
Common and/or Chemical Name - Symbol	**EPA Hazardous Waste Number(s)**
Tetryl (HE)	D001, D003
Tetrytol	D001, D003
TH-1	D001, D003
TH-3	D001, D003
Thermite Powder	D003
TH/KP	D001, D003
Titanium Tetrachloride	D003
TPH 3442 (propellant)	D003
Titanium Boron Powder	D001
Titanium Hydride	D001
Titanium Subhydride	D001
TLX	D001, D003
Trinitrotoluene (TNT)	D001, D003
Tritonal	D001, D003
TATB Pellets, Pad	D001, D003
Toluene (nitrated forms)	D001, D003
Torpex	D003
Tovex	D003
TPH 3386 (propellant)	D003
Triaminotrinitrobenzene (TATB)	D001, D003, D018
Trichloroethylene	D040
WAK 2, TP-H12	D001, D003
XTX 8003	D001, D003
Aluminum	D001, D003
Iron	D001
Lead	D008
Lead Alloy	D008

DEFINITIONS

ALSC aluminum linear shaped charge
AN ammonium nitrate
Anfo ammonium nitrate-fuel oil
AP ammonium perchlorate
CLSC copper linear shaped charge
DDNP Diazodinitrophenol
DNT Dinitrotoluene
HC hexachlorathane
HE high explosive
HMX cyclotetramethylene-tetranitramine; octohydro-1,3,5,7-tetranitro 1,3,5,7-tetrazocine
HNS hexanitrostilbene
IMR improved military rifle
LMNR lead mononitraresorcinate
PBX plastic-bonded explosive; RDX and plasticizer
PETN nitropentaerythrite; pentaerythrite tetranitrate; pentaerythritol
RDX cyclotrimethylenetrinitramine
TATB triaminotrinitrobenzene
TNT trinitrotoluene

PERMIT ATTACHMENT C: WASTE ANALYSIS PLAN

1.0 INTRODUCTION

This Waste Analysis Plan (WAP) describes the procedures that shall be used at the Facility to characterize waste to be treated at the Open Detonation (OD) Unit.

1.1. HAZARDOUS WASTES TREATED AT THE OD UNIT

Hazardous wastes treated at the OD Unit are classified as a non-wastewater waste under the Land Disposal Restrictions (LDR) regulations at 40 C.F.R. Part 268. Knowledge of the chemical and physical properties of hazardous wastes to be treated at the OD Unit is essential for proper waste management. The hazardous wastes treated at the OD Unit exhibit the characteristic of reactivity (D003). Some of these wastes also exhibit the characteristics of ignitability (D001). These wastes may also potentially contain the following toxicity characteristic metals and organic compounds, identified by specific U.S. Environmental Protection Agency (EPA) Hazardous Waste Numbers: barium (D005), chromium (D007), lead (D008), mercury (D009), benzene (D018), 2,4-dinitrotoluene (D030), hexachloroethane (D034), and trichloroethylene (D040). They may also contain underlying hazardous constituents (UHCs) such as chromium, lead, nickel, vanadium, and zinc. The characteristics of hazardous wastes treated at the OD Unit shall be identified using Acceptable Knowledge (AK) or sampling and analysis, as appropriate, and shall be documented in writing. Incompatible wastes shall not be accepted for treatment at the OD Unit. It may be necessary to saturate the wastes with a safing fluid (e.g., water, acetone, alcohol, hydraulic fluid) before treatment.

Categories of hazardous waste that may be accepted for treatment include, for example, explosives, propellants, and pyrotechnics in the form of pure substances and explosives-contaminated wastes. Waste that may be treated at the OD Unit shall include only the waste types authorized in Permit Attachment B. Corrosive (D002) wastes (e.g., picric acid) that are also reactive may be treated at the OD Unit. The hazardous wastes to be treated at the OD Unit are mostly in solid form, however, on occasion, wastes in liquid form (e.g., picric acid) may be treated.

Barium (D005), chromium (D007), lead (D008), and mercury (D009) are toxicity characteristic metals that may be in the wastes or in the casings surrounding the wastes to be treated. The toxicity characteristic organic compounds benzene (D018), 2,4-dinitrotoluene (D030), hexachloroethane (D034), and trichloroethylene (D040) may also be present.

1.2. WASTE ANALYSIS PARAMETERS

Explosive Ordnance Disposal (EOD) personnel shall review characterization information to ensure that hazardous wastes are properly characterized for their physical and chemical properties and can be managed safely and in accordance with the requirements of this Permit. AK shall only be used in lieu of sampling and analysis when the composition and physical characteristics of the waste are exactly known and well controlled.

Waste characterization information must include all necessary information on the presence of toxicity characteristic metals and organic compounds, as defined in 40 C.F.R. Part 261, Subpart C, and data on the presence of any UHCs listed in 40 C.F.R. § 268.48 in accordance with 40 C.F.R. § 268.9(a).

1.3. WASTE CHARACTERIZATION PROCEDURES

The approach to characterization shall be based on the chemical and physical nature of the waste. Characterization procedures used at the Facility require all generators to provide AK, related technical information, and/or sampling and analysis results (including information on UHCs) as appropriate. Accurate characterization is necessary for appropriate waste classification and assignment of EPA Hazardous Waste Numbers, in the preparation of LDR documentation, and ensuring proper management of waste.

1.3.1. Characterization Strategy

The characterization strategy for hazardous wastes to be treated at the OD Unit is described below.

1.3.1.1. Wastes to be Treated

Prior to accepting waste for treatment at the OD Unit, a detailed chemical and physical description of the waste shall be provided by the generator.

Ensuring that detailed and accurate waste characterization exists shall include the steps outlined below in Permit Sections 1.3.1.2 through 1.3.1.4. Hazardous waste destined for treatment shall be packaged in containers; both the waste and the containers shall be inspected before acceptance for treatment and again before loading the waste into the treatment unit.

1.3.1.2. Verification

All waste shipments to the OD Unit shall be verified in two phases prior to treatment to ensure that the waste is authorized for treatment in accordance with Permit Attachment B. Phase 1 will be conducted to ensure shipping documentation completeness, and Phase 2 is to ensure that the waste delivered corresponds to the documentation provided for that waste. Waste shall not be accepted for treatment until all verification is complete.

1.3.1.3. Phase 1 Verification

Screening is performed by the appointed EOD Team Chief. Documentation may include, but is not limited to, a completed Ammunition Disposition Request (ADR), a hazardous waste manifest, a material safety data sheet, a description of the process generating the waste, and sampling and analysis data.

Upon receipt of a waste shipment at the OD Unit, a determination of shipping documentation (hazardous waste manifest) completeness shall be made by EOD personnel. Each shipping document that accompanies an off-site waste shipment shall be checked to ensure that the following information is present and complete:

- The shipment identification number.

- The proper U.S. Department of Transportation basic description.
- The quantity (weight) of waste in the shipment.
- The number and type of containers in the shipment.
- A signed and dated certification of the shipment's content.
- The shipment labels and placards which match the shipping document.

If documentation is incomplete or inadequate, EOD personnel shall contact the generator for clarification and require that the generator correct the situation. Only waste that meets the requirements of this Permit shall be transported to the OD Unit for treatment.

Containers will be visually examined for defects such as dents, cracks, and corrosion. Conditionally exempt small quantity generators do not need a hazardous waste manifest. If there are discrepancies, they shall be resolved by contacting the generator before EOD personnel sign the shipping document. If the discrepancies cannot be resolved, EOD personnel shall reject the shipment. Rejected waste shall be returned to the generator.

1.3.1.4. Phase 2 Verification

The EOD Team Chief, with assistance from other EOD personnel, shall compare the contents of waste shipments received with the description on the documentation provided by the generator to ensure that they match. The visual inspection shall include content identification and quantity estimation. If any waste fails verification, it shall be returned to the generator to resolve the discrepancy.

1.3.2. Sampling and Analysis of Waste

Sampling and analysis of waste for purposes of characterization shall be conducted in accordance with the procedures outlined in Sections 1.3.2.1 through 1.3.2.4 of this Permit Attachment (C) and Permit Section 2.6.3.

1.3.2.1. Sampling Equipment

Each sample of waste requiring sampling and analysis shall be collected using appropriate sampling equipment, as recommended in SW-846 (EPA, 1986) or other Department-approved sampling guidance.

1.3.2.2. Equipment Decontamination

Disposable, clean equipment shall be used to eliminate the potential for cross contamination during sampling. Therefore, maintaining and decontaminating sampling equipment will not be necessary.

1.3.2.3. Sample Preservation and Storage

Waste samples shall be collected in clean containers and preserved, as appropriate, to ensure that their integrity remains intact prior to, during, and after transport to the analytical laboratory. Container types, preservation techniques, and holding times for expected analytes of interest are presented in Table C-1.

1.3.2.4. Quality Assurance/Quality Control

The Permittee shall implement a quality assurance (QA) process designed to obtain high quality data. Quality control (QC) procedures shall be employed to measure the degree to which this QA objective is fulfilled. At a minimum, the QA process shall meet the requirements of Permit Sections 6.5.17.6, 6.5.18.1, and 6.5.18.3.

QC samples shall be collected as part of sampling activities. Duplicates shall be collected and analyzed for all constituents of concern. A chain-of-custody form shall be completed and shall include the type of sample collected; the names and signatures of the sampler(s); sample identification numbers, date, and time of collection; the designation as a grab or composite sample; the names, dates, times, and signatures of any persons involved in transferring samples; and the shipping number. Personnel shall be properly trained in the use of sampling equipment, sample containers, and sampling methods to ensure that sampling activities are conducted appropriately.

1.4. ANALYTICAL LABORATORY AND TESTING/ANALYTICAL METHODS SELECTION

An EPA-certified analytical laboratory shall be selected to perform laboratory analysis of waste. The laboratory shall be required to have a comprehensive QA/QC program, technical analytical expertise, and an effective information management system.

The selection of analytical testing methods for waste is based on the following.

- The physical state of the waste.
- The analytes of interest.
- The required detection limits (i.e., regulatory thresholds).
- Information requirements (e.g., to ensure compliance with LDR treatment standards).

1.5. WASTE RE-EVALUATION FREQUENCIES

A re-evaluation of waste characterization data shall be conducted as necessary but at least annually to ensure that data are accurate, in accordance with 40 C.F.R. § 264.13(a)(3). Updates of waste characterization information are required when:

- A change occurs in the process or operation generating the hazardous waste, and
- Hazardous waste received from an off-site facility does not match the waste specified on the accompanying manifest or shipping papers.

Waste characterization data for the wastes treated at the OD Unit shall be re-evaluated at least annually. This information shall be used to determine if waste characterization data are accurate and to determine the appropriateness of current waste management practices and characterization methods, and shall be documented in the Operating Record.

REFERENCE

U.S. Environmental Protection Agency (EPA), 1986. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods; 3rd edition, update 3, SW-846, Office of Solid waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

TABLE C-1
Sample Containers, Preservation Methods, and Holding Times for Analysis of Waste[a]

Sample Type	Container Type[b]	Preservation Method	Holding Time
Volatile Organics	4 oz glass jar with Teflon cap	Cool to 4 ºC	14 days
Semivolatile Organics	4 oz glass jar with Teflon cap	Cool to 4ºC	14 days
Metals			
(except hexavalent chromium and mercury)	4 oz glass jar with Teflon cap	Cool to 4ºC	180 days
(Hexavalent chromium)	4 oz glass jar with Teflon cap		28 days
(Mercury)	4 oz glass jar with Teflon cap		28 days

a. Containers, methods and holding times from most current version of SW-846 (EPA, 1986)
b. Other container types may be used depending upon the laboratory or the method, with prior NMED approval.

DEFINITIONS
NMED New Mexico Environment Department
oz ounces
ºC degrees Celsius

PERMIT ATTACHMENT D: ANNUAL SOIL SAMPLING AND ANALYSIS PLAN

1.0 INTRODUCTION

The purpose of this sampling and analysis plan is to ensure that accurate data are collected to determine whether a release of hazardous waste or hazardous constituents has occurred during the operating period of the Open Detonation (OD) Unit that may pose a threat to human health. Any corrective action that may be required for the OD Unit shall be conducted in accordance with Part 6 of this Permit.

The OD Unit is located at the Kirtland Air Force Base (KAFB) Explosive Ordnance Disposal (EOD) Range and is permitted as a Resource Conservation and Recovery Act (RCRA) Subpart X miscellaneous unit. The OD Unit is used to treat hazardous waste to remove the hazardous characteristics of reactivity and ignitability. The Permittee shall perform soil monitoring at the OD Unit during operations to assess whether or not contaminants are being released to soil at levels that could endanger human health. This soil sampling and analysis shall be performed on an annual basis in accordance with the procedures described in this Annual Soil Sampling and Analysis Plan (SSAP).

1.1. SAMPLING PROCEDURES

This Section (1.1) describes procedures and methods for sampling soil at the OD Unit. Other applicable procedures or methods provided in the most current version of *SW-846* (EPA, 1986) may be used if conditions or experience show the alternate method(s) to be more appropriate and if approved by the Department. All sampling procedures used will be documented in a field logbook. Sampling shall be performed in accordance with procedures given in *Samplers and Sampling Procedures for Hazardous Waste Streams* (EPA, 1980), or SW-846, and in accordance with this SSAP.

1.1.1. Sampling Schedule and Frequency

Soil samples shall be collected annually at the OD Unit during the month of June. Sampling shall be conducted at the OD Unit before any backfilling, excavation, or grading is performed at the site since the last treatment event. If no treatment events have occurred during a particular annual period, annual sampling will not be conducted for that annual period. The Department shall be notified if this circumstance occurs.

1.1.2. Sampling Strategy and Analytical Parameters

For the OD Unit, four soil samples shall be collected from the zero- to six-inch depth and analyzed for total metals, explosives and other constituents listed in Table D-1. The sampling location strategy depends on the physical characteristics of the OD Unit. If only one crater (pit) is present during the sampling event, then four soil samples shall be taken from the walls of the crater at each of the four primary compass directions (Figure D-1). If more than one crater is present, a grid (with a minimum of 100 possible locations) that encompasses all of the craters shall be established, and four random sample locations within the grid will be selected for the sampling event (Figure D-2). The grid will be square in shape and its overall maximum size shall be established using the maximum distance between the walls of the craters that are present

at the site. If no craters are present, then a 150-foot by 150-foot grid shall be established at the center of the cleared area which composes the OD Unit, and four soil sample locations shall be randomly selected from within the grid.

Each sample location shall be located by reference to a surveyed grid datum, prominent site features, or from some documented reference point that can be located in the field. Sample locations shall be recorded in the field logbook, and shall be shown on a figure depicting the OD Unit in the annual reports (see Section 1.7 of this Permit Attachment).

1.1.3. Sample Collection

Qualified personnel shall collect soil samples. Sample collection procedures, types of containers and storage procedures specific to each SW-846 method shall be strictly adhered to. Prior to collecting a soil sample, sampling personnel shall scrape aside loose materials (e.g., rocks, litter) from the sampling location. Personnel shall collect soil samples using metal or plastic scoops, wooden or disposable plastic hand trowels, or similar equipment. Non-sparking equipment shall be used whenever required by EOD personnel for worker safety. Excess soil generated at each soil sampling location may be used as backfill. Samples shall be representative of the site. Cross-contamination of samples shall be prevented. Sample collection activities shall also conform to these requirements:

1. Personnel shall schedule sampling activities with EOD Range Control;
2. Personnel shall obtain clearance from an EOD Technician/Specialist for the selected location of each sample;
3. Personnel shall wear clean gloves before collecting each individual sample;
4. Personnel shall use clean sampling equipment to collect soil samples. (Note: A disposable sampler may be presumed clean if it is still in a factory-sealed wrapper. Reusable samplers will be scraped to remove any loose material, washed with a detergent and water solution, rinsed several times with tap water, rinsed with deionized water, drained of excess water, and air-dried or wiped dry.);
5. Personnel shall clear each sample for shipment to the analytical laboratory by an EOD Technician/Specialist; and
6. Personnel shall check out with EOD Range Control when sampling has been completed.

Samples collected for analysis of white phosphorous must the follow the special sample collection procedures in SW-846, Method 7580.

1.1.3.1. Sample Containers and Preservatives

Samples shall be placed in appropriate containers, compatible with the intended analysis. All containers shall be new and certified clean to ensure the integrity of samples collected. Samples shall be properly prepared and preserved as necessary to maintain sample integrity. Table D-1 lists the proper container, preservative, and holding time for each chemical parameter of interest.

1.1.3.2. Sample Identification

Sample identification numbers shall be assigned by alpha/numeric characters corresponding to the last two digits of the calendar year (YY), two digits of the month (MM), two digits of the day

of the month (DD), a code indicating soil sample (SS), and a unique number (##) designating the sample location. Thus, a complete format of a sample identification number is: YYMMDDSS##. For example, soil sample number two collected on 3rd of June 2007 would be labeled: 070603SS02.

1.1.3.3. Sample Handling, Documentation, and Custody Procedures

Chain-of-custody procedures shall be followed in accordance with Permit Section 6.5.5.3. Labels shall be affixed to sample containers in accordance with Permit Section 6.5.5.4.

The chain-of-custody form shall be signed upon receipt at the laboratory, and the original or a copy returned to the KAFB Environmental Management (EM) Branch Office for inclusion in the Operating Record. The Chain-of-custody form shall include or be accompanied by a request-for-analysis form that lists all analyses to be performed for the samples and all special instructions related to sample management or analysis. Any potential hazards posed by the samples shall be listed on the request-for-analysis form.

The sample container shall be sealed with a gummed paper seal or tag attached to the container in such a way that the seal must be broken in order to open the container.

A field logbook shall be kept and shall contain information pertinent to field surveys and sampling. Entries in the logbook shall be conducted in accordance with Permit Section 6.5.2.

The analytical laboratory shall be required to have procedures for minimizing cross contamination of samples and securing sample custody within the laboratory.

Samples relinquished to the laboratory shall be subject to the following procedures for transfer of custody and shipment.

1. When transferring the possession of samples, the individuals relinquishing and receiving them shall sign, date, and note the time on the Chain-of-custody form.
2. Shipping containers such as coolers shall be custody-sealed for shipment to the laboratory.

Laboratory personnel shall verify that samples are correctly labeled, that documentation is correct, and shall inspect the physical condition of the containers. Any discrepancies are to be resolved between laboratory and sampling personnel at this time. The laboratory portion of the form shall be completed by the laboratory personnel and shall include at a minimum:

1. The name of the person receiving the sample,
2. Laboratory accession (identification) number,
3. The date and time of sample receipt, and
4. Sample condition

1.1.3.4. Sample Shipping

Sample shipment shall be conducted in accordance with Permit Section 6.5.5.2.

1.2. INVESTIGATION-DERIVED WASTE

Investigation–derived waste shall be managed in accordance with Permit Section 6.5.7.

1.3. QUALITY ASSURANCE/QUALITY CONTROL PROGRAM

Because important decisions will be based on the data collected as part of this SSAP, a program to ensure that data are of high quality is essential. The Permittee shall follow a quality assurance/quality control (QA/QC) program that mandates documentation of the precision and accuracy of laboratory analyses as well as other aspects of quality assurance.

1.3.1. Quality Control Targets

For metals, quality control targets for accuracy and precision shall be 75-125% recovered and ±35% relative percent difference (RPD), respectively. The laboratory reporting limits for metals shall be at or below the respective background level for each metal subject to analysis.
For high explosives (HE), quality control targets for accuracy and precision shall be 20-120% recovered and ±50% RPD, respectively. The laboratory reporting limits for HE compounds shall be at or below the appropriate human risk industrial screening level for each HE compound (NMED, 2009).

1.3.2. Field Quality Control

Field quality control shall be conducted in accordance with Permit Section 6.5.14 and Table D-2 of this Permit Attachment.

1.4. LABORATORY ANALYSIS

Laboratory analysis shall be conducted in accordance with Permit Section 6.5.18.

1.5. DATA VALIDATION

Data validation shall be conducted in accordance with Permit Section 6.5.18.3.

1.6. HUMAN RISK SCREENING

If a sample result for a metal exceeds the applicable background level listed in Table D-4, the result shall be compared to the most current EPA Regional Screening Levels (RSLs) and Department soil screening levels (SSLs-NMED, 2009) for an industrial land use scenario. The industrial land use scenario shall only apply to risk screening under this SSAP, and not for purposes of closure or corrective action. Analytical results for explosives and SVOCs shall be compared to the SSLs. EPA RSLs and Department SSLs for industrial scenarios are presented in Table D-4 for the metals, SVOCs, and HE compounds that are to be evaluated.

Sample results for arsenic shall be compared with the approved background level because the natural background concentration of arsenic in this area exceeds the EPA human health medium-specific screening level. Additionally, the screening level for thallium shall be set equal to the Department soil screening level for this constituent.

If a Department SSL or EPA RSL does not exist for a substance, the Permittee shall calculate a screening level based on an industrial scenario and a cancer risk of 10^{-5} for carcinogens, and a hazard quotient (HQ) of 1.0 for noncarcinogens. This calculated screening level shall be subject to Department approval and shall be revised if determined by the Department not to be protective of human health.

Any exceedance of an EPA RSL, Department SSL, or calculated screening level shall be

reported to the Department in writing within 15 calendar days. The Department will review the information and, at its discretion, may require additional site characterization to protect the health and safety of site workers. If the Department requires additional site characterization, the Permittee shall prepare a sampling and analysis plan (SAP) for Department approval. The SAP shall be prepared and submitted to the Department within 60 calendar days of the request. Upon Department approval of the SAP, the Permittee shall implement the plan within 30 days. Upon completion of the field investigation, the Permittee shall report the results of the additional site characterization effort in writing to the Department within 90 calendar days. The Department will then determine if additional sampling is required, if the site must be remediated immediately to protect workers, or if no corrective action is required.

1.7. REPORTING

The Permittee shall submit two copies of each annual report to the Department within 90 days of completion of each sampling event. Each annual report shall include:

1. A summary cover letter.
2. Copies of all laboratory reports associated with the sampling event, including the analytical results for each sample.
3. A summary of any constituents detected at concentrations exceeding human risk levels including any exceeding a screening level calculated by the Permittee when a Department SSL or EPA RSL is unavailable. The method and data used by the Permittee to calculate a screening level must also be reported.
4. A summary of field and laboratory QC sample results.
5. A summary of whether the data meet the data quality objectives listed in this Permit Attachment. And,
6. A scaled, oriented map showing the location of the OD Unit sampling grid (if any), craters (if any), and all sample locations.

REFERENCES

New Mexico Environment Department (NMED), 2009. Technical Background Document for Development of Soil Screening Levels, Rev, V, New Mexico Environment Department, Santa Fe, New Mexico, December 2009.

U.S. Environmental Protection Agency (EPA), 1980. Samplers and Sampling Procedures for Hazardous Waste Streams; Municipal and Environmental Research Laboratory, U.S. Environmental Protection Agency, Cincinnati, Ohio, EPA-600/2-80-018, January 1980.

U.S. Environmental Protection Agency (EPA), 1986. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods; 3rd edition, update 3, SW-846, Office of Solid waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 2002. RCRA Waste Sampling Draft Technical Guidance; Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C., EPA530-D-002, August 2002.

Table D-1
Analytical Parameters and Methods, Container Types, Preservation Methods, and Holding Times for Soil Samples[a]

Parameter	Analytical Method[b]	Container Type and Preservation Method[c]	Holding Time
Total Metals: Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium (total), Cobalt, Copper, Lead, Mercury, Nickel, Selenium, Silver, Thallium, Tin, Vanadium, Zinc	6010C or 7000 Series	4 oz plastic or glass jar, stored at <4ºC	180 days; 28 days for Mercury and Chromium
High Explosives (HEs): 1,3,5-Trinitrobenzene; 1,3-Dinitrobenzene; TNT (2,4,6-trinitrotoluene); 2,4-Dinitrotoluene; 2,6-Dinitrotoluene; 2-Amino-4,6-Dinitrotoluene; 4-Amino-2,6-Dinitrotoluene; HMX (octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine); 2-Nitrotoluene; Nitrobenzene; 3-Nitrotoluene; 4-Nitrotoluene; Tetryl; RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine), 3,5-Dinitroaniline, PETN (pentaerythritol nitrate), nitroglycerine	8330B	4 oz glass jar, stored at <4ºC	14 days
White Phosphorous	7580	4 oz glass jar with PTFE lid, fill to top to minimize air in jar, stored at <4ºC	Indefinite (if preserved at <4ºC, kept in dark and tightly sealed)
Dioxins and Furans	8280B or 8290A	250 mL wide mouth amber glass jar with PTFE lid, stored at <4ºC	30 days
Perchlorate	6850	4 oz glass jar, stored at <4ºC	28 days

a. Analytical methods, preservation methods, and holding times are from most current version of Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846 (EPA, 1986).
b. Another applicable or newer method may be used with prior NMED approval.
c. Other container types may be used depending upon the laboratory or the method used with prior NMED approval.

DEFINITIONS:

mL	milliliters
NMED	New Mexico Environment Department
oz	ounces
PTFE	polytetrafluoroethylene
ºC	degrees Celsius
<	less than

TABLE D-2
Field Quality Control Samples

Quality Control Sample Type	Sample Matrix	Applicable Analytes	Frequency	Purpose
Field duplicate	Soil	Metals, HE, White Phosphorus, Perchlorate, Dioxins and Furans	One sample per sampling event	Document precision of the sampling process
Equipment blank	Water	Metals, HE, White Phosphorus, Perchlorate, Dioxins and Furans	One sample per day (if using non-disposable equipment)	Document if equipment is being properly decontaminated between samples

DEFINITION
HE high explosive

TABLE D-3
Background Concentrations Of Naturally Occurring Metals in Soil at Kirtland Air Force Base

Metal	Surface Soil (mg/kg)
Antimony	3.9
Arsenic	5.6
Barium	130
Beryllium	0.65
Cadmium	<1
Chromium (total)	17.3
Cobalt	5.2
Copper	15.4
Lead	21.4
Mercury	<0.25
Nickel	11.5
Selenium	<1
Silver	<1
Thallium	<1.1
Tin	<10
Vanadium	20.4
Zinc	62

DEFINITIONS
mg/kg milligrams per kilogram
< less than

TABLE D-4
List of Analytical Parameters and Industrial Soil Screening Levels

Analytical Parameters	EPA Regional RSL[a] (mg/kg)	NMED SSL[b] (mg/kg)
Metals		
Antimony	410	454
Arsenic	1.6	17.7
Barium	190,000	224,000
Beryllium	2,000	2,260
Cadmium	810	1,120
Chromium (Total)	1,400	Not established
Cobalt	300	20,500
Copper	41,000	45,400
Lead	800	800
Mercury (methyl)	100	114
Nickel	20,000	22,700
Selenium	5,100	5,680
Silver	5,100	5,680
Thallium	66	74.9
Tin	610,000	Not established
Vanadium	5,200	5,680
Zinc	310,000	341,000
High Explosives (HE)		
1,3,5-Trinitrobenzene	27,000	Not established
1,3-Dinitrobenzene	62	Not established
TNT (2,4,6-Trinitrotoluene)	79	469
2,4-Dinitrotoluene	1,200	103
2,6-Dinitrotoluene	620	687
2-Amino-4,6-Dinitrotoluene	2,000	Not established
4-Amino-2,6-Dinitrotoluene	1,900	Not established
HMX (Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine)	49,000	34,200
RDX (Hexahydro-1,3,5-trinitro-1,3,5-triazine)	24	174
m-Nitrotoluene	12,000	22,700
Nitrobenzene	280	277
o-Nitrotoluene	13	145
p-Nitrotoluene	110	1,200
Tetryl	2,500	2,740
3,5-Dinitroaniline	Not established	Not established
PETN (pentaerythritol tetranitrate)	Not established	Not established
Nitroglycerine	62	68.4
Other Analytes		
White phosphorous	20	Not established
Perchlorate	720	795
Dioxins and Furans (in TEQ TCDD)	0.000018	0.000204

a. Values from "Regional Screening Levels for Chemical Contaminants at Superfund Sites" (EPA, 2009).

http://www.epa.gov/reg3hwmd/risk/human/rb-concentration-table/index.htm
b. Values from "Technical Background Document for Development of Soil Screening Levels", Rev. 5 (NMED, 2009).
c. The toxicity of dioxins and furans will be measured in relation to the most toxic form of dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin [TCDD]) by calculating the toxic equivalent (TEQ).

DEFINITIONS

mg/kg	milligram per kilogram
NMED	New Mexico Environment Department
RSL	Regional Screening Level
SSL	soil screening level

Figure D-1

Figure D-2

PERMIT ATTACHMENT E: INSPECTION PLAN

1.0 INTRODUCTION

This Permit Attachment addresses general inspection requirements of 40 C.F.R. § 264.15.

1.1. INSPECTION SCHEDULE

The inspection schedule is presented in Table E-1 and shall be maintained at the Explosive Ordnance Disposal (EOD) Shop, as required by 40 C.F.R. § 264.15(b)(2).

1.2. SCOPE OF INSPECTIONS

At a minimum, the items listed in Table E-1 shall be inspected at the indicated frequencies.

1.3. FREQUENCY OF INSPECTIONS

Items listed in Table E-1 shall be inspected at the frequencies indicated in the table.

TABLE E-1 Inspection Schedule for the OD Unit		
Item Number	**Inspected For**	**Frequency**
1	Are warning signs posted on the Explosive Ordnance Disposal Range boundary fence at 300-foot intervals?	Monthly
2	Is the EOD Range flag serviceable/posted?	Immediately before treatment operations
3	Are all combustibles clear of the OD Unit to 200 feet, including vegetation?	Immediately before treatment operations
4	Are firebreaks clear of combustibles, including vegetation?	Within 24 hours before treatment operations
5	Is a first-aid kit available?	Immediately before treatment operations
6	Is the OD Unit clear of explosives from previous treatment activities including the loading and unloading areas?	Immediately before treatment operations and within 24 hours after treatment operations
7	Are the EOD Range gates working properly?	Monthly
8	Is the Contingency Plan available at the EOD Range personnel bunker?	Immediately before treatment operations
9	Are all fire-protection and communication equipment operational?	Immediately before treatment operations
10	Is the OD Unit area in good condition?	Monthly and within 24 hours before treatment operations
11	Are metal fragments cleaned up?	Monthly and within 24 hours after treatment operations
12	Is the EOD Range boundary fence in good condition?	Monthly
13	Are the EOD Range roads and firebreaks in good condition?	Monthly
14	Is the personnel bunker in good condition?	Monthly
15	Is the runoff berm around the OD Unit in good condition?	Monthly
16	Is there standing water in a pit or crater at the OD Unit?	Immediately before treatment operations and within 24 hours of a precipitation event
17	Is there kick out or treatment residues following OD operations?	Within 24 hours after treatment operations

PERMIT ATTACHMENT F: CONTINGENCY PLAN

1.0 INTRODUCTION

This Contingency Plan has been prepared for the Open Detonation (OD) Unit located at the Explosive Ordnance Disposal (EOD) Range at the Kirtland Air Force Base (KAFB) Facility in compliance with 40 C.F.R. Part 264, Subpart D, as applicable. This plan consists of emergency response procedures and activities specific to the OD Unit.

1.1. PURPOSE AND IMPLEMENTATION

The purpose of this Contingency Plan is to define the responsibilities and provide for coordination of activities to minimize hazards to human health or the environment from fires, explosions, or any sudden or non-sudden release of hazardous waste or hazardous constituents. In accordance with 40 C.F.R. § 264.51(b), the provisions of this plan shall be carried out immediately whenever there is a fire, explosion, or a release of hazardous waste or hazardous constituents that could threaten human health or the environment.

In the case of major incidents or emergencies that cannot be controlled with EOD Range resources, the Emergency Coordinator (EC) shall notify the KAFB Fire Department and the KAFB Command Post (KCP). The KCP shall assume primary responsibility for response coordination in the case of such major incidents or emergencies or delegate that responsibility to the KAFB Fire Chief. Once the KCP or KAFB Fire Chief completes its response, the EC shall assume responsibility to ensure compliance with all the provisions of this Contingency Plan, including post-emergency inspections and reporting.

1.2. DISTRIBUTION

To assure proper implementation, this Contingency Plan shall be studied and understood by all personnel involved in the management of hazardous waste at the OD Unit and by all personnel required to respond to emergency situations at the OD Unit.

A copy of this Contingency Plan and any subsequent revisions to the plan shall be maintained at the Environmental Management (EM) Branch Office and a current copy shall be maintained at the KCP, and at the personnel bunker at the EOD Range. Copies and subsequent revisions shall be distributed to the KAFB Fire Department, the Albuquerque Fire Department, and the New Mexico Environment Department in the event that they are called upon to assist with or provide emergency services.

1.3. CHARACTERISTICS OF WASTES MANAGED AT THE OD UNIT

The Permittee treats reactive (D003) and ignitable (D001) hazardous wastes. These hazardous wastes include explosives, propellants, and pyrotechnics.

1.4. SUPPORT AGREEMENTS WITH OUTSIDE FACILITIES

The Permittee shall maintain support agreements in accordance with Permit Section 2.4.4.

1.5. EMERGENCY COORDINATOR

An EC (see Table F-1 of this Permit Attachment) shall be on site during treatment activities to coordinate emergency response measures. The EC shall be thoroughly familiar with this Contingency Plan, this Permit, characteristics of the hazardous wastes managed at the OD Unit, the hazardous waste management operations and activities conducted at the OD Unit, the location of hazardous wastes managed at the OD Unit when treatment operations are in progress, the location of the Operating Record at the Facility, and the EOD Range layout. The Base Civil Engineer shall also serve as the functional equivalent of an alternate EC. If the Base Civil Engineer becomes the EC (because the primary EC is not available), the Base Civil Engineer shall be present at the OD Unit for the entire duration of the treatment event.

The EC shall ensure that personnel assigned to the EOD Range are trained in the location and use of eyewash solutions, fire extinguishers, and emergency protective clothing; in emergency procedures; and in evacuation procedures before starting any treatment operations.

The EC has three primary responsibilities. They are:

1. Assess the situation. By observing the scene, interviewing personnel, and/or reviewing records, the EC shall gather information relevant to the response, such as the type of event, quantity and type of released material, and actual or potential hazards to human health or the environment.
2. Protect personnel. The EC shall take reasonable measures to ensure the safety of personnel, such as accounting for EOD Range personnel, attending to injuries, or coordinating the evacuation of EOD Range personnel, if necessary. If evacuation is indicated for personnel, the KCP shall be informed.
3. Contain or mitigate the hazards. The EC shall take reasonable measures to ensure that fires, explosions, or releases do not occur, recur, or spread.

1.6. RESPONSE PROCEDURES

When the EC is notified of an incident or emergency, he shall first determine the scale of the incident or emergency and decide if the incident or emergency is minor or major. In the case of minor incidents or emergencies, the EC shall coordinate the response. In the case of major incidents, the EC shall relinquish control to the KCP, which may in turn relinquish control to the KAFB Fire Chief when he arrives to handle the emergency; however, the EC shall remain available to provide technical guidance and information.

If necessary to protect human health, personnel shall evacuate the OD Unit during an emergency in accordance with the requirements of Section 1.6.5 of this Permit Attachment.

In the event that the EC determines an incident to be minor, a person shall be assigned to stand by at a safe distance with a two-way radio. At the first indication of an escalation in the degree of the incident, the standby person shall be instructed to notify the KCP.

The EC or EM Branch Chief of Compliance shall notify the National Response Center (1-800-424-8802 or current phone number) and the Department with the details of the incident or emergency as soon as possible after being notified of the incident or emergency.

After any incident or emergency, the EC shall ensure that the OD Unit and emergency

equipment are cleaned, waste is properly managed and disposed of, and the OD Unit is safe to resume operation. Before operations are resumed, the EC shall contact the EM Branch Chief of Compliance, who shall inform the appropriate agencies. The EC shall also ensure that the emergency recovery inspections and activities described in Section 1.8.1 of this Permit Attachment are conducted. The EC shall also be responsible for preparing post-emergency or post-incident reports, as presented below in Section 1.8.2 of this Permit Attachment.

1.6.1. Spills

The first priority in dealing with any spill is protection of personnel. If any hazardous waste is spilled during transfer to a treatment unit, transfer of the waste shall be discontinued immediately. The Range Supervisor shall notify the EC, proper personal protective equipment (PPE) shall be donned, and the spilled material and potentially contaminated media (e.g., soil) shall be contained, removed, and managed appropriately as solid or hazardous waste. Wastes not authorized for treatment at the OD Unit shall be removed and treated or disposed of at an off-site facility, as appropriate. If appropriate, the waste shall be saturated (e.g., with water) as a precautionary measure. The incident, including details of the spill and cleanup, shall be noted in the Operating Record.

1.6.2. Personnel Exposure

In the event of personnel exposure to hazardous waste, including, but not limited to, irritation of the eyes, breathing passages, or skin; difficulty in breathing; and/or nausea, light-headedness, vertigo, or blurred vision, personnel shall immediately take the following measures.

1. Notify the EC immediately.
2. The EC shall attempt to ascertain what, if any, chemical exposure occurred and what corrective measures are appropriate.
3. Transport the affected person to a medical facility for evaluation.
4. Evacuate and barricade the area to prevent unauthorized entry.

1.6.3. Explosion and/or Fire Involving Ordnance

EOD personnel shall implement operating practices designed to minimize the risk of fires and explosions that endanger human health or the environment at the OD Unit.

1.6.4. Natural Disasters

After any natural disaster in the vicinity of the OD Unit (e.g., earthquake, floods, lightning strike), the EC shall inspect the OD Unit for any signs of damage, leakage, and land movement and initiate any necessary corrective measures to rectify potential or actual problems. Inspection findings and corrective measures shall be recorded in the Operating Record.

1.6.5. Evacuation

Personnel shall evacuate the EOD Range upon voice command or by notification over two-way radio or other communication device.

1.6.5.1. Evacuation Procedure

The following procedure shall be implemented for evacuation:

1. When an evacuation is announced, stop work.
2. Assist injured personnel to evacuate, if possible.
3. Report to the designated assembly area outside the EOD Range personnel bunker for roll call to be taken by the EC or his designee.
4. Be continually cognizant of wind directions (stay upwind, if possible) and emergency equipment.
5. Do not reenter the affected area until the EC or KAFB Fire Chief authorizes reentry.

1.6.5.2. Evacuation Route

The EC shall be responsible for ensuring that all EOD personnel and site visitors are familiar with evacuation procedures and routes. A map showing the evacuation route is provided as Figure F-1. The map shall be posted at the EOD Range personnel bunker and carried by the EC on all treatment operations.

1.7. EMERGENCY EQUIPMENT

Emergency equipment shall be available for use at the OD Unit. The emergency equipment listed in Table F-2 shall be repaired, replaced, and/or upgraded with functionally equivalent components and equipment, as necessary.

1.8. EMERGENCY AND INCIDENT RECOVERY PROCEDURES

The recovery procedures that shall be followed after a minor or major incident or emergency at the OD Unit are described below.

1.8.1. Post-Emergency Inspections and Activities

The following post-emergency incident inspections and activities shall be conducted:

1. The EC will assure that the time, date, and details of any incident or emergency are noted in the Operating Record in accordance with 40 C.F.R. § 264.56(i).
2. The EC shall inspect the premises for leaks or ruptures of equipment, and shall ensure that all recovered material and waste is managed properly. The results of the inspection shall be recorded in the Operating Record. Only containers made of or lined with materials that will not react with and are otherwise compatible with the waste resulting from cleanup procedures shall be used.
3. Emergency response equipment shall be carefully inspected and the equipment decontaminated, replaced, or refurbished, if needed. Fire extinguishers shall be checked for adequate charge. PPE shall be checked for contamination. Remedial equipment shall be inspected for contamination and proper operation. The supply of eyewash solution and other expendable items used for first aid or cleanup shall be checked and replaced, as necessary.

4. Within 24 hours of an emergency or incident, fire extinguishers shall be replaced or recharged and PPE decontaminated, repaired, or replaced as necessary.
5. Within three days of an emergency or incident, other equipment and structures shall be decontaminated. Decontamination wastes shall be collected and managed appropriately. Appropriate PPE shall be worn during decontamination procedures.
6. Within 30 days of an emergency or incident, other equipment shall be repaired or replaced as necessary.

1.8.2. Post-Emergency or Incident Reports

The following post-emergency or incident reports shall be made:

1. A verbal report of any incident or emergency shall be reported promptly to the EM Branch Chief of Compliance if he was not informed during its occurrence.
2. A written emergency or incident report shall be prepared jointly by the EC and the EM Branch Chief of Compliance and forwarded to the Department within 15 working days, as required by 40 C.F.R. § 264.56(i). The written report shall include, at a minimum, the following.
    a. Name, address, and telephone number of the Commander of KAFB, the EC, and the EM Branch Chief of Compliance;
    b. Name, address, and telephone number of the responsible official;
    c. Date, time, and the type of emergency or incident;
    d. Name and quantity of material and waste involved;
    e. Extent of injuries, if any;
    f. Assessment of actual or potential hazards to human health or the environment; and
    g. Estimated quantity and disposition of recovered material and waste.
3. Before operations are resumed at the OD Unit, the Department shall be notified that the OD Unit is in compliance with 40 C.F.R. §§ 264.56(h) and 264.56(i) and the requirements of this Permit. The notification shall address the fact that no new waste shall be treated that may be incompatible with released material and waste until cleanup procedures are completed and that all emergency equipment is cleaned and fit for its intended use.

1.8.3. Emergency/Incident Response Evaluation

The Permittee shall be responsible for annual evaluations of the KAFB Facility emergency response plans and for evaluation of the response to any incident or emergency. If these evaluations reveal that changes to the emergency response plans are necessary, they shall be amended by the Permittee and distributed to the appropriate organizations.

This Contingency Plan shall be reviewed and, if necessary, amended by the Permittee whenever:

1. The Permit, or applicable regulations, is revised.
2. The plan fails in an incident or emergency.

3. The design, construction, operation, and/or maintenance of the OD Unit or other circumstances change in a way that materially increases the potential for fires, explosions, or releases of hazardous waste or hazardous constituents, or changes the response necessary in an incident or emergency.
4. The list of emergency equipment changes.

Whenever any of the EC contact information in Table F-1 changes, a revised table shall be provided to the Department and distributed to all Contingency Plan holders. A copy of the revised table shall also be maintained at the EOD Range personnel bunker. A revision of Table F-1 constitutes an amendment to this Contingency Plan. The Permittee shall request a modification to this Permit should it become necessary to amend this Contingency Plan for any reason.

TABLE F-1
Emergency Coordinator Contact Information for the OD Unit

Contact or Name	Address	Office Phone	Home Phone
D. Brent Wilson, Base Civil Engineer	Building 20684, KAFB, NM 87117	846-7911 or 846-0411	281-5857

TABLE F-2
Type and Location of Emergency Equipment Available for Use at the OD Unit

Emergency Item or Equipment	Description	Location	Contact
Emergency Vehicles	Emergency Response Vehicle: Mobile Command Post equipped with communications equipment.	KAFB Civil Engineer Readiness	846-9196
	Ambulances	KAFB Fire Department	911 or 846-8069
	Security Vehicles: Vans and trucks equipped with communications equipment and utilized for transportation of personnel and equipment.	KAFB Security Police	846-7926
	Fire Trucks: Fire-fighting vehicles outfitted with equipment for fighting fires and with self-contained breathing apparatuses (SCBAs).	KAFB Fire Department	911 or 846-8069
	Helicopter: Rotary-wing aircraft for transportation of personnel to or from site.	KAFB Command Post	846-3777
Medical Supplies	First aid kit	EOD Range personnel bunker or vehicle	EC or Range Safety Officer
	Stretchers/Stokes Litter: Equipment for movement of injured personnel.	KAFB Fire Department	846-8069
	Blankets: Normal blankets.		
	Medical Kits: Emergency first-aid supplies.		
	Oxygen: Medical grade oxygen in compressed cylinders equipped for personnel use.		
Safety Supplies	Fire Extinguisher (ABC)	EOD Range personnel bunker or vehicle	EC or Range Safety Officer
	Eye Wash Kit		
	Spill Containment Kit		
	Decontamination Kit		
	Air Packs: SCBAs equipped with positive pressure mode for use by personnel entering hazardous atmospheres.	KAFB Fire Department	846-8069
	Monitoring Instruments		
General Supplies	Two-Way Radio	EOD Range personnel bunker or vehicle	EC or Range Safety Officer
	Shovels		
	Hand Tools		
	Broom(s)		
Transportation	Tractor-trailer combinations,	KAFB Logistics Readiness Squadron	853-7843
	Flat-bed trucks		
	Enclosed panel vans		
	Passenger vehicles, including sedans and vans		
	Passenger buses		

DEFINITIONS
SCBA self contained breathing apparatus

Figure F-1

PERMIT ATTACHMENT G: PERSONNEL TRAINING PLAN

1.0 INTRODUCTION

The primary objective of the Explosives Ordnance Disposal (EOD) training program shall be to prepare personnel to conduct operations at the Open Detonation (OD) Unit in a safe and environmentally sound manner and in compliance with this Permit and the New Mexico Hazardous Waste Management Regulations (HWMR), 20.4.1 NMAC. To achieve this objective, the program provides personnel with training relevant to their positions.

All personnel shall complete initial training within six months of assignment to EOD Range duty. Personnel shall not work at the OD Unit until they have completed training on the Contingency Plan (Permit Attachment F). Personnel shall be given, at a minimum, a basic understanding of the regulatory requirements of hazardous waste management, this Permit, and emergency response procedures. Personnel shall receive additional classroom and on-the-job training designed specifically to teach them how to perform their duties safely and in conformance with regulatory requirements and this Permit. All personnel shall receive the required training prior to being allowed to work unsupervised.

1.1. TRAINING PROGRAM

Training for personnel is the overall responsibility of the EOD Flight Chief. All training shall be conducted by qualified EOD Technicians and includes formal classroom sessions, on-the-job training, and review of written procedures and plans. A summary of the training program for personnel is shown in Table G-1.

1.1.1. Job Title/Job Description

As required by 40 C.F.R. § 264.16(d)(1) and (2), records of each job title related to hazardous waste management at the OD Unit, a list of employees for each job title, and job descriptions for each job title shall be maintained at the EOD Shop. Job descriptions shall include hazardous waste management duties, and required skills, experience, and education.

Records relating to the training program shall be maintained at the EOD Shop. The records shall also include a list of courses required for each position, course descriptions, documentation that each employee has received and completed appropriate training, and information regarding qualifications.

1.1.2. Relevance of Training to Job Position

The training program shall provide employees with training to respond effectively to emergencies at the OD Unit. Personnel shall receive relevant training on the requirements of this Permit (including Contingency Plan implementation), OD Unit operations (including emergency procedures, equipment, and systems), and in management of hazardous wastes.

1.1.3. Training Content, Frequency, and Techniques

The training program shall include a comprehensive combination of internal training courses and on-the-job training. Each training course shall be developed carefully to support the goal of safe and environmentally sound operations at the OD Unit in compliance with this Permit and the

HWMR. Course outlines shall be maintained in the Training Section at the EOD Shop. The general training content and frequency of training are presented in Table G-1.

1.2. TRAINING DIRECTOR

The Training Director (EOD Flight Chief) shall direct the training program and shall be responsible for establishing training requirements for personnel. The EOD Flight Chief shall be required to be knowledgeable of the applicable hazardous waste management regulations and specific processes employed at the OD Unit, pursuant to the HWMR and this Permit.

1.3. IMPLEMENTATION OF TRAINING PROGRAM

The training program shall be implemented to ensure that all personnel who work at the OD Unit receive the training indicated in Table G-1. All personnel shall participate annually in a training refresher. Visitors shall be provided instruction commensurate with the nature of their visit.

TABLE G-1 Training Program for the OD Unit		
Course	**Content**	**Frequency**
Basic EOD Course	Covers all aspects of positions and duties associated with EOD and OD Unit operations	Initial
Explosive Safety	General Safety Requirements, Motor Vehicle Transportation, Disposal Range Requirements, Disposal Range Procedures, Range Safety, Standard Safety Guidelines, Site Entry, Site Control, Personal Protective Equipment, Contingency Plan, Implementation, Procedures for Using Emergency Equipment, Procedures for Shutdown of Operations, Responses(s) to Emergencies, Emergency Coordinator(s), Evacuation Route and Procedures, Post-emergency Procedures	Initial/Annual
Relevant In-House Training	General Overview of Procedures to Perform Operations at the EOD Range and OD Unit; Waste Analysis Plan; Identification of Waste to be Managed; Waste Screening and Verification; Range Operation; Safety Practices; Security; Range Inspections; Preventive Procedures, Structures, and Equipment; Prevention of Reaction of Reactive Waste, Ignitable and Incompatible Waste; Authorized Wastes	Initial/Annual
Resource Conservation and Recovery Act Training	Hazardous Waste Management and Regulations – Overview, Hazardous Substances and Properties, General Facility Standards, Preparedness and Prevention, Contingency Plan and Emergency Procedures, Record Keeping and Reporting	Initial/Annual

KIRTLAND AIR FORCE BASE
ALBUQUERQUE, NEW MEXICO

Closure Plan for Open Detonation Unit

May 2014

377 MSG/CEIR
2050 Wyoming Blvd. SE
Kirtland AFB, New Mexico 87117-5270

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40 CFR 270.11
DOCUMENT CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

TOM D. MILLER, Colonel, USAF
Commander, 377th Air Base Wing

This document has been approved for public release in accordance with Department of Defense Directives and Air Force Instructions.

KIRTLAND AIR FORCE BASE
377th Air Base Wing Public Affairs

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1. INTRODUCTION

This closure plan describes the activities necessary to close the Open Detonation (OD) treatment unit located within the Explosive Ordnance Disposal (EOD) Range at Kirtland Air Force Base (AFB). The OD Unit consists of a cleared circular area approximately 1,000 ft in diameter and surrounded and delineated by an approximately two-foot (ft) high earthen berm. Figures H-1 and H-2 show the location of the EOD Range at Kirtland AFB, and the collocated OD and Open Burn (OB) Units within the EOD Range. Detonations were conducted in pits measuring approximately 30 ft long, 15 wide and 12 ft deep.

Until final closure of the unit is complete in accordance with the New Mexico Hazardous Waste Management Regulations and certification of closure has been approved by the New Mexico Environment Department (the Department), a copy of the approved Closure Plan, and any revisions thereof, shall be maintained in the Operating Record. This Closure Plan, and any revisions thereof, shall be made available, upon request, to the Department.

If the OD Unit cannot be clean-closed, a post-closure care plan addressing the hazardous constituents remaining at the site shall be prepared and submitted to the Department for approval.

The OD Unit is collocated with the OB treatment unit at the EOD Range. The OD and OB Units are scheduled to undergo final closure activities simultaneously. The OB Unit has a separate closure plan, but several elements of the OB and OD Unit closure plans overlap and are noted within the documents. Additionally, there is currently a perchlorate groundwater investigation occurring to the west of the EOD range. This investigation and its results are independent of this OD Unit closure plan.

As per Kirtland AFB's Hazardous Waste Treatment Facility Operating Permit for the Open Detonation Unit (Permit), Attachment I, Table I-3 , SWMU 06-19 (KAFB IRP site OT-29), which is located approximately 20 ft northeast of the present OB structure, requires corrective action. Corrective action at SWMU 06-19 shall comply with the provisions of the Resource Conservation and Recovery Act (RCRA).

1.1 General Closure Information

This closure plan has been prepared in compliance with the requirements of RCRA (42 U.S.C. §§6901 et seq.) and its implementing regulations at 40 CFR Parts 264 and 270 (see 40 CFR Part 264 Subparts G and X and 270.14(b)(13)), and state implementing statutes and regulations under which the state has delegated RCRA authority (see New Mexico Hazardous Waste Act, Chapter 74 Article 4 NMSA 1978 and 20.4.1 NMAC).

1.2 Closure Performance Standard

The OD Unit shall be closed to meet the following performance standards:

- Minimize the need for further maintenance;
- Control, minimize or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to ground water or surface waters or to the atmosphere; and
- Comply with the requirements of 40 CFR Part 264, Subpart G and 40 CFR §264.601.

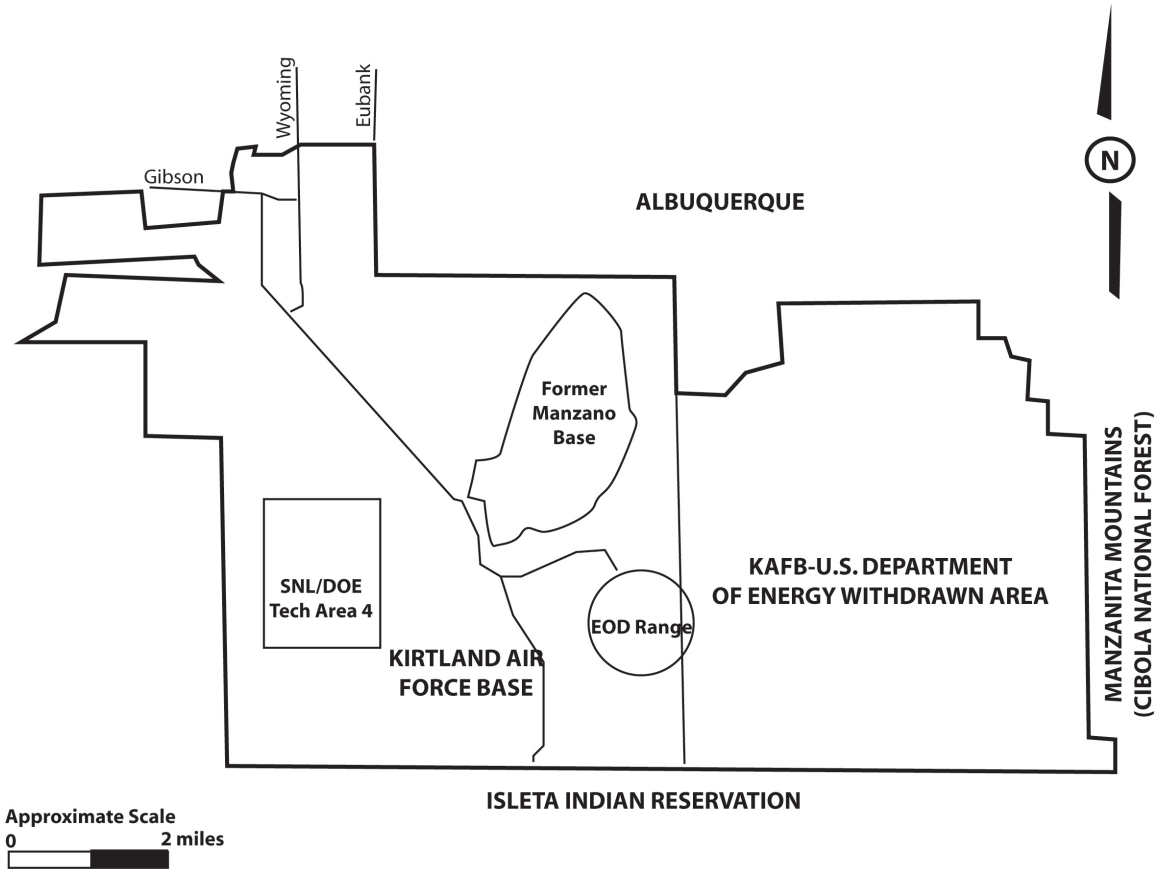

Figure H-1. Location of EOD Range at Kirtland AFB

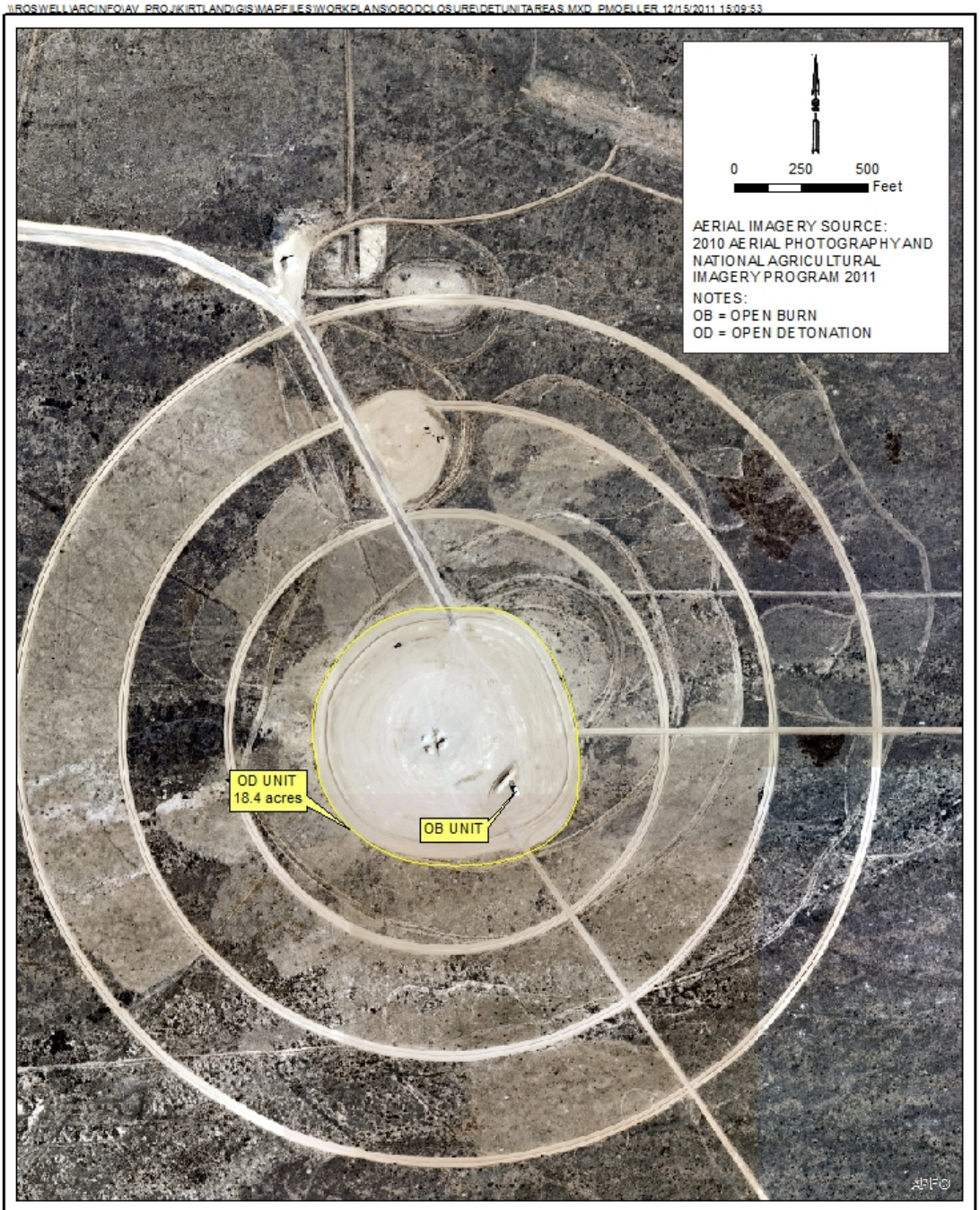

FIGURE H-2
LOCATION OF OPEN BURN AND OPEN DETONATION UNITS
EOD RANGE, KIRTLAND AIR FORCE BASE, NEW MEXICO

1.3 Final Closure Activities

The last treatment event at the OD Unit occurred on 11 August 2010. The Department was notified on 13 August 2010 that, effective immediately, the Permitee had closed the OD Unit for all treatment activities. The Permitee shall notify the Department, in writing, at least 45 calendar days prior to the date that closure activities shall commence.

Final closure activities at the OD Unit shall consist of:

- Installation of four groundwater monitoring wells at the EOD range (one upgradient and three downgradient wells) and eight consecutive quarters of groundwater sampling to determine the presence or absence of groundwater contamination;
- Removing any soil or debris from the OD Unit that have contaminant concentrations which pose unacceptable risk to human health or the environment;
- Sending for treatment and disposal any solid and hazardous waste, including any treatment residues, to a permitted Treatment, Storage, or Disposal Facility (TSDF) in accordance with applicable regulatory requirements.

Final closure for the OD Unit shall be completed when:

- All solid and hazardous waste has been disposed of off-site as required by law;
- Sampling and analysis demonstrates that no unacceptable risk to human health or the environment originating from the OD Unit exists in soil or groundwater;
- A Certification of Closure and Closure Report has been submitted to the Department; and
- The Department has approved the Certification of Closure and Closure Report.

1.4 Maximum Extent of Operations and Maximum Waste Inventory

The OD Unit was previously permitted on 20 December 1994 as Permit# NM9570024423-OD, which allowed 100,000 pounds of net explosive weight (NEW) to be treated at the OD Unit annually. Rocket motors, large caliber munitions, explosive wastes and firearms were treated at the OD Unit. Based on the operating record, the maximum inventory treated at the OD Unit was approximately 316,012 pounds of NEW.

Closure activities and any corrective action that may be required shall not be limited to the OD Unit if contamination has migrated beyond the OD Unit boundary. Any corrective action that may be required because of a release at the OB Unit shall be conducted under the terms and conditions of the 2010 Permit.

1.5 Schedule for Closure

Final closure of the OD Unit shall proceed by the general schedule presented in Table H-1.

Table H-1
Closure Schedule for the Open Detonation Unit at Kirtland AFB

Activity	Time Required
Notify the Department of receiving final volume of hazardous waste at the OD Unit	Completed
Removal of all hazardous waste from the OD Unit	Completed
Department approval of final OD Unit closure plan	TBD
Notify Department of commencement of closure activities	45 days before closure activities begin
Commence closure activities	Day 0
Remove all solid and hazardous waste	Day 90
Commence groundwater monitoring well installations	Day 90
Complete groundwater monitoring well installations	Day 180
Complete all closure activities, except groundwater monitoring	Day 360
Complete 8 quarters of groundwater monitoring	Day 900
Submit Closure Report and certification to Department	Day 960

Note: The schedule above indicates calendar days on which closure activities shall be started or completed subsequent

1.6 Closure Report

Within 60 days of completion of the final closure activities, a closure report shall be submitted to the Department. The report shall document the closure activities conducted and contain, at a minimum, the following information:

- A summary of the closure activities;
- Any significant variance from the approved closure plan and the reason for the variance;
- A summary of sampling data associated with closure, including analytical results for all field and laboratory quality control samples;
- A quality assurance statement on the adequacy of the analyses to support closure;
- The location of the file of supporting documentation (e.g., memos, logbooks, laboratory sample analysis data);
- Disposal location and quantities of all solid and hazardous wastes removed from the OD Unit;
- Certification of the accuracy of the report; and
- Survey plat.

1.7 Survey Plat and Post-Closure Requirements

Upon completion of closure activities at the OD Unit, a survey plat shall be prepared, certified by a professional land surveyor, and submitted with the closure report to the Department. The survey plat shall also be simultaneously filed with the local zoning authority. In the event that the OD Unit cannot be clean closed, a post-closure care plan shall be submitted to the Department for review and approval.

2. CLOSURE PROCEDURES

There is no hazardous waste present at the OD Unit; the last treatment event at the OD Unit occurred on 11 August 2010, and there are no treatment residues remaining. There are no structures or equipment at the OD Unit. (The structures associated with the collocated OB Unit are addressed under the OB Unit closure plan.)

The first phase of closure shall consist of a hazards survey of the OD Unit conducted by qualified contractor health physics and industrial hygiene personnel, which shall include unexploded ordnance (UXO) safety personnel, and Kirtland AFB EOD personnel. The purpose of the survey shall be to locate and remove any "kick-out" (untreated waste, waste fragments, or UXO), and to identify potential contamination concerns that may present hazards to workers during the closure activities and to specify any control measures necessary to reduce worker risk. This survey shall provide the information necessary for health physics, UXO safety, and industrial hygiene personnel to identify worker qualifications, personal protective equipment (PPE), safety awareness, work permits, exposure control programs, and emergency coordination that shall be required to perform closure. Any munitions and explosives of concern (MEC) identified during the hazard survey shall be reported to and handled by Kirtland AFB EOD staff personnel only in accordance with standard operating procedures. All workers involved in the closure activities shall be required to have training and medical monitoring as required by applicable regulations. Personnel performing closure activities shall be required to wear PPE as specified by health physics, UXO safety, and industrial hygiene personnel.

Sufficient sampling and analysis shall be required to demonstrate there are no contaminant concentrations which pose unacceptable risk to human health or the environment. Groundwater and soil samples shall be analyzed for parameters listed in Tables H-2 and H-3 to quantify contamination, if any, originating from the OD Unit.

Surface and subsurface soil at the OD Unit shall be characterized by sampling and analysis. Soil sampling shall follow the procedures described in Section 2.2.1 of this Permit Attachment (H). Soil shall be analyzed for the parameters listed in Table H-3. If sampling and analysis of soil indicates the presence of hazardous waste or hazardous constituents above background levels, a risk assessment shall be conducted based on a residential land-use scenario to determine whether the contaminants pose an unacceptable risk to human health or the environment. In lieu of a baseline risk assessment, the Permittee may compare the soil sampling results to the soil screening levels using the procedures listed in the Department's most current version of "Technical Background Document for Development of Soil Screening Levels," as it may be updated, provided the soil screening levels are based on a residential land-use scenario. If the risk assessment demonstrates that the level of contamination is unacceptable, the contaminated soil exhibiting unacceptable risk shall be subject to corrective action under Permit Part 6 and shall be excavated and removed. The excavated soil shall be collected, transferred to containers, and, if applicable, managed and disposed of as hazardous waste. The Permittee shall conduct corrective action activities at the OD Unit using the cleanup levels in Permit Section 6.2.3 if corrective action is necessary. Clean up levels shall be based on a residential land use scenario. Background soil concentrations for metals are those approved by the Department for the KAFB Facility, and are listed in Table D-4 of Permit Attachment D.

2.1 Monitoring Wells

2.1.1 Installation of New Monitoring Wells

The OD Unit is subject to the environmental performance standards of 40 C.F.R. § 264.601. As such, groundwater monitoring shall be conducted as part of closure activities to demonstrate that operations did not impact groundwater. Four monitoring wells, one upgradient and three downgradient of the OD Unit, shall be installed. The locations of the proposed monitoring wells are presented in Figure H-3.

The wells installed at the OD Unit shall meet the groundwater monitoring requirements of 40 C.F.R. §§ 264.97(a)(2), (b), and (c). Within 30 days of completing well installation, the Permitee shall submit a well completion report to the Department for approval.

Groundwater monitoring wells shall be properly plugged and abandoned in accordance with applicable New Mexico statutes and regulations, provided groundwater contamination has not occurred. If groundwater contamination has occurred, these monitoring wells shall be maintained for the purpose of implementing corrective action. The wells shall not be plugged or abandoned until the Department has approved closure of the OD Unit.

Activities for monitoring well installation are presented in the following paragraphs and include:

- Well locations,
- Drilling specifications,
- Well construction specifications,
- Well development procedures,
- A schedule for implementation and completion of the well installations;
- Preparation and submittal of a well completion report; and
- Groundwater sampling and analysis requirements for eight quarters.

The primary project objective is the installation and sampling of four groundwater monitoring wells, one upgradient and three downgradient of the site, to evaluate the potential groundwater impacts from the operation of the OD unit. The new monitoring wells shall be installed in the vicinity of the OD Unit (Figure H-3). Installation of the monitoring wells shall facilitate groundwater sampling from the uppermost groundwater both up and downgradient of potential source areas associated with the OD unit. Based on data from nearby wells, groundwater at the proposed locations is expected to occur under confined conditions within the Paleozoic sedimentary rocks of the Madera Group or Sandia Formation or the underlying Precambrian granite. The depth to the uppermost water bearing zones at the proposed well locations is expected to range from approximately 100 to 200 feet (ft) below ground surface (bgs). Final well design shall be dependent on field conditions and the placement of the fourth well shall be performed in consultation with the Department.

Table H-2

Comparison of Reporting Levels to Screening Objectives in Groundwater, Open Burn and Open Detonation Units at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Water Quality Standard	EPA Maximum Contaminant Levels/Secondary Contaminant Levels[a]	EPA Regional Screening Levels Tap Water (Nov 2012)	DOE Open Burn Suggested Maximum Background (Dec 1998)	LOQ	LOD	DL
EPA 160.2	Total dissolved solids	NA	mg/L	--	--	--	--	4	2	1
EPA 310.2	Alkalinity	NA	mg/L	--	--	--	--	10	5	2.5
EPA 350.1	Ammonia	7664-41-7	mg/L	--	--	--	--	0.5	0.1	0.049
SW9030B	Sulfide	18496-25-8	mg/L	--	--	--	--	2	0.8	0.4
SW9056	Nitrate	14797-55-8	mg/L	58.4	10	25	4 (as NO2/NO3)	0.5	0.1	0.04
SW9056	Nitrite	14797-65-0	mg/L	3.65	1	1.6	4 (as NO2/NO3)	0.5	0.1	0.05
SW9056	Chloride	16887-00-6	mg/L	--	--	--	--	0.5	0.1	0.05
SW9056	Sulfate	18785-72-3	mg/L	--	--	--	--	0.5	0.1	0.05
SW9056	Fluoride	7782-41-4	mg/L	1.46	--	620	--	0.5	0.1	0.05
SW9056	Bromide	7726-95-6	mg/L	--	--	--	--	0.5	0.1	0.05
SW9060	Total organic carbon	7440-44-0	mg/L	--	--	--	--	1	0.5	0.25
SW6010B	Barium	7440-39-3	µg/L	1,000	2,000	--	120	20	5	0.25
SW6010B	Boron	7440-42-8	µg/L	7,300	--	3100	--	20	5	1
SW6010B	Beryllium	7440-41-7	µg/L	--	4	--	4	3	1	0.3
SW6010B	Cadmium	7440-43-9	µg/L	10	5	--	0.47	3	1	0.5
SW6010B	Calcuim	7440-70-2	µg/L	--	--	--	--	1000	80	35
SW6010B	Chromium	7440-47-3	µg/L	50	100	--	43	10	5	1.2
SW6010B	Cobalt	7440-48-4	µg/L	50	--	--	2.5	10	5	3
SW6010B	Copper	7440-50-8	µg/L	1,000	1,300 (1,000)	--	<50	15	5	2.1
SW6010B	Iron	7439-89-6	µg/L	1,000	300	11000	--	200	100	50
SW6010B	Lead	7439-92-1	µg/L	50	15	--	10	10	5	2.5
SW6010B	Lithium	7439-93-2	µg/L	--	--	31	--	500	25	11
SW6010B	Magnesium	7439-95-4	µg/L	--	--	--	--	500	25	11
SW6010B	Manganese	7439-96-5	µg/L	876	--	320	--	500	25	11
SW6010B	Molybdenum	7439-98-7	µg/L	183	--	78	--	500	25	11
SW6010B	Nickel	7440-02-0	µg/L	--	--	300	28	10	5	2.4
SW6010B	Potasium	9/7/7440	µg/L	--	--	--	--	3000	250	237
SW6010B	Selenium	7782-49-2	µg/L	50	50	--	5	40	25	13
SW6010B	Silver	7440-22-4	µg/L	50	100	--	<10	5	2	0.84
SW6010B	Sodium	7440-23-5	µg/L	--	--	--	--	5000	250	91.6
SW6010B	Strontium	7440-24-6	µg/L	21900	--	9300	--	500	25	11
SW6010B	Tin	7440-31-5	µg/L	--	--	9300	50	50	15	1.7
SW6010B	Vanadium*	7440-62-2	µg/L	--	--	--	13	20	5	1.9
SW6010B	Zinc	7440-66-6	µg/L	10,000	5,000	--	260	20	10	3
SW6020A	Antimony	7440-36-0	µg/L	--	6	--	6	6	4	2
SW6020A	Arsenic	7440-38-2	µg/L	100	10	--	14	3	2	1
SW6020A	Thallium	7440-28-0	µg/L	--	2	--	2	1.5	1	0.5
SW7470A	Mercury	7439-97-6	µg/L	2	2	--	2	0.3	0.1	0.1
SW6850	Perchlorate	14797-73-0	µg/L	4[b]	--	--	--	0.5	0.25	0.082
SW8260B	1,1,1-Trichloroethane	71-55-6	µg/L	60	200	--	--	1	0.4	0.19
SW8260B	1,1,2,2-Tetrachloroethane	79-34-5	µg/L	10	--	--	--	1	0.2	0.09
SW8260B	1,1,2-trichloro-1,1,2-trifluoroethane*	76-13-1	µg/L	--	--	--	--	50	0.4	0.25
SW8260B	1,1,2-Trichloroethane	79-00-5	µg/L	10	5	--	--	1	0.4	0.31
SW8260B	1,1-Dichloroethane	75-34-3	µg/L	25	--	--	--	1	0.2	0.1
SW8260B	1,1-Dichloroethene	75-35-4	µg/L	5	7	--	--	1	0.4	0.14
SW8260B	1,2,3-Trichlorobenzene	87-61-6	µg/L	70	--	--	--	1	0.4	0.14
SW8011	1,2,3-Trichloropropane	96-18-4	µg/L	--	--	0.00065	--	0.2	0.09	0.09
SW8260B	1,2,4-Trichlorobenzene	120-82-1	µg/L	--	70	--	--	1	0.4	0.1
SW8260B	1,2,4-Trimethylbenzene	95-63-6	µg/L	--	--	15	--	1	0.2	0.12
SW8011	1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	µg/L	--	0.2	NA	--	0.02	0.005	0.005
SW8011	1,2-Dibromoethane (EDB)	106-93-4	µg/L	0.1	0.05	NA	--	0.02	0.005	0.0022
SW8260B	1,2-Dichlorobenzene	95-50-1	µg/L	--	600	--	--	1	0.4	0.14
SW8260B	1,2-Dichloroethane	107-06-2	µg/L	10	5	--	--	1	0.4	0.22
SW8260B	1,2-Dichloropropane	78-87-5	µg/L	--	5	--	--	1	0.2	0.15
SW8260B	1,3,5-Trimethylbenzene	108-67-8	µg/L	--	--	87	--	1	0.2	0.14
SW8260B	1,3-Dichlorobenzene*	541-73-1	µg/L	--	--	--	--	1	0.4	0.11
SW8260B	1,4-Dichlorobenzene	106-46-7	µg/L	--	75	--	--	1	0.2	0.13
SW8260B	1,4-Dioxane	123-91-1	µg/L	--	--	0.67	--	1	TBD	0.12
SW8260B	2-Butanone (MEK)	78-93-3	µg/L	--	--	4,900	--	2	0.4	0.35
SW8260B	2-Hexanone	591-78-6	µg/L	--	--	34	--	2	0.4	0.17
SW8260B	4-Methyl-2-pentanone (MIBK)	108-10-1	µg/L	--	--	1,000	--	2	0.4	1
SW8260B	Acetone	67-64-1	µg/L	--	--	12,000	--	10	4	2.1
SW8260B	Benzene	71-43-2	µg/L	10	5	--	--	1	0.2	0.13
SW8260B	Bromochloromethane	74-97-5	µg/L	--	--	83	--	1	0.4	0.14
SW8260B	Bromodichloromethane	75-27-4	µg/L	--	100	--	--	1	0.4	0.14
SW8260B	Bromoform	75-25-2	µg/L	--	100	--	--	1	0.4	0.1
SW8260B	Bromomethane	74-83-9	µg/L	--	--	7	--	1	0.4	0.29
SW8260B	Carbon disulfide	75-15-0	µg/L	--	--	720	--	2	0.2	0.16
SW8260B	Carbon tetrachloride	56-23-5	µg/L	10	5	--	--	1	0.4	0.15
SW8260B	Chlorobenzene	108-90-7	µg/L	--	100	--	--	1	0.2	0.12
SW8260B	Chloroethane	75-00-3	µg/L	--	--	21,000	--	1	0.4	0.34

Table H-2

Comparison of Reporting Levels to Screening Objectives in Groundwater, Open Burn and Open Detonation Units at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Water Quality Standard	EPA Maximum Contaminant Levels/Secondary Contaminant Levels[a]	EPA Regional Screening Levels Tap Water (Nov 2012)	DOE Open Burn Suggested Maximum Background (Dec 1998)	LOQ	LOD	DL
SW8260B	Chloroform	67-66-3	µg/L	100	100	--	--	1	0.2	0.12
SW8260B	Chloromethane	74-87-3	µg/L	--	--	190	--	1	0.4	0.25
SW8260B	cis-1,2-Dichloroethene	156-59-2	µg/L	--	70	--	--	1	0.4	0.1
SW8260B	cis-1,3-Dichloropropene*	10061-01-5	µg/L	--	--	--	--	1	0.4	0.22
SW8260B	Cyclohexane*	1735-17-7	µg/L	--	--	--	--	(a)	(a)	(a)
SW8260B	Dibromochloromethane	124-48-1	µg/L	--	100	--	--	1	0.4	0.13
SW8260B	Dichlorodifluoromethane (Freon 12)	75-71-8	µg/L	--	--	190	--	1	0.4	0.16
SW8260B	Ethylbenzene	100-41-4	µg/L	750	700	--	--	1	0.2	0.1
SW8260B	Isopropylbenzene	98-82-8	µg/L	--	--	390	--	1	0.2	0.12
SW8260B	Methyl tert-butyl ether (MTBE)	1634-04-4	µg/L	--	(5)	--	--	2	0.4	0.19
SW8260B	Methylene chloride	75-09-2	µg/L	100	5	--	--	1	0.4	0.35
SW8260B	Methyl Acetate*	79-20-9	µg/L	--	--	--	--	(a)	(a)	(a)
SW8260B	Methly Cyclohexane*	108-87-2	µg/L	--	--	--	--	(a)	(a)	(a)
SW8260B	m-Xylene & p-Xylene	136777-61-2	µg/L	--	10,000	--	--	1	0.8	0.18
SW8260B	Naphthalene	91-20-3	µg/L	30	--	NA	--	1	0.2	0.15
SW8260B	o-Xylene	95-47-6	µg/L	--	10,000	--	--	1	0.4	0.1
SW8260B	Styrene	100-42-5	µg/L	--	100	--	--	1	0.2	0.15
SW8260B	Tetrachloroethene	127-18-4	µg/L	--	5	--	--	1	0.2	0.1
SW8260B	Toluene	108-88-3	µg/L	750	1,000	--	--	1	0.4	0.25
SW8260B	trans-1,2-Dichloroethene	156-60-5	µg/L	--	100	--	--	1	0.4	0.11
SW8260B	trans-1,3-Dichloropropene*	10061-02-6	µg/L	--	--	--	--	1	0.2	0.08
SW8260B	Trichloroethene	79-01-6	µg/L	100	5	--	--	1	0.4	0.13
SW8260B	Trichlorofluoromethane (Freon 11)	75-69-4	µg/L	--	--	1,100	--	1	0.4	0.23
SW8260B	Vinyl chloride	75-01-4	µg/L	1	2	--	--	1	0.4	0.22
SW8260B	1,2-Dichloroethane-d4 (Surrogate)		%	--	--	--	--	--	--	--
SW8260B	4-Bromofluorobenzene (Surrogate)		%	--	--	--	--	--	--	--
SW8260B	Dibromofluoromethane (Surrogate)		%	--	--	--	--	--	--	--
SW8260B	Toluene-d8 (Surrogate)		%	--	--	--	--	--	--	--
SW8270C	1,1-biphenyl	92-52-4	µg/L	--	--	0.83	--	10	NA	5
SW8270C	1,2,4,5-tetrachlrorbenzene	95-94-3	µg/L	--	--	1.2	--	10	2.1	0.54
SW8270C	2,4,5-Trichlorophenol	95-95-4	µg/L	--	--	890	--	10	3.0	2
SW8270C	2,4,6-Trichlorophenol	88-06-2	µg/L	--	--	3.5	--	10	3.0	2
SW8270C	2,4-Dichlorophenol	120-83-2	µg/L	--	--	35	--	10	3.0	2.6
SW8270C	2,4-Dimethylphenol	105-67-9	µg/L	--	--	270	--	10	3.0	2.2
SW8270C	2,4-Dinitrotoluene	121-14-2	µg/L	--	--	0.2	--	10	3.0	2
SW8270C	2,6-Dichlorophenol*	87-65-0	µg/L	--	--	--	--	15	3.0	5
SW8270C	2,6-Dinitrotoluene	606-20-2	µg/L	--	--	15	--	10	3.0	2
SW8270C	2-Chloronaphthalene	91-58-7	µg/L	--	--	550	--	10	3.0	1.3
SW8270C	2-Chlorophenol	95-57-8	µg/L	--	--	71	--	10	3.0	1.6
SW8270C	2-Methylphenol	95-48-7	µg/L	--	--	720	--	10	3.0	0.93
SW8270C	2-Nitroaniline	88-74-4	µg/L	--	--	150	--	50	3.0	2
SW8270C	2-Nitrophenol*	88-75-5	µg/L	--	--	--	--	10	3.0	1.9
SW8270C	2,2-oxybis(1-chloropropane)*	52438-91-2	µg/L	--	--	--	--	10	3	1.3
SW8270C	3,3'-Dichlorobenzidine	91-94-1	µg/L	--	--	0.11	--	50	3.0	0.96
SW8270C	3-Methylphenol & 4-Methylphenol	65794-96-9	µg/L	--	--	720	--	30	20	10
SW8270C	3-Nitroaniline*	99-09-2	µg/L	--	--	--	--	50	3.0	1.4
SW8270C	4,6-Dinitro-2-methylphenol	534-52-1	µg/L	--	--	1.2	--	60	20	2.2
SW8270C	4-Bromophenyl phenyl ether*	101-55-3	µg/L	--	--	--	--	10	3.0	1.1
SW8270C	4-Chloro-3-methylphenol	59-50-7	µg/L	--	--	1,100	--	10	3.0	2
SW8270C	4-Chloroaniline	106-47-8	µg/L	--	--	0.32	--	10	3.0	2
SW8270C	4-Chlorophenyl phenyl ether*	7005-72-3	µg/L	--	--	--	--	10	3.0	1.1
SW8270C	4-Nitroaniline	100-01-6	µg/L	--	--	3.3	--	50	3.0	1.5
SW8270C	4-Nitrophenol*	100-02-7	µg/L	--	--	--	--	60	20	6.1
SW8270C	Acetophenone	17537-31-4	µg/L	--	--	1,500	--	10	3	0.78
SW8270C	Azobenzene (as 1,2 Diphenylhydrazine)	103-33-3	µg/L	--	--	0.067	--	10	3.0	0.71
SW8270C	Atrazine	93616-39-8	µg/L	--	--	0.26	--	(a)	(a)	(a)
SW8270C	Benzaldehyde	100-52-7	µg/L	--	--	1,500	--	(a)	(a)	(a)
SW8270C	bis(2-Chloroethoxy)methane	111-91-1	µg/L	--	--	46	--	10	3.0	1
SW8270C	bis(2-Chloroethyl) ether	111-44-4	µg/L	--	--	0.012	--	10	3.0	1.5
SW8270C	bis(2-Ethylhexyl) phthalate	117-81-7	µg/L	--	6	--	--	10	3.0	1
SW8270C	Butyl benzyl phthalate	85-68-7	µg/L	--	--	14	--	10	3.0	1.4
SW8270C	Caprolactam	105-60-2	µg/L	--	--	7,700	--	(a)	(a)	(a)
SW8270C	Carbazole*	86-74-8	µg/L	--	--	--	--	10	3.0	1.2
SW8270C	Dibenzofuran	132-64-9	µg/L	--	--	5.8	--	10	3.0	1.1
SW8270C	Diethyl phthalate	84-66-2	µg/L	--	--	11,000	--	10	3.0	0.93
SW8270C	Dimethyl phthalate*	131-11-3	µg/L	--	--	--	--	10	3.0	0.88
SW8270C	Di-n-butyl phthalate	84-74-2	µg/L	--	--	670	--	10	3.0	1.1
SW8270C	Di-n-octyl phthalate*	117-84-0	µg/L	--	--	--	--	10	3.0	1.5
SW8270C	Hexachlorobenzene	118-74-1	µg/L	--	1	--	--	10	3.0	1.4
SW8270C	Hexachlorobutadiene	87-68-3	µg/L	--	--	0.26	--	10	3.0	1.3
SW8270C	Hexachloroethane	67-72-1	µg/L	--	--	0.79	--	10	3.0	1.4

Table H-2

Comparison of Reporting Levels to Screening Objectives in Groundwater, Open Burn and Open Detonation Units at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Water Quality Standard	EPA Maximum Contaminant Levels/Secondary Contaminant Levels[a]	EPA Regional Screening Levels Tap Water (Nov 2012)	DOE Open Burn Suggested Maximum Background (Dec 1998)	LOQ	LOD	DL
SW8270C	Hexachlorocyclopentadiene	77-47-4	µg/L		--	22	--	10	3	0.214
SW8270C	Isophorone	78-59-1	µg/L	--	--	67	--	10	3.0	1
SW8270C	Nitrobenzene	98-95-3	µg/L	--	--	0.12	--	10	3.0	1.6
SW8270C	N-Nitrosodimethylamine	62-75-9	µg/L	--	--	0.0004	--	15	3.0	0.96
SW8270C	N-Nitrosodi-n-propylamine	621-64-7	µg/L	--	--	0.0093	--	10	3.0	1.4
SW8270C	N-Nitrosodiphenylamine	86-30-6	µg/L	--	--	10	--	10	3.0	0.54
SW8270C	Pentachlorophenol	87-86-5	µg/L	--	1	--	--	60	20	2
SW8270C	Phenol	108-95-2	µg/L	--	--	4,500	--	10	3.0	1.1
SW8270C	Phenol-d6		%	--	--	--	--	--	--	--
SW8270C	2-Fluorobiphenyl		%	--	--	--	--	--	--	--
SW8270C	Terphenyl-d14		%	--	--	--	--	--	--	--
SW8270C-SIM	1-methylnaphthalene	90-12-0	µg/L	--	--	0.97	--	0.1	0.01	0.006
SW8270C-SIM	2-methylnaphthalene	91-57-6	µg/L	--	--	27	--	0.1	0.01	0.006
SW8270C-SIM	Acenaphthene	83-32-9	µg/L	--	--	400	--	0.1	0.01	0.003
SW8270C-SIM	Acenaphthylene	208-96-8	µg/L	--	--	--	--	0.1	0.01	0.003
SW8270C-SIM	Anthracene	120-12-7	µg/L	--	--	1300	--	0.1	0.01	0.004
SW8270C-SIM	Benzo (a) anthracene	56-55-3	µg/L	--	--	0.029	--	0.1	0.01	0.005
SW8270C-SIM	Benzo (a) pyrene	50-32-8	µg/L	0.7	0.2	--	--	0.1	0.01	0.004
SW8270C-SIM	Benzo (b) fluoranthene	205-99-2	µg/L	--	--	0.029	--	0.1	0.02	0.012
SW8270C-SIM	Benzo (g,h,i) perylene	191-24-2	µg/L	--	--	--	--	0.1	0.01	0.006
SW8270C-SIM	Benzo (k) fluoranthene	207-08-9	µg/L	--	--	0.29	--	0.1	0.01	0.008
SW8270C-SIM	Chrysene	218-01-9	µg/L	--	--	2.9	--	0.1	0.01	0.004
SW8270C-SIM	Dibenzo (a,h) anthracene	53-70-3	µg/L	--	--	0.0029	--	0.1	0.02	0.014
SW8270C-SIM	Fluoranthene	206-44-0	µg/L	--	--	630	--	0.1	0.01	0.004
SW8270C-SIM	Fluorene	86-73-7	µg/L	--	--	220	--	0.1	0.01	0.004
SW8270C-SIM	Indeno (1,2,3-c,d) pyrene	193-39-5	µg/L	--	--	0.029	--	0.1	0.02	0.014
SW8270C-SIM	Naphthalene	91-20-3	µg/L	30		NA	--	0.1	0.01	0.004
SW8270C-SIM	Phenanthrene	85-01-8	µg/L	--	--	--	--	0.1	0.01	0.006
SW8270C-SIM	Pyrene	129-00-0	µg/L	--	--	87	--	0.1	0.01	0.004
SW8290	2,3,7,8-TCDF*	51207-31-9	pg/L	--	--	--	--	10	2.5	EDL
SW8290	2,3,7,8-TCDD*	1746-01-6	pg/L	--	--	--	--	10	2.5	EDL
SW8290	1,2,3,7,8-PeCDF*	57117-41-6	pg/L	--	--	--	--	50	6.5	EDL
SW8290	2,3,4,7,8-PeCDF*	57117-31-4	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,7,8-PeCDD*	40321-76-4	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,4,7,8-HxCDF*	70648-26-9	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,6,7,8-HxCDF*	57117-44-9	pg/L	--	--	--	--	50	12.5	EDL
SW8290	2,3,4,6,7,8-HxCDF*	60851-34-5	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,7,8,9-HxCDF*	72918-21-9	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,4,7,8-HxCDD*	39227-28-6	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,6,7,8-HxCDD*	57653-85-7	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,7,8,9-HxCDD*	19408-74-3	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,4,6,7,8-HpCDF*	67562-39-4	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,4,7,8,9-HpCDF*	55673-89-7	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,4,6,7,8-HpCDD*	35822-46-9	pg/L	--	--	--	--	50	12.5	EDL
SW8290	OCDF*	39001-02-0	pg/L	--	--	--	--	100	25	EDL
SW8290	OCDD*	3268-87-9	pg/L	--	--	--	--	100	50	EDL
SW8330B	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	µg/L	--	--	780	--	0.15	0.05	0.036
SW8330B	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	µg/L	--	--	0.61	--	0.25	0.05	0.036
SW8330B	1,3,5-Trinitrobenzene (1,3,5-TNB)	99-35-4	µg/L	--	--	460	--	0.1	0.05	0.03
SW8330B	1,3-Dinitrobenzene (1,3-DNB)	99-65-0	µg/L	--	--	1.5	--	0.15	0.1	0.05
SW8330B	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	479-45-8	µg/L	--	--	61	--	0.15	0.1	0.05
SW8330B	Nitrobenzene (NB)	98-95-3	µg/L	--	--	0.12	--	0.15	0.1	0.05
SW8330B	2,4,6-Trinitrotoluene (2,4,6-TNT)	118-96-7	µg/L	--	--	2.2	--	0.15	0.1	0.05
SW8330B	4-Amino-2,6-dinitrotoluene (4-Am-DNT)	19406-51-0	µg/L	--	--	30	--	0.15	0.1	0.05
SW8330B	2-Amino-4,6-dinitrotoluene (2-Am-DNT)	35572-78-2	µg/L	--	--	30	--	0.3	0.1	0.1
SW8330B	2,4-Dinitrotoluene (2,4-DNT)	121-14-2	µg/L	--	--	0.2	--	0.15	0.1	0.05
SW8330B	2,6-Dinitrotoluene (2,6-DNT)	606-20-2	µg/L	--	--	15	--	0.15	0.1	0.05
SW8330B	2-Nitrotoluene (2-NT)	88-72-2	µg/L	--	--	0.27	--	1	0.1	0.088
SW8330B	3-Nitrotoluene (3-NT)	99-08-1	µg/L	--	--	1.3	--	0.5	0.1	0.057
SW8330B	4-Nitrotoluene (4-NT)	99-99-0	µg/L	--	--	3.7	--	1	0.1	0.088
SW8330B	Nitroglycerin	55-63-0	µg/L	--	--	1.5	--	1	0.5	0.33
SW8330B	PETN	78-11-5	µg/L	--	--	16	--	1	0.5	0.3
SW7580	White phosphorous	7723-14-0	µg/L	--	--	0.31	--	0.05	0.025	0.015

The laboratory does not analyze for these compounds. The compounds w ill be tentatively identified based on a computer library search of the sample chromotography. If found, the coumpound concentration w ill be reported as an estimated value.

The detection limit exceeds most stringent criteria.

[a] Secondary Contaminant Levels are in parentheses

[b] KAFB RCRA permit screening criteria for perchlorate

* Risk based screening levels w ill be calculated if analyte is detected and toxicological information is available

Constituents w ith "%" units are surrogates and are not a part of the target analytes.

CAS - Chemical Abstract Service

DL - Detection limit

DOE - Department of Energy

LOD - Limit of detection

LOQ - Limit of quantitation

µg/L - micrograms per liter

mg/L - milligrams per liter

NA - not applicable

pg/L - picograms per liter

RPD - relative percent difference

Table H-3

Comparison of Reporting Levels to Screening Objectives in Soil, Open Burn Unit at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Residential SSG (Feb 2012)	Coyote Test Field Super Group Background Values (surface soil)	Coyote Test Field Super Group Background Values (subsurface soil)	EPA Regional Screening Levels, Residential (Nov 2012)	LOQ	LOD	DL
SW6010B	Antimony	7440-36-0	mg/kg	31.3	3.9	3.9	--	3	2	0.94
SW6010B	Barium	7440-39-3	mg/kg	15,596	130	214	--	2	0.5	0.12
SW6010B	Beryllium	7440-41-7	mg/kg	156	0.65	0.65	--	0.3	0.1	0.03
SW6010B	Cadmium	7440-43-9	mg/kg	70.3	1	0.9	--	0.3	0.1	0.03
SW6010B	Chromium	7440-47-3	mg/kg	117,321/2.97	17.3	12.8	--	1	0.5	0.14
SW6010B	Cobalt	7440-48-4	mg/kg	--	5.2	5.2	23	1	0.5	0.25
SW6010B	Copper	7440-50-8	mg/kg	3,129	15.4	18.2	--	1.5	0.5	0.22
SW6010B	Lead	7439-92-1	mg/kg	400	21.4	11.8	--	1	0.5	0.26
SW6010B	Nickel	7440-02-0	mg/kg	1,564	11.5	11.5	--	1	0.5	0.24
SW6010B	Selenium	7782-49-2	mg/kg	391	1	1	--	4	2.5	1.4
SW6010B	Silver	7440-22-4	mg/kg	391	1	1	--	0.5	0.2	0.09
SW6010B	Tin	7440-31-5	mg/kg	--	10	10	47,000	100	25	11
SW6010B	Vanadium	7440-62-2	mg/kg	391	20.4	21.5	--	2	0.5	0.19
SW6010B	Zinc	7440-66-6	mg/kg	23,464	62	62	--	2	1	0.19
SW6020A	Arsenic	7440-38-2	mg/kg	3.9	5.6	7.4	--	0.5	0.3	0.15
SW6020A	Thallium	7440-28-0	mg/kg	0.78	1.1	1.1	--	0.15	0.1	0.05
SW7471A	Mercury	7439-97-6	mg/kg	15.6/7.82	0.25	0.10	--	0.04	0.012	0.0086
SW6850	Perchlorate	14797-73-0	µg/kg	54,800	--	--	--	5	0.4	0.26
SW7580	White Phosphorus	7723-14-0W	µg/kg	--	--	--	1,600	0.1	0.05	0.015
SW8260B	1,1,1-Trichloroethane	71-55-6	µg/kg	15,609,580	--	--	--	5	1	0.36
SW8260B	1,1,2,2-Tetrachloroethane	79-34-5	µg/kg	8,021	--	--	--	5	1	0.68
SW8260B	1,1,2-Trichloroethane	79-00-5	µg/kg	2,811	--	--	--	5	1	0.44
SW8260B	1,1,2-trichloro-1,1,2-trifluoroethane	76-13-1	µg/kg	72,080,604	--	--	--	10	1	0.83
SW8260B	1,1-Dichloroethane	75-34-3	µg/kg	64,514	--	--	--	5	1	0.29
SW8260B	1,1-Dichloroethene	75-35-4	µg/kg	448,879	--	--	--	5	0.5	0.26
SW8260B	1,2,3-Trichlorobenzene	87-61-6	µg/kg	--	--	--	49,000	5	1	0.75
SW8260B	1,2,3-Trichloropropane	96-18-4	µg/kg	50	--	--	--	5	1	0.76
SW8260B	1,2,4-Trichlorobenzene	120-82-1	µg/kg	72,980	--	--	--	5	1	0.75
SW8260B	1,2,4-Trimethylbenzene	95-63-6	µg/kg	--	--	--	62,000	5	1	0.51
SW8260B	1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	µg/kg	186	--	--	--	10	1	0.88
SW8260B	1,2-Dibromoethane (EDB)	106-93-4	µg/kg	588	--	--	--	10	1	0.27
SW8260B	1,2-Dichlorobenzene	95-50-1	µg/kg	2,306,711	--	--	--	5	1	0.64
SW8260B	1,2-Dichloroethane	107-06-2	µg/kg	7,885	--	--	--	5	1	0.73
SW8260B	1,2-Dichloropropane	78-87-5	µg/kg	15,238	--	--	--	5	1	0.6
SW8260B	1,3,5-Trimethylbenzene	108-67-8	µg/kg	--	--	--	780,000	5	1	0.35
SW8260B	1,3-Dichlorobenzene*	541-73-1	µg/kg	--	--	--	--	5	1	0.3
SW8260B	1,4-Dichlorobenzene	106-46-7	µg/kg	31,731	--	--	--	5	1	0.78
SW8260B	1,4-Dioxane	123-91-1	µg/kg	48,634	--	--	--	250	75	39
SW8260B	2-Butanone (MEK)	78-93-3	µg/kg	37,076,608	--	--	--	10	3	1.4
SW8260B	2-Hexanone	591-78-6	µg/kg	--	--	--	210,000	10	1	0.74
SW8260B	4-Methyl-2-pentanone (MIBK)	108-10-1	µg/kg	51,578	--	--	--	10	1	0.92
SW8260B	Acetone	67-64-1	µg/kg	66,556,733	--	--	--	20	3	1.4
SW8260B	Benzene	71-43-2	µg/kg	15,381	--	--	--	5	1	0.26
SW8260B	Bromochloromethane	74-97-5	µg/kg	--	--	--	160,000	5	1	0.94
SW8260B	Bromodichloromethane	75-27-4	µg/kg	5,411	--	--	--	5	1	0.53
SW8260B	Bromoform	75-25-2	µg/kg	--	--	--	--	5	1	0.4
SW8260B	Bromomethane	74-83-9	µg/kg	16,485	--	--	--	5	3	0.86
SW8260B	Carbon disulfide	75-15-0	µg/kg	1,532,527	--	--	--	10	1	0.49
SW8260B	Carbon tetrachloride	56-23-5	µg/kg	10,833	--	--	--	5	1	0.53
SW8260B	Chlorobenzene	108-90-7	µg/kg	376,370	--	--	--	5	1	0.29
SW8260B	Chloroethane	75-00-3	µg/kg	29,806,983	--	--	--	5	1	0.45
SW8260B	Chloroform	67-66-3	µg/kg	5,864	--	--	--	5	1	0.26
SW8260B	Chloromethane	74-87-3	µg/kg	274,707	--	--	--	5	1	0.5
SW8260B	cis-1,2-Dichloroethene	156-59-2	µg/kg	156,428	--	--	--	5	1	0.89
SW8260B	cis-1,3-Dichloropropene*	10061-01-5	µg/kg	33713	--	--	--	5	1	0.64
SW8260B	Cyclohexane	1735-17-7	µg/kg	--	--	--	7,000,000	(a)	(a)	(a)
SW8260B	Dibromochloromethane	124-48-1	µg/kg	12,127	--	--	--	5	0.5	0.21
SW8260B	Dichlorodifluoromethane (Freon 12)	75-71-8	µg/kg	168,142	--	--	--	5	3	0.89
SW8260B	Ethylbenzene	100-41-4	µg/kg	68,448	--	--	--	5	1	0.34
SW8260B	Isopropylbenzene	98-82-8	µg/kg	2,430,743	--	--	--	5	1	0.52
SW8260B	Methyl Acetate	79-20-9	µg/kg	78,214,000	--	--	--	(a)	(a)	(a)
SW8260B	Methly Cyclohexane	108-87-2	µg/kg	5,625,911	--	--	--	(a)	(a)	(a)
SW8260B	Methyl tert-butyl ether (MTBE)	1634-04-4	µg/kg	901,073	--	--	--	10	1	0.6
SW8260B	Methylene chloride	75-09-2	µg/kg	409,376	--	--	--	5	1	0.84
SW8260B	m-Xylene & p-Xylene	136777-61-2	µg/kg	774,289	--	--	--	5	1	0.81
SW8260B	Naphthalene	91-20-3	µg/kg	42,976	--	--	--	5	1	0.63
SW8260B	o-Xylene	95-47-6	µg/kg	898,344	--	--	--	5	0.5	0.33
SW8260B	Styrene	100-42-5	µg/kg	7,277,612	--	--	--	5	1	0.31
SW8260B	Tetrachloroethene	127-18-4	µg/kg	7,021	--	--	--	5	1	0.61
SW8260B	Toluene	108-88-3	µg/kg	5,274,400	--	--	--	5	1	0.61
SW8260B	trans-1,2-Dichloroethene	156-60-5	µg/kg	269,586	--	--	--	5	1	0.38
SW8260B	trans-1,3-Dichloropropene*	10061-02-6	µg/kg	33713	--	--	--	5	1	0.75
SW8260B	Trichloroethene	79-01-6	µg/kg	8,767	--	--	--	5	1	0.6
SW8260B	Trichlorofluoromethane (Freon 11)	75-69-4	µg/kg	1,412,976	--	--	--	10	1	0.34
SW8260B	Vinyl chloride	75-01-4	µg/kg	728	--	--	--	5	1	0.36

Table H-3

Comparison of Reporting Levels to Screening Objectives in Soil, Open Burn Unit at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Residential SSG (Feb 2012)	Coyote Test Field Super Group Background Values (surface soil)	Coyote Test Field Super Group Background Values (subsurface soil)	EPA Regional Screening Levels, Residential (Nov 2012)	LOQ	LOD	DL
SW8270C	1,1-biphenyl	92-52-4	µg/kg	57117	--	--	--	330	NA	165
SW8270C	1,2,4,5-tetrachlrorbenzene	95-94-3	µg/kg	18,331	--	--	--	(a)	(a)	(a)
SW8270C	2,4,5-Trichlorophenol	95-95-4	µg/kg	6,110,491	--	--	--	330	167	83
SW8270C	2,4,6-Trichlorophenol	88-06-2	µg/kg	61,105	--	--	--	330	167	84
SW8270C	2,4-Dichlorophenol	120-83-2	µg/kg	183,315	--	--	--	330	167	89
SW8270C	2,4-Dimethylphenol	105-67-9	µg/kg	1,222,098	--	--	--	500	167	167
SW8270C	2,4-Dinitrotoluene	121-14-2	µg/kg	15,689	--	--	--	330	167	89
SW8270C	2,6-Dichlorophenol*	87-65-0	µg/kg	--	--	--	--	500	167	165
SW8270C	2,6-Dinitrotoluene	606-20-2	µg/kg	61,105	--	--	--	330	167	99
SW8270C	2-Chloronaphthalene	91-58-7	µg/kg	6,257,143	--	--	--	330	167	81
SW8270C	2-Chlorophenol	95-57-8	µg/kg	391,071	--	--	--	330	167	88
SW8270C	2-Methylnaphthalene	91-57-6	µg/kg	--	--	--	230,000	330	167	85
SW8270C	2-Methylphenol	95-48-7	µg/kg	--	--	--	3,100,000	330	167	58
SW8270C	2-Nitroaniline	88-74-4	µg/kg	--	--	--	610,000	1600	167	84
SW8270C	2-Nitrophenol*	88-75-5	µg/kg	--	--	--	--	330	167	82
SW8270C	2,2-oxybis(1-chloropropane)*	52438-91-2	µg/kg	--	--	--	--	330	167	54
SW8270C	3,3'-Dichlorobenzidine	91-94-1	µg/kg	10,808	--	--	--	1600	167	94
SW8270C	3-Methylphenol & 4-Methylphenol	65794-96-9	µg/kg	--	--	--	3,100,000	1000	660	330
SW8270C	3-Nitroaniline*	99-09-2	µg/kg	--	--	--	--	1600	333	167
SW8270C	4,6-Dinitro-2-methylphenol	534-52-1	µg/kg	4,888	--	--	--	2000	333	81
SW8270C	4-Bromophenyl phenyl ether*	101-55-3	µg/kg	--	--	--	--	330	167	85
SW8270C	4-Chloro-3-methylphenol	59-50-7	µg/kg	--	--	--	6,100,000	330	167	92
SW8270C	4-Chloroaniline	106-47-8	µg/kg	--	--	--	2,400	330	167	58
SW8270C	4-Chlorophenyl phenyl ether*	7005-72-3	µg/kg	--	--	--	--	330	167	93
SW8270C	4-Nitroaniline	100-01-6	µg/kg	--	--	--	24,000	1600	167	88
SW8270C	4-Nitrophenol*	100-02-7	µg/kg	--	--	--	--	2000	333	280
SW8270C	Acenaphthene	83-32-9	µg/kg	3,440,510	--	--	--	330	167	83
SW8270C	Acenaphthylene*	208-96-8	µg/kg	--	--	--	--	330	167	85
SW8270C	Anthracene	120-12-7	µg/kg	17,202,560	--	--	--	330	167	86
SW8270C	Acetophenone	17537-31-4	µg/kg	7,821,428	--	--	--	(a)	(a)	(a)
SW8270C	Azobenzene (as 1,2 diphenyl hydrazine)	103-33-3	µg/kg	6079	--	--	610	330	167	92
SW8270C	Atrazine	93616-39-8	µg/kg	--	--	--	2,100	(a)	(a)	(a)
SW8270C	Benzaldehyde	100-52-7	µg/kg	--	--	--	7,800,000	(a)	(a)	(a)
SW8270C	Benz(a)anthracene	56-55-3	µg/kg	1,476	--	--	--	330	167	92
SW8270C	Benzo(a)pyrene	50-32-8	µg/kg	147	--	--	--	330	167	94
SW8270C	Benzo(b)fluoranthene	205-99-2	µg/kg	1,476	--	--	--	330	167	95
SW8270C	Benzo(ghi)perylene*	191-24-2	µg/kg	--	--	--	--	330	167	110
SW8270C	Benzo(k)fluoranthene	207-08-9	µg/kg	14,762	--	--	--	330	167	113
SW8270C	bis(2-Chloroethoxy)methane	111-91-1	µg/kg	--	--	--	180,000	330	167	88
SW8270C	bis(2-Chloroethyl) ether	111-44-4	µg/kg	6	--	--	--	330	167	81
SW8270C	bis(2-Ethylhexyl) phthalate	117-81-7	µg/kg	347,387	--	--	--	330	167	98
SW8270C	Butyl benzyl phthalate	85-68-7	µg/kg	--	--	--	260,000	330	167	95
SW8270C	Carbazole*	86-74-8	µg/kg	--	--	--	--	330	167	95
SW8270C	Caprolactam	105-60-2	µg/kg	--	--	--	31,000,000	(a)	(a)	(a)
SW8270C	Chrysene	218-01-9	µg/kg	148,629	--	--	--	330	167	84
SW8270C	Dibenz(a,h)anthracene	53-70-3	µg/kg	147	--	--	--	330	167	102
SW8270C	Dibenzofuran	132-64-9	µg/kg	--	--	--	78,000	330	167	86
SW8270C	Diethyl phthalate	84-66-2	µg/kg	48,883,929	--	--	--	330	167	90
SW8270C	Dimethyl phthalate	131-11-3	µg/kg	611,049,107	--	--	--	330	167	87
SW8270C	Di-n-butyl phthalate	84-74-2	µg/kg	6,110,491	--	--	--	330	167	97
SW8270C	Di-n-octyl phthalate*	117-84-0	µg/kg	--	--	--	--	330	167	97
SW8270C	Fluoranthene	206-44-0	µg/kg	2,293,674	--	--	--	330	167	95
SW8270C	Fluorene	86-73-7	µg/kg	2,293,674	--	--	--	330	167	92
SW8270C	Hexachlorobenzene	118-74-1	µg/kg	3,040	--	--	--	330	167	89
SW8270C	Hexachlorobutadiene	87-68-3	µg/kg	--	--	--	--	330	167	82
SW8270C	Hexachloroethane	67-72-1	µg/kg	42,773	--	--	--	330	167	81
SW8270C	Hexachlorocyclopentadiene	77-47-4	µg/kg	366,000	--	--	--	1600	250	62
SW8270C	Indeno(1,2,3-cd)pyrene	193-39-5	µg/kg	1,476	--	--	--	330	167	96
SW8270C	Isophorone	78-59-1	µg/kg	5,119,394	--	--	--	330	167	93
SW8270C	Naphthalene	91-20-3	µg/kg	42,976	--	--	--	330	167	82
SW8270C	Nitrobenzene	98-95-3	µg/kg	53,500	--	--	--	330	167	76
SW8270C	N-Nitrosodimethylamine	62-75-9	µg/kg	22.5	--	--	--	330	167	96
SW8270C	N-Nitrosodi-n-propylamine	621-64-7	µg/kg	--	--	--	69	330	167	84
SW8270C	N-Nitrosodiphenylamine	86-30-6	µg/kg	992,516	--	--	--	330	167	86
SW8270C	Pentachlorophenol	87-86-5	µg/kg	8,935	--	--	--	330	167	51
SW8270C	2,4,6-Tribromophenol		%	--	--	--	--	--	--	--
SW8270C	2-Flourophenol		%	--	--	--	--	--	--	--
SW8270C	Nitrobenzene-d5		%	--	--	--	--	--	--	--

Table H-3

Comparison of Reporting Levels to Screening Objectives in Soil, Open Burn Unit at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Residential SSG (Feb 2012)	Coyote Test Field Super Group Background Values (surface soil)	Coyote Test Field Super Group Background Values (subsurface soil)	EPA Regional Screening Levels, Residential (Nov 2012)	LOQ	LOD	DL
SW8290	2,3,7,8-TCDF*	51207-31-9	pg/g	449	--	--	--	1	0.15	EDL
SW8290	2,3,7,8-TCDD	1746-01-6	pg/g	44.9	--	--	--	1	0.15	EDL
SW8290	1,2,3,7,8-PeCDF*	57117-41-6	pg/g	--	--	--	--	5	0.75	EDL
SW8290	2,3,4,7,8-PeCDF*	57117-31-4	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,7,8-PeCDD*	40321-76-4	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,7,8-HxCDF*	70648-26-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,6,7,8-HxCDF*	57117-44-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	2,3,4,6,7,8-HxCDF*	60851-34-5	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,7,8,9-HxCDF*	72918-21-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,7,8-HxCDD*	39227-28-6	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,6,7,8-HxCDD*	57653-85-7	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,7,8,9-HxCDD*	19408-74-3	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,6,7,8-HpCDF*	67562-39-4	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,7,8,9-HpCDF*	55673-89-7	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,6,7,8-HpCDD*	35822-46-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	OCDF*	39001-02-0	pg/g	--	--	--	--	10	1.5	EDL
SW8290	OCDD*	3268-87-9	pg/g	--	--	--	--	10	1.5	EDL
SW8330B	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	mg/kg	3,911	--	--	--	0.25	0.05	0.012
SW8330B	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	mg/kg	58.2	--	--	--	0.25	0.05	0.012
SW8330B	1,3,5-Trinitrobenzene (1,3,5-TNB)	99-35-4	mg/kg	--	--	--	2,200,000	0.25	0.05	0.01
SW8330B	1,3-Dinitrobenzene (1,3-DNB)	99-65-0	mg/kg	--	--	--	6,100	0.25	0.05	0.0042
SW8330B	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	479-45-8	mg/kg	244	--	--	--	0.25	0.05	0.01
SW8330B	Nitrobenzene (NB)	98-95-3	mg/kg	53.5	--	--	--	0.25	0.05	0.0176
SW8330B	2,4,6-Trinitrotoluene (2,4,6-TNT)	118-96-7	mg/kg	39.1	--	--	--	0.25	0.05	0.0194
SW8330B	4-Amino-2,6-dinitrotoluene (4-Am-DNT)	19406-51-0	mg/kg	--	--	--	150,000	0.25	0.05	0.01
SW8330B	2-Amino-4,6-dinitrotoluene (2-Am-DNT)	35572-78-2	mg/kg	--	--	--	150,000	0.25	0.05	0.0125
SW8330B	2,4-Dinitrotoluene (2,4-DNT)	121-14-2	mg/kg	7.15	--	--	--	0.25	0.05	0.0053
SW8330B	2-Nitrotoluene (2-NT)	88-72-2	mg/kg	29.1	--	--	--	0.5	0.05	0.013
SW8330B	3-Nitrotoluene (3-NT)	99-08-1	mg/kg	7.8	--	--	--	0.25	0.05	0.0155
SW8330B	4-Nitrotoluene (4-NT)	99-99-0	mg/kg	244	--	--	--	0.25	0.05	0.0182
SW8330B	Nitroglycerin	55-63-0	mg/kg	6.11	--	--	--	0.5	0.25	0.015
SW8330B	PETN	78-11-5	mg/kg	--	--	--	120,000	0.5	0.25	0.025
SW8330B	3,4-Dinitrotoluene (Surrogate)	610-39-9	%	--	--	--	--	--	--	--

The laboratory does not analyze for these compounds. The compounds will be tentatively identified based on a computer library search of the sample chromotography. If found, the coumpound concentration will be reported as an estimated value.

The detection limit exceeds most stringent criteria.

Constituents with "%" units are surrogates and are not a part of the target analytes.

* Risk based screening levels will be calculated if analyte is detected and toxicological information is available

DL - Detection limit

LOD - Limit of detection

LOQ - Limit of quantitation

µg/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

pg/g - picograms per gram

RPD - relative percent difference

RSD - relative standard deviation for multi-incremental sample collection

SSG - soil screening goal

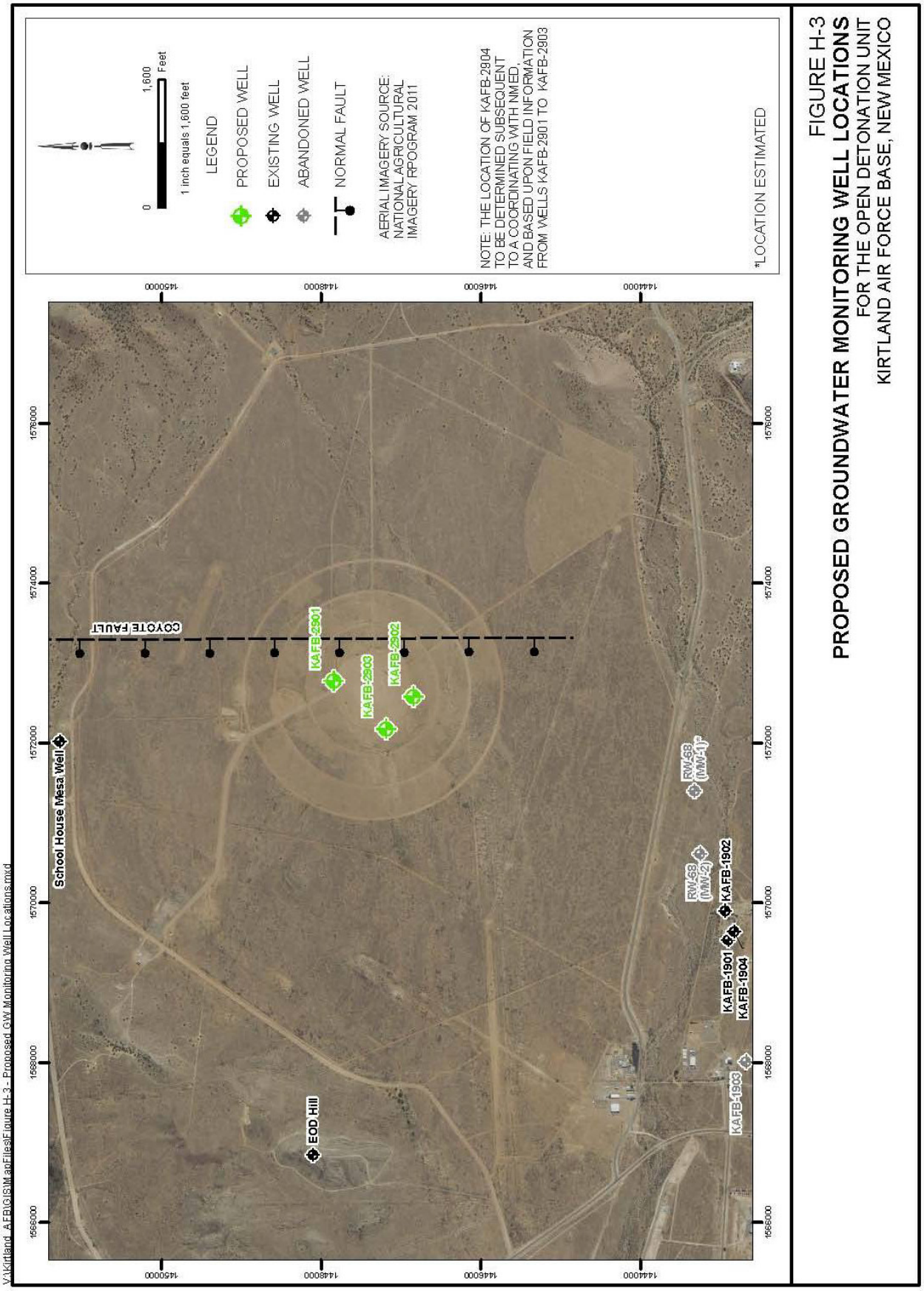

FIGURE H-3
PROPOSED GROUNDWATER MONITORING WELL LOCATIONS
FOR THE OPEN DETONATION UNIT
KIRTLAND AIR FORCE BASE, NEW MEXICO

2.1.1.1 Hydrogeologic Setting

The EOD Range is located within the Tijeras fault complex hydrogeologic region at Kirtland AFB (Sandia National Laboratories/New Mexico [SNL/NM], 2011a). The Sandia, Hubbel Springs, and Tijeras faults converge in this area and define eastern edge of the Albuquerque Basin. Within the Tijeras fault complex, a thin layer of alluvium covers bedrock. The hydrogeology in this area is poorly understood due to the complex geology created by the fault systems. On the eastern side of the Tijeras fault complex, the depth to groundwater ranges from about 45 to 325 ft bgs. Most of the monitoring wells in this area are completed in fractured bedrock at relatively shallow depths and produce modest yields of groundwater.

The nearest existing wells to the proposed monitoring well locations include the School House Well approximately 3,500 ft north-northwest of the OD unit; the EOD Hill Well approximately 4,300 ft west-northwest of the OD unit; three wells at Lake Christian (Kirtland AFB Solid Waste Management Unit [SWMU] 6-22), roughly 5,500 ft southeast of the OD unit; and three monitoring wells installed at the Old Burn Site (SNL SWMU 68), approximately 7,000 ft south of the OD unit. Nearby former monitoring well locations include two wells at the Radium Dump/Slag Piles (Kirtland AFB SWMU RW-68); approximately 4,500 ft south-southeast of the OD unit; and one well at Lake Christian (Kirtland AFB SWMU 6-22), roughly 5,500 ft southeast of the OD unit. The existing and former well locations are shown in Figure H-4.

All of the nearby wells are completed in water bearing zones of the Paleozoic sedimentary rocks of the Madera Group or Sandia Formation or the underlying Precambrian granite. The available borehole logs and well completion diagrams from the surrounding wells and former well locations indicate that the uppermost groundwater occurs under confined conditions.

The groundwater flow direction in the vicinity of the EOD Range is not well defined and is assumed to mirror the topographic gradient of the land surface. There are several north-south trending faults mapped along the Sandia/Manzanita/Manzano Mountain range front. In the vicinity of the OD unit, one normal fault crosses along the eastern edge of the EOD range, identified as the Coyote Fault in Figure H-4. This fault was encountered during drilling boreholes at the Old Burn Site (SNL SWMU 68), located south of the OD unit (SNL/NM, 2011b). This fault location is important to the OD unit investigation because it likely influences the groundwater flow across the site from east to west and may act as a hydraulic barrier. Comparison of water levels in the upgradient well and the downgradient wells shall provide data on the possible influence the fault has on local groundwater flow. The majority of the EOD Range is located west of the inferred location of the fault. The triangular configuration of the proposed downgradient monitoring wells and the measured groundwater elevations in the wells shall be used to calculate the groundwater flow direction and hydraulic gradient in the uppermost groundwater aquifer across the majority of the site.

The depth to the uppermost water bearing zones at the proposed well locations is expected to range from approximately 100 to 200 ft bgs. The horizontal groundwater flow velocity is estimated to be on the order of 50 to 100 ft/year. Based on a history of at least 40 or more years of activities in the EOD Range area, potential contaminant impacts in groundwater could be expected to have traveled roughly 2,000 to 4,000 ft downgradient based on those flow velocity estimates.

The three proposed well locations were selected in consultation with the Department (Figure H-3). One presumed upgradient and two presumed downgradient locations were selected for installation of the wells. Location of the fourth well shall be determined in consultation with the Department following installation of the three proposed wells based on gradient and flow direction.

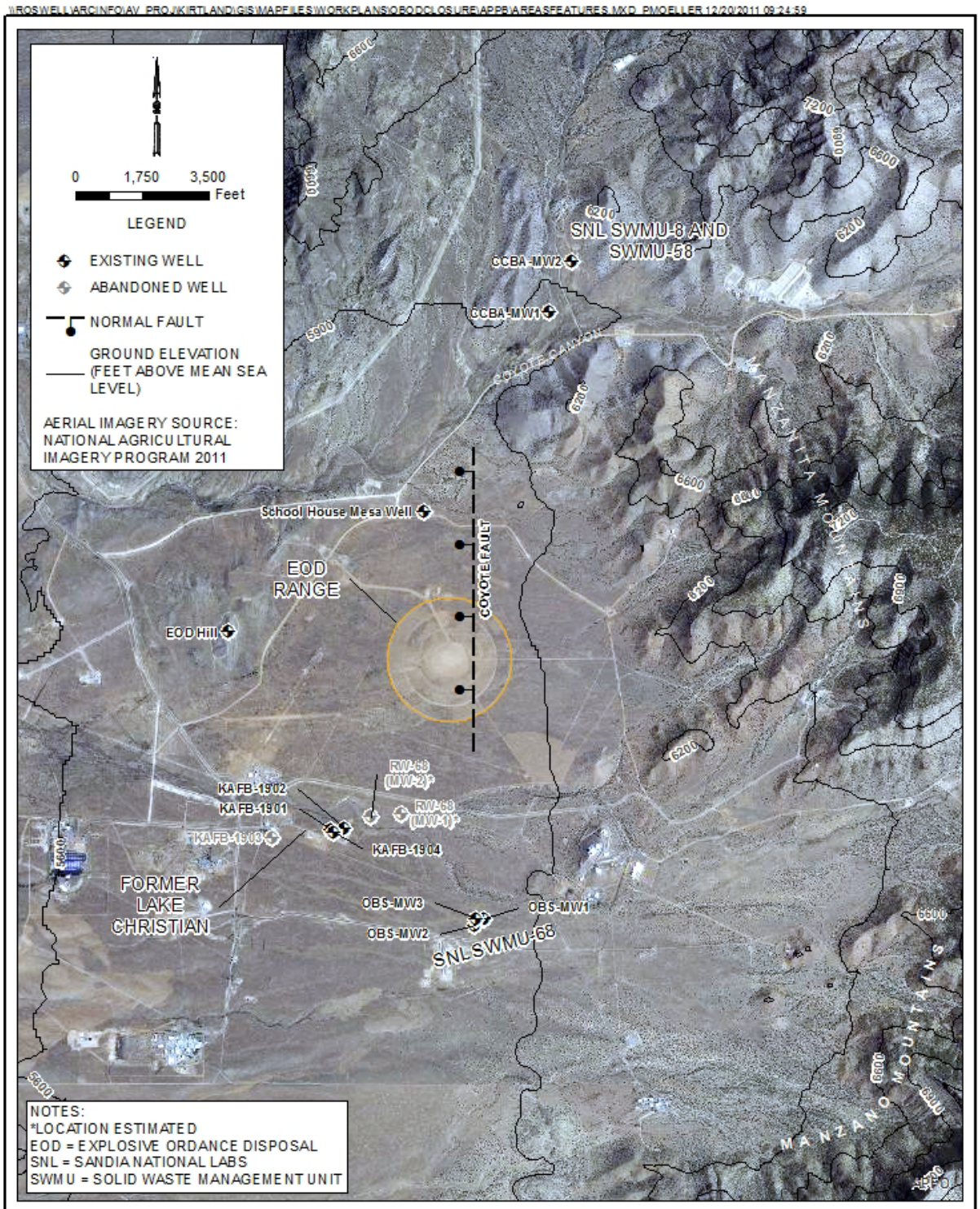

FIGURE H-4
AREA FEATURES AND WELL LOCATIONS
MONITORING WELL INSTALLATION WORK PLAN FOR THE OPEN BURN AND OPEN DETONATION UNITS
KIRTLAND AIR FORCE BASE, NEW MEXICO

2.1.1.2 Investigation Activities

Well installation activities shall be conducted in accordance with the *Kirtland Air Force Base, Base-Wide Plans for the Environmental Restoration Program*, *2004 Update* (USAF, 2004) and with the RCRA Permit. The procedures in Section 3.5 of the RCRA Permit, as well as procedures of the Base-Wide Plans, Standard Operating Procedure (SOP) B1.3: Monitoring Well Installation, shall be adhered to for this project, unless they are specifically modified by this closure plan.

2.1.1.3 Mobilization

The schedule of events for the investigation activities shall commence by drilling and installing three groundwater monitoring wells as shown in Figure H-3. Following well installations, the gradient and flow direction shall be established within the investigation area. The Permitee shall then meet with Department to determine the appropriate location of the fourth groundwater monitoring well. The fourth monitoring well, KAFB-2904, shall be installed and followed directly by the first groundwater monitoring event for the new wells. Quarterly groundwater monitoring shall be conducted according to this closure plan. At the conclusion of the investigation and four quarters of monitoring activities, the Permitee shall provide a report with recommendations based on the data collected from the first four quarters of monitoring.

An exploratory well application permit for each well shall be filed with the New Mexico Office of the State Engineer (NMOSE) in accordance with the Rules and Regulations Governing Well Driller Licensing; Construction, Repair and Plugging of Wells (NMOSE, 2005). The Bernalillo County well installation regulations are not applicable to wells installed on Kirtland AFB. All well locations shall be cleared by Unexploded Ordnance (UXO) support personnel prior to mobilization of drilling activities. An environmental impact analysis shall be performed through the Base Civil Engineering and Natural Resources Request (AF Form 813). A utility clearance of the area shall be performed using Base Civil Engineering Clearance Requests (AF IMT 103), Base Civil Engineer Work Requests (AF IMT 332), and New Mexico One Call services. A surface disturbance permit shall not be required because the total disturbed area of the wells is less than 1 acre.

2.1.1.4 Drilling Method and Sequence

The boreholes shall be installed using air-rotary casing hammer (ARCH) drilling method. This method has been successfully used for the installation of nearby monitoring wells and should facilitate lithologic description of drill cuttings and allow for the observation of soil/bedrock moisture content for identification of groundwater zones. The ARCH drilling method shall be used to advance the boring through the vadose zone and anchor the drive casing in the underlying bedrock.

The specific depths shall be determined in the field based on site conditions such as lithology and presence of groundwater. The following sequence of drilling is anticipated based on known hydrogeologic conditions and drill method capabilities:

1. Initiate boring with the ARCH method using an 8½-inch tri-cone bit and 9-5/8-inch diameter drive casing. Advance the drive casing to the depth of the contact between the alluvium and underlying bedrock.
2. Set the drive casing in the bedrock and continue drilling the borehole using an open hole drilling technique. If dense bedrock conditions are encountered in the boring, a change from a tri-cone bit to a down hole hammer bit may be required.

3. Advance the boring into the uppermost water bearing unit. Complete the borehole approximately 25 ft into the water bearing unit.

During the ARCH drilling activities, the field staff shall monitor for the presence of groundwater by visually inspecting drill cuttings for moisture. If the cuttings become wet, the borehole shall be allowed to sit idle for approximately one hour. A water level probe shall then be lowered into the borehole to assess whether groundwater has accumulated and this information shall be documented on the field log.

Field screening of the soil cuttings for the presence of volatile organic compounds (VOCs) shall be conducted during the drilling process using a portable photo ionization detector (PID) as described in Base-Wide Plans, Appendix B, SOP B3.1: Photo-ionization Detectors and Organic Vapor Analyzers (USAF, 2004). As the boreholes are advanced, the field geologist shall continuously collect soil cuttings to aid in the preparation of lithologic logs. The monitoring well lithologic log shall be completed as described in Base-Wide Plans, Appendix B SOP B1.1: Borehole and Sample Logging. Drill cuttings from ARCH method drilling shall be stored at the well site on plastic sheeting or in roll-off containers and managed as investigation-derived waste (IDW).

Groundwater purged from the boring during borehole advancement and sampling shall be allowed to settle in roll-off bins then transferred to holding tank(s). These plastic holding tanks shall be managed as IDW along with decontamination and well development fluids.

Decontamination of the drill rig, drill tools, sampling equipment, and associated equipment shall be accomplished by steam cleaning prior to drilling each well. Decontamination activities shall be conducted at a central location with water obtained from an approved onsite source. Decontamination fluids shall be contained in polyethylene tanks and managed as IDW.

2.1.1.5 Subsurface Soil Sampling

Soil and rock sampling shall be performed for lithologic description. Subsurface soil laboratory analysis is not proposed as part of this investigation. No soil or rock samples shall be submitted for laboratory analysis.

2.1.1.6 Monitoring Well Construction

Monitoring wells shall be designed and constructed based on the lithology and groundwater elevations encountered at each proposed well location. The well construction details may be subject to change based on the observed field conditions, but procedures and methods shall comply with Section 3.5 of the RCRA Permit and the OSE criteria. The anticipated well constructions details are shown in Figure H-5. The proposed monitoring well design includes the use of 4-inch-inside diameter (ID), Schedule 80 polyvinyl chloride (PVC) casing with a 5-ft well sump, 20-ft of 0.020-inch slot size well screen, and approximately 2 to 3 ft of stickup at the surface. Centralizers shall be used to stabilize the well casing within the borehole at the top and bottom of the screen interval and at a minimum spacing of 40 ft on casing above the top of the well screen.

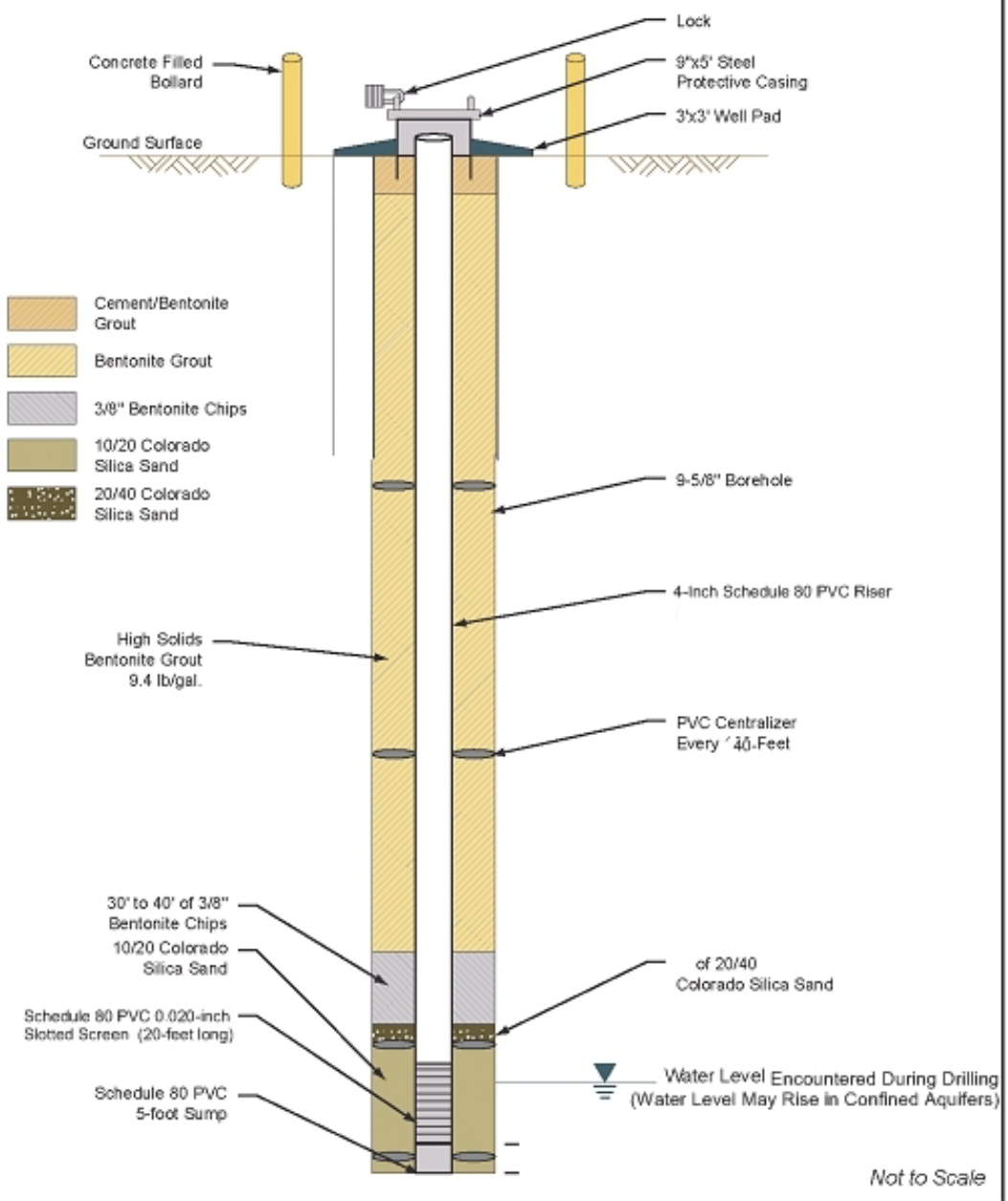

FIGURE H-5
PROPOSED MONITORING WELL DESIGN
MONITORING WELL INSTALLATION WORK PLAN
FOR THE OPEN BURN AND OPEN DETONATION UNITS
KIRTLAND AIR FORCE BASE, NEW MEXICO

Wells shall be completed as follows:

- The sand filter pack type shall be determined based on field observations and shall extend from the bottom of the silt trap to 5 ft above the top of the screen. However, it is anticipated that a filter pack of 10-20 gradation Colorado Silica Sand shall be used in the construction of the monitoring wells. The filter pack sand shall be placed through a tremie pipe. Approximately 2 ft of barrier sand, 100 percent passing an American Society for Testing and Materials (ASTM) U.S. Standard Sieve No. 60, shall be placed above the filter pack to inhibit flow of grout into the filter pack.

- A minimum of 10 ft of bentonite chips or pellets shall be installed above the filter pack through a tremie pipe. The seal shall be hydrated with clean potable water in 6-inch lifts. Setup time for the bentonite shall be at the discretion of the field geologist.

- The annular space above the hydrated bentonite seal shall be backfilled with bentonite slurry. Bentonite slurries are effective in sealing off groundwater units above the screened and sand-packed intervals of a well and are less likely to damage the well casing than bentonite-cement grout. The bentonite slurry shall be installed through a tremie pipe. The bentonite slurry shall extend from the bentonite pellet seal to approximately 50 ft bgs.

- The remaining 50 ft of annular space shall be filled with bentonite-cement grout consisting of 94 pounds of Portland cement, 3 percent by weight sodium bentonite powder, and 7 gallons of contaminant-free water. The bentonite-cement grout shall be placed using a grout pump and tremie pipe to within 5 ft of the land surface. The grout shall be allowed to set for at least 24 hours before well development begins.

- The monitoring wells shall be completed at the surface in accordance with specifications as presented in SOP B1.3 of the *Base-Wide Plans, Field Sampling Plan* (FSP) (USAF, 2004). The surface completion shall consist of a 5-foot-long, 9-inch-diameter steel stand pipe with locking cap cemented into a 3-foot-square concrete well pad. Four concrete-filled steel bollards shall be installed at the corners of the well pad to protect the well from vehicle damage.

- At the conclusion of the project, when wells KAFB-2901, KAFB-2902, KAFB-2903, and KAFB-2904 are no longer needed, the wells shall be properly abandoned in compliance with *Rules and Regulations Governing Well Driller Licensing; Construction, Repair and Plugging of Wells* (NMOSE, 2005).

2.1.1.7 Well Development

Monitoring wells shall be developed using a variety of techniques including swabbing, surging, bailing, air lifting and pumping. Monitoring well development shall adhere to procedures outlined in Base-Wide Plans, Appendix B, SOP B1.4: Monitoring Well Development (USAF, 2004). Monitoring well development shall be performed within one week after well installation but no sooner than 24 hours after grout installation. Groundwater discharged from the wells shall be monitored for pH, temperature, specific conductance, dissolved oxygen, oxidation-reduction (redox) potential, and turbidity. Each monitoring well screen shall be developed until pH and specific conductance stabilize and the water appears substantially free of sediment. The development goal is to reduce the turbidity to less than 10 nephelometric turbidity units (NTUs) and a less than 10 percent variance in the other parameters observed in the final three readings.

However, a final turbidity of less than 100 NTUs is acceptable. If the field parameters have not stabilized after 4 hours of continuous pumping, the well shall be allowed to sit overnight and development shall continue the following day for a maximum of 2 hours. If the turbidity still does not fall below 100 NTUs, the Permitee shall seek further direction from the Department.

Proposed monitoring wells KAFB-2901, KAFB-2902, and KAFB-2903 shall be developed and surveyed subsequent to installation. A static groundwater elevation from each surveyed and developed well shall be measured and used to determine the groundwater gradient and flow direction across the OD unit area. This information shall be used to determine the location and design of KAFB-2904.

2.1.1.8 Well Survey

A New Mexico licensed professional surveyor shall survey the horizontal well locations relative to New Mexico State Plane Coordinates and the vertical elevations to the nearest one-hundredth of 1 ft for the newly installed monitoring wells. Surveying shall be conducted in accordance with SOP B1.9 of the Base-Wide Plans FSP (USAF, 2004).

2.1.1.9 Groundwater Gradient Calculations

Depth to water measurements for static conditions shall be collected from monitoring wells KAFB-2901, KAFB-2902, and KAFB-2903 subsequent to well development. These measurements shall be converted to groundwater elevation data using well survey data. These elevations shall be mapped, and gradients shall be calculated perpendicular to the equipotential groundwater contours. The direction and magnitude of groundwater gradients shall provide information that shall be used to propose optimum locations for monitoring well KAFB-2904. The permitee shall consult with the Department to determine the final location of KAFB-2904. Groundwater elevations may also be collected from comparable aquifer units from nearby monitoring wells. The previously installed wells surrounding the investigation area include KAFB-1901, KAFB-1902, KAFB-1904, EOD Hill Well, and School House Mesa Well.

2.1.2 Groundwater Sampling and Analysis Plan

Groundwater monitoring shall be performed subsequent to well development at a quarterly frequency for up to eight quarters. Groundwater elevations shall be measured in each well prior to sampling. Groundwater elevations shall be used to determine groundwater flow rate and gradient on a quarterly basis. Well purging methods shall comply with the RCRA Permit Section 6.5.17.4 and groundwater samples shall be analyzed for VOCs, semivolatile organic compounds (SVOCs), explosives, perchlorate, white phosphorus, target analyte list metals, dioxins, and furans, total dissolved solids, alkalinity, anions, cations, and total organic carbon (Table H-4). Data shall be of sufficient precision and quality to meet data quality objectives and to ensure that method detection limits are less than cleanup levels where technologically feasible.

Up to eight consecutive quarters of groundwater monitoring are currently planned at the four monitoring wells. If groundwater contamination from the operation of the OD unit is not detected in the monitoring wells, they shall be properly plugged and abandoned in accordance with NMOSE regulations and Department guidance. If groundwater contamination from the operation of the OD unit is identified, the monitoring wells shall be maintained for the purpose of monitoring corrective action.

Table H-4
Groundwater Monitoring Parameters and Testing Methods for the Groundwater Investigation of the OD Unit

Analysis	Method	Testing Location	Data Use
Groundwater elevation	Groundwater probe	Field	Groundwater flow direction
pH	pH probe	Field, flow-through cell	General groundwater parameter
Temperature	Digitalthermometer	Field, flow-through cell	General groundwater parameter
Specific conductance	Conductivity meter	Field, flow-through cell	General groundwater parameter
Dissolved oxygen	Dissolved oxygen probe	Field, flow-through cell	Assess aerobic or anaerobic conditions
Oxidation-reduction potential	EH (hydrogen electrode) meter	Field, flow-through cell	Assess conditions for natural attenuation of contaminants
Turbidity	Turbidity meter	Field, flow-through cell	General groundwater parameter
Total dissolved solids	EPA 160.2[a]	Laboratory	General groundwater parameter
Alkalinity	EPA 310.2[a]	Laboratory	General groundwater parameter
Ammonia	EPA350.1[a]	Laboratory	General groundwater parameter
Sulfide	SW9030B[b]	Laboratory	General groundwater parameter
Anions (sulfate, nitrate, nitrite, chloride, bromide and fluoride)	SW9056[b]	Laboratory	General groundwater parameter
Total organic carbon	SW9060[b]	Laboratory	General groundwater parameter
Metals (barium, boron, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, lithium, magnesium, manganese, molybdenum, nickel, potassium, selenium, silver, sodium, strontium, tin, vanadium, zinc, antimony, arsenic, thallium, mercury)	SW6010B[b], SW6020A[b], SW7470A[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Perchlorate	SW6850[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Volatile organic compounds	SW8260B[b], SW8011[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Semivolatile organic compounds	SW8270C[b], SW8270-SIM[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Dioxins and furans	SW8290[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Explosives	SW8330B[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
White phosphorous	SW7580[b]	Laboratory	Assess potential contamination from OB/OD Unit operations

[a] EPA, 1993.
[b] EPA, 1996.
EPA – U.S. Environmental Protection Agency
OB/OD – Open Burn/Open Detonation

2.1.2.1 Well Purging and Field Measurements

Each monitoring well shall be purged by removing groundwater prior to sampling in order to ensure that fresh formation water is sampled. One to three well-bore volumes shall be purged from each well prior to sampling. A well-bore volume is defined as the volume of water in the saturated filter pack plus the volume of all standing water within the well screen and casing. Purge water shall be contained in polyethylene tanks for subsequent characterization and management as IDW. The following groundwater field parameters shall be measured during well purging: pH, specific conductance, dissolved oxygen concentration, turbidity, redox potential, and temperature. The volume of groundwater purged, the field parameter readings obtained at each time interval, and the instruments used to measure the field parameters shall be recorded on the field monitoring log. Water samples shall be obtained from a well only after the measured values of purge water field parameters have stabilized to within 10 percent for three consecutive measurements or once three well-bore volumes have been purged from the well.

Groundwater samples shall be collected using a pneumatic pump, a submersible electronic pump, or a bailer within eight hours of the completion of well purging. Groundwater in monitoring wells with low recharge rates and that purge dry shall be sampled when the water level in the well has recovered sufficiently to collect the required sample volume. Sampling handling, preservation, and storage shall comply with the RCRA permit requirements of Table H-5.

2.1.2.2 Laboratory Analysis and Quality Control/Quality Assurance Procedures

Groundwater samples shall be collected from each monitoring well and analyzed for VOCs, SVOCs, explosives, perchlorate, white phosphorus, target analyte list metals, dioxins, and furans, total dissolved solids, alkalinity, anions, cations, and total organic carbon (Table H-4). The proposed suite of parameters and analyses for the groundwater samples is presented in Table H-2. The contacted laboratory must meet DoD certification requirements. To ensure that data is of sufficient precision, laboratory method detection limits shall be those shown in the approved OD Unit Closure Plan. To ensure that analytical data is of sufficient quality and that laboratory and field methods are assured of proper quality field quality control samples shall be collected in compliance with the approved OD Unit Closure Plan. Level 4 laboratory data shall be requested and validated by qualified chemists to meet criteria specified by the Department and the DoD.

Data reliability shall be ensured by documenting sample management so that analyses are traceable to specific areas of potential contamination and by following a quality assurance/quality control (QA/QC) program that mandates documentation of the precision and accuracy of laboratory analyses, as well as data representativeness, completeness, comparability, and sensitivity.

The QC samples to be collected include: field duplicate samples, trip blanks, and rinsate blanks. Sample designations shall follow the guidelines as outlined in Section 4.2.1 of the Base-Wide Plans, FSP (USAF, 2004). The well identification numbers assigned to the four new wells for this investigation are: KAFB-2901, KAFB-2902, KAFB-2903, and KAFB-2904. The proposed sample number scheme is presented in Table H-6.

Table H-5
Sample Containers, Preservation Techniques, and Holding Times for Soil and Groundwater Samples

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers	Preservation Requirements	Maximum Holding Time
Soil	Metals (including mercury)	SW6010B/ SW6020 and SW7471A	1 gram	250-ml glass or polyethylene	4±2 degrees Celsius (ºC)	180 days from date of collection for metals; 28 days from collection to analysis for mercury
Soil	Volatile Organic Compounds (VOCs)	SW8260B/ SW5035	3 different 5-gram aliquots	6 40-milliliters (ml) volatile organic analysis (VOA) vials	Per sample collection: 2 VOA vials with 10-ml water and 1 VOA vial with 10-ml methanol. All vials contain a stir bar. Or 3 VOA vials containing stir bars will have a 5-gram sample aliquot added, seals and frozen on site with dry ice. Samples must remain frozen in shipment and storage at the lab until analysis.	Freeze within 48 hours of arrival at the lab, analyze within 14 days from data of collection Analyze within 14 days from data of collection
Soil	Semivolatile Organic Compounds (SVOCs)	SW8270C	30 grams	250-ml glass	4±2ºC	14 days from date of collection to extraction and 40 days from extraction to analysis
Soil	Perchlorate	SW6850	30 grams	250-ml glass	4±2ºC	28days
Soil	Explosives	SW8330B	10 grams	250-ml glass	4±2ºC	14 days from date of collection to extraction and 40 days from extraction to analysis
Soil	White Phosphorous	SW7580	40 grams	250-ml glass	4±2ºC	30 days from date of collection to extraction and analysis
Soil	Dioxins/ Furans	SW8290	30 grams	250-ml glass	4±2ºC	30 days from date of collection to extraction and 45 days from extraction to analysis
Groundwater	Dissolved metals (including mercury)	SW6010B/ 6020 and SW7470A	100-ml	1-liter polyethylene	pH < 2 with nitric acid; 4±2ºC	28 days from date of collection for Hg, 180 days for others
Groundwater	VOCs	SW8260B	3 40-ml vials	3 40-ml VOA vials	No headspace; 4±2ºC	7 days from data of collection
Groundwater	SVOCs	SW8270C	1 liter	2 1-liter amber glass	4±2ºC	7 days from date of collection to extraction and 40 days from extraction to analysis
Groundwater	Explosives	SW8330B	1 liter	2 1-liter amber glass	4±2ºC	7 days from date of collection to extraction and 40 days from extraction to analysis

Table H-5
Sample Containers, Preservation Techniques, and Holding Times for Soil and Groundwater Samples

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers	Preservation Requirements	Maximum Holding Time
Groundwater	Perchlorate	SW6850	1 liter	1- 250mL precleaned sterile, plastic containers	Field filtered with 1/3 volume headspace to remove and/or minimize microbial and anaerobic bacteria. Store at 4 ± 2 C	28 days
Groundwater	White Phosphorous	SW7580	120 ml	1-liter amber glass	4±2ºC	5 days from date of collection to extraction and analysis
Groundwater	Dioxins/ Furans	SW8290	1 liter	2 1-liter amber glass	4±2ºC	30 days from date of collection to extraction and 45 days from extraction to analysis
Groundwater	Anions (sulfate, nitrate, nitrite, chloride, bromide and fluoride)	SW9056	100-ml	1-liter polyethylene	4±2ºC	28 days from date of collection for all anions except that nitrate and nitrite are 48 hours
Groundwater	Ammonia	E350.1	100-ml	250 ml Poly	4°C pH < 2 with H2SO4	28days
Groundwater	Alkalinity	EPA 310.2	100-ml	250 ml Poly	4°C (share with SW9056)	14 days
Groundwater	Total Organic Carbon	SW9060	100-ml	1-liter polyethylene	4°C pH < 2 with HCL	28 days
Groundwater	Sulfide	SW9030B	500-ml	1-liter polyethylene	4°C Zn acetate NaOH to pH > 9	7 days
Groundwater	Total dissolved solids	EPA 160.2	100-ml	250 ml Poly	4°C	7 days

^{0}C – degrees Celsius
H2SO4 – glycine, sulfate
HCL – hydrochloric acid
mL – milliliters
NaOH – sodium hydroxide
pH – potential of hydrogen
SVOC – Semivolatile organic compound
VOA – volatile organic analysis
VOC – volatile organic compound
Zn – zinc

Table H-6
Proposed Groundwater Sample Identification for the Groundwater Investigation of the OD Unit

Sample Identifier[a]	Sample Type
OT29-GW-2901-_____	Normal
OT29-GW-2902-_____	Normal
OT29-GW-2903-_____	Normal
OT29-GW-2904-_____	Normal
OT29-FD-2901-_____	Duplicate
OT29-EB-2902-_____	Rinsate Blank
OT29-TB-2903-_____	Trip Blank[b]
OT29-MS-2904-_____	Matrix Spike
OT29-MSD-2904-_____	Matrix Spike Duplicate

[a] The six digit sample date shall make up the last portion of the sample identification number
[b] Trip Blanks shall only be analyzed for VOCs

2.1.2.3 Groundwater Data Analysis

Groundwater laboratory analytical results shall be analyzed to determine if there is statistically significant evidence of contamination at each groundwater monitoring well after each sampling event. The groundwater results shall be analyzed by comparison to baseline constituent concentrations and applicable groundwater standards.

Baseline constituent concentrations for the aquifer shall be calculated using laboratory analytical results for groundwater monitoring well KAFB-2901 and other groundwater monitoring wells completed within the same aquifer unit and located nearby. Groundwater monitoring wells that could potentially be used in the baseline constituent concentration calculations include KAFB-1902, KAFB-1903, KAFB-1904, RW68-01, RW68-02, and groundwater monitoring wells sampled by Sandia National Laboratory/New Mexico. Analysis to determine which of the groundwater monitoring wells are completed within the same aquifer unit shall be completed following installation of monitoring well KAFB-2901.

Baseline constituent concentrations shall be calculated for detected naturally occurring compounds including ammonia, sulfide, anions, metals, and perchlorate as listed in Table H-4. Anthropogenic compounds, including VOCs, SVOCs, explosives, dioxins and furans, are assumed to occur at levels less than detection limits. Baseline concentrations shall not be calculated for the anthropogenic compounds.

Baseline constituent concentrations shall be established by calculating a 95 percent upper tolerance limit (UTL) for each of the detected constituents listed above. The 95 percent UTLs shall be calculated following the methodology established as part of the Kirtland AFB Long-Term Monitoring Program (USAF, 2007). The purpose of the UTL approach is to define a constituent concentration from background well data, below which 95 percent of the monitoring well observations fall with a high degree of probability. Once the UTL is determined based on the background monitoring wells, data from downgradient site wells can be compared for evidence of a release by evaluating how the downgradient well results compare to the UTL. If the downgradient well results are greater than the UTL, there is statistical evidence that there has been an increase in the downgradient concentration of the constituent in groundwater. A detailed

description of the process to determine baseline concentrations can be found in the *Long-Term Groundwater Monitoring Summary and Baseline Determination Report, Fiscal Year 2005* (USAF, 2007).

2.1.2.4 Reporting

One well completion report shall be prepared to document the drilling and well installation activities. No laboratory analytical data shall be presented in the well completion report. The well completion report shall be submitted to the Department for approval within 30 days of the completion of well installation activities. The well installation report shall include the following information:

- Descriptions of the field program including the drilling, well installation, surveying, and IDW management activities;

- Field documentation including soil boring logs, well construction diagrams, well development logs, and survey data.

Field and laboratory data shall be submitted to the Department within 90 days after all samples are collected for each quarter.

Periodic groundwater monitoring reports shall be prepared to document quarterly groundwater monitoring results. All validated groundwater laboratory results shall be presented in periodic groundwater monitoring reports which comply with Section 6.2.4.4 of the RCRA Permit. Groundwater analytical results shall be compared to New Mexico water quality control standards and EPA maximum contaminant levels and secondary screening levels to determine if contamination above standards is present in the groundwater monitoring wells. Each quarter of analytical data shall be evaluated for the presence of potential contaminants. The Periodic Groundwater Monitoring Reports for the OD unit shall be prepared annually and following four quarters of groundwater monitoring and submitted within 90 days after the completion of the last quarterly monitoring event. Currently, up to eight consecutive quarters of groundwater monitoring and two Periodic Groundwater Monitoring Reports are planned.

2.1.2.5 Project Schedule

Table H-7 outlines the project schedule for the installation and sampling of groundwater monitoring wells. The monitoring well drilling and installation activities shall be conducted upon approval of the OD Unit Closure Plan. The well installation activities shall be documented in a Well Completion Report. Final validated groundwater analytical results from four quarters of groundwater sampling shall be reported in an Annual Groundwater Monitoring Report for the OD unit.

Table H-7
Proposed Schedule of Activities for Groundwater Monitoring Well Installation for the Closure of the OD Unit

Activity	Duration (calendar days)	Start Date
Field Investigation		
Mobilize drilling equipment	3	15 days following Closure Plan approval
Well installation, development, and surveying collection of IDW soil and water samples	28	Following mobilization
IDW characterization and disposal	45	Following well installation
Preparation of Well Completion Report		
Initiate Well Completion Report Preparation	30	Upon completion of all well drilling, development, and surveying activities
Submit Well Completion Report to USACE, USAF, and the Department	1	30 days following well installation
Quarterly Groundwater Monitoring and Periodic Reporting		
Conduct quarterly groundwater monitoring	3	Following installation of four groundwater monitoring wells and on a quarterly basis
Submit field and laboratory data from monitoring event	1	90 days following collection of groundwater samples on a quarterly basis
Prepare Periodic Groundwater Monitoring Report	90	Following collection of four quarters of groundwater samples
Submit Periodic Groundwater Monitoring Report to the Department	1	90 days following collection of fourth quarter groundwater samples
IDW – investigation-derived waste USACE – United States Army Corps of Engineers USAF – United States Air Force		

2.1.3 Mesa Schoolhouse Well

The Mesa Schoolhouse Well, a Department of Energy/National Nuclear Surety Administration (DOE/NNSA) well authorized under Kirtland AFB permit #PERM/0-K1-91-0010 was monitored for groundwater contamination as part of the December 1994 OD Unit's sampling and analysis plan. This sampling has been discontinued and the wellhead is secure. The well shall remain in place for possible future monitoring by DOE/NNSA

2.2 Sampling, Decontamination Procedures, and PPE

This section describes procedures and methods for soil and liquid sampling applicable to closure activities. While the procedures and methods are specific, other applicable procedures or methods given in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA, 1996; SW-846) may be used if conditions or experience show the alternate method to be more appropriate, and if approved by the Department. All sampling procedures actually used shall be annotated in the final closure report. Sampling shall be conducted in accordance with procedures given in "Samplers and Sampling Procedures for Hazardous Waste Streams" (EPA, 1980; EPA 600/2-80-018) or SW-846, as appropriate.

Surface and subsurface soil at the OD Unit shall be characterized by sampling and analysis.

The tools and equipment used during the sampling shall be vacuumed, cleaned with detergent and water, and scraped as necessary to remove any residue. The wash water shall be collected and

analyzed for characterization of waste. The vacuums used and their contents shall be containerized and shipped off site as hazardous waste for disposal.

All of the PPE worn by personnel performing closure activities shall be disposable; therefore, all PPE shall be placed into containers and managed as hazardous waste. This waste shall be considered to be contaminated with all of the hazardous waste constituents contained in the wastes that have been treated at the OB Unit and the OD Unit. All contained PPE wastes shall be transported to a permitted facility for disposal.

2.2.1 Soil Sampling

Soil samples shall be collected on a 25-ft by 25-ft grid spacing from the surface to 15 ft below ground surface at five ft intervals (total of four samples per location). At a minimum, the grid shall encompass all portions of the OD Unit that have hosted or may have hosted a pit used for the treatment of hazardous waste (Figure H-6).

Surface soil samples shall be collected approximately 25 ft from the OB Unit. Three samples shall be collected from each side of the OB for a total of 12 surface soil samples. These samples shall characterize potential contamination from the OB Unit that may have migrated onto the OD Unit.

The soil samples shall be analyzed for the parameters listed in Table H-3 which include all hazardous constituents of the hazardous wastes that were detonated at the OD Unit. Proposed sample identification numbers are shown in Table H-8.

Surface soil samples (zero to six inches depth) shall be collected with a wooden or Teflon™ trowel or scoop. Disposable sampling tools shall be used. In the event that the Department requests split samples, sufficient soils shall be collected to provide split samples to the Department representatives.

A Veihmeyer soil sampler, auger drill, direct push technology or other appropriate method shall be used to collect subsurface soil samples. Only discrete grab samples shall be collected; no samples shall be composited.

Clean sampling equipment shall be used to collect each sample. Unused, disposable sampling equipment may be presumed clean if still in a factory-sealed wrapper prior to use. Reusable sampling equipment shall be decontaminated after each use by scraping to remove any loose material, washing with a detergent and water solution, rinsing several times with tap water, rinsing with deionized water, and drained of excess water, and air-dried or wiped dry.

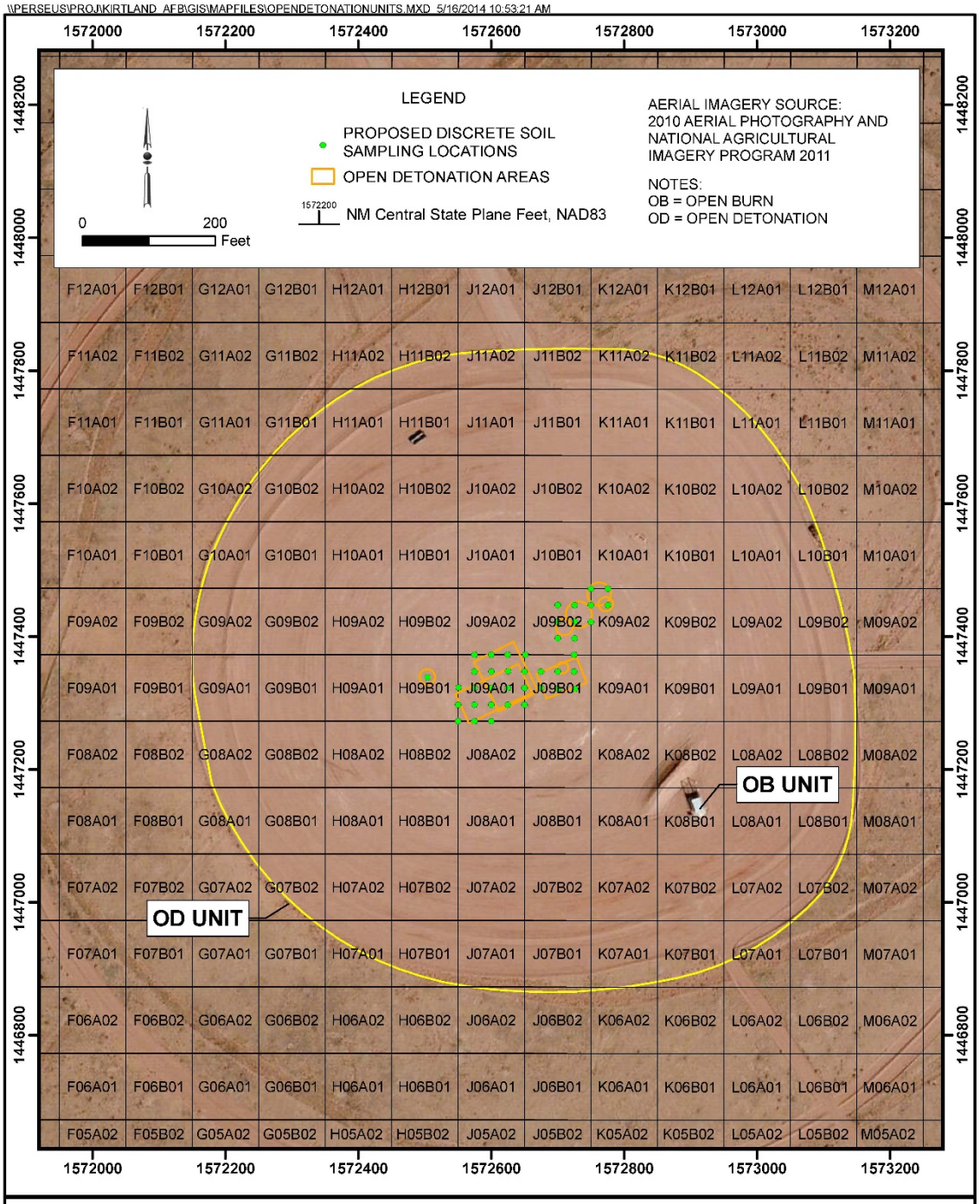

FIGURE H-6
PROPOSED DISCRETE SOIL SAMPLING LOCATIONS
OPEN DETONATION CLOSURE PLAN
KIRTLAND AIR FORCE BASE, NEW MEXICO

Table H-8
Proposed Discrete Soil Samples for the Open Detonation Unit, Kirtland Air Force Base, New Mexico

Soil Boring	Sample Identification	Depth (feet below ground surface)	Sample Type	**Metals** Methods SW-846 6010B, 6020A, 7471B	**VOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8260B	**SVOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8270C	**Total Explosives** (Per Table D-4 of RCRA Permit) Method SW-846 8330B	**Perchlorate** Method SW-846 6850	**White Phosphorous** Method SW-846 7580	**Dioxins** Method SW-846 8290
H09B1-01	OT29-SO-H09B1-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-H09B01-01-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-H09B01-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-H09B01-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-H09B01-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-01	OT29-SO-J09A1-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-02	OT29-SO-J09A1-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-03	OT29-SO-J09A1-03-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-03-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-03-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-03-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-03-1415	14 - 15	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-03-1415MS	14 - 15	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09A1-03-1415MSD	14 - 15	MS/MSD	X	X	X	X	X	X	X
J09A1-04	OT29-SO-J09A1-04-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-04-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-04-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-04-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-05	OT29-SO-J09A1-05-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09A1-05-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09A1-05-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-05-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-05-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-06	OT29-SO-J09A1-06-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-06-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-06-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-06-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-07	OT29-SO-J09A1-07-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-07-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-07-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-07-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-07-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-08	OT29-SO-J09A1-08-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-08-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-08-0405MS	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09A1-08-0405MSD	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09A1-08-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-08-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-09	OT29-SO-J09A1-09-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-09-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-09-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-09-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-10	OT29-SO-J09A1-10-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-10-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-10-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-10-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-11	OT29-SO-J09A1-11-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09A1-11-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09A1-11-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-11-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-11-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-12	OT29-SO-J09A1-12-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-12-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-12-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-12-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-13	OT29-SO-J09A1-13-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-13-0001MS	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09A1-13-0001MSD	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09A1-13-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-13-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-13-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-13-1415	14 - 15	Normal	X	X	X	X	X	X	X

Table H-8
Proposed Discrete Soil Samples for the Open Detonation Unit, Kirtland Air Force Base, New Mexico

Soil Boring	Sample Identification	Depth (feet below ground surface)	Sample Type	**Metals** Methods SW-846 6010B, 6020A, 7471B	**VOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8260B	**SVOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8270C	**Total Explosives** (Per Table D-4 of RCRA Permit) Method SW-846 8330B	**Perchlorate** Method SW-846 6850	**White Phosphorous** Method SW-846 7580	**Dioxins** Method SW-846 8290
J09A1-14	OT29-SO-J09A1-14-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-14-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-14-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-14-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-15	OT29-SO-J09A1-15-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09A1-15-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09A1-15-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-15-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-15-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-16	OT29-SO-J09A1-16-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-16-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-16-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-16-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-17	OT29-SO-J09A1-17-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-17-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-17-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-17-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-17-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-18	OT29-SO-J09A1-18-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-18-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-18-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-18-0910MS	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09A1-18-0910MSD	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09A1-18-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-19	OT29-SO-J09A1-19-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-19-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-19-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-19-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-20	OT29-SO-J09A1-20-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-20-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-20-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-20-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-20-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-21	OT29-SO-J09A1-21-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-21-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-21-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-21-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-01	OT29-SO-J09B1-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B1-01-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B1-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-02	OT29-SO-J09B1-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-03	OT29-SO-J09B1-03-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-03-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09B1-03-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09B1-03-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-03-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-04	OT29-SO-J09B1-04-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-04-0001MS	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09B1-04-0001MSD	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09B1-04-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-04-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-04-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-05	OT29-SO-J09B1-05-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-05-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-05-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-05-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-06	OT29-SO-J09B1-06-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-06-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09B1-06-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09B1-06-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-06-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-07	OT29-SO-J09B1-07-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-07-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-07-0405MS	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09B1-07-0405MSD	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09B1-07-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-07-1415	14 - 15	Normal	X	X	X	X	X	X	X

Table H-8
Proposed Discrete Soil Samples for the Open Detonation Unit, Kirtland Air Force Base, New Mexico

Soil Boring	Sample Identification	Depth (feet below ground surface)	Sample Type	**Metals** Methods SW-846 6010B, 6020A, 7471B	**VOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8260B	**SVOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8270C	**Total Explosives** (Per Table D-4 of RCRA Permit) Method SW-846 8330B	**Perchlorate** Method SW-846 6850	**White Phosphorous** Method SW-846 7580	**Dioxins** Method SW-846 8290
J09B2-01	OT29-SO-J09B2-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-02	OT29-SO-J09B2-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B2-02-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B2-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-03	OT29-SO-J09B2-03-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-03-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-03-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-03-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-04	OT29-SO-J09B2-04-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B2-04-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B2-04-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-04-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-04-1415	14 - 15	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-04-1415MS	14 - 15	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09B2-04-1415MSD	14 - 15	MS/MSD	X	X	X	X	X	X	X
J09B2-05	OT29-SO-J09B2-05-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-05-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-05-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-05-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-06	OT29-SO-J09B2-06-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-06-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-06-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-06-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-07	OT29-SO-J09B2-07-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B2-07-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B2-07-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-07-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-07-0910MS	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09B2-07-0910MSD	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09B2-07-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-08	OT29-SO-J09B2-08-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-08-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-08-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-08-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-09	OT29-SO-J09B2-09-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-09-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-09-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-09-1415	14 - 15	Normal	X	X	X	X	X	X	X
K09A2-01	OT29-SO-K09A2-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-K09A2-01-0405	4 - 5	Normal	X			X	X		
	OT29-FD-K09A2-01-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-K09A2-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-K09A2-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
K09A2-02	OT29-SO-K09A2-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-K09A2-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-K09A2-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-K09A2-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
QC	OT29-WW-RINSATE1	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-RINSATE2	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-RINSATE3	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-RINSATE4	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-TB1	-	Trip Blank		X					
	OT29-WW-TB2	-	Trip Blank		X					
	OT29-WW-TB3	-	Trip Blank		X					
	OT29-WW-TB4	-	Trip Blank		X					
			Total Normal Samples	160	80	80	160	160	80	80
			Total Field Duplicates	16	8	8	16	16	8	8
			Total Matrix Spike/Matrix Spike Duplicates	8	4	4	8	8	4	4
			Total Rinsate Blanks	4	4	4	4	4	4	4
			Total Trip Blanks		4					

MS/MSD - matrix spike/matrix spike duplicate
QC - quality control
RCRA - Resource Conservation and Recovery Act
SVOCs - semivolatile organic compounds
VOCs - volatile organic compounds

2.2.2 Liquid Sampling

Groundwater samples shall be collected from the groundwater monitoring wells installed at the OD Unit. Eight consecutive quarters of groundwater monitoring shall be conducted initially, following installation of the wells. Groundwater samples shall be obtained using methods approved by the Department within eight hours of the completion of well purging. The samples shall be analyzed for the parameters listed in Table H-4, which include all hazardous constituents of the hazardous wastes that were treated at the OD Unit.

Groundwater in monitoring wells with low recharge rates and that purge dry shall be sampled when the water level in the well has recovered sufficiently to collect the required samples. A low-flow bladder pump shall be utilized. Groundwater samples intended for metals analysis shall be submitted to the laboratory for analyses of total metals; the samples shall not be filtered in the field or laboratory.

Glass tubes shall be used to sample liquids, except groundwater. The primary advantage to using this type of sampling device is that the tube can be disposed of after each sample is collected, thus eliminating cross-contamination. Alternatively, a Coliwasa sampler may be used to sample liquids, except groundwater.

2.2.3 Appropriate Sample Containers and Preservatives

Samples shall be placed in clean containers compatible with the intended analysis and shall be properly prepared and preserved to maintain sample integrity. The most recent version of SW-846 lists the proper container, preservative, and holding time for each chemical parameter of interest, and these requirements shall be followed for all samples collected during the closure process. Table H-5 summarizes the sample containers, preservation techniques, and holding times for soil and liquid samples (including groundwater).

2.2.4 Sample Handling and Documentation

Each sample shall be labeled, sealed, and accompanied by a chain-of-custody and a request-for-analysis form. A chain-of-custody form shall be used to track samples from collection through analysis to ensure that the integrity of the samples is protected, and that analytical results can be attributed to specific samples of environmental media or waste. The procedures followed during closure shall be equivalent to those provided in the most current version of SW-846. Important aspects of the procedures are presented below. A chain-of-custody form shall be prepared for all samples collected for laboratory analyses. The form includes:

- • Sample identification number;
- • Name and signature of sample collector;
- • Date and time of sample collection;
- • Location at which sample was collected;
- • Type of waste (e.g., soil, liquid, etc.);
- • Signatures of persons who have had samples in their possession;
- • Dates and times of possession.

This form shall be initiated at the point of sample collection and shall then remain with the sample during transfer to the laboratory. The form shall be completed upon receipt at the laboratory and returned to the Permitee for inclusion in facility operating record. The chain-of-

custody form shall include a request-for analysis form that lists all analyses to be performed for the identified samples and all special instructions relating to sample management or analysis. Any potential hazards posed by the samples shall be listed on the request-for-analysis form.

The sample containers shall be sealed with gummed paper seals attached to the containers in such a way that the seals must be broken in order to open the containers. The seals and sample labels must be completed with a waterproof pen. The sample labels are necessary to prevent misidentification of samples and shall include the following information: a unique sample number; name or initials of sample collector; sample collection date and time; sample location; and, sample type, depth, and description.

A closure sampling field log book shall be kept and shall contain all information pertinent to field surveys and sampling. Sufficient information shall be recorded so that a person can reasonably reconstruct what occurred at a sampling event without relying on a collector's memory. The log book shall have bound and consecutively numbered pages in 8 by 11-inch format. Minimum entries shall include:

- Purpose of sample;
- Location of sampling;
- Name and business address of person making log entry;
- Number, type, and volume of sample;
- Description of each sampling methodology and equipment used;
- Date and time of sample collection;
- Sample destination and transporter's name (name of laboratory, UPS, etc.);
- Map or photograph of the sampling site;
- Field observations (ambient temperature, sky conditions, past 24-hour precipitation, etc.);
- Field measurements, if any (pH, flammability, conductivity, explosivity, etc.);
- Collector's sample identification number(s);
- Signature of person responsible for the log entry.

Documentation of sample acceptance at the laboratory shall be provided following sample screening and log-in. This documentation may consist of signed copies of the chain-of-custody, documentation or a letter detailing the field sample numbers accepted. Corresponding laboratory sample identification numbers shall be provided. The laboratory is required to have procedures for preventing cross contamination of samples and securing sample custody within the laboratory.

2.2.5 Sample Shipping

Samples shall be packaged and shipped to the laboratory in accordance with DOT shipping requirements and in a manner to ensure that the integrity of the samples is protected. The sample containers shall be cushioned to protect against breakage or puncture.

2.2.6 Sample Analysis

Soil, groundwater, and waste samples shall be analyzed by an ELAP-certified laboratory. The analytical laboratory shall have procedures for preventing cross-contamination of samples and securing sample custody within the laboratory. Test methods for analysis of all samples shall be performed according to procedures documented in the most current version of SW-846. Hazardous constituents associated with the regulated wastes treated at the OD Unit are included in these analyses. Analytical methods, detection limits, and instrumentation are provided in

Table H-3 for soil analysis; and in Table H-2 for groundwater analysis. Minimum calibration, operation, and quality control (bias, precision, blank and matrix effects) requirements for laboratory analyses shall be performed as listed in the individual analytical methods of SW-846. All laboratory analyst notebooks, log sheets, instrument printouts, charts, and calculations relevant to analyses of these samples shall be identified and remain accessible. This information may be requested for independent review and validation. If requested by the Department, this information shall be provided by the Permitee.

2.2.7 Quality Assurance/Quality Control Program

Because decisions about closure activities may be based, in part, on analyses of samples, a program to ensure reliability of analytical data is mandatory. Data reliability shall be ensured by documenting sample management so that analyses are traceable to specific areas of potential contamination and by following a quality assurance/quality control (QA/QC) program that mandates documentation of the precision and accuracy of laboratory analyses, as well as data completeness, representativeness, and comparability.

Sampling activities shall include collection of QC samples in addition to field documentation requirements. QC samples to be collected include: duplicate samples, trip blanks, field blanks, and rinsate blanks. Table H-9 summarizes field QC sample requirements.

Blanks and duplicate samples shall be collected to determine potential errors introduced in the data from sample collection and handling activities, laboratory error, and to assess analytical precision. To determine the potential for cross contamination, rinsate blanks consisting of rinsate from decontaminated equipment shall be collected and analyzed. At least one rinsate blank shall be collected for every ten samples collected using non-dedicated sampling equipment. Duplicate samples shall be collected at a frequency of one duplicate sample for every ten field samples. In no case shall less than one rinsate blank or duplicate sample be collected for a sampling effort. Trip blanks shall be collected on a daily basis and included in each shipment of samples that contain VOCs samples. Trip blanks are analyzed for VOCs only and are used to assess possible VOC contamination from outside sources. Trip blanks are shipped from the analytical laboratory and maintained with the sample bottles throughout the sampling process. These blank and duplicate samples shall be identified and treated as separate samples. Acceptance criteria for QA/QC sample analyses shall be compatible with the most recent version of SW-846 or other applicable guidance.

The analytical laboratory shall operate under a QA program plan (QAPP) that meets the requirements of the required methods. QC procedures in the analytical laboratory are guided by the laboratory's QAPP. Laboratory QC samples are required to establish the accuracy and precision of analytical data in order to determine the quality of the data. Table H-10- lists laboratory QC procedures by analytical methods.

The analytical laboratory data shall be evaluated using the following criteria:

- Completeness of data deliverable;
- Collection, extraction, and analysis holding times;
- Blank data;
- Laboratory control sample results;
- Matrix spike/matrix spike duplicate results;
- Laboratory duplicate sample results; and
- Overall data assessment and usability.

Table H-9
Summary of Field Quality Control Samples

Quality Control Sample Type	Sample Matrix	Applicable Analysis	Frequency	Purpose
Trip blank	Soil/Water	VOCs	One per day, per cooler containing VOC samples	Document any contamination attributable to shipping and field handling procedures
Field Duplicate	Soil/Water	VOCs, SVOCs, Metals, HE, Dioxins/Furans, White Phosphorus, Perchlorate, general chemistry[a]	Minimum of one per 10 environmental samples per media type	Document precision of the sampling/analysis process
Rinsate blank	Soil/Water	VOCs, SVOCs, metals, HE, Dioxins/Furans, White Phosphorus, Perchlorate, general chemistry[a, b]	One sample per day per media type for non-dedicated sampling equipment	Document whether decontamination of sampling equipment was adequate

[a] General chemistry - total dissolved solids, alkalinity, ammonia, sulfide, total organic carbon, sulfate, nitrate, nitrite, chloride ,fluoride, bromide

[b] No rinsate blank is required for total dissolved solids or alkalinity

HE - high explosives

SVOCs - semivolatile organic compounds

VOCs - volatile organic compounds

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method 7580

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Multipoint ICAL for all analytes (minimum five standards)	Before sample analysis	One of the following options. Option 1: Linear—RSD for each analyte ≤ 20%. Option 2: Linear—least squares regression r ≥0.995 for each analyte. Option 3: Nonlinear—COD ≥0.99 (six points will be used for second order, seven points will be used for third order) .	Correct problem then repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL. Calibration may not be forced through the origin. All quantitation for multicomponent analytes, such as technical chlordane, toxaphene, and Aroclors, must be performed form a five-point calibration. Results may not be quantified from a single point.
Second-source calibration verification	Immediately after each ICAL	All analytes within ± 20% of expected value	Correct problem and verify second-source standard. Rerun second-source verification. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Retention time window position established for each analyte and surrogate	Each ICAL and after the initial daily CCV	Position will be set using the midpoint standard of the ICAL curve. On days when an ICAL is not performed, the CCV is used.	N/A	N/A
Retention time window width established for each analyte and surrogate	At method setup and after major maintenance (for example, column change)	±3 times standard deviation for each analyte retention time from 72-hour study.	N/A	N/A
Retention time window verification for each analyte and surrogate	Each calibration verification	Analyte within established window.	Correct problem, then reanalyze all samples analyzed since the last acceptable retention time check.	**ICV:** Flagging criteria are not appropriate for initial verification. **CCV:** Apply Q-flag to all results for the specific analyte(s) in the sample that are outside the established window.
CCV	Daily, before sample analysis unless ICAL performed on same day, after every 10 samples, and at the end of the analysis sequence	All analytes within ± 15% of expected value (% D).	Correct problem, then rerun. If that fails, repeat ICAL. Reanalyze all samples since last successful calibration verification.	**If reanalysis cannot be performed,** apply Q-flag to all results for the specific analyte(s) >15%D for all samples associated with the calibration verification.
Method blank	One per analytical batch	No analytes detected > ½ LOQ. For common laboratory contaminants no analytes detected > LOQ and see Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and reanalyze method blank and all	Apply “B” flag to all associated positive results for the specific analyte(s), as appropriate. See Worksheet #36, Section 36.2.5.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method 7580

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			samples processed with the contaminated blank.	
LCS for all analytes (must contain all target analytes)	One per analytical batch	Acceptance criteria: Worksheet #15.	Correct problem, then reanalyze. If still out, reprepare and reanalyze the LCS and all samples in the affected batch.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
MS/MSD	One per 20 project samples per matrix as a minimum and as defined on the chain-of-custody form	Acceptance criteria: Worksheet #15.	Assess data to determine whether there is a matrix effect or analytical error. Review LCS for failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an eval-uation can be made regarding PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: • %R for MS or MSD > upper control limit • %R for MS or MSD < lower control limit • MS/MSD RPD > control limit
Second-column confirmation (not required for Methods 8015B [DRO or GRO]	All positive results	Same as for initial or primary column analysis.	Same as for initial or primary column analysis.	Apply J-flag if RPD > 40% from first column result. Apply Q-flag to all results for the specific analyte(s) in the sample not confirmed.
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[c])	At initial setup and then once per 12-month period or quarterly DL verification	Detection limits established will be ≤ ½ the RL in Worksheet #15 Tables (see 40 CFR, Part 136, Appendix B). For the verification check to be valid, analytes must be detected and identified by method-specified criteria or the verification check must produce a response that is at least 3 times the instrument noise level and greater than the response in the blanks associated with the MDL study.	Continue the MDL study until all criteria are met.	N/A.
LOD determination and verifi-cation (see Section D.1.2.1 and Box D-13 of the DoD QSM[c])	At initial setup and verified quarterly (if a laboratory uses multiple instruments for a given method, the LOD must be verified on each)	The apparent signal-to-noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If LOD verification fails, the laboratory must (1) repeat the MDL determination and LOD verification at a higher concentration or (2) perform and pass two consecutive LOD verifications at a higher concentration. The LOD is	N/A; samples may not be analyzed without a valid LOD.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method 7580

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			set at the higher concentration.	
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[c])	At initial setup (1) verify LOQ; and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of the DoD QSM[c])	(1) LOQ and associated precision and bias must meet client requirements and be reported; or (2) in the absence of client requirements, must meet LCS control limits (see Box D-14 of the DoD QSM[c]).	If the LOQ verification fails, laboratory must either establish a higher LOQ or modify method to meet client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag "U."
Demonstrate acceptable analyst capability	Before using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of DoD QSM[c])	QC acceptance criteria published by DoD, if available; otherwise, method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for analytes not meeting criteria (see section C.1.f of DoD QSM[c]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by an analyst until capability is demonstrated.

End of Method 7580

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Mass spectrometer tuning check Use bromofluorobenzene (SW8260B) or decafluorotriphenylphosphine (SW8270C)	Before ICAL and calibration verification	Refer to criteria listed in method description.	Retune instrument and verify.	Not appropriate.
GC performance check (8270C only or when SW8270 is used for pesticide analyses)	Daily before analysis of sample or calibration standards	Degradation ≤ 20% for DDT. No visible peak tailing for benzidine or pentachlorophenol (as a default, tailing factors should be less than 2.0).	Correct problem, then repeat performance check.	Not appropriate.
Multipoint ICAL for all analytes (minimum five standards)	Before sample analysis	SPCCs: Average RF ≥ 0.30 (SW8260B), ≥ 0.050 (SW8270C) CCCs: % RSD for RFs ≤ 30% and one of the options below; Option 1: Linear—RSD for each analyte < 15%. Option 2: Linear—linear least squares regression r > 0.995 for each analyte. Option 3: Nonlinear—COD ≥ 0.99 (6 points will be used for second order, 7 points will be used for third order). This is not a preferred option.	Correct problem, then repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL. Calibration may not be forced through the origin.
Second-source calibration verification	Once per ICAL	All analytes within ± 20% of expected value.	Correct problem and verify second-source standard. Rerun second-source verification. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Retention time window position establishment for each analyte and surrogate	Once per ICAL	Position will be set using the midpoint standard of the ICAL curve. On days when an ICAL is not performed, the CCV is used.	N/A.	N/A.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Retention time window verification for each analyte	Each sample	RRT of the analyte within ± 0.06 RRT units of ICAL. Laboratories may update the retention times based on the CCV to account for minor performance fluctuations or after routine system maintenance (e.g., column clipping. With each sample, the RRT will be compared with the most recently updated RRT. If the RRT has changed by more than ±0.06 RRT units since the last update, there has been a significant change in system performance and the laboratory must take appropriate corrective actions as required by the method and rerun the ICAL to re-establish the retention times.	Correct problem then reanalyze all samples analyzed since the last retention time check.	Apply Q-flag to all results for the specific analyte(s) in the sample that are outside the established window.
CCV	Daily, before sample analysis (unless ICAL performed on same day), and after every 12 hours of analysis time	SPCCs: Average RF ≥ 0.30 (SW8260B), ≥ 0.050 (SW8270C) CCCs: % RSD for RFs ≤ 30% and All analytes within ± 20% D of expected value from ICAL.	Correct problem, then rerun CCV. If that fails, repeat ICAL.	Apply Q-flag to all results for the specific analyte(s) > 20% D for all samples associated with the calibration verification.
ISs	Each sample, standard, and QC sample	Retention time ± 30 seconds from retention time of the IS in the ICAL midpoint standard. Extracted ion current profile area within -50% to +100% of area from IS in ICAL mid-point standard.	Inspect mass spectrometer and GC for malfunctions and make corrections as appropriate. Reanalysis of samples analyzed while the system was malfunctioning is mandatory.	Apply Q-flag to all results for analytes associated with a failed IS (unless a matrix effect can be verified), then apply M-flag.
Method blank	One per analytical batch	No analytes detected > ½ LOQ. For common laboratory contaminants, no analytes detected > LOQ. See Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and analyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s), as appropriate. See Worksheet #36, Section 36.2.5.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
LCS for all analytes	One LCS per analytical batch	Acceptance criteria: Worksheet #15.	Correct problem, then reanalyze. If still out, reprepare and reanalyze the LCS and all samples in the affected batch.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
MS/MSD	One per 20 samples per matrix as a minimum and as defined on the chain-of-custody form	Acceptance criteria: Worksheet #15.	Assess data to determine whether there is a matrix effect or analytical error. Analyze LCS for failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made regarding the PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: (1) %R for MS or MSD > upper control limit (2) %R for MS or MSD < lower control limit (3) MS/MSD RPD > control limit
Surrogate spike	Every sample, spiked sample, standard, and method blank	Acceptance criteria: Worksheet #15.	Correct problem, then reprepare and reanalyze the affected samples. If matrix effect is verified, discuss in case narrative.	For the samples: If the %R > UCL for any surrogate, apply J-flag to all positive results for associated analytes. If the %R < LCL for any surrogate, apply J-flag to all positive results for associated analytes and UJ-flag to all associated nondetects. If any surrogate recovery is <10%, apply Q-flag to all results for all associated analytes.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[C])	At initial setup and then once per 12-month period or quarterly DL verification	Detection limits established will be ≤ ½ the RL in Worksheet 15. See 40 CFR, Part 136, Appendix B. All analytes must be detected and identified by method-specified criteria for the for the verification check to be valid, or the verification check must produce a response that is at least 3 times the instrument noise level and greater than the response in the blanks associated with the MDL study.	Continue the MDL study until all criteria are met.	N/A.
LOD determination and verification (see Section D.1.2.1 and Box D-13 of the DoD QSM[C])	At initial setup and verified quarterly (if a laboratory uses multiple instruments for a given method, the LOD must be verified on each)	The apparent signal-to-noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must (1) repeat the detection limit determination and LOD verification at a higher concentration or (2) perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	N/A; samples may not be analyzed without a valid LOD.
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[C])	At initial setup: (1) verify LOQ; and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if a laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of DoD QSM[C]	(1) The LOQ and associated precision and bias must meet client requirements and must be reported or (2) in the absence of client requirements, must meet LCS control limits. See Box D-14 of the DoD QSM[C].	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag "U."
Demonstrate acceptable analyst capability	Before using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of DoD QSM[C])	QC acceptance criteria published by DoD, if available; otherwise method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for those analytes that did not meet criteria (see Section C.1.f of the DoD QSM[C]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by an analyst until capability is demonstrated.

End of Methods SW8260B, SW8270C, and SW8270C (SIM)

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8330B

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Initial multipoint calibration for all analytes (minimum five standards) (ICAL)	Minimum five-point initial calibration for target analytes, lowest concentration standard at or below the reporting limit.	Initial calibration prior to sample analysis	Average RF: RSD </= 20%; Linear: r>0.995, intercept < MDL. Apparent S/N ratio of standard at RL (LOQ) must be at least 5:1.	Evaluate standards, chromatography, and detector response. If problem found with above, correct as appropriate, then repeat initial calibration
Second-source calibration verification	Once per ICAL	All analytes within ± 20% of expected value	Correct problem and verify second source standard. Rerun second source verification. If that fails, correct problem and repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Low standard verification	Immediately following ICAL.	Less than 50 % difference for target analytes;	Evaluate data. If problem (e.g., concentrated standard, plugged injector needle) found, correct, then repeat low-level verification. If still fails, repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
CCV	Daily, before sample analysis unless ICAL performed on same day and every 24 hours of analysis time	All analytes within ± 20% of expected value	Correct problem, rerun CCV. If that fails, repeat initial calibration.	Apply Q-flag to all results for the specific analyte(s) > 30 %D for all samples associated with the calibration verification.
Surrogate spike	**Every sample, spiked sample, standard, and method blank**	**Acceptance criteria: Worksheet #15.**	**Correct problem, then reprepare and reanalyze the affected samples.** **If matrix effect is verified, discuss in case narrative.**	**For the samples:** **If the %R > UCL for any surrogate, apply J-flag to all positive results for associated analytes.** **If the %R < LCL for any surrogate, apply J-flag to all positive results for associated analytes and UJ-flag to all associated nondetects.** **If any surrogate recovery is <10%, apply Q-flag to all results for all associated analytes.**
Method Blank	One per preparation batch	No target analytes ≥ ½ LOQ and > 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater).	Verify instrument clean (evaluate calibration blank & samples prior to method blank), then reanalyze. Evaluate to determine if systematic issue within laboratory, correct, then re-prepare and reanalyze the method blank and all samples processed with the contaminated blank in accordance with DoD QSM requirements	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8330B

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
LCS for all analytes	One LCS per analytical batch	Acceptance criteria: Table 7-4	Correct problem then reanalyze. If still out, reprep and reanalyze the LCS and all samples in the affected AB.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
Confirmation Analysis	When target analytes detected on the primary column at concentrations > LOD.	Calibration and QC criteria the same as for initial/primary analsyis. Results between primary and secondary column RPD ≤ 40%	Evaluate data, then report with flag to denote RPD > 40%. Narrate obvious matrix issues.	RPD between primary and confirmation analysis ≤ 40%..
Soil Grinding Blank	When puck mill grinding is performed, one blank between each sample processed.	Blank material ground and subsampled as with the samples. Composited prior to analysis. No target analytes detected at > than 1/2 the LOQ	All blanks are reported, and data is flagged/narrated if the criteria are exceeded.	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements
Grinding Certified Reference Material (CRM)	When puck mill grinding is performed, CRM is ground for every 20 samples ground.	Within the control limits supplied by manufacturer of material	Evaluate the data, narrate any outliers and report.	Manufacturer's acceptance limits.
DL study (as part of the LOD process, reference Section D.1.2.1 of the DoD QSM)	At initial setup and subsequently once per 12-month period or quarterly DL verification checks.	DL established shall meet 40 CFR, Part 136 Appendix B.	Continue to run the DL study until all criteria are passing	N/A
LOD determination and verification (reference Section D.1.2.1 and grey box D-13 of the QSM)	At initial set-up and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must: 1) Repeat the detection limit determination and LOD verification at a higher concentration;or 2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	Not Applicable, Samples may not be analyzed without a valid LOD.
LOQ establishment and verification (reference Section D.1.2.2 and grey box D-14 of the QSM)	At initial setup: 1) Verify LOQ; and 2) Determine precision and bias at the LOQ. Subsequently, verify LOQ quarterly. If a laboratory uses multiple instruments for a given method, the LOQ must be verified on each. See Box D-14.	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or 2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DOD QSM.	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	Not Applicable, Samples may not be analyzed without a valid LOD.
Results reported between DL and LOD and the LOD and the LOQ	None	None	None	Apply F-flag to all results between DL and LOQ. If no Detection determined below the LOD, report to the LOD, flag U.

End of Method SW8330B

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Tuning (Mass Calibration Verification)	Prior to ICAL and after any mass calibration or maintenance is performed.	Quantitation ions within 0.3 m/z of expected mass.	Perform mass calibration on the MS/MS. If required, consult with instrument engineer for further maintenance.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Minimum six-point initial calibration for target analytes, lowest concentration standard at or below the reporting limit	Initial calibration prior to sample analysis	Linear: $r^2 > 0.990$ ($r>0.995$) with intercept ≤ LOD, or Average Response Factor: RSD≤ 20%.	Evaluate standards, chromatography, and mass spectrometer response. If problem found with above, correct as appropriate, then repeat initial calibration.	Evaluate standards, chromatography, and detector response. If problem found with above, correct as appropriate, then repeat initial calibration
Second-source calibration verification	Once per six-point initial calibration	Perchlorate within ±15% of the true value	Evaluate data. If problem (e.g., concentrated standard, plugged transfer line) found, correct, then repeat second source verification. If it still fails, then repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Daily calibration verification	Mid-range standard analyzed before sample analysis, after every 10 samples, and at the end of the sequence.	Perchlorate within ±15% of the true value	Correct problem, then repeat. If still fails, repeat initial calibration	Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.
Limit of Detection verification (LODv) (per batch)	Prior to sample analysis and at the end of the analysis sequence.	Perchlorate within ± 30% of the true value	Correct problem. Evaluate samples. Samples with results > RL (LOQ) may be reported. Samples since the last passing LODv with results ≤ RL (LOQ) must be reanalyzed.	**Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.**
Laboratory Reagent Blank	Prior to ICAL, following samples with overrange concentration of perchlorate, and at the end of the analytical sequence.	No perchlorate detected > LOQ	Reanalyze reagent blank (until no carryover seen), and any samples with perchlorate detections since the contaminated blank.	No target analytes ≥ ½ LOQ
Internal Standard	Every Calibration Standard	ICAL: IS for each standard must be within ± 50% of the average area of the ICAL. ICV, CCV: Within ± 50% of the average area of the ICAL or within ± 50% of the 1st CCV of the run, if the ICAL is not run the same day.	Evaluate the system. Reanalyze/repeat the calibration.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples.
Method Blank	One per preparation batch	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements	Correct problem, then re-extract and reanalyze method blank and all samples processed with the contaminated blank in accordance with DoD QSM requirements	No target analytes ≥ ½ LOQ

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Interference Check Sample (ICS)	One per preparation batch	70% -130%	Reanalyze once. If still outside the acceptance limits, evaluate to determine if cleanup filters or column degradation are suspect, replace appropriate materials and reprepare (filters) or reanalyze (column). Repeat the Interference Threshold Study to deter. If problem still exists, recalibrate.	Recovery as described in DoD Perchlorate Handbook.
IS	During acquisition of calibration standard, samples, and QC check samples	Areas within -50% to +100% of the midpoint of the last ICAL for each sample and QC in accordance with DoD QSM requirements	Inspect LCMS for malfunctions; mandatory reanalysis of samples analyzed while system was malfunctioning in accordance with DoD QSM requirements	Meets all EPA Method requirements
Isotope Ratio $^{35}CL/^{37}CL$	Every sample, batch QC sample and standard	Monitor for either the parent ion at masses 99/101 or the daughter ion at masses 83/85 depending on which ions are quantified.	Re-extract, re-clean, and/or reanalyze affected sample(s). If problem persists, perform post-spike or dilution as appropriate to confirm presence of perchlorate	Theoretical ratio approx. 3.06 Must fall within 2.3 to 3.8
LCS	One LCS per analytical/preparation batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Reanalyze LCS once. If acceptable, report. Otherwise, evaluate and re prepared and reanalyze the LCS and all samples in the associated prep batch for failed analytes, if sufficient sample material is available.	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
MS/MSD	One MS/MSD per batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Identify problem; if not related to matrix interference, re-extract and reanalyze MS/MSD in accordance with DoD QSM requirements	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
DL study (as part of the LOD process, reference Section D.1.2.1 of the DoD QSM)	At initial setup and subsequently once per 12-month period or quarterly DL verification checks.	DL established shall meet 40 CFR, Part 136 Appendix B.	Continue to run the DL study until all criteria are passing	N/A
LOD determination and verification (reference Section D.1.2.1 and grey box D-13 of the QSM)	At initial set-up and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must: 1) Repeat the detection limit determination and LOD verification at a higher concentration; or 2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD	Not Applicable, Samples may not be analyzed without a valid LOD.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			is set at the higher concentration.	
LOQ establishment and verification (reference Section D.1.2.2 and grey box D-14 of the QSM)	At initial setup: 1) Verify LOQ; and 2) Determine precision and bias at the LOQ. Subsequently, verify LOQ quarterly. If a laboratory uses multiple instruments for a given method, the LOQ must be verified on each. See Box D-14.	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or 2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DOD QSM.	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	Not Applicable, Samples may not be analyzed without a valid LOD.
Results reported between DL and LOD and the LOD and the LOQ	None	None	None	Apply F-flag to all results between DL and LOQ. If no Detection determined below the LOD, report to the LOD, flag U.

End of Method SW6850

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Tuning (Mass Calibration Verification)	Prior to ICAL and after any mass calibration or maintenance is performed.	Quantitation ions within 0.3 m/z of expected mass.	Perform mass calibration on the MS/MS. If required, consult with instrument engineer for further maintenance.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Minimum six-point initial calibration for target analytes, lowest concentration standard at or below the reporting limit	Initial calibration prior to sample analysis	Linear: $r^2 > 0.990$ ($r>0.995$) with intercept ≤ LOD, or Average Response Factor: RSD≤ 20%.	Evaluate standards, chromatography, and mass spectrometer response. If problem found with above, correct as appropriate, then repeat initial calibration.	Evaluate standards, chromatography, and detector response. If problem found with above, correct as appropriate, then repeat initial calibration
Second-source calibration verification	Once per six-point initial calibration	Perchlorate within ±15% of the true value	Evaluate data. If problem (e.g., concentrated standard, plugged transfer line) found, correct, then repeat second source verification. If it still fails, then repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Daily calibration verification	Mid-range standard analyzed before sample analysis, after every 10 samples, and at the end of the sequence.	Perchlorate within ±15% of the true value	Correct problem, then repeat. If still fails, repeat initial calibration	Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.
Limit of Detection verification (LODv) (per batch)	Prior to sample analysis and at the end of the analysis sequence.	Perchlorate within ± 30% of the true value	Correct problem. Evaluate samples. Samples with results > RL (LOQ) may be reported. Samples since the last passing LODv with results ≤ RL (LOQ) must be reanalyzed.	Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.
Laboratory Reagent Blank	Prior to ICAL, following samples with overrange concentration of perchlorate, and at the end of the analytical sequence.	No perchlorate detected > LOQ	Reanalyze reagent blank (until no carryover seen), and any samples with perchlorate detections since the contaminated blank.	No target analytes ≥ ½ LOQ
Internal Standard	Every Calibration Standard	ICAL: IS for each standard must be within ± 50% of the average area of the ICAL. ICV, CCV: Within ± 50% of the average area of the ICAL or within ± 50% of the 1st CCV of the run, if the ICAL is not run the same day.	Evaluate the system. Reanalyze/repeat the calibration.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples.
Method Blank	One per preparation batch	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements	Correct problem, then re-extract and reanalyze method blank and all samples processed with the contaminated blank in accordance with DoD QSM requirements	No target analytes ≥ ½ LOQ

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Interference Check Sample (ICS)	One per preparation batch	70% -130%	Reanalyze once. If still outside the acceptance limits, evaluate to determine if cleanup filters or column degradation are suspect, replace appropriate materials and reprepare (filters) or reanalyze (column). Repeat the Interference Threshold Study to deter. If problem still exists, recalibrate.	Recovery as described in DoD Perchlorate Handbook.
IS	During acquisition of calibration standard, samples, and QC check samples	Areas within -50% to +100% of the midpoint of the last ICAL for each sample and QC in accordance with DoD QSM requirements	Inspect LCMS for malfunctions; mandatory reanalysis of samples analyzed while system was malfunctioning in accordance with DoD QSM requirements	Meets all EPA Method requirements
Isotope Ratio $^{35}CL/^{37}CL$	Every sample, batch QC sample and standard	Monitor for either the parent ion at masses 99/101 or the daughter ion at masses 83/85 depending on which ions are quantified.	Re-extract, re-clean, and/or reanalyze affected sample(s). If problem persists, perform post-spike or dilution as appropriate to confirm presence of perchlorate	Theoretical ratio approx. 3.06 Must fall within 2.3 to 3.8
LCS	One LCS per analytical/preparation batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Reanalyze LCS once. If acceptable, report. Otherwise, evaluate and re prepared and reanalyze the LCS and all samples in the associated prep batch for failed analytes, if sufficient sample material is available.	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
MS/MSD	One MS/MSD per batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Identify problem; if not related to matrix interference, re-extract and reanalyze MS/MSD in accordance with DoD QSM requirements	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
DL study (as part of the LOD process, reference Section D.1.2.1 of the DoD QSM)	At initial setup and subsequently once per 12-month period or quarterly DL verification checks.	DL established shall meet 40 CFR, Part 136 Appendix B.	Continue to run the DL study until all criteria are passing	N/A
LOD determination and verification (reference Section D.1.2.1 and grey box D-13 of the QSM)	At initial set-up and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must: 1) Repeat the detection limit determination and LOD verification at a higher concentration; or 2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD	Not Applicable, Samples may not be analyzed without a valid LOD.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			is set at the higher concentration.	
LOQ establishment and verification (reference Section D.1.2.2 and grey box D-14 of the QSM)	At initial setup: 1) Verify LOQ; and 2) Determine precision and bias at the LOQ. Subsequently, verify LOQ quarterly. If a laboratory uses multiple instruments for a given method, the LOQ must be verified on each. See Box D-14.	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or 2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DOD QSM.	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	Not Applicable, Samples may not be analyzed without a valid LOD.
Results reported between DL and LOD and the LOD and the LOQ	None	None	None	Apply F-flag to all results between DL and LOQ. If no Detection determined below the LOD, report to the LOD, flag U.

End of Method SW6850

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW6010B and SW7470A/71A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Instrument detection limit study	At initial setup and after significant change in instrument type, personnel, test method, or sample matrix	Instrument detection limits will be < LOD.	N/A.	N/A.
Linear dynamic range or high-level check standard	Every 6 months	Within ± 10% of true value.	Correct problem, then reanalyze or reset linear range.	Apply J-flag to the specific analyte(s) for all results not within linear range.
ICAL for all analytes (minimum one standard and a blank 3- to 5-point standard preferred)	Daily before sample analysis	If more than one standard is used, correlation coefficient must be ≥ 0.995.	If applicable, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL.
ICV (second source)	Daily after ICAL	All analytes within ± 10% of expected value.	Correct problem and verify second-source standard. Rerun ICV. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
CCV (Instrument Check Standard)	After every 10 samples and at the end of the analysis sequence	All analyte(s) within ± 10% of expected value and RSD of replicate integrations < 5%.	Correct problem, then repeat CCV and reanalyze all samples since last successful calibration verification.	Apply Q-flag to all results for the specific analyte(s) >10 %D for all samples associated with the calibration verification.
Calibration blank	Before beginning a sample run, after every calibration verification	No analytes detected > LOD.	Correct problem, then analyze calibration blank and previous 10 samples.	Apply B-flag to all associated positive results for the specific analyte(s) as appropriate.
Low-level calibration check standard (at or below LOQ)	Daily, after ICAL; not required for multipoint calibration (3 or more points) with low standard at or below LOQ.	Analyte(s) with ± 20% of expected value.	Correct problem, then reanalyze.	No samples may be analyzed without a valid low-level calibration check standard. Low-level calibration check standard should be less than or equal to the LOQ.
Method blank	One per analytical batch	No analytes detected > ½ LOQ. For common laboratory contaminants, no analytes detected > LOQ. See Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and reanalyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s), as appropriate. See Worksheet #36, Section 36.2.5.
ICS	At the beginning of an analytical run	ICS A: All non-spiked analytes < LOD (unless they are a verified trace impurity from one of the spiked analytes). ICS AB: Within ± 20% of expected value.	Terminate analysis; locate and correct problem; reanalyze ICS and all associated samples.	Flagging criteria are not appropriate. No samples may be analyzed without a valid ICS. If corrective action fails, apply Q-flag to the specific analyte(s).

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW6010B and SW7470A/71A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
LCS for all analytes	One per analytical batch	Acceptance criteria: Worksheet #15.	Correct problem then reanalyze. If still out, reprepare and reanalyze the LCS and all samples in the affected batch.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
Dilution test	Each new sample matrix, at least once per analytical batch (only applicable for analytes with concentrations > 50 times LOQ)	Fivefold (1+4) dilution must agree within ± 10% of the original determination.	Add post-digestion spike.	Apply J-flag to all sample results for the specific analyte from the same matrix in the batch if either of following exist: (1) dilution test not run and batch had analyte concentrations >50X LOQ or (2) %D ≥10 and post-digestion spike not performed.
Post-digestion spike addition	When dilution test fails or if an analyte's concentration for all samples in a batch is less than 50 times LOQ (<25 for Method SW7470A/SW7471A)	Recovery within 75–125% of expected results (85-115 for SW7470A/SW7471A).	Check for instrumental problem, then reanalyze post-digestion spike addition if appropriate.	Apply J-flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition. If post-digestion spike addition recovery is < 10%, apply Q-flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition.
MS/MSD	One per 20 samples per matrix as a minimum and as defined on the chain-of-custody form	Acceptance criteria: Worksheet #15.	Assess data to determine whether there is a matrix effect or analytical error. Analyze LCS or failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made regarding PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: (1) %R for MS or MSD > UCL (2) %R for MS or MSD < LCL (3) MS/MSD RPD > control limit
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[c])	At initial setup and then once per 12-month period or quarterly DL verification checks	Detection limits established will be ≤ ½ the RL in Worksheet #15 Tables. See 40 CFR, Part 136, Appendix B. All analytes must be detected and identified by method-specified criteria for the for the verification check to be valid, or the verification check must produce a response that is at least 3X the instrument noise level and greater than the response in the blanks	Continue the MDL study until all criteria are met.	N/A.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW6010B and SW7470A/71A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
		associated with the MDL study.		
LOD determination and verification (reference Section D.1.2.1 and Box D-13 Of the DoD QSM[c])	At initial setup and verified quarterly (if a laboratory uses multiple instruments for a given method, the LOD must be verified on each)	The apparent signal-to-noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must (1) repeat the detection limit determination and LOD verification at a higher concentration; or (2) perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	N/A; samples may not be analyzed without a valid LOD.
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[c])	At initial setup: (1) verify LOQ and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if a laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of the DoD QSM[c]).	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or (2) in the absence of client require-ments, must meet control limits of the LCS. See Box D-14 of the DoD QSM[c].	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag “U.”
Demonstrate acceptable analyst capability	Before using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of the DoD QSM[c])	QC acceptance criteria published by DoD, if available; otherwise method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for those analytes that did not meet criteria (see Section C.1.f of the DoD QSM[c]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by analyst until capability is demonstrated.

End of Method SW6010B and SW7470A/71A

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6020A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
MS tuning sample	Before ICAL.	Mass calibration ≤ 0.1 amu from the true value. Resolution <0.9 amu full width at 10% peak height. Stability: RSD ≤ 5% for at least four replicate analyses.	Retune instrument then reanalyze tuning solution.	Not appropriate.
ICAL for all analytes (minimum one standard and a blank)	Daily before sample analysis	If more than one standard is used, correlation coefficient must be ≥ 0.995.	If applicable, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL.
ICV (second source)	After ICAL, before beginning a sample run at a concentration other than used for calibration	All analytes within ± 10% of expected value.	Correct problem and verify second-source standard. Rerun ICV. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
CCV	After every 10 samples and at the end of the analysis sequence—at a concentration near the middle of the calibration range	All analytes within ± 10% of expected value.	Correct problem, then repeat CCV and reanalyze all samples since last successful calibration verification.	Apply Q-flag to all results for the specific analyte(s) >10 %D for all samples associated with the calibration verification.
Calibration blank	Before beginning a sample run, after every 10 samples and at end of the analysis sequence	No analytes detected > LOD.	Correct problem, then analyze calibration blank and previous 10 samples.	Apply B-flag to all associated positive results for the specific analyte(s) as appropriate.
Low-level calibration check standard (at or below LOQ)	Daily, after ICAL Not required if multipoint calibration (3 or more points) with low standard at or below LOQ is performed	All analyte(s) with ± 20% of expected value.	Correct problem then reanalyze.	No samples may be analyzed without a valid low-level calibration check standard. Low-level calibration check standard should be less than or equal to the LOQ.
Linear range calibration (high) check standard	Every 6 months	Analyte within ± 10% of expected value.	Correct problem then reanalyze or reset linear range.	Apply J-flag to the specific analyte(s) for all results not within linear range.
Method blank (Preparation blank)	One per analytical batch	No analytes detected > ½ LOQ For common laboratory contaminants, no analytes detected > LOQ. See Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and analyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s) as appropriate. See Worksheet #36, Section 36.2.5.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6020A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Interference check solutions (ICS-A and ICS-AB)	At the beginning of an analytical run or once during an 12-hour period, whichever is more frequent	**ICS-A:** All non-spiked analytes < LOD (unless they are a verified trace impurity from one of the spiked analytes). **ICS-AB:** Within ± 20% of expected value.	Terminate analysis; locate and correct problem; reanalyze ICS; reanalyze all affected samples.	Flagging criteria are not appropriate. No samples may be analyzed without a valid ICS. If corrective action fails, apply Q-flag to the specific analyte(s).
LCS for all analytes	One LCS per analytical batch	Acceptance criteria: Worksheet #15.	Correct problem then reanalyze. If still out, reprepare and reanalyze the LCS and all samples in the affected batch.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
Dilution test	Each matrix in a analytical batch (only applicable for analytes with concentrations ≥ 100X LOD)	Fivefold (1+4) dilution must agree within ± 10% of the original determination.	Add post-digestion spike.	Apply J-flag to all sample results for the specific analyte from the same matrix in the batch if either of following exist: (1) dilution test not run and batch had analyte concentrations ≥100 times LOD or (2) % D ≥ 10 and post-digestion spike not performed.
Post-digestion spike addition	When dilution test fails or if an analyte's concentration for all samples in a batch is less than 100X LOD	Recovery within 75–125% of expected results.	Dilute the sample; reanalyze post-digestion spike addition.	Apply "J" flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition. If post-digestion spike addition recovery is < 10%, apply "Q" flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition.
MS/MSD	One per 20 samples per matrix	Acceptance criteria: Worksheet #15.	Assess data to determine whether there is a matrix effect or analytical error. Analyze LCS for failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made regarding PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: (1) %R for MS or MSD > UCL, (2) %R for MS or MSD < LCL, or (3) MS/MSD RPD > control limits
ISs	Every sample	IS intensity within 30-120% of intensity of the IS in the ICAL.	Perform corrective action as described in Method SW6020, Section 8.3.	Flagging criteria are not appropriate. No samples may be analyzed without a valid IS response.
Instrument detection limit study	At initial setup	Detection limits established will be ≤ LOD.	None.	N/A. Samples cannot be analyzed without a valid instrument detection limit.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6020A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[c])	At initial setup and then once per 12-month period or quarterly DL verification.	Detection limits established will be ≤ ½ the RL in Worksheet #15 tables. See 40 CFR, Part 136 Appendix B. Analytes must be detected and identified by method-specified criteria for the for the verification check to be valid, or the verification check must produce a response that is at least 3 times the instrument noise level and greater than the response in the blanks associated with the MDL study.	Continue to run the MDL study until all criteria are passing.	N/A.
LOD determination and verification (see Section D.1.2.1 and Box D-13 of the DoD QSM[c])	At initial setup and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must: (1) Repeat the detection limit determination and LOD verification at a higher concentration; or (2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	N/A; samples may not be analyzed without a valid LOD.
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[c])	At initial setup: (1) verify LOQ and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if a laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of the DoD QSM[c])	(1) The LOQ and associated precision and bias must meet client requirements and must be reported; or (2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DoD QSM[c].	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag "U."
Demonstrate acceptable analyst capability	Prior to using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of the DoD QSM[c])	QC acceptance criteria published by DoD, if available; otherwise method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for those analytes that did not meet criteria (see Section C.1.f of the DoD QSM[c]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by an analyst until capability is demonstrated.

End of Method SW6020A

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8290

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
MS tuning check	Before initial calibration or calibration verification and after every 12-hour period	Tune the instrument to meet the minimum resolving power of 10,000 at m/z 304.9824. Ensure that the exact mass of m/z 380.9760 is within 5 ppm of the required value. Monitor the lock mass selected ion current profile.	Retune instrument; verify. Rerun affected samples.	Not appropriate
GC column performance check	Before initial calibration or calibration verification	Peak separation between 2,3,7,8-TCDD and other TCDD isomers valley of ≤ 25%. and First and last eluters of all eight homologue retention time windows identified labeled (F/L) on the chromatogram and Absolute retention times for switching from one homologous series to the next > 10 seconds for all components of the mixture	Correct problem then repeat column performance check.	Flagging criteria are not appropriate.
Initial multipoint calibration for all analytes (minimum five standards) (ICAL)	Before sample analysis, as needed by failure of routine calibration verification standard, or when a new lot is used for standard source of CCV, sample fortification solution (IS), or recovery standards	Ion abundance ratios in accordance with Table 8 of Method SW8290 and S/N ratio ≥ 10 for all target analyte ion current profiles and % RSD ± 20% for 17 unlabeled standards and % RSD ± 30% for the 9 labeled IS.	Correct problem then repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8290

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Routine (continuing) calibration check (Use HRCC-3 calibration standard) (CCV)	At the beginning of each 12-hour period (after successful GC resolution and MS resolution checks), and at the end of 12-hour shift.	Ion abundance ratios in accordance with Table 8, Method SW8290 and RF within ± 20% D for unlabeled standards from mean RF from initial calibration and RF within ± 30% for labeled standards from mean RF from initial calibration **End of run CCV only:** If the RF for an unlabeled or labeled standard fails by ≤ 5% in the final CCV, a new "daily" mean RF may be calculated using the initial and final RF values and used to determine the specific analyte concentrations for all samples analyzed during the shift.	Correct problem, repeat calibration verification standard one more time. If that fails, then repeat initial calibration and reanalyze all samples analyzed since the last successful calibration verification. Evaluation of corresponding labeled/unlabeled standards may impact the corrective action required. **End of run CCV:** If the RF for an unlabeled or labeled standard fails by > 5% in the final CCV, run a new ICAL immediately (within 2 hours) and use the new RF values to process the samples. Alternatively, reanalyze all samples with positive detections.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified. **End of run CCV:** Apply Q-flag to all results for the specific analyte(s) in the sample which are not reprocessed or reanalyzed.
PCDD/PCDF identification	Verify all sample positive detections per Method SW8290	Retention time of sample components in accordance with stated criteria in Method SW8290 (Section 7.8.4.1) and Ion abundance ratios for all analytes, ISs, and recovery standards in accordance with criteria in Method SW8290 (Table 8, Section 7.8.4.2) and S/N ratio of all labeled analytes ≥ 10 times background noise (Method SW8290 Section 7.8.4.3) and S/N ratio of all remaining analyte ions ≥ 2.5 times background noise (Method SW8290 Section 7.8.4.3) and For PCDF, no signal present having a S/N ratio ≥ 2.5 for the corresponding ether (PCDPE) detected at the same retention time (± 2 sec, (Section 7.8.4.4)	Correct problem, then reprep and reanalyze the sample(s) with failed criteria for any of the internal, recovery, or standards. If PCDPE is detected or if sample peaks present do not meet all identification criteria, calculate the EMPC (estimated maximum possible concentration) according to Method SW8290 Section 7.9.5.2.	Flagging criteria are not appropriate. Positive identification of 2,3,7,8-TCDF on the DB-5 or equivalent column must be confirmed on a column capable of isomer specificity (DB-225) (see Method SW8290 Section 3.4). If peak identification criteria are met but ion abundance criteria fail for the analyte and IS, the sample should be presumed to have interfering contaminants. The sample should be rerun or the extract reanalyzed.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8290

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
ISs	Every sample, standard, and QC sample.	Percent recovery for each IS (before any dilutions) within 40–135% (Method SW8290 Section 8.4)	Inspect mass spectrometer and GC for malfunctions. Reanalysis of samples analyzed while the system was malfunctioning is mandatory.	Apply Q-flag to all results for analytes associated with a failed IS unless a matrix effect can be verified, then apply M.
Sample specific estimated detection limit (EDL)	Every sample that indicates non-detects or detections that are < 2.5 times background noise	Method 8290 Section 7.9.5 describes the calculation	N/A	N/A
Sample estimated maximum possible concentration (EMPC)	If PCDPE is detected or if sample peaks present do not meet all ion abundance ratio criteria	Method 8290 Section 7.9.5 describes the calculation	N/A	Apply J-flag to all EMPC values.
Method Blank	Minimum one per preparation batch. A method blank is required after a calibration run and before any sample run.	No analytes detected > ½ LOQ	Assess data and correct problem. If necessary, reprep and analyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s), as appropriate.
MS/MSD	One MS/MSD per every 20 samples per matrix	Acceptance criteria: Tables 7-2 and 7-3	Assess data to determine whether there is a matrix effect or analytical error. Analyze LCS for failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made with respect to the PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: (1) %R for MS or MSD > UCL (2) %R for MS or MSD < LCL, or (3) MS/MSD RPD > CL
Sample duplicate	One per analytical batch. This may be replaced by the MSD.	Acceptance criteria: Tables 7-2 and 7-3	Verify instrument performance, review analytical procedures.	For the specific analyte(s) in parent sample, apply J-flag.
Results reported below the lowest standard	None	None	None	Apply F-flag to all results below the lowest calibration standard.

End of Method SW8290

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods 160.2, 310.2, 350.1, SW9030B, SW9056, and SW9060

QC Check*	Frequency	Criteria	Corrective Action
Multi-point initial calibration (a blank and at least five standards) – does not apply to titrimetric method	Before initial sample analysis, every 24 hours, whenever modifications are made to the analytical system, or when continuing calibration verification fails	Correlation coefficient of linear regression is ≥ 0.995	Correct the problem and repeat the initial calibration.
Second-source calibration verification	Immediately following each initial calibration	Analytes within ±15% (±10% for SW9056) of expected value	Correct the problem and repeat initial calibration.
Calibration blank – does not apply to titrimetric methods	After every Second-source or Continuing calibration verification analysis	No analytes detected at or above the LOQ	Correct the problem, then reanalyze previous 10 samples.
Continuing calibration verification	After every 10 samples and at the end of the analysis sequence	Within ±15% (±10% for SW9056) of expected value	Recalibrate and reanalyze all samples since the last acceptable continuing calibration verification
Method Blank	At least one per analytical batch	No analytes detected at or above the LOQ	Correct the problem and re-prep and reanalyze all associated samples
MS/MSD	One set per 20 project-specific samples. MSD is optional if a laboratory sample duplicate is performed	All analytes within limits specified Limits Worksheet 15	None
Laboratory sample duplicate	Once per analytical batch if MSD not performed	Concentration of reported analytes are > 5 times the reporting limit in either sample and RPD >20%. One sample result < RL and a difference of ±2 times the reporting limit	None
LCS	At least one per analytical batch	All analytes within limits specified limits in Worksheet 15	Correct the problem, and re-prep and reanalyze the LCS and all samples in the analytical batch
*Unless calibration and QC requirements are specified for an individual method.			

End of Methods 160.2, 310.2, 350.1, SW9030B, SW9056, and SW9060

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Notes, Acronyms, and Abbreviations

[a]All corrective actions associated with project work shall be documented, and all records shall be maintained by the laboratory.

[b]Flagging criteria shall be applied when acceptance criteria were not met and corrective action was not successful or corrective action was not performed.

[c]DoD. 2010. *Department of Defense* (*DoD) Quality Systems Manual for Environmental Laboratories*. Version 4.2. October.

% D – percent difference
%R – percent recovery
CCC – calibration check compounds
CCV – continuing calibration verification
COD – coefficient of determination
DL – detection limit
DRO – diesel range organics
GC – gas chromatography
GRO – gasoline range organics
ICAL – initial calibration
ICS – interference check sample
ICV – initial calibration verification
IS – internal standard(s)
LCL – lower confidence limit
LCS – laboratory control sample
LOD – limit of detection
LODv – limit of detection verification
LOQ – limit of quantitation
MDL – method detection limit
MS/MSD – matrix spike/matrix spike duplicate
N/A – not applicable
PQO – practical quantitation objectives
PT – performance testing
QC – quality control
QSM – Quality Systems Manual (DoD)
RF – response factor
RL – reporting limit
RPD – relative percent difference
RRT – relative retention time
RSD – relative standard deviation
SPCC – system performance calibration compounds
UCL – upper confidence limit

End of Table H-10

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3. MANAGEMENT OF WASTE FROM CLOSURE ACTIVITIES

Wastes that are expected to be generated during the final closure activities at the OD Unit include: excess soil from sampling; well purge water, drill cuttings, decontamination water; PPE; and excavated soils. To minimize the amount of waste to be generated during closure activities, excess soil cuttings from borings shall be replaced in the auger holes. The volume of liquid waste generated during the cleaning of equipment is to be minimized by using only the smallest amount of wash rinse water necessary to achieve successful decontamination. Solvents shall not be used.

3.1 Waste Management

Wastes associated with closure activities at the OD Unit shall be managed as follows:

- Wastes shall be stored in appropriate containers that are compatible with the wastes and are in good condition.
- If analytical results indicate that the waste is hazardous or the Permitee project manager determines that the waste shall be classified as hazardous, the Permitee shall manage the waste in accordance with all applicable regulations in 40 CFR §261-268.
- Waste containers shall remain within the OD Unit boundary under the control of the personnel generating the waste until it is transported for treatment and disposal.
- Waste containers shall be segregated according to the compatibility and chemical waste type.
- Waste shall be stored in containers that remain closed, except when adding or removing wastes.
- Waste containers bearing free liquid shall be provided with secondary containment of sufficient volume to prevent spilled liquids from being released onto the ground.
- Waste containers shall be managed in such a manner as to prevent ruptures and leaks.
- Waste containers shall be labeled appropriately, pending receipt of analytical results. Labels shall be filled out appropriately and marked using permanent marker or pen. Label information shall include waste source, suspected contaminants, contents, depth (if appropriate), the date which accumulation began, and a contact name.

3.2 Waste Characterization

Characterization of the liquid waste and excavated soil generated during the closure of the OD Unit shall be based upon the results of sampling and analysis. Decontamination water shall be analyzed for the constituents listed in Tables H-3. PPE shall be handled in accordance with Section 1.4 of this Permit Attachment (H) and applicable state and federal regulations.

3.3 Waste Disposal

All wastes from closure activities determined to be hazardous shall be managed in accordance with the Hazardous Waste Management Regulations from the time of generation. Hazardous wastes shall be shipped off-site for treatment and disposal at a permitted RCRA facility. Wastes characterized as nonhazardous shall be evaluated to determine the appropriate disposal method in accordance with applicable law.

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KIRTLAND AIR FORCE BASE ALBUQUERQUE, NEW MEXICO

Closure Plan for Open Detonation Unit

May 2014

377 MSG/CEIR
2050 Wyoming Blvd. SE
Kirtland AFB, New Mexico 87117-5270

KAFB4201

40 CFR 270.11
DOCUMENT CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

TOM D. MILLER, Colonel, USAF
Commander, 377th Air Base Wing

This document has been approved for public release in accordance with Department of Defense Directives and Air Force Instructions.

KIRTLAND AIR FORCE BASE
377th Air Base Wing Public Affairs

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1. INTRODUCTION

This closure plan describes the activities necessary to close the Open Detonation (OD) treatment unit located within the Explosive Ordnance Disposal (EOD) Range at Kirtland Air Force Base (AFB). The OD Unit consists of a cleared circular area approximately 1,000 ft in diameter and surrounded and delineated by an approximately two-foot (ft) high earthen berm. Figures H-1 and H-2 show the location of the EOD Range at Kirtland AFB, and the collocated OD and Open Burn (OB) Units within the EOD Range. Detonations were conducted in pits measuring approximately 30 ft long, 15 wide and 12 ft deep.

Until final closure of the unit is complete in accordance with the New Mexico Hazardous Waste Management Regulations and certification of closure has been approved by the New Mexico Environment Department (the Department), a copy of the approved Closure Plan, and any revisions thereof, shall be maintained in the Operating Record. This Closure Plan, and any revisions thereof, shall be made available, upon request, to the Department.

If the OD Unit cannot be clean-closed, a post-closure care plan addressing the hazardous constituents remaining at the site shall be prepared and submitted to the Department for approval.

The OD Unit is collocated with the OB treatment unit at the EOD Range. The OD and OB Units are scheduled to undergo final closure activities simultaneously. The OB Unit has a separate closure plan, but several elements of the OB and OD Unit closure plans overlap and are noted within the documents. Additionally, there is currently a perchlorate groundwater investigation occurring to the west of the EOD range. This investigation and its results are independent of this OD Unit closure plan.

As per Kirtland AFB's Hazardous Waste Treatment Facility Operating Permit for the Open Detonation Unit (Permit), Attachment I, Table I-3 , SWMU 06-19 (KAFB IRP site OT-29), which is located approximately 20 ft northeast of the present OB structure, requires corrective action. Corrective action at SWMU 06-19 shall comply with the provisions of the Resource Conservation and Recovery Act (RCRA).

1.1 General Closure Information

This closure plan has been prepared in compliance with the requirements of RCRA (42 U.S.C. §§6901 et seq.) and its implementing regulations at 40 CFR Parts 264 and 270 (see 40 CFR Part 264 Subparts G and X and 270.14(b)(13)), and state implementing statutes and regulations under which the state has delegated RCRA authority (see New Mexico Hazardous Waste Act, Chapter 74 Article 4 NMSA 1978 and 20.4.1 NMAC).

1.2 Closure Performance Standard

The OD Unit shall be closed to meet the following performance standards:

- Minimize the need for further maintenance;
- Control, minimize or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to ground water or surface waters or to the atmosphere; and
- Comply with the requirements of 40 CFR Part 264, Subpart G and 40 CFR §264.601.

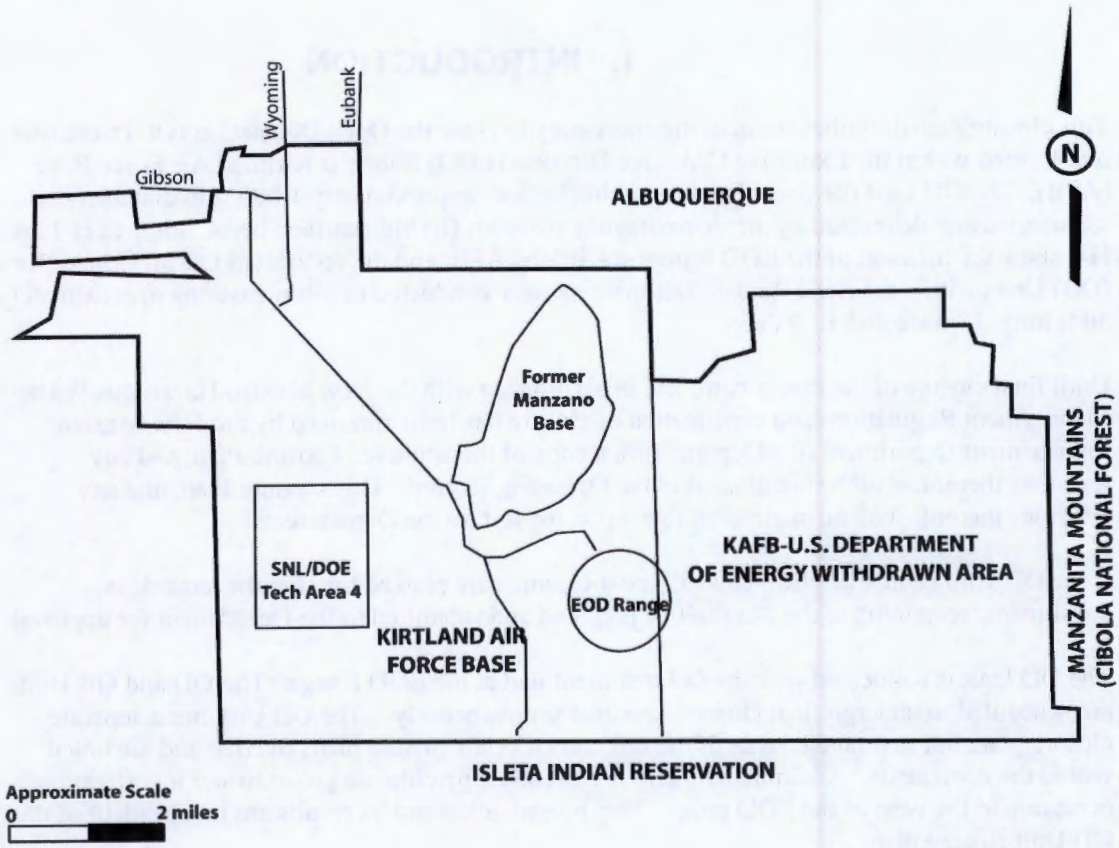

Figure H-1. Location of EOD Range at Kirtland AFB

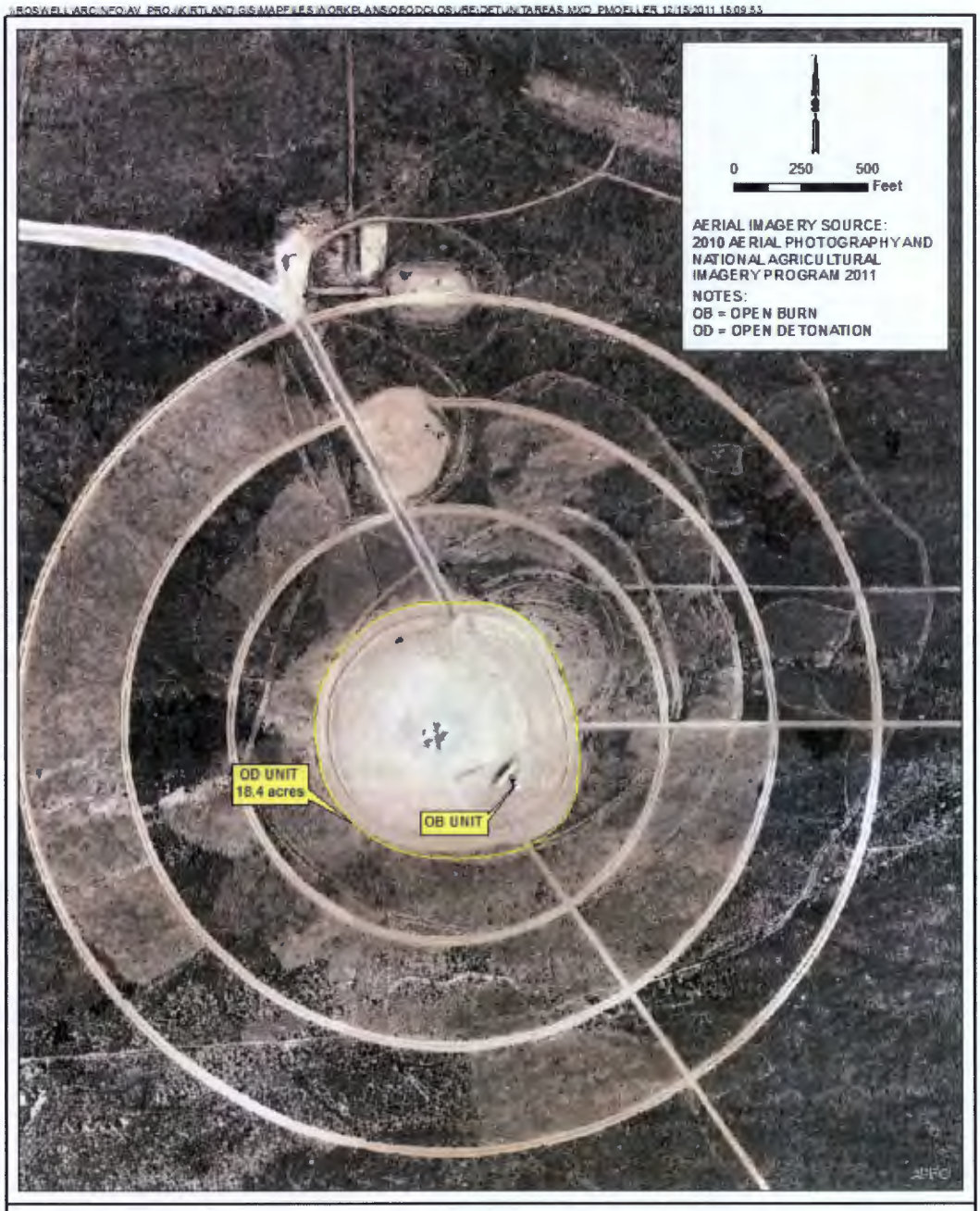

FIGURE H-2
LOCATION OF OPEN BURN AND OPEN DETONATION UNITS
EOD RANGE, KIRTLAND AIR FORCE BASE, NEW MEXICO

1.3 Final Closure Activities

The last treatment event at the OD Unit occurred on 11 August 2010. The Department was notified on 13 August 2010 that, effective immediately, the Permitee had closed the OD Unit for all treatment activities. The Permitee shall notify the Department, in writing, at least 45 calendar days prior to the date that closure activities shall commence.

Final closure activities at the OD Unit shall consist of:

- Installation of four groundwater monitoring wells at the EOD range (one upgradient and three downgradient wells) and eight consecutive quarters of groundwater sampling to determine the presence or absence of groundwater contamination;
- Removing any soil or debris from the OD Unit that have contaminant concentrations which pose unacceptable risk to human health or the environment;
- Sending for treatment and disposal any solid and hazardous waste, including any treatment residues, to a permitted Treatment, Storage, or Disposal Facility (TSDF) in accordance with applicable regulatory requirements.

Final closure for the OD Unit shall be completed when:

- All solid and hazardous waste has been disposed of off-site as required by law;
- Sampling and analysis demonstrates that no unacceptable risk to human health or the environment originating from the OD Unit exists in soil or groundwater;
- A Certification of Closure and Closure Report has been submitted to the Department; and
- The Department has approved the Certification of Closure and Closure Report.

1.4 Maximum Extent of Operations and Maximum Waste Inventory

The OD Unit was previously permitted on 20 December 1994 as Permit# NM9570024423-OD, which allowed 100,000 pounds of net explosive weight (NEW) to be treated at the OD Unit annually. Rocket motors, large caliber munitions, explosive wastes and firearms were treated at the OD Unit. Based on the operating record, the maximum inventory treated at the OD Unit was approximately 316,012 pounds of NEW.

Closure activities and any corrective action that may be required shall not be limited to the OD Unit if contamination has migrated beyond the OD Unit boundary. Any corrective action that may be required because of a release at the OB Unit shall be conducted under the terms and conditions of the 2010 Permit.

1.5 Schedule for Closure

Final closure of the OD Unit shall proceed by the general schedule presented in Table H-1.

Table H-1
Closure Schedule for the Open Detonation Unit at Kirtland AFB

Activity	Time Required
Notify the Department of receiving final volume of hazardous waste at the OD Unit	Completed
Removal of all hazardous waste from the OD Unit	Completed
Department approval of final OD Unit closure plan	TBD
Notify Department of commencement of closure activities	45 days before closure activities begin
Commence closure activities	Day 0
Remove all solid and hazardous waste	Day 90
Commence groundwater monitoring well installations	Day 90
Complete groundwater monitoring well installations	Day 180
Complete all closure activities, except groundwater monitoring	Day 360
Complete 8 quarters of groundwater monitoring	Day 900
Submit Closure Report and certification to Department	Day 960

Note: The schedule above indicates calendar days on which closure activities shall be started or completed subsequent

1.6 Closure Report

Within 60 days of completion of the final closure activities, a closure report shall be submitted to the Department. The report shall document the closure activities conducted and contain, at a minimum, the following information:

- A summary of the closure activities;
- Any significant variance from the approved closure plan and the reason for the variance;
- A summary of sampling data associated with closure, including analytical results for all field and laboratory quality control samples;
- A quality assurance statement on the adequacy of the analyses to support closure;
- The location of the file of supporting documentation (e.g., memos, logbooks, laboratory sample analysis data);
- Disposal location and quantities of all solid and hazardous wastes removed from the OD Unit;
- Certification of the accuracy of the report; and
- Survey plat.

1.7 Survey Plat and Post-Closure Requirements

Upon completion of closure activities at the OD Unit, a survey plat shall be prepared, certified by a professional land surveyor, and submitted with the closure report to the Department. The survey plat shall also be simultaneously filed with the local zoning authority. In the event that the OD Unit cannot be clean closed, a post-closure care plan shall be submitted to the Department for review and approval.

2. CLOSURE PROCEDURES

There is no hazardous waste present at the OD Unit; the last treatment event at the OD Unit occurred on 11 August 2010, and there are no treatment residues remaining. There are no structures or equipment at the OD Unit. (The structures associated with the collocated OB Unit are addressed under the OB Unit closure plan.)

The first phase of closure shall consist of a hazards survey of the OD Unit conducted by qualified contractor health physics and industrial hygiene personnel, which shall include unexploded ordnance (UXO) safety personnel, and Kirtland AFB EOD personnel. The purpose of the survey shall be to locate and remove any "kick-out" (untreated waste, waste fragments, or UXO), and to identify potential contamination concerns that may present hazards to workers during the closure activities and to specify any control measures necessary to reduce worker risk. This survey shall provide the information necessary for health physics, UXO safety, and industrial hygiene personnel to identify worker qualifications, personal protective equipment (PPE), safety awareness, work permits, exposure control programs, and emergency coordination that shall be required to perform closure. Any munitions and explosives of concern (MEC) identified during the hazard survey shall be reported to and handled by Kirtland AFB EOD staff personnel only in accordance with standard operating procedures. All workers involved in the closure activities shall be required to have training and medical monitoring as required by applicable regulations. Personnel performing closure activities shall be required to wear PPE as specified by health physics, UXO safety, and industrial hygiene personnel.

Sufficient sampling and analysis shall be required to demonstrate there are no contaminant concentrations which pose unacceptable risk to human health or the environment. Groundwater and soil samples shall be analyzed for parameters listed in Tables H-2 and H-3 to quantify contamination, if any, originating from the OD Unit.

Surface and subsurface soil at the OD Unit shall be characterized by sampling and analysis. Soil sampling shall follow the procedures described in Section 2.2.1 of this Permit Attachment (H). Soil shall be analyzed for the parameters listed in Table H-3. If sampling and analysis of soil indicates the presence of hazardous waste or hazardous constituents above background levels, a risk assessment shall be conducted based on a residential land-use scenario to determine whether the contaminants pose an unacceptable risk to human health or the environment. In lieu of a baseline risk assessment, the Permittee may compare the soil sampling results to the soil screening levels using the procedures listed in the Department's most current version of "Technical Background Document for Development of Soil Screening Levels," as it may be updated, provided the soil screening levels are based on a residential land-use scenario. If the risk assessment demonstrates that the level of contamination is unacceptable, the contaminated soil exhibiting unacceptable risk shall be subject to corrective action under Permit Part 6 and shall be excavated and removed. The excavated soil shall be collected, transferred to containers, and, if applicable, managed and disposed of as hazardous waste. The Permittee shall conduct corrective action activities at the OD Unit using the cleanup levels in Permit Section 6.2.3 if corrective action is necessary. Clean up levels shall be based on a residential land use scenario. Background soil concentrations for metals are those approved by the Department for the KAFB Facility, and are listed in Table D-4 of Permit Attachment D.

2.1 Monitoring Wells

2.1.1 Installation of New Monitoring Wells

The OD Unit is subject to the environmental performance standards of 40 C.F.R. § 264.601. As such, groundwater monitoring shall be conducted as part of closure activities to demonstrate that operations did not impact groundwater. Four monitoring wells, one upgradient and three downgradient of the OD Unit, shall be installed. The locations of the proposed monitoring wells are presented in Figure H-3.

The wells installed at the OD Unit shall meet the groundwater monitoring requirements of 40 C.F.R. §§ 264.97(a)(2), (b), and (c). Within 30 days of completing well installation, the Permitee shall submit a well completion report to the Department for approval.

Groundwater monitoring wells shall be properly plugged and abandoned in accordance with applicable New Mexico statutes and regulations, provided groundwater contamination has not occurred. If groundwater contamination has occurred, these monitoring wells shall be maintained for the purpose of implementing corrective action. The wells shall not be plugged or abandoned until the Department has approved closure of the OD Unit.

Activities for monitoring well installation are presented in the following paragraphs and include:

- Well locations,
- Drilling specifications,
- Well construction specifications,
- Well development procedures,
- A schedule for implementation and completion of the well installations;
- Preparation and submittal of a well completion report; and
- Groundwater sampling and analysis requirements for eight quarters.

The primary project objective is the installation and sampling of four groundwater monitoring wells, one upgradient and three downgradient of the site, to evaluate the potential groundwater impacts from the operation of the OD unit. The new monitoring wells shall be installed in the vicinity of the OD Unit (Figure H-3). Installation of the monitoring wells shall facilitate groundwater sampling from the uppermost groundwater both up and downgradient of potential source areas associated with the OD unit. Based on data from nearby wells, groundwater at the proposed locations is expected to occur under confined conditions within the Paleozoic sedimentary rocks of the Madera Group or Sandia Formation or the underlying Precambrian granite. The depth to the uppermost water bearing zones at the proposed well locations is expected to range from approximately 100 to 200 feet (ft) below ground surface (bgs). Final well design shall be dependent on field conditions and the placement of the fourth well shall be performed in consultation with the Department.

Table H-2

Comparison of Reporting Levels to Screening Objectives in Groundwater, Open Burn and Open Detonation Units at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Water Quality Standard	EPA Maximum Contaminant Levels/Secondary Contaminant Levels[a]	EPA Regional Screening Levels Tap Water (Nov 2012)	DOE Open Burn Suggested Maximum Background (Dec 1998)	LOQ	LOD	DL
EPA 160.2	Total dissolved solids	NA	mg/L	--	--	--	--	4	2	1
EPA 310.2	Alkalinity	NA	mg/L	--	--	--	--	10	5	2.5
EPA 350.1	Ammonia	7664-41-7	mg/L	--	--	--	--	0.5	0.1	0.049
SW9030B	Sulfide	18496-25-8	mg/L	--	--	--	--	2	0.8	0.4
SW9056	Nitrate	14797-55-8	mg/L	58.4	10	25	4 (as NO2/NO3)	0.5	0.1	0.04
SW9056	Nitrite	14797-65-0	mg/L	3.65	1	1.6	4 (as NO2/NO3)	0.5	0.1	0.05
SW9056	Chloride	16887-00-6	mg/L	--	--	--	--	0.5	0.1	0.05
SW9056	Sulfate	18785-72-3	mg/L	--	--	--	--	0.5	0.1	0.05
SW9056	Fluoride	7782-41-4	mg/L	1.46	--	620	--	0.5	0.1	0.05
SW9056	Bromide	7726-95-6	mg/L	--	--	--	--	0.5	0.1	0.05
SW9060	Total organic carbon	7440-44-0	mg/L	--	--	--	--	1	0.5	0.25
SW6010B	Barium	7440-39-3	µg/L	1,000	2,000	--	120	20	5	0.25
SW6010B	Boron	7440-42-8	µg/L	7,300	--	3100	--	20	5	1
SW6010B	Beryllium	7440-41-7	µg/L	--	4	--	4	3	1	0.3
SW6010B	Cadmium	7440-43-9	µg/L	10	5	--	0.47	3	1	0.5
SW6010B	Calcuim	7440-70-2	µg/L	--	--	--	--	1000	80	35
SW6010B	Chromium	7440-47-3	µg/L	50	100	--	43	10	5	1.2
SW6010B	Cobalt	7440-48-4	µg/L	50	--	--	2.5	10	5	3
SW6010B	Copper	7440-50-8	µg/L	1,000	1,300 (1,000)	--	<50	15	5	2.1
SW6010B	Iron	7439-89-6	µg/L	1,000	300	11000	--	200	100	50
SW6010B	Lead	7439-92-1	µg/L	50	15	--	10	10	5	2.5
SW6010B	Lithium	7439-93-2	µg/L	--	--	31	--	500	25	11
SW6010B	Magnesium	7439-95-4	µg/L	--	--	--	--	500	25	11
SW6010B	Manganese	7439-96-5	µg/L	876	--	320	--	500	25	11
SW6010B	Molybdenum	7439-98-7	µg/L	183	--	78	--	500	25	11
SW6010B	Nickel	7440-02-0	µg/L	--	--	300	28	10	5	2.4
SW6010B	Potasium	9/7/7440	µg/L	--	--	--	--	3000	250	237
SW6010B	Selenium	7782-49-2	µg/L	50	50	--	5	40	25	13
SW6010B	Silver	7440-22-4	µg/L	50	100	--	<10	5	2	0.84
SW6010B	Sodium	7440-23-5	µg/L	--	--	--	--	5000	250	91.6
SW6010B	Strontium	7440-24-6	µg/L	21900	--	9300	--	500	25	11
SW6010B	Tin	7440-31-5	µg/L	--	--	9300	50	50	15	1.7
SW6010B	Vanadium*	7440-62-2	µg/L	--	--	--	13	20	5	1.9
SW6010B	Zinc	7440-66-6	µg/L	10,000	5,000	--	260	20	10	3
SW6020A	Antimony	7440-36-0	µg/L	--	6	--	6	6	4	2
SW6020A	Arsenic	7440-38-2	µg/L	100	10	--	14	3	2	1
SW6020A	Thallium	7440-28-0	µg/L	--	2	--	2	1.5	1	0.5
SW7470A	Mercury	7439-97-6	µg/L	2	2	--	2	0.3	0.1	0.1
SW6850	Perchlorate	14797-73-0	µg/L	4[b]	--	--	--	0.5	0.25	0.082
SW8260B	1,1,1-Trichloroethane	71-55-6	µg/L	60	200	--	--	1	0.4	0.19
SW8260B	1,1,2,2-Tetrachloroethane	79-34-5	µg/L	10	--	--	--	1	0.2	0.09
SW8260B	1,1,2-trichloro-1,1,2-trifluoroethane*	76-13-1	µg/L	--	--	--	--	50	0.4	0.25
SW8260B	1,1,2-Trichloroethane	79-00-5	µg/L	10	5	--	--	1	0.4	0.31
SW8260B	1,1-Dichloroethane	75-34-3	µg/L	25	--	--	--	1	0.2	0.1
SW8260B	1,1-Dichloroethene	75-35-4	µg/L	5	7	--	--	1	0.4	0.14
SW8260B	1,2,3-Trichlorobenzene	87-61-6	µg/L	70	--	--	--	1	0.4	0.14
SW8011	1,2,3-Trichloropropane	96-18-4	µg/L	--	--	0.00065	--	0.2	0.09	0.09
SW8260B	1,2,4-Trichlorobenzene	120-82-1	µg/L	--	70	--	--	1	0.4	0.1
SW8260B	1,2,4-Trimethylbenzene	95-63-6	µg/L	--	--	15	--	1	0.2	0.12
SW8011	1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	µg/L	--	0.2	NA	--	0.02	0.005	0.005
SW8011	1,2-Dibromoethane (EDB)	106-93-4	µg/L	0.1	0.05	NA	--	0.02	0.005	0.0022
SW8260B	1,2-Dichlorobenzene	95-50-1	µg/L	--	600	--	--	1	0.4	0.14
SW8260B	1,2-Dichloroethane	107-06-2	µg/L	10	5	--	--	1	0.4	0.22
SW8260B	1,2-Dichloropropane	78-87-5	µg/L	--	5	--	--	1	0.2	0.15
SW8260B	1,3,5-Trimethylbenzene	108-67-8	µg/L	--	--	87	--	1	0.2	0.14
SW8260B	1,3-Dichlorobenzene*	541-73-1	µg/L	--	--	--	--	1	0.4	0.11
SW8260B	1,4-Dichlorobenzene	106-46-7	µg/L	--	75	--	--	1	0.2	0.13
SW8260B	1,4-Dioxane	123-91-1	µg/L	--	--	0.67	--	1	TBD	0.12
SW8260B	2-Butanone (MEK)	78-93-3	µg/L	--	--	4,900	--	2	0.4	0.35
SW8260B	2-Hexanone	591-78-6	µg/L	--	--	34	--	2	0.4	0.17
SW8260B	4-Methyl-2-pentanone (MIBK)	108-10-1	µg/L	--	--	1,000	--	2	0.4	1
SW8260B	Acetone	67-64-1	µg/L	--	--	12,000	--	10	4	2.1
SW8260B	Benzene	71-43-2	µg/L	10	5	--	--	1	0.2	0.13
SW8260B	Bromochloromethane	74-97-5	µg/L	--	--	83	--	1	0.4	0.14
SW8260B	Bromodichloromethane	75-27-4	µg/L	--	100	--	--	1	0.4	0.14
SW8260B	Bromoform	75-25-2	µg/L	--	100	--	--	1	0.4	0.1
SW8260B	Bromomethane	74-83-9	µg/L	--	--	7	--	1	0.4	0.29
SW8260B	Carbon disulfide	75-15-0	µg/L	--	--	720	--	2	0.2	0.16
SW8260B	Carbon tetrachloride	56-23-5	µg/L	10	5	--	--	1	0.4	0.15
SW8260B	Chlorobenzene	108-90-7	µg/L	--	100	--	--	1	0.2	0.12
SW8260B	Chloroethane	75-00-3	µg/L	--	--	21,000	--	1	0.4	0.34

Table H-2

Comparison of Reporting Levels to Screening Objectives in Groundwater, Open Burn and Open Detonation Units at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Water Quality Standard	EPA Maximum Contaminant Levels/Secondary Contaminant Levels[a]	EPA Regional Screening Levels Tap Water (Nov 2012)	DOE Open Burn Suggested Maximum Background (Dec 1998)	LOQ	LOD	DL
SW8260B	Chloroform	67-66-3	µg/L	100	100	--	--	1	0.2	0.12
SW8260B	Chloromethane	74-87-3	µg/L	--	--	190	--	1	0.4	0.25
SW8260B	cis-1,2-Dichloroethene	156-59-2	µg/L	--	70	--	--	1	0.4	0.1
SW8260B	cis-1,3-Dichloropropene*	10061-01-5	µg/L	--	--	--	--	1	0.4	0.22
SW8260B	Cyclohexane*	1735-17-7	µg/L	--	--	--	--	(a)	(a)	(a)
SW8260B	Dibromochloromethane	124-48-1	µg/L	--	100	--	--	1	0.4	0.13
SW8260B	Dichlorodifluoromethane (Freon 12)	75-71-8	µg/L	--	--	190	--	1	0.4	0.16
SW8260B	Ethylbenzene	100-41-4	µg/L	750	700	--	--	1	0.2	0.1
SW8260B	Isopropylbenzene	98-82-8	µg/L	--	--	390	--	1	0.2	0.12
SW8260B	Methyl tert-butyl ether (MTBE)	1634-04-4	µg/L	--	(5)	--	--	2	0.4	0.19
SW8260B	Methylene chloride	75-09-2	µg/L	100	5	--	--	1	0.4	0.35
SW8260B	Methyl Acetate*	79-20-9	µg/L	--	--	--	--	(a)	(a)	(a)
SW8260B	Methly Cyclohexane*	108-87-2	µg/L	--	--	--	--	(a)	(a)	(a)
SW8260B	m-Xylene & p-Xylene	136777-61-2	µg/L	--	10,000	--	--	1	0.8	0.18
SW8260B	Naphthalene	91-20-3	µg/L	30	--	NA	--	1	0.2	0.15
SW8260B	o-Xylene	95-47-6	µg/L	--	10,000	--	--	1	0.4	0.1
SW8260B	Styrene	100-42-5	µg/L	--	100	--	--	1	0.2	0.15
SW8260B	Tetrachloroethene	127-18-4	µg/L	--	5	--	--	1	0.2	0.1
SW8260B	Toluene	108-88-3	µg/L	750	1,000	--	--	1	0.4	0.25
SW8260B	trans-1,2-Dichloroethene	156-60-5	µg/L	--	100	--	--	1	0.4	0.11
SW8260B	trans-1,3-Dichloropropene*	10061-02-6	µg/L	--	--	--	--	1	0.2	0.08
SW8260B	Trichloroethene	79-01-6	µg/L	100	5	--	--	1	0.4	0.13
SW8260B	Trichlorofluoromethane (Freon 11)	75-69-4	µg/L	--	--	1,100	--	1	0.4	0.23
SW8260B	Vinyl chloride	75-01-4	µg/L	1	2	--	--	1	0.4	0.22
SW8260B	1,2-Dichloroethane-d4 (Surrogate)		%	--	--	--	--	--	--	--
SW8260B	4-Bromofluorobenzene (Surrogate)		%	--	--	--	--	--	--	--
SW8260B	Dibromofluoromethane (Surrogate)		%	--	--	--	--	--	--	--
SW8260B	Toluene-d8 (Surrogate)		%	--	--	--	--	--	--	--
SW8270C	1,1-biphenyl	92-52-4	µg/L	--	--	0.83	--	10	NA	5
SW8270C	1,2,4,5-tetrachlrorbenzene	95-94-3	µg/L	--	--	1.2	--	10	2.1	0.54
SW8270C	2,4,5-Trichlorophenol	95-95-4	µg/L	--	--	890	--	10	3.0	2
SW8270C	2,4,6-Trichlorophenol	88-06-2	µg/L	--	--	3.5	--	10	3.0	2
SW8270C	2,4-Dichlorophenol	120-83-2	µg/L	--	--	35	--	10	3.0	2.6
SW8270C	2,4-Dimethylphenol	105-67-9	µg/L	--	--	270	--	10	3.0	2.2
SW8270C	2,4-Dinitrotoluene	121-14-2	µg/L	--	--	0.2	--	10	3.0	2
SW8270C	2,6-Dichlorophenol*	87-65-0	µg/L	--	--	--	--	15	3.0	5
SW8270C	2,6-Dinitrotoluene	606-20-2	µg/L	--	--	15	--	10	3.0	2
SW8270C	2-Chloronaphthalene	91-58-7	µg/L	--	--	550	--	10	3.0	1.3
SW8270C	2-Chlorophenol	95-57-8	µg/L	--	--	71	--	10	3.0	1.6
SW8270C	2-Methylphenol	95-48-7	µg/L	--	--	720	--	10	3.0	0.93
SW8270C	2-Nitroaniline	88-74-4	µg/L	--	--	150	--	50	3.0	2
SW8270C	2-Nitrophenol*	88-75-5	µg/L	--	--	--	--	10	3.0	1.9
SW8270C	2,2-oxybis(1-chloropropane)*	52438-91-2	µg/L	--	--	--	--	10	3	1.3
SW8270C	3,3'-Dichlorobenzidine	91-94-1	µg/L	--	--	0.11	--	50	3.0	0.96
SW8270C	3-Methylphenol & 4-Methylphenol	65794-96-9	µg/L	--	--	720	--	30	20	10
SW8270C	3-Nitroaniline*	99-09-2	µg/L	--	--	--	--	50	3.0	1.4
SW8270C	4,6-Dinitro-2-methylphenol	534-52-1	µg/L	--	--	1.2	--	60	20	2.2
SW8270C	4-Bromophenyl phenyl ether*	101-55-3	µg/L	--	--	--	--	10	3.0	1.1
SW8270C	4-Chloro-3-methylphenol	59-50-7	µg/L	--	--	1,100	--	10	3.0	2
SW8270C	4-Chloroaniline	106-47-8	µg/L	--	--	0.32	--	10	3.0	2
SW8270C	4-Chlorophenyl phenyl ether*	7005-72-3	µg/L	--	--	--	--	10	3.0	1.1
SW8270C	4-Nitroaniline	100-01-6	µg/L	--	--	3.3	--	50	3.0	1.5
SW8270C	4-Nitrophenol*	100-02-7	µg/L	--	--	--	--	60	20	6.1
SW8270C	Acetophenone	17537-31-4	µg/L	--	--	1,500	--	10	3	0.78
SW8270C	Azobenzene (as 1,2 Diphenylhydrazine)	103-33-3	µg/L	--	--	0.067	--	10	3.0	0.71
SW8270C	Atrazine	93616-39-8	µg/L	--	--	0.26	--	(a)	(a)	(a)
SW8270C	Benzaldehyde	100-52-7	µg/L	--	--	1,500	--	(a)	(a)	(a)
SW8270C	bis(2-Chloroethoxy)methane	111-91-1	µg/L	--	--	46	--	10	3.0	1
SW8270C	bis(2-Chloroethyl) ether	111-44-4	µg/L	--	--	0.012	--	10	3.0	1.5
SW8270C	bis(2-Ethylhexyl) phthalate	117-81-7	µg/L	--	6	--	--	10	3.0	1
SW8270C	Butyl benzyl phthalate	85-68-7	µg/L	--	--	14	--	10	3.0	1.4
SW8270C	Caprolactam	105-60-2	µg/L	--	--	7,700	--	(a)	(a)	(a)
SW8270C	Carbazole*	86-74-8	µg/L	--	--	--	--	10	3.0	1.2
SW8270C	Dibenzofuran	132-64-9	µg/L	--	--	5.8	--	10	3.0	1.1
SW8270C	Diethyl phthalate	84-66-2	µg/L	--	--	11,000	--	10	3.0	0.93
SW8270C	Dimethyl phthalate*	131-11-3	µg/L	--	--	--	--	10	3.0	0.88
SW8270C	Di-n-butyl phthalate	84-74-2	µg/L	--	--	670	--	10	3.0	1.1
SW8270C	Di-n-octyl phthalate*	117-84-0	µg/L	--	--	--	--	10	3.0	1.5
SW8270C	Hexachlorobenzene	118-74-1	µg/L	--	1	--	--	10	3.0	1.4
SW8270C	Hexachlorobutadiene	87-68-3	µg/L	--	--	0.26	--	10	3.0	1.3
SW8270C	Hexachloroethane	67-72-1	µg/L	--	--	0.79	--	10	3.0	1.4

Table H-2

Comparison of Reporting Levels to Screening Objectives in Groundwater, Open Burn and Open Detonation Units at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Water Quality Standard	EPA Maximum Contaminant Levels/Secondary Contaminant Levels[a]	EPA Regional Screening Levels Tap Water (Nov 2012)	DOE Open Burn Suggested Maximum Background (Dec 1998)	LOQ	LOD	DL
SW8270C	Hexachlorocyclopentadiene	77-47-4	µg/L		--	22	--	10	3	0.214
SW8270C	Isophorone	78-59-1	µg/L	--	--	67	--	10	3.0	1
SW8270C	Nitrobenzene	98-95-3	µg/L	--	--	0.12	--	10	3.0	1.6
SW8270C	N-Nitrosodimethylamine	62-75-9	µg/L	--	--	0.0004	--	15	3.0	0.96
SW8270C	N-Nitrosodi-n-propylamine	621-64-7	µg/L	--	--	0.0093	--	10	3.0	1.4
SW8270C	N-Nitrosodiphenylamine	86-30-6	µg/L	--	--	10	--	10	3.0	0.54
SW8270C	Pentachlorophenol	87-86-5	µg/L	--	1	--	--	60	20	2
SW8270C	Phenol	108-95-2	µg/L	--	--	4,500	--	10	3.0	1.1
SW8270C	Phenol-d6		%	--	--	--	--	--	--	--
SW8270C	2-Fluorobiphenyl		%	--	--	--	--	--	--	--
SW8270C	Terphenyl-d14		%	--	--	--	--	--	--	--
SW8270C-SIM	1-methylnaphthalene	90-12-0	µg/L	--	--	0.97	--	0.1	0.01	0.006
SW8270C-SIM	2-methylnaphthalene	91-57-6	µg/L	--	--	27	--	0.1	0.01	0.006
SW8270C-SIM	Acenaphthene	83-32-9	µg/L	--	--	400	--	0.1	0.01	0.003
SW8270C-SIM	Acenaphthylene	208-96-8	µg/L	--	--	--	--	0.1	0.01	0.003
SW8270C-SIM	Anthracene	120-12-7	µg/L	--	--	1300	--	0.1	0.01	0.004
SW8270C-SIM	Benzo (a) anthracene	56-55-3	µg/L	--	--	0.029	--	0.1	0.01	0.005
SW8270C-SIM	Benzo (a) pyrene	50-32-8	µg/L	0.7	0.2	--	--	0.1	0.01	0.004
SW8270C-SIM	Benzo (b) fluoranthene	205-99-2	µg/L	--	--	0.029	--	0.1	0.02	0.012
SW8270C-SIM	Benzo (g,h,i) perylene	191-24-2	µg/L	--	--	--	--	0.1	0.01	0.006
SW8270C-SIM	Benzo (k) fluoranthene	207-08-9	µg/L	--	--	0.29	--	0.1	0.01	0.008
SW8270C-SIM	Chrysene	218-01-9	µg/L	--	--	2.9	--	0.1	0.01	0.004
SW8270C-SIM	Dibenzo (a,h) anthracene	53-70-3	µg/L	--	--	0.0029	--	0.1	0.02	0.014
SW8270C-SIM	Fluoranthene	206-44-0	µg/L	--	--	630	--	0.1	0.01	0.004
SW8270C-SIM	Fluorene	86-73-7	µg/L	--	--	220	--	0.1	0.01	0.004
SW8270C-SIM	Indeno (1,2,3-c,d) pyrene	193-39-5	µg/L	--	--	0.029	--	0.1	0.02	0.014
SW8270C-SIM	Naphthalene	91-20-3	µg/L	30		NA	--	0.1	0.01	0.004
SW8270C-SIM	Phenanthrene	85-01-8	µg/L	--	--	--	--	0.1	0.01	0.006
SW8270C-SIM	Pyrene	129-00-0	µg/L	--	--	87	--	0.1	0.01	0.004
SW8290	2,3,7,8-TCDF*	51207-31-9	pg/L	--	--	--	--	10	2.5	EDL
SW8290	2,3,7,8-TCDD*	1746-01-6	pg/L	--	--	--	--	10	2.5	EDL
SW8290	1,2,3,7,8-PeCDF*	57117-41-6	pg/L	--	--	--	--	50	6.5	EDL
SW8290	2,3,4,7,8-PeCDF*	57117-31-4	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,7,8-PeCDD*	40321-76-4	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,4,7,8-HxCDF*	70648-26-9	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,6,7,8-HxCDF*	57117-44-9	pg/L	--	--	--	--	50	12.5	EDL
SW8290	2,3,4,6,7,8-HxCDF*	60851-34-5	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,7,8,9-HxCDF*	72918-21-9	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,4,7,8-HxCDD*	39227-28-6	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,6,7,8-HxCDD*	57653-85-7	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,7,8,9-HxCDD*	19408-74-3	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,4,6,7,8-HpCDF*	67562-39-4	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,4,7,8,9-HpCDF*	55673-89-7	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,4,6,7,8-HpCDD*	35822-46-9	pg/L	--	--	--	--	50	12.5	EDL
SW8290	OCDF*	39001-02-0	pg/L	--	--	--	--	100	25	EDL
SW8290	OCDD*	3268-87-9	pg/L	--	--	--	--	100	50	EDL
SW8330B	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	µg/L	--	--	780	--	0.15	0.05	0.036
SW8330B	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	µg/L	--	--	0.61	--	0.25	0.05	0.036
SW8330B	1,3,5-Trinitrobenzene (1,3,5-TNB)	99-35-4	µg/L	--	--	460	--	0.1	0.05	0.03
SW8330B	1,3-Dinitrobenzene (1,3-DNB)	99-65-0	µg/L	--	--	1.5	--	0.15	0.1	0.05
SW8330B	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	479-45-8	µg/L	--	--	61	--	0.15	0.1	0.05
SW8330B	Nitrobenzene (NB)	98-95-3	µg/L	--	--	0.12	--	0.15	0.1	0.05
SW8330B	2,4,6-Trinitrotoluene (2,4,6-TNT)	118-96-7	µg/L	--	--	2.2	--	0.15	0.1	0.05
SW8330B	4-Amino-2,6-dinitrotoluene (4-Am-DNT)	19406-51-0	µg/L	--	--	30	--	0.15	0.1	0.05
SW8330B	2-Amino-4,6-dinitrotoluene (2-Am-DNT)	35572-78-2	µg/L	--	--	30	--	0.3	0.1	0.1
SW8330B	2,4-Dinitrotoluene (2,4-DNT)	121-14-2	µg/L	--	--	0.2	--	0.15	0.1	0.05
SW8330B	2,6-Dinitrotoluene (2,6-DNT)	606-20-2	µg/L	--	--	15	--	0.15	0.1	0.05
SW8330B	2-Nitrotoluene (2-NT)	88-72-2	µg/L	--	--	0.27	--	1	0.1	0.088
SW8330B	3-Nitrotoluene (3-NT)	99-08-1	µg/L	--	--	1.3	--	0.5	0.1	0.057
SW8330B	4-Nitrotoluene (4-NT)	99-99-0	µg/L	--	--	3.7	--	1	0.1	0.088
SW8330B	Nitroglycerin	55-63-0	µg/L	--	--	1.5	--	1	0.5	0.33
SW8330B	PETN	78-11-5	µg/L	--	--	16	--	1	0.5	0.3
SW7580	White phosphorous	7723-14-0	µg/L	--	--	0.31	--	0.05	0.025	0.015

The laboratory does not analyze for these compounds. The compounds will be tentatively identified based on a computer library search of the sample chromotography. If found, the coumpound concentration will be reported as an estimated value.

The detection limit exceeds most stringent criteria.

[a] Secondary Contaminant Levels are in parentheses

[b] KAFB RCRA permit screening criteria for perchlorate

* Risk based screening levels will be calculated if analyte is detected and toxicological information is available

Constituents with "%" units are surrogates and are not a part of the target analytes.

CAS - Chemical Abstract Service

DL - Detection limit

DOE - Department of Energy

LOD - Limit of detection

LOQ - Limit of quantitation

µg/L - micrograms per liter

mg/L - milligrams per liter

NA - not applicable

pg/L - picograms per liter

RPD - relative percent difference

Table H-3

Comparison of Reporting Levels to Screening Objectives in Soil, Open Burn Unit at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Residential SSG (Feb 2012)	Coyote Test Field Super Group Background Values (surface soil)	Coyote Test Field Super Group Background Values (subsurface soil)	EPA Regional Screening Levels, Residential (Nov 2012)	LOQ	LOD	DL
SW6010B	Antimony	7440-36-0	mg/kg	31.3	3.9	3.9	--	3	2	0.94
SW6010B	Barium	7440-39-3	mg/kg	15,596	130	214	--	2	0.5	0.12
SW6010B	Beryllium	7440-41-7	mg/kg	156	0.65	0.65	--	0.3	0.1	0.03
SW6010B	Cadmium	7440-43-9	mg/kg	70.3	1	0.9	--	0.3	0.1	0.03
SW6010B	Chromium	7440-47-3	mg/kg	117,321/2.97	17.3	12.8	--	1	0.5	0.14
SW6010B	Cobalt	7440-48-4	mg/kg	--	5.2	5.2	23	1	0.5	0.25
SW6010B	Copper	7440-50-8	mg/kg	3,129	15.4	18.2	--	1.5	0.5	0.22
SW6010B	Lead	7439-92-1	mg/kg	400	21.4	11.8	--	1	0.5	0.26
SW6010B	Nickel	7440-02-0	mg/kg	1,564	11.5	11.5	--	1	0.5	0.24
SW6010B	Selenium	7782-49-2	mg/kg	391	1	1	--	4	2.5	1.4
SW6010B	Silver	7440-22-4	mg/kg	391	1	1	--	0.5	0.2	0.09
SW6010B	Tin	7440-31-5	mg/kg	--	10	10	47,000	100	25	11
SW6010B	Vanadium	7440-62-2	mg/kg	391	20.4	21.5	--	2	0.5	0.19
SW6010B	Zinc	7440-66-6	mg/kg	23,464	62	62	--	2	1	0.19
SW6020A	Arsenic	7440-38-2	mg/kg	3.9	5.6	7.4	--	0.5	0.3	0.15
SW6020A	Thallium	7440-28-0	mg/kg	0.78	1.1	1.1	--	0.15	0.1	0.05
SW7471A	Mercury	7439-97-6	mg/kg	15.6/7.82	0.25	0.10	--	0.04	0.012	0.0086
SW6850	Perchlorate	14797-73-0	µg/kg	54,800	--	--	--	5	0.4	0.26
SW7580	White Phosphorus	7723-14-0W	µg/kg	--	--	--	1,600	0.1	0.05	0.015
SW8260B	1,1,1-Trichloroethane	71-55-6	µg/kg	15,609,580	--	--	--	5	1	0.36
SW8260B	1,1,2,2-Tetrachloroethane	79-34-5	µg/kg	8,021	--	--	--	5	1	0.68
SW8260B	1,1,2-Trichloroethane	79-00-5	µg/kg	2,811	--	--	--	5	1	0.44
SW8260B	1,1,2-trichloro-1,1,2-trifluoroethane	76-13-1	µg/kg	72,080,604	--	--	--	10	1	0.83
SW8260B	1,1-Dichloroethane	75-34-3	µg/kg	64,514	--	--	--	5	1	0.29
SW8260B	1,1-Dichloroethene	75-35-4	µg/kg	448,879	--	--	--	5	0.5	0.26
SW8260B	1,2,3-Trichlorobenzene	87-61-6	µg/kg	--	--	--	49,000	5	1	0.75
SW8260B	1,2,3-Trichloropropane	96-18-4	µg/kg	50	--	--	--	5	1	0.76
SW8260B	1,2,4-Trichlorobenzene	120-82-1	µg/kg	72,980	--	--	--	5	1	0.75
SW8260B	1,2,4-Trimethylbenzene	95-63-6	µg/kg	--	--	--	62,000	5	1	0.51
SW8260B	1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	µg/kg	186	--	--	--	10	1	0.88
SW8260B	1,2-Dibromoethane (EDB)	106-93-4	µg/kg	588	--	--	--	10	1	0.27
SW8260B	1,2-Dichlorobenzene	95-50-1	µg/kg	2,306,711	--	--	--	5	1	0.64
SW8260B	1,2-Dichloroethane	107-06-2	µg/kg	7,885	--	--	--	5	1	0.73
SW8260B	1,2-Dichloropropane	78-87-5	µg/kg	15,238	--	--	--	5	1	0.6
SW8260B	1,3,5-Trimethylbenzene	108-67-8	µg/kg	--	--	--	780,000	5	1	0.35
SW8260B	1,3-Dichlorobenzene*	541-73-1	µg/kg	--	--	--	--	5	1	0.3
SW8260B	1,4-Dichlorobenzene	106-46-7	µg/kg	31,731	--	--	--	5	1	0.78
SW8260B	1,4-Dioxane	123-91-1	µg/kg	48,634	--	--	--	250	75	39
SW8260B	2-Butanone (MEK)	78-93-3	µg/kg	37,076,608	--	--	--	10	3	1.4
SW8260B	2-Hexanone	591-78-6	µg/kg	--	--	--	210,000	10	1	0.74
SW8260B	4-Methyl-2-pentanone (MIBK)	108-10-1	µg/kg	51,578	--	--	--	10	1	0.92
SW8260B	Acetone	67-64-1	µg/kg	66,556,733	--	--	--	20	3	1.4
SW8260B	Benzene	71-43-2	µg/kg	15,381	--	--	--	5	1	0.26
SW8260B	Bromochloromethane	74-97-5	µg/kg	--	--	--	160,000	5	1	0.94
SW8260B	Bromodichloromethane	75-27-4	µg/kg	5,411	--	--	--	5	1	0.53
SW8260B	Bromoform	75-25-2	µg/kg	--	--	--	--	5	1	0.4
SW8260B	Bromomethane	74-83-9	µg/kg	16,485	--	--	--	5	3	0.86
SW8260B	Carbon disulfide	75-15-0	µg/kg	1,532,527	--	--	--	10	1	0.49
SW8260B	Carbon tetrachloride	56-23-5	µg/kg	10,833	--	--	--	5	1	0.53
SW8260B	Chlorobenzene	108-90-7	µg/kg	376,370	--	--	--	5	1	0.29
SW8260B	Chloroethane	75-00-3	µg/kg	29,806,983	--	--	--	5	1	0.45
SW8260B	Chloroform	67-66-3	µg/kg	5,864	--	--	--	5	1	0.26
SW8260B	Chloromethane	74-87-3	µg/kg	274,707	--	--	--	5	1	0.5
SW8260B	cis-1,2-Dichloroethene	156-59-2	µg/kg	156,428	--	--	--	5	1	0.89
SW8260B	cis-1,3-Dichloropropene*	10061-01-5	µg/kg	33713	--	--	--	5	1	0.64
SW8260B	Cyclohexane	1735-17-7	µg/kg	--	--	--	7,000,000	(a)	(a)	(a)
SW8260B	Dibromochloromethane	124-48-1	µg/kg	12,127	--	--	--	5	0.5	0.21
SW8260B	Dichlorodifluoromethane (Freon 12)	75-71-8	µg/kg	168,142	--	--	--	5	3	0.89
SW8260B	Ethylbenzene	100-41-4	µg/kg	68,448	--	--	--	5	1	0.34
SW8260B	Isopropylbenzene	98-82-8	µg/kg	2,430,743	--	--	--	5	1	0.52
SW8260B	Methyl Acetate	79-20-9	µg/kg	78,214,000	--	--	--	(a)	(a)	(a)
SW8260B	Methly Cyclohexane	108-87-2	µg/kg	5,625,911	--	--	--	(a)	(a)	(a)
SW8260B	Methyl tert-butyl ether (MTBE)	1634-04-4	µg/kg	901,073	--	--	--	10	1	0.6
SW8260B	Methylene chloride	75-09-2	µg/kg	409,376	--	--	--	5	1	0.84
SW8260B	m-Xylene & p-Xylene	136777-61-2	µg/kg	774,289	--	--	--	5	1	0.81
SW8260B	Naphthalene	91-20-3	µg/kg	42,976	--	--	--	5	1	0.63
SW8260B	o-Xylene	95-47-6	µg/kg	898,344	--	--	--	5	0.5	0.33
SW8260B	Styrene	100-42-5	µg/kg	7,277,612	--	--	--	5	1	0.31
SW8260B	Tetrachloroethene	127-18-4	µg/kg	7,021	--	--	--	5	1	0.61
SW8260B	Toluene	108-88-3	µg/kg	5,274,400	--	--	--	5	1	0.61
SW8260B	trans-1,2-Dichloroethene	156-60-5	µg/kg	269,586	--	--	--	5	1	0.38
SW8260B	trans-1,3-Dichloropropene*	10061-02-6	µg/kg	33713	--	--	--	5	1	0.75
SW8260B	Trichloroethene	79-01-6	µg/kg	8,767	--	--	--	5	1	0.6
SW8260B	Trichlorofluoromethane (Freon 11)	75-69-4	µg/kg	1,412,976	--	--	--	10	1	0.34
SW8260B	Vinyl chloride	75-01-4	µg/kg	728	--	--	--	5	1	0.36

Table H-3

Comparison of Reporting Levels to Screening Objectives in Soil, Open Burn Unit at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Residential SSG (Feb 2012)	Coyote Test Field Super Group Background Values (surface soil)	Coyote Test Field Super Group Background Values (subsurface soil)	EPA Regional Screening Levels, Residential (Nov 2012)	LOQ	LOD	DL
SW8270C	1,1-biphenyl	92-52-4	µg/kg	57117	--	--	--	330	NA	165
SW8270C	1,2,4,5-tetrachlorbenzene	95-94-3	µg/kg	18,331	--	--	--	(a)	(a)	(a)
SW8270C	2,4,5-Trichlorophenol	95-95-4	µg/kg	6,110,491	--	--	--	330	167	83
SW8270C	2,4,6-Trichlorophenol	88-06-2	µg/kg	61,105	--	--	--	330	167	84
SW8270C	2,4-Dichlorophenol	120-83-2	µg/kg	183,315	--	--	--	330	167	89
SW8270C	2,4-Dimethylphenol	105-67-9	µg/kg	1,222,098	--	--	--	500	167	167
SW8270C	2,4-Dinitrotoluene	121-14-2	µg/kg	15,689	--	--	--	330	167	89
SW8270C	2,6-Dichlorophenol*	87-65-0	µg/kg	--	--	--	--	500	167	165
SW8270C	2,6-Dinitrotoluene	606-20-2	µg/kg	61,105	--	--	--	330	167	99
SW8270C	2-Chloronaphthalene	91-58-7	µg/kg	6,257,143	--	--	--	330	167	81
SW8270C	2-Chlorophenol	95-57-8	µg/kg	391,071	--	--	--	330	167	88
SW8270C	2-Methylnaphthalene	91-57-6	µg/kg	--	--	--	230,000	330	167	85
SW8270C	2-Methylphenol	95-48-7	µg/kg	--	--	--	3,100,000	330	167	58
SW8270C	2-Nitroaniline	88-74-4	µg/kg	--	--	--	610,000	1600	167	84
SW8270C	2-Nitrophenol*	88-75-5	µg/kg	--	--	--	--	330	167	82
SW8270C	2,2-oxybis(1-chloropropane)*	52438-91-2	µg/kg	--	--	--	--	330	167	54
SW8270C	3,3'-Dichlorobenzidine	91-94-1	µg/kg	10,808	--	--	--	1600	167	94
SW8270C	3-Methylphenol & 4-Methylphenol	65794-96-9	µg/kg	--	--	--	3,100,000	1000	660	330
SW8270C	3-Nitroaniline*	99-09-2	µg/kg	--	--	--	--	1600	333	167
SW8270C	4,6-Dinitro-2-methylphenol	534-52-1	µg/kg	4,888	--	--	--	2000	333	81
SW8270C	4-Bromophenyl phenyl ether*	101-55-3	µg/kg	--	--	--	--	330	167	85
SW8270C	4-Chloro-3-methylphenol	59-50-7	µg/kg	--	--	--	6,100,000	330	167	92
SW8270C	4-Chloroaniline	106-47-8	µg/kg	--	--	--	2,400	330	167	58
SW8270C	4-Chlorophenyl phenyl ether*	7005-72-3	µg/kg	--	--	--	--	330	167	93
SW8270C	4-Nitroaniline	100-01-6	µg/kg	--	--	--	24,000	1600	167	88
SW8270C	4-Nitrophenol*	100-02-7	µg/kg	--	--	--	--	2000	333	280
SW8270C	Acenaphthene	83-32-9	µg/kg	3,440,510	--	--	--	330	167	83
SW8270C	Acenaphthylene*	208-96-8	µg/kg	--	--	--	--	330	167	85
SW8270C	Anthracene	120-12-7	µg/kg	17,202,560	--	--	--	330	167	86
SW8270C	Acetophenone	17537-31-4	µg/kg	7,821,428	--	--	--	(a)	(a)	(a)
SW8270C	Azobenzene (as 1,2 diphenyl hydrazine)	103-33-3	µg/kg	6079	--	--	610	330	167	92
SW8270C	Atrazine	93615-39-8	µg/kg	--	--	--	2,100	(a)	(a)	(a)
SW8270C	Benzaldehyde	100-52-7	µg/kg	--	--	--	7,800,000	(a)	(a)	(a)
SW8270C	Benz(a)anthracene	56-55-3	µg/kg	1,476	--	--	--	330	167	92
SW8270C	Benzo(a)pyrene	50-32-8	µg/kg	147	--	--	--	330	167	94
SW8270C	Benzo(b)fluoranthene	205-99-2	µg/kg	1,476	--	--	--	330	167	95
SW8270C	Benzo(ghi)perylene*	191-24-2	µg/kg	--	--	--	--	330	167	110
SW8270C	Benzo(k)fluoranthene	207-08-9	µg/kg	14,762	--	--	--	330	167	113
SW8270C	bis(2-Chloroethoxy)methane	111-91-1	µg/kg	--	--	--	180,000	330	167	88
SW8270C	bis(2-Chloroethyl) ether	111-44-4	µg/kg	6	--	--	--	330	167	81
SW8270C	bis(2-Ethylhexyl) phthalate	117-81-7	µg/kg	347,387	--	--	--	330	167	98
SW8270C	Butyl benzyl phthalate	85-68-7	µg/kg	--	--	--	260,000	330	167	95
SW8270C	Carbazole*	86-74-8	µg/kg	--	--	--	--	330	167	95
SW8270C	Caprolactam	105-60-2	µg/kg	--	--	--	31,000,000	(a)	(a)	(a)
SW8270C	Chrysene	218-01-9	µg/kg	148,629	--	--	--	330	167	84
SW8270C	Dibenz(a,h)anthracene	53-70-3	µg/kg	147	--	--	--	330	167	102
SW8270C	Dibenzofuran	132-64-9	µg/kg	--	--	--	78,000	330	167	86
SW8270C	Diethyl phthalate	84-66-2	µg/kg	48,883,929	--	--	--	330	167	90
SW8270C	Dimethyl phthalate	131-11-3	µg/kg	611,049,107	--	--	--	330	167	87
SW8270C	Di-n-butyl phthalate	84-74-2	µg/kg	6,110,491	--	--	--	330	167	97
SW8270C	Di-n-octyl phthalate*	117-84-0	µg/kg	--	--	--	--	330	167	97
SW8270C	Fluoranthene	206-44-0	µg/kg	2,293,674	--	--	--	330	167	95
SW8270C	Fluorene	86-73-7	µg/kg	2,293,674	--	--	--	330	167	92
SW8270C	Hexachlorobenzene	118-74-1	µg/kg	3,040	--	--	--	330	167	89
SW8270C	Hexachlorobutadiene	87-68-3	µg/kg	--	--	--	--	330	167	82
SW8270C	Hexachloroethane	67-72-1	µg/kg	42,773	--	--	--	330	167	81
SW8270C	Hexachlorocyclopentadiene	77-47-4	µg/kg	366,000	--	--	--	1600	250	62
SW8270C	Indeno(1,2,3-cd)pyrene	193-39-5	µg/kg	1,476	--	--	--	330	167	96
SW8270C	Isophorone	78-59-1	µg/kg	5,119,394	--	--	--	330	167	93
SW8270C	Naphthalene	91-20-3	µg/kg	42,976	--	--	--	330	167	82
SW8270C	Nitrobenzene	98-95-3	µg/kg	53,500	--	--	--	330	167	76
SW8270C	N-Nitrosodimethylamine	62-75-9	µg/kg	22.5	--	--	--	330	167	98
SW8270C	N-Nitrosodi-n-propylamine	621-64-7	µg/kg	--	--	--	69	330	167	84
SW8270C	N-Nitrosodiphenylamine	86-30-6	µg/kg	992,516	--	--	--	330	167	86
SW8270C	Pentachlorophenol	87-86-5	µg/kg	8,935	--	--	--	330	167	51
SW8270C	2,4,6-Tribromophenol		%	--	--	--	--	--	--	--
SW8270C	2-Flourophenol		%	--	--	--	--	--	--	--
SW8270C	Nitrobenzene-d5		%	--	--	--	--	--	--	--

Table H-3

Comparison of Reporting Levels to Screening Objectives in Soil, Open Burn Unit at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Residential SSG (Feb 2012)	Coyote Test Field Super Group Background Values (surface soil)	Coyote Test Field Super Group Background Values (subsurface soil)	EPA Regional Screening Levels, Residential (Nov 2012)	LOQ	LOD	DL
SW8290	2,3,7,8-TCDF*	51207-31-9	pg/g	449	--	--	--	1	0.15	EDL
SW8290	2,3,7,8-TCDD	1746-01-6	pg/g	44.9	--	--	--	1	0.15	EDL
SW8290	1,2,3,7,8-PeCDF*	57117-41-6	pg/g	--	--	--	--	5	0.75	EDL
SW8290	2,3,4,7,8-PeCDF*	57117-31-4	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,7,8-PeCDD*	40321-76-4	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,7,8-HxCDF*	70648-26-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,6,7,8-HxCDF*	57117-44-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	2,3,4,6,7,8-HxCDF*	60851-34-5	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,7,8,9-HxCDF*	72918-21-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,7,8-HxCDD*	39227-28-6	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,6,7,8-HxCDD*	57653-85-7	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,7,8,9-HxCDD*	19408-74-3	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,6,7,8-HpCDF*	67562-39-4	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,7,8,9-HpCDF*	55673-89-7	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,6,7,8-HpCDD*	35822-46-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	OCDF*	39001-02-0	pg/g	--	--	--	--	10	1.5	EDL
SW8290	OCDD*	3268-87-9	pg/g	--	--	--	--	10	1.5	EDL
SW8330B	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	mg/kg	3,911	--	--	--	0.25	0.05	0.012
SW8330B	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	mg/kg	58.2	--	--	--	0.25	0.05	0.012
SW8330B	1,3,5-Trinitrobenzene (1,3,5-TNB)	99-35-4	mg/kg	--	--	--	2,200,000	0.25	0.05	0.01
SW8330B	1,3-Dinitrobenzene (1,3-DNB)	99-65-0	mg/kg	--	--	--	6,100	0.25	0.05	0.0042
SW8330B	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	479-45-8	mg/kg	244	--	--	--	0.25	0.05	0.01
SW8330B	Nitrobenzene (NB)	98-95-3	mg/kg	53.5	--	--	--	0.25	0.05	0.0176
SW8330B	2,4,6-Trinitrotoluene (2,4,6-TNT)	118-96-7	mg/kg	39.1	--	--	--	0.25	0.05	0.0194
SW8330B	4-Amino-2,6-dinitrotoluene (4-Am-DNT)	19406-51-0	mg/kg	--	--	--	150,000	0.25	0.05	0.01
SW8330B	2-Amino-4,6-dinitrotoluene (2-Am-DNT)	35572-78-2	mg/kg	--	--	--	150,000	0.25	0.05	0.0125
SW8330B	2,4-Dinitrotoluene (2,4-DNT)	121-14-2	mg/kg	7.15	--	--	--	0.25	0.05	0.0053
SW8330B	2-Nitrotoluene (2-NT)	88-72-2	mg/kg	29.1	--	--	--	0.5	0.05	0.013
SW8330B	3-Nitrotoluene (3-NT)	99-08-1	mg/kg	7.8	--	--	--	0.25	0.05	0.0155
SW8330B	4-Nitrotoluene (4-NT)	99-99-0	mg/kg	244	--	--	--	0.25	0.05	0.0182
SW8330B	Nitroglycerin	55-63-0	mg/kg	6.11	--	--	--	0.5	0.25	0.015
SW8330B	PETN	78-11-5	mg/kg	--	--	--	120,000	0.5	0.25	0.025
SW8330B	3,4-Dinitrotoluene (Surrogate)	610-39-9	%	--	--	--	--	--	--	--

The laboratory does not analyze for these compounds. The compounds will be tentatively identified based on a computer library search of the sample chromotography.
If found, the coumpound concentration will be reported as an estimated value.
The detection limit exceeds most stringent criteria.

Constituents with "%" units are surrogates and are not a part of the target analytes.
* Risk based screening levels will be calculated if analyte is detected and toxicological information is available
DL - Detection limit
LOD - Limit of detection
LOQ - Limit of quantitation
µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
pg/g - picograms per gram
RPD - relative percent difference
RSD - relative standard deviation for multi-incremental sample collection
SSG - soil screening goal

V:\Kirtland_AFB\GIS\MapFiles\Figure H-3 - Proposed GW Monitoring Well Locations.mxd

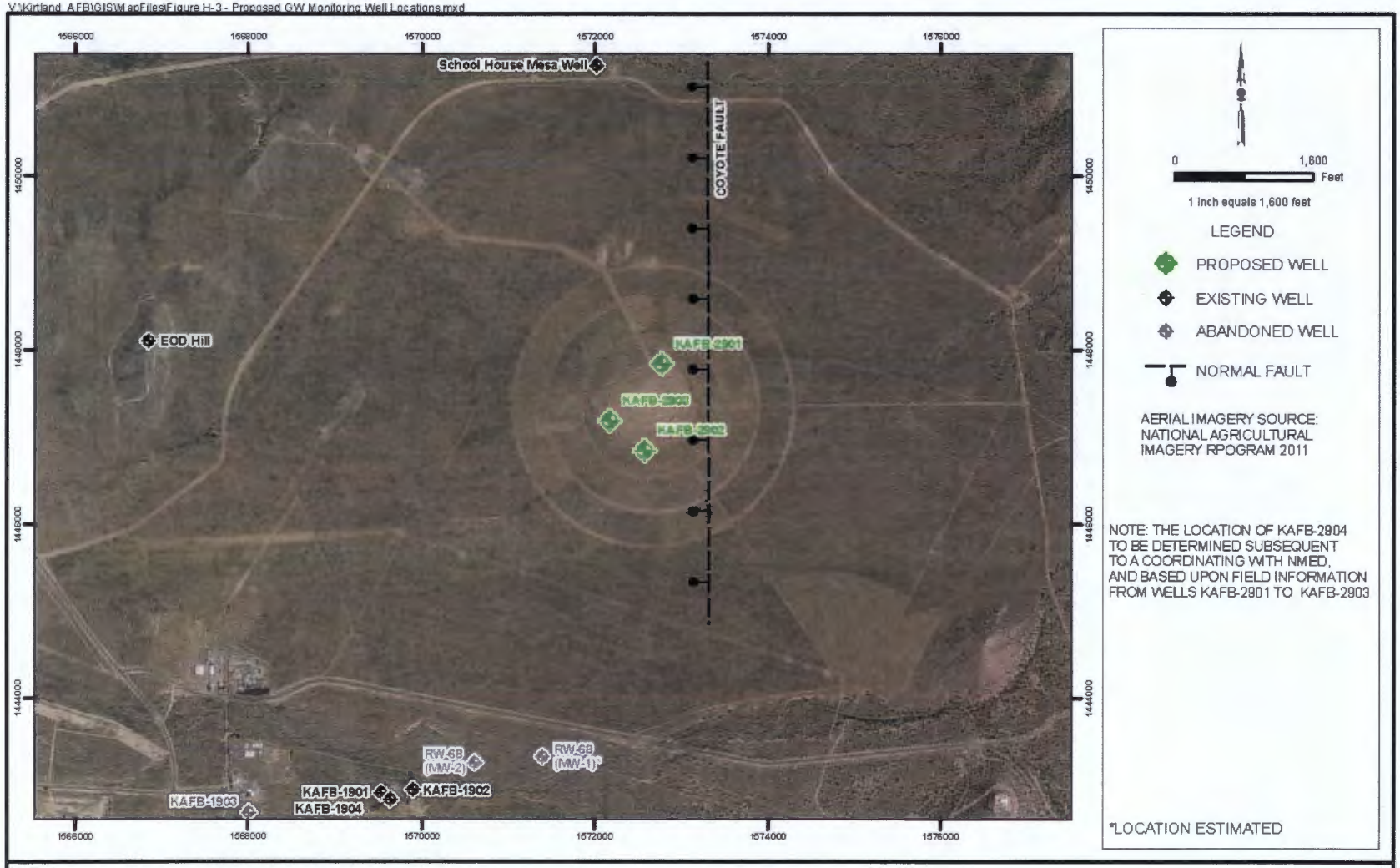

FIGURE H-3
PROPOSED GROUNDWATER MONITORING WELL LOCATIONS
FOR THE OPEN DETONATION UNIT
KIRTLAND AIR FORCE BASE, NEW MEXICO

2.1.1.1 Hydrogeologic Setting

The EOD Range is located within the Tijeras fault complex hydrogeologic region at Kirtland AFB (Sandia National Laboratories/New Mexico [SNL/NM], 2011a). The Sandia, Hubbel Springs, and Tijeras faults converge in this area and define eastern edge of the Albuquerque Basin. Within the Tijeras fault complex, a thin layer of alluvium covers bedrock. The hydrogeology in this area is poorly understood due to the complex geology created by the fault systems. On the eastern side of the Tijeras fault complex, the depth to groundwater ranges from about 45 to 325 ft bgs. Most of the monitoring wells in this area are completed in fractured bedrock at relatively shallow depths and produce modest yields of groundwater.

The nearest existing wells to the proposed monitoring well locations include the School House Well approximately 3,500 ft north-northwest of the OD unit; the EOD Hill Well approximately 4,300 ft west-northwest of the OD unit; three wells at Lake Christian (Kirtland AFB Solid Waste Management Unit [SWMU] 6-22), roughly 5,500 ft southeast of the OD unit; and three monitoring wells installed at the Old Burn Site (SNL SWMU 68), approximately 7,000 ft south of the OD unit. Nearby former monitoring well locations include two wells at the Radium Dump/Slag Piles (Kirtland AFB SWMU RW-68); approximately 4,500 ft south-southeast of the OD unit; and one well at Lake Christian (Kirtland AFB SWMU 6-22), roughly 5,500 ft southeast of the OD unit. The existing and former well locations are shown in Figure H-4.

All of the nearby wells are completed in water bearing zones of the Paleozoic sedimentary rocks of the Madera Group or Sandia Formation or the underlying Precambrian granite. The available borehole logs and well completion diagrams from the surrounding wells and former well locations indicate that the uppermost groundwater occurs under confined conditions.

The groundwater flow direction in the vicinity of the EOD Range is not well defined and is assumed to mirror the topographic gradient of the land surface. There are several north-south trending faults mapped along the Sandia/Manzanita/Manzano Mountain range front. In the vicinity of the OD unit, one normal fault crosses along the eastern edge of the EOD range, identified as the Coyote Fault in Figure H-4. This fault was encountered during drilling boreholes at the Old Burn Site (SNL SWMU 68), located south of the OD unit (SNL/NM, 2011b). This fault location is important to the OD unit investigation because it likely influences the groundwater flow across the site from east to west and may act as a hydraulic barrier. Comparison of water levels in the upgradient well and the downgradient wells shall provide data on the possible influence the fault has on local groundwater flow. The majority of the EOD Range is located west of the inferred location of the fault. The triangular configuration of the proposed downgradient monitoring wells and the measured groundwater elevations in the wells shall be used to calculate the groundwater flow direction and hydraulic gradient in the uppermost groundwater aquifer across the majority of the site.

The depth to the uppermost water bearing zones at the proposed well locations is expected to range from approximately 100 to 200 ft bgs. The horizontal groundwater flow velocity is estimated to be on the order of 50 to 100 ft/year. Based on a history of at least 40 or more years of activities in the EOD Range area, potential contaminant impacts in groundwater could be expected to have traveled roughly 2,000 to 4,000 ft downgradient based on those flow velocity estimates.

The three proposed well locations were selected in consultation with the Department (Figure H-3). One presumed upgradient and two presumed downgradient locations were selected for installation of the wells. Location of the fourth well shall be determined in consultation with the Department following installation of the three proposed wells based on gradient and flow direction.

FIGURE H-4
AREA FEATURES AND WELL LOCATIONS
MONITORING WELL INSTALLATION WORK PLAN FOR THE OPEN BURN AND OPEN DETONATION UNITS
KIRTLAND AIR FORCE BASE, NEW MEXICO

2.1.1.2 Investigation Activities

Well installation activities shall be conducted in accordance with the *Kirtland Air Force Base, Base-Wide Plans for the Environmental Restoration Program, 2004 Update* (USAF, 2004) and with the RCRA Permit. The procedures in Section 3.5 of the RCRA Permit, as well as procedures of the Base-Wide Plans, Standard Operating Procedure (SOP) B1.3: Monitoring Well Installation, shall be adhered to for this project, unless they are specifically modified by this closure plan.

2.1.1.3 Mobilization

The schedule of events for the investigation activities shall commence by drilling and installing three groundwater monitoring wells as shown in Figure H-3. Following well installations, the gradient and flow direction shall be established within the investigation area. The Permitee shall then meet with Department to determine the appropriate location of the fourth groundwater monitoring well. The fourth monitoring well, KAFB-2904, shall be installed and followed directly by the first groundwater monitoring event for the new wells. Quarterly groundwater monitoring shall be conducted according to this closure plan. At the conclusion of the investigation and four quarters of monitoring activities, the Permitee shall provide a report with recommendations based on the data collected from the first four quarters of monitoring.

An exploratory well application permit for each well shall be filed with the New Mexico Office of the State Engineer (NMOSE) in accordance with the Rules and Regulations Governing Well Driller Licensing; Construction, Repair and Plugging of Wells (NMOSE, 2005). The Bernalillo County well installation regulations are not applicable to wells installed on Kirtland AFB. All well locations shall be cleared by Unexploded Ordnance (UXO) support personnel prior to mobilization of drilling activities. An environmental impact analysis shall be performed through the Base Civil Engineering and Natural Resources Request (AF Form 813). A utility clearance of the area shall be performed using Base Civil Engineering Clearance Requests (AF IMT 103), Base Civil Engineer Work Requests (AF IMT 332), and New Mexico One Call services. A surface disturbance permit shall not be required because the total disturbed area of the wells is less than 1 acre.

2.1.1.4 Drilling Method and Sequence

The boreholes shall be installed using air-rotary casing hammer (ARCH) drilling method. This method has been successfully used for the installation of nearby monitoring wells and should facilitate lithologic description of drill cuttings and allow for the observation of soil/bedrock moisture content for identification of groundwater zones. The ARCH drilling method shall be used to advance the boring through the vadose zone and anchor the drive casing in the underlying bedrock.

The specific depths shall be determined in the field based on site conditions such as lithology and presence of groundwater. The following sequence of drilling is anticipated based on known hydrogeologic conditions and drill method capabilities:

1. Initiate boring with the ARCH method using an 8½-inch tri-cone bit and 9-5/8-inch diameter drive casing. Advance the drive casing to the depth of the contact between the alluvium and underlying bedrock.
2. Set the drive casing in the bedrock and continue drilling the borehole using an open hole drilling technique. If dense bedrock conditions are encountered in the boring, a change from a tri-cone bit to a down hole hammer bit may be required.

3. Advance the boring into the uppermost water bearing unit. Complete the borehole approximately 25 ft into the water bearing unit.

During the ARCH drilling activities, the field staff shall monitor for the presence of groundwater by visually inspecting drill cuttings for moisture. If the cuttings become wet, the borehole shall be allowed to sit idle for approximately one hour. A water level probe shall then be lowered into the borehole to assess whether groundwater has accumulated and this information shall be documented on the field log.

Field screening of the soil cuttings for the presence of volatile organic compounds (VOCs) shall be conducted during the drilling process using a portable photo ionization detector (PID) as described in Base-Wide Plans, Appendix B, SOP B3.1: Photo-ionization Detectors and Organic Vapor Analyzers (USAF, 2004). As the boreholes are advanced, the field geologist shall continuously collect soil cuttings to aid in the preparation of lithologic logs. The monitoring well lithologic log shall be completed as described in Base-Wide Plans, Appendix B SOP B1.1: Borehole and Sample Logging. Drill cuttings from ARCH method drilling shall be stored at the well site on plastic sheeting or in roll-off containers and managed as investigation-derived waste (IDW).

Groundwater purged from the boring during borehole advancement and sampling shall be allowed to settle in roll-off bins then transferred to holding tank(s). These plastic holding tanks shall be managed as IDW along with decontamination and well development fluids.

Decontamination of the drill rig, drill tools, sampling equipment, and associated equipment shall be accomplished by steam cleaning prior to drilling each well. Decontamination activities shall be conducted at a central location with water obtained from an approved onsite source. Decontamination fluids shall be contained in polyethylene tanks and managed as IDW.

2.1.1.5 Subsurface Soil Sampling

Soil and rock sampling shall be performed for lithologic description. Subsurface soil laboratory analysis is not proposed as part of this investigation. No soil or rock samples shall be submitted for laboratory analysis.

2.1.1.6 Monitoring Well Construction

Monitoring wells shall be designed and constructed based on the lithology and groundwater elevations encountered at each proposed well location. The well construction details may be subject to change based on the observed field conditions, but procedures and methods shall comply with Section 3.5 of the RCRA Permit and the OSE criteria. The anticipated well constructions details are shown in Figure H-5. The proposed monitoring well design includes the use of 4-inch-inside diameter (ID), Schedule 80 polyvinyl chloride (PVC) casing with a 5-ft well sump, 20-ft of 0.020-inch slot size well screen, and approximately 2 to 3 ft of stickup at the surface. Centralizers shall be used to stabilize the well casing within the borehole at the top and bottom of the screen interval and at a minimum spacing of 40 ft on casing above the top of the well screen.

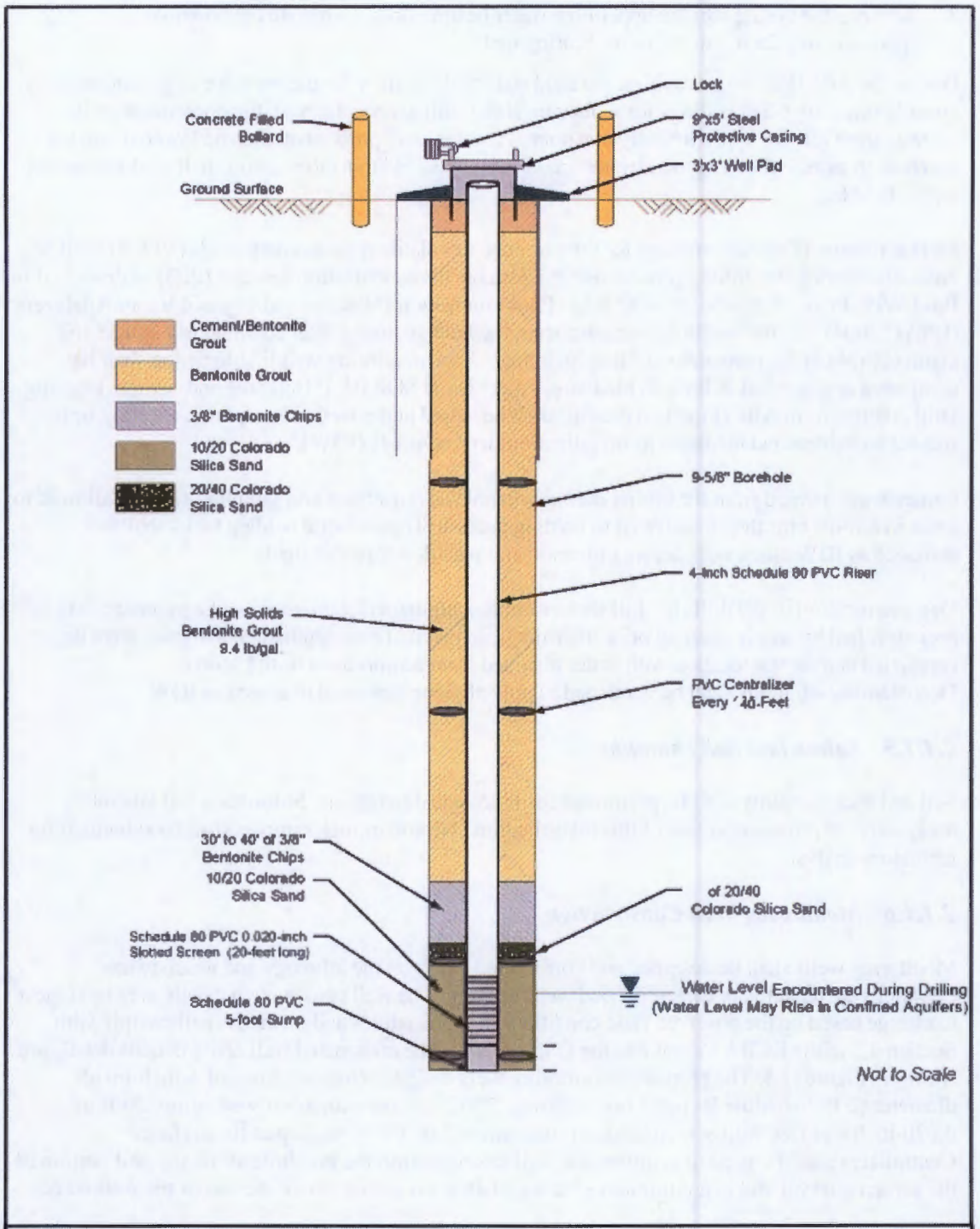

FIGURE H-5
PROPOSED MONITORING WELL DESIGN
MONITORING WELL INSTALLATION WORK PLAN
FOR THE OPEN BURN AND OPEN DETONATION UNITS
KIRTLAND AIR FORCE BASE, NEW MEXICO

Wells shall be completed as follows:

- The sand filter pack type shall be determined based on field observations and shall extend from the bottom of the silt trap to 5 ft above the top of the screen. However, it is anticipated that a filter pack of 10-20 gradation Colorado Silica Sand shall be used in the construction of the monitoring wells. The filter pack sand shall be placed through a tremie pipe. Approximately 2 ft of barrier sand, 100 percent passing an American Society for Testing and Materials (ASTM) U.S. Standard Sieve No. 60, shall be placed above the filter pack to inhibit flow of grout into the filter pack.

- A minimum of 10 ft of bentonite chips or pellets shall be installed above the filter pack through a tremie pipe. The seal shall be hydrated with clean potable water in 6-inch lifts. Setup time for the bentonite shall be at the discretion of the field geologist.

- The annular space above the hydrated bentonite seal shall be backfilled with bentonite slurry. Bentonite slurries are effective in sealing off groundwater units above the screened and sand-packed intervals of a well and are less likely to damage the well casing than bentonite-cement grout. The bentonite slurry shall be installed through a tremie pipe. The bentonite slurry shall extend from the bentonite pellet seal to approximately 50 ft bgs.

- The remaining 50 ft of annular space shall be filled with bentonite-cement grout consisting of 94 pounds of Portland cement, 3 percent by weight sodium bentonite powder, and 7 gallons of contaminant-free water. The bentonite-cement grout shall be placed using a grout pump and tremie pipe to within 5 ft of the land surface. The grout shall be allowed to set for at least 24 hours before well development begins.

- The monitoring wells shall be completed at the surface in accordance with specifications as presented in SOP B1.3 of the *Base-Wide Plans, Field Sampling Plan* (FSP) (USAF, 2004). The surface completion shall consist of a 5-foot-long, 9-inch-diameter steel stand pipe with locking cap cemented into a 3-foot-square concrete well pad. Four concrete-filled steel bollards shall be installed at the corners of the well pad to protect the well from vehicle damage.

- At the conclusion of the project, when wells KAFB-2901, KAFB-2902, KAFB-2903, and KAFB-2904 are no longer needed, the wells shall be properly abandoned in compliance with *Rules and Regulations Governing Well Driller Licensing; Construction, Repair and Plugging of Wells* (NMOSE, 2005).

2.1.1.7 Well Development

Monitoring wells shall be developed using a variety of techniques including swabbing, surging, bailing, air lifting and pumping. Monitoring well development shall adhere to procedures outlined in Base-Wide Plans, Appendix B, SOP B1.4: Monitoring Well Development (USAF, 2004). Monitoring well development shall be performed within one week after well installation but no sooner than 24 hours after grout installation. Groundwater discharged from the wells shall be monitored for pH, temperature, specific conductance, dissolved oxygen, oxidation-reduction (redox) potential, and turbidity. Each monitoring well screen shall be developed until pH and specific conductance stabilize and the water appears substantially free of sediment. The development goal is to reduce the turbidity to less than 10 nephelometric turbidity units (NTUs) and a less than 10 percent variance in the other parameters observed in the final three readings.

However, a final turbidity of less than 100 NTUs is acceptable. If the field parameters have not stabilized after 4 hours of continuous pumping, the well shall be allowed to sit overnight and development shall continue the following day for a maximum of 2 hours. If the turbidity still does not fall below 100 NTUs, the Permitee shall seek further direction from the Department.

Proposed monitoring wells KAFB-2901, KAFB-2902, and KAFB-2903 shall be developed and surveyed subsequent to installation. A static groundwater elevation from each surveyed and developed well shall be measured and used to determine the groundwater gradient and flow direction across the OD unit area. This information shall be used to determine the location and design of KAFB-2904.

2.1.1.8 Well Survey

A New Mexico licensed professional surveyor shall survey the horizontal well locations relative to New Mexico State Plane Coordinates and the vertical elevations to the nearest one-hundredth of 1 ft for the newly installed monitoring wells. Surveying shall be conducted in accordance with SOP B1.9 of the Base-Wide Plans FSP (USAF, 2004).

2.1.1.9 Groundwater Gradient Calculations

Depth to water measurements for static conditions shall be collected from monitoring wells KAFB-2901, KAFB-2902, and KAFB-2903 subsequent to well development. These measurements shall be converted to groundwater elevation data using well survey data. These elevations shall be mapped, and gradients shall be calculated perpendicular to the equipotential groundwater contours. The direction and magnitude of groundwater gradients shall provide information that shall be used to propose optimum locations for monitoring well KAFB-2904. The permitee shall consult with the Department to determine the final location of KAFB-2904. Groundwater elevations may also be collected from comparable aquifer units from nearby monitoring wells. The previously installed wells surrounding the investigation area include KAFB-1901, KAFB-1902, KAFB-1904, EOD Hill Well, and School House Mesa Well.

2.1.2 Groundwater Sampling and Analysis Plan

Groundwater monitoring shall be performed subsequent to well development at a quarterly frequency for up to eight quarters. Groundwater elevations shall be measured in each well prior to sampling. Groundwater elevations shall be used to determine groundwater flow rate and gradient on a quarterly basis. Well purging methods shall comply with the RCRA Permit Section 6.5.17.4 and groundwater samples shall be analyzed for VOCs, semivolatile organic compounds (SVOCs), explosives, perchlorate, white phosphorus, target analyte list metals, dioxins, and furans, total dissolved solids, alkalinity, anions, cations, and total organic carbon (Table H-4). Data shall be of sufficient precision and quality to meet data quality objectives and to ensure that method detection limits are less than cleanup levels where technologically feasible.

Up to eight consecutive quarters of groundwater monitoring are currently planned at the four monitoring wells. If groundwater contamination from the operation of the OD unit is not detected in the monitoring wells, they shall be properly plugged and abandoned in accordance with NMOSE regulations and Department guidance. If groundwater contamination from the operation of the OD unit is identified, the monitoring wells shall be maintained for the purpose of monitoring corrective action.

Table H-4
Groundwater Monitoring Parameters and Testing Methods for the Groundwater Investigation of the OD Unit

Analysis	Method	Testing Location	Data Use
Groundwater elevation	Groundwater probe	Field	Groundwater flow direction
pH	pH probe	Field, flow-through cell	General groundwater parameter
Temperature	Digitalthermometer	Field, flow-through cell	General groundwater parameter
Specific conductance	Conductivity meter	Field, flow-through cell	General groundwater parameter
Dissolved oxygen	Dissolved oxygen probe	Field, flow-through cell	Assess aerobic or anaerobic conditions
Oxidation-reduction potential	EH (hydrogen electrode) meter	Field, flow-through cell	Assess conditions for natural attenuation of contaminants
Turbidity	Turbidity meter	Field, flow-through cell	General groundwater parameter
Total dissolved solids	EPA 160.2[a]	Laboratory	General groundwater parameter
Alkalinity	EPA 310.2[a]	Laboratory	General groundwater parameter
Ammonia	EPA350.1[a]	Laboratory	General groundwater parameter
Sulfide	SW9030B[b]	Laboratory	General groundwater parameter
Anions (sulfate, nitrate, nitrite, chloride, bromide and fluoride)	SW9056[b]	Laboratory	General groundwater parameter
Total organic carbon	SW9060[b]	Laboratory	General groundwater parameter
Metals (barium, boron, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, lithium, magnesium, manganese, molybdenum, nickel, potassium, selenium, silver, sodium, strontium, tin, vanadium, zinc, antimony, arsenic, thallium, mercury)	SW6010B[b], SW6020A[b], SW7470A[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Perchlorate	SW6850[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Volatile organic compounds	SW8260B[b], SW8011[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Semivolatile organic compounds	SW8270C[b], SW8270-SIM[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Dioxins and furans	SW8290[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Explosives	SW8330B[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
White phosphorous	SW7580[b]	Laboratory	Assess potential contamination from OB/OD Unit operations

[a] EPA, 1993.
[b] EPA, 1996.
EPA – U.S. Environmental Protection Agency
OB/OD – Open Burn/Open Detonation

2.1.2.1 Well Purging and Field Measurements

Each monitoring well shall be purged by removing groundwater prior to sampling in order to ensure that fresh formation water is sampled. One to three well-bore volumes shall be purged from each well prior to sampling. A well-bore volume is defined as the volume of water in the saturated filter pack plus the volume of all standing water within the well screen and casing. Purge water shall be contained in polyethylene tanks for subsequent characterization and management as IDW. The following groundwater field parameters shall be measured during well purging: pH, specific conductance, dissolved oxygen concentration, turbidity, redox potential, and temperature. The volume of groundwater purged, the field parameter readings obtained at each time interval, and the instruments used to measure the field parameters shall be recorded on the field monitoring log. Water samples shall be obtained from a well only after the measured values of purge water field parameters have stabilized to within 10 percent for three consecutive measurements or once three well-bore volumes have been purged from the well.

Groundwater samples shall be collected using a pneumatic pump, a submersible electronic pump, or a bailer within eight hours of the completion of well purging. Groundwater in monitoring wells with low recharge rates and that purge dry shall be sampled when the water level in the well has recovered sufficiently to collect the required sample volume. Sampling handling, preservation, and storage shall comply with the RCRA permit requirements of Table H-5.

2.1.2.2 Laboratory Analysis and Quality Control/Quality Assurance Procedures

Groundwater samples shall be collected from each monitoring well and analyzed for VOCs, SVOCs, explosives, perchlorate, white phosphorus, target analyte list metals, dioxins, and furans, total dissolved solids, alkalinity, anions, cations, and total organic carbon (Table H-4). The proposed suite of parameters and analyses for the groundwater samples is presented in Table H-2. The contacted laboratory must meet DoD certification requirements. To ensure that data is of sufficient precision, laboratory method detection limits shall be those shown in the approved OD Unit Closure Plan. To ensure that analytical data is of sufficient quality and that laboratory and field methods are assured of proper quality field quality control samples shall be collected in compliance with the approved OD Unit Closure Plan. Level 4 laboratory data shall be requested and validated by qualified chemists to meet criteria specified by the Department and the DoD.

Data reliability shall be ensured by documenting sample management so that analyses are traceable to specific areas of potential contamination and by following a quality assurance/quality control (QA/QC) program that mandates documentation of the precision and accuracy of laboratory analyses, as well as data representativeness, completeness, comparability, and sensitivity.

The QC samples to be collected include: field duplicate samples, trip blanks, and rinsate blanks. Sample designations shall follow the guidelines as outlined in Section 4.2.1 of the Base-Wide Plans, FSP (USAF, 2004). The well identification numbers assigned to the four new wells for this investigation are: KAFB-2901, KAFB-2902, KAFB-2903, and KAFB-2904. The proposed sample number scheme is presented in Table H-6.

Table H-5
Sample Containers, Preservation Techniques, and Holding Times for Soil and Groundwater Samples

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers	Preservation Requirements	Maximum Holding Time
Soil	Metals (including mercury)	SW6010B/ SW6020 and SW7471A	1 gram	250-ml glass or polyethylene	4±2 degrees Celsius (°C)	180 days from date of collection for metals; 28 days from collection to analysis for mercury
Soil	Volatile Organic Compounds (VOCs)	SW8260B/ SW5035	3 different 5-gram aliquots	6 40-milliliters (ml) volatile organic analysis (VOA) vials	Per sample collection: 2 VOA vials with 10-ml water and 1 VOA vial with 10-ml methanol. All vials contain a stir bar. Or 3 VOA vials containing stir bars will have a 5-gram sample aliquot added, seals and frozen on site with dry ice. Samples must remain frozen in shipment and storage at the lab until analysis.	Freeze within 48 hours of arrival at the lab, analyze within 14 days from data of collection Analyze within 14 days from data of collection
Soil	Semivolatile Organic Compounds (SVOCs)	SW8270C	30 grams	250-ml glass	4±2°C	14 days from date of collection to extraction and 40 days from extraction to analysis
Soil	Perchlorate	SW6850	30 grams	250-ml glass	4±2°C	28days
Soil	Explosives	SW8330B	10 grams	250-ml glass	4±2°C	14 days from date of collection to extraction and 40 days from extraction to analysis
Soil	White Phosphorous	SW7580	40 grams	250-ml glass	4±2°C	30 days from date of collection to extraction and analysis
Soil	Dioxins/ Furans	SW8290	30 grams	250-ml glass	4±2°C	30 days from date of collection to extraction and 45 days from extraction to analysis
Groundwater	Dissolved metals (including mercury)	SW6010B/ 6020 and SW7470A	100-ml	1-liter polyethylene	pH < 2 with nitric acid; 4±2°C	28 days from date of collection for Hg, 180 days for others
Groundwater	VOCs	SW8260B	3 40-ml vials	3 40-ml VOA vials	No headspace; 4±2°C	7 days from data of collection
Groundwater	SVOCs	SW8270C	1 liter	2 1-liter amber glass	4±2°C	7 days from date of collection to extraction and 40 days from extraction to analysis
Groundwater	Explosives	SW8330B	1 liter	2 1-liter amber glass	4±2°C	7 days from date of collection to extraction and 40 days from extraction to analysis

Table H-5
Sample Containers, Preservation Techniques, and Holding Times for Soil and Groundwater Samples

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers	Preservation Requirements	Maximum Holding Time
Groundwater	Perchlorate	SW6850	1 liter	1- 250mL precleaned sterile, plastic containers	Field filtered with 1/3 volume headspace to remove and/or minimize microbial and anaerobic bacteria. Store at 4 ± 2 C	28 days
Groundwater	White Phosphorous	SW7580	120 ml	1-liter amber glass	4±2°C	5 days from date of collection to extraction and analysis
Groundwater	Dioxins/ Furans	SW8290	1 liter	2 1-liter amber glass	4±2°C	30 days from date of collection to extraction and 45 days from extraction to analysis
Groundwater	Anions (sulfate, nitrate, nitrite, chloride, bromide and fluoride)	SW9056	100-ml	1-liter polyethylene	4±2°C	28 days from date of collection for all anions except that nitrate and nitrite are 48 hours
Groundwater	Ammonia	E350.1	100-ml	250 ml Poly	4°C pH < 2 with H2SO4	28days
Groundwater	Alkalinity	EPA 310.2	100-ml	250 ml Poly	4°C (share with SW9056)	14 days
Groundwater	Total Organic Carbon	SW9060	100-ml	1-liter polyethylene	4°C pH < 2 with HCL	28 days
Groundwater	Sulfide	SW9030B	500-ml	1-liter polyethylene	4°C Zn acetate NaOH to pH > 9	7 days
Groundwater	Total dissolved solids	EPA 160.2	100-ml	250 ml Poly	4°C	7 days

°C – degrees Celsius
H2SO4 – glycine, sulfate
HCL – hydrochloric acid
mL – milliliters
NaOH – sodium hydroxide
pH – potential of hydrogen
SVOC – Semivolatile organic compound
VOA – volatile organic analysis
VOC – volatile organic compound
Zn – zinc

Table H-6
Proposed Groundwater Sample Identification for the Groundwater Investigation of the OD Unit

Sample Identifier[a]	Sample Type
OT29-GW-2901-_____	Normal
OT29-GW-2902-_____	Normal
OT29-GW-2903-_____	Normal
OT29-GW-2904-_____	Normal
OT29-FD-2901-_____	Duplicate
OT29-EB-2902-_____	Rinsate Blank
OT29-TB-2903-_____	Trip Blank[b]
OT29-MS-2904-_____	Matrix Spike
OT29-MSD-2904-_____	Matrix Spike Duplicate

[a] The six digit sample date shall make up the last portion of the sample identification number
[b] Trip Blanks shall only be analyzed for VOCs

2.1.2.3 Groundwater Data Analysis

Groundwater laboratory analytical results shall be analyzed to determine if there is statistically significant evidence of contamination at each groundwater monitoring well after each sampling event. The groundwater results shall be analyzed by comparison to baseline constituent concentrations and applicable groundwater standards.

Baseline constituent concentrations for the aquifer shall be calculated using laboratory analytical results for groundwater monitoring well KAFB-2901 and other groundwater monitoring wells completed within the same aquifer unit and located nearby. Groundwater monitoring wells that could potentially be used in the baseline constituent concentration calculations include KAFB-1902, KAFB-1903, KAFB-1904, RW68-01, RW68-02, and groundwater monitoring wells sampled by Sandia National Laboratory/New Mexico. Analysis to determine which of the groundwater monitoring wells are completed within the same aquifer unit shall be completed following installation of monitoring well KAFB-2901.

Baseline constituent concentrations shall be calculated for detected naturally occurring compounds including ammonia, sulfide, anions, metals, and perchlorate as listed in Table H-4. Anthropogenic compounds, including VOCs, SVOCs, explosives, dioxins and furans, are assumed to occur at levels less than detection limits. Baseline concentrations shall not be calculated for the anthropogenic compounds.

Baseline constituent concentrations shall be established by calculating a 95 percent upper tolerance limit (UTL) for each of the detected constituents listed above. The 95 percent UTLs shall be calculated following the methodology established as part of the Kirtland AFB Long-Term Monitoring Program (USAF, 2007). The purpose of the UTL approach is to define a constituent concentration from background well data, below which 95 percent of the monitoring well observations fall with a high degree of probability. Once the UTL is determined based on the background monitoring wells, data from downgradient site wells can be compared for evidence of a release by evaluating how the downgradient well results compare to the UTL. If the downgradient well results are greater than the UTL, there is statistical evidence that there has been an increase in the downgradient concentration of the constituent in groundwater. A detailed

description of the process to determine baseline concentrations can be found in the *Long-Term Groundwater Monitoring Summary and Baseline Determination Report, Fiscal Year 2005* (USAF, 2007).

2.1.2.4 Reporting

One well completion report shall be prepared to document the drilling and well installation activities. No laboratory analytical data shall be presented in the well completion report. The well completion report shall be submitted to the Department for approval within 30 days of the completion of well installation activities. The well installation report shall include the following information:

- Descriptions of the field program including the drilling, well installation, surveying, and IDW management activities;
- Field documentation including soil boring logs, well construction diagrams, well development logs, and survey data.

Field and laboratory data shall be submitted to the Department within 90 days after all samples are collected for each quarter.

Periodic groundwater monitoring reports shall be prepared to document quarterly groundwater monitoring results. All validated groundwater laboratory results shall be presented in periodic groundwater monitoring reports which comply with Section 6.2.4.4 of the RCRA Permit. Groundwater analytical results shall be compared to New Mexico water quality control standards and EPA maximum contaminant levels and secondary screening levels to determine if contamination above standards is present in the groundwater monitoring wells. Each quarter of analytical data shall be evaluated for the presence of potential contaminants. The Periodic Groundwater Monitoring Reports for the OD unit shall be prepared annually and following four quarters of groundwater monitoring and submitted within 90 days after the completion of the last quarterly monitoring event. Currently, up to eight consecutive quarters of groundwater monitoring and two Periodic Groundwater Monitoring Reports are planned.

2.1.2.5 Project Schedule

Table H-7 outlines the project schedule for the installation and sampling of groundwater monitoring wells. The monitoring well drilling and installation activities shall be conducted upon approval of the OD Unit Closure Plan. The well installation activities shall be documented in a Well Completion Report. Final validated groundwater analytical results from four quarters of groundwater sampling shall be reported in an Annual Groundwater Monitoring Report for the OD unit.

Table H-7
Proposed Schedule of Activities for Groundwater Monitoring Well Installation for the Closure of the OD Unit

Activity	Duration (calendar days)	Start Date
Field Investigation		
Mobilize drilling equipment	3	15 days following Closure Plan approval
Well installation, development, and surveying collection of IDW soil and water samples	28	Following mobilization
IDW characterization and disposal	45	Following well installation
Preparation of Well Completion Report		
Initiate Well Completion Report Preparation	30	Upon completion of all well drilling, development, and surveying activities
Submit Well Completion Report to USACE, USAF, and the Department	1	30 days following well installation
Quarterly Groundwater Monitoring and Periodic Reporting		
Conduct quarterly groundwater monitoring	3	Following installation of four groundwater monitoring wells and on a quarterly basis
Submit field and laboratory data from monitoring event	1	90 days following collection of groundwater samples on a quarterly basis
Prepare Periodic Groundwater Monitoring Report	90	Following collection of four quarters of groundwater samples
Submit Periodic Groundwater Monitoring Report to the Department	1	90 days following collection of fourth quarter groundwater samples

IDW – investigation-derived waste
USACE – United States Army Corps of Engineers
USAF – United States Air Force

2.1.3 Mesa Schoolhouse Well

The Mesa Schoolhouse Well, a Department of Energy/National Nuclear Surety Administration (DOE/NNSA) well authorized under Kirtland AFB permit #PERM/0-K1-91-0010 was monitored for groundwater contamination as part of the December 1994 OD Unit's sampling and analysis plan. This sampling has been discontinued and the wellhead is secure. The well shall remain in place for possible future monitoring by DOE/NNSA

2.2 Sampling, Decontamination Procedures, and PPE

This section describes procedures and methods for soil and liquid sampling applicable to closure activities. While the procedures and methods are specific, other applicable procedures or methods given in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA, 1996; SW-846) may be used if conditions or experience show the alternate method to be more appropriate, and if approved by the Department. All sampling procedures actually used shall be annotated in the final closure report. Sampling shall be conducted in accordance with procedures given in "Samplers and Sampling Procedures for Hazardous Waste Streams" (EPA, 1980; EPA 600/2-80-018) or SW-846, as appropriate.

Surface and subsurface soil at the OD Unit shall be characterized by sampling and analysis.

The tools and equipment used during the sampling shall be vacuumed, cleaned with detergent and water, and scraped as necessary to remove any residue. The wash water shall be collected and

analyzed for characterization of waste. The vacuums used and their contents shall be containerized and shipped off site as hazardous waste for disposal.

All of the PPE worn by personnel performing closure activities shall be disposable; therefore, all PPE shall be placed into containers and managed as hazardous waste. This waste shall be considered to be contaminated with all of the hazardous waste constituents contained in the wastes that have been treated at the OB Unit and the OD Unit. All contained PPE wastes shall be transported to a permitted facility for disposal.

2.2.1 Soil Sampling

Soil samples shall be collected on a 25-ft by 25-ft grid spacing from the surface to 15 ft below ground surface at five ft intervals (total of four samples per location). At a minimum, the grid shall encompass all portions of the OD Unit that have hosted or may have hosted a pit used for the treatment of hazardous waste (Figure H-6).

Surface soil samples shall be collected approximately 25 ft from the OB Unit. Three samples shall be collected from each side of the OB for a total of 12 surface soil samples. These samples shall characterize potential contamination from the OB Unit that may have migrated onto the OD Unit.

The soil samples shall be analyzed for the parameters listed in Table H-3 which include all hazardous constituents of the hazardous wastes that were detonated at the OD Unit. Proposed sample identification numbers are shown in Table H-8.

Surface soil samples (zero to six inches depth) shall be collected with a wooden or Teflon™ trowel or scoop. Disposable sampling tools shall be used. In the event that the Department requests split samples, sufficient soils shall be collected to provide split samples to the Department representatives.

A Veihmeyer soil sampler, auger drill, direct push technology or other appropriate method shall be used to collect subsurface soil samples. Only discrete grab samples shall be collected; no samples shall be composited.

Clean sampling equipment shall be used to collect each sample. Unused, disposable sampling equipment may be presumed clean if still in a factory-sealed wrapper prior to use. Reusable sampling equipment shall be decontaminated after each use by scraping to remove any loose material, washing with a detergent and water solution, rinsing several times with tap water, rinsing with deionized water, and drained of excess water, and air-dried or wiped dry.

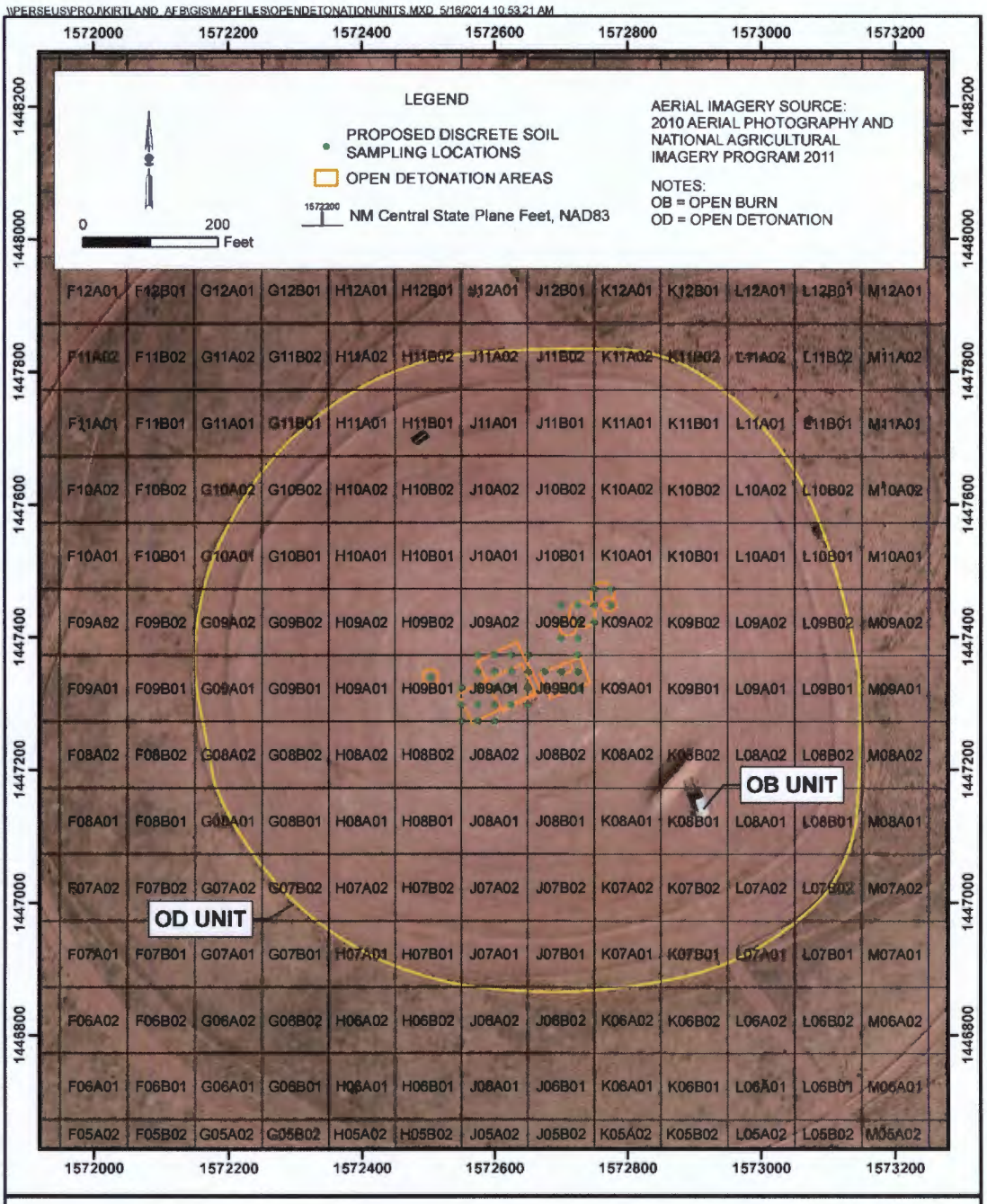

FIGURE H-6
PROPOSED DISCRETE SOIL SAMPLING LOCATIONS
OPEN DETONATION CLOSURE PLAN
KIRTLAND AIR FORCE BASE, NEW MEXICO

Table H-8
Proposed Discrete Soil Samples for the Open Detonation Unit, Kirtland Air Force Base, New Mexico

Soil Boring	Sample Identification	Depth (feet below ground surface)	Sample Type	**Metals** Methods SW-846 6010B, 6020A, 7471B	**VOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8260B	**SVOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8270C	**Total Explosives** (Per Table D-4 of RCRA Permit) Method SW-846 8330B	**Perchlorate** Method SW-846 6850	**White Phosphorous** Method SW-846 7580	**Dioxins** Method SW-846 8290
H09B1-01	OT29-SO-H09B1-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-H09B01-01-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-H09B01-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-H09B01-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-H09B01-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-01	OT29-SO-J09A1-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-02	OT29-SO-J09A1-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-03	OT29-SO-J09A1-03-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-03-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-03-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-03-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-03-1415	14 - 15	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-03-1415MS	14 - 15	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09A1-03-1415MSD	14 - 15	MS/MSD	X	X	X	X	X	X	X
J09A1-04	OT29-SO-J09A1-04-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-04-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-04-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-04-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-05	OT29-SO-J09A1-05-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09A1-05-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09A1-05-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-05-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-05-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-06	OT29-SO-J09A1-06-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-06-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-06-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-06-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-07	OT29-SO-J09A1-07-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-07-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-07-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-07-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-07-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-08	OT29-SO-J09A1-08-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-08-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-08-0405MS	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09A1-08-0405MSD	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09A1-08-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-08-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-09	OT29-SO-J09A1-09-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-09-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-09-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-09-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-10	OT29-SO-J09A1-10-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-10-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-10-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-10-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-11	OT29-SO-J09A1-11-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09A1-11-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09A1-11-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-11-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-11-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-12	OT29-SO-J09A1-12-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-12-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-12-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-12-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-13	OT29-SO-J09A1-13-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-13-0001MS	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09A1-13-0001MSD	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09A1-13-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-13-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-13-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-13-1415	14 - 15	Normal	X	X	X	X	X	X	X

Table H-8
Proposed Discrete Soil Samples for the Open Detonation Unit, Kirtland Air Force Base, New Mexico

Soil Boring	Sample Identification	Depth (feet below ground surface)	Sample Type	**Metals** Methods SW-846 6010B, 6020A, 7471B	**VOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8260B	**SVOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8270C	**Total Explosives** (Per Table D-4 of RCRA Permit) Method SW-846 8330B	**Perchlorate** Method SW-846 6850	**White Phosphorous** Method SW-846 7580	**Dioxins** Method SW-846 8290
J09A1-14	OT29-SO-J09A1-14-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-14-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-14-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-14-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-15	OT29-SO-J09A1-15-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09A1-15-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09A1-15-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-15-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-15-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-16	OT29-SO-J09A1-16-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-16-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-16-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-16-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-17	OT29-SO-J09A1-17-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-17-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-17-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-17-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-17-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-18	OT29-SO-J09A1-18-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-18-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-18-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-18-0910MS	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09A1-18-0910MSD	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09A1-18-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-19	OT29-SO-J09A1-19-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-19-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-19-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-19-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-20	OT29-SO-J09A1-20-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-20-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-20-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-20-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-20-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-21	OT29-SO-J09A1-21-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-21-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-21-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-21-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-01	OT29-SO-J09B1-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B1-01-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B1-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-02	OT29-SO-J09B1-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-03	OT29-SO-J09B1-03-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-03-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09B1-03-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09B1-03-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-03-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-04	OT29-SO-J09B1-04-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-04-0001MS	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09B1-04-0001MSD	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09B1-04-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-04-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-04-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-05	OT29-SO-J09B1-05-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-05-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-05-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-05-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-06	OT29-SO-J09B1-06-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-06-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09B1-06-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09B1-06-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-06-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-07	OT29-SO-J09B1-07-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-07-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-07-0405MS	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09B1-07-0405MSD	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09B1-07-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-07-1415	14 - 15	Normal	X	X	X	X	X	X	X

Table H-8
Proposed Discrete Soil Samples for the Open Detonation Unit, Kirtland Air Force Base, New Mexico

Soil Boring	Sample Identification	Depth (feet below ground surface)	Sample Type	**Metals** Methods SW-846 6010B, 6020A, 7471B	**VOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8260B	**SVOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8270C	**Total Explosives** (Per Table D-4 of RCRA Permit) Method SW-846 8330B	**Perchlorate** Method SW-846 6850	**White Phosphorous** Method SW-846 7580	**Dioxins** Method SW-846 8290
J09B2-01	OT29-SO-J09B2-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-02	OT29-SO-J09B2-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B2-02-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B2-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-03	OT29-SO-J09B2-03-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-03-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-03-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-03-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-04	OT29-SO-J09B2-04-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B2-04-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B2-04-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-04-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-04-1415	14 - 15	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-04-1415MS	14 - 15	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09B2-04-1415MSD	14 - 15	MS/MSD	X	X	X	X	X	X	X
J09B2-05	OT29-SO-J09B2-05-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-05-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-05-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-05-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-06	OT29-SO-J09B2-06-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-06-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-06-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-06-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-07	OT29-SO-J09B2-07-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B2-07-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B2-07-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-07-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-07-0910MS	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09B2-07-0910MSD	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09B2-07-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-08	OT29-SO-J09B2-08-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-08-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-08-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-08-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-09	OT29-SO-J09B2-09-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-09-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-09-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-09-1415	14 - 15	Normal	X	X	X	X	X	X	X
K09A2-01	OT29-SO-K09A2-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-K09A2-01-0405	4 - 5	Normal	X			X	X		
	OT29-FD-K09A2-01-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-K09A2-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-K09A2-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
K09A2-02	OT29-SO-K09A2-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-K09A2-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-K09A2-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-K09A2-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
QC	OT29-WW-RINSATE1	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-RINSATE2	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-RINSATE3	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-RINSATE4	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-TB1	-	Trip Blank		X					
	OT29-WW-TB2	-	Trip Blank		X					
	OT29-WW-TB3	-	Trip Blank		X					
	OT29-WW-TB4	-	Trip Blank		X					
			Total Normal Samples	160	80	80	160	160	80	80
			Total Field Duplicates	16	8	8	16	16	8	8
			Total Matrix Spike/Matrix Spike Duplicates	8	4	4	8	8	4	4
			Total Rinsate Blanks	4	4	4	4	4	4	4
			Total Trip Blanks		4					

MS/MSD - matrix spike/matrix spike duplicate
QC - quality control
RCRA - Resource Conservation and Recovery Act
SVOCs - semivolatile organic compounds
VOCs - volatile organic compounds

2.2.2 Liquid Sampling

Groundwater samples shall be collected from the groundwater monitoring wells installed at the OD Unit. Eight consecutive quarters of groundwater monitoring shall be conducted initially, following installation of the wells. Groundwater samples shall be obtained using methods approved by the Department within eight hours of the completion of well purging. The samples shall be analyzed for the parameters listed in Table H-4, which include all hazardous constituents of the hazardous wastes that were treated at the OD Unit.

Groundwater in monitoring wells with low recharge rates and that purge dry shall be sampled when the water level in the well has recovered sufficiently to collect the required samples. A low-flow bladder pump shall be utilized. Groundwater samples intended for metals analysis shall be submitted to the laboratory for analyses of total metals; the samples shall not be filtered in the field or laboratory.

Glass tubes shall be used to sample liquids, except groundwater. The primary advantage to using this type of sampling device is that the tube can be disposed of after each sample is collected, thus eliminating cross-contamination. Alternatively, a Coliwasa sampler may be used to sample liquids, except groundwater.

2.2.3 Appropriate Sample Containers and Preservatives

Samples shall be placed in clean containers compatible with the intended analysis and shall be properly prepared and preserved to maintain sample integrity. The most recent version of SW-846 lists the proper container, preservative, and holding time for each chemical parameter of interest, and these requirements shall be followed for all samples collected during the closure process. Table H-5 summarizes the sample containers, preservation techniques, and holding times for soil and liquid samples (including groundwater).

2.2.4 Sample Handling and Documentation

Each sample shall be labeled, sealed, and accompanied by a chain-of-custody and a request-for-analysis form. A chain-of-custody form shall be used to track samples from collection through analysis to ensure that the integrity of the samples is protected, and that analytical results can be attributed to specific samples of environmental media or waste. The procedures followed during closure shall be equivalent to those provided in the most current version of SW-846. Important aspects of the procedures are presented below. A chain-of-custody form shall be prepared for all samples collected for laboratory analyses. The form includes:

- • Sample identification number;
- • Name and signature of sample collector;
- • Date and time of sample collection;
- • Location at which sample was collected;
- • Type of waste (e.g., soil, liquid, etc.);
- • Signatures of persons who have had samples in their possession;
- • Dates and times of possession.

This form shall be initiated at the point of sample collection and shall then remain with the sample during transfer to the laboratory. The form shall be completed upon receipt at the laboratory and returned to the Permitee for inclusion in facility operating record. The chain-of-

custody form shall include a request-for analysis form that lists all analyses to be performed for the identified samples and all special instructions relating to sample management or analysis. Any potential hazards posed by the samples shall be listed on the request-for-analysis form.

The sample containers shall be sealed with gummed paper seals attached to the containers in such a way that the seals must be broken in order to open the containers. The seals and sample labels must be completed with a waterproof pen. The sample labels are necessary to prevent misidentification of samples and shall include the following information: a unique sample number; name or initials of sample collector; sample collection date and time; sample location; and, sample type, depth, and description.

A closure sampling field log book shall be kept and shall contain all information pertinent to field surveys and sampling. Sufficient information shall be recorded so that a person can reasonably reconstruct what occurred at a sampling event without relying on a collector's memory. The log book shall have bound and consecutively numbered pages in 8 by 11-inch format. Minimum entries shall include:

- Purpose of sample;
- Location of sampling;
- Name and business address of person making log entry;
- Number, type, and volume of sample;
- Description of each sampling methodology and equipment used;
- Date and time of sample collection;
- Sample destination and transporter's name (name of laboratory, UPS, etc.);
- Map or photograph of the sampling site;
- Field observations (ambient temperature, sky conditions, past 24-hour precipitation, etc.);
- Field measurements, if any (pH, flammability, conductivity, explosivity, etc.);
- Collector's sample identification number(s);
- Signature of person responsible for the log entry.

Documentation of sample acceptance at the laboratory shall be provided following sample screening and log-in. This documentation may consist of signed copies of the chain-of-custody, documentation or a letter detailing the field sample numbers accepted. Corresponding laboratory sample identification numbers shall be provided. The laboratory is required to have procedures for preventing cross contamination of samples and securing sample custody within the laboratory.

2.2.5 Sample Shipping

Samples shall be packaged and shipped to the laboratory in accordance with DOT shipping requirements and in a manner to ensure that the integrity of the samples is protected. The sample containers shall be cushioned to protect against breakage or puncture.

2.2.6 Sample Analysis

Soil, groundwater, and waste samples shall be analyzed by an ELAP-certified laboratory. The analytical laboratory shall have procedures for preventing cross-contamination of samples and securing sample custody within the laboratory. Test methods for analysis of all samples shall be performed according to procedures documented in the most current version of SW-846. Hazardous constituents associated with the regulated wastes treated at the OD Unit are included in these analyses. Analytical methods, detection limits, and instrumentation are provided in

Table H-3 for soil analysis; and in Table H-2 for groundwater analysis. Minimum calibration, operation, and quality control (bias, precision, blank and matrix effects) requirements for laboratory analyses shall be performed as listed in the individual analytical methods of SW-846. All laboratory analyst notebooks, log sheets, instrument printouts, charts, and calculations relevant to analyses of these samples shall be identified and remain accessible. This information may be requested for independent review and validation. If requested by the Department, this information shall be provided by the Permitee.

2.2.7 Quality Assurance/Quality Control Program

Because decisions about closure activities may be based, in part, on analyses of samples, a program to ensure reliability of analytical data is mandatory. Data reliability shall be ensured by documenting sample management so that analyses are traceable to specific areas of potential contamination and by following a quality assurance/quality control (QA/QC) program that mandates documentation of the precision and accuracy of laboratory analyses, as well as data completeness, representativeness, and comparability.

Sampling activities shall include collection of QC samples in addition to field documentation requirements. QC samples to be collected include: duplicate samples, trip blanks, field blanks, and rinsate blanks. Table H-9 summarizes field QC sample requirements.

Blanks and duplicate samples shall be collected to determine potential errors introduced in the data from sample collection and handling activities, laboratory error, and to assess analytical precision. To determine the potential for cross contamination, rinsate blanks consisting of rinsate from decontaminated equipment shall be collected and analyzed. At least one rinsate blank shall be collected for every ten samples collected using non-dedicated sampling equipment. Duplicate samples shall be collected at a frequency of one duplicate sample for every ten field samples. In no case shall less than one rinsate blank or duplicate sample be collected for a sampling effort. Trip blanks shall be collected on a daily basis and included in each shipment of samples that contain VOCs samples. Trip blanks are analyzed for VOCs only and are used to assess possible VOC contamination from outside sources. Trip blanks are shipped from the analytical laboratory and maintained with the sample bottles throughout the sampling process. These blank and duplicate samples shall be identified and treated as separate samples. Acceptance criteria for QA/QC sample analyses shall be compatible with the most recent version of SW-846 or other applicable guidance.

The analytical laboratory shall operate under a QA program plan (QAPP) that meets the requirements of the required methods. QC procedures in the analytical laboratory are guided by the laboratory's QAPP. Laboratory QC samples are required to establish the accuracy and precision of analytical data in order to determine the quality of the data. Table H-10- lists laboratory QC procedures by analytical methods.

The analytical laboratory data shall be evaluated using the following criteria:

- Completeness of data deliverable;
- Collection, extraction, and analysis holding times;
- Blank data;
- Laboratory control sample results;
- Matrix spike/matrix spike duplicate results;
- Laboratory duplicate sample results; and
- Overall data assessment and usability.

Table H-9
Summary of Field Quality Control Samples

Quality Control Sample Type	Sample Matrix	Applicable Analysis	Frequency	Purpose
Trip blank	Soil/Water	VOCs	One per day, per cooler containing VOC samples	Document any contamination attributable to shipping and field handling procedures
Field Duplicate	Soil/Water	VOCs, SVOCs, Metals, HE, Dioxins/Furans, White Phosphorus, Perchlorate, general chemistry[a]	Minimum of one per 10 environmental samples per media type	Document precision of the sampling/analysis process
Rinsate blank	Soil/Water	VOCs, SVOCs, metals, HE, Dioxins/Furans, White Phosphorus, Perchlorate, general chemistry[a, b]	One sample per day per media type for non-dedicated sampling equipment	Document whether decontamination of sampling equipment was adequate

[a] General chemistry - total dissolved solids, alkalinity, ammonia, sulfide, total organic carbon, sulfate, nitrate, nitrite, chloride ,fluoride, bromide

[b] No rinsate blank is required for total dissolved solids or alkalinity

HE - high explosives

SVOCs - semivolatile organic compounds

VOCs - volatile organic compounds

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method 7580

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Multipoint ICAL for all analytes (minimum five standards)	Before sample analysis	One of the following options. Option 1: Linear—RSD for each analyte ≤ 20%. Option 2: Linear—least squares regression r ≥0.995 for each analyte. Option 3: Nonlinear—COD ≥0.99 (six points will be used for second order, seven points will be used for third order) .	Correct problem then repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL. Calibration may not be forced through the origin. All quantitation for multicomponent analytes, such as technical chlordane, toxaphene, and Aroclors, must be performed form a five-point calibration. Results may not be quantified from a single point.
Second-source calibration verification	Immediately after each ICAL	All analytes within ± 20% of expected value	Correct problem and verify second-source standard. Rerun second-source verification. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Retention time window position established for each analyte and surrogate	Each ICAL and after the initial daily CCV	Position will be set using the midpoint standard of the ICAL curve. On days when an ICAL is not performed, the CCV is used.	N/A	N/A
Retention time window width established for each analyte and surrogate	At method setup and after major maintenance (for example, column change)	±3 times standard deviation for each analyte retention time from 72-hour study.	N/A	N/A
Retention time window verification for each analyte and surrogate	Each calibration verification	Analyte within established window.	Correct problem, then reanalyze all samples analyzed since the last acceptable retention time check.	**ICV:** Flagging criteria are not appropriate for initial verification. **CCV:** Apply Q-flag to all results for the specific analyte(s) in the sample that are outside the established window.
CCV	Daily, before sample analysis unless ICAL performed on same day, after every 10 samples, and at the end of the analysis sequence	All analytes within ± 15% of expected value (% D).	Correct problem, then rerun. If that fails, repeat ICAL. Reanalyze all samples since last successful calibration verification.	**If reanalysis cannot be performed,** apply Q-flag to all results for the specific analyte(s) >15%D for all samples associated with the calibration verification.
Method blank	One per analytical batch	No analytes detected > ½ LOQ. For common laboratory contaminants no analytes detected > LOQ and see Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and reanalyze method blank and all	Apply "B" flag to all associated positive results for the specific analyte(s), as appropriate. See Worksheet #36, Section 36.2.5.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method 7580

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			samples processed with the contaminated blank.	
LCS for all analytes (must contain all target analytes)	One per analytical batch	Acceptance criteria: Worksheet #15.	Correct problem, then reanalyze. If still out, reprepare and reanalyze the LCS and all samples in the affected batch.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
MS/MSD	One per 20 project samples per matrix as a minimum and as defined on the chain-of-custody form	Acceptance criteria: Worksheet #15.	Assess data to determine whether there is a matrix effect or analytical error. Review LCS for failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made regarding PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: • %R for MS or MSD > upper control limit • %R for MS or MSD < lower control limit • MS/MSD RPD > control limit
Second-column confirmation (not required for Methods 8015B [DRO or GRO]	All positive results	Same as for initial or primary column analysis.	Same as for initial or primary column analysis.	Apply J-flag if RPD > 40% from first column result. Apply Q-flag to all results for the specific analyte(s) in the sample not confirmed.
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[c])	At initial setup and then once per 12-month period or quarterly DL verification	Detection limits established will be ≤ ½ the RL in Worksheet #15 Tables (see 40 CFR, Part 136, Appendix B). For the verification check to be valid, analytes must be detected and identified by method-specified criteria or the verification check must produce a response that is at least 3 times the instrument noise level and greater than the response in the blanks associated with the MDL study.	Continue the MDL study until all criteria are met.	N/A.
LOD determination and verification (see Section D.1.2.1 and Box D-13 of the DoD QSM[c])	At initial setup and verified quarterly (if a laboratory uses multiple instruments for a given method, the LOD must be verified on each)	The apparent signal-to-noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If LOD verification fails, the laboratory must (1) repeat the MDL determination and LOD verification at a higher concentration or (2) perform and pass two consecutive LOD verifications at a higher concentration. The LOD is	N/A; samples may not be analyzed without a valid LOD.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method 7580

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			set at the higher concentration.	
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[c])	At initial setup (1) verify LOQ; and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of the DoD QSM[c])	(1) LOQ and associated precision and bias must meet client requirements and be reported; or (2) in the absence of client requirements, must meet LCS control limits (see Box D-14 of the DoD QSM[c]).	If the LOQ verification fails, laboratory must either establish a higher LOQ or modify method to meet client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag "U."
Demonstrate acceptable analyst capability	Before using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of DoD QSM[c])	QC acceptance criteria published by DoD, if available; otherwise, method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for analytes not meeting criteria (see section C.1.f of DoD QSM[c]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by an analyst until capability is demonstrated.

End of Method 7580

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Mass spectrometer tuning check Use bromofluorobenzene (SW8260B) or decafluorotriphenylphosphine (SW8270C)	Before ICAL and calibration verification	Refer to criteria listed in method description.	Retune instrument and verify.	Not appropriate.
GC performance check (8270C only or when SW8270 is used for pesticide analyses)	Daily before analysis of sample or calibration standards	Degradation ≤ 20% for DDT. No visible peak tailing for benzidine or pentachlorophenol (as a default, tailing factors should be less than 2.0).	Correct problem, then repeat performance check.	Not appropriate.
Multipoint ICAL for all analytes (minimum five standards)	Before sample analysis	SPCCs: Average RF ≥ 0.30 (SW8260B), ≥ 0.050 (SW8270C) CCCs: % RSD for RFs ≤ 30% and one of the options below; Option 1: Linear—RSD for each analyte < 15%. Option 2: Linear—linear least squares regression r > 0.995 for each analyte. Option 3: Nonlinear—COD ≥ 0.99 (6 points will be used for second order, 7 points will be used for third order). This is not a preferred option.	Correct problem, then repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL. Calibration may not be forced through the origin.
Second-source calibration verification	Once per ICAL	All analytes within ± 20% of expected value.	Correct problem and verify second-source standard. Rerun second-source verification. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Retention time window position establishment for each analyte and surrogate	Once per ICAL	Position will be set using the midpoint standard of the ICAL curve. On days when an ICAL is not performed, the CCV is used.	N/A.	N/A.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Retention time window verification for each analyte	Each sample	RRT of the analyte within ± 0.06 RRT units of ICAL. Laboratories may update the retention times based on the CCV to account for minor performance fluctuations or after routine system maintenance (e.g., column clipping. With each sample, the RRT will be compared with the most recently updated RRT. If the RRT has changed by more than ±0.06 RRT units since the last update, there has been a significant change in system performance and the laboratory must take appropriate corrective actions as required by the method and rerun the ICAL to re-establish the retention times.	Correct problem then reanalyze all samples analyzed since the last retention time check.	Apply Q-flag to all results for the specific analyte(s) in the sample that are outside the established window.
CCV	Daily, before sample analysis (unless ICAL performed on same day), and after every 12 hours of analysis time	SPCCs: Average RF ≥ 0.30 (SW8260B), ≥ 0.050 (SW8270C) CCCs: % RSD for RFs ≤ 30% and All analytes within ± 20% D of expected value from ICAL.	Correct problem, then rerun CCV. If that fails, repeat ICAL.	Apply Q-flag to all results for the specific analyte(s) > 20% D for all samples associated with the calibration verification.
ISs	Each sample, standard, and QC sample	Retention time ± 30 seconds from retention time of the IS in the ICAL midpoint standard. Extracted ion current profile area within -50% to +100% of area from IS in ICAL mid-point standard.	Inspect mass spectrometer and GC for malfunctions and make corrections as appropriate. Reanalysis of samples analyzed while the system was malfunctioning is mandatory.	Apply Q-flag to all results for analytes associated with a failed IS (unless a matrix effect can be verified), then apply M-flag.
Method blank	One per analytical batch	No analytes detected > ½ LOQ. For common laboratory contaminants, no analytes detected > LOQ. See Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and analyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s), as appropriate. See Worksheet #36, Section 36.2.5.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
LCS for all analytes	One LCS per analytical batch	Acceptance criteria: Worksheet #15.	Correct problem, then reanalyze. If still out, reprepare and reanalyze the LCS and all samples in the affected batch.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
MS/MSD	One per 20 samples per matrix as a minimum and as defined on the chain-of-custody form	Acceptance criteria: Worksheet #15.	Assess data to determine whether there is a matrix effect or analytical error. Analyze LCS for failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made regarding the PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: (1) %R for MS or MSD > upper control limit (2) %R for MS or MSD < lower control limit (3) MS/MSD RPD > control limit
Surrogate spike	Every sample, spiked sample, standard, and method blank	Acceptance criteria: Worksheet #15.	Correct problem, then reprepare and reanalyze the affected samples. If matrix effect is verified, discuss in case narrative.	For the samples: If the %R > UCL for any surrogate, apply J-flag to all positive results for associated analytes. If the %R < LCL for any surrogate, apply J-flag to all positive results for associated analytes and UJ-flag to all associated nondetects. If any surrogate recovery is <10%, apply Q-flag to all results for all associated analytes.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[C])	At initial setup and then once per 12-month period or quarterly DL verification	Detection limits established will be ≤ ½ the RL in Worksheet 15. See 40 CFR, Part 136, Appendix B. All analytes must be detected and identified by method-specified criteria for the for the verification check to be valid, or the verification check must produce a response that is at least 3 times the instrument noise level and greater than the response in the blanks associated with the MDL study.	Continue the MDL study until all criteria are met.	N/A.
LOD determination and verification (see Section D.1.2.1 and Box D-13 of the DoD QSM[C])	At initial setup and verified quarterly (if a laboratory uses multiple instruments for a given method, the LOD must be verified on each)	The apparent signal-to-noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must (1) repeat the detection limit determination and LOD verification at a higher concentration or (2) perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	N/A; samples may not be analyzed without a valid LOD.
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[C])	At initial setup: (1) verify LOQ; and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if a laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of DoD QSM[C]	(1) The LOQ and associated precision and bias must meet client requirements and must be reported or (2) in the absence of client requirements, must meet LCS control limits. See Box D-14 of the DoD QSM[C].	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag "U."
Demonstrate acceptable analyst capability	Before using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of DoD QSM[C])	QC acceptance criteria published by DoD, if available; otherwise method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for those analytes that did not meet criteria (see Section C.1.f of the DoD QSM[C]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by an analyst until capability is demonstrated.

End of Methods SW8260B, SW8270C, and SW8270C (SIM)

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8330B

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Initial multipoint calibration for all analytes (minimum five standards) (ICAL)	Minimum five-point initial calibration for target analytes, lowest concentration standard at or below the reporting limit.	Initial calibration prior to sample analysis	Average RF: RSD </= 20%; Linear: r>0.995, intercept < MDL. Apparent S/N ratio of standard at RL (LOQ) must be at least 5:1.	Evaluate standards, chromatography, and detector response. If problem found with above, correct as appropriate, then repeat initial calibration
Second-source calibration verification	Once per ICAL	All analytes within ± 20% of expected value	Correct problem and verify second source standard. Rerun second source verification. If that fails, correct problem and repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Low standard verification	Immediately following ICAL.	Less than 50 % difference for target analytes;	Evaluate data. If problem (e.g., concentrated standard, plugged injector needle) found, correct, then repeat low-level verification. If still fails, repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
CCV	Daily, before sample analysis unless ICAL performed on same day and every 24 hours of analysis time	All analytes within ± 20% of expected value	Correct problem, rerun CCV. If that fails, repeat initial calibration.	Apply Q-flag to all results for the specific analyte(s) > 30 %D for all samples associated with the calibration verification.
Surrogate spike	**Every sample, spiked sample, standard, and method blank**	**Acceptance criteria: Worksheet #15.**	**Correct problem, then reprepare and reanalyze the affected samples.** **If matrix effect is verified, discuss in case narrative.**	**For the samples:** **If the %R > UCL for any surrogate, apply J-flag to all positive results for associated analytes.** **If the %R < LCL for any surrogate, apply J-flag to all positive results for associated analytes and UJ-flag to all associated nondetects.** **If any surrogate recovery is <10%, apply Q-flag to all results for all associated analytes.**
Method Blank	One per preparation batch	No target analytes ≥ ½ LOQ and > 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater).	Verify instrument clean (evaluate calibration blank & samples prior to method blank), then reanalyze. Evaluate to determine if systematic issue within laboratory, correct, then re-prepare and reanalyze the method blank and all samples processed with the contaminated blank in accordance with DoD QSM requirements	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8330B

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
LCS for all analytes	One LCS per analytical batch	Acceptance criteria: Table 7-4	Correct problem then reanalyze. If still out, reprep and reanalyze the LCS and all samples in the affected AB.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
Confirmation Analysis	When target analytes detected on the primary column at concentrations > LOD.	Calibration and QC criteria the same as for initial/primary analsyis. Results between primary and secondary column RPD ≤ 40%	Evaluate data, then report with flag to denote RPD > 40%. Narrate obvious matrix issues.	RPD between primary and confirmation analysis ≤ 40%..
Soil Grinding Blank	When puck mill grinding is performed, one blank between each sample processed.	Blank material ground and subsampled as with the samples. Composited prior to analysis. No target analytes detected at > than 1/2 the LOQ	All blanks are reported, and data is flagged/narrated if the criteria are exceeded.	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements
Grinding Certified Reference Material (CRM)	When puck mill grinding is performed, CRM is ground for every 20 samples ground.	Within the control limits supplied by manufacturer of material	Evaluate the data, narrate any outliers and report.	Manufacturer's acceptance limits.
DL study (as part of the LOD process, reference Section D.1.2.1 of the DoD QSM)	At initial setup and subsequently once per 12-month period or quarterly DL verification checks.	DL established shall meet 40 CFR, Part 136 Appendix B.	Continue to run the DL study until all criteria are passing	N/A
LOD determination and verification (reference Section D.1.2.1 and grey box D-13 of the QSM)	At initial set-up and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must: 1) Repeat the detection limit determination and LOD verification at a higher concentration;or 2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	Not Applicable, Samples may not be analyzed without a valid LOD.
LOQ establishment and verification (reference Section D.1.2.2 and grey box D-14 of the QSM)	At initial setup: 1) Verify LOQ; and 2) Determine precision and bias at the LOQ. Subsequently, verify LOQ quarterly. If a laboratory uses multiple instruments for a given method, the LOQ must be verified on each. See Box D-14.	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or 2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DOD QSM.	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	Not Applicable, Samples may not be analyzed without a valid LOD.
Results reported between DL and LOD and the LOD and the LOQ	None	None	None	Apply F-flag to all results between DL and LOQ. If no Detection determined below the LOD, report to the LOD, flag U.

End of Method SW8330B

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Tuning (Mass Calibration Verification)	Prior to ICAL and after any mass calibration or maintenance is performed.	Quantitation ions within 0.3 m/z of expected mass.	Perform mass calibration on the MS/MS. If required, consult with instrument engineer for further maintenance.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Minimum six-point initial calibration for target analytes, lowest concentration standard at or below the reporting limit	Initial calibration prior to sample analysis	Linear: $r^2 > 0.990$ ($r>0.995$) with intercept ≤ LOD, or Average Response Factor: RSD≤ 20%.	Evaluate standards, chromatography, and mass spectrometer response. If problem found with above, correct as appropriate, then repeat initial calibration.	Evaluate standards, chromatography, and detector response. If problem found with above, correct as appropriate, then repeat initial calibration
Second-source calibration verification	Once per six-point initial calibration	Perchlorate within ±15% of the true value	Evaluate data. If problem (e.g., concentrated standard, plugged transfer line) found, correct, then repeat second source verification. If it still fails, then repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Daily calibration verification	Mid-range standard analyzed before sample analysis, after every 10 samples, and at the end of the sequence.	Perchlorate within ±15% of the true value	Correct problem, then repeat. If still fails, repeat initial calibration	Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.
Limit of Detection verification (LODv) (per batch)	Prior to sample analysis and at the end of the analysis sequence.	Perchlorate within ± 30% of the true value	Correct problem. Evaluate samples. Samples with results > RL (LOQ) may be reported. Samples since the last passing LODv with results ≤ RL (LOQ) must be reanalyzed.	**Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.**
Laboratory Reagent Blank	Prior to ICAL, following samples with overrange concentration of perchlorate, and at the end of the analytical sequence.	No perchlorate detected > LOQ	Reanalyze reagent blank (until no carryover seen), and any samples with perchlorate detections since the contaminated blank.	No target analytes ≥ ½ LOQ
Internal Standard	Every Calibration Standard	ICAL: IS for each standard must be within ± 50% of the average area of the ICAL. ICV, CCV: Within ± 50% of the average area of the ICAL or within ± 50% of the 1st CCV of the run, if the ICAL is not run the same day.	Evaluate the system. Reanalyze/repeat the calibration.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples.
Method Blank	One per preparation batch	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements	Correct problem, then re-extract and reanalyze method blank and all samples processed with the contaminated blank in accordance with DoD QSM requirements	No target analytes ≥ ½ LOQ

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Interference Check Sample (ICS)	One per preparation batch	70% -130%	Reanalyze once. If still outside the acceptance limits, evaluate to determine if cleanup filters or column degradation are suspect, replace appropriate materials and reprepare (filters) or reanalyze (column). Repeat the Interference Threshold Study to deter. If problem still exists, recalibrate.	Recovery as described in DoD Perchlorate Handbook.
IS	During acquisition of calibration standard, samples, and QC check samples	Areas within -50% to +100% of the midpoint of the last ICAL for each sample and QC in accordance with DoD QSM requirements	Inspect LCMS for malfunctions; mandatory reanalysis of samples analyzed while system was malfunctioning in accordance with DoD QSM requirements	Meets all EPA Method requirements
Isotope Ratio $^{35}CL/^{37}CL$	Every sample, batch QC sample and standard	Monitor for either the parent ion at masses 99/101 or the daughter ion at masses 83/85 depending on which ions are quantified.	Re-extract, re-clean, and/or reanalyze affected sample(s). If problem persists, perform post-spike or dilution as appropriate to confirm presence of perchlorate	Theoretical ratio approx. 3.06 Must fall within 2.3 to 3.8
LCS	One LCS per analytical/preparation batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Reanalyze LCS once. If acceptable, report. Otherwise, evaluate and re prepared and reanalyze the LCS and all samples in the associated prep batch for failed analytes, if sufficient sample material is available.	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
MS/MSD	One MS/MSD per batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Identify problem; if not related to matrix interference, re-extract and reanalyze MS/MSD in accordance with DoD QSM requirements	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
DL study (as part of the LOD process, reference Section D.1.2.1 of the DoD QSM)	At initial setup and subsequently once per 12-month period or quarterly DL verification checks.	DL established shall meet 40 CFR, Part 136 Appendix B.	Continue to run the DL study until all criteria are passing	N/A
LOD determination and verification (reference Section D.1.2.1 and grey box D-13 of the QSM)	At initial set-up and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must: 1) Repeat the detection limit determination and LOD verification at a higher concentration; or 2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD	Not Applicable, Samples may not be analyzed without a valid LOD.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			is set at the higher concentration.	
LOQ establishment and verification (reference Section D.1.2.2 and grey box D-14 of the QSM)	At initial setup: 1) Verify LOQ; and 2) Determine precision and bias at the LOQ. Subsequently, verify LOQ quarterly. If a laboratory uses multiple instruments for a given method, the LOQ must be verified on each. See Box D-14.	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or 2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DOD QSM.	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	Not Applicable, Samples may not be analyzed without a valid LOD.
Results reported between DL and LOD and the LOD and the LOQ	None	None	None	Apply F-flag to all results between DL and LOQ. If no Detection determined below the LOD, report to the LOD, flag U.

End of Method SW6850

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Tuning (Mass Calibration Verification)	Prior to ICAL and after any mass calibration or maintenance is performed.	Quantitation ions within 0.3 m/z of expected mass.	Perform mass calibration on the MS/MS. If required, consult with instrument engineer for further maintenance.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Minimum six-point initial calibration for target analytes, lowest concentration standard at or below the reporting limit	Initial calibration prior to sample analysis	Linear: $r^2 > 0.990$ (r>0.995) with intercept ≤ LOD, or Average Response Factor: RSD≤ 20%.	Evaluate standards, chromatography, and mass spectrometer response. If problem found with above, correct as appropriate, then repeat initial calibration.	Evaluate standards, chromatography, and detector response. If problem found with above, correct as appropriate, then repeat initial calibration
Second-source calibration verification	Once per six-point initial calibration	Perchlorate within ±15% of the true value	Evaluate data. If problem (e.g., concentrated standard, plugged transfer line) found, correct, then repeat second source verification. If it still fails, then repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Daily calibration verification	Mid-range standard analyzed before sample analysis, after every 10 samples, and at the end of the sequence.	Perchlorate within ±15% of the true value	Correct problem, then repeat. If still fails, repeat initial calibration	Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.
Limit of Detection verification (LODv) (per batch)	Prior to sample analysis and at the end of the analysis sequence.	Perchlorate within ± 30% of the true value	Correct problem. Evaluate samples. Samples with results > RL (LOQ) may be reported. Samples since the last passing LODv with results ≤ RL (LOQ) must be reanalyzed.	Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.
Laboratory Reagent Blank	Prior to ICAL, following samples with overrange concentration of perchlorate, and at the end of the analytical sequence.	No perchlorate detected > LOQ	Reanalyze reagent blank (until no carryover seen), and any samples with perchlorate detections since the contaminated blank.	No target analytes ≥ ½ LOQ
Internal Standard	Every Calibration Standard	ICAL: IS for each standard must be within ± 50% of the average area of the ICAL. ICV, CCV: Within ± 50% of the average area of the ICAL or within ± 50% of the 1st CCV of the run, if the ICAL is not run the same day.	Evaluate the system. Reanalyze/repeat the calibration.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples.
Method Blank	One per preparation batch	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements	Correct problem, then re-extract and reanalyze method blank and all samples processed with the contaminated blank in accordance with DoD QSM requirements	No target analytes ≥ ½ LOQ

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Interference Check Sample (ICS)	One per preparation batch	70% -130%	Reanalyze once. If still outside the acceptance limits, evaluate to determine if cleanup filters or column degradation are suspect, replace appropriate materials and reprepare (filters) or reanalyze (column). Repeat the Interference Threshold Study to deter. If problem still exists, recalibrate.	Recovery as described in DoD Perchlorate Handbook.
IS	During acquisition of calibration standard, samples, and QC check samples	Areas within -50% to +100% of the midpoint of the last ICAL for each sample and QC in accordance with DoD QSM requirements	Inspect LCMS for malfunctions; mandatory reanalysis of samples analyzed while system was malfunctioning in accordance with DoD QSM requirements	Meets all EPA Method requirements
Isotope Ratio $^{35}CL/^{37}CL$	Every sample, batch QC sample and standard	Monitor for either the parent ion at masses 99/101 or the daughter ion at masses 83/85 depending on which ions are quantified.	Re-extract, re-clean, and/or reanalyze affected sample(s). If problem persists, perform post-spike or dilution as appropriate to confirm presence of perchlorate	Theoretical ratio approx. 3.06 Must fall within 2.3 to 3.8
LCS	One LCS per analytical/preparation batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Reanalyze LCS once. If acceptable, report. Otherwise, evaluate and re prepared and reanalyze the LCS and all samples in the associated prep batch for failed analytes, if sufficient sample material is available.	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
MS/MSD	One MS/MSD per batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Identify problem; if not related to matrix interference, re-extract and reanalyze MS/MSD in accordance with DoD QSM requirements	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
DL study (as part of the LOD process, reference Section D.1.2.1 of the DoD QSM)	At initial setup and subsequently once per 12-month period or quarterly DL verification checks.	DL established shall meet 40 CFR, Part 136 Appendix B.	Continue to run the DL study until all criteria are passing	N/A
LOD determination and verification (reference Section D.1.2.1 and grey box D-13 of the QSM)	At initial set-up and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must: 1) Repeat the detection limit determination and LOD verification at a higher concentration; or 2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD	Not Applicable, Samples may not be analyzed without a valid LOD.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			is set at the higher concentration.	
LOQ establishment and verification (reference Section D.1.2.2 and grey box D-14 of the QSM)	At initial setup: 1) Verify LOQ; and 2) Determine precision and bias at the LOQ. Subsequently, verify LOQ quarterly. If a laboratory uses multiple instruments for a given method, the LOQ must be verified on each. See Box D-14.	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or 2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DOD QSM.	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	Not Applicable, Samples may not be analyzed without a valid LOD.
Results reported between DL and LOD and the LOD and the LOQ	None	None	None	Apply F-flag to all results between DL and LOQ. If no Detection determined below the LOD, report to the LOD, flag U.

End of Method SW6850

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW6010B and SW7470A/71A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Instrument detection limit study	At initial setup and after significant change in instrument type, personnel, test method, or sample matrix	Instrument detection limits will be < LOD.	N/A.	N/A.
Linear dynamic range or high-level check standard	Every 6 months	Within ± 10% of true value.	Correct problem, then reanalyze or reset linear range.	Apply J-flag to the specific analyte(s) for all results not within linear range.
ICAL for all analytes (minimum one standard and a blank 3- to 5-point standard preferred)	Daily before sample analysis	If more than one standard is used, correlation coefficient must be ≥ 0.995.	If applicable, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL.
ICV (second source)	Daily after ICAL	All analytes within ± 10% of expected value.	Correct problem and verify second-source standard. Rerun ICV. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
CCV (Instrument Check Standard)	After every 10 samples and at the end of the analysis sequence	All analyte(s) within ± 10% of expected value and RSD of replicate integrations < 5%.	Correct problem, then repeat CCV and reanalyze all samples since last successful calibration verification.	Apply Q-flag to all results for the specific analyte(s) >10 %D for all samples associated with the calibration verification.
Calibration blank	Before beginning a sample run, after every calibration verification	No analytes detected > LOD.	Correct problem, then analyze calibration blank and previous 10 samples.	Apply B-flag to all associated positive results for the specific analyte(s) as appropriate.
Low-level calibration check standard (at or below LOQ)	Daily, after ICAL; not required for multipoint calibration (3 or more points) with low standard at or below LOQ.	Analyte(s) with ± 20% of expected value.	Correct problem, then reanalyze.	No samples may be analyzed without a valid low-level calibration check standard. Low-level calibration check standard should be less than or equal to the LOQ.
Method blank	One per analytical batch	No analytes detected > ½ LOQ. For common laboratory contaminants, no analytes detected > LOQ. See Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and reanalyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s), as appropriate. See Worksheet #36, Section 36.2.5.
ICS	At the beginning of an analytical run	ICS A: All non-spiked analytes < LOD (unless they are a verified trace impurity from one of the spiked analytes). ICS AB: Within ± 20% of expected value.	Terminate analysis; locate and correct problem; reanalyze ICS and all associated samples.	Flagging criteria are not appropriate. No samples may be analyzed without a valid ICS. If corrective action fails, apply Q-flag to the specific analyte(s).

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW6010B and SW7470A/71A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
LCS for all analytes	One per analytical batch	Acceptance criteria: Worksheet #15.	Correct problem then reanalyze. If still out, reprepare and reanalyze the LCS and all samples in the affected batch.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
Dilution test	Each new sample matrix, at least once per analytical batch (only applicable for analytes with concentrations > 50 times LOQ)	Fivefold (1+4) dilution must agree within ± 10% of the original determination.	Add post-digestion spike.	Apply J-flag to all sample results for the specific analyte from the same matrix in the batch if either of following exist: (1) dilution test not run and batch had analyte concentrations >50X LOQ or (2) %D ≥10 and post-digestion spike not performed.
Post-digestion spike addition	When dilution test fails or if an analyte's concentration for all samples in a batch is less than 50 times LOQ (<25 for Method SW7470A/SW7471A)	Recovery within 75–125% of expected results (85-115 for SW7470A/SW7471A).	Check for instrumental problem, then reanalyze post-digestion spike addition if appropriate.	Apply J-flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition. If post-digestion spike addition recovery is < 10%, apply Q-flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition.
MS/MSD	One per 20 samples per matrix as a minimum and as defined on the chain-of-custody form	Acceptance criteria: Worksheet #15.	Assess data to determine whether there is a matrix effect or analytical error. Analyze LCS or failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made regarding PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: (1) %R for MS or MSD > UCL (2) %R for MS or MSD < LCL (3) MS/MSD RPD > control limit
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[c])	At initial setup and then once per 12-month period or quarterly DL verification checks	Detection limits established will be ≤ ½ the RL in Worksheet #15 Tables. See 40 CFR, Part 136, Appendix B. All analytes must be detected and identified by method-specified criteria for the for the verification check to be valid, or the verification check must produce a response that is at least 3X the instrument noise level and greater than the response in the blanks	Continue the MDL study until all criteria are met.	N/A.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW6010B and SW7470A/71A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
		associated with the MDL study.		
LOD determination and verification (reference Section D.1.2.1 and Box D-13 Of the DoD QSM[c])	At initial setup and verified quarterly (if a laboratory uses multiple instruments for a given method, the LOD must be verified on each)	The apparent signal-to-noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must (1) repeat the detection limit determination and LOD verification at a higher concentration; or (2) perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	N/A; samples may not be analyzed without a valid LOD.
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[c])	At initial setup: (1) verify LOQ and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if a laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of the DoD QSM[c]).	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or (2) in the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DoD QSM[c].	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag "U."
Demonstrate acceptable analyst capability	Before using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of the DoD QSM[c])	QC acceptance criteria published by DoD, if available; otherwise method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for those analytes that did not meet criteria (see Section C.1.f of the DoD QSM[c]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by analyst until capability is demonstrated.

End of Method SW6010B and SW7470A/71A

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6020A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
MS tuning sample	Before ICAL.	Mass calibration ≤ 0.1 amu from the true value. Resolution <0.9 amu full width at 10% peak height. Stability: RSD ≤ 5% for at least four replicate analyses.	Retune instrument then reanalyze tuning solution.	Not appropriate.
ICAL for all analytes (minimum one standard and a blank)	Daily before sample analysis	If more than one standard is used, correlation coefficient must be ≥ 0.995.	If applicable, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL.
ICV (second source)	After ICAL, before beginning a sample run at a concentration other than used for calibration	All analytes within ± 10% of expected value.	Correct problem and verify second-source standard. Rerun ICV. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
CCV	After every 10 samples and at the end of the analysis sequence—at a concentration near the middle of the calibration range	All analytes within ± 10% of expected value.	Correct problem, then repeat CCV and reanalyze all samples since last successful calibration verification.	Apply Q-flag to all results for the specific analyte(s) >10 %D for all samples associated with the calibration verification.
Calibration blank	Before beginning a sample run, after every 10 samples and at end of the analysis sequence	No analytes detected > LOD.	Correct problem, then analyze calibration blank and previous 10 samples.	Apply B-flag to all associated positive results for the specific analyte(s) as appropriate.
Low-level calibration check standard (at or below LOQ)	Daily, after ICAL Not required if multipoint calibration (3 or more points) with low standard at or below LOQ is performed	All analyte(s) with ± 20% of expected value.	Correct problem then reanalyze.	No samples may be analyzed without a valid low-level calibration check standard. Low-level calibration check standard should be less than or equal to the LOQ.
Linear range calibration (high) check standard	Every 6 months	Analyte within ± 10% of expected value.	Correct problem then reanalyze or reset linear range.	Apply J-flag to the specific analyte(s) for all results not within linear range.
Method blank (Preparation blank)	One per analytical batch	No analytes detected > ½ LOQ For common laboratory contaminants, no analytes detected > LOQ. See Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and analyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s) as appropriate. See Worksheet #36, Section 36.2.5.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6020A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Interference check solutions (ICS-A and ICS-AB)	At the beginning of an analytical run or once during an 12-hour period, whichever is more frequent	**ICS-A:** All non-spiked analytes < LOD (unless they are a verified trace impurity from one of the spiked analytes). **ICS-AB:** Within ± 20% of expected value.	Terminate analysis; locate and correct problem; reanalyze ICS; reanalyze all affected samples.	Flagging criteria are not appropriate. No samples may be analyzed without a valid ICS. If corrective action fails, apply Q-flag to the specific analyte(s).
LCS for all analytes	One LCS per analytical batch	Acceptance criteria: Worksheet #15.	Correct problem then reanalyze. If still out, reprepare and reanalyze the LCS and all samples in the affected batch.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
Dilution test	Each matrix in a analytical batch (only applicable for analytes with concentrations ≥ 100X LOD)	Fivefold (1+4) dilution must agree within ± 10% of the original determination.	Add post-digestion spike.	Apply J-flag to all sample results for the specific analyte from the same matrix in the batch if either of following exist: (1) dilution test not run and batch had analyte concentrations ≥100 times LOD or (2) % D ≥ 10 and post-digestion spike not performed.
Post-digestion spike addition	When dilution test fails or if an analyte's concentration for all samples in a batch is less than 100X LOD	Recovery within 75–125% of expected results.	Dilute the sample; reanalyze post-digestion spike addition.	Apply "J" flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition. If post-digestion spike addition recovery is < 10%, apply "Q" flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition.
MS/MSD	One per 20 samples per matrix	Acceptance criteria: Worksheet #15.	Assess data to determine whether there is a matrix effect or analytical error. Analyze LCS for failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made regarding PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: (1) %R for MS or MSD > UCL, (2) %R for MS or MSD < LCL, or (3) MS/MSD RPD > control limits
ISs	Every sample	IS intensity within 30-120% of intensity of the IS in the ICAL.	Perform corrective action as described in Method SW6020, Section 8.3.	Flagging criteria are not appropriate. No samples may be analyzed without a valid IS response.
Instrument detection limit study	At initial setup	Detection limits established will be ≤ LOD.	None.	N/A. Samples cannot be analyzed without a valid instrument detection limit.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6020A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[c])	At initial setup and then once per 12-month period or quarterly DL verification.	Detection limits established will be ≤ ½ the RL in Worksheet #15 tables. See 40 CFR, Part 136 Appendix B. Analytes must be detected and identified by method-specified criteria for the for the verification check to be valid, or the verification check must produce a response that is at least 3 times the instrument noise level and greater than the response in the blanks associated with the MDL study.	Continue to run the MDL study until all criteria are passing.	N/A.
LOD determination and verification (see Section D.1.2.1 and Box D-13 of the DoD QSM[c])	At initial setup and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must: (1) Repeat the detection limit determination and LOD verification at a higher concentration; or (2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	N/A; samples may not be analyzed without a valid LOD.
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[c])	At initial setup: (1) verify LOQ and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if a laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of the DoD QSM[c])	(1) The LOQ and associated precision and bias must meet client requirements and must be reported; or (2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DoD QSM[c].	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag "U."
Demonstrate acceptable analyst capability	Prior to using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of the DoD QSM[c])	QC acceptance criteria published by DoD, if available; otherwise method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for those analytes that did not meet criteria (see Section C.1.f of the DoD QSM[c]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by an analyst until capability is demonstrated.

End of Method SW6020A

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8290

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
MS tuning check	Before initial calibration or calibration verification and after every 12-hour period	Tune the instrument to meet the minimum resolving power of 10,000 at m/z 304.9824. Ensure that the exact mass of m/z 380.9760 is within 5 ppm of the required value. Monitor the lock mass selected ion current profile.	Retune instrument; verify. Rerun affected samples.	Not appropriate
GC column performance check	Before initial calibration or calibration verification	Peak separation between 2,3,7,8-TCDD and other TCDD isomers valley of ≤ 25%. and First and last eluters of all eight homologue retention time windows identified labeled (F/L) on the chromatogram and Absolute retention times for switching from one homologous series to the next > 10 seconds for all components of the mixture	Correct problem then repeat column performance check.	Flagging criteria are not appropriate.
Initial multipoint calibration for all analytes (minimum five standards) (ICAL)	Before sample analysis, as needed by failure of routine calibration verification standard, or when a new lot is used for standard source of CCV, sample fortification solution (IS), or recovery standards	Ion abundance ratios in accordance with Table 8 of Method SW8290 and S/N ratio ≥ 10 for all target analyte ion current profiles and % RSD ± 20% for 17 unlabeled standards and % RSD ± 30% for the 9 labeled IS.	Correct problem then repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8290

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Routine (continuing) calibration check (Use HRCC-3 calibration standard) (CCV)	At the beginning of each 12-hour period (after successful GC resolution and MS resolution checks), and at the end of 12-hour shift.	Ion abundance ratios in accordance with Table 8, Method SW8290 and RF within ± 20% D for unlabeled standards from mean RF from initial calibration and RF within ± 30% for labeled standards from mean RF from initial calibration **End of run CCV only:** If the RF for an unlabeled or labeled standard fails by ≤ 5% in the final CCV, a new "daily" mean RF may be calculated using the initial and final RF values and used to determine the specific analyte concentrations for all samples analyzed during the shift.	Correct problem, repeat calibration verification standard one more time. If that fails, then repeat initial calibration and reanalyze all samples analyzed since the last successful calibration verification. Evaluation of corresponding labeled/unlabeled standards may impact the corrective action required. **End of run CCV:** If the RF for an unlabeled or labeled standard fails by > 5% in the final CCV, run a new ICAL immediately (within 2 hours) and use the new RF values to process the samples. Alternatively, reanalyze all samples with positive detections.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified. **End of run CCV:** Apply Q-flag to all results for the specific analyte(s) in the sample which are not reprocessed or reanalyzed.
PCDD/PCDF identification	Verify all sample positive detections per Method SW8290	Retention time of sample components in accordance with stated criteria in Method SW8290 (Section 7.8.4.1) and Ion abundance ratios for all analytes, ISs, and recovery standards in accordance with criteria in Method SW8290 (Table 8, Section 7.8.4.2) and S/N ratio of all labeled analytes ≥ 10 times background noise (Method SW8290 Section 7.8.4.3) and S/N ratio of all remaining analyte ions ≥ 2.5 times background noise (Method SW8290 Section 7.8.4.3) and For PCDF, no signal present having a S/N ratio ≥ 2.5 for the corresponding ether (PCDPE) detected at the same retention time (± 2 sec, (Section 7.8.4.4)	Correct problem, then reprep and reanalyze the sample(s) with failed criteria for any of the internal, recovery, or standards. If PCDPE is detected or if sample peaks present do not meet all identification criteria, calculate the EMPC (estimated maximum possible concentration) according to Method SW8290 Section 7.9.5.2.	Flagging criteria are not appropriate. Positive identification of 2,3,7,8-TCDF on the DB-5 or equivalent column must be confirmed on a column capable of isomer specificity (DB-225) (see Method SW8290 Section 3.4). If peak identification criteria are met but ion abundance criteria fail for the analyte and IS, the sample should be presumed to have interfering contaminants. The sample should be rerun or the extract reanalyzed.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8290

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
ISs	Every sample, standard, and QC sample.	Percent recovery for each IS (before any dilutions) within 40–135% (Method SW8290 Section 8.4)	Inspect mass spectrometer and GC for malfunctions. Reanalysis of samples analyzed while the system was malfunctioning is mandatory.	Apply Q-flag to all results for analytes associated with a failed IS unless a matrix effect can be verified, then apply M.
Sample specific estimated detection limit (EDL)	Every sample that indicates non-detects or detections that are < 2.5 times background noise	Method 8290 Section 7.9.5 describes the calculation	N/A	N/A
Sample estimated maximum possible concentration (EMPC)	If PCDPE is detected or if sample peaks present do not meet all ion abundance ratio criteria	Method 8290 Section 7.9.5 describes the calculation	N/A	Apply J-flag to all EMPC values.
Method Blank	Minimum one per preparation batch. A method blank is required after a calibration run and before any sample run.	No analytes detected > ½ LOQ	Assess data and correct problem. If necessary, reprep and analyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s), as appropriate.
MS/MSD	One MS/MSD per every 20 samples per matrix	Acceptance criteria: Tables 7-2 and 7-3	Assess data to determine whether there is a matrix effect or analytical error. Analyze LCS for failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made with respect to the PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: (1) %R for MS or MSD > UCL (2) %R for MS or MSD < LCL, or (3) MS/MSD RPD > CL
Sample duplicate	One per analytical batch. This may be replaced by the MSD.	Acceptance criteria: Tables 7-2 and 7-3	Verify instrument performance, review analytical procedures.	For the specific analyte(s) in parent sample, apply J-flag.
Results reported below the lowest standard	None	None	None	Apply F-flag to all results below the lowest calibration standard.

End of Method SW8290

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods 160.2, 310.2, 350.1, SW9030B, SW9056, and SW9060

QC Check*	Frequency	Criteria	Corrective Action
Multi-point initial calibration (a blank and at least five standards) – does not apply to titrimetric method	Before initial sample analysis, every 24 hours, whenever modifications are made to the analytical system, or when continuing calibration verification fails	Correlation coefficient of linear regression is ≥ 0.995	Correct the problem and repeat the initial calibration.
Second-source calibration verification	Immediately following each initial calibration	Analytes within ±15% (±10% for SW9056) of expected value	Correct the problem and repeat initial calibration.
Calibration blank – does not apply to titrimetric methods	After every Second-source or Continuing calibration verification analysis	No analytes detected at or above the LOQ	Correct the problem, then reanalyze previous 10 samples.
Continuing calibration verification	After every 10 samples and at the end of the analysis sequence	Within ±15% (±10% for SW9056) of expected value	Recalibrate and reanalyze all samples since the last acceptable continuing calibration verification
Method Blank	At least one per analytical batch	No analytes detected at or above the LOQ	Correct the problem and re-prep and reanalyze all associated samples
MS/MSD	One set per 20 project-specific samples. MSD is optional if a laboratory sample duplicate is performed	All analytes within limits specified Limits Worksheet 15	None
Laboratory sample duplicate	Once per analytical batch if MSD not performed	Concentration of reported analytes are > 5 times the reporting limit in either sample and RPD >20%. One sample result < RL and a difference of ±2 times the reporting limit	None
LCS	At least one per analytical batch	All analytes within limits specified limits in Worksheet 15	Correct the problem, and re-prep and reanalyze the LCS and all samples in the analytical batch

*Unless calibration and QC requirements are specified for an individual method.

End of Methods 160.2, 310.2, 350.1, SW9030B, SW9056, and SW9060

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Notes, Acronyms, and Abbreviations

[a]All corrective actions associated with project work shall be documented, and all records shall be maintained by the laboratory.

[b]Flagging criteria shall be applied when acceptance criteria were not met and corrective action was not successful or corrective action was not performed.

[c]DoD. 2010. *Department of Defense (DoD) Quality Systems Manual for Environmental Laboratories*. Version 4.2. October.

% D – percent difference
%R – percent recovery
CCC – calibration check compounds
CCV – continuing calibration verification
COD – coefficient of determination
DL – detection limit
DRO – diesel range organics
GC – gas chromatography
GRO – gasoline range organics
ICAL – initial calibration
ICS – interference check sample
ICV – initial calibration verification
IS – internal standard(s)
LCL – lower confidence limit
LCS – laboratory control sample
LOD – limit of detection
LODv – limit of detection verification
LOQ – limit of quantitation
MDL – method detection limit
MS/MSD – matrix spike/matrix spike duplicate
N/A – not applicable
PQO – practical quantitation objectives
PT – performance testing
QC – quality control
QSM – Quality Systems Manual (DoD)
RF – response factor
RL – reporting limit
RPD – relative percent difference
RRT – relative retention time
RSD – relative standard deviation
SPCC – system performance calibration compounds
UCL – upper confidence limit

End of Table H-10

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3. MANAGEMENT OF WASTE FROM CLOSURE ACTIVITIES

Wastes that are expected to be generated during the final closure activities at the OD Unit include: excess soil from sampling; well purge water, drill cuttings, decontamination water; PPE; and excavated soils. To minimize the amount of waste to be generated during closure activities, excess soil cuttings from borings shall be replaced in the auger holes. The volume of liquid waste generated during the cleaning of equipment is to be minimized by using only the smallest amount of wash rinse water necessary to achieve successful decontamination. Solvents shall not be used.

3.1 Waste Management

Wastes associated with closure activities at the OD Unit shall be managed as follows:

- Wastes shall be stored in appropriate containers that are compatible with the wastes and are in good condition.
- If analytical results indicate that the waste is hazardous or the Permitee project manager determines that the waste shall be classified as hazardous, the Permitee shall manage the waste in accordance with all applicable regulations in 40 CFR §261-268.
- Waste containers shall remain within the OD Unit boundary under the control of the personnel generating the waste until it is transported for treatment and disposal.
- Waste containers shall be segregated according to the compatibility and chemical waste type.
- Waste shall be stored in containers that remain closed, except when adding or removing wastes.
- Waste containers bearing free liquid shall be provided with secondary containment of sufficient volume to prevent spilled liquids from being released onto the ground.
- Waste containers shall be managed in such a manner as to prevent ruptures and leaks.
- Waste containers shall be labeled appropriately, pending receipt of analytical results. Labels shall be filled out appropriately and marked using permanent marker or pen. Label information shall include waste source, suspected contaminants, contents, depth (if appropriate), the date which accumulation began, and a contact name.

3.2 Waste Characterization

Characterization of the liquid waste and excavated soil generated during the closure of the OD Unit shall be based upon the results of sampling and analysis. Decontamination water shall be analyzed for the constituents listed in Tables H-3. PPE shall be handled in accordance with Section 1.4 of this Permit Attachment (H) and applicable state and federal regulations.

3.3 Waste Disposal

All wastes from closure activities determined to be hazardous shall be managed in accordance with the Hazardous Waste Management Regulations from the time of generation. Hazardous wastes shall be shipped off-site for treatment and disposal at a permitted RCRA facility. Wastes characterized as nonhazardous shall be evaluated to determine the appropriate disposal method in accordance with applicable law.

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KIRTLAND AIR FORCE BASE
ALBUQUERQUE, NEW MEXICO

Closure Plan for Open Detonation Unit

May 2014

377 MSG/CEIR
2050 Wyoming Blvd. SE
Kirtland AFB, New Mexico 87117-5270

KAFB4201

40 CFR 270.11
DOCUMENT CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

TOM D. MILLER, Colonel, USAF
Commander, 377th Air Base Wing

This document has been approved for public release in accordance with Department of Defense Directives and Air Force Instructions.

KIRTLAND AIR FORCE BASE
377th Air Base Wing Public Affairs

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1. INTRODUCTION

This closure plan describes the activities necessary to close the Open Detonation (OD) treatment unit located within the Explosive Ordnance Disposal (EOD) Range at Kirtland Air Force Base (AFB). The OD Unit consists of a cleared circular area approximately ~~1,500~~ 1,000 ft in diameter and surrounded and delineated by an approximately two-foot (ft) high earthen berm. Figures H-1 and H-2 show the location of the EOD Range at Kirtland AFB, and the collocated OD and Open Burn (OB) Units within the EOD Range. Detonations were conducted in pits measuring approximately 30 ft long, 15 wide and 12 ft deep.

Until final closure of the unit is complete in accordance with the New Mexico Hazardous Waste Management Regulations and certification of closure has been approved by the New Mexico Environment Department (~~NMED or~~ the Department), a copy of the approved Closure Plan, and any revisions thereof, shall be maintained in the Operating Record. This Closure Plan, and any revisions thereof, shall be made available, upon request, to the Department.

If the OD Unit cannot be clean-closed, a post-closure care plan addressing the hazardous constituents remaining at the site shall be prepared and submitted to the Department for approval.

The OD Unit is collocated with the OB treatment unit at the EOD Range. The OD and OB Units are scheduled to undergo final closure activities simultaneously. The OB Unit has a separate closure plan, but several elements of the OB and OD Unit closure plans overlap and are noted within the documents. Additionally, there is currently a perchlorate groundwater investigation occurring to the west of the EOD range. This investigation and its results are independent of this OD Unit closure plan.

As per Kirtland AFB's Hazardous Waste Treatment Facility Operating Permit for the Open Detonation Unit (Permit), Attachment I, Table I-3 , SWMU 06-19 (KAFB IRP site OT-29), which is located approximately 20 ft northeast of the present OB structure, requires corrective action. Corrective action at SWMU 06-19 shall comply with the provisions of the Resource Conservation and Recovery Act (RCRA).

1.1 General Closure Information

This closure plan has been prepared in compliance with the requirements of RCRA (42 U.S.C. §§6901 et seq.) and its implementing regulations at 40 CFR Parts 264 and 270 (see 40 CFR Part 264 Subparts G and X and 270.14(b)(13)), and state implementing statutes and regulations under which the state has delegated RCRA authority (see New Mexico Hazardous Waste Act, Chapter 74 Article 4 NMSA 1978 and 20.4.1 NMAC).

1.2 Closure Performance Standard

The OD Unit shall be closed to meet the following performance standards:

- Minimize the need for further maintenance;
- Control, minimize or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to ground water or surface waters or to the atmosphere; and
- Comply with the requirements of 40 CFR Part 264, Subpart G and 40 CFR §264.601.

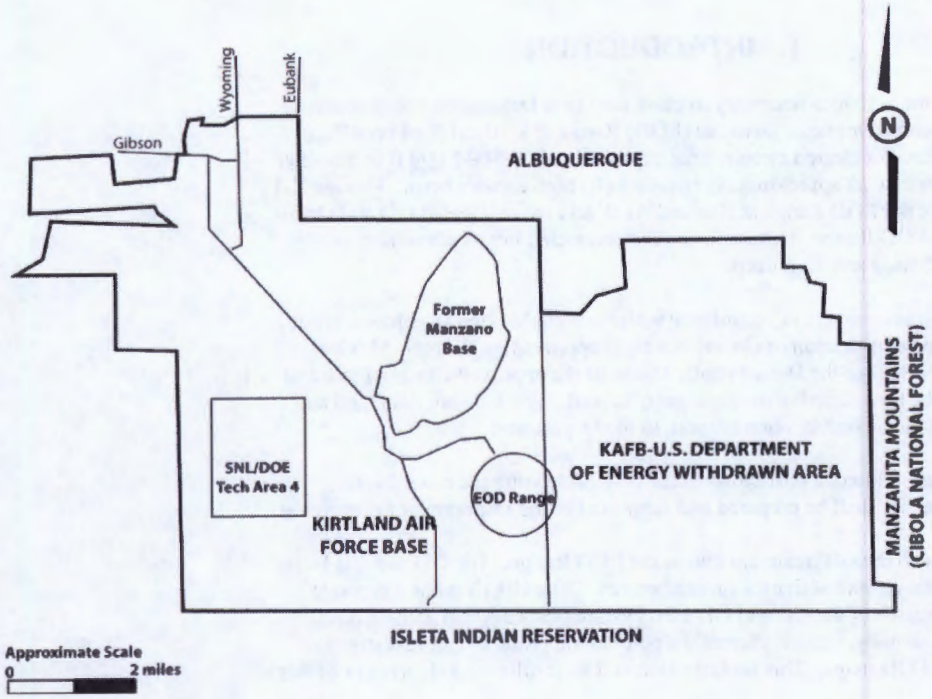

Figure H-1. Location of EOD Range at Kirtland AFB

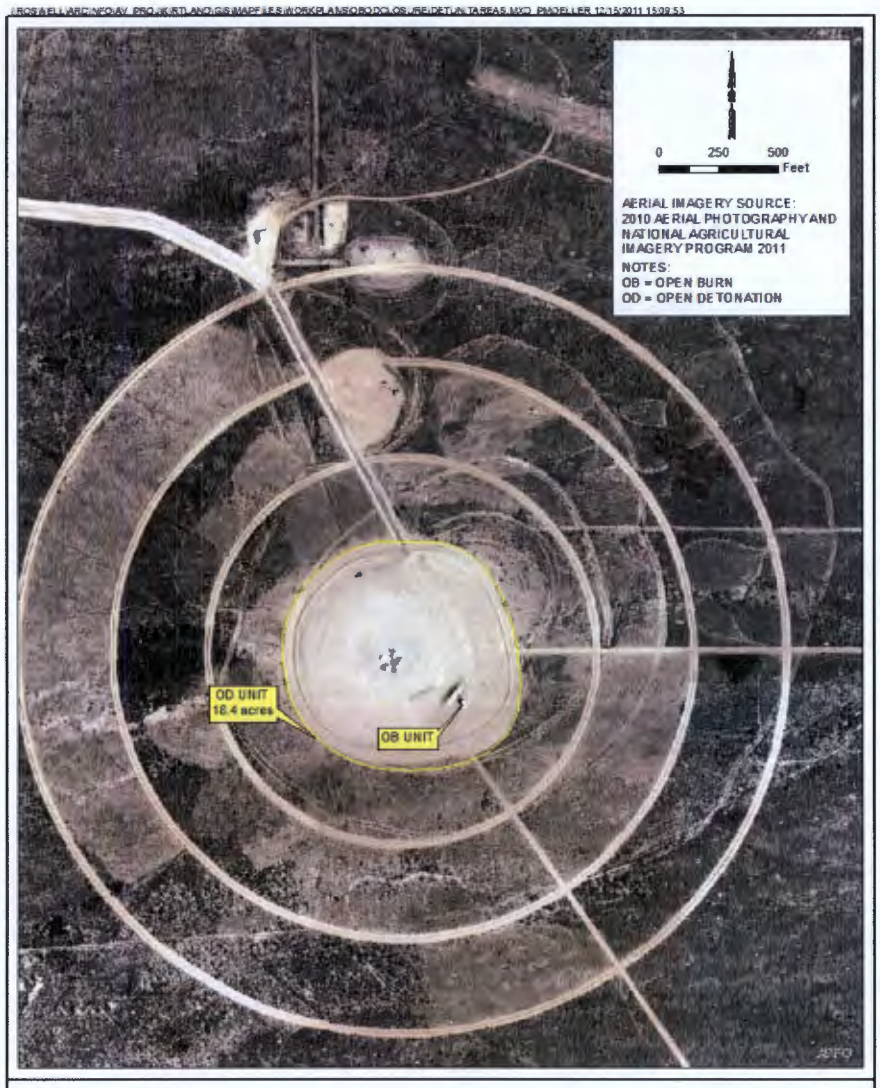

FIGURE H-2
LOCATION OF OPEN BURN AND OPEN DETONATION UNITS
EOD RANGE, KIRTLAND AIR FORCE BASE, NEW MEXICO

1.3 Final Closure Activities

The last treatment event at the OD Unit occurred on 11 August 2010. The Department was notified on 13 August 2010 that, effective immediately, ~~Kirtland AFB~~the Permitee had closed the OD Unit for all treatment activities~~.~~. The Permittee shall notify the Department, in writing, at least 45 calendar days prior to the date that closure activities shall commence.

Final closure activities at the OD Unit shall consist of:

- Installation of four groundwater monitoring wells at the EOD range (one upgradient and three downgradient wells) and eight consecutive quarters of groundwater sampling to determine the presence or absence of groundwater contamination;
- Removing any soil or debris from the OD Unit that have contaminant concentrations which pose unacceptable risk to human health or the environment;
- Sending for treatment and disposal any solid and hazardous waste, including any treatment residues, to a permitted Treatment, Storage, or Disposal Facility (TSDF) in accordance with applicable regulatory requirements.

Final closure for the OD Unit shall be completed when:

- All solid and hazardous waste has been disposed of off-site as required by law;
- Sampling and analysis demonstrates that no unacceptable risk to human health or the environment originating from the OD Unit exists in soil or groundwater;
- A Certification of Closure and Closure Report has been submitted to the Department; and
- The Department has approved the Certification of Closure and Closure Report.

1.4 Maximum Extent of Operations and Maximum Waste Inventory

The OD Unit was previously permitted on 20 December 1994 as Permit# NM9570024423-OD, which allowed 100,000 pounds of net explosive weight (NEW) to be treated at the OD Unit annually. Rocket motors, large caliber munitions, explosive wastes and firearms were treated at the OD Unit. Based on the operating record, the maximum inventory treated at the OD Unit was approximately 316,012 pounds of NEW.

Closure activities and any corrective action that may be required shall not be limited to the OD Unit if contamination has migrated beyond the OD Unit boundary. Any corrective action that may be required because of a release at the OB Unit shall be conducted under the terms and conditions of the 2010 Permit. ~~This will allow for an efficient closure of the OB Unit.~~

1.5 Schedule for Closure

Final closure of the OD Unit shall proceed by the general schedule presented in Table H-1.

Table H-1
Closure Schedule for the Open Detonation Unit at Kirtland AFB

Activity	Time Required
Notify the Department of receiving final volume of hazardous waste at the OD Unit	Completed
Removal of all hazardous waste from the OD Unit	Completed
Department approval of final OD Unit closure plan	TBD
Notify Department of commencement of closure activities	45 days before closure activities begin
Commence closure activities	Day 0
Remove all solid and hazardous waste	Day 90
Commence groundwater monitoring well installations	Day 90
Complete groundwater monitoring well installations	Day 180
Complete all closure activities, except groundwater monitoring	Day 360
Complete 8 quarters of groundwater monitoring	Day 900
Submit Closure Report and certification to ~~NMED~~Department	Day 960

Note: The schedule above indicates calendar days on which closure activities shall be started or completed subsequent

1.6 Closure Report

Within 60 days of completion of the final closure activities, a closure report shall be submitted to the Department. The report shall document the closure activities conducted and contain, at a minimum, the following information:

- A summary of the closure activities;
- Any significant variance from the approved closure plan and the reason for the variance;
- A summary of sampling data associated with closure, including analytical results for all field and laboratory quality control samples;
- A quality assurance statement on the adequacy of the analyses to support closure;
- The location of the file of supporting documentation (e.g., memos, logbooks, laboratory sample analysis data);
- Disposal location and quantities of all solid and hazardous wastes removed from the OD Unit;
- Certification of the accuracy of the report; and
- Survey plat.

1.7 Survey Plat and Post-Closure Requirements

Upon completion of closure activities at the OD Unit, a survey plat shall be prepared, certified by a professional land surveyor, and submitted with the closure report to the Department. The survey plat shall also be simultaneously filed with the local zoning authority. In the event that the OD Unit cannot be clean closed, a post-closure care plan shall be submitted to the Department for review and approval.

2. CLOSURE PROCEDURES

There is no hazardous waste present at the OD Unit; the last treatment event at the OD Unit occurred on 11 August 2010, and there are no treatment residues remaining. There are no structures or equipment at the OD Unit. (The structures associated with the collocated OB Unit are addressed under the OB Unit closure plan.)

The first phase of closure shall consist of a hazards survey of the OD Unit conducted by qualified contractor health physics and industrial hygiene personnel, which ~~will~~shall include unexploded ordnance (UXO) safety personnel, and Kirtland AFB EOD personnel. The purpose of the survey shall be to locate and remove any "kick-out" (untreated waste, waste fragments, or UXO), and to identify potential contamination concerns that may present hazards to workers during the closure activities and to specify any control measures necessary to reduce worker risk. This survey ~~will~~shall provide the information necessary for health physics, UXO safety, and industrial hygiene personnel to identify worker qualifications, personal protective equipment (PPE), safety awareness, work permits, exposure control programs, and emergency coordination that ~~will~~shall be required to perform closure. Any munitions and explosives of concern (MEC) identified during the hazard survey ~~will~~shall be reported to and handled by Kirtland AFB EOD staff personnel only in accordance with standard operating procedures. All workers involved in the closure activities ~~will~~shall be required to have training and medical monitoring as required by applicable regulations. Personnel performing closure activities ~~will~~shall be required to wear PPE as specified by health physics, UXO safety, and industrial hygiene personnel.

Sufficient sampling and analysis shall be required to demonstrate there are no contaminant concentrations which pose unacceptable risk to human health or the environment. ~~Soil and groundwater~~ Groundwater and soil samples shall be analyzed for parameters listed in Tables H-2 and H-3 to quantify contamination, if any, originating from the OD Unit.

~~Groundwater sampling results shall be compared to the New Mexico Water Quality Control Commission water quality standards and the Federal Safe Drinking Water Act maximum contaminant levels (MCLs), included in Table H-3. If the levels of hazardous constituents in the groundwater exceed the water quality standards or MCLs, a risk assessment shall be prepared. If the risk assessment demonstrates that the level of contamination is unacceptable, the groundwater shall be subject to corrective action, and a corrective action work plan subject to NMED review and approval shall be developed. For perchlorate, Kirtland AFB will apply the Office of the Under Secretary of Defense *Perchlorate Release Management Policy* dated 22 April 2009.~~

Surface and subsurface soil at the OD Unit shall be characterized by sampling and analysis. Soil sampling shall follow the procedures described in Section 2.2.1 of this Permit Attachment (H). Soil shall be analyzed for the parameters listed in Table H-~~2~~3. If sampling and analysis of soil indicates the presence of hazardous waste or hazardous constituents above background levels, a risk assessment shall be conducted based on a residential land-use scenario to determine whether the contaminants pose an unacceptable risk to human health or the environment. In lieu of a baseline risk assessment, the Permittee may compare the soil sampling results to the soil screening levels using the procedures listed in the Department's most current version of "Technical Background Document for Development of Soil Screening Levels," as ~~amended~~it may be updated, provided the soil screening levels are based on a residential land-use scenario. If the risk assessment demonstrates that the level of contamination is unacceptable, the contaminated soil exhibiting unacceptable risk shall be subject to corrective action under Permit Part 6 and shall be excavated and removed. The excavated soil shall be collected, transferred to containers, and, if

applicable, managed and disposed of as hazardous waste. The Permittee shall conduct corrective action activities at the OD Unit using the cleanup levels in Permit Section 6.2.3 if corrective action is necessary. Clean up levels shall be based on a residential land use scenario. Background soil concentrations for metals are those approved by the Department for the KAFB Facility, and are listed in Table D-4 of Permit Attachment D.

2.1 Monitoring Wells

2.1.1 Installation of New Monitoring Wells

The OD Unit is subject to the environmental performance standards of 40 C.F.R. § 264.601. As such, groundwater monitoring shall be conducted as part of closure activities to demonstrate that operations did not impact groundwater. Four monitoring wells, one upgradient and three downgradient of the OD Unit, shall be installed. The locations of the proposed monitoring wells are presented in Figure H-3.

~~A monitoring well installation plan is included as Attachment I to this Closure Plan. The Monitoring Well Installation Plan addresses:~~

- ~~Well locations,~~
- ~~Drilling specifications,~~
- ~~Well construction specifications,~~
- ~~Well development procedures,~~
- ~~A schedule for implementation and completion of the well installations;~~
- ~~Preparation and submittal of a well completion report; and~~
- ~~Groundwater sampling and analysis requirements for eight quarters.~~

~~In addition, t~~The wells installed at the OD Unit shall meet the groundwater monitoring requirements of 40 C.F.R. §§ 264.97(a)(2), (b), and (c). Within 30 days of completing well installation, ~~Kirtland AFB~~the Permitee shall submit a well completion report to the Department for approval.

Groundwater monitoring wells shall be properly plugged and abandoned in accordance with applicable New Mexico statutes and regulations, provided groundwater contamination has not occurred. If groundwater contamination has occurred, these monitoring wells shall be maintained for the purpose of implementing corrective action. The wells shall not be plugged or abandoned until the Department has approved closure of the OD Unit.

~~A~~ Activities for monitoring well installation ~~plan is included as Attachment I to this Closure Plan. The Monitoring Well Installation Plan addresses~~are presented in the following paragraphs and include:

- Well locations,
- Drilling specifications,
- Well construction specifications,
- Well development procedures,
- A schedule for implementation and completion of the well installations;
- Preparation and submittal of a well completion report; and

- Groundwater sampling and analysis requirements for eight quarters.

~~This work plan describes the proposed monitoring well installation and sampling activities near the Open Detonation (OD) unit on Kirtland Air Force Base (AFB), New Mexico.~~ The primary project objective is the installation and sampling of four groundwater monitoring wells, one upgradient and three downgradient of the site, to evaluate the potential groundwater impacts from the operation of the OD unit. ~~The general site location is shown in Figure 1.~~

The new monitoring wells ~~will~~shall be installed in the vicinity of the OD Unit (Figure H-3). ~~The proposed monitoring well locations are shown on Figure 2.~~ Installation of the monitoring wells ~~will~~shall facilitate groundwater sampling from the uppermost groundwater both up and downgradient of potential source areas associated with the OD unit. Based on data from nearby wells, groundwater at the proposed locations is expected to occur under confined conditions within the Paleozoic sedimentary rocks of the Madera Group or Sandia Formation or the underlying Precambrian granite. The depth to the uppermost water bearing zones at the proposed well locations is expected to range from approximately 100 to 200 feet (ft) below ground surface (bgs). Final well design ~~will~~shall be dependent on field conditions and the placement of the fourth well ~~will~~shall be performed in consultation with the ~~New Mexico Environment~~ Department ~~Hazardous Waste Bureau (NMED-HWB).~~

Table H-2

Comparison of Reporting Levels to Screening Objectives in Groundwater, Open Burn and Open Detonation Units at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Water Quality Standard	EPA Maximum Contaminant Levels[a]	EPA Regional Screening Levels Tap Water (Nov 2012)	DOE Open Burn Suggested Maximum Background (Dec 1998)	LOQ	LOD	DL
EPA 160.2	Total dissolved solids	NA	mg/L	--	--	--	--	10	8	2.5
EPA 310.2	Alkalinity	7664-41-7	mg/L	--	--	--	--	10	2.5	0.49
EPA 350.1	Ammonia	7664-41-7	mg/L	--	--	--	--	0.5	0.1	0.049
SW9030B	Sulfide	14797-55-8	mg/L	58.4	10	25	4 (as NO2/NO3)	0.5	0.1	0.04
SW9056	Nitrate	14797-55-8	mg/L	3.65	10	25	4 (as NO2/NO3)	0.5	0.1	0.05
SW9056	Nitrite	14797-65-0	mg/L	3.65	1	1.6	4 (as NO2/NO3)	0.5	0.1	0.05
SW9056	Chloride	16887-00-6	mg/L	--	--	--	--	0.5	0.1	0.05
SW9056	Sulfate	18785-72-3	mg/L	1.46	--	620	--	0.5	0.1	0.05
SW9056	Fluoride	16984-48-8	mg/L	1.46	--	620	--	0.5	0.1	0.05
SW9056	Bromide	7782-90-7	mg/L	--	--	--	--	0.5	0.1	0.05
SW9060	Total organic carbon	7440-44-0	mg/L	1,000	2,000	--	120	20	0.55	0.25
SW6010B	Barium	7440-39-3	µg/L	7,300	2,000	3100	120	20	5	0.25
SW6010B	Beryllium	7440-41-7	µg/L	7,300	4	3100	4	20	5	0.13
SW6010B	Cadmium	7440-43-9	µg/L	10	5	--	0.47	3	1	0.5
SW6010B	Calcium	7440-70-2	µg/L	10	5	--	0.47	1000	80	35
SW6010B	Chromium	7440-47-3	µg/L	50	100	--	43	1000	80	8.5
SW6010B	Cobalt	7440-48-4	µg/L	50	100	--	23	10	5	1.32
SW6010B	Copper	7440-50-8	µg/L	1,000	1,300 (1,000)	--	29	15	5	2.31
SW6010B	Iron	7439-89-6	µg/L	1,000	1,300 (300,000)	11000	<50	200	100	50
SW6010B	Lead	7439-92-1	µg/L	15000	15	11000	10	200	150	35
SW6010B	Lithium	7439-93-2	µg/L	50	15	31	10	500	25	11
SW6010B	Magnesium	7439-95-4	µg/L	--	--	31	--	500	25	11
SW6010B	Manganese	7439-96-5	µg/L	876	--	320	--	500	25	11
SW6010B	Molybdenum	7439-98-7	µg/L	183	--	370	--	500	25	11
SW6010B	Nickel	7440-02-0	µg/L	183	--	300	28	500	25	2.4
SW6010B	Potassium	7440-09-7	µg/L	--	--	300	28	3000	250	237
SW6010B	Selenium	7782-49-2	µg/L	50	50	--	5	3000	250	237
SW6010B	Silver	7440-22-4	µg/L	50	100	--	<10	5	2	0.84
SW6010B	Sodium	7440-23-5	µg/L	50	100	--	<10	5000	250	91.6
SW6010B	Strontium	7440-24-6	µg/L	21900	--	9300	--	5000	250	91.6
SW6010B	Tin	7440-31-5	µg/L	21900	--	9300	50	500	25	1.7
SW6010B	Tin	7440-31-5	µg/L	--	--	9300	50	50	15	1.7
SW6010B	Zinc	7440-66-6	µg/L	10,000	5,000	--	260	20	10	1.9
SW6020A	Antimony	7440-36-0	µg/L	10,000	5,000	--	260	6	4	3
SW6020A	Arsenic	7440-38-2	µg/L	100	10	--	14	3	2	1
SW6020A	Thallium	7440-28-0	µg/L	100	2	--	2	1.5	1	0.5
SW7470A	Mercury	7439-97-6	µg/L	2	2	--	2	0.2	0.1	0.1
SW6850	Perchlorate	14797-73-0	µg/L	4[b]	7	--	7	0.5	0.25	0.082
SW8260B	1,1,1-Trichloroethane	71-55-6	µg/L	4[b]	200	--	--	1	0.4	0.19
SW8260B	1,1,2,2-Tetrachloroethane	79-34-5	µg/L	10	200	--	--	1	0.2	0.09
SW8260B	1,1,2-trichloro-1,1,2-trifluoroethane*	76-13-1	µg/L	10	--	--	--	50	0.4	0.25
SW8260B	1,1,2-trichloro-1,1,2-trifluoroethane*	76-13-1	µg/L	10	5	--	--	50	0.4	0.31
SW8260B	1,1-Dichloroethane	75-34-3	µg/L	25	5	--	--	1	0.2	0.4
SW8260B	1,1-Dichloroethene	75-35-4	µg/L	5	7	--	--	1	0.4	0.14
SW8260B	1,2,3-Trichlorobenzene	87-61-6	µg/L	70	7	--	--	1	0.4	0.14
SW8260B	1,2,3-Trichloropropane	96-18-4	µg/L	70	--	0.00065	--	0.2	0.09	0.09
SW8011	1,2,3-Trichloropropane	96-18-4	µg/L	--	--	0.00065	--	0.2	0.09	0.09
SW8260B	1,2,4-Trimethylbenzene	95-63-6	µg/L	--	70	15	--	1	0.2	0.12
SW8260B	1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	µg/L	--	0.2	NA	--	0.02	0.005	0.005
SW8011	1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	µg/L	--	0.2	NA	--	0.02	0.005	0.005
SW8011	1,2-Dibromoethane (EDB)	106-93-4	µg/L	0.1	0.05	NA	--	0.02	0.005	0.0022
SW8260B	1,2-Dichloroethane	107-06-2	µg/L	10	5	--	--	1	0.4	0.22
SW8260B	1,2-Dichlorobenzene	95-50-1	µg/L	--	600	--	--	1	0.4	0.14
SW8260B	1,2-Dichloropropane	78-87-5	µg/L	10	5	--	--	1	0.2	0.15
SW8260B	1,3,5-Trimethylbenzene	108-67-8	µg/L	--	--	87	--	1	0.2	0.14
SW8260B	1,3-Dichlorobenzene*	541-73-1	µg/L	--	--	--	--	1	0.4	0.11
SW8260B	1,4-Dichlorobenzene	106-46-7	µg/L	--	75	--	--	1	0.2	0.13
SW8260B	1,4-Dioxane	123-91-1	µg/L	--	--	0.67	--	1	TBD	0.12
SW8260B	2-Butanone (MEK)	78-93-3	µg/L	--	--	4,900	--	2	0.4	0.35
SW8260B	2-Hexanone	591-78-6	µg/L	--	--	34	--	2	0.4	0.17
SW8260B	4-Methyl-2-pentanone (MIBK)	108-10-1	µg/L	--	--	1,000	--	2	0.4	1
SW8260B	Acetone	67-64-1	µg/L	--	--	12,000	--	10	4	2.1
SW8260B	Benzene	71-43-2	µg/L	10	5	--	--	1	0.2	0.13
SW8260B	Bromochloromethane	74-97-5	µg/L	--	--	83	--	1	0.4	0.14
SW8260B	Bromodichloromethane	75-27-4	µg/L	--	100	--	--	1	0.4	0.14
SW8260B	Bromoform	75-25-2	µg/L	--	100	--	--	1	0.4	0.1
SW8260B	Bromomethane	74-83-9	µg/L	--	--	7	--	1	0.4	0.29
SW8260B	Carbon disulfide	75-15-0	µg/L	--	--	720	--	2	0.2	0.16
SW8260B	Carbon tetrachloride	56-23-5	µg/L	10	5	--	--	1	0.4	0.15
SW8260B	Chlorobenzene	108-90-7	µg/L	--	100	--	--	1	0.2	0.12
SW8260B	Chloroethane	75-00-3	µg/L	--	--	21,000	--	1	0.4	0.34

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Table H-2

Comparison of Reporting Levels to Screening Objectives in Groundwater, Open Burn and Open Detonation Units at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Water Quality Standard	EPA Maximum Contaminant Levels/Secondary Contaminant Levels[a]	EPA Regional Screening Levels Tap Water (Nov 2012)	DOE Open Burn Suggested Maximum Background (Dec 1998)	LOQ	LOD	DL
SW8260B	Chloroform	67-66-3	µg/L	100	100	--	--	1	0.2	0.12
SW8260B	Chloromethane	74-87-3	µg/L	--	--	190	--	1	0.4	0.25
SW8260B	cis-1,2-Dichloroethene	156-59-2	µg/L	--	70	--	--	1	0.4	0.1
SW8260B	cis-1,3-Dichloropropene*	10061-01-5	µg/L	--	--	--	--	1	0.4	0.22
SW8260B	Cyclohexane*	1735-17-7	µg/L	--	--	--	--	(a)	(a)	(a)
SW8260B	Dibromochloromethane	124-48-1	µg/L	--	100	--	--	1	0.4	0.13
SW8260B	Dichlorodifluoromethane (Freon 12)	75-71-8	µg/L	--	--	190	--	1	0.4	0.16
SW8260B	Ethylbenzene	100-41-4	µg/L	750	700	--	--	1	0.2	0.1
SW8260B	Isopropylbenzene	98-82-8	µg/L	--	--	390	--	1	0.2	0.12
SW8260B	Methyl tert-butyl ether (MTBE)	1634-04-4	µg/L	--	(5)	--	--	2	0.4	0.19
SW8260B	Methylene chloride	75-09-2	µg/L	100	5	--	--	1	0.4	0.35
SW8260B	Methyl Acetate*	79-20-9	µg/L	--	--	--	--	(a)	(a)	(a)
SW8260B	Methly Cyclohexane*	108-87-2	µg/L	--	--	--	--	(a)	(a)	(a)
SW8260B	m-Xylene & p-Xylene	136777-61-2	µg/L	--	10,000	--	--	1	0.8	0.18
SW8260B	Naphthalene	91-20-3	µg/L	30	--	NA	--	1	0.2	0.15
SW8260B	o-Xylene	95-47-6	µg/L	--	10,000	--	--	1	0.4	0.1
SW8260B	Styrene	100-42-5	µg/L	--	100	--	--	1	0.2	0.15
SW8260B	Tetrachloroethene	127-18-4	µg/L	--	5	--	--	1	0.2	0.1
SW8260B	Toluene	108-88-3	µg/L	750	1,000	--	--	1	0.4	0.25
SW8260B	trans-1,2-Dichloroethene	156-60-5	µg/L	--	100	--	--	1	0.4	0.11
SW8260B	trans-1,3-Dichloropropene*	10061-02-6	µg/L	--	--	--	--	1	0.2	0.08
SW8260B	Trichloroethene	79-01-6	µg/L	100	5	--	--	1	0.4	0.13
SW8260B	Trichlorofluoromethane (Freon 11)	75-69-4	µg/L	--	--	1,100	--	1	0.4	0.23
SW8260B	Vinyl chloride	75-01-4	µg/L	1	2	--	--	1	0.4	0.22
SW8260B	1,2-Dichloroethane-d4 (Surrogate)		%	--	--	--	--	--	--	--
SW8260B	4-Bromofluorobenzene (Surrogate)		%	--	--	--	--	--	--	--
SW8260B	Dibromofluoromethane (Surrogate)		%	--	--	--	--	--	--	--
SW8260B	Toluene-d8 (Surrogate)		%	--	--	--	--	--	--	--
SW8270C	1,1-biphenyl	92-52-4	µg/L	--	--	0.83	--	10	NA	5
SW8270C	1,2,4,5-tetrachlrorbenzene	95-94-3	µg/L	--	--	1.2	--	10	2.1	0.54
SW8270C	2,4,5-Trichlorophenol	95-95-4	µg/L	--	--	890	--	10	3.0	2
SW8270C	2,4,6-Trichlorophenol	88-06-2	µg/L	--	--	3.5	--	10	3.0	2
SW8270C	2,4-Dichlorophenol	120-83-2	µg/L	--	--	35	--	10	3.0	2.6
SW8270C	2,4-Dimethylphenol	105-67-9	µg/L	--	--	270	--	10	3.0	2.2
SW8270C	2,4-Dinitrotoluene	121-14-2	µg/L	--	--	0.2	--	10	3.0	2
SW8270C	2,6-Dichlorophenol*	87-65-0	µg/L	--	--	--	--	15	3.0	5
SW8270C	2,6-Dinitrotoluene	606-20-2	µg/L	--	--	15	--	10	3.0	2
SW8270C	2-Chloronaphthalene	91-58-7	µg/L	--	--	550	--	10	3.0	1.3
SW8270C	2-Chlorophenol	95-57-8	µg/L	--	--	71	--	10	3.0	1.6
SW8270C	2-Methylphenol	95-48-7	µg/L	--	--	720	--	10	3.0	0.93
SW8270C	2-Nitroaniline	88-74-4	µg/L	--	--	150	--	50	3.0	2
SW8270C	2-Nitrophenol*	88-75-5	µg/L	--	--	--	--	10	3.0	1.9
SW8270C	2,2-oxybis(1-chloropropane)*	52438-91-2	µg/L	--	--	--	--	10	3	1.3
SW8270C	3,3'-Dichlorobenzidine	91-94-1	µg/L	--	--	0.11	--	50	3.0	0.86
SW8270C	3-Methylphenol & 4-Methylphenol	65794-96-9	µg/L	--	--	720	--	30	20	10
SW8270C	3-Nitroaniline*	99-09-2	µg/L	--	--	--	--	50	3.0	1.4
SW8270C	4,6-Dinitro-2-methylphenol	534-52-1	µg/L	--	--	1.2	--	60	20	2.2
SW8270C	4-Bromophenyl phenyl ether*	101-55-3	µg/L	--	--	--	--	10	3.0	1.1
SW8270C	4-Chloro-3-methylphenol	59-50-7	µg/L	--	--	1,100	--	10	3.0	2
SW8270C	4-Chloroaniline	106-47-8	µg/L	--	--	0.32	--	10	3.0	2
SW8270C	4-Chlorophenyl phenyl ether*	7005-72-3	µg/L	--	--	--	--	10	3.0	1.1
SW8270C	4-Nitroaniline	100-01-6	µg/L	--	--	3.3	--	50	3.0	1.5
SW8270C	4-Nitrophenol*	100-02-7	µg/L	--	--	--	--	60	20	6.1
SW8270C	Acetophenone	17537-31-4	µg/L	--	--	1,500	--	10	3	0.78
SW8270C	Azobenzene (as 1,2 Diphenylhydrazine)	103-33-3	µg/L	--	--	0.067	--	10	3.0	0.71
SW8270C	Atrazine	93616-39-8	µg/L	--	--	0.26	--	(a)	(a)	(a)
SW8270C	Benzaldehyde	100-52-7	µg/L	--	--	1,500	--	(a)	(a)	(a)
SW8270C	bis(2-Chloroethoxy)methane	111-91-1	µg/L	--	--	46	--	10	3.0	1
SW8270C	bis(2-Chloroethyl) ether	111-44-4	µg/L	--	--	0.012	--	10	3.0	1.5
SW8270C	bis(2-Ethylhexyl) phthalate	117-81-7	µg/L	--	6	--	--	10	3.0	1
SW8270C	Butyl benzyl phthalate	85-68-7	µg/L	--	--	14	--	10	3.0	1.4
SW8270C	Caprolactam	105-60-2	µg/L	--	--	7,700	--	(a)	(a)	(a)
SW8270C	Carbazole*	86-74-8	µg/L	--	--	--	--	10	3.0	1.2
SW8270C	Dibenzofuran	132-64-9	µg/L	--	--	5.8	--	10	3.0	1.1
SW8270C	Diethyl phthalate	84-66-2	µg/L	--	--	11,000	--	10	3.0	0.93
SW8270C	Dimethyl phthalate*	131-11-3	µg/L	--	--	--	--	10	3.0	0.88
SW8270C	Di-n-butyl phthalate	84-74-2	µg/L	--	--	670	--	10	3.0	1.1
SW8270C	Di-n-octyl phthalate*	117-84-0	µg/L	--	--	--	--	10	3.0	1.5
SW8270C	Hexachlorobenzene	118-74-1	µg/L	--	1	--	--	10	3.0	1.4
SW8270C	Hexachlorobutadiene	87-68-3	µg/L	--	--	0.26	--	10	3.0	1.3
SW8270C	Hexachloroethane	67-72-1	µg/L	--	--	0.79	--	10	3.0	1.4

Table H-2

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Method	Analyte	CAS #	Units	New Mexico Water Quality Standard	EPA Maximum Contaminant Levels/Secondary Contaminant Levels[a]	EPA Regional Screening Levels Tap Water (Nov 2012)	DOE Open Burn Suggested Maximum Background (Dec 1998)	LOQ	LOD	DL
SW8270C	Hexachlorocyclopentadiene	77-47-4	µg/L		--	22	--	10	3	0.214
SW8270C	Isophorone	78-59-1	µg/L	--	--	67	--	10	3.0	1
SW8270C	Nitrobenzene	98-95-3	µg/L	--	--	0.12	--	10	3.0	1.6
SW8270C	N-Nitrosodimethylamine	62-75-9	µg/L	--	--	0.0004	--	15	3.0	0.96
SW8270C	N-Nitrosodi-n-propylamine	621-64-7	µg/L	--	--	0.0093	--	10	3.0	1.4
SW8270C	N-Nitrosodiphenylamine	86-30-6	µg/L	--	--	10	--	10	3.0	0.54
SW8270C	Pentachlorophenol	87-86-5	µg/L	--	1	--	--	60	20	2
SW8270C	Phenol	108-95-2	µg/L	--	--	4,500	--	10	3.0	1.1
SW8270C	Phenol-d6		%	--	--	--	--	--	--	--
SW8270C	2-Fluorobiphenyl		%	--	--	--	--	--	--	--
SW8270C	Terphenyl-d14		%	--	--	--	--	--	--	--
SW8270C-SIM	1-methylnaphthalene	90-12-0	µg/L	--	--	0.97	--	0.1	0.01	0.006
SW8270C-SIM	2-methylnaphthalene	91-57-6	µg/L	--	--	27	--	0.1	0.01	0.006
SW8270C-SIM	Acenaphthene	83-32-9	µg/L	--	--	400	--	0.1	0.01	0.003
SW8270C-SIM	Acenaphthylene	208-96-8	µg/L	--	--	--	--	0.1	0.01	0.003
SW8270C-SIM	Anthracene	120-12-7	µg/L	--	--	1300	--	0.1	0.01	0.004
SW8270C-SIM	Benzo (a) anthracene	56-55-3	µg/L	--	--	0.029	--	0.1	0.01	0.005
SW8270C-SIM	Benzo (a) pyrene	50-32-8	µg/L	0.7	0.2	--	--	0.1	0.01	0.004
SW8270C-SIM	Benzo (b) fluoranthene	205-99-2	µg/L	--	--	0.029	--	0.1	0.02	0.012
SW8270C-SIM	Benzo (g,h,i) perylene	191-24-2	µg/L	--	--	--	--	0.1	0.01	0.006
SW8270C-SIM	Benzo (k) fluoranthene	207-08-9	µg/L	--	--	0.29	--	0.1	0.01	0.008
SW8270C-SIM	Chrysene	218-01-9	µg/L	--	--	2.9	--	0.1	0.01	0.004
SW8270C-SIM	Dibenzo (a,h) anthracene	53-70-3	µg/L	--	--	0.0029	--	0.1	0.02	0.014
SW8270C-SIM	Fluoranthene	206-44-0	µg/L	--	--	630	--	0.1	0.01	0.004
SW8270C-SIM	Fluorene	86-73-7	µg/L	--	--	220	--	0.1	0.01	0.004
SW8270C-SIM	Indeno (1,2,3-c,d) pyrene	193-39-5	µg/L	--	--	0.029	--	0.1	0.02	0.014
SW8270C-SIM	Naphthalene	91-20-3	µg/L	30		NA	--	0.1	0.01	0.004
SW8270C-SIM	Phenanthrene	85-01-8	µg/L	--	--	--	--	0.1	0.01	0.006
SW8270C-SIM	Pyrene	129-00-0	µg/L	--	--	87	--	0.1	0.01	0.004
SW8290	2,3,7,8-TCDF*	51207-31-9	pg/L	--	--	--	--	10	2.5	EDL
SW8290	2,3,7,8-TCDD*	1746-01-6	pg/L	--	--	--	--	10	2.5	EDL
SW8290	1,2,3,7,8-PeCDF*	57117-41-6	pg/L	--	--	--	--	50	6.5	EDL
SW8290	2,3,4,7,8-PeCDF*	57117-31-4	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,7,8-PeCDD*	40321-76-4	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,4,7,8-HxCDF*	70648-26-9	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,6,7,8-HxCDF*	57117-44-9	pg/L	--	--	--	--	50	12.5	EDL
SW8290	2,3,4,6,7,8-HxCDF*	60851-34-5	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,7,8,9-HxCDF*	72918-21-9	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,4,7,8-HxCDD*	39227-28-6	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,6,7,8-HxCDD*	57653-85-7	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,7,8,9-HxCDD*	19408-74-3	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,4,6,7,8-HpCDF*	67562-39-4	pg/L	--	--	--	--	50	6.5	EDL
SW8290	1,2,3,4,7,8,9-HpCDF*	55673-89-7	pg/L	--	--	--	--	50	12.5	EDL
SW8290	1,2,3,4,6,7,8-HpCDD*	35822-46-9	pg/L	--	--	--	--	50	12.5	EDL
SW8290	OCDF*	39001-02-0	pg/L	--	--	--	--	100	25	EDL
SW8290	OCDD*	3268-87-9	pg/L	--	--	--	--	100	50	EDL
SW8330B	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	µg/L	--	--	780	--	0.15	0.05	0.036
SW8330B	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	µg/L	--	--	0.61	--	0.25	0.05	0.036
SW8330B	1,3,5-Trinitrobenzene (1,3,5-TNB)	99-35-4	µg/L	--	--	460	--	0.1	0.05	0.03
SW8330B	1,3-Dinitrobenzene (1,3-DNB)	99-65-0	µg/L	--	--	1.5	--	0.15	0.1	0.05
SW8330B	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	479-45-8	µg/L	--	--	61	--	0.15	0.1	0.05
SW8330B	Nitrobenzene (NB)	98-95-3	µg/L	--	--	0.12	--	0.15	0.1	0.05
SW8330B	2,4,6-Trinitrotoluene (2,4,6-TNT)	118-96-7	µg/L	--	--	2.2	--	0.15	0.1	0.05
SW8330B	4-Amino-2,6-dinitrotoluene (4-Am-DNT)	19406-51-0	µg/L	--	--	30	--	0.15	0.1	0.05
SW8330B	2-Amino-4,6-dinitrotoluene (2-Am-DNT)	35572-78-2	µg/L	--	--	30	--	0.3	0.1	0.1
SW8330B	2,4-Dinitrotoluene (2,4-DNT)	121-14-2	µg/L	--	--	0.2	--	0.15	0.1	0.05
SW8330B	2,6-Dinitrotoluene (2,6-DNT)	606-20-2	µg/L	--	--	15	--	0.15	0.1	0.05
SW8330B	2-Nitrotoluene (2-NT)	88-72-2	µg/L	--	--	0.27	--	1	0.1	0.088
SW8330B	3-Nitrotoluene (3-NT)	99-08-1	µg/L	--	--	1.3	--	0.5	0.1	0.057
SW8330B	4-Nitrotoluene (4-NT)	99-99-0	µg/L	--	--	3.7	--	1	0.1	0.088
SW8330B	Nitroglycerin	55-63-0	µg/L	--	--	1.5	--	1	0.5	0.33
SW8330B	PETN	78-11-5	µg/L	--	--	16	--	1	0.5	0.3
SW7580	White phosphorous	7723-14-0	µg/L	--	--	0.31	--	0.05	0.025	0.015

The laboratory does not analyze for these compounds. The compounds will be tentatively identified based on a computer library search of the sample chromotography. If found, the coumpound concentration will be reported as an estimated value.

The detection limit exceeds most stringent criteria.

[a] Secondary Contaminant Levels are in parentheses

[b] KAFB RCRA permit screening criteria for perchlorate

* Risk based screening levels will be calculated if analyte is detected and toxicological information is available

Constituents with "%" units are surrogates and are not a part of the target analytes.

CAS - Chemical Abstract Service

DL - Detection limit

DOE - Department of Energy

LOD - Limit of detection

LOQ - Limit of quantitation

µg/L - micrograms per liter

mg/L - milligrams per liter

NA - not applicable

pg/L - picograms per liter

RPD - relative percent difference

Table H-3

Comparison of Reporting Levels to Screening Objectives in Soil, Open Burn Unit at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Residential SSG (Feb 2012)	Coyote Test Field Super Group Background Values (surface soil)	Coyote Test Field Super Group Background Values (subsurface soil)	EPA Regional Screening Levels, Residential (Nov 2012)	LOQ	LOD	DL
SW6010B	Antimony	7440-36-0	mg/kg	31.3	3.9	3.9	--	3	2	0.94
SW6010B	Barium	7440-39-3	mg/kg	15,596	130	214	--	2	0.5	0.12
SW6010B	Beryllium	7440-41-7	mg/kg	156	0.65	0.65	--	0.3	0.1	0.03
SW6010B	Cadmium	7440-43-9	mg/kg	70.3	1	0.9	--	0.3	0.1	0.03
SW6010B	Chromium	7440-47-3	mg/kg	117,321/2.97	17.3	12.8	--	1	0.5	0.14
SW6010B	Cobalt	7440-48-4	mg/kg	--	5.2	5.2	23	1	0.5	0.25
SW6010B	Copper	7440-50-8	mg/kg	3,129	15.4	18.2	--	1.5	0.5	0.22
SW6010B	Lead	7439-92-1	mg/kg	400	21.4	11.8	--	1	0.5	0.26
SW6010B	Nickel	7440-02-0	mg/kg	1,564	11.5	11.5	--	1	0.5	0.24
SW6010B	Selenium	7782-49-2	mg/kg	391	1	1	--	4	2.5	1.4
SW6010B	Silver	7440-22-4	mg/kg	391	1	1	--	0.5	0.2	0.09
SW6010B	Tin	7440-31-5	mg/kg	--	10	10	47,000	100	25	11
SW6010B	Vanadium	7440-62-2	mg/kg	391	20.4	21.5	--	2	0.5	0.19
SW6010B	Zinc	7440-66-6	mg/kg	23,464	62	62	--	2	1	0.19
SW6020A	Arsenic	7440-38-2	mg/kg	3.9	5.6	7.4	--	0.5	0.3	0.15
SW6020A	Thallium	7440-28-0	mg/kg	0.78	1.1	1.1	--	0.15	0.1	0.05
SW7471A	Mercury	7439-97-6	mg/kg	15.6/7.82	0.25	0.10	--	0.04	0.012	0.0086
SW6850	Perchlorate	14797-73-0	µg/kg	54,800	--	--	--	5	0.4	0.26
SW7580	White Phosphorus	7723-14-0W	µg/kg	--	--	--	1,600	0.1	0.05	0.015
SW8260B	1,1,1-Trichloroethane	71-55-6	µg/kg	15,609,580	--	--	--	5	1	0.36
SW8260B	1,1,2,2-Tetrachloroethane	79-34-5	µg/kg	8,021	--	--	--	5	1	0.68
SW8260B	1,1,2-Trichloroethane	79-00-5	µg/kg	2,811	--	--	--	5	1	0.44
SW8260B	1,1,2-trichloro-1,1,2-trifluoroethane	76-13-1	µg/kg	72,080,604	--	--	--	10	1	0.83
SW8260B	1,1-Dichloroethane	75-34-3	µg/kg	64,514	--	--	--	5	1	0.29
SW8260B	1,1-Dichloroethene	75-35-4	µg/kg	448,879	--	--	--	5	0.5	0.26
SW8260B	1,2,3-Trichlorobenzene	87-61-6	µg/kg	--	--	--	49,000	5	1	0.75
SW8260B	1,2,3-Trichloropropane	96-18-4	µg/kg	50	--	--	--	5	1	0.76
SW8260B	1,2,4-Trichlorobenzene	120-82-1	µg/kg	72,980	--	--	--	5	1	0.75
SW8260B	1,2,4-Trimethylbenzene	95-63-6	µg/kg	--	--	--	62,000	5	1	0.51
SW8260B	1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	µg/kg	186	--	--	--	10	1	0.88
SW8260B	1,2-Dibromoethane (EDB)	106-93-4	µg/kg	588	--	--	--	10	1	0.27
SW8260B	1,2-Dichlorobenzene	95-50-1	µg/kg	2,306,711	--	--	--	5	1	0.64
SW8260B	1,2-Dichloroethane	107-06-2	µg/kg	7,885	--	--	--	5	1	0.73
SW8260B	1,2-Dichloropropane	78-87-5	µg/kg	15,238	--	--	--	5	1	0.6
SW8260B	1,3,5-Trimethylbenzene	108-67-8	µg/kg	--	--	--	780,000	5	1	0.35
SW8260B	1,3-Dichlorobenzene*	541-73-1	µg/kg	--	--	--	--	5	1	0.3
SW8260B	1,4-Dichlorobenzene	106-46-7	µg/kg	31,731	--	--	--	5	1	0.78
SW8260B	1,4-Dioxane	123-91-1	µg/kg	48,634	--	--	--	250	75	39
SW8260B	2-Butanone (MEK)	78-93-3	µg/kg	37,076,608	--	--	--	10	3	1.4
SW8260B	2-Hexanone	591-78-6	µg/kg	--	--	--	210,000	10	1	0.74
SW8260B	4-Methyl-2-pentanone (MIBK)	108-10-1	µg/kg	51,578	--	--	--	10	1	0.92
SW8260B	Acetone	67-64-1	µg/kg	66,556,733	--	--	--	20	3	1.4
SW8260B	Benzene	71-43-2	µg/kg	15,381	--	--	--	5	1	0.26
SW8260B	Bromochloromethane	74-97-5	µg/kg	--	--	--	160,000	5	1	0.94
SW8260B	Bromodichloromethane	75-27-4	µg/kg	5,411	--	--	--	5	1	0.53
SW8260B	Bromoform	75-25-2	µg/kg	--	--	--	--	5	1	0.4
SW8260B	Bromomethane	74-83-9	µg/kg	16,485	--	--	--	5	3	0.86
SW8260B	Carbon disulfide	75-15-0	µg/kg	1,532,527	--	--	--	10	1	0.49
SW8260B	Carbon tetrachloride	56-23-5	µg/kg	10,833	--	--	--	5	1	0.53
SW8260B	Chlorobenzene	108-90-7	µg/kg	376,370	--	--	--	5	1	0.29
SW8260B	Chloroethane	75-00-3	µg/kg	29,806,983	--	--	--	5	1	0.45
SW8260B	Chloroform	67-66-3	µg/kg	5,864	--	--	--	5	1	0.26
SW8260B	Chloromethane	74-87-3	µg/kg	274,707	--	--	--	5	1	0.5
SW8260B	cis-1,2-Dichloroethene	156-59-2	µg/kg	156,428	--	--	--	5	1	0.89
SW8260B	cis-1,3-Dichloropropene*	10061-01-5	µg/kg	33713	--	--	--	5	1	0.64
SW8260B	Cyclohexane	1735-17-7	µg/kg	--	--	--	7,000,000	(a)	(a)	(a)
SW8260B	Dibromochloromethane	124-48-1	µg/kg	12,127	--	--	--	5	0.5	0.21
SW8260B	Dichlorodifluoromethane (Freon 12)	75-71-8	µg/kg	168,142	--	--	--	5	3	0.89
SW8260B	Ethylbenzene	100-41-4	µg/kg	68,448	--	--	--	5	1	0.34
SW8260B	Isopropylbenzene	98-82-8	µg/kg	2,430,743	--	--	--	5	1	0.52
SW8260B	Methyl Acetate	79-20-9	µg/kg	78,214,000	--	--	--	(a)	(a)	(a)
SW8260B	Methly Cyclohexane	108-87-2	µg/kg	5,625,911	--	--	--	(a)	(a)	(a)
SW8260B	Methyl tert-butyl ether (MTBE)	1634-04-4	µg/kg	901,073	--	--	--	10	1	0.6
SW8260B	Methylene chloride	75-09-2	µg/kg	409,376	--	--	--	5	1	0.84
SW8260B	m-Xylene & p-Xylene	136777-61-2	µg/kg	774,289	--	--	--	5	1	0.81
SW8260B	Naphthalene	91-20-3	µg/kg	42,976	--	--	--	5	1	0.63
SW8260B	o-Xylene	95-47-6	µg/kg	898,344	--	--	--	5	0.5	0.33
SW8260B	Styrene	100-42-5	µg/kg	7,277,612	--	--	--	5	1	0.31
SW8260B	Tetrachloroethene	127-18-4	µg/kg	7,021	--	--	--	5	1	0.61
SW8260B	Toluene	108-88-3	µg/kg	5,274,400	--	--	--	5	1	0.61
SW8260B	trans-1,2-Dichloroethene	156-60-5	µg/kg	269,586	--	--	--	5	1	0.38
SW8260B	trans-1,3-Dichloropropene*	10061-02-6	µg/kg	33713	--	--	--	5	1	0.75
SW8260B	Trichloroethene	79-01-6	µg/kg	8,767	--	--	--	5	1	0.6
SW8260B	Trichlorofluoromethane (Freon 11)	75-69-4	µg/kg	1,412,976	--	--	--	10	1	0.34
SW8260B	Vinyl chloride	75-01-4	µg/kg	728	--	--	--	5	1	0.36

Table H-3
Comparison of Reporting Levels to Screening Objectives in Soil, Open Burn Unit at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Residential SSG (Feb 2012)	Coyote Test Field Super Group Background Values (surface soil)	Coyote Test Field Super Group Background Values (subsurface soil)	EPA Regional Screening Levels, Residential (Nov 2012)	LOQ	LOD	DL
SW8270C	1,1-biphenyl	92-52-4	µg/kg	57117	--	--	--	330	NA	165
SW8270C	1,2,4,5-tetrachlorbenzene	95-94-3	µg/kg	18,331	--	--	--	(a)	(a)	(a)
SW8270C	2,4,5-Trichlorophenol	95-95-4	µg/kg	6,110,491	--	--	--	330	167	83
SW8270C	2,4,6-Trichlorophenol	88-06-2	µg/kg	61,105	--	--	--	330	167	84
SW8270C	2,4-Dichlorophenol	120-83-2	µg/kg	183,315	--	--	--	330	167	89
SW8270C	2,4-Dimethylphenol	105-67-9	µg/kg	1,222,098	--	--	--	500	167	167
SW8270C	2,4-Dinitrotoluene	121-14-2	µg/kg	15,689	--	--	--	330	167	89
SW8270C	2,6-Dichlorophenol*	87-65-0	µg/kg	--	--	--	--	500	167	165
SW8270C	2,6-Dinitrotoluene	606-20-2	µg/kg	61,105	--	--	--	330	167	99
SW8270C	2-Chloronaphthalene	91-58-7	µg/kg	6,257,143	--	--	--	330	167	81
SW8270C	2-Chlorophenol	95-57-8	µg/kg	391,071	--	--	--	330	167	88
SW8270C	2-Methylnaphthalene	91-57-6	µg/kg	--	--	--	230,000	330	167	85
SW8270C	2-Methylphenol	95-48-7	µg/kg	--	--	--	3,100,000	330	167	58
SW8270C	2-Nitroaniline	88-74-4	µg/kg	--	--	--	610,000	1600	167	84
SW8270C	2-Nitrophenol*	88-75-5	µg/kg	--	--	--	--	330	167	82
SW8270C	2,2-oxybis(1-chloropropane)*	52438-91-2	µg/kg	--	--	--	--	330	167	54
SW8270C	3,3'-Dichlorobenzidine	91-94-1	µg/kg	10,808	--	--	--	1600	167	94
SW8270C	3-Methylphenol & 4-Methylphenol	65794-96-9	µg/kg	--	--	--	3,100,000	1000	660	330
SW8270C	3-Nitroaniline*	99-09-2	µg/kg	--	--	--	--	1600	333	167
SW8270C	4,6-Dinitro-2-methylphenol	534-52-1	µg/kg	4,888	--	--	--	2000	333	81
SW8270C	4-Bromophenyl phenyl ether*	101-55-3	µg/kg	--	--	--	--	330	167	85
SW8270C	4-Chloro-3-methylphenol	59-50-7	µg/kg	--	--	--	6,100,000	330	167	92
SW8270C	4-Chloroaniline	106-47-8	µg/kg	--	--	--	2,400	330	167	58
SW8270C	4-Chlorophenyl phenyl ether*	7005-72-3	µg/kg	--	--	--	--	330	167	93
SW8270C	4-Nitroaniline	100-01-6	µg/kg	--	--	--	24,000	1600	167	88
SW8270C	4-Nitrophenol*	100-02-7	µg/kg	--	--	--	--	2000	333	280
SW8270C	Acenaphthene	83-32-9	µg/kg	3,440,510	--	--	--	330	167	83
SW8270C	Acenaphthylene*	208-96-8	µg/kg	--	--	--	--	330	167	85
SW8270C	Anthracene	120-12-7	µg/kg	17,202,560	--	--	--	330	167	86
SW8270C	Acetophenone	17537-21-4	µg/kg	7,821,428	--	--	--	(a)	(a)	(a)
SW8270C	Azobenzene (as 1,2 diphenyl hydrazine)	103-33-3	µg/kg	6079	--	--	610	330	167	92
SW8270C	Atrazine	93515-39-9	µg/kg	--	--	--	2,100	(a)	(a)	(a)
SW8270C	Benzaldehyde	100-52-7	µg/kg	--	--	--	7,800,000	(a)	(a)	(a)
SW8270C	Benz(a)anthracene	56-55-3	µg/kg	1,476	--	--	--	330	167	92
SW8270C	Benzo(a)pyrene	50-32-8	µg/kg	147	--	--	--	330	167	94
SW8270C	Benzo(b)fluoranthene	205-99-2	µg/kg	1,476	--	--	--	330	167	95
SW8270C	Benzo(ghi)perylene*	191-24-2	µg/kg	--	--	--	--	330	167	110
SW8270C	Benzo(k)fluoranthene	207-08-9	µg/kg	14,762	--	--	--	330	167	113
SW8270C	bis(2-Chloroethoxy)methane	111-91-1	µg/kg	--	--	--	180,000	330	167	88
SW8270C	bis(2-Chloroethyl) ether	111-44-4	µg/kg	8	--	--	--	330	167	81
SW8270C	bis(2-Ethylhexyl) phthalate	117-81-7	µg/kg	347,387	--	--	--	330	167	98
SW8270C	Butyl benzyl phthalate	85-68-7	µg/kg	--	--	--	260,000	330	167	95
SW8270C	Carbazole*	86-74-8	µg/kg	--	--	--	--	330	167	95
SW8270C	Caprolactam	105-60-2	µg/kg	--	--	--	31,000,000	(a)	(a)	(a)
SW8270C	Chrysene	218-01-9	µg/kg	148,629	--	--	--	330	167	84
SW8270C	Dibenz(a,h)anthracene	53-70-3	µg/kg	147	--	--	--	330	167	102
SW8270C	Dibenzofuran	132-64-9	µg/kg	--	--	--	78,000	330	167	86
SW8270C	Diethyl phthalate	84-66-2	µg/kg	48,883,929	--	--	--	330	167	90
SW8270C	Dimethyl phthalate	131-11-3	µg/kg	611,049,107	--	--	--	330	167	87
SW8270C	Di-n-butyl phthalate	84-74-2	µg/kg	6,110,491	--	--	--	330	167	97
SW8270C	Di-n-octyl phthalate*	117-84-0	µg/kg	--	--	--	--	330	167	97
SW8270C	Fluoranthene	206-44-0	µg/kg	2,293,674	--	--	--	330	167	95
SW8270C	Fluorene	86-73-7	µg/kg	2,293,674	--	--	--	330	167	92
SW8270C	Hexachlorobenzene	118-74-1	µg/kg	3,040	--	--	--	330	167	89
SW8270C	Hexachlorobutadiene	87-68-3	µg/kg	--	--	--	--	330	167	82
SW8270C	Hexachloroethane	67-72-1	µg/kg	42,773	--	--	--	330	167	81
SW8270C	Hexachlorocyclopentadiene	77-47-4	µg/kg	366,000	--	--	--	1600	250	62
SW8270C	Indeno(1,2,3-cd)pyrene	193-39-5	µg/kg	1,476	--	--	--	330	167	96
SW8270C	Isophorone	78-59-1	µg/kg	5,119,394	--	--	--	330	167	93
SW8270C	Naphthalene	91-20-3	µg/kg	42,976	--	--	--	330	167	82
SW8270C	Nitrobenzene	98-95-3	µg/kg	53,500	--	--	--	330	167	76
SW8270C	N-Nitrosodimethylamine	62-75-9	µg/kg	22.5	--	--	--	330	167	96
SW8270C	N-Nitrosodi-n-propylamine	621-64-7	µg/kg	--	--	--	69	330	167	84
SW8270C	N-Nitrosodiphenylamine	86-30-6	µg/kg	992,516	--	--	--	330	167	86
SW8270C	Pentachlorophenol	87-86-5	µg/kg	8,935	--	--	--	330	167	51
SW8270C	2,4,6-Tribromophenol		%	--	--	--	--	--	--	--
SW8270C	2-Flourophenol		%	--	--	--	--	--	--	--
SW8270C	Nitrobenzene-d5		%	--	--	--	--	--	--	--

Table H-3
Comparison of Reporting Levels to Screening Objectives in Soil, Open Burn Unit at Kirtland Air Force Base, New Mexico

Method	Analyte	CAS #	Units	New Mexico Residential SSG (Feb 2012)	Coyote Test Field Super Group Background Values (surface soil)	Coyote Test Field Super Group Background Values (subsurface soil)	EPA Regional Screening Levels, Residential (Nov 2012)	LOQ	LOD	DL
SW8290	2,3,7,8-TCDF*	51207-31-9	pg/g	449	--	--	--	1	0.15	EDL
SW8290	2,3,7,8-TCDD	1746-01-6	pg/g	44.9	--	--	--	1	0.15	EDL
SW8290	1,2,3,7,8-PeCDF*	57117-41-6	pg/g	--	--	--	--	5	0.75	EDL
SW8290	2,3,4,7,8-PeCDF*	57117-31-4	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,7,8-PeCDD*	40321-76-4	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,7,8-HxCDF*	70648-26-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,6,7,8-HxCDF*	57117-44-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	2,3,4,6,7,8-HxCDF*	60851-34-5	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,7,8,9-HxCDF*	72918-21-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,7,8-HxCDD*	39227-28-6	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,6,7,8-HxCDD*	57653-85-7	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,7,8,9-HxCDD*	19408-74-3	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,6,7,8-HpCDF*	67562-39-4	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,7,8,9-HpCDF*	55673-89-7	pg/g	--	--	--	--	5	0.75	EDL
SW8290	1,2,3,4,6,7,8-HpCDD*	35822-46-9	pg/g	--	--	--	--	5	0.75	EDL
SW8290	OCDF*	39001-02-0	pg/g	--	--	--	--	10	1.5	EDL
SW8290	OCDD*	3268-87-9	pg/g	--	--	--	--	10	1.5	EDL
SW8330B	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	mg/kg	3,911	--	--	--	0.25	0.05	0.012
SW8330B	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	mg/kg	58.2	--	--	--	0.25	0.05	0.012
SW8330B	1,3,5-Trinitrobenzene (1,3,5-TNB)	99-35-4	mg/kg	--	--	--	2,200,000	0.25	0.05	0.01
SW8330B	1,3-Dinitrobenzene (1,3-DNB)	99-65-0	mg/kg	--	--	--	6,100	0.25	0.05	0.0042
SW8330B	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	479-45-8	mg/kg	244	--	--	--	0.25	0.05	0.01
SW8330B	Nitrobenzene (NB)	98-95-3	mg/kg	53.5	--	--	--	0.25	0.05	0.0176
SW8330B	2,4,6-Trinitrotoluene (2,4,6-TNT)	118-96-7	mg/kg	39.1	--	--	--	0.25	0.05	0.0194
SW8330B	4-Amino-2,6-dinitrotoluene (4-Am-DNT)	19406-51-0	mg/kg	--	--	--	150,000	0.25	0.05	0.01
SW8330B	2-Amino-4,6-dinitrotoluene (2-Am-DNT)	35572-78-2	mg/kg	--	--	--	150,000	0.25	0.05	0.0125
SW8330B	2,4-Dinitrotoluene (2,4-DNT)	121-14-2	mg/kg	7.15	--	--	--	0.25	0.05	0.0053
SW8330B	2-Nitrotoluene (2-NT)	88-72-2	mg/kg	29.1	--	--	--	0.5	0.05	0.013
SW8330B	3-Nitrotoluene (3-NT)	99-08-1	mg/kg	7.8	--	--	--	0.25	0.05	0.0155
SW8330B	4-Nitrotoluene (4-NT)	99-99-0	mg/kg	244	--	--	--	0.25	0.05	0.0182
SW8330B	Nitroglycerin	55-63-0	mg/kg	6.11	--	--	--	0.5	0.25	0.015
SW8330B	PETN	78-11-5	mg/kg	--	--	--	120,000	0.5	0.25	0.025
SW8330B	3,4-Dinitrotoluene (Surrogate)	610-39-9	%	--	--	--	--	--	--	--

The laboratory does not analyze for these compounds. The compounds will be tentatively identified based on a computer library search of the sample chromotography.
If found, the coumpound concentration will be reported as an estimated value.
The detection limit exceeds most stringent criteria.

Constituents with "%" units are surrogates and are not a part of the target analytes.
* Risk based screening levels will be calculated if analyte is detected and toxicological information is available
DL - Detection limit
LOD - Limit of detection
LOQ - Limit of quantitation
µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
pg/g - picograms per gram
RPD - relative percent difference
RSD - relative standard deviation for multi-incremental sample collection
SSG - soil screening goal

V:\Kirtland_AFB\GIS\MapFiles\Figure H-3 - Proposed GW Monitoring Well Locations.mxd

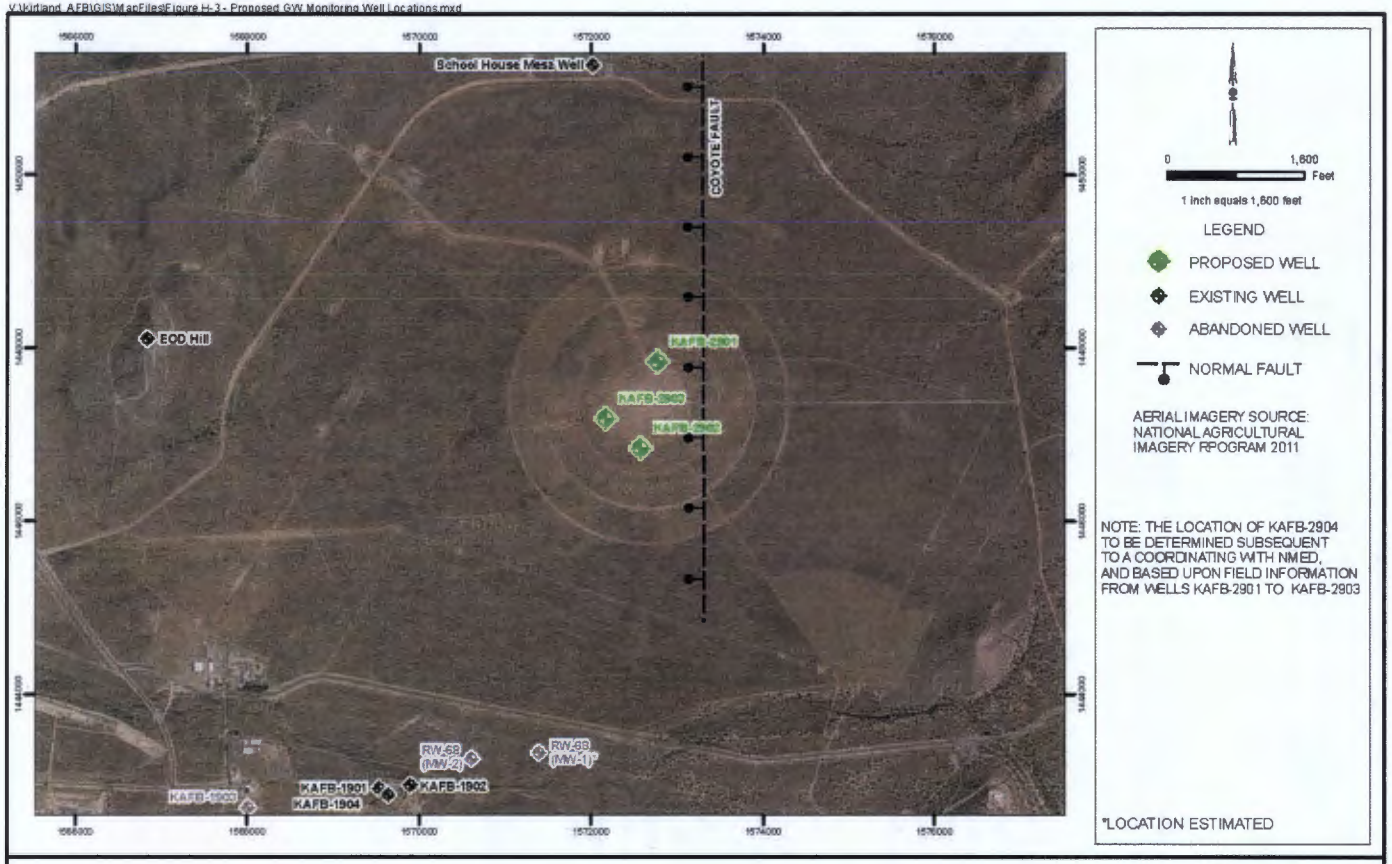

FIGURE H-3
PROPOSED GROUNDWATER MONITORING WELL LOCATIONS
FOR THE OPEN DETONATION UNIT
KIRTLAND AIR FORCE BASE, NEW MEXICO

~~This work plan was prepared as part of the U.S. Air Force (USAF) Environmental Restoration Program (ERP) under contract number W912DR-09-D-004, Delivery Order DM04, in accordance with the U.S. Army Corps of Engineers (USACE) Performance Work Statement dated 29 July 2011. This work plan has been revised to address NMED comments on the October 2010 Closure Plan for the Open Detonation Unit (USAF, 2010).~~

~~Site Description~~

~~The Open Burn (OB) and OD units are located within the EOD Range at Kirtland AFB. The EOD Range is located in the southeast portion of Kirtland AFB, east of Lovelace Road and south of the former Manzano Base. Figure 1 shows the location of the EOD Range at Kirtland AFB and the collocated OD and OB units within the EOD Range.~~

~~The OD unit consists of a cleared circular area approximately 1,500 ft in diameter and surrounded by an approximately 2-ft-high earthen berm. Detonations were conducted in pits approximately 30 ft long, 15 ft wide, and 12 ft deep within this area. The OD unit was permitted on 20 December 1994 as Permit Number NM9570024423-OD, which allowed 100,000 pounds of net explosive weight to be treated at the OD unit annually. Rocket motors, large caliber munitions, explosive wastes, and firearms were treated at the OD unit. Operations at the OD unit ceased in August 2010.~~

~~The OB unit is collocated with the OD unit and consists of a steel container on a reinforced concrete slab foundation, surrounded by concrete walls on three sides. The 8-inch-thick concrete slab is 30.5 ft long by 10.5 ft wide, and the 1-ft-thick concrete walls are 21.5 ft long, 10.5 ft wide, and 9 ft high. The northern portion of the reinforced concrete pad is level, and a 2-ft-wide by approximately 6-inch-high containment hump is location at the southern extent of the level portion of the pad to prevent run-on to or runoff from the concrete pad. The remaining portion of the concrete slab is sloped gently to the south, which allowed vehicular access to unload wastes for treatment at the OB unit. On the northwest side of the OB unit is a soil berm, measuring approximately 15 ft high and 40 ft long, which protected the unit from shock waves resulting from detonations at the collocated OD unit.~~

~~The steel container has a capacity of approximately 12 cubic yards. It is approximately 11 ft long with an inner height of 4.3 ft and an overall height of 5.25 ft. A heavy steel door is located at one end of the container to facilitate placement of wastes and removal of treatment residues. The OB unit has retractable, galvanized steel cover which covered the unit during nonoperational periods. The cover is slightly inclined to prevent precipitation from entering the unit. The last treatment event conducted at the OB unit was in May 2008.~~

2.1.1.1 Hydrogeologic Setting

The EOD Range is located within the Tijeras fault complex hydrogeologic region at Kirtland AFB (Sandia National Laboratories/New Mexico [SNL/NM], 2011a). The Sandia, Hubbel Springs, and Tijeras faults converge in this area and define eastern edge of the Albuquerque Basin. Within the Tijeras fault complex, a thin layer of alluvium covers bedrock. The hydrogeology in this area is poorly understood due to the complex geology created by the fault systems. On the eastern side of the Tijeras fault complex, the depth to groundwater ranges from about 45 to 325 ft bgs. Most of the monitoring wells in this area are completed in fractured bedrock at relatively shallow depths and produce modest yields of groundwater.

The nearest existing wells to the proposed monitoring well locations include the School House Well approximately 3,500 ft north-northwest of the OD unit; the EOD Hill Well approximately 4,300 ft west-northwest of the OD unit; three wells at Lake Christian (Kirtland AFB Solid Waste Management Unit [SWMU] 6-22), roughly 5,500 ft southeast of the OD unit; and three monitoring wells installed at the Old Burn Site (SNL SWMU 68), approximately 7,000 ft south of the OD unit. Nearby former monitoring well locations include two wells at the Radium Dump/Slag Piles (Kirtland AFB SWMU RW-68); approximately 4,500 ft south-southeast of the OD unit; and one well at Lake Christian (Kirtland AFB SWMU 6-22), roughly 5,500 ft southeast of the OD unit. The existing and former well locations are shown in Figure H~~3~~-4.

All of the nearby wells are completed in water bearing zones of the Paleozoic sedimentary rocks of the Madera Group or Sandia Formation or the underlying Precambrian granite. The available borehole logs and well completion diagrams from the surrounding wells and former well locations indicate that the uppermost groundwater occurs under confined conditions.

The groundwater flow direction in the vicinity of the EOD Range is not well defined and is assumed to mirror the topographic gradient of the land surface. There are several north-south trending faults mapped along the Sandia/Manzanita/Manzano Mountain range front. In the vicinity of the OD unit, one normal fault crosses along the eastern edge of the EOD range, identified as the Coyote Fault in Figure ~~3~~H-4. This fault was encountered during drilling boreholes at the Old Burn Site (SNL SWMU 68), located south of the OD unit (SNL/NM, 2011b). This fault location is important to the OD unit investigation because it likely influences the groundwater flow across the site from east to west and may act as a hydraulic barrier. Comparison of water levels in the upgradient well and the downgradient wells ~~will~~shall provide data on the possible influence the fault has on local groundwater flow. The majority of the EOD Range is located west of the inferred location of the fault. The triangular configuration of the proposed downgradient monitoring wells and the measured groundwater elevations in the wells ~~will~~shall be used to calculate the groundwater flow direction and hydraulic gradient in the uppermost groundwater aquifer across the majority of the site.

The depth to the uppermost water bearing zones at the proposed well locations is expected to range from approximately 100 to 200 ft bgs. The horizontal groundwater flow velocity is estimated to be on the order of 50 to 100 ft/year. Based on a history of at least 40 or more years of activities in the EOD Range area, potential contaminant impacts in groundwater could be expected to have traveled roughly 2,000 to 4,000 ft downgradient based on those flow velocity estimates.

The three proposed well locations were selected in consultation with the ~~NMED-HWB~~Department (Figure H-3). One presumed upgradient and two presumed downgradient locations were selected for installation of the wells. Location of the fourth well ~~will~~shall be determined in consultation with the ~~NMED-HWB~~Department following installation of the three proposed wells based on gradient and flow direction.

FIGURE H-4
AREA FEATURES AND WELL LOCATIONS
MONITORING WELL INSTALLATION WORK PLAN FOR THE OPEN BURN AND OPEN DETONATION UNITS
KIRTLAND AIR FORCE BASE, NEW MEXICO

2.1.1.2 Investigation Activities

Well installation activities ~~will~~shall be conducted in accordance with the *Kirtland Air Force Base, Base-Wide Plans for the Environmental Restoration Program, 2004 Update* (USAF, 2004) and with the ~~*Resource Conservation and Recovery Act* (~~RCRA~~)~~ Permit ~~(NMED, 2010)~~. The procedures in Section 3.5 of the RCRA Permit, as well as procedures of the Base-Wide Plans, Standard Operating Procedure (SOP) B1.3: Monitoring Well Installation, ~~will~~shall be adhered to for this project, unless they are specifically modified by this ~~work~~closure plan.

2.1.1.3 Mobilization

The schedule of events for the investigation activities ~~will~~shall commence by drilling and installing three groundwater monitoring wells as shown in Figure H-3~~2~~. Following well installations, the gradient and flow direction ~~will~~shall be established within the investigation area. ~~CH2M HILL personnel~~ The Permitee ~~will~~shall then meet with ~~NMED HWB~~Department to determine the appropriate location of the fourth groundwater monitoring well. The fourth monitoring well, KAFB-2904, ~~will~~shall be installed and followed directly by the first groundwater monitoring event for the new wells. Quarterly groundwater monitoring ~~will~~shall be conducted according to this ~~work~~closure plan. At the conclusion of the investigation and four quarters of monitoring activities, ~~CH2M HILL~~the Permitee ~~will~~shall provide a report with recommendations based on the data collected from the first four quarters of monitoring.

An exploratory well application permit ~~(Attachment)~~ for each well ~~will~~shall be filed with the New Mexico Office of the State Engineer (NMOSE) in accordance with the Rules and Regulations Governing Well Driller Licensing; Construction, Repair and Plugging of Wells (NMOSE, 2005). The Bernalillo County well installation regulations are not applicable to wells installed on Kirtland AFB. All well locations ~~will~~shall be cleared by Unexploded Ordnance (UXO) support personnel prior to mobilization of drilling activities. An environmental impact analysis ~~will~~shall be performed through the Base Civil Engineering and Natural Resources Request (AF Form 813). A utility clearance of the area ~~will~~shall be performed using Base Civil Engineering Clearance Requests (AF IMT 103), Base Civil Engineer Work Requests (AF IMT 332), and New Mexico One Call services. A surface disturbance permit ~~will~~shall not be required because the total disturbed area of the wells is less than 1 acre.

2.1.1.4 Drilling Method and Sequence

The boreholes ~~will~~shall be installed using air-rotary casing hammer (ARCH) drilling method. This method has been successfully used for the installation of nearby monitoring wells and should facilitate lithologic description of drill cuttings and allow for the observation of soil/bedrock moisture content for identification of groundwater zones. The ARCH drilling method ~~will~~shall be used to advance the boring through the vadose zone and anchor the drive casing in the underlying bedrock.

The specific depths ~~will~~shall be determined in the field based on site conditions such as lithology and presence of groundwater. The following sequence of drilling is anticipated based on known hydrogeologic conditions and drill method capabilities:

1. Initiate boring with the ARCH method using an 8½-inch tri-cone bit and 9-5/8-inch diameter drive casing. Advance the drive casing to the depth of the contact between the alluvium and underlying bedrock.

2. Set the drive casing in the bedrock and continue drilling the borehole using an open hole drilling technique. If dense bedrock conditions are encountered in the boring, a change from a tri-cone bit to a down hole hammer bit may be required.

3. Advance the boring into the uppermost water bearing unit. Complete the borehole approximately 25 ft into the water bearing unit.

During the ARCH drilling activities, the field staff ~~will~~shall monitor for the presence of groundwater by visually inspecting drill cuttings for moisture. If the cuttings become wet, the borehole ~~will~~shall be allowed to sit idle for approximately one hour. A water level probe ~~will~~shall then be lowered into the borehole to assess whether groundwater has accumulated and this information ~~will~~shall be documented on the field log.

Field screening of the soil cuttings for the presence of volatile organic compounds (VOCs) ~~will~~shall be conducted during the drilling process using a portable photo ionization detector (PID) as described in Base-Wide Plans, Appendix B, SOP B3.1: Photo-ionization Detectors and Organic Vapor Analyzers (USAF, 2004). As the boreholes are advanced, the field geologist ~~will~~shall continuously collect soil cuttings to aid in the preparation of lithologic logs. The monitoring well lithologic log ~~will~~shall be completed as described in Base-Wide Plans, Appendix B SOP B1.1: Borehole and Sample Logging. Drill cuttings from ARCH method drilling ~~will~~shall be stored at the well site on plastic sheeting or in roll-off containers and managed as investigation-derived waste (IDW).

Groundwater purged from the boring during borehole advancement and sampling ~~will~~shall be allowed to settle in roll-off bins then transferred to holding tank(s). These plastic holding tanks ~~will~~shall be managed as IDW along with decontamination and well development fluids.

Decontamination of the drill rig, drill tools, sampling equipment, and associated equipment ~~will~~shall be accomplished by steam cleaning prior to drilling each well. Decontamination activities ~~will~~shall be conducted at a central location with water obtained from an approved onsite source. Decontamination fluids ~~will~~shall be contained in polyethylene tanks and managed as IDW.

2.1.1.5 Subsurface Soil Sampling

Soil and rock sampling ~~will~~shall be performed for lithologic description. Subsurface soil laboratory analysis is not proposed as part of this investigation. No soil or rock samples ~~will~~shall be submitted for laboratory analysis.

2.1.1.6 Monitoring Well Construction

Monitoring wells ~~will~~shall be designed and constructed based on the lithology and groundwater elevations encountered at each proposed well location. The well construction details may be subject to change based on the observed field conditions, but procedures and methods ~~will~~shall comply with Section 3.5 of the RCRA Permit and the OSE criteria. The anticipated well constructions details are shown in Figure H-54. The proposed monitoring well design includes the use of 4-inch-inside diameter (ID), Schedule 80 polyvinyl chloride (PVC) casing with a 5-ft well sump, 20-ft of 0.020-inch slot size well screen, and approximately 2 to 3 ft of stickup at the surface. Centralizers ~~will~~shall be used to stabilize the well casing within the borehole at the top and bottom of the screen interval and at a minimum spacing of 40 ft on casing above the top of the well screen.

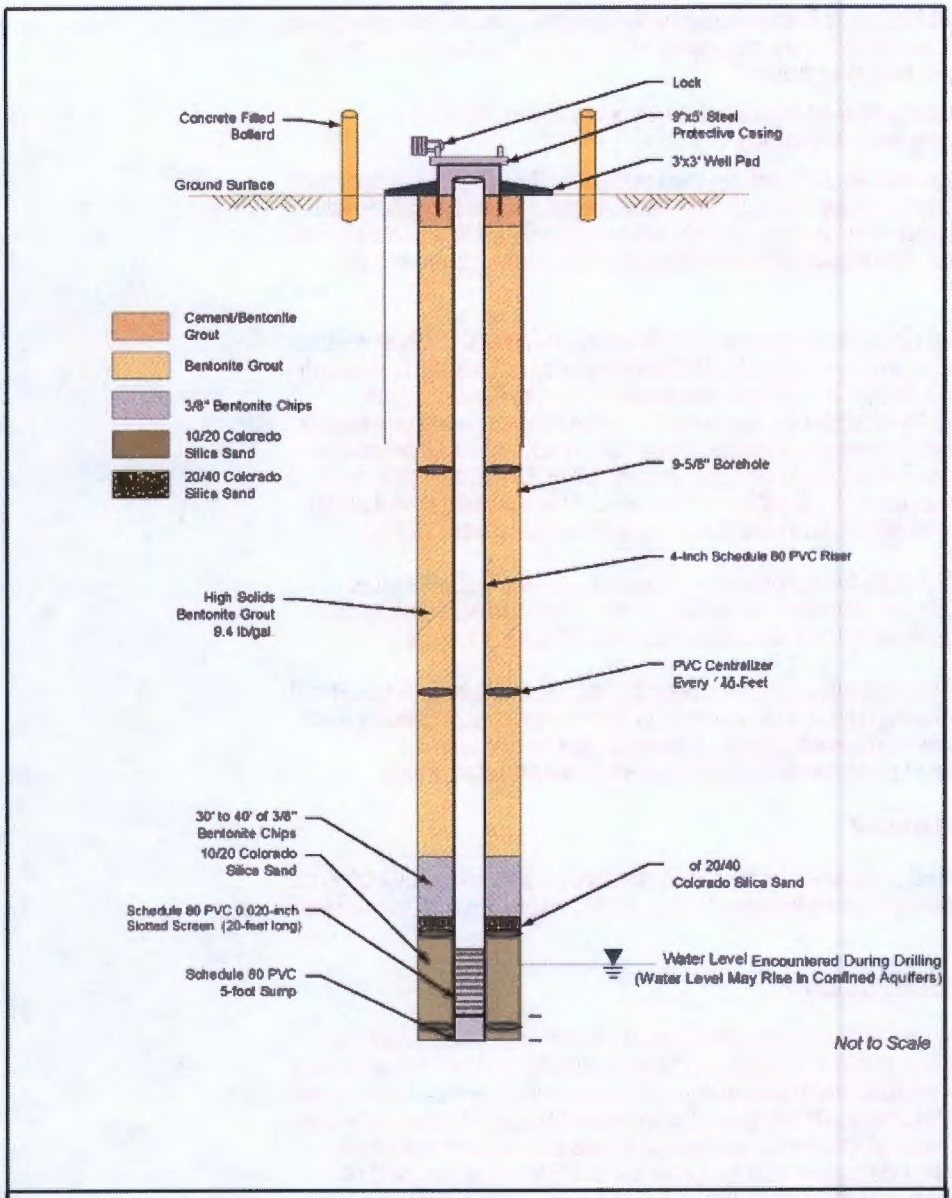

FIGURE H-5
PROPOSED MONITORING WELL DESIGN
MONITORING WELL INSTALLATION WORK PLAN
FOR THE OPEN BURN AND OPEN DETONATION UNITS
KIRTLAND AIR FORCE BASE, NEW MEXICO

Wells ~~will~~shall be completed as follows:

- The sand filter pack type ~~will~~shall be determined based on field observations and ~~will~~shall extend from the bottom of the silt trap to 5 ft above the top of the screen. However, it is anticipated that a filter pack of 10-20 gradation Colorado Silica Sand ~~will~~shall be used in the construction of the monitoring wells. The filter pack sand ~~will~~shall be placed through a tremie pipe. Approximately 2 ft of barrier sand, 100 percent passing an American Society for Testing and Materials (ASTM) U.S. Standard Sieve No. 60, ~~will~~shall be placed above the filter pack to inhibit flow of grout into the filter pack.

- A minimum of 10 ft of bentonite chips or pellets ~~will~~shall be installed above the filter pack through a tremie pipe. The seal ~~will~~shall be hydrated with clean potable water in 6-inch lifts. Setup time for the bentonite ~~will~~shall be at the discretion of the field geologist.

- The annular space above the hydrated bentonite seal ~~will~~shall be backfilled with bentonite slurry. Bentonite slurries are effective in sealing off groundwater units above the screened and sand-packed intervals of a well and are less likely to damage the well casing than bentonite-cement grout. The bentonite slurry ~~will~~shall be installed through a tremie pipe. The bentonite slurry ~~will~~shall extend from the bentonite pellet seal to approximately 50 ft bgs.

- The remaining 50 ft of annular space ~~will~~shall be filled with bentonite-cement grout consisting of 94 pounds of Portland cement, 3 percent by weight sodium bentonite powder, and 7 gallons of contaminant-free water. The bentonite-cement grout ~~will~~shall be placed using a grout pump and tremie pipe to within 5 ft of the land surface. The grout ~~will~~shall be allowed to set for at least 24 hours before well development begins.

- The monitoring wells ~~will~~shall be completed at the surface in accordance with ~~Kirtland AFB~~ specifications as presented in SOP B1.3 of the *Base-Wide Plans, Field Sampling Plan* (FSP) (USAF, 2004). The surface completion ~~will~~shall consist of a 5-foot-long, 9-inch-diameter steel stand pipe with locking cap cemented into a 3-foot-square concrete well pad. Four concrete-filled steel bollards ~~will~~shall be installed at the corners of the well pad to protect the well from vehicle damage.

- At the conclusion of the project, when wells KAFB-2901, KAFB-2902, KAFB-2903, and KAFB-2904 are no longer needed, the wells ~~will~~shall be properly abandoned in compliance with *Rules and Regulations Governing Well Driller Licensing; Construction, Repair and Plugging of Wells* (NMOSE, 2005).

2.1.1.7 Well Development ~~and Sampling~~

Monitoring wells ~~will~~shall be developed using a variety of techniques including swabbing, surging, bailing, air lifting and pumping. Monitoring well development ~~will~~shall adhere to procedures outlined in Base-Wide Plans, Appendix B, SOP B1.4: Monitoring Well Development (USAF, 2004). Monitoring well development ~~will~~shall be performed within one week after well installation but no sooner than 24 hours after grout installation. Groundwater discharged from the wells ~~will~~shall be monitored for pH, temperature, specific conductance, dissolved oxygen, oxidation-reduction (redox) potential, and turbidity. Each monitoring well screen ~~will~~shall be developed until pH and specific conductance stabilize and the water appears substantially free of sediment. The development goal is to reduce the turbidity to less than 10 nephelometric turbidity

units (NTUs) and a less than 10 percent variance in the other parameters observed in the final three readings. However, a final turbidity of less than 100 NTUs is acceptable. If the field parameters have not stabilized after 4 hours of continuous pumping, the well ~~will~~shall be allowed to sit overnight and development ~~will~~shall continue the following day for a maximum of 2 hours. If the turbidity still does not fall below 100 NTUs, the ~~USACE Project Manager~~Permitee ~~will~~shall ~~be contacted and~~seek further direction ~~will be sought~~from the Department.

Proposed monitoring wells KAFB-2901, KAFB-2902, and KAFB-2903 ~~will~~shall be developed and surveyed subsequent to installation. A static groundwater elevation from each surveyed and developed well ~~will~~shall be measured and used to determine the groundwater gradient and flow direction across the OD unit area. This information ~~will~~shall be used to determine the location and design of KAFB-2904.

2.1.1.8 Well Survey

A New Mexico licensed professional surveyor ~~will~~shall survey the horizontal well locations relative to New Mexico State Plane Coordinates and the vertical elevations to the nearest one-hundredth of 1 ft for the newly installed monitoring wells. Surveying ~~will~~shall be conducted in accordance with SOP B1.9 of the Base-Wide Plans FSP (USAF, 2004).

2.1.1.9 Groundwater Gradient Calculations

Depth to water measurements for static conditions ~~will~~shall be collected from monitoring wells KAFB-2901, KAFB-2902, and KAFB-2903 subsequent to well development. These measurements ~~will~~shall be converted to groundwater elevation data using well survey data. These elevations ~~will~~shall be mapped, and gradients ~~will~~shall be calculated perpendicular to the equipotential groundwater contours. The direction and magnitude of groundwater gradients ~~will~~shall provide information that ~~will~~shall be used to propose optimum locations for monitoring well KAFB-2904. ~~Kirtland AFB and CH2MHILL~~The permitee ~~will~~shall consult with the ~~NMED-HWB~~Department to determine the final location of KAFB-2904. Groundwater elevations may also be collected from comparable aquifer units from nearby monitoring wells. The previously installed wells surrounding the investigation area include KAFB-1901, KAFB-1902, KAFB-1904, EOD Hill Well, and School House Mesa Well.

2.1.2 Groundwater Sampling and Analysis Plan

Groundwater monitoring ~~will~~shall be performed subsequent to well development at a quarterly frequency for up to eight quarters. Groundwater elevations ~~will~~shall be measured in each well prior to sampling. Groundwater elevations ~~will~~shall be used to determine groundwater flow rate and gradient on a quarterly basis. Well purging methods ~~will~~shall comply with the RCRA Permit Section 6.5.17.4 and groundwater samples ~~will~~shall be analyzed for VOCs, semivolatile organic compounds (SVOCs), explosives, perchlorate, white phosphorus, target analyte list metals, dioxins, and furans, total dissolved solids, alkalinity, anions, cations, and total organic carbon (Table H-4). Data ~~will~~shall be of sufficient precision and quality to meet data quality objectives and to ensure that method detection limits are less than cleanup levels where technologically feasible.

Up to eight consecutive quarters of groundwater monitoring are currently planned at the four monitoring wells. If groundwater contamination from the operation of the OD unit is not detected in the monitoring wells, they ~~will~~shall be properly plugged and abandoned in accordance with

NMOSE regulations and ~~NMED~~Department guidance. If groundwater contamination from the operation of the OD unit is identified, the monitoring wells ~~will~~shall be maintained for the purpose of monitoring corrective action.

Table H-4
~~-~~Groundwater Monitoring Parameters and Testing Methods
for the Groundwater Investigation of the OD Unit

Analysis	Method	Testing Location	Data Use
Groundwater elevation	Groundwater probe	Field	Groundwater flow direction
pH	pH probe	Field, flow-through cell	General groundwater parameter
Temperature	Digital-thermometer	Field, flow-through cell	General groundwater parameter
Specific conductance	Conductivity meter	Field, flow-through cell	General groundwater parameter
Dissolved oxygen	Dissolved oxygen probe	Field, flow-through cell	Assess aerobic or anaerobic conditions
Oxidation-reduction potential	EH (hydrogen electrode) meter	Field, flow-through cell	Assess conditions for natural attenuation of contaminants
Turbidity	Turbidity meter	Field, flow-through cell	General groundwater parameter
Total dissolved solids	EPA 160.2[a]	Laboratory	General groundwater parameter
Alkalinity	EPA 310.2[a]	Laboratory	General groundwater parameter
Ammonia	EPA350.1[a]	Laboratory	General groundwater parameter
Sulfide	SW9030B[b]	Laboratory	General groundwater parameter
Anions (sulfate, nitrate, nitrite, chloride, bromide and fluoride)	SW9056[b]	Laboratory	General groundwater parameter
Total organic carbon	SW9060[b]	Laboratory	General groundwater parameter
Metals (barium, boron, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, lithium, magnesium, manganese, molybdenum, nickel, potassium, selenium, silver, sodium, strontium, tin, vanadium, zinc, antimony, arsenic, thallium, mercury)	SW6010B[b], SW6020A[b], SW7470A[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Perchlorate	SW6850[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Volatile organic compounds	SW8260B[b], SW8011[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Semivolatile organic compounds	SW8270C[b], SW8270-SIM[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Dioxins and furans	SW8290[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
Explosives	SW8330B[b]	Laboratory	Assess potential contamination from OB/OD Unit operations
White ~~phosphrorous~~phosphorous	SW7~~826~~580[b]	Laboratory	Assess potential contamination from OB/OD Unit operations

[a] EPA, 1993.
[b] EPA, 1996.
EPA – U.S. Environmental Protection Agency
OB/OD – Open Burn/Open Detonation

2.1.2.1 Well Purging and Field Measurements

Each monitoring well shall be purged by removing groundwater prior to sampling in order to ensure that fresh formation water is sampled. One to three well-bore volumes ~~will~~shall be purged from each well prior to sampling. A well-bore volume is defined as the volume of water in the saturated filter pack plus the volume of all standing water within the well screen and casing. Purge water ~~will~~shall be contained in polyethylene tanks for subsequent characterization and management as IDW. The following groundwater field parameters ~~will~~shall be measured during well purging: pH, specific conductance, dissolved oxygen concentration, turbidity, redox potential, and temperature. The volume of groundwater purged, the field parameter readings obtained at each time interval, and the instruments used to measure the field parameters shall be recorded on the field monitoring log. Water samples shall be obtained from a well only after the measured values of purge water field parameters have stabilized to within 10 percent for three consecutive measurements or once three well-bore volumes have been purged from the well.

Groundwater samples ~~will~~shall be collected using a pneumatic pump, a submersible electronic pump, or a bailer within eight hours of the completion of well purging. Groundwater in monitoring wells with low recharge rates and that purge dry ~~will~~shall be sampled when the water level in the well has recovered sufficiently to collect the required sample volume. Sampling handling, preservation, and storage shall comply with the RCRA permit requirements of Table H-5. ~~Sample handling, preservation, and storage will comply with the RCRA Permit requirements of Table H-6.~~

2.1.2.2 Laboratory Analysis and Quality Control/Quality Assurance Procedures

Groundwater samples ~~will~~shall be collected from each monitoring well and analyzed for VOCs, SVOCs, explosives, perchlorate, white phosphorus, target analyte list metals, dioxins, and furans, total dissolved solids, alkalinity, anions, cations, and total organic carbon (Table H-4). The proposed suite of parameters and analyses for the groundwater samples is presented in Table ~~2-1~~H-2. The contacted laboratory must meet DoD certification requirements. To ensure that data is of sufficient precision, laboratory method detection limits ~~will~~shall be those shown in the approved OD Unit Closure Plan. To ensure that analytical data is of sufficient quality and that laboratory and field methods are assured of proper quality field quality control samples ~~will~~shall be collected in compliance with the approved OD Unit Closure Plan. Level 4 laboratory data ~~will~~shall be requested and validated by qualified chemists to meet criteria specified by the ~~NMED~~Department and the DoD.

Data reliability ~~will~~shall be ensured by documenting sample management so that analyses are traceable to specific areas of potential contamination and by following a quality assurance/quality control (QA/QC) program that mandates documentation of the precision and accuracy of laboratory analyses, as well as data representativeness, completeness, comparability, and sensitivity.

The QC samples to be collected include: field duplicate samples, trip blanks, and rinsate blanks ~~as discussed in the Open Detonation Unit Closure Plan~~. Sample designations ~~will~~shall follow the ~~Kirtland AFB~~ guidelines as outlined in Section 4.2.1 of the Base-Wide Plans, FSP (USAF, 2004). The well identification numbers assigned to the four new wells for this investigation are: KAFB-2901, KAFB-2902, KAFB-2903, and KAFB-2904. The proposed sample number scheme is presented in Table ~~2-2~~H-6.

Table H-5
Sample Containers, Preservation Techniques, and Holding Times for Soil and Groundwater Samples

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers	Preservation Requirements	Maximum Holding Time
Soil	Metals (including mercury)	SW6010B/ SW6020 and SW7471A	1 gram	250-ml glass or polyethylene	4±2 degrees Celsius (°C)	180 days from date of collection for metals; 28 days from collection to analysis for mercury
Soil	Volatile Organic Compounds (VOCs)	SW8260B/ SW5035	3 different 5-gram aliquots	6 40-milliliters (ml) volatile organic analysis (VOA) vials	Per sample collection: 2 VOA vials with 10-ml water and 1 VOA vial with 10-ml methanol. All vials contain a stir bar. Or 3 VOA vials containing stir bars will have a 5-gram sample aliquot added, seals and frozen on site with dry ice. Samples must remain frozen in shipment and storage at the lab until analysis.	Freeze within 48 hours of arrival at the lab, analyze within 14 days from data of collection Analyze within 14 days from data of collection
Soil	Semivolatile Organic Compounds (SVOCs)	SW8270C	30 grams	250-ml glass	4±2°C	14 days from date of collection to extraction and 40 days from extraction to analysis
Soil	Perchlorate	SW6850	30 grams	250-ml glass	4±2°C	28days
Soil	Explosives	SW8330B	10 grams	250-ml glass	4±2°C	14 days from date of collection to extraction and 40 days from extraction to analysis
Soil	White Phosphorous	SW7580	40 grams	250-ml glass	4±2°C	30 days from date of collection to extraction and analysis
Soil	Dioxins/ Furans	SW8290	30 grams	250-ml glass	4±2°C	30 days from date of collection to extraction and 45 days from extraction to analysis
Groundwater	Dissolved metals (including mercury)	SW6010B/ 6020 and SW7470A	100-ml	1-liter polyethylene	pH < 2 with nitric acid; 4±2°C	28 days from date of collection for Hg, 180 days for others
Groundwater	VOCs	SW8260B	3 40-ml vials	3 40-ml VOA vials	No headspace; 4±2°C	7 days from data of collection
Groundwater	SVOCs	SW8270C	1 liter	2 1-liter amber glass	4±2°C	7 days from date of collection to extraction and 40 days from extraction to analysis
Groundwater	Explosives	SW8330B	1 liter	2 1-liter amber glass	4±2°C	7 days from date of collection to extraction and 40 days from extraction to analysis

Table H-5
Sample Containers, Preservation Techniques, and Holding Times for Soil and Groundwater Samples

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers	Preservation Requirements	Maximum Holding Time
Groundwater	Perchlorate	SW6850	1 liter	1- 250mL precleaned sterile, plastic containers	Field filtered with 1/3 volume headspace to remove and/or minimize microbial and anaerobic bacteria. Store at 4 ± 2 C	28 days
Groundwater	White Phosphorous	SW7580	120 ml	1-liter amber glass	4±2°C	5 days from date of collection to extraction and analysis
Groundwater	Dioxins/ Furans	SW8290	1 liter	2 1-liter amber glass	4±2°C	30 days from date of collection to extraction and 45 days from extraction to analysis
Groundwater	Anions (sulfate, nitrate, nitrite, chloride, bromide and fluoride)	SW9056	100-ml	1-liter polyethylene	4±2°C	28 days from date of collection for all anions except that nitrate and nitrite are 48 hours
Groundwater	Ammonia	E350.1	100-ml	250 ml Poly	4°C pH < 2 with H2SO4	28days
Groundwater	Alkalinity	EPA 310.2	100-ml	250 ml Poly	4°C (share with SW9056)	14 days
Groundwater	Total Organic Carbon	SW9060	100-ml	1-liter polyethylene	4°C pH < 2 with HCL	28 days
Groundwater	Sulfide	SW9030B	500-ml	1-liter polyethylene	4°C Zn acetate NaOH to pH > 9	7 days
Groundwater	Total dissolved solids	EPA 160.2	100-ml	250 ml Poly	4°C	7 days

°C – degrees Celsius
H2SO4S – glycine, sulfate
HCL – hydrochloric acid
mL – milliliters
NaOH – sodium hydroxide
pH – potential of hydrogen
SVOC – Semivolatile organic compound
VOA – volatile organic analysis
VOC – volatile organic compound
Zn – zinc

Table ~~2-2~~H-6
Proposed Groundwater Sample Identification for the Groundwater Investigation of the OD Unit

Sample Identifier[a]	Sample Type
OT29-GW-2901-_____	Normal
OT29-GW-2902-_____	Normal
OT29-GW-2903-_____	Normal
OT29-GW-2904-_____	Normal
OT29-FD-2901-_____	Duplicate
OT29-EB-2902-_____	~~Equipment~~Rinsate Blank
OT29-TB-2903-_____	Trip Blank[b]
OT29-MS-2904-_____	Matrix Spike
OT29-MSD-2904-_____	Matrix Spike Duplicate

[a] The six digit sample date ~~will~~shall make up the last portion of the sample identification number
[b] Trip Blanks ~~will~~shall only be analyzed for VOCs

2.1.2.3 ~~Investigation Derived Waste~~Groundwater Data Analysis

Groundwater laboratory analytical results shall be analyzed to determine if there is statistically significant evidence of contamination at each groundwater monitoring well after each sampling event. The groundwater results shall be analyzed by comparison to baseline constituent concentrations and applicable groundwater standards.

Baseline constituent concentrations for the aquifer shall be calculated using laboratory analytical results for groundwater monitoring well KAFB-2901 and other groundwater monitoring wells completed within the same aquifer unit and located nearby. Groundwater monitoring wells that could potentially be used in the baseline constituent concentration calculations include KAFB-1902, KAFB-1903, KAFB-1904, RW68-01, RW68-02, and groundwater monitoring wells sampled by Sandia National Laboratory/New Mexico. Analysis to determine which of the groundwater monitoring wells are completed within the same aquifer unit shall be completed following installation of monitoring well KAFB-2901.

Baseline constituent concentrations shall be calculated for detected naturally occurring compounds including ammonia, sulfide, anions, metals, and percholorate as listed in Table H-4. Anthropogenic compounds, including VOCs, SVOCs, explosives, dioxins and furans, are assumed to occur at levels less than detection limits. Baseline concentrations shall not be calculated for the anthropogenic compounds.

Baseline constituent concentrations shall be established by calculating a 95 percent upper tolerance limit (UTL) for each of the detected constituents listed above. The 95 percent UTLs shall be calculated following the methodology established as part of the Kirtland AFB Long-Term Monitoring Program (USAF, 2007). The purpose of the UTL approach is to define a constituent concentration from background well data, below which 95 percent of the monitoring well observations fall with a high degree of probability. Once the UTL is determined based on the background monitoring wells, data from downgradient site wells can be compared for evidence of a release by evaluating how the downgradient well results compare to the UTL. If the downgradient well results are greater than the UTL, there is statistical evidence that there has been an increase in the downgradient concentration of the constituent in groundwater. A detailed description of the process to determine baseline concentrations can be found in the *Long-Term Groundwater Monitoring Summary and Baseline Determination Report, Fiscal Year 2005* (USAF, 2007). ~~Soil cuttings recovered during drilling operations are expected to be nonhazardous, native material. The cuttings will be stockpiled on plastic sheet or in roll-off containers at each well site.~~

~~Upon completion of drilling activities, composite samples will be collected from the cuttings and analyzed for the full suite of toxicity characteristic leachate procedure (TCLP) parameters. The full suite of TCLP parameters includes analyses for VOCs, SVOCs, the eight RCRA-listed metals, pesticides, and herbicides along with reactivity, ignitability, and corrosivity. If the sample results indicate the cuttings are nonhazardous waste, the cuttings will be disposed of in the Kirtland AFB construction and demolition (C&D) landfill.~~

~~Decontamination will be conducted on a concrete pad constructed for that purpose (located near Pennsylvania Road, southeast of the Tijeras Arroyo Golf Course) or on plastic sheeting at the site. Wastewater from the equipment decontamination will be stored in plastic holding tanks along with purge water from well development activities and groundwater sampling. IDW water samples will be collected from the tanks and analyzed for VOCs, SVOCs, and RCRA-listed metals. The sample analytical results will be compared to the New Mexico Water Quality Control Commission standards and the Albuquerque Bernalillo County Water Utility Authority standards to determine the appropriate disposal option.~~

~~Site Safety and Health Plan~~

~~All environmental drilling and monitoring activities will be conducted in accordance with the SSHP prepared for the OD Closure Activities.~~

2.1.2.4 Reporting

One well completion report ~~will~~shall be prepared to document the drilling and well installation activities. No laboratory analytical data ~~will~~shall be presented in the well completion report. The well completion report ~~will~~shall be submitted to ~~NMED~~the Department for approval within ~~6~~30 days of the completion of well installation activities. The well installation report ~~will~~shall include the following information:

- Descriptions of the field program including the drilling, well installation, surveying, and IDW management activities;
- Field documentation including soil boring logs, well construction diagrams, well development logs, and survey data.

Field and laboratory data ~~will~~shall be submitted to the ~~NMED~~Department within 90 days after all samples are collected for each quarter.

Periodic groundwater monitoring reports ~~will~~shall be prepared to document quarterly groundwater monitoring results. All validated groundwater laboratory results ~~will~~shall be presented in periodic groundwater monitoring reports which comply with Section 6.2.4.4 of the RCRA Permit. Groundwater analytical results ~~will~~shall be compared to New Mexico water quality control standards and EPA maximum contaminant levels and secondary screening levels to determine if contamination above standards is present in the groundwater monitoring wells. Each quarter of analytical data ~~will~~shall be evaluated for the presence of potential contaminants. The Periodic Groundwater Monitoring Reports for the OD unit ~~will~~shall be prepared annually and following four quarters of groundwater monitoring and submitted within 90 days after the completion of the last quarterly monitoring event. Currently, up to eight consecutive quarters of groundwater monitoring and two Periodic Groundwater Monitoring Reports are planned.

2.1.2.5 Project Schedule

Table ~~2-H-3~~7 outlines the project schedule for the installation and sampling of groundwater monitoring wells. The monitoring well drilling and installation activities ~~will~~shall be conducted upon approval of the OD Unit Closure Plan ~~and this Monitoring Well Installation Plan~~. The well installation activities ~~will~~shall be documented in a Well Completion Report. Final validated groundwater analytical results from four quarters of groundwater sampling ~~will~~shall be reported in an Annual Groundwater Monitoring Report for the OD unit~~s~~.

Table ~~2-3~~H-7
Proposed Schedule of Activities for Groundwater Monitoring Well Installation for the Closure of the OD Unit

Activity	Duration (calendar days)	Start Date
~~Preparation of Plans~~		
~~Submit Well Installation work plan to NMED~~		~~First Quarter 2013~~
~~NMED Review of work plan~~	~~45~~	~~First Quarter 2013~~
~~Receipt of NMED comments on work plan~~		~~Second Quarter 2013~~
~~Prepare and submit revised work plan~~	~~30~~	~~Upon receipt of comments~~
Field Investigation		
Mobilize drilling equipment	3	15 days following ~~work plan~~Closure Plan
Well installation, development, and surveying collection of IDW soil and water samples	28	Following mobilization
IDW characterization~~,~~ and disposal	45	Following well installation
Preparation of Well Completion Report		
Initiate Well Completion Report Preparation	~~6~~30	Upon completion of all well drilling, development, and surveying activities
Submit Well Completion Report to USACE, USAF, and ~~NMED~~the Department	1	~~6~~30 days following well installation
Quarterly Groundwater Monitoring and Periodic Reporting		
Conduct quarterly groundwater monitoring	3	Following installation of four groundwater monitoring wells and on a quarterly basis
Submit field and laboratory data from monitoring event	1	90 days following collection of groundwater samples on a quarterly basis
Prepare Periodic Groundwater Monitoring Report	90	Following collection of four quarters of groundwater samples
Submit Periodic Groundwater Monitoring Report to ~~USACE, USAF, and NMED~~the Department	1	90 days following collection of fourth quarter groundwater samples

IDW – investigation-derived waste
USACE – United States Army Corps of Engineers
USAF – United States Air Force

~~2.1.2~~2.1.3 Mesa Schoolhouse Well

The Mesa Schoolhouse Well, a Department of Energy/National Nuclear Surety Administration (DOE/NNSA) well authorized under Kirtland AFB permit #PERM/0-K1-91-0010 was monitored for groundwater contamination as part of the December 1994 OD Unit's sampling and analysis plan. This sampling has been discontinued and the wellhead is secure. The well ~~will~~shall remain in place for possible future monitoring by DOE/NNSA

2.2 Sampling, Decontamination Procedures, and PPE

This section describes procedures and methods for soil and liquid sampling applicable to closure activities. While the procedures and methods are specific, other applicable procedures or methods given in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA, 1996; SW-846) may
be used if conditions or experience show the alternate method to be more appropriate, and if approved by the Department. All sampling procedures actually used shall be annotated in the final closure report. Sampling shall be conducted in accordance with procedures given in

"Samplers and Sampling Procedures for Hazardous Waste Streams" (EPA, 1980; EPA 600/2-80-018) or SW-846, as appropriate.

Surface and subsurface soil at the OD Unit shall be characterized by sampling and analysis.

The tools and equipment used during the sampling shall be vacuumed, cleaned with detergent and water, and scraped as necessary to remove any residue. The wash water shall be collected and analyzed for characterization of waste. The vacuums used and their contents shall be containerized and shipped off site as hazardous waste for disposal.

All of the PPE worn by personnel performing closure activities ~~will~~shall be disposable; therefore, all PPE shall be placed into containers and managed as hazardous waste. This waste shall be considered to be contaminated with all of the hazardous waste constituents contained in the wastes that have been treated at the OB Unit and the OD Unit. All contained PPE wastes shall be transported to a permitted facility for disposal.

2.2.1 Soil Sampling

Soil samples shall be conducted on a 25-ft by 25-ft grid spacing from the surface to 15 ft below ground surface at five ft intervals (total of four samples per location). At a minimum, the grid shall encompass all portions of the OD Unit that have hosted or may have hosted a pit used for the treatment of hazardous waste~~.~~ (Figure H-~~4~~6).

Surface soil samples ~~will~~shall be collected approximately 25 ft from the OB Unit. Three samples shall be collected from each side of the OB for a total of 12 surface soil samples. These samples ~~will~~shall characterize potential contamination from the OB Unit that may have migrated onto the OD Unit.

The soil samples shall be analyzed for the parameters listed in Table H-~~2~~3 which include all hazardous constituents of the hazardous wastes that were detonated at the OD Unit. Proposed sample identification numbers are shown in Table H-8.

Surface soil samples (zero to six inches depth) shall be collected with a wooden or Teflon™ trowel or scoop. Disposable sampling tools shall be used. In the event that the Department requests split samples, sufficient soils shall be collected to provide split samples to the Department representatives.

A Veihmeyer soil sampler, auger drill, direct push technology or other appropriate method shall be used to collect subsurface soil samples. Only discrete grab samples shall be collected; no samples shall be composited.

Clean sampling equipment shall be used to collect each sample. Unused, disposable sampling equipment may be presumed clean if still in a factory-sealed wrapper prior to use. Reusable sampling equipment shall be decontaminated after each use by scraping to remove any loose material, washing with a detergent and water solution, rinsing several times with tap water, rinsing with deionized water, and drained of excess water, and air-dried or wiped dry.

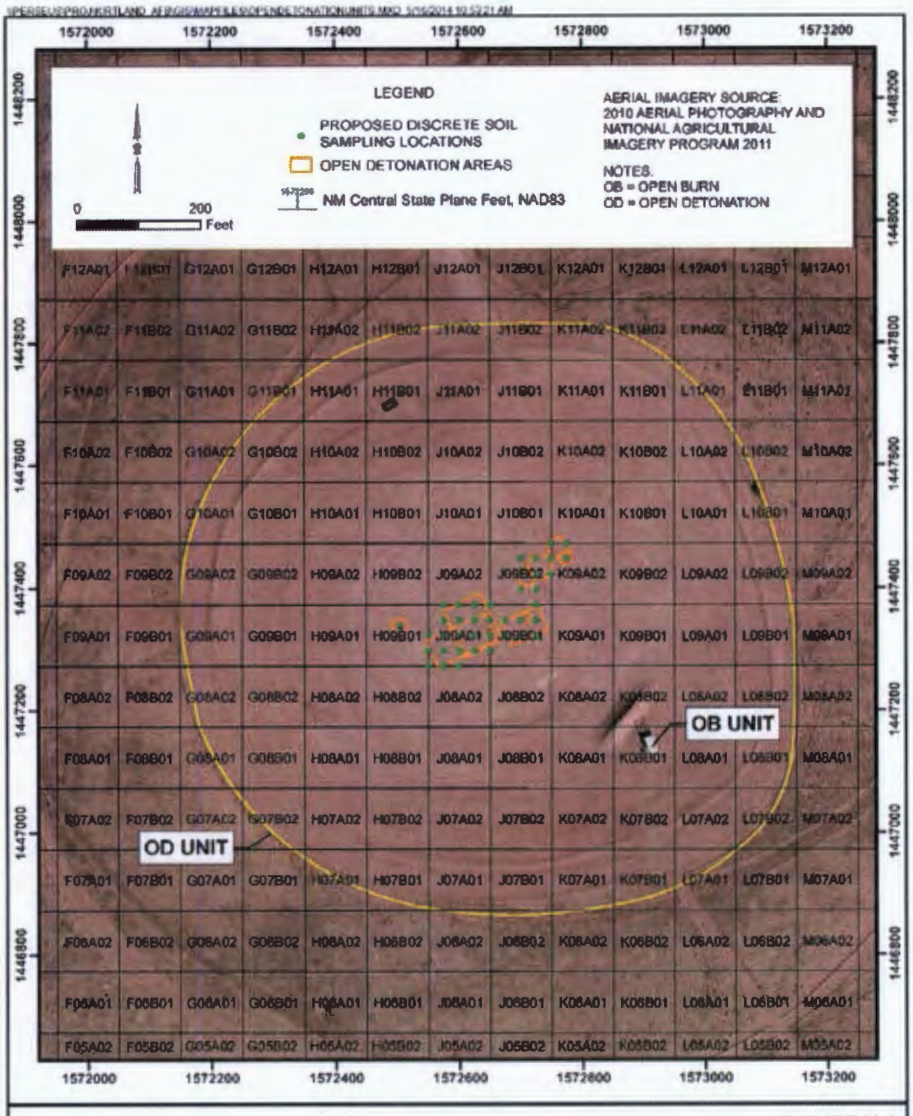

FIGURE H-6
PROPOSED DISCRETE SOIL SAMPLING LOCATIONS
OPEN DETONATION CLOSURE PLAN
KIRTLAND AIR FORCE BASE, NEW MEXICO

Table H-8
Proposed Discrete Soil Samples for the Open Detonation Unit, Kirtland Air Force Base, New Mexico

Soil Boring	Sample Identification	Depth (feet below ground surface)	Sample Type	**Metals** Methods SW-846 6010B, 6020A, 7471B	**VOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8260B	**SVOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8270C	**Total Explosives** (Per Table D-4 of RCRA Permit) Method SW-846 8330B	**Perchlorate** Method SW-846 6850	**White Phosphorous** Method SW-846 7580	**Dioxins** Method SW-846 8290
H09B1-01	OT29-SO-H09B1-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-H09B01-01-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-H09B01-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-H09B01-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-H09B01-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-01	OT29-SO-J09A1-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-02	OT29-SO-J09A1-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-03	OT29-SO-J09A1-03-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-03-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-03-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-03-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-03-1415	14 - 15	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-03-1415MS	14 - 15	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09A1-03-1415MSD	14 - 15	MS/MSD	X	X	X	X	X	X	X
J09A1-04	OT29-SO-J09A1-04-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-04-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-04-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-04-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-05	OT29-SO-J09A1-05-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09A1-05-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09A1-05-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-05-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-05-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-06	OT29-SO-J09A1-06-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-06-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-06-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-06-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-07	OT29-SO-J09A1-07-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-07-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-07-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-07-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-07-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-08	OT29-SO-J09A1-08-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-08-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-08-0405MS	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09A1-08-0405MSD	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09A1-08-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-08-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-09	OT29-SO-J09A1-09-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-09-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-09-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-09-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-10	OT29-SO-J09A1-10-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-10-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-10-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-10-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-11	OT29-SO-J09A1-11-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09A1-11-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09A1-11-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-11-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-11-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-12	OT29-SO-J09A1-12-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-12-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-12-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-12-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-13	OT29-SO-J09A1-13-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-13-0001MS	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09A1-13-0001MSD	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09A1-13-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-13-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-13-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-13-1415	14 - 15	Normal	X	X	X	X	X	X	X

Table H-8
Proposed Discrete Soil Samples for the Open Detonation Unit, Kirtland Air Force Base, New Mexico

Soil Boring	Sample Identification	Depth (feet below ground surface)	Sample Type	**Metals** Methods SW-846 6010B, 6020A, 7471B	**VOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8260B	**SVOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8270C	**Total Explosives** (Per Table D-4 of RCRA Permit) Method SW-846 8330B	**Perchlorate** Method SW-846 6850	**White Phosphorous** Method SW-846 7580	**Dioxins** Method SW-846 8290
J09A1-14	OT29-SO-J09A1-14-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-14-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-14-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-14-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-15	OT29-SO-J09A1-15-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09A1-15-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09A1-15-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-15-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-15-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-16	OT29-SO-J09A1-16-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-16-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-16-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-16-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-17	OT29-SO-J09A1-17-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-17-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-17-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-17-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-17-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-18	OT29-SO-J09A1-18-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-18-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-18-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-18-0910MS	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09A1-18-0910MSD	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09A1-18-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-19	OT29-SO-J09A1-19-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-19-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-19-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-19-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-20	OT29-SO-J09A1-20-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-20-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09A1-20-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09A1-20-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-20-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09A1-21	OT29-SO-J09A1-21-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09A1-21-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09A1-21-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09A1-21-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-01	OT29-SO-J09B1-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B1-01-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B1-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-02	OT29-SO-J09B1-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-03	OT29-SO-J09B1-03-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-03-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09B1-03-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09B1-03-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-03-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-04	OT29-SO-J09B1-04-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-04-0001MS	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09B1-04-0001MSD	0 - 1	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09B1-04-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-04-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-04-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-05	OT29-SO-J09B1-05-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-05-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-05-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-05-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-06	OT29-SO-J09B1-06-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-06-0405	4 - 5	Normal	X			X	X		
	OT29-FD-J09B1-06-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-J09B1-06-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-06-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B1-07	OT29-SO-J09B1-07-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B1-07-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B1-07-0405MS	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09B1-07-0405MSD	4 - 5	MS/MSD	X			X	X		
	OT29-SO-J09B1-07-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B1-07-1415	14 - 15	Normal	X	X	X	X	X	X	X

Table H-8
Proposed Discrete Soil Samples for the Open Detonation Unit, Kirtland Air Force Base, New Mexico

Soil Boring	Sample Identification	Depth (feet below ground surface)	Sample Type	**Metals** Methods SW-846 6010B, 6020A, 7471B	**VOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8260B	**SVOCs** (Per Table H-3 of RCRA Permit) Method SW-846 8270C	**Total Explosives** (Per Table D-4 of RCRA Permit) Method SW-846 8330B	**Perchlorate** Method SW-846 6850	**White Phosphorous** Method SW-846 7580	**Dioxins** Method SW-846 8290
J09B2-01	OT29-SO-J09B2-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-01-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-02	OT29-SO-J09B2-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B2-02-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B2-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-03	OT29-SO-J09B2-03-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-03-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-03-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-03-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-04	OT29-SO-J09B2-04-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B2-04-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B2-04-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-04-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-04-1415	14 - 15	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-04-1415MS	14 - 15	MS/MSD	X	X	X	X	X	X	X
	OT29-SO-J09B2-04-1415MSD	14 - 15	MS/MSD	X	X	X	X	X	X	X
J09B2-05	OT29-SO-J09B2-05-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-05-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-05-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-05-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-06	OT29-SO-J09B2-06-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-06-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-06-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-06-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-07	OT29-SO-J09B2-07-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-FD-J09B2-07-0001	0 - 1	Field Duplicate	X	X	X	X	X	X	X
	OT29-SO-J09B2-07-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-07-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-07-0910MS	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09B2-07-0910MSD	9 - 10	MS/MSD	X			X	X		
	OT29-SO-J09B2-07-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-08	OT29-SO-J09B2-08-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-08-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-08-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-08-1415	14 - 15	Normal	X	X	X	X	X	X	X
J09B2-09	OT29-SO-J09B2-09-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-J09B2-09-0405	4 - 5	Normal	X			X	X		
	OT29-SO-J09B2-09-0910	9 - 10	Normal	X			X	X		
	OT29-SO-J09B2-09-1415	14 - 15	Normal	X	X	X	X	X	X	X
K09A2-01	OT29-SO-K09A2-01-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-K09A2-01-0405	4 - 5	Normal	X			X	X		
	OT29-FD-K09A2-01-0405	4 - 5	Field Duplicate	X			X	X		
	OT29-SO-K09A2-01-0910	9 - 10	Normal	X			X	X		
	OT29-SO-K09A2-01-1415	14 - 15	Normal	X	X	X	X	X	X	X
K09A2-02	OT29-SO-K09A2-02-0001	0 - 1	Normal	X	X	X	X	X	X	X
	OT29-SO-K09A2-02-0405	4 - 5	Normal	X			X	X		
	OT29-SO-K09A2-02-0910	9 - 10	Normal	X			X	X		
	OT29-SO-K09A2-02-1415	14 - 15	Normal	X	X	X	X	X	X	X
QC	OT29-WW-RINSATE1	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-RINSATE2	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-RINSATE3	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-RINSATE4	-	Equipment Blank	X	X	X	X	X	X	X
	OT29-WW-TB1	-	Trip Blank		X					
	OT29-WW-TB2	-	Trip Blank		X					
	OT29-WW-TB3	-	Trip Blank		X					
	OT29-WW-TB4	-	Trip Blank		X					
			Total Normal Samples	160	80	80	160	160	80	80
			Total Field Duplicates	16	8	8	16	16	8	8
			Total Matrix Spike/Matrix Spike Duplicates	8	4	4	8	8	4	4
			Total Rinsate Blanks	4	4	4	4	4	4	4
			Total Trip Blanks		4					

MS/MSD - matrix spike/matrix spike duplicate
QC - quality control
RCRA - Resource Conservation and Recovery Act
SVOCs - semivolatile organic compounds
VOCs - volatile organic compounds

2.2.2 Liquid Sampling

Groundwater samples shall be collected from the groundwater monitoring wells installed at the OD Unit. Eight consecutive quarters of groundwater monitoring shall be conducted initially, following installation of the wells. Groundwater samples ~~will~~shall be obtained using methods approved by the Department within eight hours of the completion of well purging. The samples shall be analyzed for the parameters listed in Table H-~~3~~4, which include all hazardous constituents of the hazardous wastes that were treated at the OD Unit.

Groundwater in monitoring wells with low recharge rates and that purge dry shall be sampled when the water level in the well has recovered sufficiently to collect the required samples. A low-flow bladder pump shall be utilized. Groundwater samples intended for metals analysis shall be submitted to the laboratory for analyses of total metals; the samples ~~will~~shall not be filtered in the field or laboratory.

Glass tubes shall be used to sample liquids, except groundwater. The primary advantage to using this type of sampling device is that the tube can be disposed of after each sample is collected, thus eliminating cross-contamination. Alternatively, a Coliwasa sampler may be used to sample liquids, except groundwater.

2.2.3 Appropriate Sample Containers and Preservatives

Samples shall be placed in clean containers compatible with the intended analysis and shall be properly prepared and preserved to maintain sample integrity. The most recent version of SW-846 lists the proper container, preservative, and holding time for each chemical parameter of interest, and these requirements ~~will~~shall be followed for all samples collected during the closure process. Table H-~~4~~5 summarizes the sample containers, preservation techniques, and holding times for soil and liquid samples (including groundwater).

2.2.4 Sample Handling and Documentation

Each sample shall be labeled, sealed, and accompanied by a chain-of-custody and a request-for-analysis form. A chain-of-custody form shall be used to track samples from collection through analysis to ensure that the integrity of the samples is protected, and that analytical results can be attributed to specific samples of environmental media or waste. The procedures followed during closure ~~will~~shall be equivalent to those provided in the most current version of SW-846. Important aspects of the procedures are presented below. A chain-of-custody form ~~will~~shall be prepared for all samples collected for laboratory analyses. The form includes:

- • Sample identification number;
- • Name and signature of sample collector;
- • Date and time of sample collection;
- • Location at which sample was collected;
- • Type of waste (e.g., soil, liquid, etc.);
- • Signatures of persons who have had samples in their possession;
- • Dates and times of possession.

This form ~~will~~shall be initiated at the point of sample collection and ~~will~~shall then remain with the sample during transfer to the laboratory. The form ~~will~~shall be completed upon receipt at the laboratory and returned to ~~Kirtland AFB~~the Permitee for inclusion in facility operating record.

The chain-of-custody form ~~will~~shall include a request-for analysis form that lists all analyses to be performed for the identified samples and all special instructions relating to sample management or analysis. Any potential hazards posed by the samples shall be listed on the request-for-analysis form.

The sample containers ~~will~~shall be sealed with gummed paper seals attached to the containers in such a way that the seals must be broken in order to open the containers. The seals and sample labels must be completed with a waterproof pen. The sample labels are necessary to prevent misidentification of samples and shall include the following information: a unique sample number; name or initials of sample collector; sample collection date and time; sample location; and, sample type, depth, and description.

A closure sampling field log book ~~will~~shall be kept and ~~will~~shall contain all information pertinent to field surveys and sampling. Sufficient information shall be recorded so that a person can reasonably reconstruct what occurred at a sampling event without relying on a collector's memory. The log book shall have bound and consecutively numbered pages in 8 by 11-inch format. Minimum entries ~~will~~shall include:

- Purpose of sample;
- Location of sampling;
- Name and business address of person making log entry;
- Number, type, and volume of sample;
- Description of each sampling methodology and equipment used;
- Date and time of sample collection;
- Sample destination and transporter's name (name of laboratory, UPS, etc.);
- Map or photograph of the sampling site;
- Field observations (ambient temperature, sky conditions, past 24-hour precipitation, etc.);
- Field measurements, if any (pH, flammability, conductivity, explosivity, etc.);
- Collector's sample identification number(s);
- Signature of person responsible for the log entry.

Documentation of sample acceptance at the laboratory ~~will~~shall be provided following sample screening and log-in. This documentation may consist of signed copies of the chain-of-custody, documentation or a letter detailing the field sample numbers accepted. Corresponding laboratory sample identification numbers ~~will~~shall be provided. The laboratory is required to have procedures for preventing cross contamination of samples and securing sample custody within the laboratory.

2.2.5 Sample Shipping

Samples shall be packaged and shipped to the laboratory in accordance with DOT shipping requirements and in a manner to ensure that the integrity of the samples is protected. The sample containers shall be cushioned to protect against breakage or puncture.

2.2.6 Sample Analysis

Soil, groundwater, and waste samples ~~will~~shall be analyzed by an ELAP-certified laboratory. The analytical laboratory shall have procedures for preventing cross-contamination of samples and securing sample custody within the laboratory. Test methods for analysis of all samples ~~will~~shall be performed according to procedures documented in the most current version of SW-

846. Hazardous constituents associated with the regulated wastes treated at the OD Unit are included in these analyses. Analytical methods, detection limits, and instrumentation are provided in Table H-~~2~~ 3 for soil analysis; and in Table H-~~3~~ 2 for groundwater analysis. Minimum calibration, operation, and quality control (bias, precision, blank and matrix effects) requirements for laboratory analyses shall be performed as listed in the individual analytical methods of SW-846. All laboratory analyst notebooks, log sheets, instrument printouts, charts, and calculations relevant to analyses of these samples shall be identified and remain accessible. This information may be requested for independent review and validation. If requested by the Department, this information shall be provided by the Permittee.

2.2.7 Quality Assurance/Quality Control Program

Because decisions about closure activities may be based, in part, on analyses of samples, a program to ensure reliability of analytical data is mandatory. Data reliability ~~will~~shall be ensured by documenting sample management so that analyses are traceable to specific areas of potential contamination and by following a quality assurance/quality control (QA/QC) program that mandates documentation of the precision and accuracy of laboratory analyses, as well as data completeness, representativeness, and comparability.

Sampling activities ~~will~~shall include collection of QC samples in addition to field documentation requirements. QC samples to be collected include: duplicate samples, trip blanks, field blanks, and rinsate blanks. Table H-~~5~~ 9 summarizes field QC sample requirements.

Blanks and duplicate samples shall be collected to determine potential errors introduced in the data from sample collection and handling activities, laboratory error, and to assess analytical precision. To determine the potential for cross contamination, rinsate blanks consisting of rinsate from decontaminated equipment shall be collected and analyzed. At least one rinsate blank ~~will~~shall be collected for every ten samples collected using non-dedicated sampling equipment. Duplicate samples ~~will~~shall be collected at a frequency of one duplicate sample for every ten field samples. In no case ~~will~~shall less than one rinsate blank or duplicate sample be collected for a sampling effort. Trip blanks ~~will~~shall be collected on a daily basis and included in each shipment of samples that contain VOCs samples. Trip blanks are analyzed for VOCs only and are used to assess possible VOC contamination from outside sources. Trip blanks are shipped from the analytical laboratory and maintained with the sample bottles throughout the sampling process. These blank and duplicate samples ~~will~~shall be identified and treated as separate samples. Acceptance criteria for QA/QC sample analyses ~~will~~shall be compatible with the most recent version of SW-846 or other applicable guidance.

The analytical laboratory shall operate under a QA program plan (QAPP) that meets the requirements of ~~SW-846~~the required methods. QC procedures in the analytical laboratory are guided by the laboratory's QAPP. Laboratory QC samples are required to establish the accuracy and precision of analytical data in order to determine the quality of the data. Table H-410- lists laboratory QC procedures by analytical methods.

The analytical laboratory data shall be evaluated using the following criteria:

- Completeness of data deliverable;
- Collection, extraction, and analysis holding times;
- Blank data;
- Laboratory control sample results;

- Matrix spike/matrix spike duplicate results;
- Laboratory duplicate sample results; and
- Overall data assessment and usability.

Table H-9
Summary of Field Quality Control Samples

Quality Control Sample Type	Sample Matrix	Applicable Analysis	Frequency	Purpose
Trip blank	Soil/Water	VOCs	One per day, per cooler containing VOC samples	Document any contamination attributable to shipping and field handling procedures
Field Duplicate	Soil/Water	VOCs, SVOCs, Metals, HE, Dioxins/Furans, White Phosphorus, Perchlorate, General chemistry[a]	Minimum of one per 10 environmental samples per media type	Document precision of the sampling/analysis process
Rinsate blank	Soil/Water	VOCs, SVOCs, metals, HE[a], Dioxins/Furans, White Phosphorus, Perchlorate, General chemistry[a, b]	One sample per day per media type for non-dedicated sampling equipment	Document whether decontamination of sampling equipment was adequate

[a] General chemistry - total dissolved solids, alkalinity, ammonia, sulfide, total organic carbon, sulfate, nitrate, nitrite, chloride, fluoride, bromide

[b] No rinsate blank is required for total dissolved solids or alkalinity.

HE - high explosives

SVOCs - semivolatile organic compounds

VOCs - volatile organic compounds

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method 7580

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Multipoint ICAL for all analytes (minimum five standards)	Before sample analysis	One of the following options. Option 1: Linear—RSD for each analyte ≤ 20%. Option 2: Linear—least squares regression r >0.995 for each analyte. Option 3: Nonlinear—COD ≥0.99 (six points will be used for second order, seven points will be used for third order) .	Correct problem then repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL. Calibration may not be forced through the origin. All quantitation for multicomponent analytes, such as technical chlordane, toxaphene, and Aroclors, must be performed form a five-point calibration. Results may not be quantified from a single point.
Second-source calibration verification	Immediately after each ICAL	All analytes within ± 20% of expected value	Correct problem and verify second-source standard. Rerun second-source verification. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Retention time window position established for each analyte and surrogate	Each ICAL and after the initial daily CCV	Position will be set using the midpoint standard of the ICAL curve. On days when an ICAL is not performed, the CCV is used.	N/A	N/A
Retention time window width established for each analyte and surrogate	At method setup and after major maintenance (for example, column change)	±3 times standard deviation for each analyte retention time from 72-hour study.	N/A	N/A
Retention time window verification for each analyte and surrogate	Each calibration verification	Analyte within established window.	Correct problem, then reanalyze all samples analyzed since the last acceptable retention time check.	**ICV:** Flagging criteria are not appropriate for initial verification. **CCV:** Apply Q-flag to all results for the specific analyte(s) in the sample that are outside the established window.
CCV	Daily, before sample analysis unless ICAL performed on same day, after every 10 samples, and at the end of the analysis sequence	All analytes within ± 15% of expected value (% D).	Correct problem, then rerun. If that fails, repeat ICAL. Reanalyze all samples since last successful calibration verification.	**If reanalysis cannot be performed,** apply Q-flag to all results for the specific analyte(s) >15%D for all samples associated with the calibration verification.
Method blank	One per analytical batch	No analytes detected > ½ LOQ. For common laboratory contaminants no analytes detected > LOQ and see Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and reanalyze method blank and all samples processed with the	Apply "B" flag to all associated positive results for the specific analyte(s), as appropriate. See Worksheet #36, Section 36.2.5.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method 7580

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			contaminated blank.	
LCS for all analytes (must contain all target analytes)	One per analytical batch	Acceptance criteria: Worksheet #15.	Correct problem, then reanalyze. If still out, reprepare and reanalyze the LCS and all samples in the affected batch.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
MS/MSD	One per 20 project samples per matrix as a minimum and as defined on the chain-of-custody form	Acceptance criteria: Worksheet #15.	Assess data to determine whether there is a matrix effect or analytical error. Review LCS for failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made regarding PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: • %R for MS or MSD > upper control limit • %R for MS or MSD < lower control limit • MS/MSD RPD > control limit
Second-column confirmation (not required for Methods 8015B [DRO or GRO]	All positive results	Same as for initial or primary column analysis.	Same as for initial or primary column analysis.	Apply J-flag if RPD > 40% from first column result. Apply Q-flag to all results for the specific analyte(s) in the sample not confirmed.
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[c])	At initial setup and then once per 12-month period or quarterly DL verification	Detection limits established will be ≤ ½ the RL in Worksheet #15 Tables (see 40 CFR, Part 136, Appendix B). For the verification check to be valid, analytes must be detected and identified by method-specified criteria or the verification check must produce a response that is at least 3 times the instrument noise level and greater than the response in the blanks associated with the MDL study.	Continue the MDL study until all criteria are met.	N/A.
LOD determination and verification (see Section D.1.2.1 and Box D-13 of the DoD QSM[c])	At initial setup and verified quarterly (if a laboratory uses multiple instruments for a given method, the LOD must be verified on each)	The apparent signal-to-noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If LOD verification fails, the laboratory must (1) repeat the MDL determination and LOD verification at a higher concentration or (2) perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher	N/A; samples may not be analyzed without a valid LOD.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method 7580

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			concentration.	
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[c])	At initial setup (1) verify LOQ; and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of the DoD QSM[c])	(1) LOQ and associated precision and bias must meet client requirements and be reported; or (2) in the absence of client requirements, must meet LCS control limits (see Box D-14 of the DoD QSM[c]).	If the LOQ verification fails, laboratory must either establish a higher LOQ or modify method to meet client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag "U."
Demonstrate acceptable analyst capability	Before using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of DoD QSM[c])	QC acceptance criteria published by DoD, if available; otherwise, method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for analytes not meeting criteria (see section C.1.f of DoD QSM[c]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by an analyst until capability is demonstrated.

End of Method 7580

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Mass spectrometer tuning check Use bromofluorobenzene (SW8260B) or decafluorotriphenylphosphine (SW8270C)	Before ICAL and calibration verification	Refer to criteria listed in method description.	Retune instrument and verify.	Not appropriate.
GC performance check (8270C only or when SW8270 is used for pesticide analyses)	Daily before analysis of sample or calibration standards	Degradation ≤ 20% for DDT. No visible peak tailing for benzidine or pentachlorophenol (as a default, tailing factors should be less than 2.0).	Correct problem, then repeat performance check.	Not appropriate.
Multipoint ICAL for all analytes (minimum five standards)	Before sample analysis	SPCCs: Average RF ≥ 0.30 (SW8260B), ≥ 0.050 (SW8270C) CCCs: % RSD for RFs ≤ 30% and one of the options below: Option 1: Linear—RSD for each analyte < 15%. Option 2: Linear—linear least squares regression r > 0.995 for each analyte. Option 3: Nonlinear—COD ≥ 0.99 (6 points will be used for second order, 7 points will be used for third order). This is not a preferred option.	Correct problem, then repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL. Calibration may not be forced through the origin.
Second-source calibration verification	Once per ICAL	All analytes within ± 20% of expected value.	Correct problem and verify second-source standard. Rerun second-source verification. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Retention time window position establishment for each analyte and surrogate	Once per ICAL	Position will be set using the midpoint standard of the ICAL curve. On days when an ICAL is not performed, the CCV is used.	N/A.	N/A.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Retention time window verification for each analyte	Each sample	RRT of the analyte within ± 0.06 RRT units of ICAL. Laboratories may update the retention times based on the CCV to account for minor performance fluctuations or after routine system maintenance (e.g., column clipping. With each sample, the RRT will be compared with the most recently updated RRT. If the RRT has changed by more than ±0.06 RRT units since the last update, there has been a significant change in system performance and the laboratory must take appropriate corrective actions as required by the method and rerun the ICAL to re-establish the retention times.	Correct problem then reanalyze all samples analyzed since the last retention time check.	Apply Q-flag to all results for the specific analyte(s) in the sample that are outside the established window.
CCV	Daily, before sample analysis (unless ICAL performed on same day), and after every 12 hours of analysis time	SPCCs: Average RF ≥ 0.30 (SW8260B), ≥ 0.050 (SW8270C) CCCs: % RSD for RFs ≤ 30% and All analytes within ± 20% D of expected value from ICAL.	Correct problem, then rerun CCV. If that fails, repeat ICAL.	Apply Q-flag to all results for the specific analyte(s) > 20% D for all samples associated with the calibration verification.
ISs	Each sample, standard, and QC sample	Retention time ± 30 seconds from retention time of the IS in the ICAL midpoint standard. Extracted ion current profile area within -50% to +100% of area from IS in ICAL mid-point standard.	Inspect mass spectrometer and GC for malfunctions and make corrections as appropriate. Reanalysis of samples analyzed while the system was malfunctioning is mandatory.	Apply Q-flag to all results for analytes associated with a failed IS (unless a matrix effect can be verified), then apply M-flag.
Method blank	One per analytical batch	No analytes detected > ½ LOQ. For common laboratory contaminants, no analytes detected > LOQ. See Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and analyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s), as appropriate. See Worksheet #36, Section 36.2.5.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
LCS for all analytes	One LCS per analytical batch	Acceptance criteria: Worksheet #15.	Correct problem, then reanalyze. If still out, reprepare and reanalyze the LCS and all samples in the affected batch.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
MS/MSD	One per 20 samples per matrix as a minimum and as defined on the chain-of-custody form	Acceptance criteria: Worksheet #15.	Assess data to determine whether there is a matrix effect or analytical error. Analyze LCS for failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made regarding the PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: (1) %R for MS or MSD > upper control limit (2) %R for MS or MSD < lower control limit (3) MS/MSD RPD > control limit
Surrogate spike	Every sample, spiked sample, standard, and method blank	Acceptance criteria: Worksheet #15.	Correct problem, then reprepare and reanalyze the affected samples. If matrix effect is verified, discuss in case narrative.	For the samples: If the %R > UCL for any surrogate, apply J-flag to all positive results for associated analytes. If the %R < LCL for any surrogate, apply J-flag to all positive results for associated analytes and UJ-flag to all associated nondetects. If any surrogate recovery is <10%, apply Q-flag to all results for all associated analytes.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[c])	At initial setup and then once per 12-month period or quarterly DL verification	Detection limits established will be ≤ ½ the RL in Worksheet 15. See 40 CFR, Part 136, Appendix B. All analytes must be detected and identified by method-specified criteria for the for the verification check to be valid, or the verification check must produce a response that is at least 3 times the instrument noise level and greater than the response in the blanks associated with the MDL study.	Continue the MDL study until all criteria are met.	N/A.
LOD determination and verification (see Section D.1.2.1 and Box D-13 of the DoD QSM[c])	At initial setup and verified quarterly (if a laboratory uses multiple instruments for a given method, the LOD must be verified on each)	The apparent signal-to-noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must (1) repeat the detection limit determination and LOD verification at a higher concentration or (2) perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	N/A; samples may not be analyzed without a valid LOD.
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[c])	At initial setup: (1) verify LOQ; and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if a laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of DoD QSM[c]	(1) The LOQ and associated precision and bias must meet client requirements and must be reported or (2) in the absence of client requirements, must meet LCS control limits. See Box D-14 of the DoD QSM[c].	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag "U."
Demonstrate acceptable analyst capability	Before using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of DoD QSM[c])	QC acceptance criteria published by DoD, if available; otherwise method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for those analytes that did not meet criteria (see Section C.1.f of the DoD QSM[c]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by an analyst until capability is demonstrated.

End of Methods SW8260B, SW8270C, and SW8270C (SIM)

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8330B

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Initial multipoint calibration for all analytes (minimum five standards) (ICAL)	Minimum five-point initial calibration for target analytes, lowest concentration standard at or below the reporting limit.	Initial calibration prior to sample analysis	Average RF: RSD </= 20%; Linear: r>0.995, intercept < MDL. Apparent S/N ratio of standard at RL (LOQ) must be at least 5:1.	Evaluate standards, chromatography, and detector response. If problem found with above, correct as appropriate, then repeat initial calibration
Second-source calibration verification	Once per ICAL	All analytes within ± 20% of expected value	Correct problem and verify second source standard. Rerun second source verification. If that fails, correct problem and repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Low standard verification	Immediately following ICAL.	Less than 50 % difference for target analytes;	Evaluate data. If problem (e.g., concentrated standard, plugged injector needle) found, correct, then repeat low-level verification. If still fails, repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
CCV	Daily, before sample analysis unless ICAL performed on same day and every 24 hours of analysis time	All analytes within ± 20% of expected value	Correct problem, rerun CCV. If that fails, repeat initial calibration.	Apply Q-flag to all results for the specific analyte(s) > 30 %D for all samples associated with the calibration verification.
Surrogate spike	**Every sample, spiked sample, standard, and method blank**	**Acceptance criteria: Worksheet #15.**	**Correct problem, then reprepare and reanalyze the affected samples.** **If matrix effect is verified, discuss in case narrative.**	**For the samples:** **If the %R > UCL for any surrogate, apply J-flag to all positive results for associated analytes.** **If the %R < LCL for any surrogate, apply J-flag to all positive results for associated analytes and UJ-flag to all associated nondetects.** **If any surrogate recovery is <10%, apply Q-flag to all results for all associated analytes.**
Method Blank	One per preparation batch	No target analytes ≥ ½ LOQ and > 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater).	Verify instrument clean (evaluate calibration blank & samples prior to method blank), then reanalyze. Evaluate to determine if systematic issue within laboratory, correct, then re-prepare and reanalyze the method blank and all samples processed with the contaminated blank in accordance with DoD QSM requirements	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW8260B, SW8270C, and SW8270C (SIM)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
LCS for all analytes	One LCS per analytical batch	Acceptance criteria: Table 7-4	Correct problem then reanalyze. If still out, reprep and reanalyze the LCS and all samples in the affected AB.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
Confirmation Analysis	When target analytes detected on the primary column at concentrations > LOD.	Calibration and QC criteria the same as for initial/primary analsyis. Results between primary and secondary column RPD ≤ 40%	Evaluate data, then report with flag to denote RPD > 40%. Narrate obvious matrix issues.	RPD between primary and confirmation analysis ≤ 40%..
Soil Grinding Blank	When puck mill grinding is performed, one blank between each sample processed.	Blank material ground and subsampled as with the samples. Composited prior to analysis. No target analytes detected at > than 1/2 the LOQ	All blanks are reported, and data is flagged/narrated if the criteria are exceeded.	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements
Grinding Certified Reference Material (CRM)	When puck mill grinding is performed, CRM is ground for every 20 samples ground.	Within the control limits supplied by manufacturer of material	Evaluate the data, narrate any outliers and report.	Manufacturer's acceptance limits.
DL study (as part of the LOD process, reference Section D.1.2.1 of the DoD QSM)	At initial setup and subsequently once per 12-month period or quarterly DL verification checks.	DL established shall meet 40 CFR, Part 136 Appendix B.	Continue to run the DL study until all criteria are passing	N/A
LOD determination and verification (reference Section D.1.2.1 and grey box D-13 of the QSM)	At initial set-up and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must: 1) Repeat the detection limit determination and LOD verification at a higher concentration;or 2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	Not Applicable. Samples may not be analyzed without a valid LOD.
LOQ establishment and verification (reference Section D.1.2.2 and grey box D-14 of the QSM)	At initial setup: 1) Verify LOQ; and 2) Determine precision and bias at the LOQ. Subsequently, verify LOQ quarterly. If a laboratory uses multiple instruments for a given method, the LOQ must be verified on each. See Box D-14.	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or 2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DOD QSM.	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	Not Applicable. Samples may not be analyzed without a valid LOD.
Results reported between DL and LOD and the LOD and the LOQ	None	None	None	Apply F-flag to all results between DL and LOQ. If no Detection determined below the LOD, report to the LOD, flag U.

End of Method SW8330B

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Tuning (Mass Calibration Verification)	Prior to ICAL and after any mass calibration or maintenance is performed.	Quantitation ions within 0.3 m/z of expected mass.	Perform mass calibration on the MS/MS. If required, consult with instrument engineer for further maintenance.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Minimum six-point initial calibration for target analytes, lowest concentration standard at or below the reporting limit	Initial calibration prior to sample analysis	Linear: $r^2 > 0.990$ (r>0.995) with intercept ≤ LOD, or Average Response Factor: RSD≤ 20%.	Evaluate standards, chromatography, and mass spectrometer response. If problem found with above, correct as appropriate, then repeat initial calibration.	Evaluate standards, chromatography, and detector response. If problem found with above, correct as appropriate, then repeat initial calibration
Second-source calibration verification	Once per six-point initial calibration	Perchlorate within ±15% of the true value	Evaluate data. If problem (e.g., concentrated standard, plugged transfer line) found, correct, then repeat second source verification. If it still fails, then repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Daily calibration verification	Mid-range standard analyzed before sample analysis, after every 10 samples, and at the end of the sequence.	Perchlorate within ±15% of the true value	Correct problem, then repeat. If still fails, repeat initial calibration	Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.
Limit of Detection verification (LODv) (per batch)	Prior to sample analysis and at the end of the analysis sequence.	Perchlorate within ± 30% of the true value	Correct problem. Evaluate samples. Samples with results > RL (LOQ) may be reported. Samples since the last passing LODv with results ≤ RL (LOQ) must be reanalyzed.	**Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.**
Laboratory Reagent Blank	Prior to ICAL, following samples with overrange concentration of perchlorate, and at the end of the analytical sequence.	No perchlorate detected > LOQ	Reanalyze reagent blank (until no carryover seen), and any samples with perchlorate detections since the contaminated blank.	No target analytes ≥ ½ LOQ
Internal Standard	Every Calibration Standard	ICAL: IS for each standard must be within ± 50% of the average area of the ICAL. ICV, CCV: Within ± 50% of the average area of the ICAL or within ± 50% of the 1st CCV of the run, if the ICAL is not run the same day.	Evaluate the system. Reanalyze/repeat the calibration.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples.
Method Blank	One per preparation batch	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements	Correct problem, then re-extract and reanalyze method blank and all samples processed with the contaminated blank in accordance with DoD QSM requirements	No target analytes ≥ ½ LOQ

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Interference Check Sample (ICS)	One per preparation batch	70% -130%	Reanalyze once. If still outside the acceptance limits, evaluate to determine if cleanup filters or column degradation are suspect, replace appropriate materials and reprepare (filters) or reanalyze (column). Repeat the Interference Threshold Study to deter. If problem still exists, recalibrate.	Recovery as described in DoD Perchlorate Handbook.
IS	During acquisition of calibration standard, samples, and QC check samples	Areas within -50% to +100% of the midpoint of the last ICAL for each sample and QC in accordance with DoD QSM requirements	Inspect LCMS for malfunctions; mandatory reanalysis of samples analyzed while system was malfunctioning in accordance with DoD QSM requirements	Meets all EPA Method requirements
Isotope Ratio $^{35}CL/^{37}CL$	Every sample, batch QC sample and standard	Monitor for either the parent ion at masses 99/101 or the daughter ion at masses 83/85 depending on which ions are quantified.	Re-extract, re-clean, and/or reanalyze affected sample(s). If problem persists, perform post-spike or dilution as appropriate to confirm presence of perchlorate	Theoretical ratio approx. 3.06 Must fall within 2.3 to 3.8
LCS	One LCS per analytical/preparation batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Reanalyze LCS once. If acceptable, report. Otherwise, evaluate and re prepared and reanalyze the LCS and all samples in the associated prep batch for failed analytes, if sufficient sample material is available.	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
MS/MSD	One MS/MSD per batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Identify problem; if not related to matrix interference, re-extract and reanalyze MS/MSD in accordance with DoD QSM requirements	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
DL study (as part of the LOD process, reference Section D.1.2.1 of the DoD QSM)	At initial setup and subsequently once per 12-month period or quarterly DL verification checks.	DL established shall meet 40 CFR, Part 136 Appendix B.	Continue to run the DL study until all criteria are passing	N/A
LOD determination and verification (reference Section D.1.2.1 and grey box D-13 of the QSM)	At initial set-up and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must: 1) Repeat the detection limit determination and LOD verification at a higher concentration; or 2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher	Not Applicable. Samples may not be analyzed without a valid LOD.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			concentration.	
LOQ establishment and verification (reference Section D.1.2.2 and grey box D-14 of the QSM)	At initial setup: 1) Verify LOQ; and 2) Determine precision and bias at the LOQ. Subsequently, verify LOQ quarterly. If a laboratory uses multiple instruments for a given method, the LOQ must be verified on each. See Box D-14.	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or 2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DOD QSM.	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	Not Applicable. Samples may not be analyzed without a valid LOD.
Results reported between DL and LOD and the LOD and the LOQ	None	None	None	Apply F-flag to all results between DL and LOQ. If no Detection determined below the LOD, report to the LOD, flag U.

End of Method SW6850

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Tuning (Mass Calibration Verification)	Prior to ICAL and after any mass calibration or maintenance is performed.	Quantitation ions within 0.3 m/z of expected mass.	Perform mass calibration on the MS/MS. If required, consult with instrument engineer for further maintenance.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Minimum six-point initial calibration for target analytes, lowest concentration standard at or below the reporting limit	Initial calibration prior to sample analysis	Linear: r^2 > 0.990 (r>0.995) with intercept ≤ LOD, or Average Response Factor: RSD≤ 20%.	Evaluate standards, chromatography, and mass spectrometer response. If problem found with above, correct as appropriate, then repeat initial calibration.	Evaluate standards, chromatography, and detector response. If problem found with above, correct as appropriate, then repeat initial calibration
Second-source calibration verification	Once per six-point initial calibration	Perchlorate within ±15% of the true value	Evaluate data. If problem (e.g., concentrated standard, plugged transfer line) found, correct, then repeat second source verification. If it still fails, then repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
Daily calibration verification	Mid-range standard analyzed before sample analysis, after every 10 samples, and at the end of the sequence.	Perchlorate within ±15% of the true value	Correct problem, then repeat. If still fails, repeat initial calibration	Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.
Limit of Detection verification (LODv) (per batch)	Prior to sample analysis and at the end of the analysis sequence.	Perchlorate within ± 30% of the true value	Correct problem. Evaluate samples. Samples with results > RL (LOQ) may be reported. Samples since the last passing LODv with results ≤ RL (LOQ) must be reanalyzed.	Apply Q-flag to all results for the specific analyte for all samples associated with the calibration verification.
Laboratory Reagent Blank	Prior to ICAL, following samples with overrange concentration of perchlorate, and at the end of the analytical sequence.	No perchlorate detected > LOQ	Reanalyze reagent blank (until no carryover seen), and any samples with perchlorate detections since the contaminated blank.	No target analytes ≥ ½ LOQ
Internal Standard	Every Calibration Standard	ICAL: IS for each standard must be within ± 50% of the average area of the ICAL. ICV, CCV: Within ± 50% of the average area of the ICAL or within ± 50% of the 1st CCV of the run, if the ICAL is not run the same day.	Evaluate the system. Reanalyze/repeat the calibration.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples.
Method Blank	One per preparation batch	No target analytes ≥ ½ LOQ in accordance with DoD QSM requirements	Correct problem, then re-extract and reanalyze method blank and all samples processed with the contaminated blank in accordance with DoD QSM requirements	No target analytes ≥ ½ LOQ

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Interference Check Sample (ICS)	One per preparation batch	70% -130%	Reanalyze once. If still outside the acceptance limits, evaluate to determine if cleanup filters or column degradation are suspect, replace appropriate materials and reprepare (filters) or reanalyze (column). Repeat the Interference Threshold Study to deter. If problem still exists, recalibrate.	Recovery as described in DoD Perchlorate Handbook.
IS	During acquisition of calibration standard, samples, and QC check samples	Areas within -50% to +100% of the midpoint of the last ICAL for each sample and QC in accordance with DoD QSM requirements	Inspect LCMS for malfunctions; mandatory reanalysis of samples analyzed while system was malfunctioning in accordance with DoD QSM requirements	Meets all EPA Method requirements
Isotope Ratio $^{35}CL/^{37}CL$	Every sample, batch QC sample and standard	Monitor for either the parent ion at masses 99/101 or the daughter ion at masses 83/85 depending on which ions are quantified.	Re-extract, re-clean, and/or reanalyze affected sample(s). If problem persists, perform post-spike or dilution as appropriate to confirm presence of perchlorate	Theoretical ratio approx. 3.06 Must fall within 2.3 to 3.8
LCS	One LCS per analytical/preparation batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Reanalyze LCS once. If acceptable, report. Otherwise, evaluate and re prepared and reanalyze the LCS and all samples in the associated prep batch for failed analytes, if sufficient sample material is available.	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
MS/MSD	One MS/MSD per batch, spiked at the LOQ.	QC acceptance criteria: 80% to 120% accuracy,15% precision, as per QSM and DoD Perchlorate Handbook	Identify problem; if not related to matrix interference, re-extract and reanalyze MS/MSD in accordance with DoD QSM requirements	QC acceptance criteria: 80% to 120% accuracy, 15% precision.
DL study (as part of the LOD process, reference Section D.1.2.1 of the DoD QSM)	At initial setup and subsequently once per 12-month period or quarterly DL verification checks.	DL established shall meet 40 CFR, Part 136 Appendix B.	Continue to run the DL study until all criteria are passing	N/A
LOD determination and verification (reference Section D.1.2.1 and grey box D-13 of the QSM)	At initial set-up and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must; 1) Repeat the detection limit determination and LOD verification at a higher concentration; or 2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher	Not Applicable. Samples may not be analyzed without a valid LOD.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6850

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
			concentration.	
LOQ establishment and verification (reference Section D.1.2.2 and grey box D-14 of the QSM)	At initial setup: 1) Verify LOQ; and 2) Determine precision and bias at the LOQ. Subsequently, verify LOQ quarterly. If a laboratory uses multiple instruments for a given method, the LOQ must be verified on each. See Box D-14.	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or 2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DOD QSM.	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	Not Applicable. Samples may not be analyzed without a valid LOD.
Results reported between DL and LOD and the LOD and the LOQ	None	None	None	Apply F-flag to all results between DL and LOQ. If no Detection determined below the LOD, report to the LOD, flag U.

End of Method SW6850

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW6010B and SW7470A/71A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Instrument detection limit study	At initial setup and after significant change in instrument type, personnel, test method, or sample matrix	Instrument detection limits will be < LOD.	N/A.	N/A.
Linear dynamic range or high-level check standard	Every 6 months	Within ± 10% of true value.	Correct problem, then reanalyze or reset linear range.	Apply J-flag to the specific analyte(s) for all results not within linear range.
ICAL for all analytes (minimum one standard and a blank 3- to 5-point standard preferred)	Daily before sample analysis	If more than one standard is used, correlation coefficient must be ≥ 0.995.	If applicable, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL.
ICV (second source)	Daily after ICAL	All analytes within ± 10% of expected value.	Correct problem and verify second-source standard. Rerun ICV. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
CCV (Instrument Check Standard)	After every 10 samples and at the end of the analysis sequence	All analyte(s) within ± 10% of expected value and RSD of replicate integrations < 5%.	Correct problem, then repeat CCV and reanalyze all samples since last successful calibration verification.	Apply Q-flag to all results for the specific analyte(s) >10 %D for all samples associated with the calibration verification.
Calibration blank	Before beginning a sample run, after every calibration verification	No analytes detected > LOD.	Correct problem, then analyze calibration blank and previous 10 samples.	Apply B-flag to all associated positive results for the specific analyte(s) as appropriate.
Low-level calibration check standard (at or below LOQ)	Daily, after ICAL; not required for multipoint calibration (3 or more points) with low standard at or below LOQ.	Analyte(s) with ± 20% of expected value.	Correct problem, then reanalyze.	No samples may be analyzed without a valid low-level calibration check standard. Low-level calibration check standard should be less than or equal to the LOQ.
Method blank	One per analytical batch	No analytes detected > ½ LOQ. For common laboratory contaminants, no analytes detected > LOQ. See Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and reanalyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s), as appropriate. See Worksheet #36, Section 36.2.5.
ICS	At the beginning of an analytical run	ICS A: All non-spiked analytes < LOD (unless they are a verified trace impurity from one of the spiked analytes). ICS AB: Within ± 20% of expected value.	Terminate analysis; locate and correct problem; reanalyze ICS and all associated samples.	Flagging criteria are not appropriate. No samples may be analyzed without a valid ICS. If corrective action fails, apply Q-flag to the specific analyte(s).

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW6010B and SW7470A/71A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
LCS for all analytes	One per analytical batch	Acceptance criteria: Worksheet #15.	Correct problem then reanalyze. If still out, reprepare and reanalyze the LCS and all samples in the affected batch.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
Dilution test	Each new sample matrix, at least once per analytical batch (only applicable for analytes with concentrations > 50 times LOQ)	Fivefold (1+4) dilution must agree within ± 10% of the original determination.	Add post-digestion spike.	Apply J-flag to all sample results for the specific analyte from the same matrix in the batch if either of following exist: (1) dilution test not run and batch had analyte concentrations >50X LOQ or (2) %D ≥10 and post-digestion spike not performed.
Post-digestion spike addition	When dilution test fails or if an analyte's concentration for all samples in a batch is less than 50 times LOQ (<25 for Method SW7470A/SW7471A)	Recovery within 75–125% of expected results (85-115 for SW7470A/SW7471A).	Check for instrumental problem, then reanalyze post-digestion spike addition if appropriate.	Apply J-flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition. If post-digestion spike addition recovery is < 10%, apply Q-flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition.
MS/MSD	One per 20 samples per matrix as a minimum and as defined on the chain-of-custody form	Acceptance criteria: Worksheet #15.	Assess data to determine whether there is a matrix effect or analytical error. Analyze LCS or failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made regarding PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: (1) %R for MS or MSD > UCL (2) %R for MS or MSD < LCL (3) MS/MSD RPD > control limit
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[c])	At initial setup and then once per 12-month period or quarterly DL verification checks	Detection limits established will be ≤ ½ the RL in Worksheet #15 Tables. See 40 CFR, Part 136, Appendix B. All analytes must be detected and identified by method-specified criteria for the for the verification check to be valid, or the verification check must produce a response that is at least 3X the instrument noise level and greater than the response in the blanks associated with the MDL	Continue the MDL study until all criteria are met.	N/A.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods SW6010B and SW7470A/71A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
		study.		
LOD determination and verification (reference Section D.1.2.1 and Box D-13 Of the DoD QSM[c])	At initial setup and verified quarterly (if a laboratory uses multiple instruments for a given method, the LOD must be verified on each)	The apparent signal-to-noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must (1) repeat the detection limit determination and LOD verification at a higher concentration; or (2) perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	N/A; samples may not be analyzed without a valid LOD.
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[c])	At initial setup: (1) verify LOQ and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if a laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of the DoD QSM[c]).	1) The LOQ and associated precision and bias must meet client requirements and must be reported; or (2) in the absence of client require-ments, must meet control limits of the LCS. See Box D-14 of the DoD QSM[c].	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag "U."
Demonstrate acceptable analyst capability	Before using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of the DoD QSM[c])	QC acceptance criteria published by DoD, if available; otherwise method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for those analytes that did not meet criteria (see Section C.1.f of the DoD QSM[c]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by analyst until capability is demonstrated.

End of Method SW6010B and SW7470A/71A

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6020A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
MS tuning sample	Before ICAL.	Mass calibration ≤ 0.1 amu from the true value. Resolution <0.9 amu full width at 10% peak height. Stability: RSD ≤ 5% for at least four replicate analyses.	Retune instrument then reanalyze tuning solution.	Not appropriate.
ICAL for all analytes (minimum one standard and a blank)	Daily before sample analysis	If more than one standard is used, correlation coefficient must be ≥ 0.995.	If applicable, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL.
ICV (second source)	After ICAL, before beginning a sample run at a concentration other than used for calibration	All analytes within ± 10% of expected value.	Correct problem and verify second-source standard. Rerun ICV. If that fails, correct problem and repeat ICAL.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified.
CCV	After every 10 samples and at the end of the analysis sequence—at a concentration near the middle of the calibration range	All analytes within ± 10% of expected value.	Correct problem, then repeat CCV and reanalyze all samples since last successful calibration verification.	Apply Q-flag to all results for the specific analyte(s) >10 %D for all samples associated with the calibration verification.
Calibration blank	Before beginning a sample run, after every 10 samples and at end of the analysis sequence	No analytes detected > LOD.	Correct problem, then analyze calibration blank and previous 10 samples.	Apply B-flag to all associated positive results for the specific analyte(s) as appropriate.
Low-level calibration check standard (at or below LOQ)	Daily, after ICAL Not required if multipoint calibration (3 or more points) with low standard at or below LOQ is performed	All analyte(s) with ± 20% of expected value.	Correct problem then reanalyze.	No samples may be analyzed without a valid low-level calibration check standard. Low-level calibration check standard should be less than or equal to the LOQ.
Linear range calibration (high) check standard	Every 6 months	Analyte within ± 10% of expected value.	Correct problem then reanalyze or reset linear range.	Apply J-flag to the specific analyte(s) for all results not within linear range.
Method blank (Preparation blank)	One per analytical batch	No analytes detected > ½ LOQ For common laboratory contaminants, no analytes detected > LOQ. See Worksheet #36, Section 36.2.5.	Assess data. Correct problem. If necessary, reprepare and analyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s) as appropriate. See Worksheet #36, Section 36.2.5.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6020A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Interference check solutions (ICS-A and ICS-AB)	At the beginning of an analytical run or once during an 12-hour period, whichever is more frequent	**ICS-A:** All non-spiked analytes < LOD (unless they are a verified trace impurity from one of the spiked analytes). **ICS-AB:** Within ± 20% of expected value.	Terminate analysis; locate and correct problem; reanalyze ICS; reanalyze all affected samples.	Flagging criteria are not appropriate. No samples may be analyzed without a valid ICS. If corrective action fails, apply Q-flag to the specific analyte(s).
LCS for all analytes	One LCS per analytical batch	Acceptance criteria: Worksheet #15.	Correct problem then reanalyze. If still out, reprepare and reanalyze the LCS and all samples in the affected batch.	If corrective action fails, apply Q-flag to the specific analyte(s) in all samples in the associated preparatory batch.
Dilution test	Each matrix in a analytical batch (only applicable for analytes with concentrations > 100X LOD)	Fivefold (1+4) dilution must agree within ± 10% of the original determination.	Add post-digestion spike.	Apply J-flag to all sample results for the specific analyte from the same matrix in the batch if either of following exist: (1) dilution test not run and batch had analyte concentrations ≥100 times LOD or (2) % D ≥ 10 and post-digestion spike not performed.
Post-digestion spike addition	When dilution test fails or if an analyte's concentration for all samples in a batch is less than 100X LOD	Recovery within 75–125% of expected results.	Dilute the sample; reanalyze post-digestion spike addition.	Apply "J" flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition. If post-digestion spike addition recovery is < 10%, apply "Q" flag to all sample results (for same matrix) for the specific analyte(s) for all samples associated with the post-digestion spike addition.
MS/MSD	One per 20 samples per matrix	Acceptance criteria: Worksheet #15.	Assess data to determine whether there is a matrix effect or analytical error. Analyze LCS for failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made regarding PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: (1) %R for MS or MSD > UCL, (2) %R for MS or MSD < LCL, or (3) MS/MSD RPD > control limits
ISs	Every sample	IS intensity within 30-120% of intensity of the IS in the ICAL.	Perform corrective action as described in Method SW6020, Section 8.3.	Flagging criteria are not appropriate. No samples may be analyzed without a valid IS response.
Instrument detection limit study	At initial setup	Detection limits established will be ≤ LOD.	None.	N/A. Samples cannot be analyzed without a valid instrument detection limit.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW6020A

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
DL study (as part of the LOD process; see Section D.1.2.1 of the DoD QSM[c])	At initial setup and then once per 12-month period or quarterly DL verification.	Detection limits established will be ≤ ½ the RL in Worksheet #15 tables. See 40 CFR, Part 136 Appendix B. Analytes must be detected and identified by method-specified criteria for the for the verification check to be valid, or the verification check must produce a response that is at least 3 times the instrument noise level and greater than the response in the blanks associated with the MDL study.	Continue to run the MDL study until all criteria are passing.	N/A.
LOD determination and verification (see Section D.1.2.1 and Box D-13 of the DoD QSM[c])	At initial setup and verified quarterly. If a laboratory uses multiple instruments for a given method, the LOD must be verified on each	The apparent signal to noise ratio must be at least 3 and the results must meet all method requirements for analyte identification.	If the LOD verification fails, the laboratory must: (1) Repeat the detection limit determination and LOD verification at a higher concentration; or (2) Perform and pass two consecutive LOD verifications at a higher concentration. The LOD is set at the higher concentration.	N/A; samples may not be analyzed without a valid LOD.
LOQ establishment and verification (see Section D.1.2.2 and Box D-14 of the DoD QSM[c])	At initial setup: (1) verify LOQ and (2) determine precision and bias at the LOQ; then verify LOQ quarterly (if a laboratory uses multiple instruments for a given method, the LOQ must be verified on each; see Box D-14 of the DoD QSM[c])	(1) The LOQ and associated precision and bias must meet client requirements and must be reported; or (2) In the absence of client requirements, must meet control limits of the LCS. See Box D-14 of the DoD QSM[c].	If the LOQ verification fails, the laboratory must either establish a higher LOQ or modify method to meet the client-required precision and bias.	N/A; samples may not be analyzed without a valid LOQ.
Results reported between the DL and LOD, and the LOD and LOQ	None	None.	None.	Apply F-flag to all results between DL and LOQ. If no result below the LOD, report to the LOD, flag "U."
Demonstrate acceptable analyst capability	Prior to using any test method and at any time there is a significant change in instrument type, personnel, or test method (see Appendix C of the DoD QSM[c])	QC acceptance criteria published by DoD, if available; otherwise method-specified criteria.	Recalculate results; locate and fix problem, then rerun demonstration for those analytes that did not meet criteria (see Section C.1.f of the DoD QSM[c]).	N/A. This is a demonstration of ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample (e.g., LCS or PT sample). No analysis will be allowed by an analyst until capability is demonstrated.

End of Method SW6020A

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8290

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
MS tuning check	Before initial calibration or calibration verification and after every 12-hour period	Tune the instrument to meet the minimum resolving power of 10,000 at m/z 304.9824. Ensure that the exact mass of m/z 380.9760 is within 5 ppm of the required value. Monitor the lock mass selected ion current profile.	Retune instrument; verify. Rerun affected samples.	Not appropriate
GC column performance check	Before initial calibration or calibration verification	Peak separation between 2,3,7,8-TCDD and other TCDD isomers valley of ≤ 25%. and First and last eluters of all eight homologue retention time windows identified labeled (F/L) on the chromatogram and Absolute retention times for switching from one homologous series to the next > 10 seconds for all components of the mixture	Correct problem then repeat column performance check.	Flagging criteria are not appropriate.
Initial multipoint calibration for all analytes (minimum five standards) (ICAL)	Before sample analysis, as needed by failure of routine calibration verification standard, or when a new lot is used for standard source of CCV, sample fortification solution (IS), or recovery standards	Ion abundance ratios in accordance with Table 8 of Method SW8290 and S/N ratio > 10 for all target analyte ion current profiles and % RSD ± 20% for 17 unlabeled standards and % RSD ± 30% for the 9 labeled IS.	Correct problem then repeat initial calibration.	Problem must be corrected. Samples may not be analyzed until there is a valid ICAL.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8290

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
Routine (continuing) calibration check (Use HRCC-3 calibration standard) (CCV)	At the beginning of each 12-hour period (after successful GC resolution and MS resolution checks), and at the end of 12-hour shift.	Ion abundance ratios in accordance with Table 8, Method SW8290 and RF within ± 20% D for unlabeled standards from mean RF from initial calibration and RF within ± 30% for labeled standards from mean RF from initial calibration **End of run CCV only:** If the RF for an unlabeled or labeled standard fails by ≤ 5% in the final CCV, a new "daily" mean RF may be calculated using the initial and final RF values and used to determine the specific analyte concentrations for all samples analyzed during the shift.	Correct problem, repeat calibration verification standard one more time. If that fails, then repeat initial calibration and reanalyze all samples analyzed since the last successful calibration verification. Evaluation of corresponding labeled/unlabeled standards may impact the corrective action required. **End of run CCV:** If the RF for an unlabeled or labeled standard fails by > 5% in the final CCV, run a new ICAL immediately (within 2 hours) and use the new RF values to process the samples. Alternatively, reanalyze all samples with positive detections.	Problem must be corrected. Samples may not be analyzed until the calibration has been verified. **End of run CCV:** Apply Q-flag to all results for the specific analyte(s) in the sample which are not reprocessed or reanalyzed.
PCDD/PCDF identification	Verify all sample positive detections per Method SW8290	Retention time of sample components in accordance with stated criteria in Method SW8290 (Section 7.8.4.1) and Ion abundance ratios for all analytes, ISs, and recovery standards in accordance with criteria in Method SW8290 (Table 8, Section 7.8.4.2) and S/N ratio of all labeled analytes ≥ 10 times background noise (Method SW8290 Section 7.8.4.3) and S/N ratio of all remaining analyte ions ≥ 2.5 times background noise (Method SW8290 Section 7.8.4.3) and For PCDF, no signal present having a S/N ratio ≥ 2.5 for the corresponding ether (PCDPE) detected at the same retention time (± 2 sec, (Section 7.8.4.4)	Correct problem, then reprep and reanalyze the sample(s) with failed criteria for any of the internal, recovery, or standards. If PCDPE is detected or if sample peaks present do not meet all identification criteria, calculate the EMPC (estimated maximum possible concentration) according to Method SW8290 Section 7.9.5.2.	Flagging criteria are not appropriate. Positive identification of 2,3,7,8-TCDF on the DB-5 or equivalent column must be confirmed on a column capable of isomer specificity (DB-225) (see Method SW8290 Section 3.4). If peak identification criteria are met but ion abundance criteria fail for the analyte and IS, the sample should be presumed to have interfering contaminants. The sample should be rerun or the extract reanalyzed.

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Method SW8290

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]	Flagging Criteria[b]
ISs	Every sample, standard, and QC sample.	Percent recovery for each IS (before any dilutions) within 40–135% (Method SW8290 Section 8.4)	Inspect mass spectrometer and GC for malfunctions. Reanalysis of samples analyzed while the system was malfunctioning is mandatory.	Apply Q-flag to all results for analytes associated with a failed IS unless a matrix effect can be verified, then apply M.
Sample specific estimated detection limit (EDL)	Every sample that indicates non-detects or detections that are < 2.5 times background noise	Method 8290 Section 7.9.5 describes the calculation	N/A	N/A
Sample estimated maximum possible concentration (EMPC)	If PCDPE is detected or if sample peaks present do not meet all ion abundance ratio criteria	Method 8290 Section 7.9.5 describes the calculation	N/A	Apply J-flag to all EMPC values.
Method Blank	Minimum one per preparation batch. A method blank is required after a calibration run and before any sample run.	No analytes detected > ½ LOQ	Assess data and correct problem. If necessary, reprep and analyze method blank and all samples processed with the contaminated blank.	Apply B-flag to all associated positive results for the specific analyte(s), as appropriate.
MS/MSD	One MS/MSD per every 20 samples per matrix	Acceptance criteria: Tables 7-2 and 7-3	Assess data to determine whether there is a matrix effect or analytical error. Analyze LCS for failed target analytes. Potential matrix effects should be communicated to CH2M HILL so an evaluation can be made with respect to the PQOs.	For the specific analyte(s) in all samples collected from the same site matrix as the parent, apply M-flag if: (1) %R for MS or MSD > UCL (2) %R for MS or MSD < LCL, or (3) MS/MSD RPD > CL
Sample duplicate	One per analytical batch. This may be replaced by the MSD.	Acceptance criteria: Tables 7-2 and 7-3	Verify instrument performance, review analytical procedures.	For the specific analyte(s) in parent sample, apply J-flag.
Results reported below the lowest standard	None	None	None	Apply F-flag to all results below the lowest calibration standard.

End of Method SW8290

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Methods 160.2, 310.2, 350.1, SW9030B, SW9056, and SW9060

QC Check*	Frequency	Criteria	Corrective Action
Multi-point initial calibration (a blank and at least five standards) – does not apply to titrimetric method	Before initial sample analysis, every 24 hours, whenever modifications are made to the analytical system, or when continuing calibration verification fails	Correlation coefficient of linear regression is ≥ 0.995	Correct the problem and repeat the initial calibration.
Second-source calibration verification	Immediately following each initial calibration	Analytes within ±15% (±10% for SW9056) of expected value	Correct the problem and repeat initial calibration.
Calibration blank – does not apply to titrimetric methods	After every Second-source or Continuing calibration verification analysis	No analytes detected at or above the LOQ	Correct the problem, then reanalyze previous 10 samples.
Continuing calibration verification	After every 10 samples and at the end of the analysis sequence	Within ±15% (±10% for SW9056) of expected value	Recalibrate and reanalyze all samples since the last acceptable continuing calibration verification
Method Blank	At least one per analytical batch	No analytes detected at or above the LOQ	Correct the problem and re-prep and reanalyze all associated samples
MS/MSD	One set per 20 project-specific samples. MSD is optional if a laboratory sample duplicate is performed	All analytes within limits specified Limits Worksheet 15	None
Laboratory sample duplicate	Once per analytical batch if MSD not performed	Concentration of reported analytes are > 5 times the reporting limit in either sample and RPD >20%. One sample result < RL and a difference of ±2 times the reporting limit	None
LCS	At least one per analytical batch	All analytes within limits specified limits in Worksheet 15	Correct the problem, and re-prep and reanalyze the LCS and all samples in the analytical batch

*Unless calibration and QC requirements are specified for an individual method.

End of Methods 160.2, 310.2, 350.1, SW9030B, SW9056, and SW9060

Table H-10
Summary of Laboratory Quality Control Procedures by Analytical Method
Notes, Acronyms, and Abbreviations

[a]All corrective actions associated with project work ~~will~~shall be documented, and all records ~~will~~shall be maintained by the laboratory.

[b]Flagging criteria ~~will~~shall be applied when acceptance criteria were not met and corrective action was not successful or corrective action was not performed.

[c]DoD, 2010, *Department of Defense (DoD) Quality Systems Manual for Environmental Laboratories*, Version 4.2, October.

% D – percent difference
%R – percent recovery
CCC – calibration check compounds
CCV – continuing calibration verification
COD – coefficient of determination
DL – detection limit
DRO – diesel range organics
GC – gas chromatography
GRO – gasoline range organics
ICAL – initial calibration
ICS – interference check sample
ICV – initial calibration verification
IS – internal standard(s)
LCL – lower confidence limit
LCS – laboratory control sample
LOD – limit of detection
LODv – limit of detection verification
LOQ – limit of quantitation
MDL – method detection limit
MS/MSD – matrix spike/matrix spike duplicate
N/A – not applicable
PQO – practical quantitation objectives
PT – performance testing
QC – quality control
QSM – Quality Systems Manual (DoD)
RF – response factor
RL – reporting limit
RPD – relative percent difference
RRT – relative retention time
RSD – relative standard deviation
SPCC – system performance calibration compounds
UCL – upper confidence limit

End of Table H-10

3. MANAGEMENT OF WASTE FROM CLOSURE ACTIVITIES

Wastes that are expected to be generated during the final closure activities at the OD Unit include: excess soil from sampling; well purge water, drill cuttings, decontamination water; PPE; and excavated soils. To minimize the amount of waste to be generated during closure activities, excess soil cuttings from borings ~~will~~shall be replaced in the auger holes. The volume of liquid waste generated during the cleaning of equipment is to be minimized by using only the smallest amount of wash rinse water necessary to achieve successful decontamination. Solvents ~~will~~shall not be used.

3.1 Waste Management

Wastes associated with closure activities at the OD Unit ~~will~~shall be managed as follows:

- Wastes ~~will~~shall be stored in appropriate containers that are compatible with the wastes and are in good condition.
- If analytical results indicate that the waste is hazardous or the ~~Kirtland AFB~~Permitee project manager determines that the waste ~~will~~shall be classified as hazardous, ~~Kirtland AFB~~the Permitee ~~will~~shall manage the waste in accordance with all applicable regulations in 40 CFR §261-268.
- Waste containers shall remain within the OD Unit boundary under the control of the personnel generating the waste until it is transported for treatment and disposal.
- Waste containers ~~will~~shall be segregated according to the compatibility and chemical waste type.
- Waste ~~will~~shall be stored in containers that remain closed, except when adding or removing wastes.
- Waste containers bearing free liquid ~~will~~shall be provided with secondary containment of sufficient volume to prevent spilled liquids from being released onto the ground.
- Waste containers ~~will~~shall be managed in such a manner as to prevent ruptures and leaks.
- Waste containers ~~will~~shall be labeled appropriately, pending receipt of analytical results. Labels ~~will~~shall be filled out appropriately and marked using permanent marker or pen. Label information ~~will~~shall include waste source, suspected contaminants, contents, depth (if appropriate), the date which accumulation began, and a contact name.

3.2 Waste Characterization

Characterization of the liquid waste and excavated soil generated during the closure of the OD Unit ~~will~~shall be based upon the results of sampling and analysis. Decontamination water ~~will~~shall be analyzed for the constituents listed in Tables H-3. PPE ~~will~~shall be handled ~~as non-hazardous waste and will be managed appropriately~~in accordance with Section 1.4 of this Permit Attachment (H) and applicable state and federal regulations~~-~~.

3.3 Waste Disposal

All wastes from closure activities determined to be hazardous ~~will~~shall be managed in accordance with the Hazardous Waste Management Regulations from the time of generation. Hazardous wastes ~~will~~shall be shipped off-site for treatment and disposal at a permitted RCRA facility.

Wastes characterized as nonhazardous ~~will~~shall be evaluated to determine the appropriate disposal method in accordance with applicable law.

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