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DEPARTMENT OF THE AIR FORCE

HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE, NEW MEXICO

ENTERED

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New Mexico Environment Department
Attn: Mr. John Kieling, Chief
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe NM 87505-6303

Dear Mr. Kieling

Holloman Air Force Base is pleased to submit the Final RCRA Facility Assessment Confirmatory Sampling Report Sites SS-65/TU-71, SS-67 and SS-69 for your review.

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.

The report concludes that the sites have been characterized or remediated in accordance with applicable state and/or federal regulations, with the supporting data indicating that any contaminants pose an acceptable level of risk under current projected future land use. Accordingly, Holloman AFB submits that based on Criterion #5 of the Permit being satisfied, these sites should be determined to require no further action.

If you have any questions, please contact Ms. DeAnna Rothhaupt of our Asset Management Flight at (575) 572-3931.

Sincerely

20130821

A. DAVID BUDAK, GS-14, DAFC

Attachment:
Final RCRA Facility Assessment Confirmatory Sampling Report Sites SS-65/TU-71, SS-67 and SS-69

cc:

(w/Atch)	(w/o Atch)	(w/CD)
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FINAL

RCRA FACILITY ASSESSMENT CONFIRMATORY SAMPLING REPORT SITES SS-65/TU-71, SS-67, AND SS-69 HOLLOMAN AIR FORCE BASE, NEW MEXICO

Prepared For:

49 CES/CEAN
Holloman Air Force Base
New Mexico

Under Contract To:

U.S. Army Corps of Engineers
Omaha District
1616 Capitol Avenue
Omaha, Nebraska 68102-1618

Contract No. W9128F-11-D-0029
Task Order No. 0002

July 2013

Prepared by:

NATIONVIEW

1608 13th Avenue South, Suite 160
Birmingham, Alabama 35205

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FINAL

RCRA FACILITY ASSESSMENT

CONFIRMATORY SAMPLING REPORT
SITES SS-65/TU-71, SS-67, AND SS-69
HOLLOMAN AFB, NEW MEXICO

Prepared for:

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Holloman Air Force Base
New Mexico

Under Contract To:

U.S. Army Corps of Engineers
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FINAL
RCRA FACILITY ASSESSMENT
CONFIRMATORY SAMPLING REPORT
SITES SS-65/TU-71, SS-67, AND SS-69
HOLLOMAN AFB, NEW MEXICO

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ACRONYMS AND ABBREVIATIONS

AAF	Army Air Field
Accutest	Accutest Laboratories Inc., Orlando Florida
AF Fm	Air Force Form
amsl	Above mean sea level
AOC	Area of Concern
BEAR	Basic Expeditionary Airfield Resources
bgs	Below ground surface
Bhate	Bhate Environmental Associates, Inc.
CES/CEAN	Civil Engineering Squadron/Environmental Asset Management Flight
CFR	Code of Federal Regulations
CY	cubic yards
°C	Degrees Celsius
DPT	Direct push technology
DRO	Diesel range organics
ERP	Environmental Restoration Program
°F	Degrees Fahrenheit
ft	feet
>	Greater Than
GPS	Global Positioning System
GRO	Gasoline range organics
HAFB	Holloman Air Force Base
HHMSSL	Human Health Medium Specific Screening Level
J	Data Qualifier (denotes an estimated value)
LCS	Laboratory Control Sample
µg/L	Micrograms per liter
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NationView	NationView LLC
NFA	No Further Action
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMWRRS	New Mexico Water Rights Reporting System
NMWQCC	New Mexico Water Quality Control Commission
NOA	Notice of Approval
ORO	Oil range organics
PCB	Polychlorinated Biphenyl
PID	Photoionization detector
PRG	Preliminary Remediation Goal

ACRONYMS AND ABBREVIATIONS (CONTINUED)

QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RBC	Risk Based Concentration
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RPD	Relative Percent Difference
RSL	Regional Screening Level
SOP	Standard Operating Procedure
SSL	Soil Screening Level
SVOC	Semi-volatile organic compound
SWMU	Solid Waste Management Unit
TAL	Target Analyte List
TCE	Trichloroethylene
TCLP	Toxicity characteristic leaching procedure
TDS	Total dissolved solids
TPH	Total petroleum hydrocarbons
UJ	Data Qualifier (denotes an estimated non detected value)
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
UTL	Upper Tolerance Limit
VOC	Volatile organic compound
WRCC	Western Regional Climate Center
WSMR	White Sands Missile Range
WWTP	Waste Water Treatment Plant

1 INTRODUCTION

In 2006, Bhate Environmental Associates, Inc., (Bhate) was retained by the United States Army Corps of Engineers (USACE) Omaha District, under contract DACA87-02-D0003, Task Order No. DK01, to conduct a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA), Confirmatory Sampling, at nine Areas of Concern (AOCs) at Holloman Air Force Base (HAFB), New Mexico. The Scope of Services for conducting a RFA at nine Environmental Restoration Program (ERP) sites (SS-65, SS-66, SS-67, SS-68, SS-69, SS-72, SS-73, RW-70, and TU-71) was issued by the USACE Omaha District on November 8, 2005. During the review of site-related documents, a site walk and the preparation of the *RCRA Facility Assessment Confirmatory Sampling Work Plan Multiple Sites Holloman AFB, New Mexico* (Bhate, 2007), it was determined that sites SS-65 and TU-71 were co-located, therefore their investigations were combined so that the investigation of site SS-65 would serve to characterize both sites.

All of the field work performed during the RFA was conducted in accordance with the approved *RCRA Facility Assessment Confirmatory Sampling Work Plan Multiple Sites Holloman AFB, New Mexico* (Bhate, 2007). The final version of the RFA Work Plan (Bhate, 2007) was revised to address deficiencies outlined by the New Mexico Environment Department (NMED) in correspondence dated June 11, 2007 and was approved by the NMED on November 7, 2007. NMED correspondence and responses to NMED comments are provided in Appendix A.

The *Final RCRA Facility Assessment Confirmatory Sampling Report Multiple Sites (SS-66, S-68, RW-70, SS-72, and SS-73) Holloman AFB, New Mexico* (Bhate, 2008) describes the RFA sampling results, conclusions and recommendations for referenced sites. The NMED approved the *RFA Confirmation Sampling Report, Multiple Sites* (Bhate, 2008) and issued a Certificate of Completion for Corrective Action Complete Without Controls for SS-66 (AOC-C), SS-68 (AOC-F), RW-70 (AOC-M), SS-72 (AOC-838) and SS-73 (AOC-1088) on July 18, 2012 (Appendix A).

Preparation and submittal of this RFA report (for sites SS-65, SS-67, and SS-69) was delayed at the request of the NMED until the background concentrations of metals at HAFB could be finalized (NMED, 2011). The *RCRA Facility Assessment Preliminary Review/Visual Site Inspection Report, Holloman AFB, New Mexico* (A.T. Kearney, 1988) recommended that further investigation should be conducted at sites SS-65, SS-67, and SS-69 to determine the presence of potential contamination. Therefore, the rationale for conducting the RFA Confirmatory Sampling investigation (soil and groundwater sampling) was to determine the presence of subsurface contamination at these sites. This RFA report has been prepared by NationView LLC, (NationView), and addresses the soil and groundwater sampling results as well as the conclusions and recommendations for sites SS-65, SS-67, and SS-69. NationView has been retained by the USACE Omaha District under contract W9128F-11-D-0029, Task Order No. 02. The locations of HAFB and the three RFA sites included in this report are provided in Figures 1-1 and 1-2.

1.1 Objectives

The primary objective of the *RCRA Facility Assessment Confirmatory Sampling Work Plan Multiple Sites Holloman AFB, New Mexico* (Bhate, 2007) was to collect soil and groundwater data to fulfill the requirements identified by the New Mexico Environment Department (NMED) to achieve site closures.

This report summarizes the conditions and any potential impacts to soil and groundwater at sites SS-65, SS-67, and SS-69. During the review of site related documents (e.g. *RCRA Facility Assessment Preliminary Review/Visual Site Inspection Report*, A.T. Kearney, Inc., 1988) for preparing the RFA Work Plan (Bhate, 2007), it was determined that site SS-65 and TU-71 were co-located, therefore their investigations were combined so that the investigation of site SS-65 served to characterize both sites. The proposal was discussed with and approved by the NMED Hazardous Waste Bureau during a conference call held on November 2, 2006 (Bhate, 2007). The NMED delisted site TU-71 and as a result this site is not listed on either Table A or Table B of the HAFB Hazardous Waste Facility Permit (No. NM6572124422) Appendix 4-A (NMED, 2012a).

During the RFA confirmatory sampling investigation required data was collected to support the closure of the sites SS-65, SS-67, and SS-69 based on correspondence provided by the NMED (Appendix A of this report and the HAFB Hazardous Waste Permit [NMED, 2004]). The ultimate objective is to achieve No Further Action (NFA) approval for site closure from NMED. The conclusion of the document requests that NMED issue an NFA for sites SS-65, SS-67, and SS-69 based upon Criterion #5 (Appendix 4-B HAFB Hazardous Wastes Facility Permit No. NM6572124422), (NMED, 2004) which states:

"The site was characterized or remediated in accordance with applicable state and/or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use."

1.2 Purpose of the RFA Confirmatory Sampling Report

The primary objective of the RFA is to comply with the requirements of RCRA Permit number NM6572124422 by completing the sampling program identified in the Scope of Work and applying site-specific data quality objectives identified in the HAFB *Basewide Quality Assurance Project Plan* (Basewide QAPP) (Bhate, 2003). The data quality objectives include:

- Generate data to characterize contaminant sources; and
- Determine, to the extent possible, the nature and extent of contamination in the site media.

1.3 Scope of Work

The following summary of the work performed under this RCRA Facility Assessment is detailed in the *RCRA Facility Assessment Confirmatory Sampling Work Plan, Multiple Sites* (Bhate, 2007) and included:

- Review existing information about each site;
- Conduct a site and environs reconnaissance;
- Collect soil and groundwater data,
- Identify potential receptors; and
- Evaluate all information collected.

The following Activities were performed by Bhate from April 2007 through April 2013:

1.3.1 **SS-65 Building 807 Test Cell Surface Spill**

The *Holloman Air Force Base Environmental Restoration Program Site Status Summaries Report* (HAFB, 2005) identified site SS-65 as a suspected surface spill of petroleum hydrocarbons located approximately 25 feet north of Building 807 Test Cell. Therefore, the objective of the investigation at Site SS-65 was to further investigate stained soils observed just north of Building 807 which were initially identified during the 1988 RFA (A.T. Kearney, Inc., 1988). In addition, the HAFB ERP Site Status Summaries Report (HAFB, 2005) also identified a suspected leaking underground storage tank (UST) located immediately north of Building 807. However, a review of the construction drawings for the trim pads and Building 807, as well as a records search at the HAFB Real Property office did not indicate that a UST ever existed at Building 807 (ERP Site TU-71). Furthermore, evidence of an underground storage tank (e.g., vent or fill pipes) were not observed in this area during the site visit conducted on July 12, 2006. Therefore, as previous discussed it was agreed by the NMED to combine the TU-71 investigation with the investigation of site SS-65.

The objectives of the SS-65 investigation also identified as AOC-B on Table A of the HAFB Hazardous Waste Facility Permit (NMED, 2012a) were accomplished by conducting a records research, subsurface soil sampling, temporary monitoring well installation, and groundwater sampling. Five soil borings (SS65-DP01 through SS65-DP05) were installed and a total of five soil samples were collected for chemical analysis (one from each boring). Three of the boreholes were converted into temporary monitoring wells (SS65-DP01 through SS65-DP03). Groundwater samples were collected from two of the three temporary monitoring wells (SS65-DP01 and SS65-DP02).

Groundwater and soil samples collected were analyzed for the following:

- Volatile Organic Compounds (VOCs) using United States Environmental Protection Agency (USEPA) Method 8260B (soil and groundwater);

- Semi volatile Organic Compounds (SVOCs) using USEPA Method 8270C (soil and groundwater);
- Polychlorinated Biphenyl's (PCBs) using USEPA Method 8082 (soil and groundwater);
- Target Analyte List (TAL) Metals using USEPA Method 6010B/7471A (soil) and USEPA Method 6010B/7470A (groundwater);
- Total petroleum hydrocarbons (TPH) – gasoline range organics (GRO), diesel range organics (DRO), and oil range organics (ORO), using USEPA method 8015M (soil and groundwater); and
- Total dissolved solids (TDS) using USEPA Method 160.1 (groundwater).

SS-65 had not been investigated in the past beyond the visual site inspection which was conducted during the 1988 RFA. Beyond anecdotal information, there is no evidence of any kind of a spill occurring at the site. The area surrounding this site has been disturbed during the construction of the adjacent F-117 bed down facilities. The locations of the five soil borings and three monitoring wells installed during the SS-65 RFA investigation are shown on Figure 1-3.

1.3.2 **SS-67, Buildings 903-909, Sand Blast Residue**

The 1988 RFA Report (A.T. Kearney, Inc., 1988) identified suspected releases to the environment from the sand blasting operations conducted at Buildings 903 and 905. Sand blasting residue (a mixture of materials including silica shot, metal, and old paint) were reportedly staged along the south side of Buildings 903 and 905.

The objectives of investigation at Site SS-67, also identified as AOC-E on Table A of the HAFB Hazardous Waste Facility Permit (NMED, 2012a), was to determine if any impacts, from the previous sand blasting operations were made to the soil and groundwater at the site. During a site visit conducted on July 12, 2006 a small 6 feet (ft) by 6 ft area of black colored grit (sandblast residue) was observed five feet east of a telephone pole located along the south side of Building 905 (Figure 1-4). However, during the April 2007 SS-67 RFA field investigation this area had been graded and landscaping gravel had been laid in the area. Additionally, the sandblasting residue was not visibly apparent under the landscaping gravel.

The objectives of the SS-67 investigation were accomplished by conducting records research, soil sampling and groundwater sampling. Four soil borings (SS67-DP01 through SS67-DP04) were advanced to characterize the subsurface soils, and each soil boring was completed as a temporary monitoring well. At the request of the NMED, surface soil samples were collected at six locations (SS67-SS01 through SS67-SS06) along the south side of Building 905 where the sandblast residue was identified during the July 2006 site visit.

Groundwater and soil samples collected were analyzed for the following:

- VOCs using USEPA Method 8260B (soil and groundwater);
- SVOCs using USEPA Method 8270C (soil and groundwater);

- TAL Metals using USEPA Method 6010B/7471A (soil) and USEPA Method 6010B/7470A (groundwater);
- TPH – GRO, DRO, and ORO, using USEPA method 8015M (soil and groundwater); and
- TDS using USEPA Method 160.1 (groundwater only).

The SS-67 Soil boring/temporary monitoring well locations (SS67-DP01 through SS67-DP04) including the surface soil sample locations (SS67-SS01 through SS67-SS06) are shown on Figure 1-4.

1.3.3 **SS-69, Fighter Wing Flight Line Spill**

The 1988 RFA Report (A.T. Kearney, Inc., 1988) identified site SS-69 as a surface spill of approximately 275 gallons of trichloroethylene and 200 gallons of carbon tetrachloride that occurred in the general area of the 49th Tactical Air Command Flight Line. The *Holloman Air Force Base Environmental Restoration Program Site Status Summaries Report* (HAFB, 2005) stated that the spill occurred approximately 200 feet southwest of Building 868 (pre-1991configuration).

The objectives of the investigation at site SS-69 also identified as AOC-I on Table A of the HAFB Hazardous Waste Facility Permit (NMED, 2012a), was to further investigate the reported spill of solvents identified during the 1988 RFA. This objective was accomplished by conducting records research, soil sampling and groundwater sampling. Three soil borings (SS69-DP01 through SS69-DP03) were advanced to characterize the subsurface soils, additionally; each soil boring was completed as a temporary monitoring well. Soil boring/temporary monitoring well locations (SS69-DP01 through SS69-DP03) are shown on Figure 1-5.

Groundwater and soil samples collected were analyzed for the following:

- VOCs using USEPA Method 8260B (soil and groundwater);
- SVOCs using USEPA Method 8270C (soil and groundwater);
- TAL Metals using USEPA Method 6010B/7471A (soil) and USEPA Method (6010B/7470A (groundwater);
- TPH – GRO, DRO, and ORO, using USEPA method 8015M (soil and groundwater); and
- TDS using USEPA Method 160.1 (groundwater only).

1.4 Document Organization

This RCRA Facility Assessment Report has been modeled after the format suggested in the Report Requirements found in the HAFB RCRA Permit NM6572124422 (Appendix 4-B of the Permit). The document contains the following 6 sections:

- Section 1 – Introduction
- Section 2 – Site Background and Historical Data Review

- Section 3 – Environmental Setting
- Section 4 – Laboratory Analysis and Data Validation
- Section 5 – Site Specific Results, Conclusions and Recommendations.
- Section 6 – References

The tables and figures referenced throughout this RFA Report are included following the text (after Section 6). This report also includes the following appendices:

- Appendix A – NMED Correspondence
- Appendix B – Soil Boring Logs and Monitoring Well Construction Diagrams
- Appendix C – Monitoring Well Development and Sampling Forms
- Appendix D – Laboratory Analysis and Data Validation Summary
- Appendix E – Data Validation Summary with Data Validation Reports
- Appendix F – SS-67 Sandblast Residue/Soil – Waste Characterization and Waste Manifests

2 SITE-SPECIFIC BACKGROUND AND HISTORICAL DATA REVIEW

2.1 HAFB Site Description

HAFB is situated in south central New Mexico, in the northwest central part of Otero County, approximately 75 miles north-northeast of El Paso, Texas (Figure 1-1). HAFB has a population of 6,000 and occupies about 50,000 acres in the northeast quarter of Section 1, Township 17 South, Range 8 East. The White Sands Missile Range (WSMR) testing facilities occupy additional land extending northward from the Base. Private and public owned lands border the remainder of HAFB. The major highway servicing HAFB is Highway 70, which runs southwest from the town of Alamogordo and separates HAFB from publicly owned lands to the south. Alamogordo which has a population of approximately 35,000 is located approximately 7 miles east of the base.

HAFB was first established in 1942 as Alamogordo Army Air Field (AAF). From 1942 through 1945, Alamogordo AAF served as the training grounds for over 20 different flight groups, flying primarily B-17s, B-24s, and B-29s. After World War II, most operations had ceased at the base. In 1947, Air Material Command announced the air field would be its primary site for the testing and development of un-manned aircraft, guided missiles, and other research programs. On January 13, 1948, the Alamogordo installation was renamed Holloman Air Force Base, in honor of the late Col. George V. Holloman; a pioneer in guided missile research. In 1968, the 49th Tactical Fighter Wing arrived at HAFB and has remained since. Today, HAFB also serves as the training center for the German Air Force's Tactical Training Center.

Figure 1-2 shows the location of the sites described in the following sections.

2.2 SS-65, Building 807, Test Cell Surface Spill

2.2.1 SS-65 Site Description and Background

ERP Site SS-65, Building 807 Test Cell Surface Spill Area is also identified as AOC-B, and is listed on Table A (further corrective action required) of the HAFB Hazardous Waste Facility Permit No. NM6572124422 (NMED 2012a). The 1988 RFA Report (A.T. Kearney, Inc., 1988) identified the location of this site as the "area next to Building 807 Test Cell". Additionally the *HAFB Environmental Restoration Program Site Status Summaries* prepared in December 2005 stated that "SS-65 (AOC-B) is a suspected surface spill of petroleum hydrocarbons located approximately 25 feet north of Building 807" (Holloman, 2005).

During the records search for this RFA investigation aerial photographs of HAFB dated 1972, 1979, 1996, and 2004 were viewed and Building 807 could not be located. The Real Property Office at the base was contacted and it was learned that Building 807 is listed in their inventory as a cinder block building that was constructed in 1977 that measures 10 feet wide by 15 feet long. A detailed layout of this site and its surroundings is shown on Figure 1-3.

During the SS-65 site visit conducted on July 12, 2006, Building 807 (cinder block building, measuring 10 x 15 feet) was located approximately 40 feet southeast of Building 801. The building has no windows and is not occupied. Although oil and grease staining was observed next to Building 807 during the 1988 RFA, there were no visible signs of staining or spills of any kind noted during the July 12, 2006 site visit. Three soil piles were observed outside the northwest wall of the building. However the soil appeared to be excess overburden removed during the repair of a nearby water line.

Additionally, the HAFB Environmental Restoration Program Site Status Summaries Report (HAFB 2005) described ERP Site TU-71 as a suspected leaking UST located immediately north of Building 807. There is no available information regarding the presence of a UST at this site. The information reviewed during the records search for SS-65, which included construction drawings and records from the HAFB Real Property office confirmed that a UST never existed in the vicinity of Building 807. The site visit (July 12, 2006) did not reveal any indications of an underground storage tank in this area (e.g., UST fill and/or vent pipes were not observed). Therefore, during a conference call with the NMED on November 2, 2006, it was mutually determined by the NMED and the 49th Civil Engineering Squadron/Environmental Asset Management Flight (CES/CEAN) that the RFA confirmation sampling investigation for sites SS-65 and TU-71 would be combined. Furthermore, site TU-71 is not listed in Table A or B of the HAFB Hazardous Waste Facility Permit No. NM6572124422 (NMED 2012a), as a result ERP Site TU-71 is not further discussed in this report.

2.2.2 Previous Investigations and Dates of Operation and Description of Past and Current Practices

2.2.2.1 Records Searched

A record search for Site SS-65 was conducted by Bhate in 2006 and was presented in the Work Plan (Bhate, 2007).

The records that were searched for this site included:

- Aerial photographs over several years (1972, 1979, 1996, and 2004)
- HAFB Real Property Records
- *RCRA Facility Assessment Preliminary Review/Visual Site Inspection Report* (Kearney, 1988)
- *Construction Trim Pads W/Support (Phase I and II*), *Drawing Number HO 285A-6, Sheet 2.I of 10* (HAFB, 1980)
- *Construction Engine Test Stand (Phase I) Drawings HO 283B-6 Sheet 2 out of 5* (HAFB, 1980)
- *HAFB Environmental Restoration Program Site Status Summaries* (HAFB, 2005)
- *RCRA Facility Assessment Preliminary Review/Visual Site Inspection Report* (Kearney, 1988)

2.2.2.2 Dates of Operation and Description of Past and Current Practices

Building 807 was built in 1977 but does not appear to be in use currently. Because of its small size, it is believed to have been a bathroom facility for test personnel to use during the period that this particular engine test area was active. According to personnel from the HAFB 49th CES/CEAN, this test cell area consisted of two trim pads and one engine test stand, and spills of jet fuel were known to occur especially after the engine was shut down following a test. The site was used to test engines from F-15 and F-4 fighter aircraft during the 1970s and 1980s. During the phase-in of the F-117s in the 1990s, this test cell area was abandoned and replaced with testing facilities suitable for the F-117 which are located approximately 300 yards southeast of the site. This test cell area is currently not operational because these aircraft are not part of air operations at HAFB.

2.3 SS-67, Building 903-909 Sandblast Residues

2.3.1 Site Description and Background

ERP Site SS-67, Buildings 903-909 Sand Blast Residues is also identified as AOC-E and is listed on Table A (further corrective action required) of the HAFB Hazardous Waste Facility Permit No. NM6572124422 (NMED 2012a).

The 1988 RFA Report (A.T. Kearney, Inc., 1988) identified this site as a pile of sandblast residue located 100 feet east of Building 903 (south of Building 905). Buildings 903 and 905 are located in the south end of the 49th Materiel Maintenance Group complex at HAFB, also known as the BEAR (Basic Expeditionary Airfield Resources) Base.

It should be noted that the 1988 RFA Report included Building 909 in the site name, thereby implying that it was part of the site. This is believed to be an error because Building 909 is located on the far north side of BEAR Base, approximately 2,000 feet away from Building 903. A detailed layout of site SS-67 (Buildings 903 and 905) is shown on Figure 1-4.

2.3.2 Previous Investigations and Dates of Operation and Description of Past and Current Practices

2.3.2.1 Records Searched

A record search for Site SS-67 was conducted by Bhate in 2006 and is presented in the Work Plan (Bhate, 2007).

The records that were searched for this site included:

- Aerial photographs taken in 1996 and 2004
- *RCRA Facility Assessment Preliminary Review/Visual Site Inspection Report* (Kearney, 1988)
- *HAFB Environmental Restoration Program Site Status Summaries* (HAFB, 2005)

2.3.2.2 Dates of Operation and Description of Past and Current Practices

At the time of the 1988 RFA, metal surface preparation and painting operations took place at buildings 903 and 905 as part of a corrosion control operation that served HAFB. The corrosion shop began operation in 1978. Sand blasting of metal parts (aluminum and steel) took place in Building 905 and was performed as a surface preparation step prior to painting which was done in Building 903. Residue which is a mixture of materials including the silica shot, metal, and old paint was staged outside of Buildings 903 and 905. Mounds of material can be seen staged along the south side of Buildings 903 and 905 in the 1996 aerial photograph of the area. However, personnel from that period that are familiar with the sand blasting operation could not be located to confirm that these mounds or piles were in fact residue from the sand blasting operation and were present during the site visit made as part of the RFA in 1988. Aerial photos of this area for the years 1987, 1988, and 1989 could not be located to confirm the presence of these piles during these earlier years.

Surface cleaning (Building 905) and painting operations (Building 903) for corrosion control continue today in these buildings, although process improvements have been made with regard to the sand blasting operation and residue management. For instance, the abrasive material currently in use is plastic beads instead of silica. The beads are separated from the abraded sediments allowing reuse of the beads and collection of the sediments for proper disposal as hazardous waste.

The SS-67 RFA site visit was conducted on July 12, 2006. The residue from the sandblasting is currently drummed and labeled as hazardous waste. The exterior of both buildings were examined and it was noted that the sand piles that appeared in the 1996 aerial photo were removed and replaced with ornamental cobble stone. In addition, a 6 foot x 6 foot area of sandblast residue (black colored grit) was observed five feet east of the telephone phone located along the south side of Building 905 (Figure 1-4). This black grit material is similar to the description of the sandblast residue described in the 1988 RFA.

Sandblasting residue containing paint chips and heavy metals may have been placed directly on the ground adjacent to the buildings. Aerial photographs, institutional knowledge, and the presence of a small remaining area of staining (near the telephone pole) indicate that stockpiling of this material may have occurred. Piles of sandblast debris no longer exist at the site. The exact volume of material that was generated and perhaps placed in piles on the ground is unknown.

2.4 SS-69, Fighter Wing Flight Line Spill

2.4.1 Site Description and Background

ERP Site SS-69, Fighter Wing Flight Line Spill is also identified as AOC-I and is listed on Table A (further corrective action required) of the HAFB Hazardous Waste Facility Permit No. NM6572124422 (NMED 2012a).

The 1988 RFA Report (A.T. Kearney, Inc., 1988) identifies the site as the location of a surface spill of approximately of 275 gallons of trichloroethylene and 200 gallons of carbon tetrachloride that occurred generally in the area of the 49th Tactical Air Command Flight Line. The HAFB Environmental Restoration Program Site Status Summaries Report (HAFB, 2005) stated the spill occurred approximately 200 feet southwest of Building 868 and that the exact location of the spill is unknown. The source of this information could not be verified. Both documents identify the same general area (Building 868) as the location of the spill. A detailed layout of site SS-69 (Building 868) is shown on Figure 1-5

2.4.2 Previous Investigations and Dates of Operation and Description of Past and Current Practices

2.4.2.1 Records Searched

A record search for Site SS-69 was conducted by Bhate in 2006 and presented in the Work Plan (Bhate, 2007) and is described below.

The records that were searched for this site included:

- Aerial photographs of the F-117 flight line taken in 1984, 1996, and 2003
- *HAFB Environmental Restoration Program Site Status Summaries* (December, 2005)
- *RCRA Facility Assessment Preliminary Review/Visual Site Inspection Report* (Kearney, 1988)

2.4.2.2 Dates of Operation and Description of Past and Current Practices

Building 868 has been in existence for approximately 25 years and has served as a maintenance hangar for both F-117s and F-15s. There have been upgrades over the years, primarily during the early 1990s which is when the transition to the F-117s from the F-15s occurred. The aerial photographs of this period show a considerable addition to Building 868 and it tripled in length in approximately 1991. The outline of the Building 868 pre-1991 is shown on Figure 1-5. In addition, the 1998 aerial photo of site SS-69 confirms the size of original Building 868 (Figure 2-10, *RCRA Facility Assessment Confirmatory Sampling Work Plan, Multiple Sites* [Bhate, 2007]).

The SS-69 RFA site visit was conducted on August 1, 2006. The flight line was examined with particular attention given to the suspected location of the spills (i.e., 200 feet southwest of the original Building 868 structure). The entire area is covered with reinforced concrete since it serves as a taxi-way for heavy aircraft. There was no evidence of spills such as staining on the concrete.

Presently, the use of solvents by the United States Air Force (USAF) is limited to parts cleaning (if at all) and for the most part the use of halogenated (i.e. trichloroethylene [TCE]) and non-halogenated (i.e. acetone, toluene) solvents have been replaced with alternative chemicals as part of their pollution prevention programs.

The reported releases of trichloroethylene and carbon tetrachloride occurred over a hardened concrete surface (i.e. a flight line) approximately 12 inches thick that has low permeability. Visits were made to the HAFB Fire Department and to the Bio-Environmental organization to obtain any kind of record that would confirm the solvent spills but none was found, nor was there any personnel that recalled any spill in that area during the 1980s.

2.5 Applicable Screening Criteria

The analytical data collected during this sampling event was evaluated against all of the applicable regulatory screening criteria that are specified in Appendix 4-F *Action Levels and Cleanup Levels* of the Holloman AFB Hazardous Waste Permit No. NM6572124422 (NMED, 2004). Soil and groundwater data evaluation consisted of a direct comparison to the applicable action level screening criteria. The applicable screening criteria are presented in the RFA analytical data summary tables for the analytes and media of concern. The following sections present the regulatory criteria that were used to evaluate the analytical data generated from this investigation.

2.5.1 **Soils**

2.5.1.1 VOCs, SVOCs, PCBs, and TAL Metals

The NMED residential soil screening levels (SSLs) established in Appendix A, Table A-1 *Risk Assessment Guidance for Investigation and Remediation, Table A-1* (NMED, 2012b) were used as the primary action levels for VOCs, SVOCs, PCBs, and TAL metals. As per the HAFB Permit, Appendix 4-F V.1 (NMED, 2004) if a NMED soil cleanup level has not been established for a particular contaminant of potential concern (e.g. 2-methylnapthalene) that constituent was compared to the USEPA Region 6 *Human Health Medium Specific Screening Level* (HHMSSL). It should be noted that, under an Interagency Agreement as an update of the USEPA Region 3 Risk Based Concentration (RBC) Table, Region 6 HHMSSL Table, and the Region 9 Preliminary Remediation Goal (PRG) Table; the Region 6 HHMSSLs have been combined into the Regional Screening Level (RSL) Table (USEPA, 2013). Additionally, all detected TAL metals were compared their NMED approved HAFB background levels (NMED, 2011).

2.5.1.2 Total Petroleum Hydrocarbons

The action levels for TPH detected in soil were established in NMED's *Risk Assessment Guidance for Site Investigation and Remediation, Table 6-3 TPH Screening Guidelines – Vapor Migration and Inhalation of Groundwater* (NMED, 2012b). Based on the site specific process knowledge and history the type of petroleum product is different at each site. Since it was not known what type of petroleum hydrocarbon was spilled at Site SS-65, the TPH screening guideline (residential direct exposure), for an unknown oil (1,000 milligrams per kilogram [mg/kg]) will be utilized as the action level at this site. The TPH screening guideline (residential direct exposure), for diesel #2/crankcase oil

(1,000 mg/kg) is the action level at site SS-67. Additionally, as the suspected solvent spill area is located on the West Ramp area the TPH screening guideline (residential direct exposure), for kerosene and jet fuel (1,000 mg/kg) will be used as the action level at site SS-69.

2.5.2 **Groundwater**

2.5.2.1 VOCs, SVOCs, PCBs, and TAL Metals

There are two applicable standards for groundwater: the New Mexico Water Quality Control Commission (NMWQCC) groundwater standards for contaminants (New Mexico Administrative Code [NMAC], 20.6.2.3103) and the USEPA's *National Primary Drinking Water Regulations* (USEPA, 2009) Maximum Contaminant Levels (MCLs). The lower of the two standards are used as action levels for VOCs, SVOCs, PCBs, and TAL metals detected in groundwater. Additionally, all detected dissolved TAL metals were compared to their respective NMED Approved Background Levels for Filtered (Dissolved) Constituents in Groundwater (NMED, 2011).

2.5.2.2 Total Petroleum Hydrocarbons

The action levels for TPH detected in groundwater were established in Table 6-3 of NMED's *Risk Assessment Guidance for Site Investigations and Remediation* (NMED, 2012b). Based on the process knowledge and site history the type of petroleum product is different at each site. Since it was not known what type of petroleum hydrocarbon was spilled at Site SS-65, the TPH screening guideline (concentration in groundwater), for an unknown oil (50 milligrams per liter [mg/L]) is utilized as the action level at this site. The TPH screening guideline (concentration in groundwater), for diesel #2/crankcase oil (32 mg/L) will be used as the action level at site SS-67. Additionally, as the suspected solvent spill area is located on the West Ramp area the TPH screening guideline (concentration in groundwater), for kerosene and jet fuel (18.5 mg/L) will be used as the action level at site SS-69.

2.5.2.3 Total Dissolved Solids

There are two applicable standards for TDS detected in groundwater: NMWQCC groundwater standards for contaminants (NMAC 20.6.2.3103) and USEPA's *National Priority Drinking Water Regulations* (USEPA, 2009) MCLs. The lower of the standards was used as the action level for TDS.

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3 ENVIRONMENTAL SETTING

3.1 Physiography and Topography

HAFB is located within the Sacramento Mountains Physiographic Province on the western edge of the Sacramento Mountains. HAFB is approximately 59,600 acres in area, and is located at a mean elevation of 4,093 feet above mean sea level (amsl). The region is characterized by high tablelands with rolling summit plains; cuesta-formed mountains dipping eastward and of west-facing escarpments with the wide bracketed basin forming the basin and range complex. The Base is located in the Tularosa Sub-basin which is part of the Central Closed Basins. The bordering mountains rise abruptly to altitudes of 7,000 to 12,000 feet amsl. The San Andres Mountains bound the basin to the west (about 30 miles) with the Sacramento Mountains approximately 10 miles to the east. At its widest, the basin is about 60 miles east to west and stretches approximately 150 miles north to south.

The Tularosa Basin is a closed basin that contains all of the surface flow within its boundaries. Surface runoff from the surrounding mountains has deposited alluvial fans on the interior of the plain. Around the base, the ground surface is undulating comprised of alluvial fan deposits, eolian dunes, and flat bottomed playas (pan shaped depressions carved by wind erosion). To the west of the Base lie the gypsum sand dune fields of the White Sands National Monument. A topographic map of the base is provided as Figure 3-1.

3.2 Surface Water and Hydrology

The Tularosa Basin contains all of the surface flow in its boundaries. The nearest inflow of surface waters to the Base comes from the Lost River, located in the north-central region of the Base. The upper reaches of the Three Rivers and the Sacramento River are perennial in the basin. Within the boundaries of the Base, surface water runoff is controlled by several arroyos that trend to the southwest (Figure 3-2) Hay Draw arroyo is located in the far north. Malone and Rita's Draw, which drain into the Lost River, and Dillard Draw arroyos are located along the eastern perimeter of the Base. Approximately 10,000 years ago, indications are of a much wetter climate. The present day Lake Otero encompassed a much larger area, possibly upwards of several hundred square miles. Its remains are the Alkali Flat and Lake Lucero. Lake Lucero is a temporary feature of merely a few inches in depth during the rainy season.

The hydrology of the southern portion of the Base (south of the wastewater treatment plant) is dominated by several manmade features that form a connected hydrologic system. The principal components of this system are: the stormwater drainage canal, Lagoon G, Lake Holloman, and Lake Stinky. In addition, there are both natural and constructed wetlands in this area, some of which are related to and dependent on the manmade surface water features.

HAFB currently generates under 1 million gallons per day of wastewater. This effluent is discharged into a holding tank for golf course irrigation, spillover is then directed to

Lagoon G and then diverted through the constructed wetlands and Lake Holloman. A berm surrounding this lagoon prevents stormwater from flowing into the lagoon. The stormwater drainage canal starts at a point north of Lagoon G, and then extends southwest of the lagoon into Lake Holloman. The canal is about 2 feet wide and 1 mile long with an elevation change of about 5 feet between Lagoon G and Lake Holloman. The canal also receives effluent from Lagoon G.

Lake Holloman was created in 1965 to receive excess flow from the previous sewage treatment lagoon system. It was formed by the construction of a non-engineered earthen dam midway along an existing ephemeral lake (playa) that normally received runoff from HAFB. Lake Holloman receives water from the stormwater drainage canal, Lagoon G, and effluent from the wastewater treatment plant (WWTP). The amount of effluent going to Lake Holloman can be adjusted depending on the water requirements of Lagoon G and the constructed wetlands. The lake is in a state of dynamic equilibrium, rising and falling with seasonal and annual variations in runoff, local shallow groundwater, and treated effluent from the WWTP.

Lake Stinky encompasses as much as 35 acres of playa below Lake Holloman. This area represents a remnant of the original playa grassland present in the project area prior to the construction of the lagoon system for the original wastewater treatment system in 1948. Persistent seepage from Lake Holloman is sufficient to maintain a limited surface water expression in Lake Stinky, as well as a substantial growth of wetland vegetation (tamarisk and saltgrass) at the base of the dam separating Lake Stinky and Lake Holloman. During most years, total annual discharge to Lake Holloman is sufficient to result in overflow to Lake Stinky. On these occasions, Lake Stinky extends south from the dam through culverts underneath U.S. Highway 70/82 to encompass as much as 61 acres.

There are approximately 119 acres of jurisdictional wetlands on the main base (United States Air Force, 1996), the majority of which are located south of the WWTP near Lagoon G and Lake Holloman (79 acres). Some of these areas are fed partly by seepage from artificial impoundments (e.g., north end of Lake Stinky; west and south of Lagoon G). Others may have an independent existence, or be only slightly affected by the impoundments. These latter areas seem to be remnants of the wetlands that existed before the construction of the present system. Many of the wetlands located south of the WWTP are important foraging areas for resident and migrating birds and/or bats.

3.3 Regional Geology

The Tularosa Basin is the easternmost extension of the Basin and Range Providence of the western United States. The Basin and Range was created by Cenozoic extensional (normal) faulting of Precambrian- through Tertiary-age sedimentary and igneous rocks. The basin is a graben, or downthrown block, bounded by the upthrown fault blocks of the San Andres and Sacramento Mountains.

During the Permian period of the Paleozoic era (approximately 270 million years ago), southern New Mexico was covered by a shallow sea. Limestone and sandstone were deposited, forming thick sedimentary units. Toward the end of the Mesozoic era (approximately 70 million years ago), the major mountain building activities that formed the Rocky Mountains took place. During these events, southern New Mexico emerged from the ocean as the earth's crust upwarped gently in this region. During the Cenozoic era (beginning approximately 70 million years ago), basin and range formation was initiated in what is now the southwestern United States. Approximately 10 million years ago, Cenozoic faulting formed the graben structure known as the Tularosa Basin. During this process, arched portions of rock collapsed between large-scale, north-south trending faults. The Tularosa Basin is a central downthrown area, bounded on the east and west by fault block mountains. Bedded Permian strata can be seen along the faces of the Sacramento and San Andres Mountains. Permian limestones also occur west of HAFB in a low bedrock outcrop near Hurtz Spring. In the millions of years following, rainfall, snowmelt, and wind eroded the mountain sediments depositing them in the valley (i.e. Tularosa Basin). Water carrying eroded limestone, dolomite, gravel, and other matter continue to flow into the basin. A generalized cross-section of the Tularosa Basin is shown in Figure 3-3.

As the Tularosa Basin is a bolson, which is a basin with no surface drainage outlet, sediments carried by surface water into a closed basin are bolson deposits. The overlying alluvium generally consists of unconsolidated gravels, sands, and clays. Soils in the basin are derived from the adjacent ranges as erosional deposits of limestone, dolomite, and gypsum. Coarser material is deposited at the base of the mountains while finer material is carrier to the basin's interior. The bolson fill deposits thin out from Alamogordo to less than 100 feet near Hurtz Spring. Bolson fill deposits are 8,000 feet thick or more in the central portion of the Tularosa Basin.

Near-surface geologic conditions at HAFB have been established during this and numerous other ERP investigations. The near-surface bolsom deposits at HAFB consist of sediments that are alluvial, eolian, and lacustrine in origin. A fining sequence from the ranges towards the basin's center characterizes the area with the near surface soils as alluvial, eolian, and lacustrine deposits. The alluvial fan deposits are laterally discontinuous units of interbedded sand, silt, and clay while the eolian deposits consist primarily of gypsum sands. The eolian and alluvial deposits are usually indistinguishable due to the reworking of the alluvial sediment by eolian processes. The playa, or lacustrine deposits, consist of clay containing gypsum and are contiguous with the alluvial fan and eolian deposits throughout HAFB. There has been the identification of stiff caliche layers, varying in thickness, at different areas of the Base. A generalized near surface cross-section for HAFB is shown in Figure 3-4.

3.4 Regional Soils

The United States Department of Agriculture (USDA) Soil Conservation Service has identified two soil associations in the vicinity of Holloman AFB; the Holloman-Gypsum Land-Yesum complex, and the Mead silty clay loam. The permeability of these horizons

ranges from $4x10^{-4}$ to 1 $x10^{-3}$ centimeters per second. The distribution of soils in the vicinity of HAFB is depicted on Figure 3-5 (USDA, 1981).

The Holloman-Gypsum land-Yesum complex, 0 to 5 percent slopes soil consists of large areas of shallow and deep, well drained soils and areas of exposed gypsum. The Holloman soil makes up about 35 percent of the complex. Typically, the surface layer is light brown very fine sandy loam about 3 inches thick. The upper 13 inches of the substratum is pink very fine sandy loam that is very high in gypsum. Below that, the substratum is white gypsum to a depth of more than 60 inches. This soil is calcareous and mildly alkaline to moderately alkaline throughout. Permeability is moderate, and available water capacity is very low.

Gypsum land makes up about 30 percent of the Holloman-Gypsum land-Yesum complex, 0 to 5 percent slopes. Typically, less than 1 inch of very fine sandy loam overlies soft to hard, white gypsum. The deep Yesum very fine sandy loam makes up about 20 percent of the complex. Typically, the surface layer is light brown very fine sandy loam about 3 inches thick. The upper 9 inches of the substratum is light brown fine sandy loam that is very high in gypsum. Below that, the substratum is pink very fine sandy loam to a depth of more than 60 inches. The soil is calcareous throughout and is mildly alkaline. Permeability is moderate, and available water capacity is moderate. Many fine gypsum crystals are found throughout the profile.

The soil type located across the main drainage area for the installation is Mead silty clay loam, 0 to 1 percent slopes. This deep, poorly drained, nearly level soil is on outer fringes of alluvial fans. This soil formed in fine textured alluvium over lacustrine lake sediment. It is very high in salt content because of periodic flooding and poor drainage. Slopes are smooth and concave. Typically, the surface layer is reddish brown silty clay loam and clay loam about 5 inches thick. The substratum, to a depth of 48 inches, is light reddish brown clay that has a high content of salts. Below that, the substratum is lacustrine material of variable texture and color to a depth of more than 60 inches. Included with this soil are areas of Holloman soils and Gypsum land along the margins of the unit of steep, short gully sides and knolls. These inclusions make up about 15 percent of the map unit for this soil type. Individual areas are generally smaller than 10 acres. This soil is moderately calcareous throughout and is moderately to strongly alkaline. It has a layer of salt that is more soluble than gypsum. Permeability is very slow, and available water capacity is low.

3.5 Regional Hydrogeology

The majority (over 70 %) of the ERP Sites, Solid Waste Management Units (SWMUs), and AOCs located across HAFB have groundwater monitoring wells containing water with an average TDS concentration greater than (>) 10,000 mg/L. This TDS data supports the hypothesis that TDS concentrations below 10,000 mg/L at HAFB are caused by dilution of natural groundwater from leaking water lines and surface irrigation from the domestic water supply. TDS concentrations > 10,000 mg/L exceed the NMWQCC limit as potable water (NMAC, 20.6.2.3103) and thus, the groundwater beneath HAFB has been designated as unfit for human consumption. Likewise, USEPA

guidelines (USEPA, 1986) have identified the groundwater as a Class IIIB water source, characterized by TDS concentrations exceeding 10,000 mg/L (therefore, the naturally occurring groundwater at HAFB is not regulated). Figure 3-6 shows the general groundwater flow direction at the Base. Groundwater quality in the Tularosa Basin is of potable quality at the recharge areas in close proximity to the Sacramento Mountains and becomes increasingly mineralized (high total dissolved solids) toward the central portion of the basin and discharge areas. Potable water is available from municipal wells along the margins of the basin with more saline water towards the center. The principal sources of potable water are located in a long narrow north-south trending area on the upslope sides of Tularosa and Alamogordo and in the far southern part of the basin. HAFB is also supplied potable water from Lake Bonito, which is in the Pecos River Basin.

The preponderance of the groundwater occurs as an unconfined aquifer in the unconsolidated deposits of the central basin, with the primary source of recharge as rainfall percolation and minor amounts of stream run-off along the western edge of the Sacramento Mountains. Surface water/rainfall migrates downward into the alluvial sediments at the edge of the shallow aquifer near the ranges, and flows downgradient through progressively finer-grained sediments towards the central basin. Because the Tularosa Basin is a closed system, water that enters the area only leaves either through evaporation or percolation. This elevated amount of percolation results in a fairly high water table. Beneath HAFB, the water table ranges from 5 to 50 feet (ft) below ground surface (bgs). Flow for the Base is generally towards the southwest with localized influences from the variations in the topography of the Base. The ground surface slopes at a slightly higher rate than the water table such that the depth to groundwater in the northern areas of the Base is comparably greater (25 to 40 ft bgs) than in the southern areas of the Base (less than 10 ft bgs). Near the arroyos, groundwater flows directly toward the surface drainage feature.

In addition, there are no potable water wells on HAFB. Potable water for the Base (Boles, Douglas, and San Andres well fields) and the city of Alamogordo is derived from the foot of the nearby Sacramento Mountains, just south of Alamogordo. According to the groundwater well inventory (Table 3-1) prepared by the New Mexico Office of the State Engineer, there are approximately 25 domestic, 15 commercial, 7 irrigation, and 3 livestock wells located within a 4-mile radius of HAFB (New Mexico Water Rights Reporting System [NMWRRS] database, 2009). As shown on Figure 3-7 these wells are located along HAFB's northern and eastern boundaries (upgradient and cross gradient respectively).

3.6 Site-Specific Geology and Hydrogeology

This section presents the site-specific geology and hydrogeology for Sites SS-65, SS-67, and SS-69. The site specific soil boring logs and temporary monitoring well construction diagrams for this investigation are included in Appendix B. The survey data (northing and easting coordinates) for the soil borings and temporary monitoring wells and depth to groundwater measurements (temporary monitoring wells only) for these sites is tabulated on Table 3-2.

3.6.1 **SS-65 Geology and Hydrogeology**

Descriptions of the site geology are based upon the three soil borings (SS-65-DP01 through DP-03) which were installed in April and August 2007. This investigation defined the subsurface conditions at site SS-65 via direct sampling and observation of drilling operations. Drilling logs and temporary monitoring well construction diagrams for SS65-DP01 through DP-03 are included in Appendix B of this report. Soil boring logs were not recorded for the two hand auger soil borings (SS-65-DP04 and DP05) that were sampled in January 2008. The site SS-65 lithology consists primarily of silty fine sands with sand content increasing with depth.

Groundwater at SS-65 occurs in silty sands in a shallow unconfined aquifer. Based on the monitoring well construction diagrams (Appendix B) the three temporary monitoring wells (SS65-DP01 through SS65-DP03) are screened from 6 to 11 feet bgs. The depth to groundwater measurements (from the top of casing) were collected in April 2007 (SS65-DP01) and August 2007 (SS65-DP02 and –DP03) ranged from 3.95 to 4.66 feet bgs Table 3-2). Due to conflicting groundwater flow directions between sites SS-65, SS-67 and SS-69 (due to possible vertical control survey error) a SS-65 potentiometric map was not created, however, as indicated on the Basewide Groundwater Contour Map (Figure 3-6) the groundwater flow direction in the vicinity of Site SS-65 is to the southwest.

3.6.2 **SS-67 Geology and Hydrogeology**

Descriptions of the site geology are based upon the four soil borings installed during this investigation in April 2007and August 2007. This investigation defined the subsurface conditions at Site SS-67 via direct sampling and observation of drilling operations. Drilling logs and temporary monitoring well construction diagrams for SS67-DP01 through DP-04 are included as Appendix B of this report. The Site SS-67 lithology consists primarily of silty sands with a discontinuous clay layer.

Groundwater at SS-67 occurs in silty sands in a shallow unconfined aquifer. Based on the monitoring well construction diagrams (Appendix B) the four temporary monitoring wells (SS67-DP01 through SS67-DP04) are screened between 1 to 15 ft bgs. The depth to groundwater measurements (from the top of casing) were collected in April 2007 (SS67-DP01 and DP02) and August 2007 (SS67-DP03 and –DP04) ranged from 4.86 to 11.13 (SS67-DP03, a poor recharging well) (Table 3-2). Due to conflicting groundwater flow directions between sites SS-65, SS-67 and SS-69 (due to possible vertical control survey error) a SS-67 potentiometric map was not created, however, as indicated on the Basewide Groundwater Contour Map (Figure 3-6) the groundwater flow direction in the vicinity of Site SS-67 is to the southwest.

3.6.3 **SS-69 Geology and Hydrogeology**

Descriptions of the site geology are based upon the three soil borings installed during this investigation in April 2007. This investigation defined the subsurface conditions at

site SS-69 via direct sampling and observation of drilling operations. Drilling logs and temporary monitoring well construction diagrams for SS69-DP01 through DP-03 are included as Appendix B of this report. The site SS-69 lithology consists primarily of sandy silt, silt and silt with clay.

Groundwater at SS-69 occurs in silty sand in a shallow unconfined aquifer. Based on the monitoring well construction diagrams (Appendix B) the three temporary monitoring wells (SS69-DP01 through SS69-DP03) are screened between 2.5 to 13 ft bgs. The depth to groundwater measurements (from the top of casing) were collected in April 2007 ranged from 6.47 to 7.62 ft bgs (Table 3-2). Due to conflicting groundwater flow directions between sites SS-65, SS-67 and SS-69 (due to possible vertical control survey error) a SS-69 potentiometric map was not created, however, as indicated on the Basewide Groundwater Contour Map (Figure 3-6) the groundwater flow direction in the vicinity of Site SS-69 is to the southwest.

3.7 Climate

As a whole, New Mexico has a mild, arid to semi-arid continental climate characterized by light precipitation totals; abundant sunshine, relatively low humidity, and relatively large annual and diurnal temperature range (Western Regional Climate Center [WRCC], 2003). The climate of the Central Closed Basins varies with elevation. The Base is found in the low areas and is characterized by warm temperatures and dry air. Daytime temperatures often exceed 100 degrees Fahrenheit (°F) in the summer months and are in the middle 50s in the winter. A preponderance of clear skies and relatively low humidity permits rapid night time cooling resulting in average diurnal temperature ranges of 25 to 35°F. Potential evapotranspiration, at 67 inches per year, significantly exceeds annual precipitation, usually less than 10 inches. The very low rainfall amounts resulting in the arid conditions, which with the topographically induced wind patterns combining with the sparse vegetation, tend to cause localized “dust devils”. The annual rainfall for Alamogordo is 12 inches per year[1]. Much of the precipitation falls during the mid-summer monsoonal period (July and August) as brief, yet frequent, intense thunderstorms culminating to 30 – 40% of the annual total rainfall.

3.8 Current and Future Land Use

The land surrounding HAFB consists of residential areas to the east and northeast (City of Alamogordo), rangeland to the south, the White Sands National Monument to the west, and areas where military activities are conducted to the north. The desert terrain of the area immediately surrounding HAFB has limited development, and there are no agricultural operations, residential communities, or large industrial operations located adjacent to the Base. HAFB is an active military installation and is expected to remain active for the foreseeable future. No transfer of military property to the public is anticipated, and public access to the Base is restricted (Foster Wheeler, 2002). The

[1] http://countrystudies.us/united-states/weather/new-mexico/

area surrounding Sites SS-65, SS-67 and SS-69 is classified as industrial, containing air craft hangars, and numerous maintenance buildings.

Residential development on the Base is limited by environmental and operational constraints imposed by the 100-year floodplain, historic sites, and areas identified under the Installation Restoration Program. Safety and noise zones also limit residential development on HAFB. Future plans for residential development on the Base include renovation of existing structures, replacement of inefficient buildings, and expansion into open areas in the southeast corner of the Base (HAFB, 2000). Future land use is not expected to differ significantly from current land use practices (Foster Wheeler, 2002).

3.9 Current and Future Water Use

At present, the primary fresh water resource for the City of Alamogordo and HAFB is Lake Bonita, 60 miles northeast of the Tularosa Basin. Currently, there are no potable supplies of groundwater or surface water located on the Base. HAFB obtains its water supply from the City of Alamogordo and the HAFB wells in the Boles, San Andres, and Douglas well fields at the base of the Sacramento Mountains. No water supply wells are located on or near the Base because of poor groundwater quality (TDS > 10,000 mg/L).

4 LABORATORY ANALYSIS AND DATA VALIDATION

The analysis of samples collected during this investigation followed the proposed methodologies presented in the *Final RCRA Facility Assessment Confirmatory Sampling Work Plan, Multiple Sites, Holloman Air Force Base, New Mexico* (Bhate, 2007). All analytical procedures followed the EPA SW-846 protocol with the groundwater and soil samples being analyzed for the following:

- VOCs by USEPA Method 8260B (SS-65, SS-67 and SS-69)
- SVOCs by USEPA Method 8270C (SS-65, SS-67 and SS-69)
- TPH –GRO, TPH - DRO, and TPH –ORO by USEPA Method 8015 (SS-65, SS-67 and SS-69)
- TAL Metals by USEPA Method 6010/200.7/7471(SS-65, SS-67 and SS-69)
- RCRA Metals by USEPA Method 1311 (SS-67 waste characterization soil only)
- PCBs by USEPA Method 8082 (SS-65 only)

The groundwater samples included:

- TDS by EPA Method 160.1(SS-65, SS-67 and SS-69)

All of the laboratory data generated as part of this project was validated by the project chemist. Field Quality Assurance (QA)/ Quality Control (QC) samples, including trip blanks, equipment blank, matrix spikes (MS), and matrix spike duplicates (MSD) were collected to document field and laboratory QA/QC. The laboratory analytical data packages are provided in Appendix D of this report. The Data Validation Reports are provided in Appendix E. Accutest Laboratories (Accutest) in Orlando Florida and Test America Laboratories in Nashville, Tennessee performed the analysis of all samples collected.

Overall, only minor QC issues were identified during the data validation of the laboratory results and the laboratory took all necessary corrective actions. All of the data were determined to be usable with only minor qualifications. Information regarding the precision, accuracy, representativeness, and completeness is provided in the validation reports (Appendix E) with the following section providing a synopsis of each analyte group.

4.1 Volatile Organic Compounds

Methylene chloride was detected in a trip blank associated with samples SS69-DP01-5, SS69-DP02-5 and SS69-DP03-5. This common laboratory contaminant was detected at concentrations <10x the amount in the trip blank in SS69-DP02-5 and SS69-DP03-5. Therefore, blank contamination was present and this compound was qualified estimated "J".

4.2 Semi-Volatile Organic Compounds

No QC deficiencies warranted semi-volatile organic data qualification.

4.3 Total Petroleum Hydrocarbon

The laboratory control sample (LCS) results for the TPH-DRO analysis yielded recoveries below QC limits in associated samples SS65-DP02-5, SS65-DP03-5, SS67-DP03-5, SS67-DP03-5a and SS67-DP04-5. TPH-DRO was qualified estimated non detected "UJ" or estimated, "J".

4.4 TAL Metals

Samples SS65-DP02 and SS67-DP03 yielded method blank detections of barium, cadmium and sodium. Blank contamination was the basis for those analytes, with concentrations >method detection limit (MDL), to be qualified estimated, "J".

Due to sample non-homogeneity, the matrix spike recoveries and/or relative percent difference (RPD) of various metals, associated with soil samples SS65-DP01-5, SS65-DP02-5, SS65-DP03-5, SS65-DP04-5, SS65-DP05-5, SS67-DP01-5, SS67-DP02-5, SS67-DP03-5, SS67-DP03-5a, SS67-DP04-5, SS67-SS01, , SS67-SS06, SS69-DP01-5, SS69-DP02-5 and SS69-DP03-5, were outside control limits. The non-detected compounds that resulted in deficient MS/MSD recoveries were qualified estimated non detected "UJ" and those with results > the MDL were qualified estimated "J". Multiple metals with deficient laboratory duplicate RPDs and sample results >MDL were qualified estimated "J". Also, the serial dilution for several metals in the above mentioned samples exceeded RPD QC control limits. The concentration of those metals >50x MDL were qualified estimated "J". Finally, the RPD between the sample (SS67-SS02) and its field duplicate was outside project defined control limits for antimony, arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel, vanadium and zinc. These compounds were qualified estimated, "J", in both parent and duplicate sample.

Water samples SS65-DP01, SS67-DP01, SS67-DP02, SS67-DP01FD, SS67-DP04, SS69-DP01, SS69-DP02 and SS69-DP03 produced MS/MSD recoveries and/or RPDs for various metals outside control limits. Those compounds with deficient MS/MSD recoveries were qualified estimated non-detected "UJ" or estimated "J". The unsatisfactory laboratory duplicate RPDs for a number of metals in these samples were qualified estimated "J" or estimated non-detected, "UJ". The serial dilution in the above mentioned samples for several metals indicated physical and chemical interferences. Only those metal concentrations >50x MDL were qualified estimated "J". See individual Data Validation Reports for specifics (Appendix E).

4.5 PCBs

The PCBs analysis required no qualification.

4.6 Total Dissolved Solids

No QC deficiencies warranted qualification of total dissolved solids data.

5 SITE SPECIFIC RESULTS, CONCLUSIONS, AND RECOMMENDATIONS

This section presents the site specific investigations, results, conclusions, and recommendations for the RFA Confirmatory Sampling at SS-65, SS-67, and SS-69.

All of SS-65, SS-67 and SS-69 boreholes and temporary monitoring wells were surveyed using a Trimble® Geometrics Pro XR global positioning system (GPS) in accordance with the methods described in the Basewide QAPP (Bhate, 2003). The horizontal locations (northing and easting coordinates) are relative to the State Plane Coordinate System New Mexico Central and surveyed to an accuracy of +/- 1.0 ft. Table 3-2 summarizes the horizontal survey data, depth to groundwater measurements collected from April through December 2007 and January 2008.

5.1 SS-65, Building 807 Test Cell Surface Spill

5.1.1 Site Investigation

The following field activities were performed at SS-65 in order to evaluate subsurface and groundwater conditions:

- Five soil borings (SS65-DP01 through SS65-DP05) were drilled and sampled in order to delineate the potential for contamination associated with the observed surface staining during the 1988 RFA.
- Three temporary monitoring wells (SS65-DP01 through SS65-DP03) were installed.
- Two groundwater samples were collected from temporary monitoring wells SS65-DP01 and SS65-DP02.

Soil and groundwater laboratory analytical results are presented in Tables 5-1 and 5-2 of this report.

Prior to beginning field work a Base Dig Permit (Air Force Form [AF Fm] 103) with a utility clearance, was submitted and approved by the proper authority. All completed field and waste handling activities at SS-65 were performed in accordance with HAFB Standard Operating Procedures (SOPs), provided in the *Basewide Quality Assurance Project Plan* (Bhate, 2003) and the *Bhate Standard Operating Procedures* (Bhate, 2002), outlined in the *Final RCRA Facility Assessment Confirmatory Sampling Work Plan, Multiple Sites, Holloman Air Force Base, New Mexico* (Bhate, 2007).

5.1.1.1 Subsurface Soil Sampling

In April and August 2007 three direct push technology (DPT) soil borings (SS65-DP01 through SS65-DP03) were advanced at Site SS-65. In addition, soil samples were also collected by hand auger methods from soil borings SS65-DP04 and SS65-DP05 in January 2008 (Figure 1-3). Direct push technology soil borings were advanced using an AMS® Incorporated, truck-mounted 9600 direct push drill rig, and a five foot Geoprobe® Dual Tube sampling system. Each boring was continuously sampled every

five feet to a depth of 11 ft bgs. One soil sample for chemical analysis was collected from each boring from the 0 to 5 ft bgs interval.

Soils were visually classified in the field by a Geologist according to the Unified Soil Classification System. Soils were screened with a MiniRAE® 2000 VOC photoionization detector (PID) with soil-headspace screening techniques to assist in the selection of samples for laboratory analysis, if necessary. As there were no signs of visible staining or elevated PID readings one subsurface soil sample was collected near the capillary fringe (5 ft bgs) from each boring. Soil samples were placed in the appropriate containers, packed on ice at 4 degrees Celsius (ºC), and delivered under chain-of-custody to Accutest, in Orlando, Florida. Soil boring logs for SS-65-DP01 through DP03 are included in Appendix B (Note: soil boring logs were not recorded for the two hand auger soil borings [SS-65-DP04 and DP05] which were advanced to 5ft bgs.)

5.1.1.2 Groundwater Sampling

In April and September 2007, groundwater samples were collected from two of the three temporary monitoring wells (SS65-DP01 and SS65-DP02) shown on Figure 1-3. Based on NMEDs comment # 5 (Appendix A) on the *RFA Confirmation Sampling Work Plan* (Bhate, 2007) these two wells were selected because the soil samples collected from the corresponding boreholes for these wells had the highest levels of TPH-ORO. Prior to sampling groundwater, water levels were measured and each well was subsequently purged. The wells were purged utilizing low-flow techniques. A peristaltic pump and disposable polyethylene tubing were placed at mid-screen or mid-water column and each well was pumped at an average of less than 0.5 liters per minute. All samples for TAL metals analysis were filtered in-line through a disposable 0.45 micron filter. The Monitoring Well Development/Sample Collection Forms are included in Appendix C of this report. Groundwater samples were placed in the appropriate containers, packed on ice at 4º C, and delivered under chain-of-custody to Accutest in Orlando, Florida and Test America in Nashville, Tennessee.

5.1.2 **Nature and Extent of Contamination**

This section presents the soil and groundwater analytical results from this field investigation completed at SS-65 by Bhate in April/August 2007 and January 2008. This section also presents the nature and extent of contamination found in the soil and groundwater. The soil and groundwater sampling locations from this investigation are shown on Figure 1-3.

The objectives of the Confirmatory Sampling at site SS-65 were to determine if any soil, and/or groundwater contamination exist at the site, delineate the horizontal and vertical extent of the contamination (if present), and to collect the proper data meeting the data quality objectives to support closure of the site based on guidance from the NMED. Soil and groundwater analytical results are summarized in Tables 5-1 and 5-2, respectively. Soil and groundwater results that are above applicable action levels are presented on Figures 5-1 and 5-2. The complete analytical data packages for this investigation as provided by Accutest and Test America are presented in Appendix D of this report.

5.1.2.1 Soil Analytical Results

The five soil samples collected from soil borings SS65-DP01 through SS65-DP05 (Figure 5-1) during this investigation were analyzed for VOCs; SVOCs; PCBs; TPH-GRO, DRO, and ORO; and TAL Metals. The subsurface soil samples collected during this investigation were collected from the 0 to 5 feet bgs interval. The last digit of the sample identification number indicates the bottom of the sample interval; the SS-65 soil analytical results are summarized in Table 5-1.

Low levels of four VOCs (Acetone, 1,1 –dichloroethylene, methylene chloride and methyl ethyl ketone) were detected above the laboratory MDL. As shown on Table 5-1, all VOC concentrations are all below the current NMED SSLs (NMED, 2012b). In addition, SVOCs and PCBs were not detected above the MDL in any of the SS-65 soil samples.

TPH-GRO and -DRO were not detected above the laboratory MDL. However, TPH-ORO was detected in four of the five samples with concentrations ranging from 8.87 mg/kg (SS65-DP04-5) to 113 mg/kg (SS65-DP01-5), which are below the NMED TPH Screening Guideline for unknown oil (1,000 mg/kg) (Table 6-3, NMED, 2012b).

Twenty two TAL metals were detected in above the MDL in the five SS-65 soil samples. With the exception of arsenic (one sample), all TAL metals were detected below their respective SSLs and RSLs. Arsenic was detected slightly above the SSL (3.9 mg/kg) and the NMED approved background level (3.7 mg/kg) (NMED, 2011) in soil sample SS65-DP04-5 at a concentration of 4.6 mg/kg (Figure 5-1). Although this singular detection of arsenic is above the SSL, it most likely represents the natural variability in soil geochemistry at HAFB and is not related to a petroleum fuel spill. There were scattered detections of five metals (aluminum, cadmium, copper, manganese and zinc) which had concentrations above NMED approved background levels but below their respective SSLs. Additionally there were detections of two metals (magnesium and potassium) above the NMED approved background level for which NMED SSLs and USEPA RSLs have not been established as they are not carcinogenic.

5.1.2.2 Groundwater Analytical Results

The two SS-65 groundwater samples collected from monitoring wells SS65-DP01 and SS65-DP02 (Figure 5-2) were analyzed for VOCs; SVOCs; PCBs; TPH-GRO, DRO, and ORO; TAL Metals; and TDS. The analytical results for these groundwater samples are presented in Table 5-2.

An estimated concentration of acetone (8.4 micrograms per liter [µg/L]) was the only VOC detected above the laboratory MDL. Acetone is a common laboratory contaminant which currently does not have an applicable action level.. Additionally, SVOCs and PCBs were not detected above the MDL either of the SS-65 groundwater samples.

TPH-GRO and ORO were not detected above the MDL. TPH-DRO was detected in the groundwater sample collected from monitoring well SS65-DP01 at an estimated concentration of 0.112 J mg/L. This estimated concentration of TPH-DRO is below the NMED TPH Screening Guideline for unknown oil (50 mg/L) (NMED, 2012b).

Sixteen of the 23 TAL metals were detected above the MDL. With the exception of iron, manganese and thallium, all detected metals were below their respective NMWQCC standards and/or USEPA MCLs (Table 5-2). Manganese was detected in both groundwater samples (SS65-DP01 and SS65-DP02) above the USEPA Secondary MCL (50 µg/L) at concentrations of 1,180 µg/L and 1,550 µg/L respectively. Iron was detected above the USEPA Secondary MCL (300 µg/L) in groundwater sample SS65-DP02 with a concentration of 351 µg/L and an estimated concentration of thallium (3.5 J µg/L) was detected above the USEPA MCL and NMED approved background level (2 µg/L) in groundwater sample SS65-DP01. However, it should be noted that this detection of thallium is below the basewide background Upper Tolerance Limit (UTL) for thallium (15 µg/L) (NationViewIBhate JV III, 2011). In addition, the National Secondary Drinking Water Regulations (USEPA, 2009) for iron and manganese are non-enforceable guidelines regarding contaminants that may cause aesthetic effects (such as taste, odor, or color in drinking water [USEPA, 2009]). The exceedances of iron, manganese and thallium are depicted on Figure 5-2). Furthermore, three metals (beryllium, cobalt and nickel) were detected in the SS65-DP01 groundwater sample above their respective NMED approved background levels for dissolved constituents but at concentrations below their respective action levels (Table 5-2).

Total dissolved solids concentrations ranged from 9,260 mg/L (SS65-DP01) and 10,700 mg/L (SS65-DP02). Both concentrations are well above the NMWQCC (1,000 mg/L) and EPA Secondary MCL (500 mg/L) screening levels (Figure 5-2). Additionally, groundwater with TDS concentrations > 10,000 mg/L (e.g. SS65-DP02) is classified by the USEPA as a Class III B aquifer which is designated as unfit for human consumption (USEPA, 1986).

5.1.3 **Conclusions and Recommendation**

The analytical results from the soil and groundwater samples collected at site SS-65 during this investigation did not contain any VOCs, SVOCs, TPH, or PCBs in excess of current action levels. Although arsenic was detected slightly above the SSL (3.9 kg/mg) in one sample (SS65-DP04-5) at 4.6 mg/kg all other TAL metals were detected at concentrations below their respective action levels. Therefore, this singular exceedance of arsenic represents the natural variability of soil geochemistry and is not related to surfical spill of petroleum hydrocarbons.

With the exception of iron, manganese and thallium all detected TAL metals were below their respective groundwater action levels. Although iron and manganese were detected above their respective USEPA Secondary MCLs, the National Secondary Drinking Water Regulations are non-enforceable guidelines regarding contaminates that may cause aesthetic effects (USEPA, 2009) Thallium was detected in one groundwater sample (SS65-DP02) at 3.5 J µg/L which slightly exceeded the USEPA MCL (2 µg/L) but at a concentration that was below the HAFB Basewide UTL (15 µg/L) (NationViewIBhate JV III, 2011) which indicates that this exceedance most likely represents the natural variability of groundwater geochemistry at HAFB.

The maximum TDS concentration in the groundwater sample collected from SS65-DP02 (10,700 mg/L) which classifies this aquifer as a Class III B aquifer (TDS > 10,000 mg/l) which is designated as unfit for human consumption (USEPA, 1986). As a result of this aquifer classification the human ingestion of groundwater at this site is an invalid pathway.

Therefore, HAFB is requesting NFA (Corrective Action Complete without controls) for site SS-65 based upon Criterion #5 listed in Appendix 4-B of the HAFB Hazardous Waste Permit (NMED, 2004) which states:

> *"The site was characterized or remediated in accordance with applicable state and/or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use."*

This criterion was accomplished by conducting field activities (soil and groundwater sampling) at site SS-65. These field activities were completed to meet the requirements outlined in the NMED correspondence dated June 11, 2007 and November 7, 2007(see Appendix A). It was determined by this investigation that no further corrective action is required at site SS-65.

Upon concurrence from NMED for NFA at this site, Bhate will abandon the temporary monitoring wells in accordance with all applicable State and federal guidelines and provide a letter report to both the USACE and NMED.

5.2 SS-67, Building 903-909 Sandblast Residue

5.2.1 Site Investigation

The following field activities were performed at SS-67 in order to evaluate subsurface and groundwater conditions:

- Four soil borings (SS67-DP01 through SS67-DP04) were drilled and 5 soil samples were collected (including one field duplicate) to delineate the potential for contamination associated with the observed sand blasting residue in the 1988 RFA.
- Four temporary monitoring wells (SS67-DP01 through SS67-DP04) were installed.
- Five groundwater samples were collected (SS67-DP01 through SS67-DP04 and field duplicate SS67-DP01FD) from Site SS-67 temporary monitoring wells.
- At the request of the NMED (Notice of Approval [NOA] letter dated November 7, 2007 [Appendix A]) one surface soil sample (SS67-SS01) was collected from the center of the 6 ft x 6 ft area of sandblast residue (identified during the July 2006 site visit) in December 2007.
- Due to elevated concentrations of several TAL metals five additional surface soil samples (SS67-SS02 through SS67-SS06) were collected in the vicinity of SS67-SS01 in June 2012.

Site SS-67 investigation soil and groundwater laboratory analytical results are presented in Tables 5-3 and 5-4 of this report.

Prior to beginning field work a Base Dig Permit (AF Fm 103) with a utility clearance, was submitted and approved by the proper authority. All completed field and waste handling activities at SS-67 were performed in accordance with HAFB SOPs, provided in the *Basewide Quality Assurance Project Plan* (Bhate, 2003) and the *Bhate Standard Operating Procedures* (Bhate, 2002), outlined in the *Final RCRA Facility Assessment Confirmatory Sampling Work Plan, Multiple Sites, Holloman Air Force Base, New Mexico* (Bhate, 2007). Subsurface Soil Sampling

5.2.1.1 Subsurface and Surface Soil Sampling

In April and August 2007, four DPT soil borings (SS67-DP01 through SS67-DP04) were advanced at Site SS-67 (Figure 1-4). These soil borings were advanced using an AMS® Incorporated, truck-mounted 9600 direct push drill rig, and a five foot Geoprobe® Dual Tube sampling system. Each boring was continuously sampled every five feet to a depth of 11 to 15 feet bgs. One soil sample for chemical analysis was collected from each boring from a depth of 0 to 5 feet bgs. In December 2007, one surface soil sample (SS67-SS01) was collected of the soil containing sandblast residue/black grit from a depth of 1 to 2 inches bgs. Due to detections of four TAL metals above applicable action levels, five additional surface soil locations (SS67-SS02 through SS67-SS06) were sampled from the area surrounding SS67-SS01. The locations for the surface soil samples collected in the immediate vicinity of a 6 ft x 6 ft area of the sandblast residue (identified during the July 2006 site visit) are also shown on Figure 1-4.

Soils were visually classified in the field by a Geologist according to the Unified Soil Classification System. Soils were screened with a MiniRAE® 2000 PID with soil-headspace screening techniques to assist in the selection of samples for laboratory analysis, if necessary. One subsurface soil sample was collected near the capillary fringe (5 ft bgs) from each boring as there were no signs of visible staining or elevated PID readings. Soil samples were placed in the appropriate containers, packed on ice at 4 ºC, and delivered under chain-of-custody to Accutest, in Orlando, Florida. Soil boring logs for SS67-DP01 through SS67-DP04 are included in Appendix B.

5.2.1.2 Groundwater Sampling

In April, August and September 2007, groundwater samples were collected from the four temporary monitoring wells (SS67-DP01 through SS67-DP04) shown on Figure 1-4. Prior to sampling groundwater, water levels were measured and each well was subsequently purged. The wells were purged utilizing low-flow techniques. A peristaltic pump and disposable polyethylene tubing were placed at mid-screen or mid-water column and each well was pumped at an average of less than 0.5 liter per minute. All samples for TAL metals analysis were filtered in-line through a disposable 0.45 micron filter. The Monitoring Well Development/Sample Collection Forms are included in Appendix C of this report. Groundwater samples were placed in the appropriate containers, packed on ice at 4º C, and delivered under chain-of-custody to Accutest, in Orlando, Florida and Test America in Nashville, Tennessee.

5.2.2 **Nature and Extent of Contamination**

This section presents the soil and groundwater analytical results from this field investigation completed at SS-67 by Bhate in 2007. This section also presents the nature and extent of contamination found in the soil and groundwater during this investigation. The soil and groundwater sampling locations from this investigation are shown on Figure 1-4.

The objectives of the Confirmatory Sampling at site SS-67 were to determine if any soil, and/or groundwater contamination exist at the site, delineate the horizontal and vertical extent of the contamination (if present), and to collect the proper data meeting the data quality objectives to support closure of the site based on guidance from the NMED. Soil and groundwater analytical results are summarized in Tables 5-3 and 5-4, respectively. Soil and groundwater results that are above applicable action levels are presented on Figures 5-3, 5-4 and 5-5. The complete analytical data packages for this investigation as provided by Accutest and Test America are presented in Appendix D of this report.

5.2.2.1 Subsurface Soil Analytical Results

The five soil samples (including one duplicate) collected from soil borings SS67-DP01 through SS67-DP04 during this investigation were analyzed for VOCs; SVOCs; TPH-GRO, DRO, and ORO; and TAL Metals. The subsurface soil samples collected during this investigation were collected from the 0 to 5 feet bgs interval. The last digit of the sample identification number indicates the bottom of the sample interval; the SS-67 soil analytical results are summarized in Table 5-3. Analytes detected at concentrations that exceed the applicable soil screening criteria are also displayed on Figure 5-3.

Methylene chloride was the only VOC detected above the laboratory MDL at concentrations below the NMED SSL (409 mg/kg). It should be noted that methylene chloride is a common laboratory contaminant. Additionally, SVOCs, and TPH-GRO, were not detected above the MDL in any of the SS-67 soil samples. Low concentrations of TPH-DRO (15.5 mg/kg) and TPH-ORO (74.0 mg/kg) were detected in one soil sample (SS67-DP03-5-a) below the TPH screening guideline for diesel #2/crankcase oil (1,000 mg/kg).

Twenty three TAL metals were detected above the MDL in the five SS-67 soil samples. With the exception of arsenic (two samples) and thallium (one sample), all other detected TAL metals were below their residential SSLs. Arsenic was detected slightly above the NMED SSL (3.9 mg/kg) in soil samples SS67-DP01-5 and SS67-DP03-5 with concentrations of 4.1 mg/kg and 4.8 J mg/kg. In addition, thallium was also detected above its SSL (0.782 mg/kg) in one soil sample (SS67-DP03-5) at a concentration of 5.30 J mg/kg. Although these three detections are slightly above their respective residential SSLs, they most likely represent the natural variability of soil geochemistry. Furthermore, these detections are below the NMED industrial/occupational SSLs for arsenic (17.7 mg/kg) and thallium (11.4 mg/kg) which are applicable as site SS-67 is located within an industrial area of HAFB. Additionally, three metals (cadmium, copper

and lead) were detected above their respective NMED approved background levels but below their respective SSLs in SS67-DP01-5.

5.2.2.2 Surface Soil Analytical Results

At the request of the NMED (RFA Work Plan approval letter dated November 7, 2007 [Appendix A]) a surface soil sample containing the black grit/sandblast residue (SS67-SS01) which was observed in a 6 ft by 6 ft area located south of Building 905 was collected for TAL metals analysis in December 2007 (Figure 5-4). Antimony (46.6 mg/kg), arsenic (110 mg/kg), cobalt (34.6 mg/kg) and lead (703 mg/kg) were detected above their respective residential SSLs. In addition, six metals (cadmium, chromium, copper, iron, silver and zinc) were detected above their NMED approved background levels but below their respective SSLs. In June 2012, six additional surface soil samples (including a duplicate) were collected in the vicinity of SS67-SS01 to determine the extent of the metals contamination associated with the sandblast residue for excavation and offsite disposal. The locations of the additional surface soil samples (SS67-SS02 through SS67-SS06) are also shown on Figure 5-4. Three TAL metals (antimony, arsenic and cobalt) were detected above their respective SSLs. Antimony was detected above the SSL (31.3 mg/kg) in one sample (SS67-SS06) at a concentration of 41.9 mg/kg. Arsenic was detected in five samples above the SSL (3.9 mg/kg) with concentrations ranging from 6.3 mg/kg (SS67-SS03) to 92.7 mg/kg (SS67-SS06). Cobalt was detected above the RSL (23 mg/kg) in one sample (SS67-SS06) at a concentration of 27.2 mg/kg. There were scattered detections of seven metals (cadmium, chromium, copper, iron, lead silver and zinc) which had concentrations above their respective NMED approved background levels but below their respective SSLs. Additionally, sodium was detected above the NMED approved background level; however there is not an established SSL or RSL for this metal. The surface soil analytical results are presented in Table 5-3 and TAL metals exceeding applicable residential action levels are shown on Figure 5-4.

Based on the exceedances antimony, arsenic, cobalt and lead which were detected in six of the surface soil samples and NMED direction (RFA Work Plan approval letter dated November 7, 2007 [Appendix A]) the residual sandblasting debris around the telephone pole located along the south side of Building 905 was excavated for off-site disposal in April 2013. A summary of the sandblast residue remedial action is presented below in Section 5.2.3.

5.2.2.3 Groundwater Analytical Results

The five groundwater samples (including one duplicate) collected from monitoring wells SS67-DP01 through SS67-DP04 were analyzed for VOCs; SVOCs; TPH-GRO, DRO, and ORO; TAL Metals; and TDS. The groundwater analytical results are presented in Table 5-4 and analytes exceeding applicable action levels are shown on Figure 5-5.

Chloromethane (groundwater sample SS67-DP03 [1.58 µg/L]) was the only VOC detected above the laboratory MDL in the five SS-67 groundwater samples. Currently there is no NMWQCC or USEPA MCL for chloromethane. In addition, all SVOCs were not detected above the MDL.

TPH-GRO and -ORO were not detected above the MDL. Low levels of TPH-DRO were detected in groundwater samples SS67-DP03 and SS67-DP04 with concentrations of 0.111 mg/L and 0.111 J mg/L. These detections of TPH-DRO are below the NMED TPH Screening Guideline for diesel #2/crankcase oil (32 mg/L) (NMED 2012b).

Eighteen of the 23 TAL metals were detected above the MDL. Arsenic, iron, manganese and thallium were the only metals that exceeded their NMWQCC standards and/or USEPA MCLs. Manganese was detected in all of the SS-67 groundwater samples above the USEPA Secondary MCL (50 µg/L) at concentrations ranging from 80.1 µg/L (SS67-DP02) to 414 µg/L (SS67-DP03). Iron was detected above the USEPA Secondary MCL (300 µg/L) in the groundwater water sample collected from SS67-DP03 at a concentration of 3,030 µg/L. However, the National Secondary Drinking Water Regulations (USEPA, 2009) for iron and manganese are non-enforceable guidelines regarding contaminants that may cause aesthetic effects (such as taste, odor, or color in drinking water [USEPA, 2009]). Arsenic was detected in groundwater sample SS67-DP04 with a concentration of 27.3 µg/L, which exceeds the USEPA MCL (10 µg/L) but not the NMWQCC groundwater standard (100 µg/L). However, this detection of arsenic is below the basewide background Upper Tolerance Limit (UTL) for arsenic (28.53 µg/L) (NationViewIBhate JV III, 2011) and reflects the natural geochemical variability of the aquifer. The other estimated detections of arsenic were all below the USEPA MCL. Thallium was detected above the MDL in one groundwater sample (SS67-DP01FD ([Field Duplicate]) at an estimated concentration of 4.2 J µg/L, which exceeded the USEPA MCL (2 µg/L). However, this detection is below the basewide background UTL for thallium (15.00 µg/L) (NationViewIBhate JV III, 2011) and thallium was not detected in the primary sample (SS67-DP01) which also indicates the natural geochemical variability of the aquifer. In addition, two metals (beryllium and chromium) were detected above their respective NMED approved background levels (NMED, 2011) but at concentrations that are below their respective action levels (Table 5-4).

Total dissolved solids concentrations ranged from 5,660 mg/L (SS67-DP01) to 10,700 mg/L (SS67-DP03). All SS-67 TDS concentrations are well above the NMWQCC (1,000 mg/kg) and USEPA MCL (500 mg/L) screening levels (Figure 5-4). Additionally, groundwater with TDS concentrations > 10,000 mg/L (e.g. SS67-DP03) is classified by the USEPA as a Class III B aquifer which is designated as unfit for human consumption (USEPA, 1986).

5.2.3 **Sandblast Residue/Surface Soil Remedial Action**

This section describes the sandblast residue/surface soil excavation, site restoration, and offsite disposal activities which were conducted at Site SS-67. This section also describes the confirmation soil sampling conducted along the sidewalls and floor bottom of the excavation.

Prior to starting excavation activities a 12-point composite characterization sample of the sandblast residue/surface soil was collected for the purpose of determining if the sandblast residue/surface soil could be disposed offsite as non-hazardous waste at the Rio Rancho Waste Management Landfill, New Mexico. The waste characterization sample (SS67-WC01) was collected on February 6, 2013 and shipped to Accutest Laboratory in Orlando, Florida for VOC (USEPA Method 8260B), SVOC (USEPA Method 8270D) TPH-GRO/DRO/ORO (USEPA Method 8015C) and RCRA metals toxicity characteristic leaching procedure (TCLP) (USEPA Method 1311) analysis. Low concentrations of bis(2-Ethylhexyl)phthalate (a common lab contaminant) and TPH-ORO were the only organic compounds detected. In addition, five RCRA metals (arsenic, barium, cadmium, chromium and lead) were detected at low and estimated concentrations below their respective toxicity characteristic levels (40 Code of Federal Regulations [CFR] §261.24). Based on the analytical data a waste profile was generated to dispose of the SS-67 soil/sandblast residue as non-hazardous waste at the Rio Rancho Waste Management Landfill. A summary table of SS67-WC01 analytical results and the waste profile are provided in Appendix F. The laboratory data package for SS67-WC01 is included in Appendix D.

To determine the effectiveness of the sandblast residue/surface soil removal action, confirmation soil samples were collected from the sidewalls and bottom of the excavation. The confirmation soil samples were also submitted to Accutest in Orlando, Florida for analysis. A Summary table presenting the results of the SS-67 confirmation sampling is presented in Table 5-5. Excavation confirmation samples were analyzed by Accutest for TAL metals by EPA Method 6010B/7471A.

The results of the TAL metals laboratory analyses were reviewed and compared to the current residential NMED SSLs (NMED, 2012b). A summary of the excavation activities, confirmation soil sampling results, transportation and disposal of impacted soil and the site restoration activities are described below in Sections 5.2.3.1 through 5.3.3.4. The SS-67 excavation boundary and the locations of the confirmation soil samples are shown on Figure 5-6. The complete laboratory analytical results for the confirmation soil sampling are also included in Appendix D

5.2.3.1 Excavation Activities

Excavation operations for removing surficial sandblast residue/soil were conducted on April 23 - 24, 2013. The approximate area of the final excavation at SS-67 was 900 square feet (30 ft x 30 ft area) to an average depth of 0.5 feet bgs. Figure 5-6 shows the boundaries of the excavated area. The volume of sandblast residue/soil removed from the SS-67 excavation was approximately 51 cubic yards (CY) (32.44 tons). Seven confirmation soil samples were collected from the sidewalls around the perimeter (SS67-SW1 through SS67-SW6) and on the floor bottom (SS67-Bottom1) of the excavation (Figure 5-6).

5.2.3.2 Excavation Confirmation Soil Sampling Results

Excavation confirmation samples were collected at a total of 7 locations from the sidewalls along the perimeter and on the floor bottom of the SS-67 excavation (Figure

5-6). The confirmation samples were analyzed for TAL metals. A summary of the results for the SS-67 excavation confirmation samples are presented in Table 5-5.

Twenty TAL metals were detected above the MDL in the eight SS-67 excavation confirmation samples. However, thallium was the only TAL metal detected above its respective residential SSL. As shown on Figure 5-6, thallium was detected in each confirmation sample slightly above the NMED residential SSL (0.782 mg/kg) with concentrations ranging from 1.5J mg/kg (SS67-SW4) to 2.6J mg/kg (SS67-SW6). These low level detections of thallium most likely represent the natural variability of soil geochemistry at the site as thallium was not detected in any of the previously collected surficial sandblast residue/soil samples (SS67-SS01 through SS67-SS06). In addition, these estimated detections are below the NMED industrial/occupational SSL for thallium (11.4 mg/kg) which is applicable as site SS-67 is located within an industrial area of HAFB. Furthermore, sodium was detected above the NMED approved background level in two samples, however there is not an established SSL or RSL for this metal.

5.2.3.3 Transportation and Disposal

Based on the waste characterization analytical results (SS67-WC-01) the sandblast residue/soil was determined to be non-hazardous and suitable for disposal at the Rio Rancho Waste Management Landfill (Appendix F). The soil was direct loaded by a front end loader into three 20 CY roll off bins for transportation. CTI Inc. transported approximately 51 CY (32.44 tons) of sandblast grit residue/soil from the SS-67 excavation to the Rio Rancho Waste Management Landfill, New Mexico on April 23-24, 2013. The waste manifests for the sandblast grit residue/soil sent offsite to the Rio Rancho Landfill are included in Appendix F.

5.2.3.4 Site Restoration

Site restoration activities included backfilling the shallow excavation with recycled concrete aggregate (road base) from the HAFB Reuse Area. Concrete aggregate was used for backfilling the excavation as the area along the south side of building 905 is currently utilized as an equipment lay-down yard. The backfill was compacted with a front end loader and the excavation was graded to existing surface topography and slightly arched to provide drainage for storm water run-off. No sidewalks, roads, or landscaped areas were affected.

5.2.4 Conclusions and Recommendation

The analytical results from the soil and groundwater samples collected at site SS-67 during this investigation did not contain any VOCs, SVOCs, or TPH, in excess of current SSLs, NMWQCC standards, or USEPA MCLs. However, six surface soil samples which contained sandblast residue (located along the south side of Building 905) had detections of four TAL metals (antimony, arsenic, cobalt and lead) above their current NMED residential SSLs. As a result of these exceedances, approximately 51 CY (32.44 tons) of soil containing sandblast residue was excavated and transported to the Rio Rancho Waste Management Landfill in April 2013. The confirmation soil samples collected from the perimeter and bottom of the excavation provide documentation of the

complete removal of sandblast residue/soil containing TAL metals in excess of applicable NMED SSLs.

With the exception of arsenic, iron, manganese and thallium all detected TAL metals were below their respective groundwater action levels. Arsenic was detected in one groundwater sample (SS67-DP04) above the USEPA MCL (10 µg/L) at a concentration of 27.3 µg/L. However this detection is below the basewide background UTL for arsenic (28.53 µg/L) (NationViewIBhate JV III, 2011) and reflects the natural geochemical variability of the aquifer. Although iron and manganese were detected above their respective USEPA Secondary MCLs, the National Secondary Drinking Water Regulations are non-enforceable guidelines regarding contaminates that may cause aesthetic effects (USEPA, 2009). Thallium was detected in one groundwater sample (SS65-DP02) at 4.2 J µg/L which slightly exceeded the USEPA MCL (2 µg/L) but at a concentration that was below the HAFB Basewide UTL (15 µg/L) (NationViewIBhate JV III, 2011) which indicates that this exceedance most likely represents the natural variability of groundwater geochemistry at HAFB.

The maximum TDS concentration in the groundwater sample collected from SS65-DP03 (10,700 mg/L) classifies this aquifer as a Class III B aquifer (TDS > 10,000 mg/l) which is designated as unfit for human consumption (USEPA, 1986). As a result of this aquifer classification the human ingestion of groundwater at this site is an invalid pathway.

Therefore, HAFB is requesting NFA (Corrective Action Complete with controls given the current and foreseeable land use within BEAR Base [a fenced and access-restricted area]) for site SS-67 based upon Criterion #5 listed in Appendix 4-B of the HAFB Hazardous Waste Permit (NMED, 2004).

This criterion was accomplished by conducting field activities (soil and groundwater sampling) and a soil removal remedial action at site SS-67. These field activities were completed to meet the requirements outlined in the NMED correspondence dated June 11, 2007 (see Appendix A of this report). It was determined by this investigation that contamination was not detected at this site.

Upon concurrence from NMED for NFA at this site, Bhate will abandon the temporary monitoring wells in accordance with all applicable State and federal guidelines and provide a letter report to both the USACE and NMED.

5.3 SS-69, Fighter Wing Flight Line Spill

5.3.1 Site Investigation

The following field activities were performed at SS-69 in order to evaluate subsurface and groundwater conditions:

- Three soil borings (SS69-DP01 through SS69-DP03) were drilled and sampled in order to delineate the potential contamination associated with a surface spill of solvents onto the flight line identified in the 1988 RFA.
- Three temporary monitoring wells (SS69-DP01 through SS69-DP03) were installed.
- Three groundwater samples were collected from temporary monitoring wells SS69-DP01 through SS69-DP03.

Site SS-69 soil and groundwater laboratory analytical results are presented in Tables 5-6 and 5-7 of this report.

Prior to beginning field work a Base Dig Permit (AF Fm 103) with a utility clearance, was submitted and approved by the proper authority. All completed field and waste handling activities at SS-69 were performed in accordance with HAFB SOPs, provided in the *Basewide Quality Assurance Project Plan* (Bhate, 2003) and the *Bhate Standard Operating Procedures* (Bhate, 2002), outlined in the *Final RCRA Facility Assessment Confirmatory Sampling Work Plan, Multiple Sites, Holloman Air Force Base, New Mexico* (Bhate, 2007).

5.3.1.1 Subsurface Soil Sampling

In April 2007, three DPT soil borings (SS69-DP01 through SS69-DP03) were advanced at Site SS-67 (Figure 1-5). These soil borings were advanced using an AMS® Incorporated, truck-mounted 9600 direct push drill rig, and a five foot Geoprobe® Dual Tube sampling system. Each boring was continuously sampled every five feet to a depth of 11.3 to 13 ft bgs. One soil sample was collected for chemical analysis from each boring from a depth of 0 to 5 ft bgs.

Soils were visually classified in the field by a Geologist according to the Unified Soil Classification System. Soils were screened with a MiniRAE® 2000 PID with soil-headspace screening techniques to assist in the selection of samples for laboratory analysis, if necessary. One soil subsurface soil sample was collected near the capillary fringe (5 ft bgs) from each boring as there were no signs of visible staining or elevated PID readings. Soil samples were placed in the appropriate containers, packed on ice at 4 ºC, and delivered under chain-of-custody to Accutest, in Orlando, Florida. Soil boring logs for SS69-DP01 through SS69-DP03 are included in Appendix B of this report.

5.3.1.2 Groundwater Sampling

In April 2007, groundwater samples were collected from the three temporary monitoring wells (SS69-DP01 through SS69-DP03) shown on Figure 1-5. Prior to sampling groundwater, water levels were measured and each well was subsequently purged. The wells were purged utilizing low-flow techniques. A peristaltic pump and disposable polyethylene tubing were placed at mid-screen or mid-water column and each well was pumped at an average of less than 0.5 liter per minute. All samples for TAL metals analysis were filtered in-line through a disposable 0.45 micron filter. The Monitoring Well Development/Sample Collection Forms are included in Appendix C of this report. Groundwater samples were placed in the appropriate containers, packed on ice at 4º C, and delivered under chain-of-custody to Accutest, in Orlando, Florida.

5.3.2 **Nature and Extent of Contamination**

This section presents the soil and groundwater analytical results from this field investigation completed at SS-69 by Bhate in 2007. This section also presents the nature and extent of contamination found in the soil and groundwater during this investigation. The soil and groundwater sampling locations from this investigation are shown on Figure 1-5.

The objectives of the Confirmatory Sampling at site SS-69 were to determine if any soil, and/or groundwater contamination exist at the site, delineate the horizontal and vertical extent of the contamination (if present), and to collect the proper data meeting the data quality objectives to support closure of the site based on guidance from the NMED. Soil and groundwater analytical results are summarized in Tables 5-6 and 5-7, respectively. The complete analytical data packages for this investigation as provided by Accutest, are presented in Appendix D of this report.

5.3.2.1 Soil Analytical Results

The three soil samples collected from soil borings SS69-DP01 through SS69-DP03 (Figure 1-5) during this investigation were analyzed for VOCs; SVOCs; TPH-GRO, DRO, and ORO; and TAL Metals. The subsurface soil samples collected during this investigation were collected from the 0 to 5 feet bgs interval. The last digit of the sample identification number indicates the bottom of the sample interval; the SS-69 soil analytical results are summarized in Table 5-6.

Methylene chloride was the only VOC detected above the laboratory MDL and is a common laboratory contaminant. All SVOCs were not detected above the MDL in any of the SS-69 soil samples.

TPH-DRO and GRO were not detected above the MDL in any of the SS-69 soil samples. TPH-ORO was detected above the MDL in one soil sample (SS69-DP01-5) with a concentration of 28.1 mg/kg, below the NMED TPH Screening Guideline for kerosene and jet fuel (1000 mg/kg) (NMED, 2012b).

Nineteen TAL metals were detected in SS-69 soil samples. None of the TAL metals were detected at concentrations above the NMED SSLs. However, cobalt was detected in one sample (SS69-DP03-05) above the NMED approved background level but below the USEPA RSL (USEPA, 2013).

5.3.2.2 Groundwater Analytical Results

Three groundwater samples collected from SS69-DP01 through SS69-DP03 were analyzed for VOCs; SVOCs; TPH-GRO, DRO, and ORO; TAL Metals; and TDS. The analytical results are presented in Table 5-7. Figure 5-7 presents the analytes which exceeded applicable groundwater action levels.

Four volatile organic compounds (acetone, toluene, 1,1-dichloroethane and trichloroethylene) were detected above the MDL (Table 5-7). The maximum concentrations of toluene (0.52 J µg/L [SS69-DP01]), 1,1-dichlorethane (0.76 J µg/L [SS69-DP02]) and TCE (2.2 µg/L [SS69-DP03]) are below their respective groundwater

action levels (750 µg/L, 25 µg/L and 5 µg/L respectively). Acetone was detected in all three groundwater samples with estimated concentrations ranging from 6.1 J µg/L (SS69-DP03) to 15.6 J µg/L (SS69-DP01). There are no applicable NMWQCC or USEPA groundwater action levels for acetone.

One estimated detection of di-n-butyl phthalate (2.9 J µg/L [SS69-DP02]) was the only SVOC detected in the three SS-69 groundwater samples. Currently there are no NMWQCC and USEPA groundwater action levels for di-n-butyl phthalate.

TPH-GRO was not detected in any of the SS-69 groundwater samples. Low detections of TPH-DRO were detected in groundwater samples SS69-DP01 and SS69-DP02 at concentrations 0.127 J mg/L and 0.270 mg/L respectively. In addition, the groundwater sample collected from SS69-DP02 had an estimated concentration of TPH-ORO (0.168 J mg/L). All TPH concentrations were below the NMED TPH Screening Guideline for kerosene and jet fuel (18.5 mg/L) (NMED, 2012b).

Nineteen of the 23 TAL metals were detected above the MDL. Arsenic and manganese were the only TAL metals that exceeded USEPA MCLs and/or NMWQCC standards (Table 5-7 and Figure 5-7). Note: Aluminum was detected in groundwater samples SS69-DP01 and SS69-DP02 at concentrations of 57.1 µg/L and 50 µg/L which are below the upper end of the USEPA Secondary MCL range for aluminum (200 µg/L). Manganese was detected in each of the SS-69 groundwater samples above the USEPA Secondary MCL (50 µg/L) at concentrations ranging from 130 µg/L (SS69-DP01) to 367 µg/L (SS69-DP03). However, the National Secondary Drinking Water Regulations (USEPA, 2009) for manganese are non-enforceable guidelines regarding contaminants that may cause aesthetic effects (such as taste, odor, or color in drinking water [USEPA, 2009]). In addition, the singular detection of manganese (367 µg/L [SS69-DP030] above the NMWQCC standard (200 µg/L) is attributed to the natural variability of groundwater geochemistry at the site. Arsenic concentrations exceeded the USEPA MCL and the NMED approved background level (10 µg/L) in groundwater samples SS69-DP02 (15.1 µg/L) and SS69-DP03 (11.3 µg/L). However, these detections of arsenic are below the basewide background UTL for arsenic (28.53 µg/L) (NationViewIBhate JV III, 2011) and reflect the natural geochemical variability of the aquifer. In addition, aluminum and barium were detected above their respective NMED approved background level but below the NMWQCC groundwater standard.

Total dissolved solids concentrations ranged from 3,090 mg/L (SS68-DP02) to 4,370 (SS68-DP03) mg/kg and exceeded the NMWQCC groundwater standard (1,000 mg/kg) and USEPA Secondary MCL (500 mg/L). As shown of Figure 5-7 a network of underground water lines crisscross site SS-69 and temporary monitoring wells SS69-DP01 and –DP02 are located immediately adjacent to a water line. Therefore, these low concentrations of TDS concentrations (less than 10,000 mg/L) are most likely due to anthropogenic influences (i.e., leaking water lines) as the HAFB unfiltered (total) groundwater UTL is 65,956.58 mg/L (NationViewIBhate JV III, 2011).

5.3.3 **Conclusions and Recommendation**

The analytical results from the soil and groundwater samples collected at site SS-69 during this investigation did not contain any VOCs, SVOCs, or TPH, in excess of current action levels. Additionally, all TAL metals were detected in the soil samples below their applicable SSLs and RSLs.

With the exception of arsenic and manganese all detected TAL metals were below their respective groundwater action levels. Although manganese was detected above its USEPA Secondary MCL in the three SS-69 groundwater samples, the National Secondary Drinking Water Regulations are non-enforceable guidelines regarding contaminates that may cause aesthetic effects (USEPA, 2009). Arsenic was detected in two groundwater samples (SS69-DP02 and SS69-DP03) at 15.1 µg/L and 11.3 µg/L, which exceeded the USEPA MCL (10 µg/L) but at concentrations that are below the HAFB Basewide UTL (28.53 µg/L) (NationViewIBhate JV III, 2011) which indicates that this exceedance most likely represents the natural variability of groundwater geochemistry at HAFB.

Although the TDS concentrations at SS-69 ranged from 3,090 mg/L to 4,370 mg/L it is likely that these are artificially deflated TDS values due to leaking underground water lines which traverse the site (Figure 5-7), as the HAFB unfiltered (total) groundwater UTL is 65,956.58 mg/L (NationViewIBhate JV III, 2011). Without the anthropogenic influence of leaking underground water lines the TDS concentrations at site SS-69 would be > 10,000 mg/L. TDS concentrations > 10,000 mg/L are classified by the USEPA as a Class III B aquifer which is designated as unfit for human consumption (USEPA, 1986). As a result of this classification the human ingestion of groundwater at this site is an invalid pathway.

Therefore, HAFB is requesting NFA (Corrective Action Complete without controls) for site SS-69 based upon Criterion #5 listed in Appendix 4-B of the HAFB Hazardous Waste Permit (NMED, 2004) which states:

> *"The site was characterized or remediated in accordance with applicable state and/or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use."*

This criterion was accomplished by conducting field activities (soil and groundwater sampling) at site SS-69. These field activities were completed to meet the requirements outlined in the NMED correspondence dated June 11, 2007 and November 7, 2007(see Appendix A). Therefore, it was determined by this investigation that no further corrective action is required at site SS-69.

Upon concurrence from NMED for NFA at this site, Bhate will abandon the temporary monitoring wells in accordance with all applicable State and federal guidelines and provide a letter report to both the USACE and NMED.

6 REFERENCES

A.T. Kearney, Inc. September 1988. *RCRA Facility Assessment Preliminary Review/Visual Site Inspection Report.* Holloman AFB, New Mexico.

Bhate Environmental Associates, Inc. August 2002. *Bhate Standard Operating Procedures (BSOPs).*

Bhate Environmental Associates, Inc. November 2003. *Basewide Quality Assurance Project Plan*. Holloman Air Force Base, New Mexico.

Bhate Environmental Associates, Inc. July 2007. *RCRA Facility Assessment Confirmatory Sampling Work Plan, Multiple Sites*. Holloman AFB, New Mexico

Bhate Environmental Associates, Inc. May 2008. *RCRA Facility Assessment Confirmatory Sampling Report.* Holloman AFB, New Mexico

Foster Wheeler Environmental Corporation. December 2002. *Draft Report for the Remedial Investigation of DP-63 – Disposal Pit 63, Holloman Air Force Base, New Mexico.*

Holloman AFB. 1980. *Construction Trim Pads W/Support (Phase I and II*). Drawing Number HO 285A-6, Sheet 2.I of 10.

Holloman Air Force Base, 2000*. Horizons 2000 Facility Improvement Plan.*

Holloman AFB. December 2005. *Holloman Air Force Base Environmental Restoration Program Site Status Summaries*, Holloman AFB, New Mexico.

NationViewIBhate JV III. July 2011. *Basewide Background Study Report, Holloman Air Force Base, New Mexico.*

NMAC. September 15, 2002. *20.6.2.3103, New Mexico Water Quality Control Commission Regulations*. http://www.nmenv.state.nm.us/NMED_Regs/gwb/20_6_2_NMAC.pdf.

New Mexico Environment Department. February 2004. Hazardous Waste Facility Permit No. NM6572124422.

NMED. November 7, 2007. *Approval of the RCRA facility assessment Confirmatory Sampling Work Plan, Multiple Sites, Holloman Air Force Base, New Mexico, EPA ID# NM6572124422 (HWB-HAFB-07-002)*.

NMED. December 28, 2011*. Conditional Approval: Basewide Background Study Report, Holloman Air Force Base, EPA ID# NM6572124422 (HWB-HAFB-09-004)*.

NMED. June 2012a. Appendix 4-A: Summary of Solid Waste Management Units (Table A and B), Holloman Air Force Base, Hazardous Waste Facility Permit No. NM6572124422.

New Mexico Environment Department. June 2012b. Risk Assessment Guidance for Site Investigations and Remediation.

New Mexico Water Rights Reporting System (NMWRRS) database, June 2009. http://nmwrrs.ose.state.nm.us/WRDispatcher?page=meterDrillerSelection.

Title 40 Code of Federal Regulations (CFR) §261.24. July 1, 2012. *Table 1 – Maximum Concentration of Contaminants for the Toxicity Characteristic.*

U.S. Department of Agriculture. 1981. *Soil Survey of Otero Area, New Mexico: Parts of Otero, Eddy, and Chaves Counties.*

U.S. Environmental Protection Agency (USEPA). 1986. *Final Draft Guidelines for Groundwater Classification under the EPA Groundwater Protection Strategy.*

USEPA. May 2009a. *National Priority Drinking Water Regulations.* EPA 816-F-09-004.

USEPA. May 2013. USEPA Regions 3, 6, and 9 Regional Screening Levels. (http://www.epa.gov/Region6/6pd/rcra_c/pd-n/screen.htm)

WRCC. 2003. Desert Research Institute State Narrative Web Page, http://www.wsmr.army. mil/paopage/Pages/WU%2360.htm.

TABLES

Table 3-1
Groundwater Wells
Located Within a 4-Mile Radius
of Holloman Air Force Base
RCRA Facility Assessment Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Well ID Number	Use	NAD 83 UTM (in meters)		Well Depth (ft)
		X	Y	
T 00078	Commercial	398468	3648755	428
T 00868	Domestic	400972	3650377	215
T 03794	Irrigation	403280	3651057	250
T 04855	Domestic	403784	3651965	235
T 04967	Domestic	403480	3652067	200
T 00518	Domestic	405819	3646323	305
T 00518 S	Domestic	405819	3646323	220
T 00614	Domestic	404503	3646838	245
T 00995	Domestic	405824	3646730	308
T 01868	Domestic	405824	3646730	280
T 02650	Domestic	405619	3646523	265
T 03230	Domestic	403699	3647252	160
T 04728	Domestic	404503	3646838	216
T 05079 POD1	Domestic	401365	3646757	406
T 01167	Livestock	404993	3644302	170
T 01235	Irrigation	404995	3644706	200
T 03062	Commercial	403678	3644412	295
T 03455	Domestic	403365	3644318	150
T 03483	Domestic	402565	3644318	140
T 03934	Commercial	403578	3644915	160
T 05201 POD1	Irrigation	403380	3644374	295
T 05202 POD1	Irrigation	403381	3644374	250
T 00146	Livestock	402960	3642700	110
T 03245	Commercial	406609	3643887	190
T 04228	Domestic	405295	3643589	180
T 04386 S-6	Commercial	404903	3640666	290
T 04386 S-9	Commercial	404895	3640673	320
T 00172 S	Irrigation	406088	3640755	125
T 00776	Irrigation	406391	3640650	120
T 00782	Domestic	406187	3640854	120
T 00818	Irrigation	406391	3640650	125
T 02431	Domestic	405987	3640654	152
T 03909	Livestock	404765	3639453	140
T 04386 S	Commercial	404886	3638830	290
T 04386 S-2	Commercial	404888	3638830	310
T 04386 S-3	Commercial	404886	3638837	300
T 04386 S-4	Commercial	404886	3638841	295
T 04386 S-5	Commercial	404903	3640661	310
T 03147	Domestic	406380	3638633	135
T 04080	Domestic	406481	3638734	170
T 03228	Domestic	404290	3637226	160
T 00347	Domestic	403131	3634704	182
T 00972	Domestic	404882	3636009	150
T 01602	Domestic	406510	3635592	135
T 05041 POD1	Domestic	406205	3635697	200
T 01012	Commercial	401072	3634316	72
T 01277	Commercial	404434	3633172	104
T 01327	Commercial	400958	3633604	90
T 01526	Commercial	401368	3633601	152
T 01623	Domestic	400743	3633202	260

Source: New Mexico Water Rights Reporting System Database, 2009

Table 3-2
Summary of Soil Boring/ Temporary Monitoring Well Locations and Depth to Water
RCRA Facility Assessment Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Site	Monitoring Well Identification	NAD83, State Plane (ft)		TOC Elevation	Ground Surface Elevation	Difference between TOC and Ground Surface Elevations (ft)	Depth to Water (ft below TOC)	Depth to Water (ft bgs)	Date
		Easting	Northing						
SS-65	SS65-DP01 [1]	1684124.7402	667654.9086	4048.13	4047.05	1.08	5.27	4.19	4/18/2007
	SS65-DP02 [1]	1684160.3276	667642.1705	4047.98	4046.94	1.04	5.70	4.66	8/21/2007
	SS65-DP03 [1]	1684111.7619	667626.7810	4047.65	4046.91	0.75	4.70	3.95	8/21/2007
	SS65-DP04 [3]	1684117.7800	667654.0305	NA	NA	NA	NA	NA	1/16/2008
	SS65-DP05 [3]	1684132.0160	667654.9854	NA	NA	NA	NA	NA	1/16/2008
SS-67	SS67-DP01 [1]	1680574.8990	669184.6310	4047.99	4047.00	0.99	7.50	6.51	4/18/2007
	SS67-DP02 [1]	1680435.9405	669129.5670	4046.93	4046.05	0.88	5.74	4.86	4/18/2007
	SS67-DP03 [1]	1680668.7377	669168.2914	4048.52	4048.12	0.40	11.53	11.13	8/24/2007
	SS67-DP04 [1]	1680487.3517	669164.3850	4047.25	4046.48	0.78	6.75	5.97	8/24/2007
	SS67-SS01 [3]	1680633.5920	669182.7980	NA	NA	NA	NA	NA	12/26/2007
SS-69	SS69-DP01 [2]	1684292.1566	670728.5400	4059.01	4059.01	0.00	7.62	7.62	4/18/2007
	SS69-DP02 [2]	1684288.6404	670602.3663	4058.40	4058.57	-0.17	6.30	6.47	4/18/2007
	SS69-DP03 [2]	1684339.8499	670406.2864	4058.51	4058.57	-0.06	6.92	6.98	4/18/2007

Notes:

TOC = Top of Casing
NAD83 = North American Datum 1983
ft = Feet
PVC = Polyvinyl Chloride
bgs = below ground surface
NA = Not applicable
SS65 = Building 807, Test Cell Surface Spill Area
SS67 = Building 903-909 Sandblast Residue
SS69 = Fighter Wing Flight Line Spill
DP = Direct Push Boring
SS = Surface Soil
[1] Above ground temporary well completion
[2] Below ground temporary well completion
[3] Soil sample only. No well completion

Table 5-1
SS-65 Soil Analytical Results
RCRA Facility Assessment Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Client Sample Identification:	**Soil Screening Levels**	**Basewide Background Levels**		SS65-DP01-5			SS65-DP02-5			SS65-DP03-5			SS65-DP04-5			SS65-DP05-5		
Lab Sample Identification:	**NMED Residential[1]**	**NMED Approved Background Level [2]**	**Combined Soil Background Level [3]**	F48764-1			F51968-1			F51968-2			F55136-1			F55136-2		
Date Sampled:				4/16/2007			8/21/2007			8/21/2007			1/16/2008			1/16/2008		
Analyte				Result[4]	LQ	CQ	Result[4]	LQ	CQ	Result[4]	LQ	CQ	Result[4]	LQ	CQ	Result[4]	LQ	CQ
Volatile Organic Compounds (8260B)	**mg/kg**	**mg/kg**	**mg/kg**	**µg/kg**			**µg/kg**			**µg/kg**			**µg/kg**			**µg/kg**		
Acetone	66,600	NV	NV	28	U		27	U		26	U		75.6			32	U	
1,1-Dichloroethylene	449	NV	NV	2.2	U		1.1	U		3.4	J		1.0	U		1.3	U	
Methylene chloride	409	NV	NV	5.6	U		8.0	J		12.7			2.0	U		6.3	U	
Methyl ethyl ketone	37,100	NV	NV	11	U		11	U		11	U		18.8			13	U	
Semi-Volatile Organic Compounds (8270C)	**mg/kg**	**mg/kg**	**mg/kg**	**µg/kg**			**µg/kg**			**µg/kg**			**µg/kg**			**µg/kg**		
All Semi-Volatile Organic Compounds	NV	NV	NV	ND			ND			ND			ND			ND		
Total Petroleum Hydrocarbons (8015)	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**			**mg/kg**			**mg/kg**			**mg/kg**			**mg/kg**		
Oil Range Organics (>C22-C36)	1,000 [7]	NV	NV	113			44.1			28.5			8.87	J		6.8	U	
TAL Metals Analysis (6010B)	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**			**mg/kg**			**mg/kg**			**mg/kg**			**mg/kg**		
Aluminum	78,000	13,722	13,722.27	21,300		J	3,970		J	16,500		J	23,100		J	8110		J
Antimony	31.3	1.6	1.60	1.2	J	J	0.21	U	UJ	0.69	J	J	0.43	J	J	0.25	U	
Arsenic	3.9	3.7	3.66	3.2			1.8			3.6			**4.6**		J	2.4		J
Barium	15,600	169.3	169.25	87.6		J	37.0		J	88.2		J	134		J	45.9		J
Beryllium	156	1.6	1.53	1.1			0.21	J		1.3			1.2			0.39		
Cadmium	70.3	0.3	0.28	0.44			0.18	J		0.39			0.059	U		0.065	U	
Calcium	NV [5]	317,332	317,331.59	53,500		J	177,000		J	82,100		J	53300		J	206000		J
Chromium	117,000	25	24.95	14.0		J	2.8			12.2		J	18.0		J	6.1		J
Cobalt	23 [6]	7.7	7.70	6.2		J	1.3	J		5.6		J	7.0		J	2.2	J	J
Copper	3,130	13	12.96	17.8			2.9			14.7			21.6		J	7.1		J
Iron	54,800	23,049	23,049.48	16,300		J	2,520		J	12,500		J	16300		J	5540		J
Lead	400	10.9	10.87	9.0			4.3	J		6.9			6.8		J	2.0	J	J
Magnesium	NV [5]	16,991	16,990.65	31,000		J	4,460		J	17,700		J	27400			4900		
Manganese	1,860	393	393.47	433		J	52.2		J	431		J	505		J	113		J
Mercury	15.6	10.8	10.76000	0.013	J		0.012	U		0.012	U		0.012	U		0.013	U	
Nickel	1,560	17.4	17.34	14.9		J	2.7			11.4		J	14.6		J	4.8		J
Potassium	NV [5]	5,077	5,077.12	5,050		J	1,710		J	6,830		J	8220			3400		
Selenium	391	1.4	1.40	0.83	J	J	0.83	J		0.42	J		0.47	J	J	0.29	U	UJ
Silver	391	1.1	1.10	0.056	U		0.077	U		0.085	U		0.083	U		0.091	U	
Sodium	NV [5]	5,196	5,195.97	2,200			565		J	1,950		J	1530			535	J	
Vanadium	391	42.6	42.53	26.4		J	7.6			20.8		J	28.2		J	11.5		J
Zinc	23,500	54.6	54.53	58.7		J	14.3		J	53.6		J	59.5		J	19.0		J
Polychlorinated Biphenyls (8082)	**mg/kg**	**mg/kg**	**mg/kg**	**µg/kg**			**µg/kg**			**µg/kg**			**µg/kg**			**µg/kg**		
All Polychlorinated Biphenyls	NV	NV	NV	ND			ND			ND			ND			ND		
General Chemistry (160.3 M)	**%**	**%**	**%**	**%**			**%**			**%**			**%**			**%**		
Solids, Percent	NV	NV	NV	79.5			86.9			82.4			80.7			72.9		

Notes:

NMED = New Mexico Environment Department
TAL = Target Analyte List
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
ND = Non Detect. Result was not detected above the laboratory reporting limit.
NV = No Value
LQ = Laboratory Qualifier
CQ = Validating Chemist Qualifier

Qualifiers:

J = Estimated result. Result is between the method detection limit and the reporting limit.
U = Undetected. Value set at the limit of detection

Client Sample Nomenclature:

SS-65 = Building 807, Test Cell Surface Spill Area
DP = Direct Push
Final digit(s) equal the sample interval depth below ground surface

[1] Table A-1, NMED Soil Screening Levels. *Risk Assessment Guidance for Site Investigations and Remediation* (NMED, June 2012).
[2] Table 1, Conditional Approval Letter, Basewide Background Study Report, Holloman Air Force Base, New Mexico (NMED, December 2011)
[3] Table 5-18, *Basewide Background Study Report, Holloman Air Force Base, New Mexico* (NationView|Bhate JV III, July 2011)
[4] If results are not detected (U) then the value is set at the method detection limit (MDL)
[5] No Value established for NMED Residential SSL (June, 2012) and USEPA RSL (May, 2013)
[6] USEPA Region 3, 6, and 9 Regional Screening Levels (RSLs) (May, 2013)
[7] Table 6-3, TPH Screening Guidelines for Unknown oil, Concentration in Groundwater. *Risk Assessment Guidance for Site Investigations and Remediation* (NMED, June 2012)

Bold value indicates analytes above NMED SSLs (Table A-1, June 2012) or TPH results above NMED TPH Screening Guidelines (Table 6-3, June 2012)
Indicates analytical results above the NMED Approved Basewide Background Levels, but below the NMED Residential SSL and USEPA RSL
Indicates analytical results above the NMED Approved Background Level, but without established NMED Residential SSL or USEPA RSL

Table 5-2
SS-65 Groundwater Analytical Results
RCRA Facility Assessment Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Client Sample Identification:	Groundwater Screening Levels		Basewide Background Levels		SS65-DP01			SS65-DP02		
Lab Sample Identification:					F48807-1			NQI2690-01		
Date Sampled:	NMWQCC[1]	USEPA MCL[2]	NMED Approved Background Levels (Dissolved Constituents)[3]	Dissolved Metals in Groundwater UTL [4]	4/16/02007			9/21/2007		
Analyte					Result[5]	LQ	CQ	Result[5]	LQ	CQ
Volatile Organic Compounds (8260B)	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**			**µg/L**		
Acetone	NV	NV	NV	NV	8.4	J		50	U	
Semi-Volatile Organic Compounds (8270C)	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**			**µg/L**		
All Semi-Volatile Organic Compounds	NV	NV	NV	NV	ND			ND		
Total Petroleum Hydrocarbons (8015)	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**			**mg/L**		
Diesel Range Organics (C10-C22)	50.0 [6]	NV	NV	NV	0.112	J		0.0952	U	
Polychlorinated Biphenyls (8082)	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**			**mg/L**		
All PCBs	NV	NV	NV	NV	ND			ND		
TAL Metals Analysis (6010B)	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**			**µg/L**		
Barium	1,000	2,000	30.2	30.13	19.4	J		24.9		J
Beryllium	NV	4	1	1.00	2.0	J		4	U	
Cadmium	10	5	2.5	2.41	0.30	U		2.1		J
Calcium	NV	NV	1,151,302	1,151,301.20	782,000		J	630,000		
Cobalt	50	NV	2.6	2.60	11.9	J	J	20	U	
Copper	1,000	1,300	22	57.46	1.1	J		10	U	
Iron	1,000	300 [7]	65.6	65.56	15	U		**351**		
Magnesium	NV	NV	3,630,927	3,630,926.70	519,000		J	308,000		
Manganese	200	50 [7]	50	118.65	**1,180**			**1,550**		
Nickel	200	NV	15.9	15.89	72.2		J	25.4		
Potassium	NV	NV	120,480	120,479.98	74,900		J	57,000		
Selenium	50	50	25.3	25.26	14	U		22.8		
Sodium	NV	NV	19,972,499	19,972,499.00	897,000		J	387,000		J
Thallium	NV	2	2	15.00	**3.5**	J	J	10	U	
Vanadium	NV	NV	73.8	73.73	36.7	J		91.1		
Zinc	10,000	5,000 [7]	23	56.28	11.2	J		50	U	
General Chemistry (EPA 160.1)	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**			**mg/L**		
Solids, Total Dissolved	1,000	500 [7]	NV	65956.58 [8]	**9,260**			**10,700**		

Notes:

NMWQCC = New Mexico Water Quality Control Commission
NMED = New Mexico Environment Department
USEPA = United States Environmetal Protection Agency
MCL = Maximum Contaminant Level
TAL = Total Analyte List
µg/L = micrograms per liter
mg/L = milligrams per liter
NV = No Value
ND = Not Detected
LQ = Laboratory Qualifier
CQ = Validating Chemist Qualifier

Qualifiers:
J = Estimated result. Result is between the method detection limit and the reporting limit.
Q = One or more quality control criteria failed
U = Undetected. Value set at the limit of detection

Client Sample Nomenclature:
SS-65 = Building 807, Test Cell Surface Spill Area
DP = Direct Push

Final digit(s) equal the sample interval depth below ground surface

[1] Standards for Groundwater, if 10,000 mg/l TDS Concentration or Less, New Mexico Administrative Code 20.6.2.3103
[2] USEPA National Primary Drinking Water Regulations MCLs (816-F-09-004, May 2009)
[3] Table 3, Partial Approval Letter, Basewide Background Study Report, Holloman Air Force Base, New Mexico (NMED, December 2011)
[4] Table 5-18, *Basewide Background Study Report, Holloman Air Force Base, New Mexico* (NationView|Bhate JV III, July 2011)
[5] If results are not detected (U) then the value is set at the method detection limit (MDL)
[6] Table 6-3, TPH Screening Guidelines for Unknown oil, Concentration in Groundwater. *Risk Assessment Guidance for Site Investigations and Remediation* (NMED, June 2012)
[7] USEPA Secondary Drinking Water Standard
[8] Value established in the Basewide Background Study Report, HAFB, New Mexico (NationView/Bhate JV III, July 2011) and derived from the Total Groundwater UTL.

Bold value indicates analytes above the New Mexico Groundwater Quality Standards, the USEPA MCLs, or the NMED TPH Screening Guidelines
Indicates analytical results above the NMED approved Basewide Background Level , but below the New Mexico Groundwater Quality Standard, or USEPA MCL

Table 5-3
SS-67 Soil Analytical Results
RFA Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Client Sample Identification:	Soil Screening Levels	Basewide Background Levels		SS67-DP01-5			SS67-DP02-5			SS67-DP03-5			SS67-DP03-5-a			SS67-DP04-5			SS67-SS01		
Lab Sample Identification:	NMED Residential[1]	NMED Approved Background Level [2]	Combined Soil Background Level [3]	F48700-1			F48700-2			F51947-1			F51947-2			F51947-3			F54812-1		
Date Sampled:				4/13/2007			4/13/2007			8/20/2007			8/20/2007			8/20/2007			12/26/2007		
Analyte				Result[4]	LQ	CQ	Result[4]	LQ	CQ	Result[4]	LQ	CQ	Result[4]	LQ	CQ	Result[4]	LQ	CQ	Result[4]	LQ	CQ
Volatile Organic Compounds (8260B)	**mg/kg**	**mg/kg**	**mg/kg**	**µg/kg**			**µg/kg**			**µg/kg**			**µg/kg**			**µg/kg**			**µg/kg**		
Methylene chloride	409	NV	NV	6.2	U		7.1	U		15.4	J		6.9	J		7.8	J		NA		
Semi-Volatile Organic Compounds (8270C)	**mg/kg**	**mg/kg**	**mg/kg**	**µg/kg**			**µg/kg**			**µg/kg**			**µg/kg**			**µg/kg**			**µg/kg**		
All Semi-Volatile Organic Compounds	NV	NV	NV	ND			ND			ND			ND			ND			NA		
Total Petroleum Hydrocarbons (8015)	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**			**mg/kg**			**mg/kg**			**mg/kg**			**mg/kg**			**mg/kg**		
Diesel Range Organics (C10-C22)	1,000 [7]	NV	NV	7.1	U		6.9	U		6.6	U	UJ	15.5		J	6.1	U	UJ	NA		
Oil Range Organics (>C22-C36)	1,000 [7]	NV	NV	7.1	U		6.9	U		6.6	U		74.0			6.1	U		NA		
TAL Metals Analysis (6010B)	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**			**mg/kg**			**mg/kg**			**mg/kg**			**mg/kg**			**mg/kg**		
Aluminum	78,000	13,722	13,722.27	3,080		J	681		J	1,370		J	1,960		J	2,390		J	2,070		J
Antimony	31.3	1.6	1.60	0.93	J	J	0.35	U	UJ	2.4	U	UJ	2.2	U	UJ	2.4	U	UJ	**46.6**		
Arsenic	3.9	3.7	3.66	**4.1**		J	0.54		J	**4.8**	J	J	2.3	U	UJ	2.5	U	UJ	**110**		J
Barium	15,600	169.3	169.25	40.4			22.7			21.5	J		37.5	J		25.6	J		86.0		J
Beryllium	156	1.6	1.53	0.11	J		0.066	U		0.64	U		0.58	U		0.63	U		0.14	J	
Cadmium	70.3	0.3	0.28	0.30		J	0.066	U	UJ	0.64	U		0.58	U		0.63	U		6.60		J
Calcium	NV [6]	317,332	317,331.59	218,000		J	181,000		J	201,000		J	183,000		J	160,000		J	132,000		J
Chromium	117,000	25	24.95	3.7		J	0.48	J	J	1.1	J	J	4.1	J	J	2.0	J	J	99.1		J
Cobalt	23 [5]	7.7	7.70	2.3	J	J	0.57	J	J	0.75	J		1.1	J		0.8	J		**34.6**		J
Copper	3,130	13	12.96	59.8		J	1.8		J	2.4	J		6.1	J		2.1	J		1,760		
Iron	54,800	23,049	23,049.48	3,470		J	462		J	1,090		J	1,850		J	1,980		J	45,500		J
Lead	400	10.9	10.87	13.4		J	0.13	U	UJ	1.5	U	UJ	7.1	J	J	1.7	J	J	**703**		J
Magnesium	NV [6]	16,991	16,990.65	4,810			1,860			2,150	J	J	4,280		J	2,100	J	J	4,120		J
Manganese	1,860	393	393.47	56.5		J	9.1		J	20.4			41.5			36.0			326		J
Mercury	15.6	10.8	10.76	0.0092	U	UJ	0.016	J	J	0.013	U		0.012	U		0.012	U		0.013	U	UJ
Nickel	1,560	17.4	17.40	3.0		J	0.99	J	J	1.6	U	UJ	2.6	J	J	2.3	J	J	8.2		J
Potassium	NV [6]	5,077	5,077.12	1,090		J	331	J	J	1,580	J		1,770	J		1,790	J		1,170		J
Selenium	391	1.4	1.40	0.14	U		0.13	U		2.9	U	UJ	2.6	U	UJ	2.8	U	UJ	0.80	J	
Silver	391	1.1	1.10	0.14	J	J	0.060	U		0.890	U	UJ	0.81	U	UJ	0.880	U	UJ	2.8		J
Sodium	NV [6]	5,196	5,195.97	481	J	J	472	J	J	1,500	J		2,910	J		1,350	J		1,900		
Thallium	0.782	1.3	1.30	0.64	U		0.60	U		**5.3**	J	J	3.2	U	UJ	3.50	U	UJ	3.6	U	
Vanadium	391	42.6	42.53	7.6			2.4	J		3.4	J	J	4.8	J	J	7.2	J	J	10.6		J
Zinc	23,500	54.6	54.53	49.6		J	1.7		J	3.7	J	J	15.6		J	6.4	J	J	1,700		J
General Chemistry (160.3 M)	**%**	**%**	**%**	**%**			**%**			**%**			**%**			**%**			**%**		
Solids, Percent	NV	NV	NV	69.9			72.7			74.9			83.3			79.2			NA		

Notes:

NA = Not Applicable (or not analyzed)
NMED = New Mexico Environment Department
TAL = Target Analyte List
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
ND = Not Detected
NV = No Value
LQ = Laboratory Qualifier
CQ = Validating Chemist Qualifier

Qualifiers:
U = Not detected
J = Indicates an estimated value

Client Sample Nomenclature:
SS-67 = Building 903-909 Sandblast Residue
DP = Direct Push
SS = Surface Soil
Final digit(s) equal the sample interval depth below ground surface
a = Sample sufix denoting a field duplicate sample

[1] Table A-1, NMED Soil Screening Levels. *Risk Assessment Guidance for Site Investigations and Remediation* (NMED, June 2012).
[2] Table 1, Conditional Approval Letter, Basewide Background Study Report, Holloman Air Force Base, New Mexico (NMED, December 2011)
[3] Table 5-18, *Basewide Background Study Report, Holloman Air Force Base, New Mexico* (NationView|Bhate JV III, July 2011)
[4] If results are not detected (U) then the value is set at the method detection limit (MDL)
[5] USEPA Region 3, 6, and 9 Regional Screening Levels (RSLs) May, 2013)
[6] No Value established for NMED Residential SSL (June, 2012) and USEPA RSL (May, 2013)
[7] Table 6-3, TPH Screening Guidelines for Diesel #2/crankcase oil, Concentration in Groundwater. *Risk Assessment Guidance for Site Investigations and Remediation* (NMED, June 2012)

Bold value indicates analytes above NMED SSLs (Table A-1, June 2012) or TPH results above NMED TPH Screening Guidelines (Table 6-3, June 2012)
Indicates analytical results above the NMED Approved Basewide Background Levels, but below the NMED Residential SSL and USEPA RSL
Indicates analytical results above the NMED Approved Background Level, but without established NMED Residential SSL or USEPA RSL

Table 5-3
SS-67 Soil Analytical Results
RFA Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Client Sample Identification:	Soil Screening Levels	Basewide Background Levels		SS67-SS02			SS67-SS02A			SS67-SS03			SS67-SS04			SS67-SS05			SS67-SS06		
Lab Sample Identification:	NMED Residential[1]	NMED Approved Background Level [2]	Combined Soil Background Level [3]	F94476-1			F94476-2			F94476-3			F94476-4			F94476-5			F94476-6		
Date Sampled:				6/26/2012			6/26/2012			6/26/2012			6/26/2012			6/26/2012			6/26/2012		
Analyte				Result[4]	LQ	CQ	Result[4]	LQ	CQ	Result[4]	LQ	CQ	Result[4]	LQ	CQ	Result[4]	LQ	CQ	Result[4]	LQ	CQ
Volatile Organic Compounds (8260B)	**mg/kg**	**mg/kg**	**mg/kg**	**µg/kg**			**µg/kg**			**µg/kg**			**µg/kg**			**µg/kg**			**µg/kg**		
Methylene chloride	409	NV	NV	NA			NA			NA			NA			NA			NA		
Semi-Volatile Organic Compounds (8270C)	**mg/kg**	**mg/kg**	**mg/kg**	**µg/kg**			**µg/kg**			**µg/kg**			**µg/kg**			**µg/kg**			**µg/kg**		
All Semi-Volatile Organic Compounds	NV	NV	NV	NA			NA			NA			NA			NA			NA		
Total Petroleum Hydrocarbons (8015)	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**			**mg/kg**			**mg/kg**			**mg/kg**			**mg/kg**			**mg/kg**		
Diesel Range Organics (C10-C22)	1,000 [7]	NV	NV	NA			NA			NA			NA			NA			NA		
Oil Range Organics (>C22-C36)	1,000 [7]	NV	NV	NA			NA			NA			NA			NA			NA		
TAL Metals Analysis (6010B)	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**			**mg/kg**			**mg/kg**			**mg/kg**			**mg/kg**			**mg/kg**		
Aluminum	78,000	13,722	13,722.27	2840			4290			2440			2070			2170			2040		
Antimony	31.3	1.6	1.60	7.4	J	J	18.2		J	1.2	J		1.1	U		15.3			**41.9**		J
Arsenic	3.9	3.7	3.66	**19.8**		J	**46.5**		J	**6.3**		J	2.3	J	J	**28.4**		J	**92.7**		J
Barium	15,600	169.3	169.25	89.3			58.8			85.0			43.8	J		112			71.4		J
Beryllium	156	1.6	1.53	0.24	U		0.21	U		0.23	U		0.28	U		0.23	U		0.20	U	J
Cadmium	70.3	0.3	0.28	1.7	J	J	3.5		J	1.3	J		0.72	J		0.63	J		2.9		
Calcium	NV [6]	317,332	317,331.59	141000		J	102000		J	158000		J	221000		J	157000		J	125000		J
Chromium	117,000	25	24.95	68.8		J	166		J	20.6		J	8.9		J	42.2		J	57.6		J
Cobalt	23 [5]	7.7	7.70	7.3	J	J	18.3		J	3.3	J	J	1.3	J	J	8.4	J	J	**27.2**		J
Copper	3,130	13	12.96	246		J	701		J	66.6			18.4			307			1290		
Iron	54,800	23,049	23,049.48	12000		J	28000		J	6020			3190			12700			33400		
Lead	400	10.9	10.87	124		J	326		J	33.8		J	23.2			162		J	328		J
Magnesium	NV [6]	16,991	16,990.65	7530		J	8410		J	6370			8560			6920			6510		
Manganese	1,860	393	393.47	156			323			139			70.4			209			219		
Mercury	15.6	10.8	10.76	0.0091	U		0.0095	U		0.0090	U		0.0098	U		0.0090	U		0.0094	U	
Nickel	1,560	17.4	17.40	4.4	J	J	8.1	J	J	3.2	J		2.6	J		4.4	J		7.9		J
Potassium	NV [6]	5,077	5,077.12	687	J		860	J		729	J		1230	J		1010	J		1080	J	
Selenium	391	1.4	1.40	1.9	U		1.7	U		1.8	U		2.3	U		1.8	U		1.6	U	
Silver	391	1.1	1.10	0.75	J		1.2	J		0.23	U		0.28	U		0.44	J		1.1	J	J
Sodium	NV [6]	5,196	5,195.97	1010	J		1280	J		1170	J		5860			5450			5290		
Thallium	0.782	1.3	1.30	1.3	U		1.1	U		1.2	U		1.5	U		1.2	U		1.0	U	J
Vanadium	391	42.6	42.53	11.1	J	J	18.5		J	9.2	J		6.9	J		8.8	J		9.0	J	J
Zinc	23,500	54.6	54.53	209		J	577		J	106			38.6			342		J	1050		J
General Chemistry (160.3 M)	**%**	**%**	**%**	**%**			**%**			**%**			**%**			**%**			**%**		
Solids, Percent	NV	NV	NV	81.8			83.8			89.5			82.2			87.2			86.9		

Notes:

NA = Not Applicable (or not analyzed)
NMED = New Mexico Environment Department
TAL = Target Analyte List
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
ND = Not Detected
NV = No Value
LQ = Laboratory Qualifier
CQ = Validating Chemist Qualifier

Qualifiers:
U = Not detected
J = Indicates an estimated value

Client Sample Nomenclature:
SS-67 = Building 903-909 Sandblast Residue
DP = Direct Push
SS = Surface Soil
Final digit(s) equal the sample interval depth below ground surface
a = Sample sufix denoting a field duplicate sample

[1] Table A-1, NMED Soil Screening Levels. *Risk Assessment Guidance for Site Investigations and Remediation* (NMED, June 2012).
[2] Table 1, Conditional Approval Letter, Basewide Background Study Report, Holloman Air Force Base, New Mexico (NMED, December 2011)
[3] Table 5-18, *Basewide Background Study Report, Holloman Air Force Base, New Mexico* (NationView|Bhate JV III, July 2011)
[4] If results are not detected (U) then the value is set at the method detection limit (MDL)
[5] USEPA Region 3, 6, and 9 Regional Screening Levels (RSLs) May, 2013)
[6] No Value established for NMED Residential SSL (June, 2012) and USEPA RSL (May, 2013)
[7] Table 6-3, TPH Screening Guidelines for Diesel #2/crankcase oil, Concentration in Groundwater. *Risk Assessment Guidance for Site Investigations and Remediation* (NMED, June 2012)
Bold value indicates analytes above NMED SSLs (Table A-1, June 2012) or TPH results above NMED TPH Screening Guidelines (Table 6-3, June 2012)
Indicates analytical results above the NMED Approved Basewide Background Levels, but below the NMED Residential SSL and USEPA RSL
Indicates analytical results above the NMED Approved Background Level, but without established NMED Residential SSL or USEPA RSL

Table 5-4
SS-67 Groundwater Analytical Results
RCRA Facility Assessment Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Client Sample Identification:	Groundwater Screening Levels		Background Screening Levels		SS67-DP01			SS67-DP01FD			SS67-DP02			SS67-DP03			SS67-DP04		
Lab Sample Identification:	NMWQCC[1]	USEPA MCL[2]	NMED Approved Background Levels (Dissolved Constituents)[3]	Dissolved Metals in Groundwater UTL [4]	F48769-1			F48769-4			F48769-2			NQI2692-01			F51966-1		
Date Sampled:					4/16/02007			4/16/2007			4/16/2007			9/20/2007			8/20/2007		
Analyte					Result[5]	LQ	CQ	Result[5]	LQ	CQ	Result[5]	LQ	CQ	Result[5]	LQ	CQ0	Result[5]	LQ	CQ
Volatile Organic Compounds (8260B)	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**			**µg/L**			**µg/L**			**µg/L**			**µg/L**		
Chloromethane	NV	NV	NV	NV	1.0	U		1.0	U		1.0	U		1.58			1.0	U	
Semi-Volatile Organic Compounds (8270C)	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**			**µg/L**			**µg/L**			**µg/L**			**µg/L**		
All Semi-Volatile Organic Compounds	NV	NV	NV	NV	ND			ND			ND			ND			ND		
Total Petroleum Hydrocarbons (8015)	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**			**mg/L**			**mg/L**			**mg/L**			**mg/L**		
Diesel Range Organics (C10-C22)	32 [6]	NV	NV	NV	0.10	U		0.095	U		0.096	U		0.111			0.111	J	
TAL Metals Analysis (6010B)	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**			**µg/L**			**µg/L**			**µg/L**			**µg/L**		
Aluminum	5,000	50 [7]	54	54.00	18	U		31.9	J		45.9	J		1,000	U		400	U	
Arsenic	100	10	10	28.53	3.7	J		4.1	J		3.0	J		100	U		**27.3**	**J**	
Barium	1,000	2,000	30.2	30.13	14.3	J		13.3	J		12.2	J		127		J	25.0	U	
Beryllium	NV	4	1	1.00	1.8	J		1.6	J		1.3	J		40	U		5	U	UJ
Calcium	NV	NV	1,151,302	1,151,301.20	484000		J	483000		J	500000		J	601,000			519000		
Chromium	50	100	2.5	2.50	3.5	J		3.6	J		0.60	U		50	U		4.6	U	
Cobalt	50	NV	2.6	2.60	0.81	J	J	0.89	J	J	0.70	J	J	200	U		5.00	U	
Copper	1,000	1,300	22	57.46	3.7	J		1.6	J		1.0	U		100	U		6.00	U	
Iron	1,000	300 [7]	65.6	65.56	15	U		15	U		15	U		**3,030**			3000	U	
Magnesium	NV	NV	3,630,927	3,630,926.70	343000		J	447000		J	396000		J	559,000			411000		
Manganese	200	50 [7]	50	118.65	**135**			**113**			**80.1**			**414**			**112**		
Nickel	200	NV	15.9	15.89	10.6	J		5.2	J		3.5	J		100	U		5.00	U	
Potassium	NV	NV	120,480	120,479.98	78200	U	J	77500		J	68000		J	100,000			65600		J
Silver	50	100 [7]	10	10.00	0.90	U		1.0	J		1.4	J		50	U		3.9	U	
Sodium	NV	NV	19,972,499	19,972,499.00	642000	U	J	930000		J	733000		J	1,220,000		J	989000		J
Thallium	NV	2	2	15.00	2.9	U	UJ	**4.2**	**J**	J	2.9	U	UJ	1,000	U		33	U	
Vanadium	NV	NV	73.8	73.73	30.6	J		30.1	J		28.0	J		200	U		17.1	J	
Zinc	10,000	5,000 [7]	23	56.28	18.5	J		13.5	J		8.6	J		500	U		25.0	U	
General Chemistry (EPA 160.1)	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**			**mg/L**			**mg/L**			**mg/L**			**mg/L**		
Solids, Total Dissolved	1,000	500 [7]	NV	65956.58 [8]	**5,660**			**7,720**			**6,150**			**10,700**			**8,180**		

Notes:

NMED = New Mexico Environment Department
NMWQCC = New Mexico Water Quality Control Commission
USEPA = United States Environmetal Protection Agency
MCL = Maximum Contaminant Level
TAL = Total Analyte List
µg/L = micrograms per liter
mg/L = milligrams per liter
NV = No Value
LQ = Laboratory Qualifier
CQ = Validating Chemist Qualifier

[1] Standards for Groundwater, if 10,000 mg/l TDS Concentration or Less, New Mexico Administrative Code 20.6.2.3103
[2] USEPA National Primary Drinking Water Regulations MCLs (816-F-09-004, May 2009)
[3] Table 3, Partial Approval Letter, Basewide Background Study Report, Holloman Air Force Base, New Mexico (NMED, December 2011)
[4] Table 5-18, *Basewide Background Study Report, Holloman Air Force Base, New Mexico* (NationView|Bhate JV III, July 2011)
[5] If results are not detected (U) then the value is set at the method detection limit (MDL)
[6] Table 6-3, TPH Screening Guidelines for Diesel #2/crankcase oil, Concentration in Groundwater. *Risk Assessment Guidance for Site Investigations and Remediation* (NMED, June 2012)
[7] USEPA Secondary Drinking Water Standard
[8] Value established in the Basewide Background Study Report, HAFB, New Mexico (NationView/Bhate JV III, July 2011) and derived from the Total Groundwater UTL.

Bold value indicates analytes above the New Mexico Groundwater Quality Standards, the USEPA MCLs, or the NMED TPH Screening Guidelines

Indicates analytical results above the NMED approved Basewide Background Level , but below the New Mexico Groundwater Quality Standard, or USEPA MCL

Qualifier:
U = Not detected
J = Indicates an estimated value

Client Sample Nomenclature:
SS-67 = Building 903-909 Sandblast Residue
DP = Direct Push
FD = Sample sufix denoting a field duplicate sample

Table 5-5
SS-67 Excavation Confirmation Soil Analytical (April 2013)
RFA Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Client Sample Identification:	**Soil Screening Levels**	**Basewide Background**		SS67-BOTTOM 1		SS67-BOTTOM 1A		SS67-SW1		SS67-SW2		SS67-SW3		SS67-SW4		SS67-SW5		SS67-SW6	
Lab Sample Identification:	**NMED Residential[1]**	**NMED Approved Background Levels [2]**	**Combined Soil Background Level [3]**	FA4005-7		FA4005-8		FA4005-1		FA4005-2		FA4005-3		FA4005-4		FA4005-5		FA4005-6	
Date Sampled:				4/24/2013		4/24/2013		4/24/2013		4/24/2013		4/24/2013		4/24/2013		4/24/2013		4/24/2013	
Analyte				**Result [4]**	**Q**	**Result [4]**	**Q**	**Result [4]**	**Q**	**Result [4]**	**Q**	**Result [4]**	**Q**	**Result [4]**	**Q**	**Result [4]**	**Q**	**Result [4]**	**Q**
TAL Metals Analysis (6010B/7471A)	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
Aluminum	78,000	13,722	13,722.27	624		482		2,710		1,730		2,760		1,820		1,880		1,830	
Antimony	31.3	1.6	1.60	1.2	J	1.2	U	1	U	1	U	1.2	U	1.3	U	1.5	J	1.4	J
Arsenic	3.9	3.7	3.66	0.85	U	1	U	1.2	J	0.86	U	1	U	1.1	U	0.88	U	1.5	J
Barium	15,600	169.3	169.25	19.9	J	18.6	J	31.7	J	38.4	J	52.7	J	26.7	J	44.2	J	46.4	J
Calcium	NV [6]	317,332	317,331.59	256,000		271,000		182,000		197,000		225,000		270,000		273,000		254,000	
Chromium	117,000	25	24.95	0.96	U	1.2	U	3.4	J	1.7	J	2.6	J	1.5	J	2.5	J	3.4	J
Cobalt	23 [5]	7.7	7.70	0.64	J	0.38	J	1.3	J	0.76	J	1.1	J	1.4	J	1	J	1.2	J
Copper	3,130	13	12.96	4.4	J	2.6	J	3.7	J	4.3	J	5.7	J	4.7	J	6.6	J	17	
Iron	54,800	23,049	23,049.48	498		343		2,610		1,260		2,020		1,400		1,400		1,710	
Lead	400	10.9	10.87	1.8	J	0.79	J	4.3	J	4.4	J	2.2	J	1.8	J	3.2	J	9.2	J
Magnesium	NV [6]	16,991	16,990.65	2,680	J	2,510	J	3,760		6,060		9,340		6,160		7,470		8,320	
Manganese	1,860	393	393.47	9.4		7.1	J	39.3		19.2		40.3		29.5		26.2		30.3	
Mercury	15.6	10.8	10.76	0.0068	J	0.0058	J	0.0049	U	0.0051	U	0.0066	J	0.0058	U	0.0056	U	0.0065	J
Nickel	1,560	17.4	17.40	0.88	J	0.57	J	2.4	J	1.3	J	2.3	J	1.5	J	1.8	J	1.8	J
Potassium	NV [6]	5,077	5,077.12	357	J	307	J	960	J	763	J	1,150	J	781	J	611	J	560	J
Silver	391	1.1	1.10	0.37	J	0.33	U	0.39	J	0.27	U	0.56	J	0.58	J	0.27	U	0.27	U
Sodium	NV [6]	5,196	5,195.97	2,300	J	2,330	J	2,070	J	8,290		9,450		2,870	J	1,610	J	1,680	J
Thallium	0.782	1.3	1.30	1.7	J	2.2	J	1.8	J	2.1	J	1.7	J	1.5	J	2.5	J	2.6	J
Vanadium	391	42.6	42.53	1.2	J	0.88	J	6.7	J	3.9	J	5.1	J	2.8	J	6	J	7.1	J
Zinc	23,500	54.6	54.53	2.9	J	2	U	12.3		7.3	J	10	J	6.3	J	9	J	16.5	
General Chemistry (160.3 M)	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Solids, Percent	NV	NV	NV	74.1		75		80.6		76.3		66.6		67.2		65.6		65.8	

Notes:
NMED = New Mexico Environment Department
TAL = Target Analyte List
mg/kg = milligrams per kilogram
NV = No Value
Q = Qualifier
% = percent

Qualifiers:
U = Not detected
J = Indicates an estimated value

Client Sample Nomenclature:
SS-67 = Building 903-909 Sandblast Residue
SW = Sidewall Soil Confirmation Sample

[1] Table A-1, NMED Soil Screening Levels. *Risk Assessment Guidance for Site Investigations and Remediation* (NMED, June 2012).
[2] Table 1, Conditional Approval Letter, Basewide Background Study Report, Holloman Air Force Base, New Mexico (NMED, December 2011)
[3] Table 5-18, *Basewide Background Study Report, Holloman Air Force Base, New Mexico* (NationView|Bhate JV III, July 2011)
[4] If results are not detected (U) then the value is set at the method detection limit (MDL)
[5] USEPA Region 3, 6, and 9 Regional Screening Levels (RSLs) (May, 2013)
[6] No Value established for NMED Residential SSL (June, 2012) and USEPA RSL (May, 2013)
Bold value indicates analytes above NMED SSLs (June, 2012)
Indicates analytical results above the NMED Approved Background Level, but without established NMED Residential SSL or USEPA RSL

Table 5-6
SS-69 Soil Analytical Results
RFA Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Client Sample Identification:	Soil Screening Levels	Basewide Background Levels		SS69-DP01-5			SS69-DP02-5			SS69-DP03-5		
Lab Sample Identification:				F48777-1			F48777-2			F48777-3		
Date Sampled:	NMED Residential [1]	NMED Approved Background Level [2]	Combined Soil Background Level [3]	4/17/2007			4/17/2007			4/17/2007		
Analyte				Result[4]	LQ	CQ	Result[4]	LQ	CQ	Result[4]	LQ	CQ
Volatile Organic Compounds (8260B)	**mg/kg**	**mg/kg**	**mg/kg**	**µg/kg**			**µg/kg**			**µg/kg**		
Methylene chloride	409	NV	NV	16.5			12.2		J	8.2	J	J
Semi-Volatile Organic Compounds (8270C)	**mg/kg**	**mg/kg**	**mg/kg**	**µg/kg**			**µg/kg**			**µg/kg**		
All Semi-Volatile Organic Compounds	NV	NV	NV	ND			ND			ND		
Total Petroleum Hydrocarbons (8015)	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**			**mg/kg**			**mg/kg**		
Oil Range Organics (> C22-C36)	1,000 [7]	NV	NV	28.1			5.9	U		5.8	U	
TAL Metals Analysis (6010B)	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**			**mg/kg**			**mg/kg**		
Aluminum	7,800	13,722	13,722.27	3,570		J	2,740		J	1,340		J
Arsenic	3.9	3.7	3.66	0.97			1.1			0.70		
Barium	15,600	169.3	169.25	30.8		J	23.5		J	20.3		J
Beryllium	156	1.6	1.53	0.16	J		0.11	J		0.056	U	
Cadmium	70.3	0.3	0.28	0.064	J		0.064	J		0.096	J	
Calcium	NV [6]	317,332	317,331.59	102,000		J	86,700		J	123,000		J
Chromium	117,000	25	24.95	2.4			1.6			1.7		
Cobalt	23 [5]	7.7	7.70	1.4	J		0.99	J		7.8		J
Copper	3,130	13	12.96	3.0			3.2			2.7		
Iron	54,800	23,049	23,049.48	2,660		J	1,820		J	1,780		J
Lead	400	10.9	10.87	2.2	J		0.12	U		0.11	U	
Magnesium	NV	16,991	16,990.65	3,770		J	4,530		J	3,750		J
Manganese	1,860	393	393.47	58.5		J	39.7		J	38.5		J
Nickel	1,560	17.4	17.34	2.8		J	2.1	J		1.5	J	
Potassium	NV [6]	5,077	5,077.12	876	J	J	662	J	J	271	J	J
Silver	391	1.1	1.10	0.05	U		0.054	U		0.072	J	
Sodium	NV [6]	5,196	5,195.97	187	J		236	J		121	J	
Vanadium	391	42.6	42.53	6.8		J	8.0		J	3.6		J
Zinc	23,500	54.6	54.53	10.5		J	6.3		J	5.5		J
General Chemistry (160.3 M)	**%**	**%**	**%**	**%**			**%**			**%**		
Solids, Percent	NV	NV	NV	86.5			84			84.4		

Notes:

NMED = New Mexico Environment Department
TPH-GRO = Total Petroleum Hydrocarbon - Gasoline Range Organics
TAL = Target Analyte List
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
ND = Not Detected
NV = No Value
LQ = Laboratory Qualifier
CQ = Validating Chemist Qualifier

[1] Table A-1, NMED Soil Screening Levels. *Risk Assessment Guidance for Site Investigations and Remediation* (NMED, June 2012).
[2] Table 1, Conditional Approval Letter, Basewide Background Study Report, Holloman Air Force Base, New Mexico (NMED, December 2011)
[3] Table 5-18, *Basewide Background Study Report, Holloman Air Force Base, New Mexico* (NationView|Bhate JV III, July 2011)
[4] If results are not detected (U) then the value is set at the method detection limit (MDL)
[5] USEPA Region 3, 6, and 9 Regional Screening Levels (RSLs) (May, 2013)
[6] No Value established for NMED Residential SSL (June, 2012) and USEPA RSL (May, 2013)
[7] Table 6-3, TPH Screening Guidelines for Kerosene & jet fuel, Concentration in Groundwater. *Risk Assessment Guidance for Site Investigations and Remediation* (NMED, June 2012)

Bold value indicates analytes above NMED SSLs (Table A-1, June 2012) or TPH results above NMED TPH Screening Guidelines (Table 6-3, June 2012)

Indicates analytical results above the NMED Approved Basewide Background Levels, but below the NMED Residential SSL and USEPA RSL

Qualifiers:
U = Not detected
J = Indicates an estimated value

Client Sample Nomenclature:
SS-69 = Fighter Wing Flight Line Spill
DP = Direct Push
Final digit(s) equal the sample interval depth below ground surface

Table 5-7
SS-69 Groundwater Analytical Results
RCRA Facility Assessment Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Client Sample Identification:	Groundwater Screening Levels		Basewide Background Levels		SS69-DP01			SS69-DP02			SS69-DP03		
Lab Sample Identification:	NMWQCC[1]	USEPA MCL[2]	NMED Approved Background Levels (Dissolved Constituents)[3]	Dissolved Metals in Groundwater UTL [4]	F48811-1			F48894-1			F48811-2		
Date Sampled:					4/17/02007			4/18/2007			4/17/2007		
Analyte					Result[5]	LQ	CQ	Result[5]	LQ	CQ	Result[5]	LQ	CQ
Volatile Organic Compounds (8260B)	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**			**µg/L**			**µg/L**		
Acetone	NV	NV	NV	NV	15.6	J		6.9	J		6.1	J	
Toluene	750	1000	NV	NV	0.52	J		0.5	U		0.5	U	
1,1-Dichloroethane	25	NV	NV	NV	0.5	U		0.76	J		0.5	U	
Trichloroethylene	100	5	NV	NV	0.5	U		0.76	J		2.2		
Semi-Volatile Organic Compounds (8270C)	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**			**µg/L**			**µg/L**		
Di-n-butyl phthalate	NV	NV	NV	NV	2.0	U		2.9	J		2.0	U	
Total Petroleum Hydrocarbons (8015)	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**			**mg/L**			**mg/L**		
Diesel Range Organics (C10-C22)	18.5 [6]	NV	NV	NV	0.127	J		0.270			0.10	U	
Oil Range Organics (> C22-C36)	18.5 [6]	NV	NV	NV	0.10	U		0.168	J		0.10	U	
TAL Metals Analysis (6010B)	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**			**µg/L**			**µg/L**		
Aluminum	5,000	50-200 [7]	54	54.00	**57.1**	J		50	J		39.3	J	
Antimony	NV	6	6	10.00	6.8	U	UJ	6.8	U	UJ	6.8	U	UJ
Arsenic	100	10	10	28.53	5.1	J		**15.1**			**11.3**		
Barium	1,000	2,000	30.2	30.13	22.5	J	J	31.4	J	J	20.5	J	J
Beryllium	NV	4	1	1.00	0.65	J		0.40	U		0.97	J	
Cadmium	10	5	2.5	2.41	0.30	U		0.30	U		0.30	U	
Calcium	NV	NV	1,151,302	1,151,301.20	619000		J	623000		J	634000		J
Cobalt	50	NV	2.6	2.60	1.5	J	J	1.2	J	J	0.85	J	J
Copper	1,000	1,300	22	57.46	3.8	J		1.0	U		1.0	U	
Magnesium	NV	NV	3,630,927	3,630,926.70	97800		J	89000		J	160000		J
Manganese	200	50 [7]	50	118.65	**130**			**186**			**367**		
Nickel	200	NV	15.9	15.89	11.6	J		7.3	J		6.7	J	
Potassium	NV	NV	120,480	120,479.98	23100		J	9250	J	J	23000		J
Selenium	50	50	25.3	25.26	2.8	U		2.8	U		2.8	U	
Silver	50	100 [7]	10	10.00	1.1	J		1.6	J		0.90	U	
Sodium	NV	NV	19,972,499	19,972,499.00	85000		J	78800		J	120000		J
Thallium	NV	2	2	15.00	2.9	U	UJ	2.9	U	UJ	2.9	U	UJ
Vanadium	NV	NV	73.8	73.73	35.0	J		13.2	J		38.9	J	
Zinc	10,000	5,000 [7]	23	56.28	8.3	J		9.5	J		15.2	J	
General Chemistry (EPA 160.1)	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**			**mg/L**			**mg/L**		
Solids, Total Dissolved	1,000	500 [7]	NV	65956.58 [8]	**3270**			**3090**			**4370**		

Notes:
NA = Not Applicable (or not analyzed)
NMWQCC = New Mexico Water Quality Control Commission
USEPA = United States Environmetal Protection Agency
MCL = Maximum Contaminant Level
TAL = Total Analyte List
µg/L = micrograms per liter
mg/L = milligrams per liter
NV = No Value
LQ = Laboratory Qualifier
CQ = Validating Chemist Qualifier

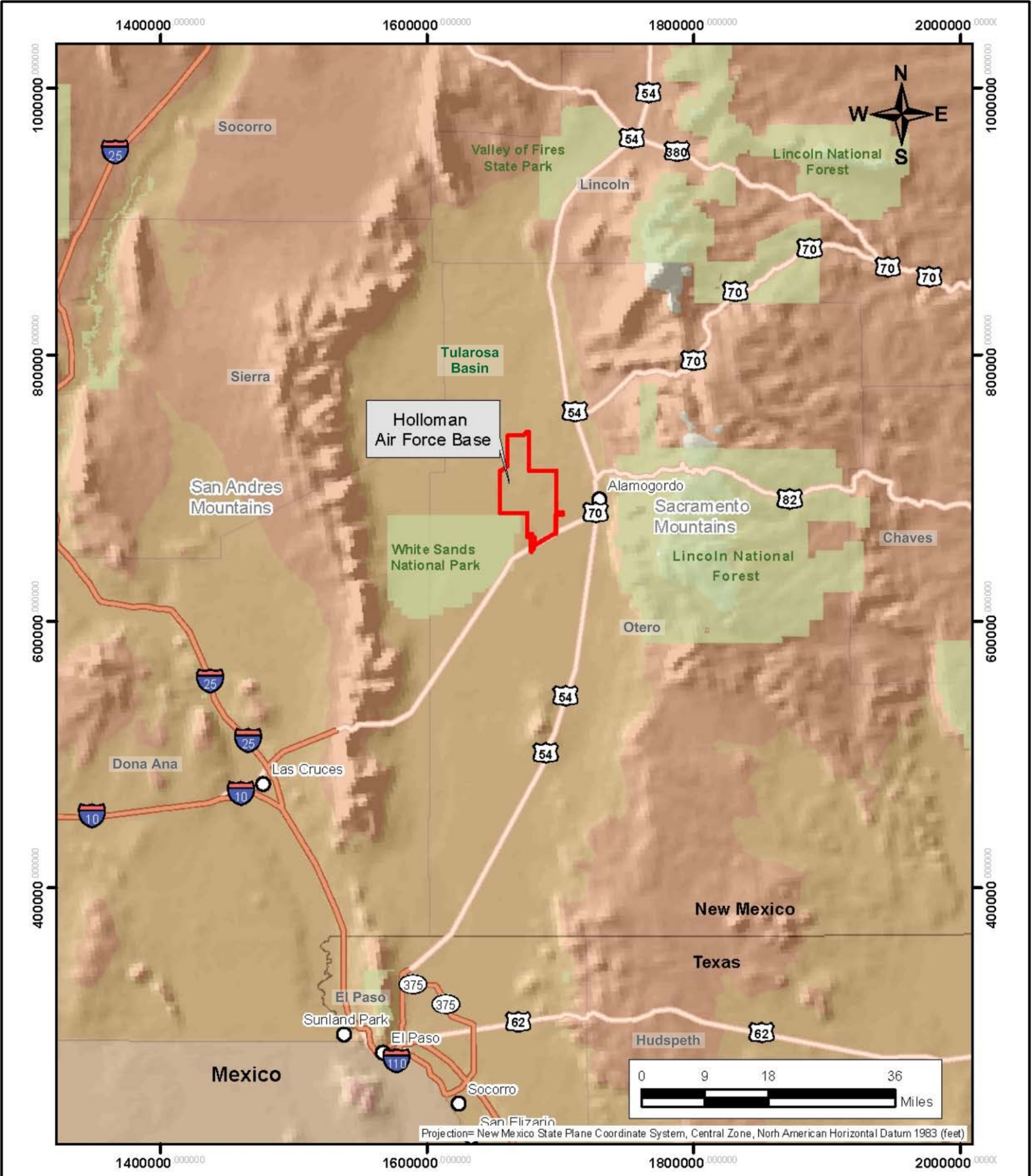
[1] Standards for Groundwater, if 10,000 mg/l TDS Concentration or Less, New Mexico Administrative Code 20.6.2.3103
[2] USEPA National Primary Drinking Water Regulations MCLs (816-F-09-004, May 2009)
[3] Table 3, Partial Approval Letter, Basewide Background Study Report, Holloman Air Force Base, New Mexico (NMED, December 2011)
[4] Table 5-18, *Basewide Background Study Report, Holloman Air Force Base, New Mexico* (NationView|Bhate JV III, July 2011)
[5] If results are not detected (U) then the value is set at the Method Detection Limit (MDL)
[6] Table 6-3, TPH Screening Guidelines for Kerosene and jet fuel, Concentration in Groundwater. *Risk Assessment Guidance for Site Investigations and Remediation* (NMED, June 2012)
[7] USEPA Secondary Drinking Water Standard
[8] Value established in the Basewide Background Study Report, HAFB, New Mexico (NationView/Bhate JV III, July 2011) and derived from the Total Groundwater UTL.

Bold value indicates analytes above the New Mexico Groundwater Quality Standards, the USEPA MCLs, or the NMED TPH Screening Guidelines
Indicates analytical results above the NMED approved Basewide Background Level , but below the New Mexico Groundwater Quality Standard, or USEPA MCL
Indicates analytical results above the New Mexico Groundwater Quality Standard, or USEPA MCL, but below the NMED approved Basewide Background Level

Qualifiers:
Q = Qualifier
U = Not detected
J = Indicates an estimated value

Client Sample Nomenclature:
SS-69 = Fighter Wing Flight Line Spill
DP = Direct Push

FIGURES



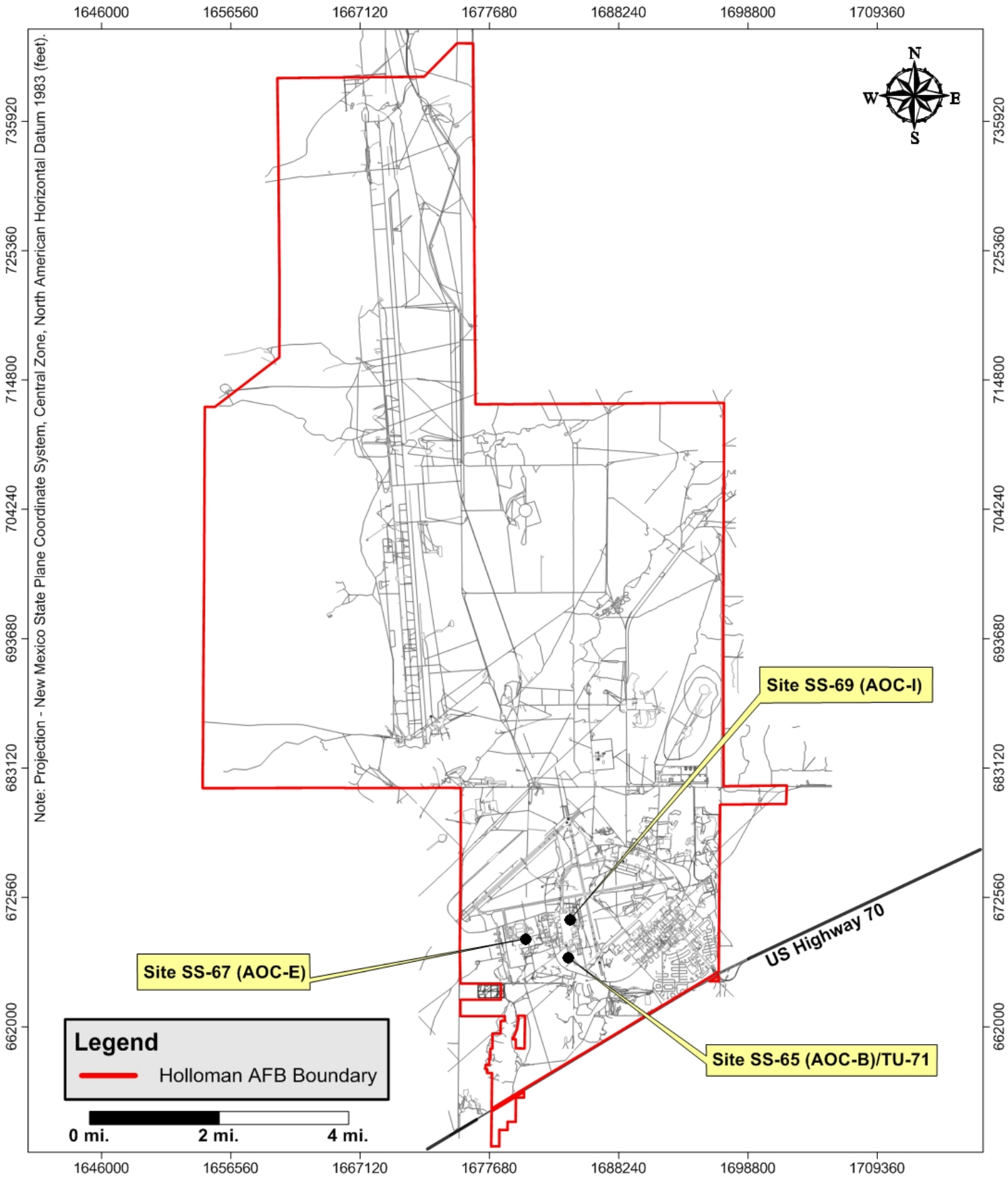
NATIONVIEW

Holloman Air Force Base, New Mexico Location Map

PROJECT NO.	SCALE	DATE	DRAWN BY:
11-0020	1" = 18 mi.	4/19/2013	dtm
			DRAWING NO. 1-1

RCRA Facility Assessment
Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Figure 1-1



NATIONVIEW

Sites
SS-65/TU-71, SS-67, and SS-69
Location Map

PROJECT NO.	SCALE	DATE	DRAWN BY:
11-0020	1" = 2 mi.	4/19/2013	dtm
			DRAWING NO. 1-2

RCRA Facility Assessment
Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Figure 1-2

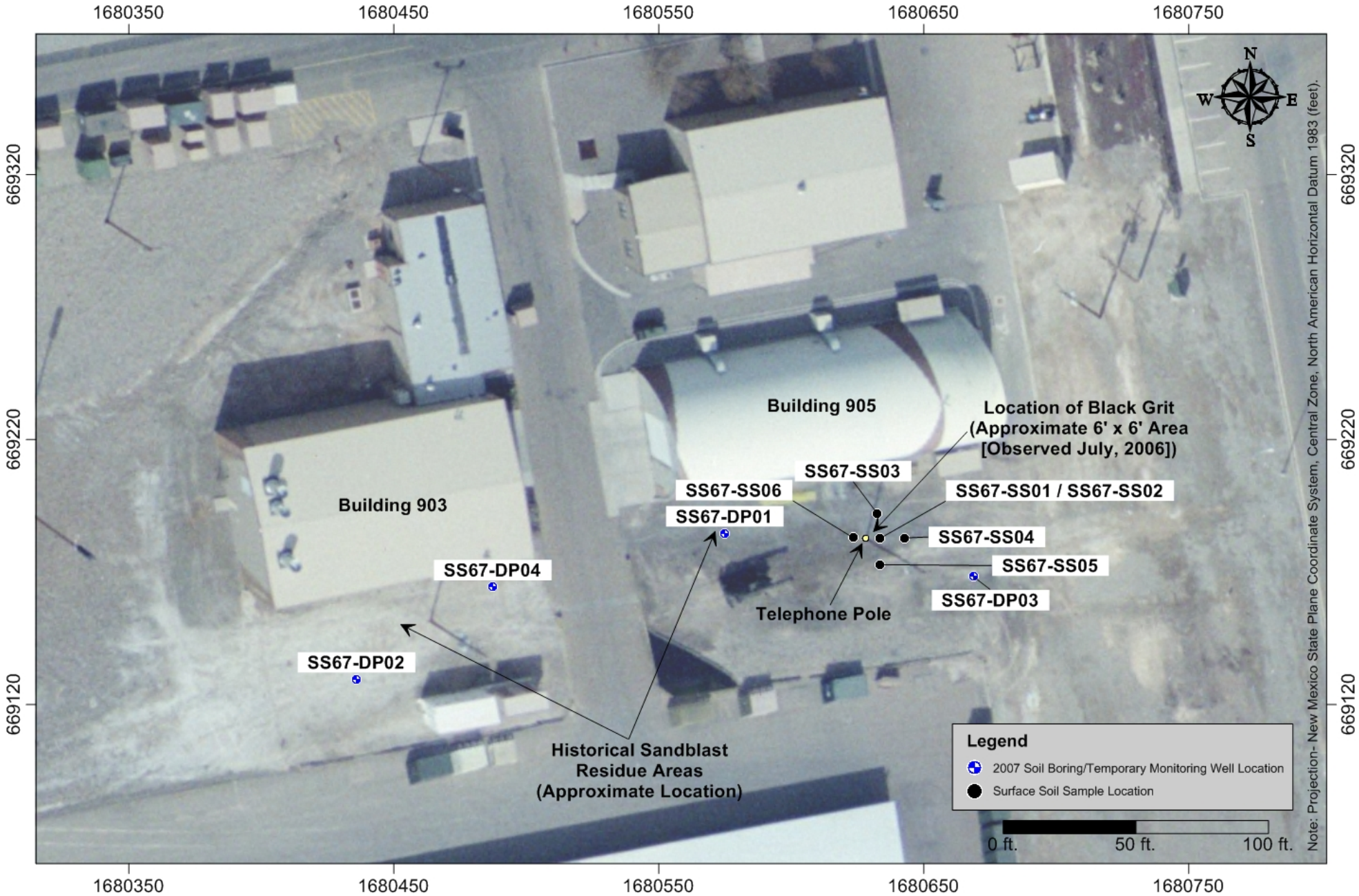
NATIONVIEW

SS-65
Site Location Map

PROJECT NO.	SCALE	DATE	DRAWN BY:
11-0020	1" = 50 ft.	4/19/2013	dtm
			DRAWING NO: 1-3

RCRA Facility Assessment
Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Figure 1-3



NATIONVIEW

SS-67
Site Location Map

PROJECT NO.	SCALE	DATE	DRAWN BY:
11-0020	1" = 50 ft.	4/19/2013	dtm
			DRAWING NO: 1-4

RCRA Facility Assessment
Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Figure 1-4

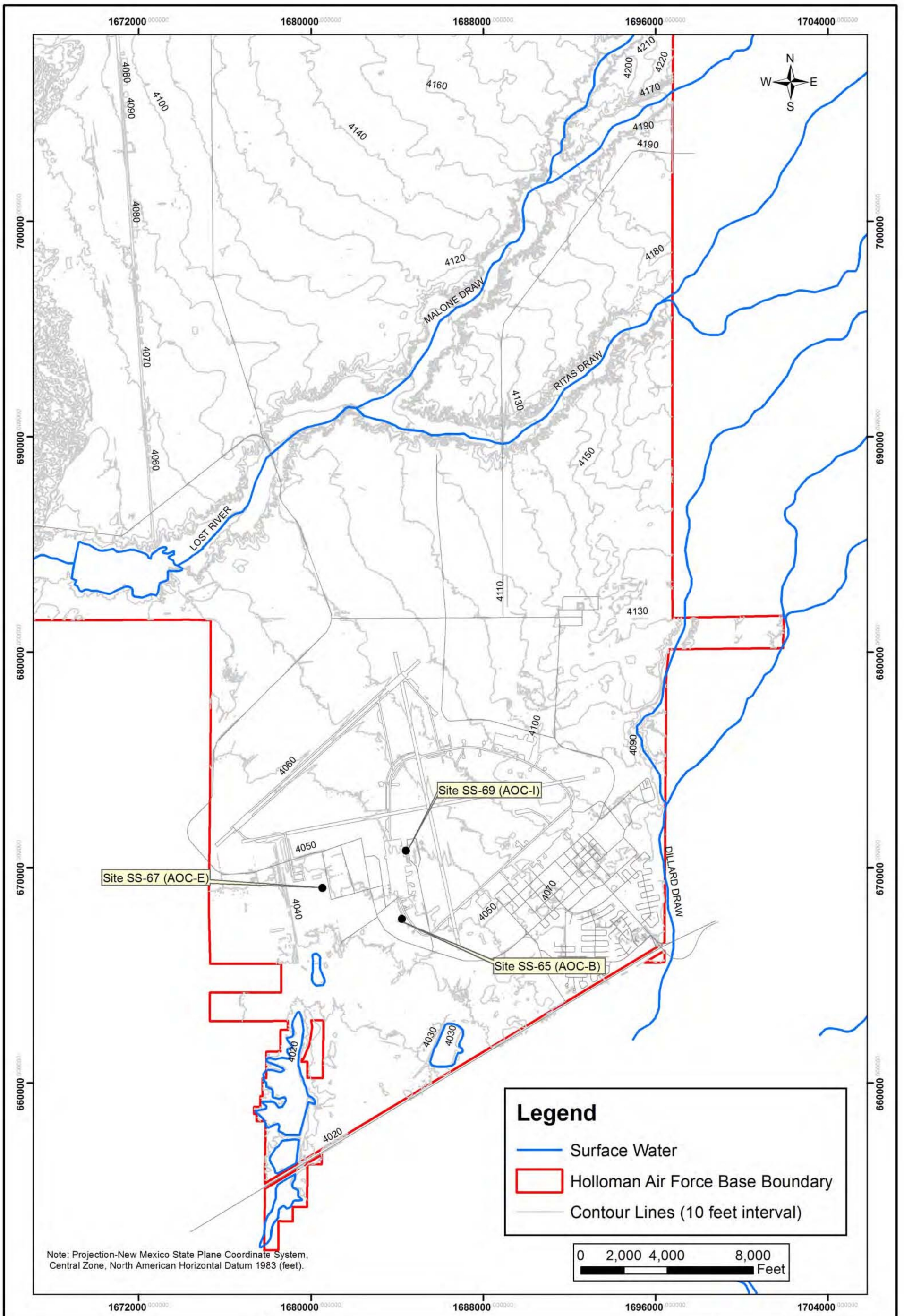
NATIONVIEW

SS-69
Site Location Map

PROJECT NO.	SCALE	DATE	DRAWN BY:
11-0020	1" = 50 ft.	4/19/2013	dtm
			DRAWING NO: 1-5

RCRA Facility Assessment
Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Figure 1-5



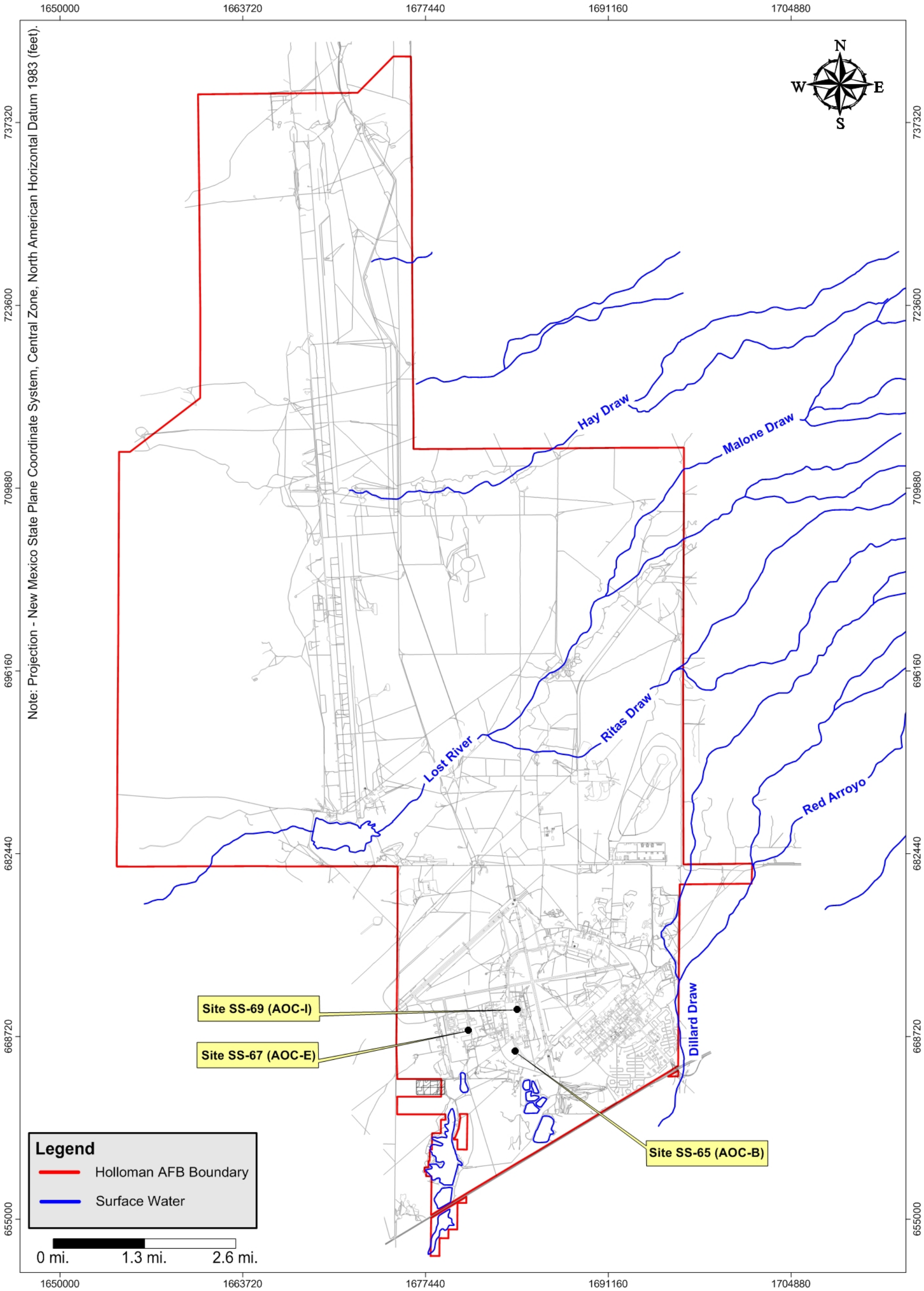
NATIONVIEW

Topographic Map
Holloman AFB, New Mexico

PROJECT NO:	SCALE:	DATE:	DRAWN BY:
11-0020	1 inch = 4,000 feet	5/16/2012	WB
			DRAWING NO: 3-1

RCRA Facility Assessment
Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Figure 3-1



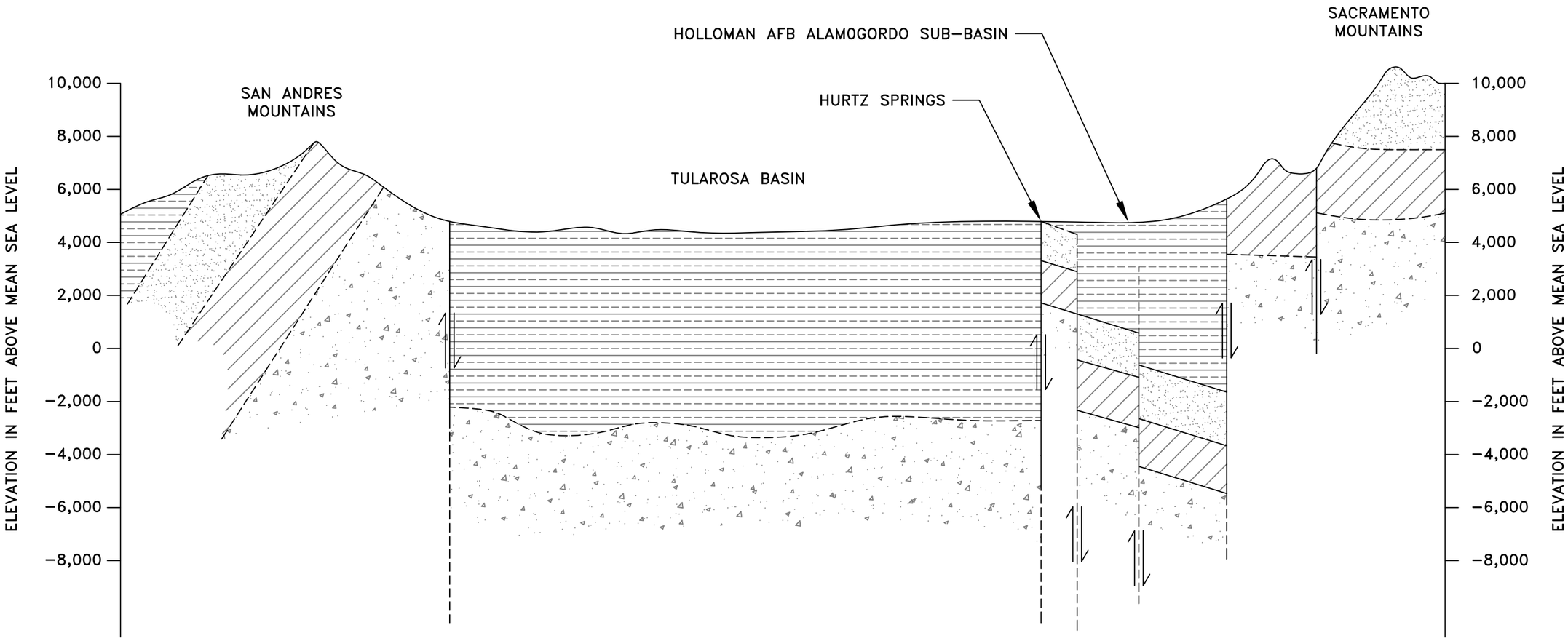
NATIONVIEW

Surface Drainages
Holloman AFB, New Mexico

PROJECT NO.	SCALE	DATE	DRAWN BY: dtm
11-0020	1" = 1.3 mi.	4/19/2013	DRAWING NO: 3-2

RCRA Facility Assessment
Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Figure 3-2



LEGEND:

- CENOZOIC ALLUVIUM AND LAKE DEPOSITS
- SEDIMENTARY ROCK OF PERMIAN AGE
- SEDIMENTARY ROCKS OF CAMBRIAN, ORDOVICIAN, SILURIAN, DEVONIAN, MISSISSIPPIAN AND PENNSYLVANIAN AGE
- INTRUSIVE ROCKS OF TERTIARY, CRETACEOUS OR PRECAMBRIAN AGE
- FAULT, ARROWS INDICATE RELATIVE MOVEMENT

0 5 10
SCALE IN MILES:

RCRA Facility Assessment
Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

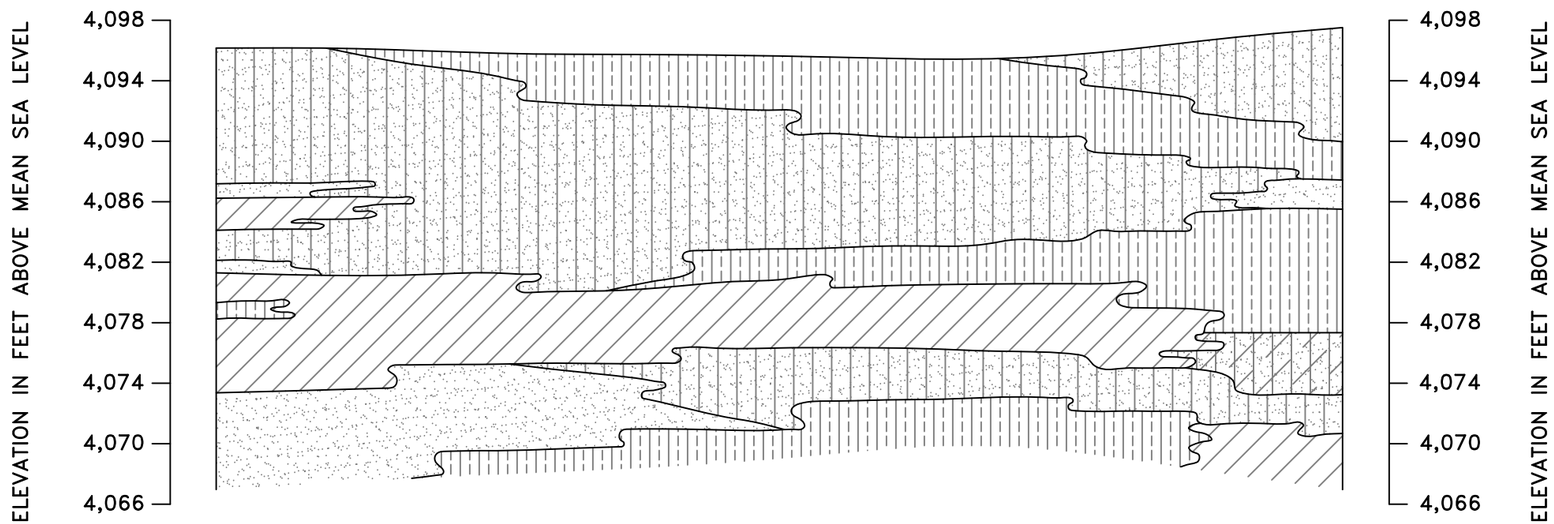
Figure 3-3

GENERALIZED GEOLOGIC CROSS SECTION OF THE TULAROSA BASIN

Source: Radian, 1992.

PROJECT NO.	SCALE	DATE	DRAWN BY:	DRAWING NO:
11-0020	SHOWN	4/22/13	MRM	Figure 3-3

NATIONVIEW



LEGEND:

- CL AND CH – CLAY
- ML AND MH – SILT
- SM – SILTY SAND
- SM–SC – SILTY, CLAYEY SAND
- SP – SAND

0' 100' 200'
SCALE IN FEET:

RCRA Facility Assessment
Confirmatory Sampling Report
Sites SS–65, SS–67, and SS–69
Holloman AFB, New Mexico

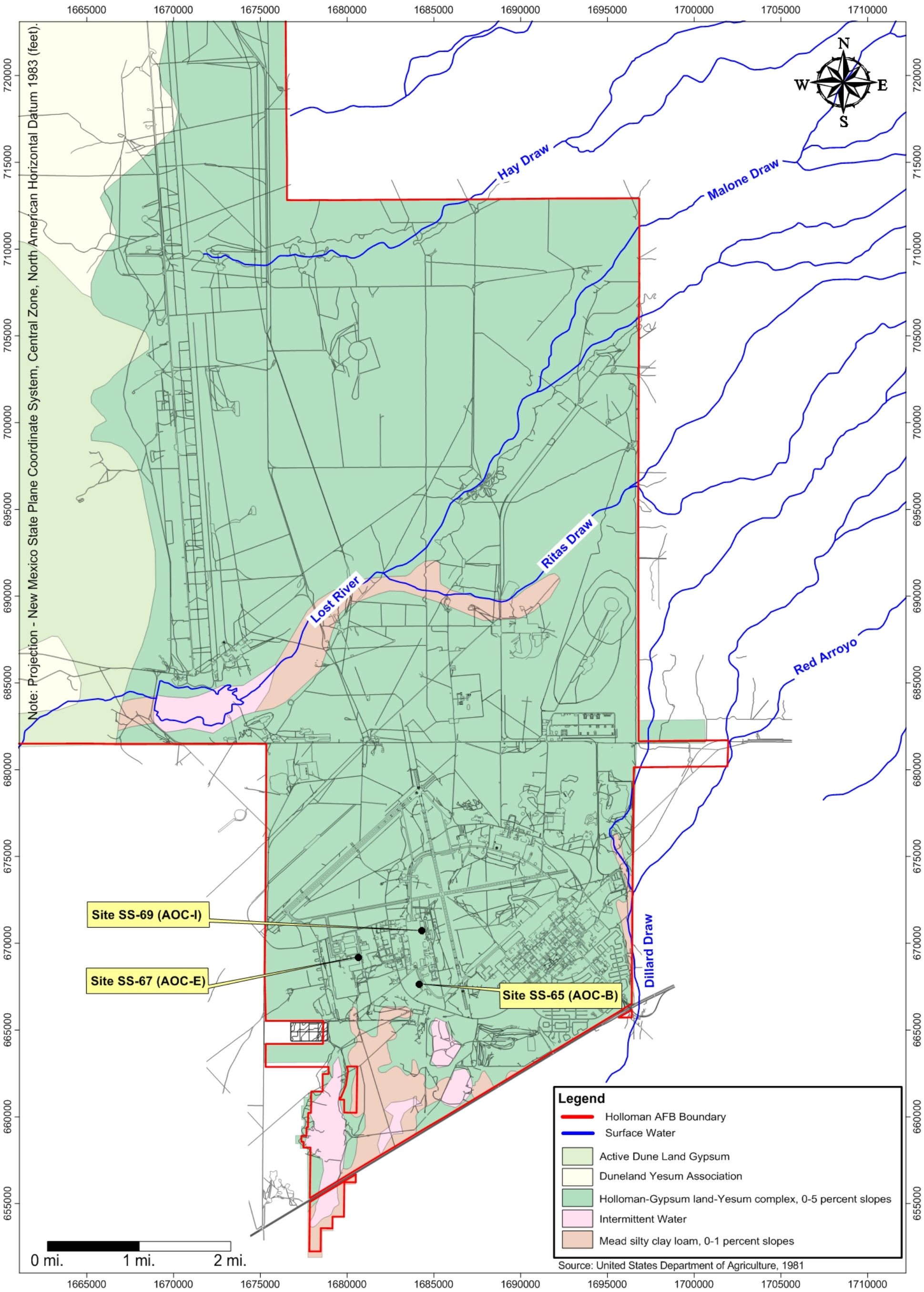
Figure 3–4

GENERALIZED NEAR–SURFACE GEOLOGIC CROSS SECTION FOR HOLLOMAN AFB

Source: Radian, 1992.

PROJECT NO.	SCALE	DATE	DRAWN BY:	DRAWING NO:
11–0020	SHOWN	4/22/13	MRM	Figure 3–4

NATIONVIEW



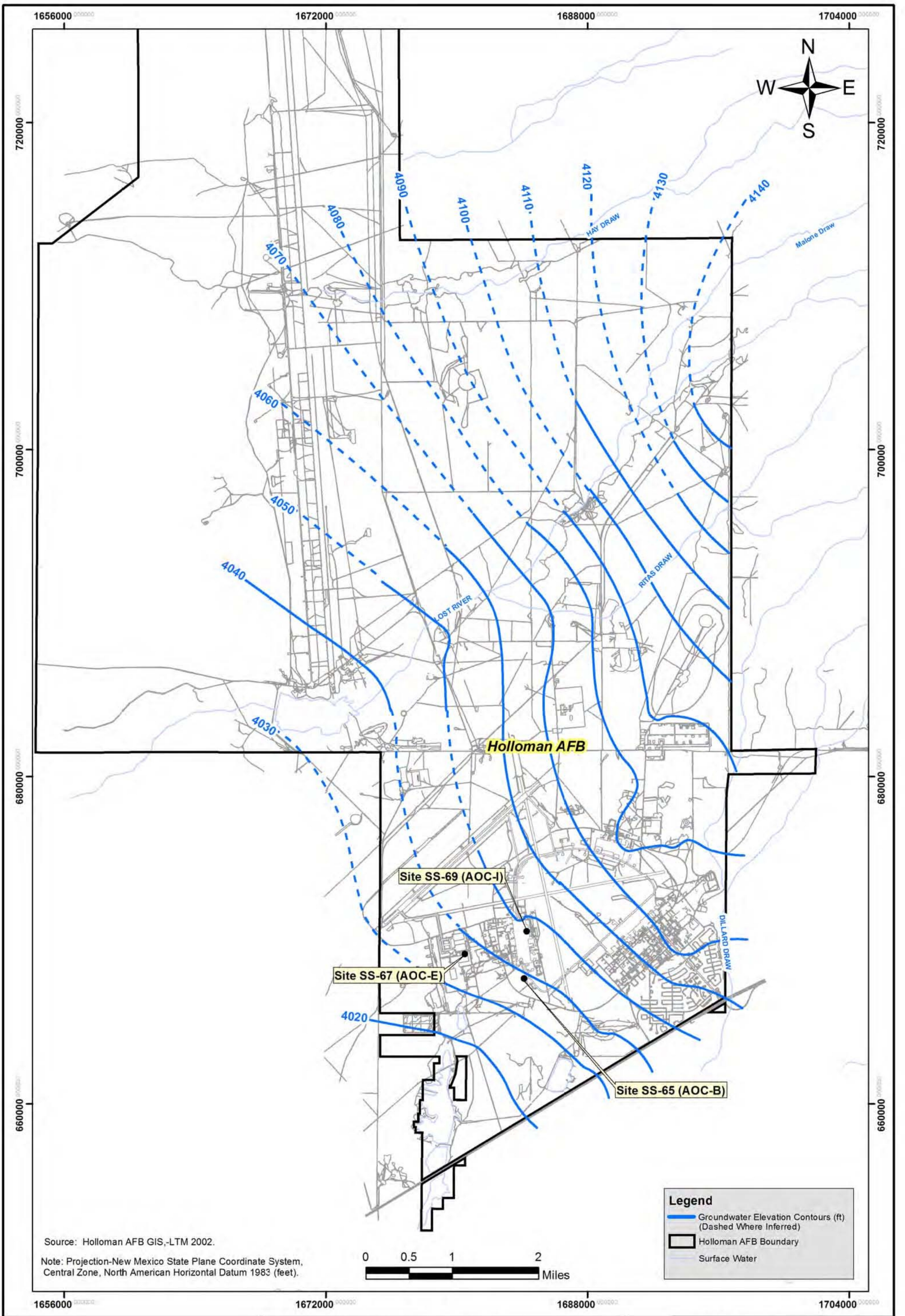
NATIONVIEW

Soil Map
Holloman AFB, New Mexico

PROJECT NO.	SCALE	DATE	DRAWN BY: dtm
11-0020	1" = 1.0 mi.	4/19/2013	DRAWING NO: 3-5

RCRA Facility Assessment
Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Figure 3-5



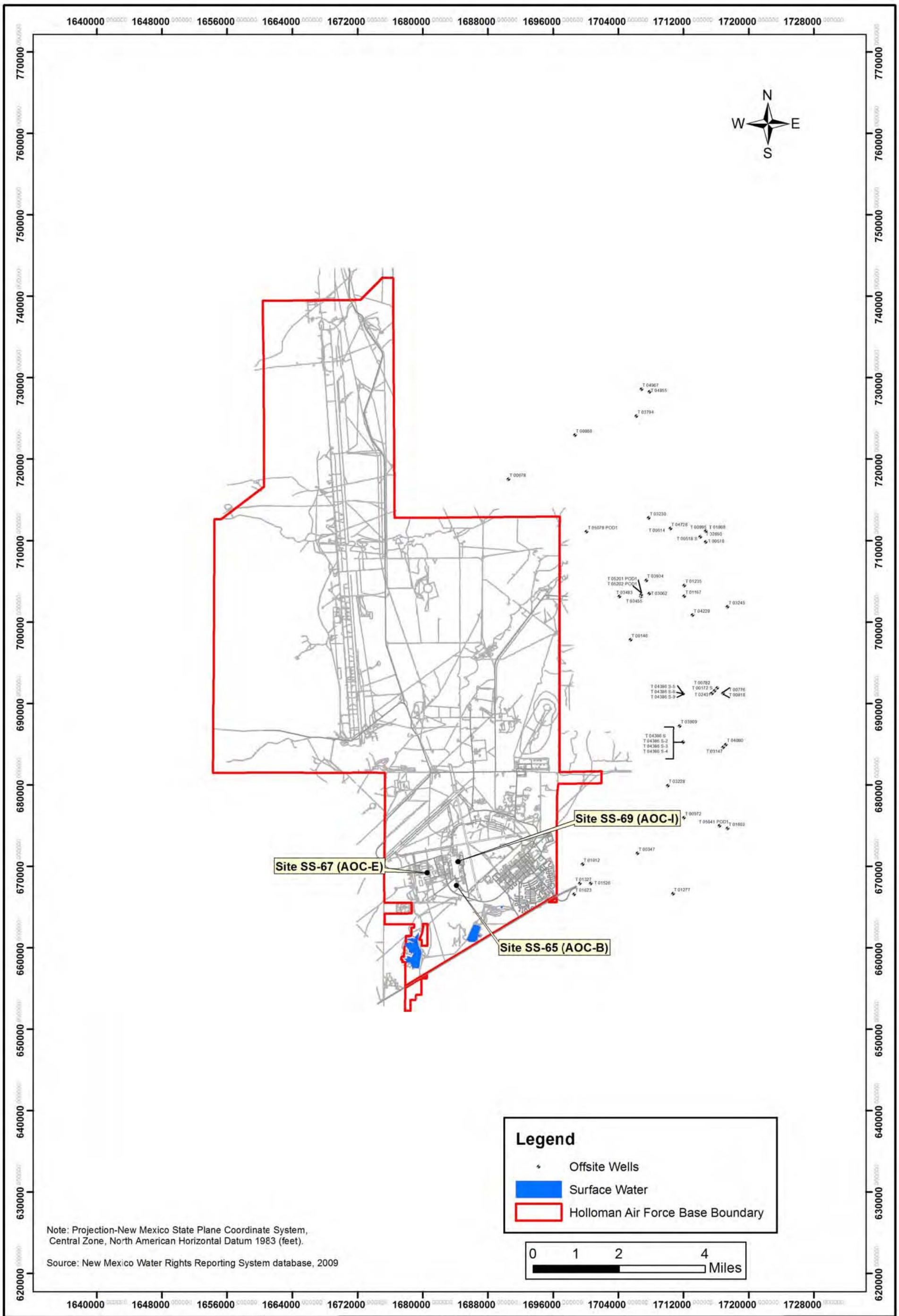
NATIONVIEW

Basewide Groundwater Contour Map
Holloman AFB, New Mexico

PROJECT NO:	SCALE:	DATE:	DRAWN BY:
11-0020	1" = 1 mile	5/16/2012	WB
			DRAWING NO: Figure 3-6

RCRA Facility Assessment
Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Figure 3-6



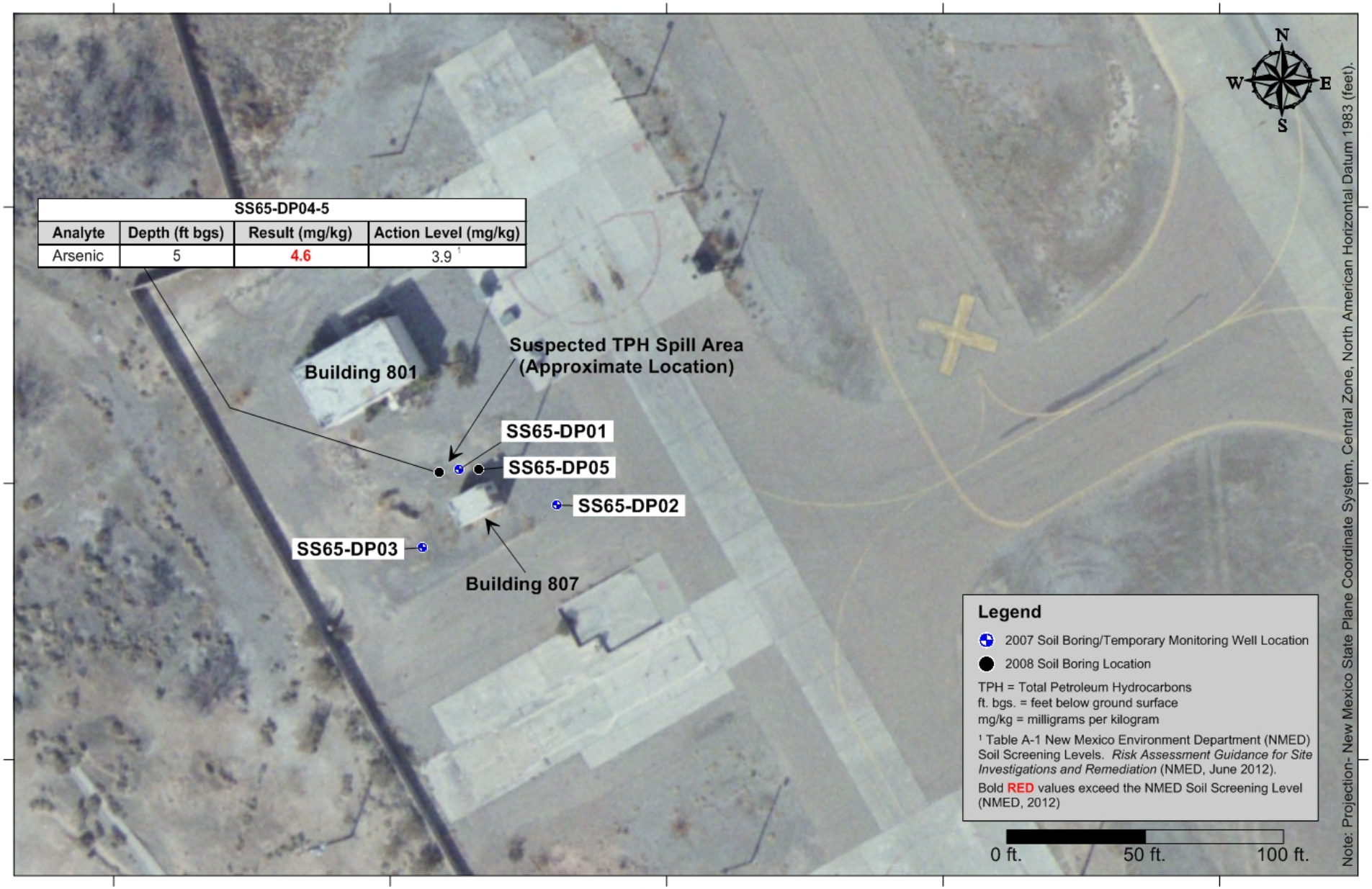
NATIONVIEW

Groundwater Wells Located Within a 4-Mile Radius of Holloman AFB, New Mexico

PROJECT NO:	SCALE:	DATE:	DRAWN BY:
11-0020	1 inch = 2 miles	5/16/2012	WB
			DRAWING NO: 3-7

RCRA Facility Assessment
Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Figure 3-7



SS65-DP04-5			
Analyte	Depth (ft bgs)	Result (mg/kg)	Action Level (mg/kg)
Arsenic	5	**4.6**	3.9 [1]

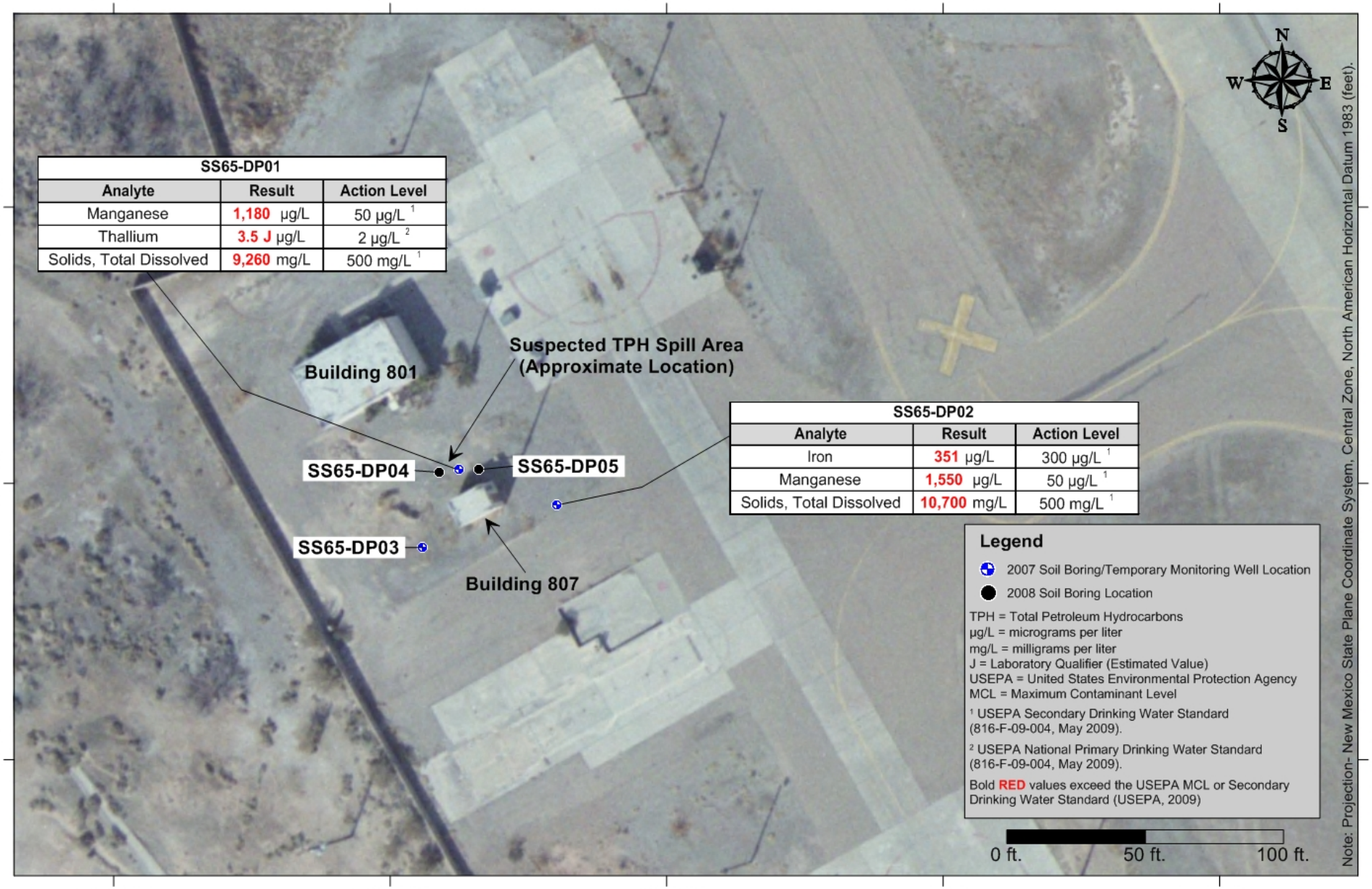
NATIONVIEW

SS-65
Soil Analytical Results Above Action Levels

PROJECT NO.	SCALE	DATE	DRAWN BY:
11-0020	1" = 50 ft.	4/19/2013	dtm
			DRAWING NO: 5-1

RCRA Facility Assessment
Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Figure 5-1



SS65-DP01		
Analyte	Result	Action Level
Manganese	**1,180** µg/L	50 µg/L [1]
Thallium	**3.5 J** µg/L	2 µg/L [2]
Solids, Total Dissolved	**9,260** mg/L	500 mg/L [1]

SS65-DP02		
Analyte	Result	Action Level
Iron	**351** µg/L	300 µg/L [1]
Manganese	**1,550** µg/L	50 µg/L [1]
Solids, Total Dissolved	**10,700** mg/L	500 mg/L [1]

Legend

- 2007 Soil Boring/Temporary Monitoring Well Location
- 2008 Soil Boring Location

TPH = Total Petroleum Hydrocarbons
µg/L = micrograms per liter
mg/L = milligrams per liter
J = Laboratory Qualifier (Estimated Value)
USEPA = United States Environmental Protection Agency
MCL = Maximum Contaminant Level

[1] USEPA Secondary Drinking Water Standard (816-F-09-004, May 2009).

[2] USEPA National Primary Drinking Water Standard (816-F-09-004, May 2009).

Bold **RED** values exceed the USEPA MCL or Secondary Drinking Water Standard (USEPA, 2009)

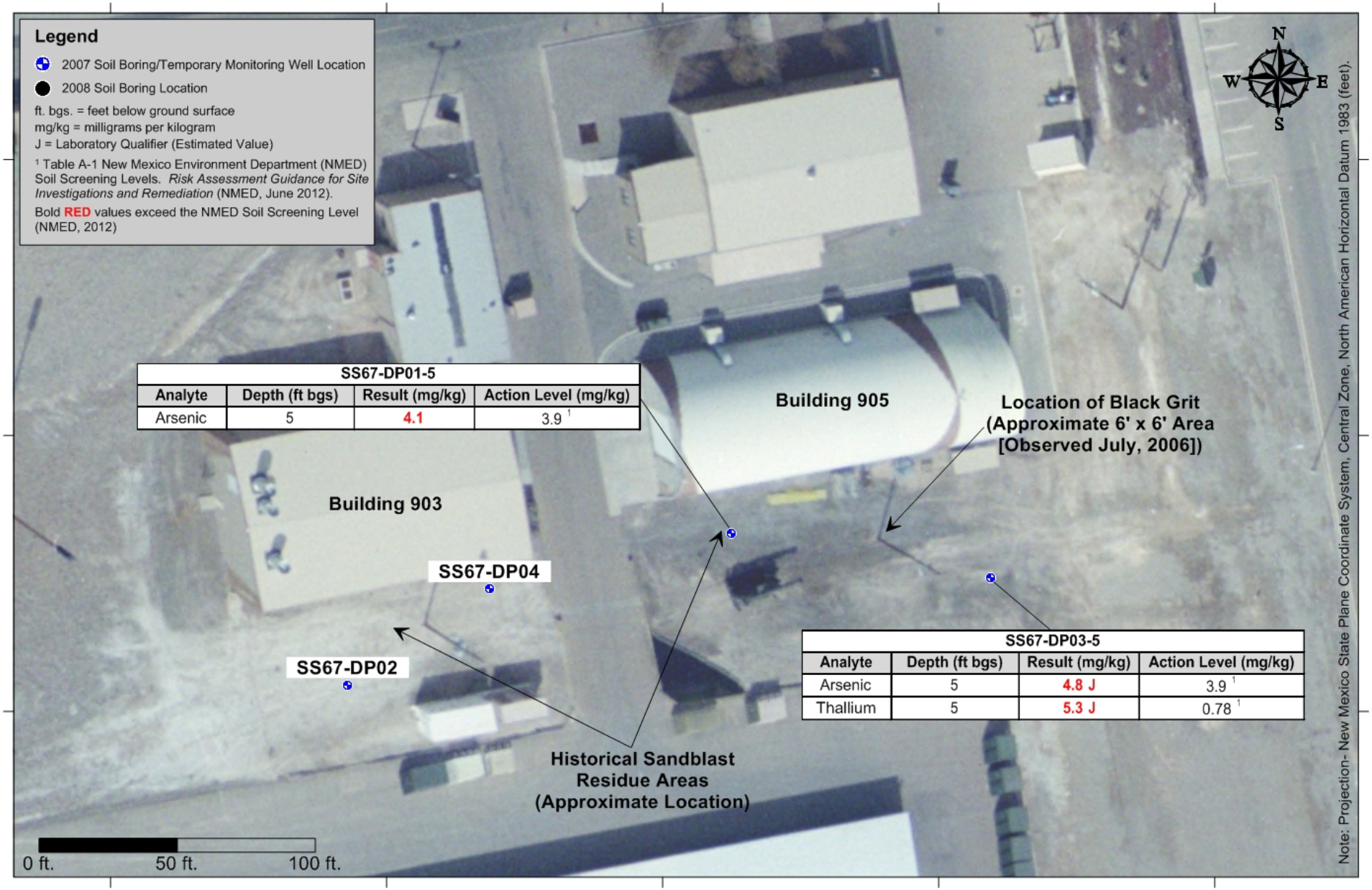
NATIONVIEW

SS-65
Groundwater Analytical Results Above Action Levels

PROJECT NO.	SCALE	DATE	DRAWN BY:
11-0020	1" = 50 ft.	4/19/2013	dtm
			DRAWING NO: 5-2

RCRA Facility Assessment
Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Figure 5-2



SS67-DP01-5			
Analyte	Depth (ft bgs)	Result (mg/kg)	Action Level (mg/kg)
Arsenic	5	**4.1**	3.9 [1]

SS67-DP03-5			
Analyte	Depth (ft bgs)	Result (mg/kg)	Action Level (mg/kg)
Arsenic	5	**4.8 J**	3.9 [1]
Thallium	5	**5.3 J**	0.78 [1]

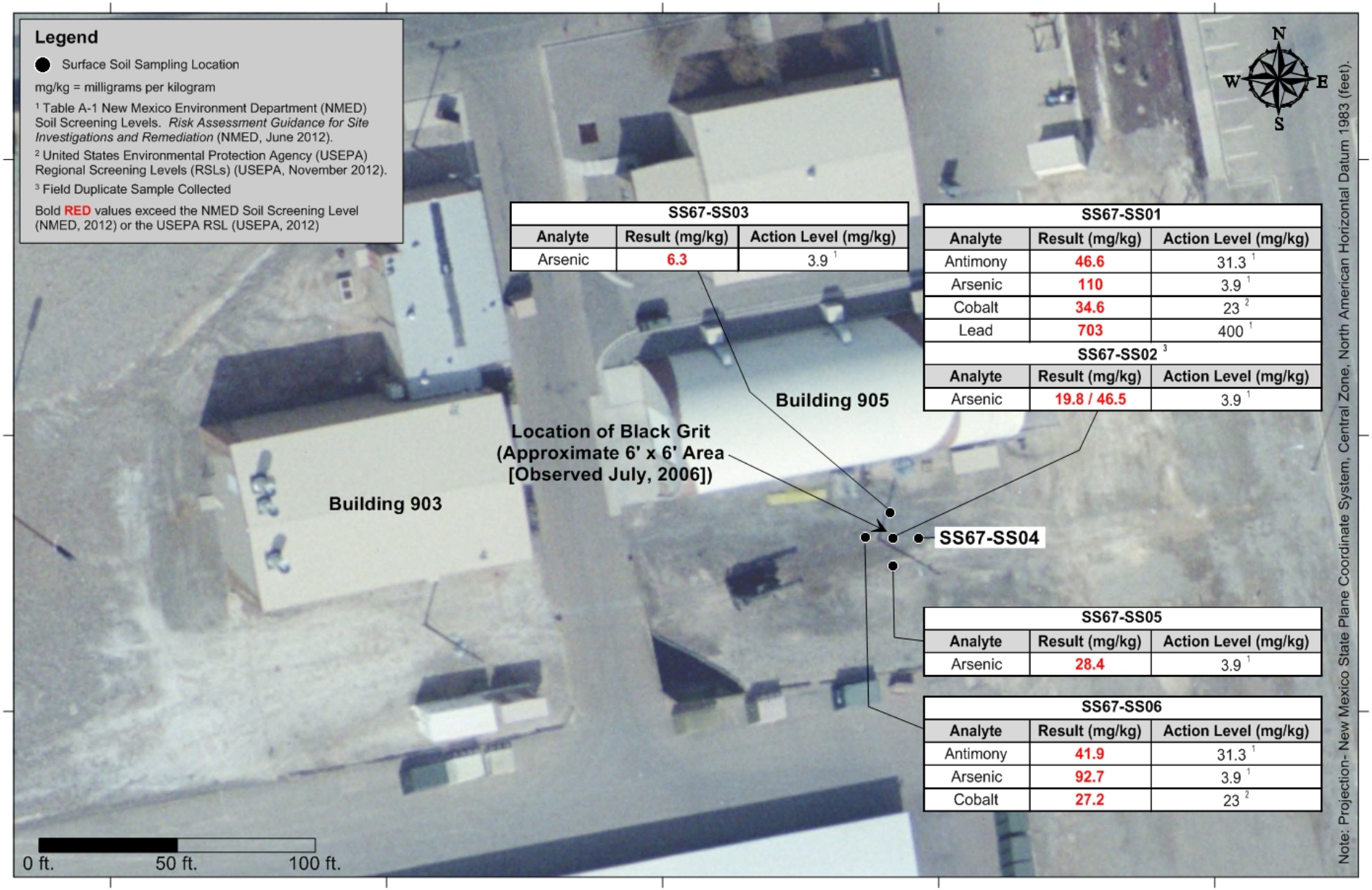
NATIONVIEW

SS-67
Subsurface Soil Analytical Results Above Action Levels

PROJECT NO.	SCALE	DATE	DRAWN BY:
11-0020	1" = 50 ft.	4/19/2013	dtm
			DRAWING NO: 5-3

RCRA Facility Assessment
Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Figure 5-3



SS67-SS03		
Analyte	Result (mg/kg)	Action Level (mg/kg)
Arsenic	**6.3**	3.9 [1]

SS67-SS01		
Analyte	Result (mg/kg)	Action Level (mg/kg)
Antimony	**46.6**	31.3 [1]
Arsenic	**110**	3.9 [1]
Cobalt	**34.6**	23 [2]
Lead	**703**	400 [1]

SS67-SS02 [3]		
Analyte	Result (mg/kg)	Action Level (mg/kg)
Arsenic	**19.8 / 46.5**	3.9 [1]

SS67-SS05		
Analyte	Result (mg/kg)	Action Level (mg/kg)
Arsenic	**28.4**	3.9 [1]

SS67-SS06		
Analyte	Result (mg/kg)	Action Level (mg/kg)
Antimony	**41.9**	31.3 [1]
Arsenic	**92.7**	3.9 [1]
Cobalt	**27.2**	23 [2]

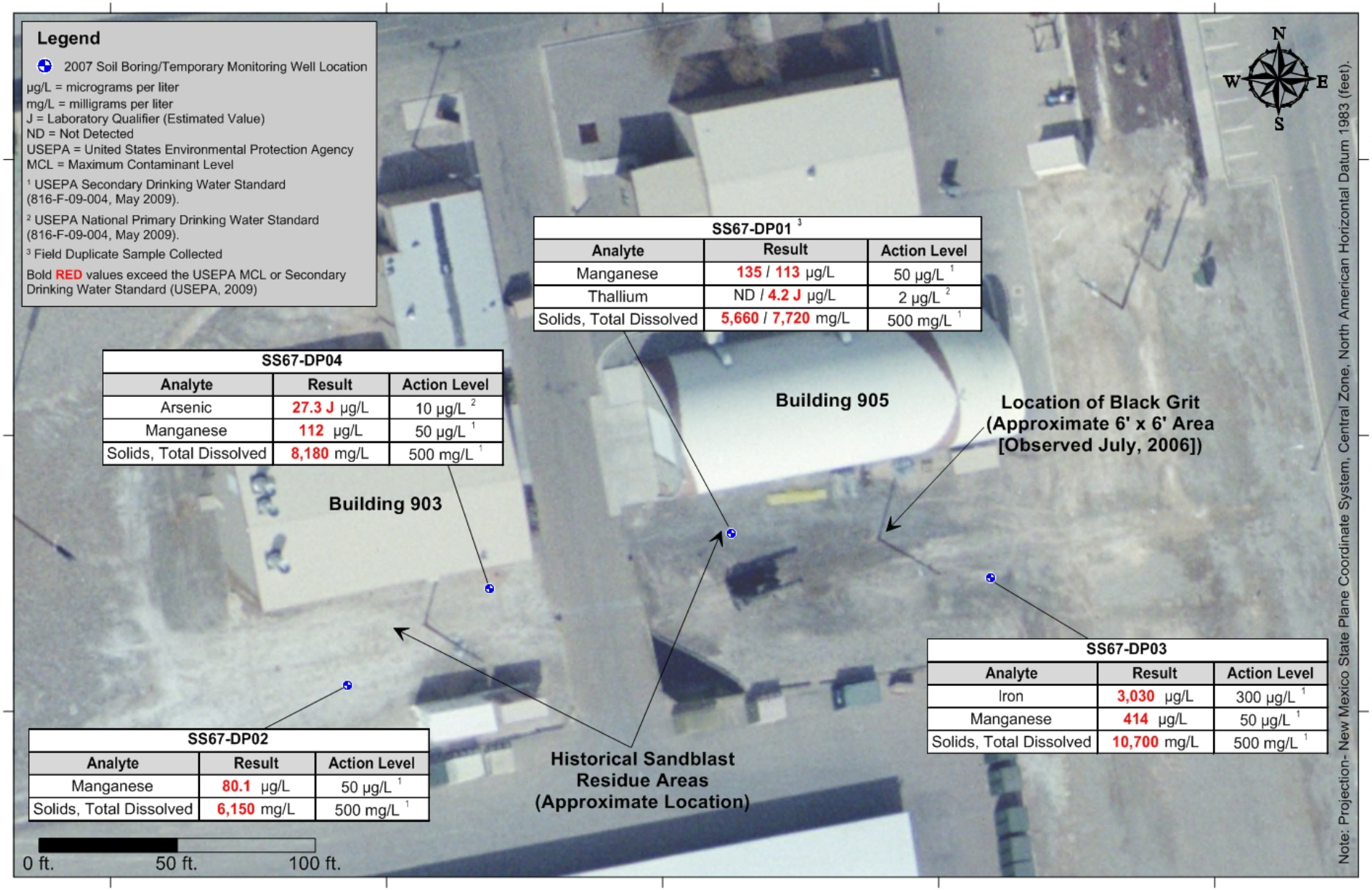
NATIONVIEW

SS-67
Surface Soil Analytical Results Above Action Levels

PROJECT NO.	SCALE	DATE	DRAWN BY:
11-0020	1" = 50 ft.	4/19/2013	dtm
			DRAWING NO: 5-4

RCRA Facility Assessment
Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Figure 5-4



SS67-DP01 [3]

Analyte	Result	Action Level
Manganese	**135** / **113** µg/L	50 µg/L [1]
Thallium	ND / **4.2 J** µg/L	2 µg/L [2]
Solids, Total Dissolved	**5,660** / **7,720** mg/L	500 mg/L [1]

SS67-DP04

Analyte	Result	Action Level
Arsenic	**27.3 J** µg/L	10 µg/L [2]
Manganese	**112** µg/L	50 µg/L [1]
Solids, Total Dissolved	**8,180** mg/L	500 mg/L [1]

SS67-DP03

Analyte	Result	Action Level
Iron	**3,030** µg/L	300 µg/L [1]
Manganese	**414** µg/L	50 µg/L [1]
Solids, Total Dissolved	**10,700** mg/L	500 mg/L [1]

SS67-DP02

Analyte	Result	Action Level
Manganese	**80.1** µg/L	50 µg/L [1]
Solids, Total Dissolved	**6,150** mg/L	500 mg/L [1]

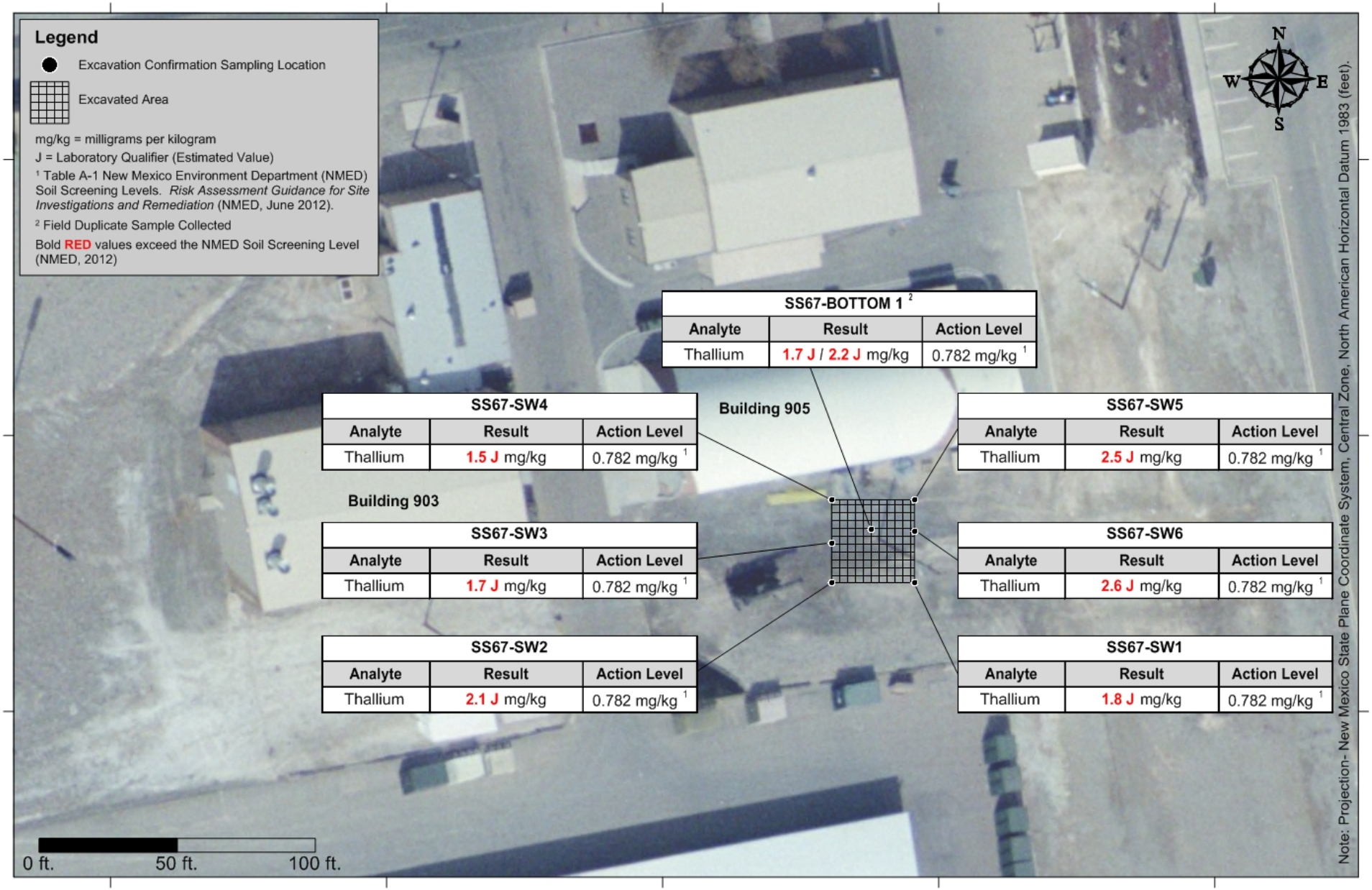
NATIONVIEW

SS-67
Groundwater Analytical Results Above Action Levels

PROJECT NO.	SCALE	DATE	DRAWN BY:
11-0020	1" = 50 ft.	4/19/2013	dtm
			DRAWING NO: 5-5

RCRA Facility Assessment
Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Figure 5-5



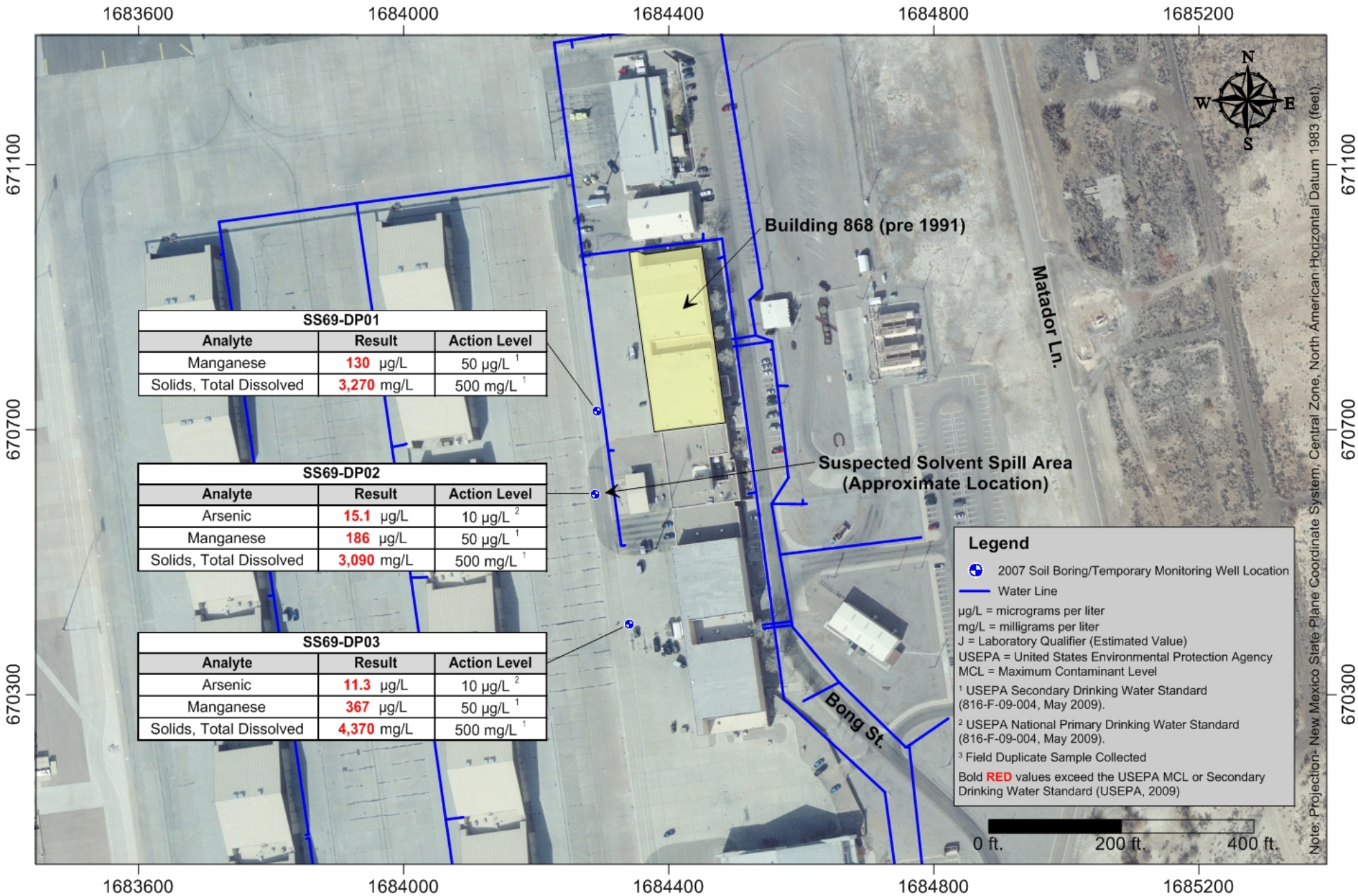
NATIONVIEW

SS-67 Sandblast Residue/Surface Soil Excavation Area and Soil Analytical Results Above Action Levels (April 2013)

PROJECT NO.	SCALE	DATE	DRAWN BY:
11-0020	1" = 50 ft.	5/07/2013	DRAWING NO: 5-6

RCRA Facility Assessment
Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Figure 5-6



SS69-DP01

Analyte	Result	Action Level
Manganese	**130** µg/L	50 µg/L [1]
Solids, Total Dissolved	**3,270** mg/L	500 mg/L [1]

SS69-DP02

Analyte	Result	Action Level
Arsenic	**15.1** µg/L	10 µg/L [2]
Manganese	**186** µg/L	50 µg/L [1]
Solids, Total Dissolved	**3,090** mg/L	500 mg/L [1]

SS69-DP03

Analyte	Result	Action Level
Arsenic	**11.3** µg/L	10 µg/L [2]
Manganese	**367** µg/L	50 µg/L [1]
Solids, Total Dissolved	**4,370** mg/L	500 mg/L [1]

NATIONVIEW

SS-69
Groundwater Analytical Results Above Action Levels

PROJECT NO.	SCALE	DATE	DRAWN BY:
11-0020	1" = 50 ft.	4/26/2013	dtm
			DRAWING NO: 5-7

RCRA Facility Assessment
Confirmatory Sampling Report
Sites SS-65, SS-67, and SS-69
Holloman AFB, New Mexico

Figure 5-7

APPENDIX A
NMED CORRESPONDENCE

State of New Mexico
ENVIRONMENT DEPARTMENT
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Telephone (505) 476-6000
Fax (505) 476-6030
www.nmenv.state.nm.us

BILL RICHARDSON
GOVERNOR

RON CURRY
SECRETARY

CINDY PADILLA
SECRETARY

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

June 11, 2007

REC'D JUN 25 A.M.

Debbie Hartell, Chief
Environmental Flight
49th CES/CEV
550 Tabosa Avenue
Holloman AFB, NM 88330-8458

RE: NOTICE OF DEFICIENCY: RCRA FACILITY ASSESSMENT, CONFIRMATORY SAMPLING WORK PLAN, MULTIPLE SITES JANUARY 2007 HOLLOMAN AIR FORCE BASE (HAFB), EPA ID# NM6572124422 HWB-HAFB-07-002

Dear Ms. Hartell:

The New Mexico Environment Department (NMED) has reviewed the Holloman Air Force Base's (the Permittees) document entitled *RCRA Facility Assessment Confirmatory Sampling Work Plan, Multiple Sites,* dated January 2007 (Work Plan). The Work Plan addresses the following Areas of Concern (AOCs): AOC-B (SS-65), AOC-C (SS-66), AOC-E (SS-67), AOC-F (SS-68), AOC-I (SS-69), AOC-M (RW-70) and AOC-S (TU-71). It also addresses Environmental Restoration Project (ERP) Sites SS-72 and SS-73. The Permittee must address the following deficiencies before NMED can make a final determination regarding approval of the Work Plan.

1. The Permittee must seek to modify its RCRA permit to add ERP Sites SS-72 and SS-73 to Table A of the permit which lists sites requiring corrective action. The Permittee must submit a request for a Class 1 permit modification within 60 days of receipt of this letter. In the request, the Permittee must include all of the necessary information to support a Class 1 permit modification in accordance with 40 C.F.R. § 270.42(a).

2. At Site SS-72, the Permittee proposes to install three groundwater sampling points to collect groundwater samples. The Permittee should discuss in this Work Plan the option to install permanent monitoring wells if contamination is detected.

3. According to Figure 9-2 in the *Final 2005 Long-Term Groundwater Monitoring Report*, localized groundwater at Site SS-73 may flow in a more northerly direction. To investigate a possible source of contamination to SS61-MW02, the Permittee must locate two additional soil borings/groundwater sampling points at Site SS-73. One will be located south of buildings 1085 and 1088 and one will be located north of buildings 1085 and 1088. Soil and groundwater samples shall be analyzed as proposed in the Work Plan.

4. At Site SS-73, spills may have occurred during former gasoline fueling operations. It is possible that total petroleum hydrocarbons may have been released and were a source of contamination. In addition to volatile and semi-volatile organics, the Permittee must analyze all proposed soil and groundwater samples for total petroleum hydrocarbons that include gasoline range organics (GRO) and diesel range organics (DRO).

5. At Site SS-65, there is little information concerning the type, size, location, and extent of the surface spill. From the description provided, the adjacent building may have been a storage facility, instead of a bathroom as stated in the Work Plan. The observed oil and grease staining may be a result of leaks during storage. The proposed borehole is not sufficient to determine the presence of contaminants in this area because there are many uncertainties associated with this site, such as location and extent of supposed surface spill and past operational pratices. The Permittee must install a total of three borings to the depth of groundwater and collect samples as proposed in this Work Plan. The borings should be located within 25 feet of the building and to the north of the building. If contamination is detected in the soil, the Permittee must install one groundwater sampling point in the boring with the highest apparent contamination and collect a groundwater sample for analysis as proposed in this Work Plan.

6. Site SS-66 is titled *Building 835 Spills*. The 1996 aerial photo depicts two distinct concrete pad areas with oil stains approximately 25 feet apart. One borehole will not serve to reduce the uncertainty of a release from both of these locations. The Permittee must install one boring at each of these identified spill areas. Because surface runoff from any release that occurred on these concrete pads had the potential to contaminate the surrounding soil, the Permittee must install one boring north of these areas as well. All borings will be drilled to the depth proposed in this Work Plan. If contamination is detected in the soil, the Permittee must install one groundwater sampling point in the boring with the highest apparent contamination and collect a groundwater sample for analysis as proposed in this Work Plan.

7. The Permittee must provide information on the contents of the quenching bath oils at Site SS-66. Specifically, NMED is concerned that cyanide may have been used in the process. If so, the Permittee must also sample the soil and groundwater for cyanide.

8. The Work Plan states that, at Site SS-67, "an area just south of Building 905, near a telephone pole, was observed to have black colored grit over a surface area of approximately 6 x 6 feet. This black material is similar to the description of the sandblasting debris described in the 1988 RFA." This recent (July 12, 2006) observation indicates the waste piles were not completely removed as reported. The Permittee must remove the remaining sandblasting debris from the ground surface and collect surface and subsurface soil samples in this area to determine the extent of contamination. Soil samples must be analyzed for Target Analyte List metals. If contamination remains above NMED soil screening levels (SSLs), the soil must be removed until SSLs are achieved.

9. At Site SS-67, the Work Plan indicates that field screening will be performed on the soil samples. Given the history of operations at this site, the potential contaminants of concern are metals and other constituents found in paints. NMED recommends the Permittee not use field screening to determine sample locations. Following removal of the sandblasting debris, the Permittee must collect soils samples from the 0-6 inch interval and from the two-foot depth. The Permittee must also install two boreholes outside of each building (903 and 905). The Permittee must analyze the samples as proposed in this Work Plan.

10. As part of its investigation-derived waste management, the Permittee proposes to spread sediment remaining in the decontamination pad area on the ground. NMED requires that the Permittee containerize its investigation-derived waste (sediment) from the decontamination area and manage it accordingly based on analytical data.

11. As part of its general decontamination procedures, the Permittee proposes to allow decontamination water to evaporate or to dispose of it at the HAFB wastewater treatment plant. NMED requires that all liquid waste, including decontamination water and purge water, be containerized until characterization is performed and proper disposal is arranged. The waste may be characterized based on known or suspected contaminants. NMED recommends a dry decontamination method be used prior to wet decontamination. In this method, equipment is brushed with a wire or other suitable brush, if practicable and necessary, to remove large particles.

12. The Permittee must revise Table 3-1 (Analytical Methods and Number of Samples by Site) to reflect the number of samples required in the aforementioned comments.

13. The Permittee has included the scope of services as an appendix to this Work Plan. This appendix is intended to provide guidance to the contractors performing the work. As such, it should not be an appendix to a work plan that is subject to approval by a regulatory authority and should be removed.

The Permittee must respond to this Notice of Deficiency within thirty (30) calendar days of receipt of this letter. If you have any questions regarding this matter or if you would like to discuss the comments prior to your response, please contact Darlene Goering of my staff at (505) 222-9504 or (505) 476-6042.

Sincerely,

James P. Bearzi
Chief
Hazardous Waste Bureau

cc: J. Kieling, NMED HWB
W. Moats, NMED HWB
C. Amindyas, NMED HWB
D. Strasser, NMED HWB
D. Goering, NMED HWB
D. Tellez, EPA Region 6 (6PD-F)
File: HAFB 2007 and Reading
HWB-HAFB-07-002

Response to Comments RCRA Facility Assessment Confirmatory Sampling Work Plan, Multiple Sites, January 2007 Holloman AFB, NM				
Comment No.	**Section**	**Page**	**Comment**	**Response**
Author	**James P. Bearzi**		**Date of Comments: June 11, 2007, Notice of Deficiency HWB-HAFB-07-002**	**Date of Response: July 2, 2007**
1	General		The Permittee must seek to modify its RCRA permit to add ERP Sites SS-72 and SS-73 to Table A of the permit which lists sites requiring corrective action. The Permittee must submit a request for a Class 1 permit modification within 60 days of receipt of this letter. In the request, the Permittee must include all of the necessary information to support a Class 1 permit modification in accordance with 40 C.F.R. § 270.42 (a).	Concur. A request for a Class I permit modification will be submitted.
2	2.1.5	2-3	At Site SS-72, the Permittee proposes to install three groundwater sampling points to collect groundwater samples. The Permittee should discuss in this Work Plan the option to install permanent monitoring wells if contamination is detected.	No contamination was detected in either the soil or the groundwater samples; therefore no permanent monitoring wells are required.
3	2.2.5	2-5	According to Figure 9-2 in the *Final 2005 Long-Term Groundwater Monitoring Report*, localized groundwater at Site SS-73 may flow in a more northerly direction. To investigate a possible source of contamination to SS61-MW02, the Permittee must locate two additional soil borings/groundwater sampling points at Site SS-73. One will be located south of buildings 1085 and 1088 and one will be located north of buildings 1085 and 1088. Soil and groundwater samples shall be analyzed as proposed in the Work Plan.	Concur. Two additional soil borings/groundwater sampling points will be installed north and south of Buildings 1085 and 1088. Section 2.2.5 of the text, Figure 2-3, and Table 3-1 will reflect the change.
4	2.2.5	2-5	At Site SS-73, spills may have occurred during former gasoline fueling operations. It possible that total petroleum hydrocarbons may have been released and were a source of contamination. In addition to volatile and semi-volatile organics, the Permittee must analyze all proposed soil and groundwater samples for total petroleum hydrocarbons that include gasoline range organics (GRO) and diesel range organics (DRO).	Concur, however, Holloman AFB requests that no soil TPH samples be collected from the originally proposed three soil borings (SS73-DP04, SS73-DP05, and SS73-DP06) and only groundwater TPH samples will be collected. However, soil and groundwater TPH samples will be collected from the two additional borings requested by NMED. Section 2.2.5 and Table 3-1 will reflect the changes.

Response to Comments RCRA Facility Assessment Confirmatory Sampling Work Plan, Multiple Sites, January 2007 Holloman AFB, NM				
Comment No.	**Section**	**Page**	**Comment**	**Response**
Author	**James P. Bearzi**		**Date of Comments: June 11, 2007, Notice of Deficiency HWB-HAFB-07-002**	**Date of Response: July 2, 2007**
5	2.3.4	2-7	At Site SS-65, there is little information concerning the type, size, location, and extent of the surface spill. From the description provided, the adjacent building may have been a storage facility, instead of a bathroom as stated in the Work Plan. The observed oil and grease staining may be a result of leaks during storage. The proposed borehole is not sufficient to determine the presence of contaminants in this area because there are many uncertainties associated with this site, such as location and extent of supposed surface spill and past operational practices. The Permittee must install a total of three borings to the depth of groundwater and collect samples as proposed in this Work Plan. The borings should be located within 25 feet of the building and to the north of the building. If contamination is detected in the soil, the Permittee must install one groundwater sampling point in the boring with the highest apparent contamination and collect groundwater sample for analysis as proposed in this Work Plan.	Concur. Two additional borings will be installed north of Building 807 within 25 feet of the building. Based on soil sampling results, a groundwater sample will be collected from the boring with the highest contamination, as well as one groundwater sample from SS65-DP01. Section 2.3.4, Figure 2-4, and Table 3-1 will reflect the changes.
6	2.4.4	2-9	Site SS-66 is titled *Building 835 Spills*. The 1996 aerial photo depicts two distinct concrete pad areas with oil stains approximately 25 feet apart. One borehole will not serve to reduce the uncertainty of a release from both of these locations. The Permittee must install one boring at each of these identified spill areas. Because surface runoff from any release that occurred on these concrete pads had the potential to contaminate the surrounding soil, the Permittee must install one boring north of these areas as well. All borings will be drilled to the depth proposed in this Work Plan. If contamination is detected in the soil, the Permittee must install one groundwater sampling point in the boring with the highest apparent contamination and	Concur. Three additional borings will be installed (one north of the former Building 835 and two located at the spill site). Based on soil sampling results a groundwater sample will be collected from the boring with the highest contamination, as well as one groundwater sample from SS66-DP01. Section 2.4.4, Figure 2-6, and Table 3-1 will reflect the changes.

Response to Comments RCRA Facility Assessment Confirmatory Sampling Work Plan, Multiple Sites, January 2007 Holloman AFB, NM				
Comment No.	**Section**	**Page**	**Comment**	**Response**
Author	**James P. Bearzi**		**Date of Comments: June 11, 2007, Notice of Deficiency HWB-HAFB-07-002**	**Date of Response: July 2, 2007**
			collect a groundwater sample for analysis as proposed in this Work Plan.	
7	2.4.4	2-9	The Permittee must provide information on the contents of the quenching bath oils at Site SS-66. Specifically, NMED is concerned that cyanide may have been used in the process. If so, the Permittee must also sample the soil and groundwater for cyanide.	Concur. Soil and groundwater samples for cyanide analysis will be collected from the additional soil borings requested by NMED from the previous comment. Section 2.4.4 and Table 3-1 will reflect the changes.
8	2.5.4	2-11	The Work Plan states that, at Site SS-67, "an area just south of Building 905, near a telephone pole, was observed to have black colored grit over a surface area of approximately 6 x 6 feet. This black material is similar to the description of the sandblasting debris described in the 1988 RFA." This recent (July 12, 2006) observation indicates the waste piles were not completely removed as reported. The Permittee must remove the remaining sandblasting debris from the ground surface and collect surface and subsurface soil samples in this area to determine the extent of contamination. Soil samples must be analyzed for Target Analyte List metals. If contamination remains above NMED soil screening levels (SSLs), the soil must be removed until SSLs are achieved.	Based on field observations, this area appears to have been graded and gravel has been laid down in the areas of the soil borings. No waste piles or sandblasting residue remains at the site. However, it should be noted that biological soil crusts (which may appear similar to black grit associated with sandblasting as described in the Work Plan) exist naturally in the area and are formed by living organisms and their by-products, creating a crust of soil particles bound together by organic materials. These crusts play an important role in the increase of soil stability and water infiltration, and appear to have a positive effect on plant germination and growth. Section 2.5.3 will include this information. Holloman AFB concludes that additional investigative and/or removal activities are not warranted at this time.
9	2.5.4	2-11	At Site SS-67, the Work Plan indicates that field screening will be performed on the soil samples. Given the history of operations at this site, the potential contaminants of concern are metals and other constituents found in paints. NMED recommends the Permittee not use field screening to determine sample locations. Following removal of the sandblasting debris, the Permittee must collect soils samples from the 0-6 inch interval and from the two-foot depth. The Permittee must also install two boreholes outside of each building (903 and 905). The Permittee	Concur. However, during the most recent field activities in April 2007, a soil sample from the 0-2.5 foot interval (from a 0-5 foot sampling sleeve) was collected from each of the soil borings located at Site SS-67. Due to shallow groundwater, field screening techniques were not useful at this site. Please see the previous comment in response to the removal of the sandblasting debris. Two additional borings will be installed outside of each building (903 and 905) as previously submitted. Section 2.5.4, Table 3-1, and Figure 2-7 will reflect the changes.

Response to Comments RCRA Facility Assessment Confirmatory Sampling Work Plan, Multiple Sites, January 2007 Holloman AFB, NM				
Comment No.	**Section**	**Page**	**Comment**	**Response**
Author	**James P. Bearzi**		**Date of Comments: June 11, 2007, Notice of Deficiency HWB-HAFB-07-002**	**Date of Response: July 2, 2007**
			must analyze the samples as proposed in this Work Plan.	
10	3.4	3-5	As part of its investigation-derived waste management, the Permittee proposes to spread sediment remaining in the decontamination pad area on the ground. NMED requires that the Permittee containerize the investigation-derived waste (sediment) from the decontamination area and manage it accordingly based on analytical data.	Concur, Holloman AFB will containerize all soil IDW and place it in the land farm located on Holloman AFB. The text in Section 3.4 will reflect the change.
11	3.4 & 3.6	3-5	As part of its general decontamination procedures, the Permittee proposes to allow decontamination water to evaporate or to dispose of it at the HAFB wastewater treatment plant. NMED requires that all liquid waste, including decontamination water and purge water, be containerized until characterization is performed and proper disposal is arranged. The waste may be characterized based on known or suspected contaminants. NMED recommends a dry decontamination method be used prior to wet decontamination. In this method, equipment is brushed with a wire or other suitable brush, if practicable and necessary, to remove large particles.	Concur, Holloman AFB will containerize all IDW and transport it to the HAFB wastewater treatment plant. Sampling results from the investigation will be used to characterize the water, prior to disposal. The text in Sections 3.4 and 3.6 will reflect the changes.
12	Table 3-1		The Permittee must revise Table 3-1 (Analytical Methods and Number of Samples by Site) to reflect the number of samples required in the aforementioned comments.	Concur. Table 3-1 will reflect the changes.
13	Appendix A		The Permittee has included the scope of services as an appendix to this Work Plan. This appendix is intended to provide guidance to the contractors performing the work. As such, it should not be an appendix to a work plan that is subject to approval by a regulatory authority and should be removed.	Concur. This appendix will be removed from the Work Plan.

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

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Santa Fe, New Mexico 87505-6303
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Governor

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Lieutenant Governor

RON CURRY
Secretary

CINDY PADILLA
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

November 7, 2007

Debbie Hartell, Chief
Environmental Flight
49th CES/CEV
550 Tabosa Avenue
Holloman AFB, NM 88330-8458

RE: APPROVAL OF THE RCRA FACILITY ASSESSMENT CONFIRMATORY SAMPLING WORK PLAN, MULTIPLE SITES HOLLOMAN AIR FORCE BASE, NEW MEXICO EPA ID# NM6572124422 HWB-HAFB-07-002

Dear Ms. Hartell:

The New Mexico Environment Department (NMED) received Holloman Air Force Base's (the "Permittee") *Response to Notice of Deficiency for the RCRA Facility Assessment, Confirmatory Sampling Work Plan, Multiple Sites* (Response), dated October 15, 2007. NMED has reviewed the Response and hereby approves the aforementioned work plan with the following comments. The comment numbers refer to the original comment numbers as found in the notice of deficiency. NMED notes that the response was not received within the 30 calendar days that were given to the Permittee during which to respond.

Comment #5:

The Permittee was directed to install two additional borings north of and within 25 feet of Building 807. Based on the site description in the work plan, these are the most likely locations

to confirm the presence or absence of soil staining observed during the 1988 RFA. The Permittee agreed to install the additional borings but the proposed locations are to the east and west of Building 807, instead of to the north. The Permittee shall relocate the additional borings to the north.

Comment #8:

The Permittee was directed to remove the remaining sandblasting debris from the ground around the telephone pole. This area, as reported in the work plan, "was observed to have black colored grit" and was described as a "small remaining area of staining." In the Response, the Permittee states that this "black grit" is actually a naturally-occurring biological soil crust that appears similar to black grit. Because of the ambiguity of the nature of the material, the Permittee must collect a sample of the material. The Permittee must collect the sample from the top 1-2 inches and analyze it for Target Analyte List metals. If the laboratory analysis indicates that the material is waste, the Permittee will remove the remaining waste until NMED soil screening levels are achieved.

If you have any questions regarding this letter, please contact Ms. Darlene Goering of my staff at (505) 222-9504.

Sincerely,

John E. Kieling
Program Manager
Permits Management Program
Hazardous Waste Bureau

cc: J. Bearzi, NMED HWB
W. Moats, NMED HWB
C. Amindyas, NMED HWB
D. Strasser, NMED HWB
L. King, EPA Region 6 (6PD-F)
File: HAFB 2007 and Reading
HAFB-07-002

NEW MEXICO ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

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Governor

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Lieutenant Governor

DAVE MARTIN
Secretary

BUTCH TONGATE
Deputy Secretary

JAMES H. DAVIS, Ph.D.
Director
Resource Protection Division

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

July 18, 2012

A. David Budak
Deputy Base Civil Engineer
49 CES/CEVR
550 Tabosa Avenue
Holloman AFB, NM 88330-8458

RE: APPROVAL
RCRA FACILITY ASSESSMENT CONFIRMATORY SAMPLING REPORT, MULTIPLE SITES (SS-66, SS-68, RW-70, SS-72 AND SS-73), MAY 2008
HOLLOMAN AIR FORCE BASE, EPA ID# NM6572124422
HWB-HAFB-08-006

Dear Mr. Budak:

The New Mexico Environment Department (NMED) has reviewed Holloman Air Force Base's (the Permittee's) *RCRA Facility Assessment Confirmatory Sampling Report, Multiple Sites, SS-66 (*AOC-C*), SS-68 (*AOC-F*), RW-70 (*AOC-M*), SS-72 (*AOC-838*) and SS-73 (*AOC-1088*)* which was received on June 27, 2008. The subject *Report* is hereby approved. NMED therefore issues a Certificate of Completion for Corrective Action Complete Without Controls (CAC) for AOC-C, AOC-M, AOC-838 and AOC-1088. Please note that site AOC-F (SS-68) is currently in the process of being granted CAC status through a separate permit modification procedure.

The Permittee may initiate a Class 3 Permit Modification Request (PMR) for CAC for sites AOC-C, AOC-M, AOC-838 and AOC-1088 in accordance with 40 C.F.R. §270.42(c). The Class 3 PMR includes requirements for public notice and for providing opportunity for public

comments that are mandatory. NMED's determination that corrective action is complete is subject to NMED's reservation of rights for new information or unknown conditions. As part of the PMR process, new information may become available during the public comment period that a previously issued Certificate of Completion for a given site is not protective of human health or the environment. NMED reserves all rights against the Permittee, and may withdraw a previously issued Certificate of Completion for any site where new information indicates that further corrective action is needed to protect human health and the environment.

If you have any questions regarding this matter, please contact David Strasser at (505) 222-9526.

Sincerely,

John E. Kieling
Chief
Hazardous Waste Bureau

cc: W. Moats, NMED HWB
C. Amindyas, NMED HWB
D. Strasser, NMED HWB
D. Scruggs, HAFB
C. Hendrickson, EPA, Region 6 (6PD-F)
File: HAFB 2012 and Reading
HAFB-08-006

APPENDIX B

SOIL BORING LOGS AND MONITORING WELL CONSTRUCTION DIAGRAMS

SS-65

Soil Boring Logs and Monitoring well Construction Diagrams

HTW DRILLING LOG

HOLE NO.	SS65-DP01
1. COMPANY NAME	Bhate Environmental Associates, Inc.
2. DRILLING CONTRACTOR	ESN
SHEET	OF 1 SHEETS 2
3. PROJECT	Holloman Air Force Base Confirmatory Sampling - SS65
4. LOCATION	Holloman Air Force Base, New Mexico
5. NAME OF DRILLER	Chad Grubbs
6. MANUFACTURER'S DESIGNATION OF DRILL	Power Probe 9600 Pro
7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT	3.25" OD Rods 5' in Length 2.5" OD Teflon Liners 5' in Length - for sampling
8. HOLE LOCATION	North 667654.9087N East 1684124.7401E
9. SURFACE ELEVATION (ft. NGVD)	4047.045
10. DATE STARTED	16-Apr-2007
11. DATE COMPLETED	16-Apr-2007
12. OVERBURDEN THICKNESS	NA
15. DEPTH GROUNDWATER ENCOUNTERED	2' BGS
13. DEPTH DRILLED INTO ROCK	NA
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	5.25 BTOC, <1 Day (4/16/07)
14. TOTAL DEPTH OF HOLE	11 ft BGS
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	5.27 BTOC, 2 Days (4/18/07)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	3

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC %
SS65-DP01-5	8260	TAL	TPH-D/G/ORO	PCBs	SVOCs	100

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
-	NA	Temporary	NA	Katherine Thompson

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4047.045	0	slightly Sandy SILT w/Gravel, Pink (7.5 YR 7/4), Moist, angular sands (very fine grained) and gravel, soft to medium stiff, weak, massive, dry strength not measured in field, moderate reaction, medium dense, non-plastic, ML	PID: 0.0 FID: 4.0	1	SS65-DP01-5	NA	
4037.045	1						
4027.045	2	slightly Sandy SILT, Light Brown (7.5 YR 6/4), Saturated, subangular sands (very fine grained), soft to medium stiff, weak, massive, dry strength not measured in field, moderate reaction, medium dense, non-plastic, ML					
4017.045	3						
4007.045	4						
	5						

HTW DRILLING LOG

HOLE NO. SS65-DP01

PROJECT: Holloman Air Force Base Confirmatory Sampling - SS65

INSPECTOR: Katherine Thompson

SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
3997.045		Silty Sand, Pink (7.5 YR 8/3), Saturated, subangular sands (very fine grained), medium stiff to stiff, weak, massive, dry strength not measured in field, moderate reaction, medium dense, non-plastic, SM	NA	2	NA	NA	
3987.045	6						
3977.045	7						
		Silty Sand, Very Pale Brown (10 YR 7/4), Saturated, subangular to rounded sands (very fine grained), soft to medium stiff, weak, massive, dry strength not measured in field, moderate reaction, medium dense, non-plastic, SM	NA	3	NA	NA	
3967.045	8						
3957.045	9						
3947.045	10	Same as above with color change to Pale Brown (10YR 6/3)					
3937.045	11	END OF BOREHOLE					
	12						
	13						

HTW DRILLING LOG

HOLE NO.	SS65-DP02
1. COMPANY NAME	Bhate Environmental Associates, Inc.
2. DRILLING CONTRACTOR	Vista Geoscience LLC
SHEET	OF 1 SHEETS 2
3. PROJECT	Holloman Air Force Base Confirmatory Sampling - SS65
4. LOCATION	Holloman Air Force Base, New Mexico
5. NAME OF DRILLER	Zack Hurst
6. MANUFACTURER'S DESIGNATION OF DRILL	Power Probe 9600 Pro
7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT	3.25" OD Rods 5' in Length 2.5" OD Teflon Liners 5' in Length - for sampling
8. HOLE LOCATION	North 667642.1705N East 1684160.3276 E
9. SURFACE ELEVATION (ft. NGVD)	4046.941
10. DATE STARTED	21-Aug-2007
11. DATE COMPLETED	21-Aug-2007
12. OVERBURDEN THICKNESS	NA
15. DEPTH GROUNDWATER ENCOUNTERED	2' BGS
13. DEPTH DRILLED INTO ROCK	NA
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	5.7 BTOC, <1 Day (4/21/07)
14. TOTAL DEPTH OF HOLE	11 ft BGS
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	3

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC %
SS65-DP02-5	8260	TAL	TPH-D/G/ORO	PCBs	SVOCs	100

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
-	NA	Temporary	NA	Katherine Thompson

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4046.941	0	Top 1' fill material	PID: 0.0	1	SS65-DP02-5	NA	
4045.941	1	Sandy Silt, Very Pale Brown (10 YR 7/3), Moist to Wet, soft, weak, massive, dry strength not measured in field, moderate reaction, medium dense, non-plastic, ML					
4044.941	2						
4043.941	3						
4042.941	4						
4041.941	5						

HTW DRILLING LOG

HOLE NO. SS65-DP02

PROJECT: Holloman Air Force Base Confirmatory Sampling - SS65

INSPECTOR: Katherine Thompson

SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4041.941		Silt with Clay, Light Yellowish Brown (10 YR 6/4), Saturated, subangular sands (very fine grained), soft, weak, massive, dry strength not measured in field, moderate reaction, medium dense, non-plastic, ML	NA	2	NA	NA	
4040.941	6						
4039.941	7						
4038.941	8						
		Sand with silt, White (10 YR 8/2), Moist to wet, subangular to angular sands (medium grained) with granules of calcite, soft to medium stiff, weak, massive, dry strength not measured in field, moderate to rapid reaction, medium dense, non-plastic, SM	NA	3	NA	NA	
4037.941	9						
4036.941	10						
4035.941	11	END OF BOREHOLE					
	12						
	13						

HTW DRILLING LOG

HOLE NO.	SS65-DP03
1. COMPANY NAME	Bhate Environmental Associates, Inc.
2. DRILLING CONTRACTOR	Vista Geoscience LLC
SHEET	OF 1 SHEETS 2
3. PROJECT	Holloman Air Force Base Confirmatory Sampling - SS65
4. LOCATION	Holloman Air Force Base, New Mexico
5. NAME OF DRILLER	Zack Hurst
6. MANUFACTURER'S DESIGNATION OF DRILL	Power Probe 9600 Pro
7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT	3.25" OD Rods 5' in Length 2.5" OD Teflon Liners 5' in Length - for sampling
8. HOLE LOCATION	North 667626.7810N East 1684111.7619 E
9. SURFACE ELEVATION (ft. NGVD)	4046.905
10. DATE STARTED	21-Aug-2007
11. DATE COMPLETED	21-Aug-2007
12. OVERBURDEN THICKNESS	NA
15. DEPTH GROUNDWATER ENCOUNTERED	2' BGS
13. DEPTH DRILLED INTO ROCK	NA
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	4.7 BTOC, <1 Day (4/21/07)
14. TOTAL DEPTH OF HOLE	11 ft BGS
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	3

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC %
SS65-DP03-5	8260	TAL	TPH-D/G/ORO	PCBs	SVOCs	100

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
-	NA	Temporary	NA	Katherine Thompson

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4046.905	0	Top 2' fill material	PID: 0.0	1	SS65-DP03-5	NA	
4045.905	1						
4044.905	2	Silt with Clay, Brown (7.5 YR 4/4), Moist, soft to medium stiff, weak, massive, dry strength not measured in field, moderate reaction, medium dense, non-plastic, ML					
4043.905	3						
4042.905	4						
4041.905	5						

HTW DRILLING LOG

HOLE NO. SS65-DP03

PROJECT: Holloman Air Force Base Confirmatory Sampling - SS65

INSPECTOR: Katherine Thompson

SHEET OF 2 SHEETS 2

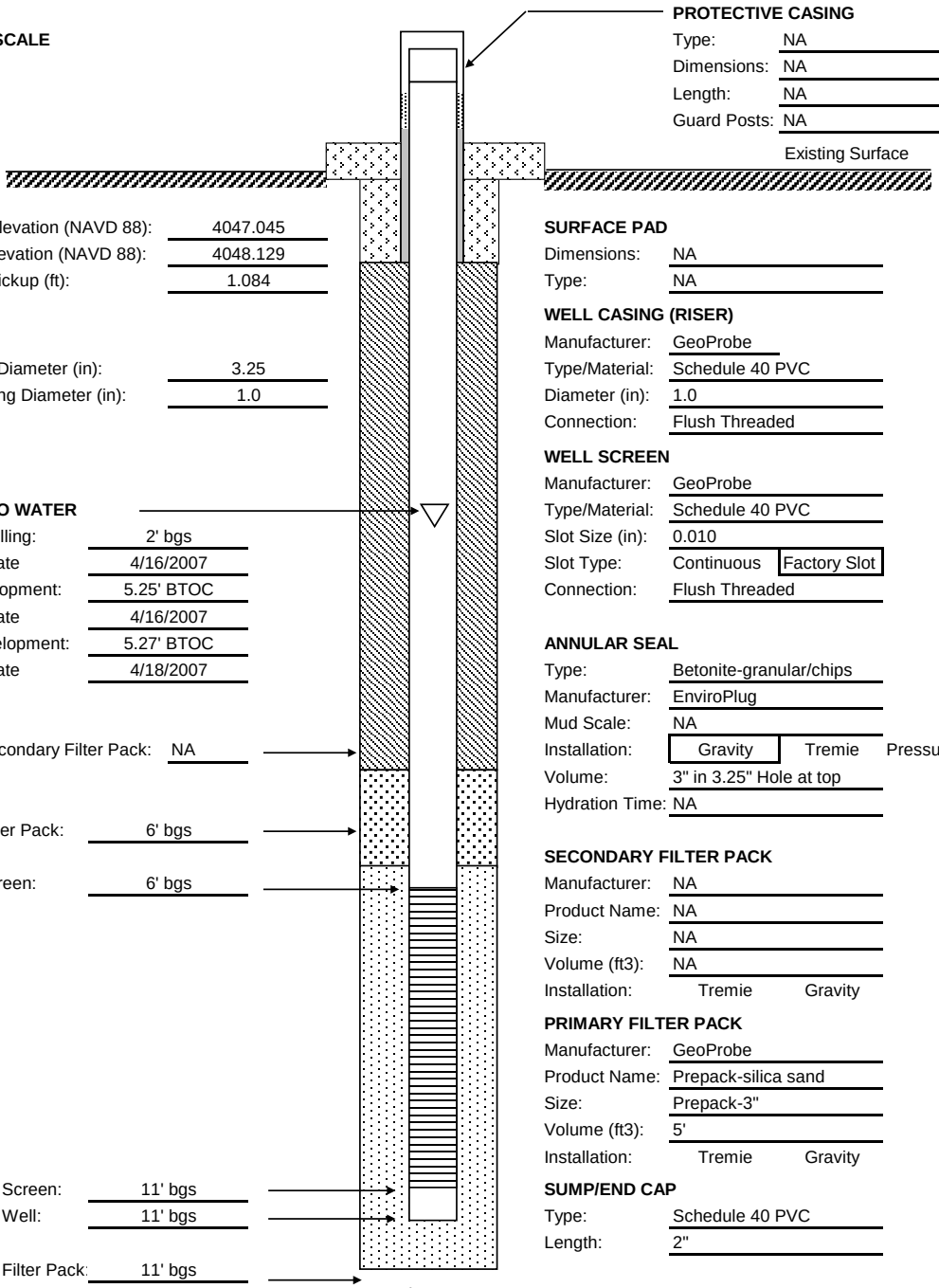
ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4041.905		Silty Sand, Light Yellowish Brown (10 YR 6/4), Saturated, subangular sands (very fine grained), medium stiff to stiff, weak, massive, dry strength not measured in field, moderate reaction, medium dense, non-plastic, SM	NA	2	NA	NA	
4040.905	6						
4039.905	7						
4038.905	8						
4037.905	9						
4036.905	10	Sandy Silt, White (10 YR 8/2), Moist, subangular to rounded sands (very fine grained) with granules of calcite and quartz, soft to medium stiff, weak, massive, dry strength not measured in field, moderate to rapid reaction, medium dense, non-plastic, ML	NA	3	NA	NA	
4035.905	11	END OF BOREHOLE					
	12						
	13						

BHATE
Environmental Engineers and Scientists

TEMPORARY WELL CONSTRUCTION DIAGRAM (Abovegrade)

SITE:	SS-65	**WELL/BORING ID:**	SS65-DP01
PROJECT NAME:	HAFB-Confirmatory Sampling	**DRILLING METHOD:**	Direct Push Technology
PROJECT NO./PHASE:	9050360 01.01	**DATE(S):**	16-Apr-07
DRILLING CONTRACTOR:	ESN	**SURVEYOR:**	Bhate - Craig McGriff
DRILLER:	Chad Grubbs	**NORTHING (NAD 83):**	667654.9087
GEOLOGIST:	Katherine Thompson	**EASTING (NAD 83):**	1684124.7401

NOT TO SCALE



PROTECTIVE CASING
Type: NA
Dimensions: NA
Length: NA
Guard Posts: NA

Existing Surface

Surface Elevation (NAVD 88): 4047.045
Casing Elevation (NAVD 88): 4048.129
Casing Stickup (ft): 1.084

Borehole Diameter (in): 3.25
Well Casing Diameter (in): 1.0

DEPTH TO WATER
During Drilling: 2' bgs
Date: 4/16/2007
Pre Development: 5.25' BTOC
Date: 4/16/2007
Post Development: 5.27' BTOC
Date: 4/18/2007

Top of Secondary Filter Pack: NA

Top of Filter Pack: 6' bgs

Top of Screen: 6' bgs

Bottom of Screen: 11' bgs
Bottom of Well: 11' bgs

Bottom of Filter Pack: 11' bgs

Borehole Depth: 11' bgs

SURFACE PAD
Dimensions: NA
Type: NA

WELL CASING (RISER)
Manufacturer: GeoProbe
Type/Material: Schedule 40 PVC
Diameter (in): 1.0
Connection: Flush Threaded

WELL SCREEN
Manufacturer: GeoProbe
Type/Material: Schedule 40 PVC
Slot Size (in): 0.010
Slot Type: Continuous | Factory Slot
Connection: Flush Threaded

ANNULAR SEAL
Type: Betonite-granular/chips
Manufacturer: EnviroPlug
Mud Scale: NA
Installation: Gravity | Tremie | Pressure
Volume: 3" in 3.25" Hole at top
Hydration Time: NA

SECONDARY FILTER PACK
Manufacturer: NA
Product Name: NA
Size: NA
Volume (ft3): NA
Installation: Tremie | Gravity

PRIMARY FILTER PACK
Manufacturer: GeoProbe
Product Name: Prepack-silica sand
Size: Prepack-3"
Volume (ft3): 5'
Installation: Tremie | Gravity

SUMP/END CAP
Type: Schedule 40 PVC
Length: 2"

BACKFILL MATERIAL
Type: NA
Volume: NA

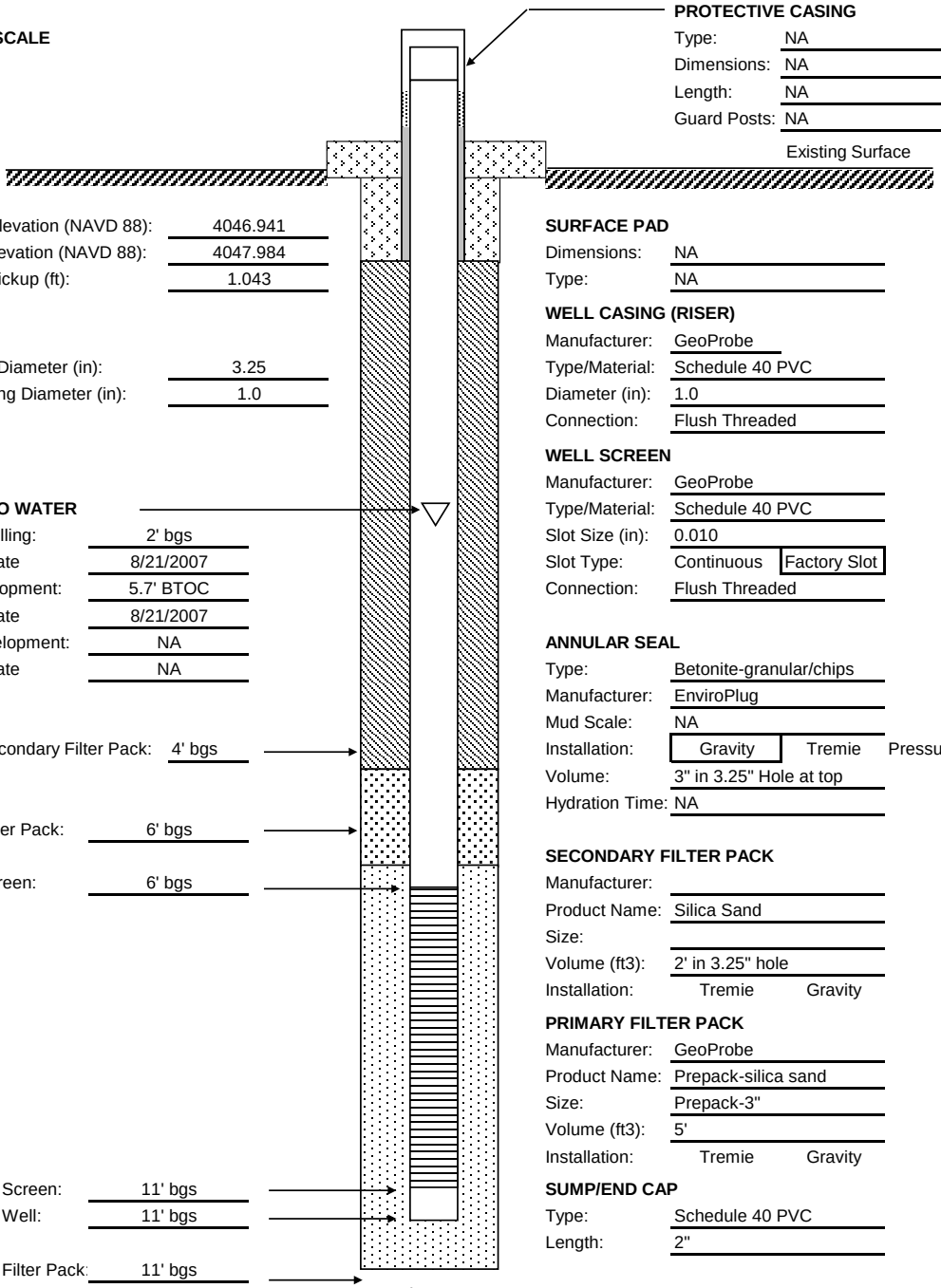
Comments:

BHATE
Environmental Engineers and Scientists

TEMPORARY WELL CONSTRUCTION DIAGRAM (Abovegrade)

SITE:	SS-65	**WELL/BORING ID:**	SS65-DP02
PROJECT NAME:	HAFB-Confirmatory Sampling	**DRILLING METHOD:**	Direct Push Technology
PROJECT NO./PHASE:	9050360 01.01	**DATE(S):**	21-Aug-07
DRILLING CONTRACTOR:	Vista Geoscience LLC	**SURVEYOR:**	Bhate - Craig McGriff
DRILLER:	Zack Hurst	**NORTHING (NAD 83):**	667642.1705
GEOLOGIST:	Katherine Thompson	**EASTING (NAD 83):**	1684160.3276

NOT TO SCALE



PROTECTIVE CASING
Type: NA
Dimensions: NA
Length: NA
Guard Posts: NA

Existing Surface

Surface Elevation (NAVD 88): 4046.941
Casing Elevation (NAVD 88): 4047.984
Casing Stickup (ft): 1.043

Borehole Diameter (in): 3.25
Well Casing Diameter (in): 1.0

DEPTH TO WATER
During Drilling: 2' bgs
Date: 8/21/2007
Pre Development: 5.7' BTOC
Date: 8/21/2007
Post Development: NA
Date: NA

Top of Secondary Filter Pack: 4' bgs

Top of Filter Pack: 6' bgs

Top of Screen: 6' bgs

Bottom of Screen: 11' bgs
Bottom of Well: 11' bgs

Bottom of Filter Pack: 11' bgs

Borehole Depth: 11' bgs

SURFACE PAD
Dimensions: NA
Type: NA

WELL CASING (RISER)
Manufacturer: GeoProbe
Type/Material: Schedule 40 PVC
Diameter (in): 1.0
Connection: Flush Threaded

WELL SCREEN
Manufacturer: GeoProbe
Type/Material: Schedule 40 PVC
Slot Size (in): 0.010
Slot Type: Continuous | Factory Slot
Connection: Flush Threaded

ANNULAR SEAL
Type: Betonite-granular/chips
Manufacturer: EnviroPlug
Mud Scale: NA
Installation: Gravity | Tremie | Pressure
Volume: 3" in 3.25" Hole at top
Hydration Time: NA

SECONDARY FILTER PACK
Manufacturer:
Product Name: Silica Sand
Size:
Volume (ft3): 2' in 3.25" hole
Installation: Tremie | Gravity

PRIMARY FILTER PACK
Manufacturer: GeoProbe
Product Name: Prepack-silica sand
Size: Prepack-3"
Volume (ft3): 5'
Installation: Tremie | Gravity

SUMP/END CAP
Type: Schedule 40 PVC
Length: 2"

BACKFILL MATERIAL
Type: NA
Volume: NA

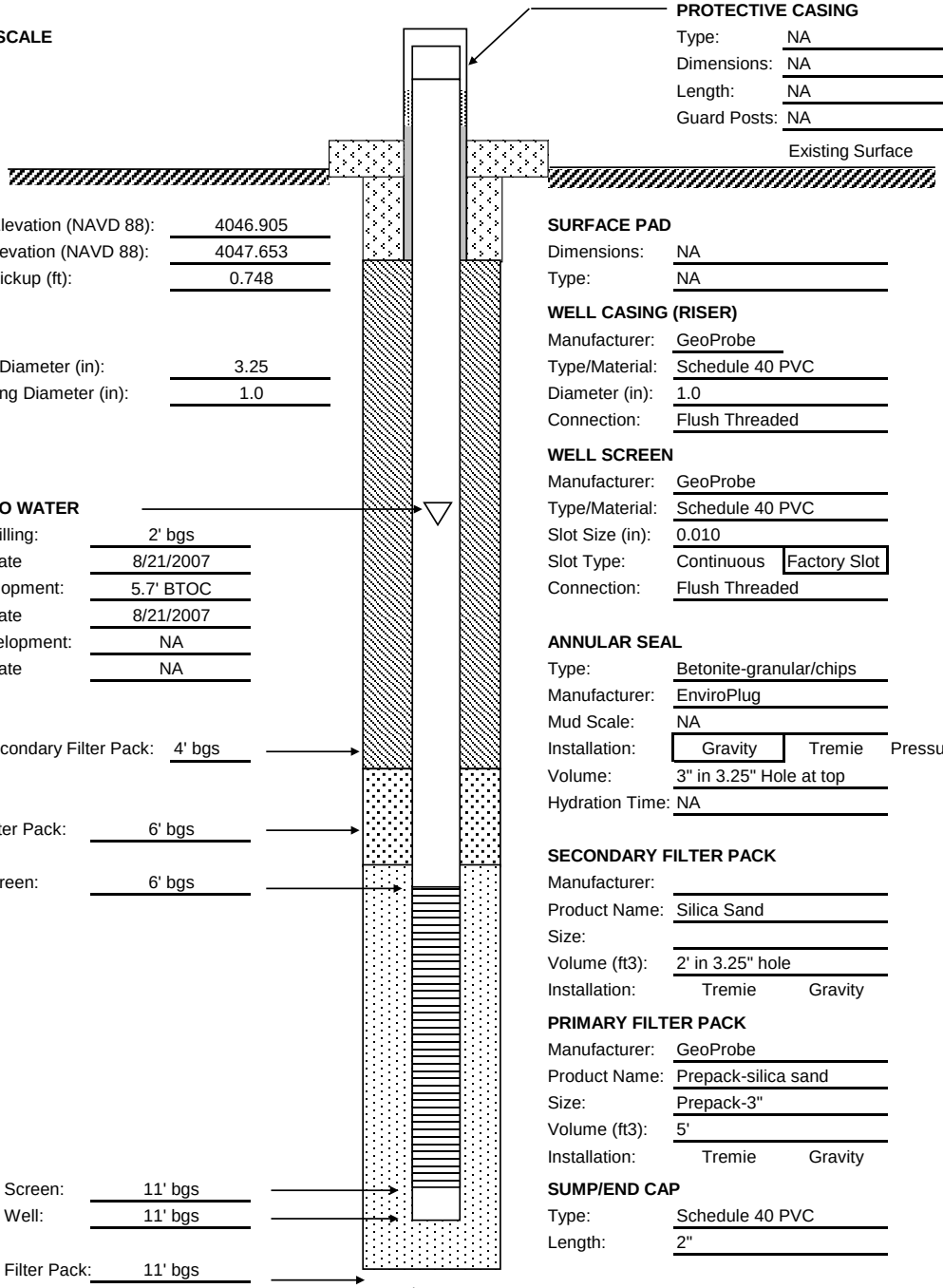
Comments:

BHATE
Environmental Engineers and Scientists

TEMPORARY WELL CONSTRUCTION DIAGRAM (Abovegrade)

SITE:	SS-65	**WELL/BORING ID:**	SS65-DP03
PROJECT NAME:	HAFB-Confirmatory Sampling	**DRILLING METHOD:**	Direct Push Technology
PROJECT NO./PHASE:	9050360 01.01	**DATE(S):**	21-Aug-07
DRILLING CONTRACTOR:	Vista Geoscience LLC	**SURVEYOR:**	Bhate - Craig McGriff
DRILLER:	Zack Hurst	**NORTHING (NAD 83):**	667626.7810
GEOLOGIST:	Katherine Thompson	**EASTING (NAD 83):**	1684111.7619

NOT TO SCALE



PROTECTIVE CASING
Type: NA
Dimensions: NA
Length: NA
Guard Posts: NA

Surface Elevation (NAVD 88): 4046.905
Casing Elevation (NAVD 88): 4047.653
Casing Stickup (ft): 0.748

Borehole Diameter (in): 3.25
Well Casing Diameter (in): 1.0

DEPTH TO WATER
During Drilling: 2' bgs
Date: 8/21/2007
Pre Development: 5.7' BTOC
Date: 8/21/2007
Post Development: NA
Date: NA

Top of Secondary Filter Pack: 4' bgs

Top of Filter Pack: 6' bgs

Top of Screen: 6' bgs

Bottom of Screen: 11' bgs
Bottom of Well: 11' bgs

Bottom of Filter Pack: 11' bgs

Borehole Depth: 11' bgs

SURFACE PAD
Dimensions: NA
Type: NA

WELL CASING (RISER)
Manufacturer: GeoProbe
Type/Material: Schedule 40 PVC
Diameter (in): 1.0
Connection: Flush Threaded

WELL SCREEN
Manufacturer: GeoProbe
Type/Material: Schedule 40 PVC
Slot Size (in): 0.010
Slot Type: Continuous | Factory Slot
Connection: Flush Threaded

ANNULAR SEAL
Type: Betonite-granular/chips
Manufacturer: EnviroPlug
Mud Scale: NA
Installation: Gravity | Tremie | Pressure
Volume: 3" in 3.25" Hole at top
Hydration Time: NA

SECONDARY FILTER PACK
Manufacturer:
Product Name: Silica Sand
Size:
Volume (ft3): 2' in 3.25" hole
Installation: Tremie | Gravity

PRIMARY FILTER PACK
Manufacturer: GeoProbe
Product Name: Prepack-silica sand
Size: Prepack-3"
Volume (ft3): 5'
Installation: Tremie | Gravity

SUMP/END CAP
Type: Schedule 40 PVC
Length: 2"

BACKFILL MATERIAL
Type: NA
Volume: NA

Comments:

SS-67

Soil Boring Logs and Monitoring well Construction Diagrams

HTW DRILLING LOG

HOLE NO.	SS67-DP01
1. COMPANY NAME	Bhate Environmental Associates, Inc.
2. DRILLING CONTRACTOR	ESN
SHEET	OF 1 SHEETS 3
3. PROJECT	Holloman Air Force Base Confirmatory Sampling - SS67
4. LOCATION	Holloman Air Force Base, New Mexico
5. NAME OF DRILLER	Chad Grubbs
6. MANUFACTURER'S DESIGNATION OF DRILL	Power Probe 9600 Pro
7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT	3.25" OD Rods 5' in Length 2.5" OD Teflon Liners 5' in Length - for sampling
8. HOLE LOCATION	North East 669184.6308N 1680574.8996E
9. SURFACE ELEVATION (ft. NGVD)	4047.003
10. DATE STARTED	13-Apr-2007
11. DATE COMPLETED	13-Apr-2007
12. OVERBURDEN THICKNESS	NA
15. DEPTH GROUNDWATER ENCOUNTERED	0.25' BGS
13. DEPTH DRILLED INTO ROCK	NA
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	7.56 BTOC, <1 Day (4/13/07)
14. TOTAL DEPTH OF HOLE	15 ft BGS
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	7.5 BTOC, 5 Days (4/18/07)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	4

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC %
SS67-DP01-5	8260	TAL	TPH-D/G/ORO	SVOCs	NA	70.8

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
-	NA	Temporary	NA	Katherine Thompson

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4047.003	0	Silty Sand, Pink (7.5 YR 7/3), Wet, subangular to subrounded sands (very fine grained), soft, weak, massive, dry strength not measured in field, quick reaction, very loose to loose, non-plastic, SM	PID: 0.0 FID: 4.7	1	SS67-DP01-5	NA	
4046.003	1						
4045.003	2						
4044.003	3						
4043.003	4						
	5						

HTW DRILLING LOG

HOLE NO. SS67-DP01

PROJECT: Holloman Air Force Base Confirmatory Sampling - SS67

INSPECTOR: Katherine Thompson

SHEET OF 2 SHEETS 3

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4042.003		Lean Clay (with nearly 50% silt and sand containing calcium carbonates), Light Reddish Brown (5 YR 6/4), Moist, subangular to subrounded sands (very fine grained), medium stiff to stiff, weak, massive, dry strength not measured in field, moderate reaction, medium dense, non-plastic to slightly plastic, CL, strong solvent odor	NA	2	NA	NA	
4041.003	6						
		Same as above with increasing clay content, CL	NA	2	NA	NA	
4040.003	7						
4039.003	8						
4038.003	9						
4037.003	10						
		Same as above with increasing clay content, CL	NA	3	NA	NA	
4036.003	11						
4035.003	12						
		Same as above with color change to Light Yellowish Brown (2.5 Y 6/3), Dry to Slightly Moist, moderate to slow reaction, and very stiff to hard, CL	NA	4	NA	NA	
4034.003	13						

HTW DRILLING LOG

HOLE NO. SS67-DP01

PROJECT: Holloman Air Force Base Confirmatory Sampling - SS67

INSPECTOR: Katherine Thompson

SHEET 3 OF 3 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4033.003	14	Same as above	NA	4	NA	NA	
4032.003	15	END OF BOREHOLE					
4031.003	16						
4030.003	17						
4029.003	18						
4028.003	19						
4027.003	20						
4026.003	21						
4025.003	22						

HTW DRILLING LOG

HOLE NO.	SS67-DP02
1. COMPANY NAME	Bhate Environmental Associates, Inc.
2. DRILLING CONTRACTOR	ESN
SHEET	OF 1 SHEETS 2
3. PROJECT	Holloman Air Force Base Confirmatory Sampling - SS67
4. LOCATION	Holloman Air Force Base, New Mexico
5. NAME OF DRILLER	Chad Grubbs
6. MANUFACTURER'S DESIGNATION OF DRILL	Power Probe 9600 Pro
7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT	3.25" OD Rods 5' in Length 2.5" OD Teflon Liners 5' in Length - for sampling
8. HOLE LOCATION	North 669129.5626N East 1680435.9570E
9. SURFACE ELEVATION (ft. NGVD)	4046.047
10. DATE STARTED	13-Apr-2007
11. DATE COMPLETED	13-Apr-2007
12. OVERBURDEN THICKNESS	NA
15. DEPTH GROUNDWATER ENCOUNTERED	0.25' BGS
13. DEPTH DRILLED INTO ROCK	NA
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	5.98 BTOC, <1 Day (4/13/07)
14. TOTAL DEPTH OF HOLE	11 ft BGS
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	5.95 BTOC, 5 Days (4/18/07)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	4

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC %
SS67-DP02-5	8260	TAL	TPH-D/G/ORO	SVOCs	NA	100

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
-	NA	Temporary	NA	Katherine Thompson

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4046.047	0	Sandy Silt (with gravel), Pink (7.5 YR 7/4), Wet to Saturated, subangular to subrounded sands (very fine grained) and angular gravel, soft, weak, massive, dry strength not measured in field, moderate reaction, loose to medium dense, non-plastic, ML	PID: 12.1 FID: 4.0	1	SS67-DP02-5	NA	
4045.047	1						
4044.047	2						
4043.047	3						
4042.047	4						
	5						

HTW DRILLING LOG

HOLE NO. SS67-DP02

PROJECT: Holloman Air Force Base Confirmatory Sampling - SS67

INSPECTOR: Katherine Thompson

SHEET OF 2 SHEETS 2

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4041.047		Silty Sand (with clay), Reddish Brown (5 YR 5/4), Moist, subangular sands (very fine grained), medium stiff, weak, massive, dry strength not measured in field, moderate to quick reaction, medium dense, non-plastic, SM	NA	2	NA	NA	
4040.047	6						
4039.047	7						
		Same as above with increasing sand content, SM	NA	3	NA	NA	
4038.047	8						
4037.047	9						
4036.047	10	Same as above	NA	4	NA	NA	
4036.003	11	END OF BOREHOLE					
4035.047	12						
4034.047	13						

HTW DRILLING LOG

HOLE NO.	SS67-DP03
1. COMPANY NAME	Bhate Environmental Associates, Inc.
2. DRILLING CONTRACTOR	Vista Geoscience LLC
SHEET	OF 1 SHEETS 3
3. PROJECT	Holloman Air Force Base Confirmatory Sampling - SS67
4. LOCATION	Holloman Air Force Base, New Mexico
5. NAME OF DRILLER	Zack Hurst
6. MANUFACTURER'S DESIGNATION OF DRILL	Power Probe 9600 Pro
7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT	3.25" OD Rods 5' in Length 2.5" OD Teflon Liners 5' in Length - for sampling
8. HOLE LOCATION	North East 669168.2914N 1680668.7377E
9. SURFACE ELEVATION (ft. NGVD)	4048.122
10. DATE STARTED	20-Aug-2007
11. DATE COMPLETED	20-Aug-2007
12. OVERBURDEN THICKNESS	NA
15. DEPTH GROUNDWATER ENCOUNTERED	2' BGS
13. DEPTH DRILLED INTO ROCK	NA
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	Dry, <1 Day (4/13/07)
14. TOTAL DEPTH OF HOLE	11 ft BGS
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	11.53 BTOC, 4 Days (8/24/07)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	3

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC %
SS67-DP03-5	8260	TAL	TPH-D/G/ORO	SVOCs	NA	100

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
-	NA	Temporary	NA	Katherine Thompson

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4048.122	0	Sandy Silt (with gravel), (7.5 YR 6/4), Moist, subangular to subrounded sands (very fine grained) and angular gravel, soft, weak, massive, dry strength not measured in field, rapid, loose to medium dense, non-plastic, ML	PID: 0.0	1	SS67-DP03-5	NA	
4047.122	1						
4046.122	2						
4045.122	3						
4044.122	4						
	5						

HTW DRILLING LOG

HOLE NO. SS67-DP03

PROJECT: Holloman Air Force Base Confirmatory Sampling - SS67

INSPECTOR: Katherine Thompson

SHEET OF 2 SHEETS 3

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4033.122		Silty Sand (with clay), Reddish Brown (5 YR 5/4), Moist, subangular sands (very fine grained), medium stiff to stiff, weak, massive, dry strength not measured in field, moderate reaction, medium dense to dense, non-plastic, SM	0.0	2	NA	NA	
4032.122							
	6						
4031.122							
	7						
4030.122							
	8						
4029.122							
	9						
4028.122							
4027.122	10	Same as above with increasing sand content, SM	0.0	3	NA	NA	
4026.122	11						
4025.122	12						
4024.122	13						

HTW DRILLING LOG

HOLE NO. SS67-DP03

PROJECT: Holloman Air Force Base Confirmatory Sampling - SS67

INSPECTOR: Katherine Thompson

SHEET OF 3 SHEETS 3

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4023.122	14				NA		
4022.122	15	END OF BOREHOLE					
	7						
	8						
	9						
	10				NA		
	11						
	12						
	13						

HTW DRILLING LOG

HOLE NO.	SS67-DP04
1. COMPANY NAME	Bhate Environmental Associates, Inc.
2. DRILLING CONTRACTOR	Vista Geoscience LLC
SHEET	OF 1 SHEETS 2
3. PROJECT	Holloman Air Force Base Confirmatory Sampling - SS67
4. LOCATION	Holloman Air Force Base, New Mexico
5. NAME OF DRILLER	Zack Hurst
6. MANUFACTURER'S DESIGNATION OF DRILL	Power Probe 9600 Pro
7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT	3.25" OD Rods 5' in Length 2.5" OD Teflon Liners 5' in Length - for sampling
8. HOLE LOCATION	North 669164.3850N East 1680487.3517E
9. SURFACE ELEVATION (ft. NGVD)	4046.475
10. DATE STARTED	20-Aug-2007
11. DATE COMPLETED	20-Aug-2007
12. OVERBURDEN THICKNESS	NA
15. DEPTH GROUNDWATER ENCOUNTERED	2' BGS
13. DEPTH DRILLED INTO ROCK	NA
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	6.6' BTOC, <1 Day (8/20/07)
14. TOTAL DEPTH OF HOLE	14 ft BGS
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	6.75 BTOC, 4 Days (8/24/07)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	3

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC %
SS67-DP04-5	8260	TAL	TPH-D/G/ORO	SVOCs	NA	100

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
-	NA	Temporary	NA	Katherine Thompson

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4046.475	0	Sand with Silt (with gravel), Brownish Yellow (10 YR 6/6), Moist, subangular to subrounded sands (very fine grained) and angular gravel, soft, weak, massive, dry strength not measured in field, rapid, loose to medium dense, non-plastic, SM	PID: 0.0	1	SS67-DP04-5	NA	
4045.475	1						
4044.475	2	Silt with sand, Very Pale Brown, Wet, medium stiff to soft, weak, massive, dry strength not measured in field, moderate, medium dense, non plastic, ML					
4043.475	3						
4042.475	4						
4041.475	5						

HTW DRILLING LOG

HOLE NO. SS67-DP04

PROJECT: Holloman Air Force Base Confirmatory Sampling - SS67

INSPECTOR: Katherine Thompson

SHEET OF 2 SHEETS 3

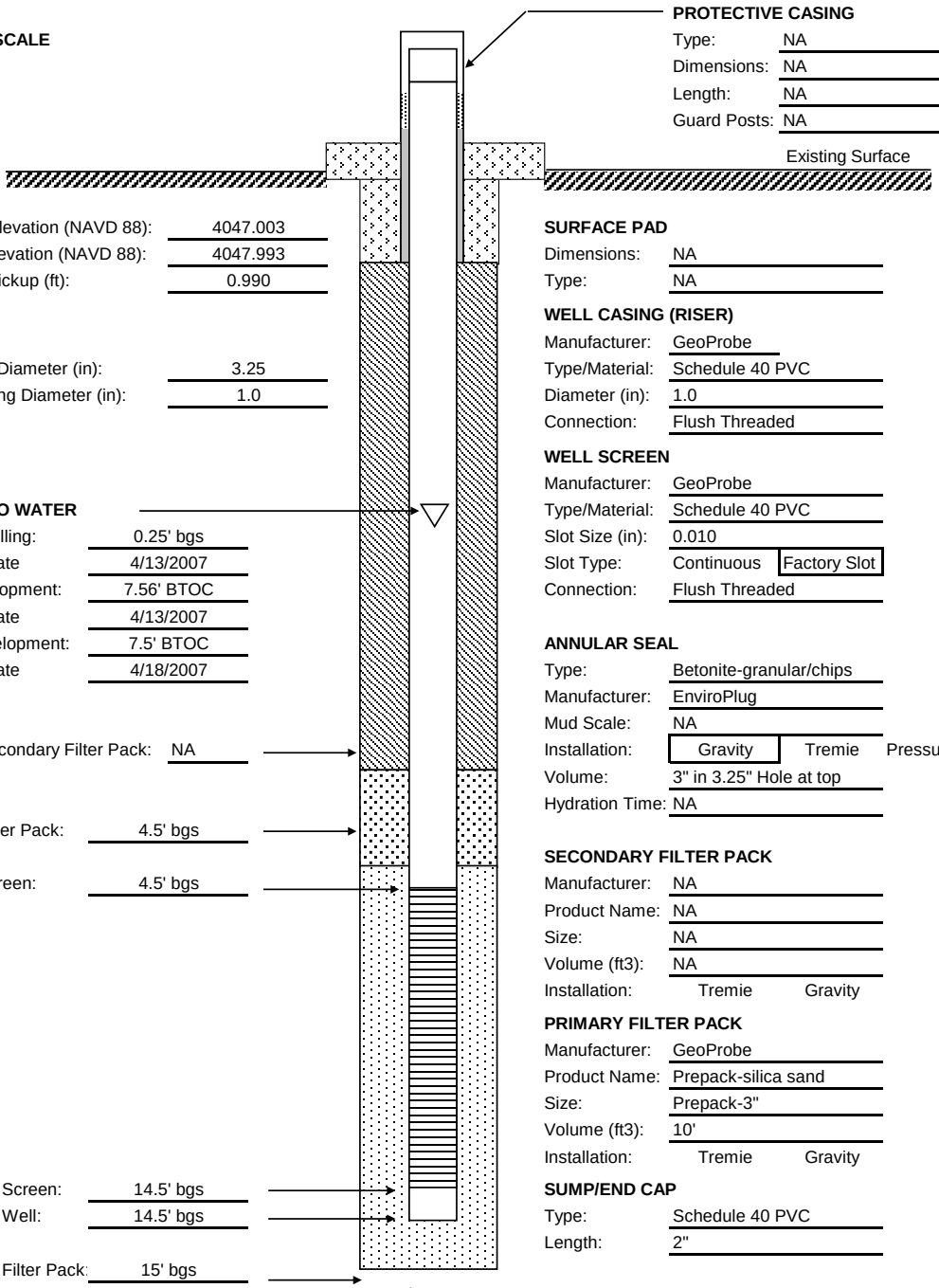
ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4041.475		Sand (with silt), Reddish Brown (5 YR 5/4), Wet, subangular sands (very fine grained), soft, weak, massive, dry strength not measured in field, moderate reaction, medium dense, non-plastic, SM	0.0	2	NA	NA	
4040.475	6						
4039.475	7						
4038.475	8						
4037.475	9						
4036.475	10	Same as above with increasing silt content, ML	0.0	3	NA	NA	
4035.475	11						
4034.475	12						
4033.475	13						
4032.475		End of Borehole					

BHATE
Environmental Engineers and Scientists

TEMPORARY WELL CONSTRUCTION DIAGRAM (Abovegrade)

SITE:	SS-67	**WELL/BORING ID:**	SS67-DP01
PROJECT NAME:	HAFB-Confirmatory Sampling	**DRILLING METHOD:**	Direct Push Technology
PROJECT NO./PHASE:	9050360 01.03	**DATE(S):**	13-Apr-07
DRILLING CONTRACTOR:	ESN	**SURVEYOR:**	Bhate - Craig McGriff
DRILLER:	Chad Grubbs	**NORTHING (NAD 83):**	669184.6308
GEOLOGIST:	Katherine Thompson	**EASTING (NAD 83):**	1680574.8996

NOT TO SCALE



PROTECTIVE CASING
Type: NA
Dimensions: NA
Length: NA
Guard Posts: NA

Surface Elevation (NAVD 88): 4047.003
Casing Elevation (NAVD 88): 4047.993
Casing Stickup (ft): 0.990

Borehole Diameter (in): 3.25
Well Casing Diameter (in): 1.0

DEPTH TO WATER
During Drilling: 0.25' bgs
Date: 4/13/2007
Pre Development: 7.56' BTOC
Date: 4/13/2007
Post Development: 7.5' BTOC
Date: 4/18/2007

Top of Secondary Filter Pack: NA
Top of Filter Pack: 4.5' bgs
Top of Screen: 4.5' bgs
Bottom of Screen: 14.5' bgs
Bottom of Well: 14.5' bgs
Bottom of Filter Pack: 15' bgs
Borehole Depth: 15' bgs

SURFACE PAD
Dimensions: NA
Type: NA

WELL CASING (RISER)
Manufacturer: GeoProbe
Type/Material: Schedule 40 PVC
Diameter (in): 1.0
Connection: Flush Threaded

WELL SCREEN
Manufacturer: GeoProbe
Type/Material: Schedule 40 PVC
Slot Size (in): 0.010
Slot Type: Continuous | Factory Slot
Connection: Flush Threaded

ANNULAR SEAL
Type: Betonite-granular/chips
Manufacturer: EnviroPlug
Mud Scale: NA
Installation: Gravity | Tremie | Pressure
Volume: 3" in 3.25" Hole at top
Hydration Time: NA

SECONDARY FILTER PACK
Manufacturer: NA
Product Name: NA
Size: NA
Volume (ft3): NA
Installation: Tremie | Gravity

PRIMARY FILTER PACK
Manufacturer: GeoProbe
Product Name: Prepack-silica sand
Size: Prepack-3"
Volume (ft3): 10'
Installation: Tremie | Gravity

SUMP/END CAP
Type: Schedule 40 PVC
Length: 2"

BACKFILL MATERIAL
Type: NA
Volume: NA

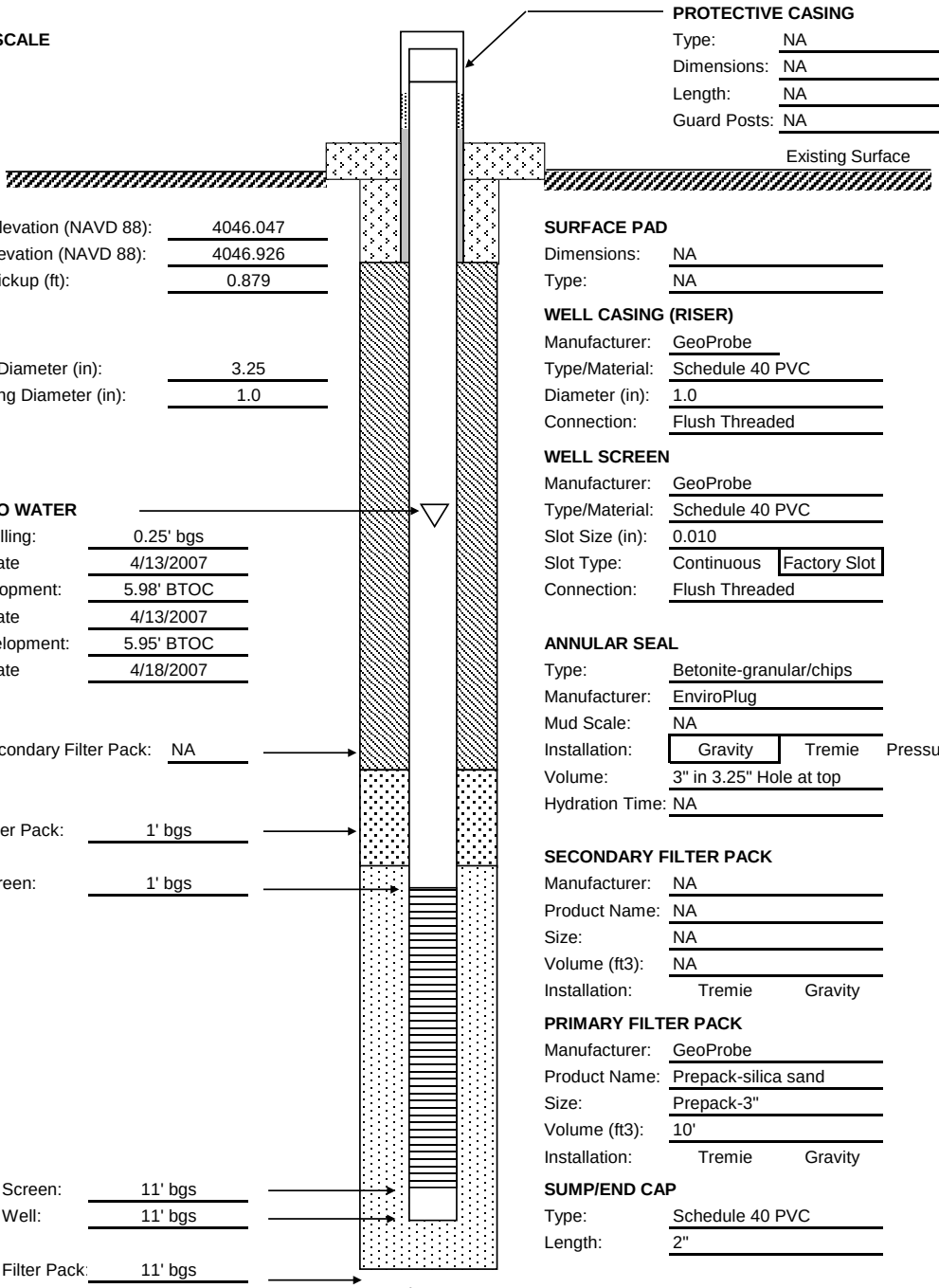
Comments:

BHATE
Environmental Engineers and Scientists

TEMPORARY WELL CONSTRUCTION DIAGRAM (Abovegrade)

SITE:	SS-67	**WELL/BORING ID:**	SS67-DP02
PROJECT NAME:	HAFB-Confirmatory Sampling	**DRILLING METHOD:**	Direct Push Technology
PROJECT NO./PHASE:	9050360 01.03	**DATE(S):**	13-Apr-07
DRILLING CONTRACTOR:	ESN	**SURVEYOR:**	Bhate - Craig McGriff
DRILLER:	Chad Grubbs	**NORTHING (NAD 83):**	669129.5626
GEOLOGIST:	Katherine Thompson	**EASTING (NAD 83):**	1680435.9570

NOT TO SCALE



PROTECTIVE CASING
Type: NA
Dimensions: NA
Length: NA
Guard Posts: NA

Surface Elevation (NAVD 88): 4046.047
Casing Elevation (NAVD 88): 4046.926
Casing Stickup (ft): 0.879

Borehole Diameter (in): 3.25
Well Casing Diameter (in): 1.0

DEPTH TO WATER
During Drilling: 0.25' bgs
Date 4/13/2007
Pre Development: 5.98' BTOC
Date 4/13/2007
Post Development: 5.95' BTOC
Date 4/18/2007

Top of Secondary Filter Pack: NA
Top of Filter Pack: 1' bgs
Top of Screen: 1' bgs
Bottom of Screen: 11' bgs
Bottom of Well: 11' bgs
Bottom of Filter Pack: 11' bgs
Borehole Depth: 11' bgs

SURFACE PAD
Dimensions: NA
Type: NA

WELL CASING (RISER)
Manufacturer: GeoProbe
Type/Material: Schedule 40 PVC
Diameter (in): 1.0
Connection: Flush Threaded

WELL SCREEN
Manufacturer: GeoProbe
Type/Material: Schedule 40 PVC
Slot Size (in): 0.010
Slot Type: Continuous | Factory Slot
Connection: Flush Threaded

ANNULAR SEAL
Type: Betonite-granular/chips
Manufacturer: EnviroPlug
Mud Scale: NA
Installation: Gravity | Tremie | Pressure
Volume: 3" in 3.25" Hole at top
Hydration Time: NA

SECONDARY FILTER PACK
Manufacturer: NA
Product Name: NA
Size: NA
Volume (ft3): NA
Installation: Tremie | Gravity

PRIMARY FILTER PACK
Manufacturer: GeoProbe
Product Name: Prepack-silica sand
Size: Prepack-3"
Volume (ft3): 10'
Installation: Tremie | Gravity

SUMP/END CAP
Type: Schedule 40 PVC
Length: 2"

BACKFILL MATERIAL
Type: NA
Volume: NA

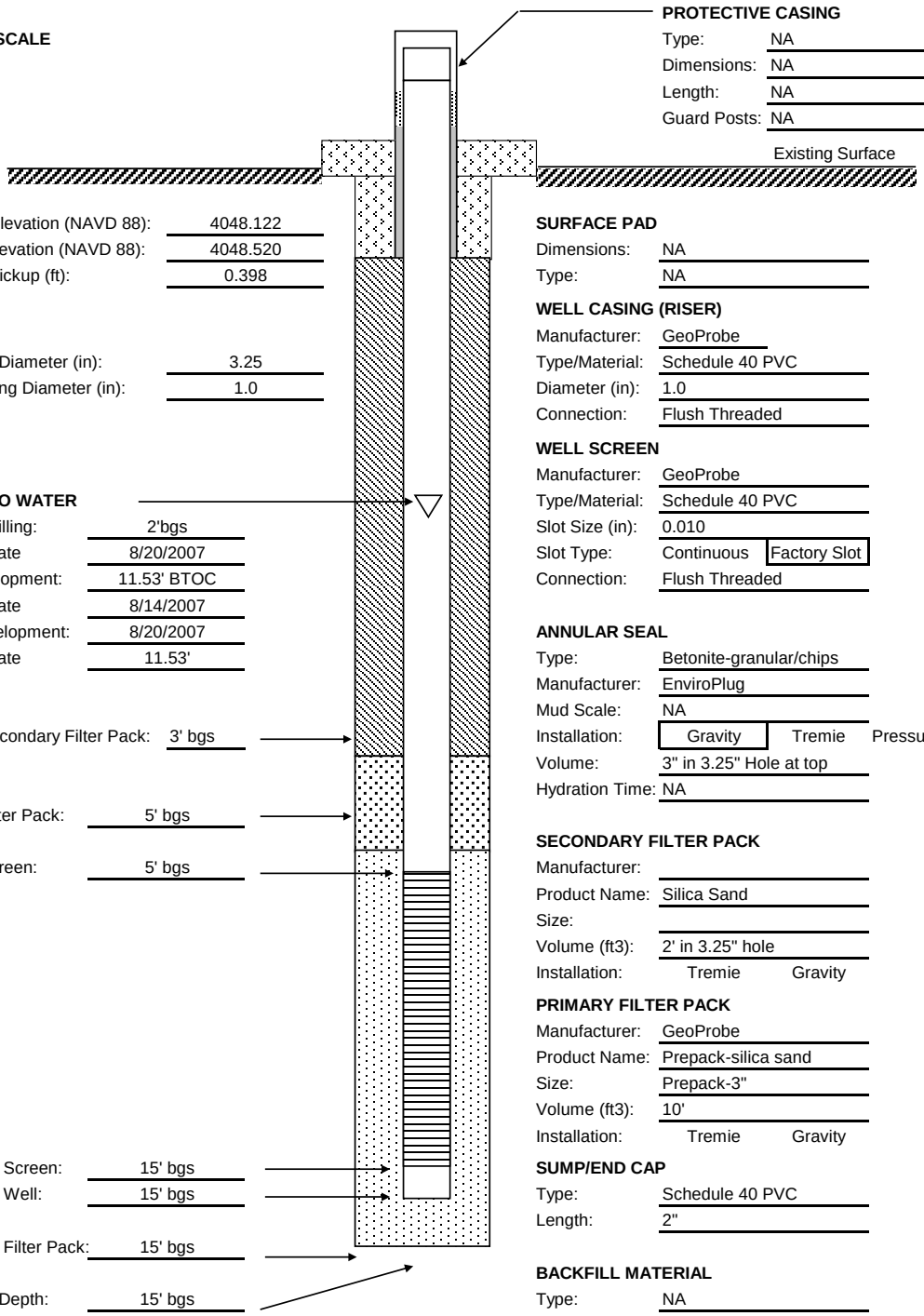
Comments:

BHATE
Environmental Engineers and Scientists

TEMPORARY WELL CONSTRUCTION DIAGRAM (Abovegrade)

SITE:	SS-67	**WELL/BORING ID:**	SS67-DP03
PROJECT NAME:	HAFB-Confirmatory Sampling	**DRILLING METHOD:**	Direct Push Technology
PROJECT NO./PHASE:	9050360 01.03	**DATE(S):**	20-Aug-07
DRILLING CONTRACTOR:	Vista Geoscience LLC	**SURVEYOR:**	Bhate - Craig McGriff
DRILLER:	Zack Hurst	**NORTHING (NAD 83):**	669168.2914
GEOLOGIST:	Katherine Thompson	**EASTING (NAD 83):**	1680668.7377

NOT TO SCALE



PROTECTIVE CASING
Type: NA
Dimensions: NA
Length: NA
Guard Posts: NA

Surface Elevation (NAVD 88): 4048.122
Casing Elevation (NAVD 88): 4048.520
Casing Stickup (ft): 0.398

Borehole Diameter (in): 3.25
Well Casing Diameter (in): 1.0

DEPTH TO WATER
During Drilling: 2'bgs
Date: 8/20/2007
Pre Development: 11.53' BTOC
Date: 8/14/2007
Post Development: 8/20/2007
Date: 11.53'

Top of Secondary Filter Pack: 3' bgs

Top of Filter Pack: 5' bgs

Top of Screen: 5' bgs

Bottom of Screen: 15' bgs
Bottom of Well: 15' bgs

Bottom of Filter Pack: 15' bgs

Borehole Depth: 15' bgs

SURFACE PAD
Dimensions: NA
Type: NA

WELL CASING (RISER)
Manufacturer: GeoProbe
Type/Material: Schedule 40 PVC
Diameter (in): 1.0
Connection: Flush Threaded

WELL SCREEN
Manufacturer: GeoProbe
Type/Material: Schedule 40 PVC
Slot Size (in): 0.010
Slot Type: Continuous | Factory Slot
Connection: Flush Threaded

ANNULAR SEAL
Type: Betonite-granular/chips
Manufacturer: EnviroPlug
Mud Scale: NA
Installation: Gravity | Tremie | Pressure
Volume: 3" in 3.25" Hole at top
Hydration Time: NA

SECONDARY FILTER PACK
Manufacturer:
Product Name: Silica Sand
Size:
Volume (ft3): 2' in 3.25" hole
Installation: Tremie | Gravity

PRIMARY FILTER PACK
Manufacturer: GeoProbe
Product Name: Prepack-silica sand
Size: Prepack-3"
Volume (ft3): 10'
Installation: Tremie | Gravity

SUMP/END CAP
Type: Schedule 40 PVC
Length: 2"

BACKFILL MATERIAL
Type: NA
Volume: NA

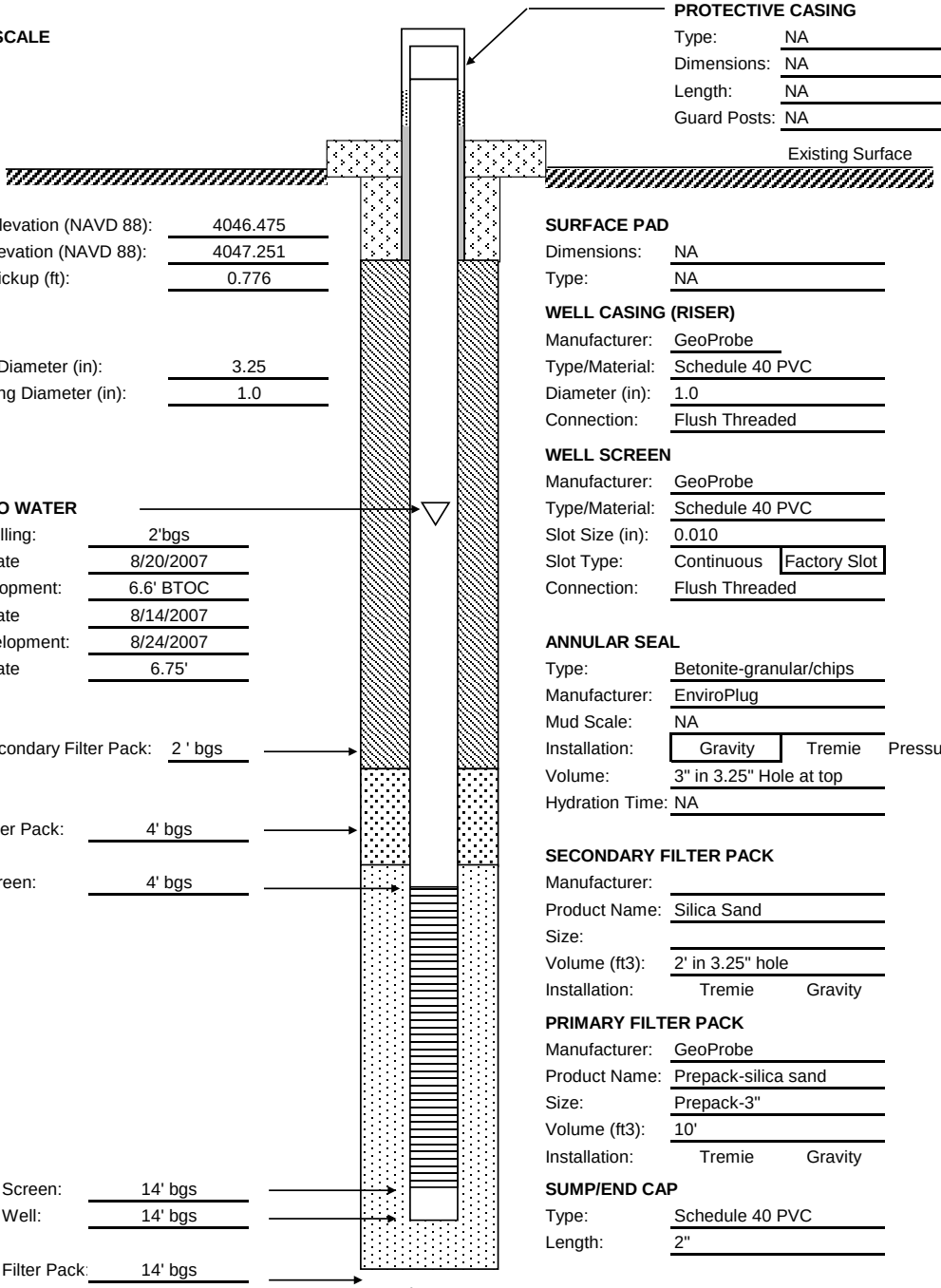
Comments:

BHATE
Environmental Engineers and Scientists

TEMPORARY WELL CONSTRUCTION DIAGRAM (Abovegrade)

SITE:	SS-67	**WELL/BORING ID:**	SS67-DP04
PROJECT NAME:	HAFB-Confirmatory Sampling	**DRILLING METHOD:**	Direct Push Technology
PROJECT NO./PHASE:	9050360 01.03	**DATE(S):**	20-Aug-07
DRILLING CONTRACTOR:	Vista Geoscience LLC	**SURVEYOR:**	Bhate - Craig McGriff
DRILLER:	Zack Hurst	**NORTHING (NAD 83):**	669164.3850
GEOLOGIST:	Katherine Thompson	**EASTING (NAD 83):**	1680487.3517

NOT TO SCALE



PROTECTIVE CASING
Type: NA
Dimensions: NA
Length: NA
Guard Posts: NA

Existing Surface

Surface Elevation (NAVD 88): 4046.475
Casing Elevation (NAVD 88): 4047.251
Casing Stickup (ft): 0.776

Borehole Diameter (in): 3.25
Well Casing Diameter (in): 1.0

DEPTH TO WATER
During Drilling: 2'bgs
Date: 8/20/2007
Pre Development: 6.6' BTOC
Date: 8/14/2007
Post Development: 8/24/2007
Date: 6.75'

Top of Secondary Filter Pack: 2 ' bgs
Top of Filter Pack: 4' bgs
Top of Screen: 4' bgs
Bottom of Screen: 14' bgs
Bottom of Well: 14' bgs
Bottom of Filter Pack: 14' bgs
Borehole Depth: 14' bgs

SURFACE PAD
Dimensions: NA
Type: NA

WELL CASING (RISER)
Manufacturer: GeoProbe
Type/Material: Schedule 40 PVC
Diameter (in): 1.0
Connection: Flush Threaded

WELL SCREEN
Manufacturer: GeoProbe
Type/Material: Schedule 40 PVC
Slot Size (in): 0.010
Slot Type: Continuous | Factory Slot
Connection: Flush Threaded

ANNULAR SEAL
Type: Betonite-granular/chips
Manufacturer: EnviroPlug
Mud Scale: NA
Installation: Gravity | Tremie | Pressure
Volume: 3" in 3.25" Hole at top
Hydration Time: NA

SECONDARY FILTER PACK
Manufacturer:
Product Name: Silica Sand
Size:
Volume (ft3): 2' in 3.25" hole
Installation: Tremie | Gravity

PRIMARY FILTER PACK
Manufacturer: GeoProbe
Product Name: Prepack-silica sand
Size: Prepack-3"
Volume (ft3): 10'
Installation: Tremie | Gravity

SUMP/END CAP
Type: Schedule 40 PVC
Length: 2"

BACKFILL MATERIAL
Type: NA
Volume: NA

Comments:

SS-69

Soil Boring Logs and Monitoring well Construction Diagrams

HTW DRILLING LOG

HOLE NO.	SS69-DP01
1. COMPANY NAME	Bhate Environmental Associates, Inc.
2. DRILLING CONTRACTOR	ESN
SHEET	OF 1 SHEETS 2
3. PROJECT	Holloman Air Force Base Confirmatory Sampling - SS69
4. LOCATION	Holloman Air Force Base, New Mexico
5. NAME OF DRILLER	Chad Grubbs
6. MANUFACTURER'S DESIGNATION OF DRILL	Power Probe 9600 Pro
7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT	3.25" OD Rods 5' in Length 2.5" OD Teflon Liners 5' in Length - for sampling
8. HOLE LOCATION	North East 670728.5394N 1684292.1564E
9. SURFACE ELEVATION (ft. NGVD)	4059.009
10. DATE STARTED	17-Apr-2007
11. DATE COMPLETED	17-Apr-2007
12. OVERBURDEN THICKNESS	1.17' Gravel Fill (concrete cored previously)
15. DEPTH GROUNDWATER ENCOUNTERED	1.25' BGS
13. DEPTH DRILLED INTO ROCK	NA
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	6.6 BTOC, <1/2 Day (4/17/07)
14. TOTAL DEPTH OF HOLE	13 ft BGS
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	7.62 BTOC, 1 Day (4/18/07)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	5

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC %
SS69-DP01-5	8260	TAL	TPH-D/G/ORO	SVOCs	NA	100

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
-	NA	Temporary	NA	Katherine Thompson

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4059.009	0	Silt (with clay ~30% and sand~5%), Very Pale Brown (10 YR 7/4), Wet, angular sands (coarse grained), soft, weak, massive, dry strength not measured in field, moderate reaction, medium dense, non-plastic to slightly plastic, ML	PID: 20.0 FID: 2.7	1	SS69-DP01-5	NA	
4058.009	1						
4057.009	2						
4056.009	3						
4055.009	4						
	5						

HTW DRILLING LOG

HOLE NO. SS69-DP01

PROJECT: Holloman Air Force Base Confirmatory Sampling - SS69

INSPECTOR: Katherine Thompson

SHEET OF 2 SHEETS 2

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4054.009		Silty Sand, Light Brown (7.5 YR 6/4), Saturated, subangular to subrounded sands (very fine grained), soft, weak, massive, dry strength not measured in field, moderate to quick reaction, loose to medium dense, non-plastic, SM	PID: 21 FID: 2.4	2	NA	NA	
4053.009	6						
4052.009	7						
4051.009	8						
4050.009	9						
4049.009	10	Silty Sand, Pink (7.5 YR 7/4), Saturated, subangular to subrounded sands (very fine grained), medium stiff, weak, massive, dry strength not measured in field, moderate to quick reaction, loose to medium dense, non-plastic, SM	PID: 110 FID: 3.4	3	NA	NA	
4048.009	11	Same as above.	PID: 190 FID: 2.5	4	NA	NA	
4047.009	12						
		Silt (with sand, clay, mica, calcium carbonates), Dry, angular sands, stiff to very stiff, weak, massive, dry strength not measured in field, no reaction, dense, non-plastic, ML	NA	5	NA	NA	Hit tough caliche at ~12.25' bgs.
4046.009	13	END OF BOREHOLE					

HTW DRILLING LOG

HOLE NO.	SS69-DP02
1. COMPANY NAME	Bhate Environmental Associates, Inc.
2. DRILLING CONTRACTOR	ESN
SHEET	OF 1 SHEETS 2
3. PROJECT	Holloman Air Force Base Confirmatory Sampling - SS69
4. LOCATION	Holloman Air Force Base, New Mexico
5. NAME OF DRILLER	Chad Grubbs
6. MANUFACTURER'S DESIGNATION OF DRILL	Power Probe 9600 Pro
7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT	3.25" OD Rods 5' in Length 2.5" OD Teflon Liners 5' in Length - for sampling
8. HOLE LOCATION	North East 670602.3652N 1684288.6436E
9. SURFACE ELEVATION (ft. NGVD)	4058.574
10. DATE STARTED	17-Apr-2007
11. DATE COMPLETED	17-Apr-2007
12. OVERBURDEN THICKNESS	0.5' of asphalt and fill material
15. DEPTH GROUNDWATER ENCOUNTERED	0.25' BGS
13. DEPTH DRILLED INTO ROCK	NA
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	6.3 BTOC, 1 Day (4/18/07)
14. TOTAL DEPTH OF HOLE	12.5 ft BGS
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	4

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC %
SS69-DP02-5	8260	TAL	TPH-D/G/ORO	SVOCs	NA	100

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
-	NA	Temporary	NA	Katherine Thompson

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4058.574	0	Silty Sand, Brownish Yellow (10 YR 6/6), Wet to Saturated, subangular sands (very fine-grained), soft, weak, massive, dry strength not measured in field, moderate reaction, medium dense, non-plastic, SM	PID: 25 FID: 2.0	1	SS69-DP02-5	NA	
4057.574	1						
4056.574	2						
4055.574	3	Same as above with color change to Very Pale Brown (10 YR 7/4)	See above	1	NA	NA	
4054.574	4	Same as above with angular gravels	See above	1	NA	NA	
	5						

HTW DRILLING LOG

HOLE NO. SS69-DP02

PROJECT: Holloman Air Force Base Confirmatory Sampling - SS69

INSPECTOR: Katherine Thompson

SHEET OF 2 SHEETS 2

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4053.574		Same as above.	PID: 1600 FID: 1.10	2	NA	NA	
4052.574	6						
4051.574	7						
4050.574	8	Silty Sand, Pale Brown (10 YR 6/3), Saturated, subangular sands, medium stiff, weak, massive, dry strength not measured in field, medium dense, non-plastic, SM	PID: 180 FID: 2.80	3			
4049.574	9						
4048.574	10	Silty Sand, Pink (7.5 YR 7/4), Saturated, subangular to subrounded sands (very fine grained), medium stiff, weak, massive, dry strength not measured in field, moderate to quick reaction, loose to medium dense, non-plastic, SM	PID: 1300 FID: 0.0	4	NA	NA	
4047.574	11	Same as above.	PID: 230 FID: 2.8	4	NA	NA	
4046.574	12						
4045.574	13	END OF BOREHOLE					Hit tough caliche at ~12.5' bgs.

HTW DRILLING LOG

HOLE NO.	SS69-DP03
1. COMPANY NAME	Bhate Environmental Associates, Inc.
2. DRILLING CONTRACTOR	ESN
SHEET	OF 1 SHEETS 2
3. PROJECT	Holloman Air Force Base Confirmatory Sampling - SS69
4. LOCATION	Holloman Air Force Base, New Mexico
5. NAME OF DRILLER	Chad Grubbs
6. MANUFACTURER'S DESIGNATION OF DRILL	Power Probe 9600 Pro
7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT	3.25" OD Rods 5' in Length 2.5" OD Teflon Liners 5' in Length - for sampling
8. HOLE LOCATION	North 670406.2862N East 1684339.8498E
9. SURFACE ELEVATION (ft. NGVD)	4058.571
10. DATE STARTED	17-Apr-2007
11. DATE COMPLETED	17-Apr-2007
12. OVERBURDEN THICKNESS	1.75' of gravel and fill material (concrete cored previously)
15. DEPTH GROUNDWATER ENCOUNTERED	1' BGS
13. DEPTH DRILLED INTO ROCK	NA
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	6.92 BTOC, 1 Day (4/18/07)
14. TOTAL DEPTH OF HOLE	11.3 ft BGS
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA	NA	NA	4

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC %
SS69-DP03-5	8260	TAL	TPH-D/G/ORO	SVOCs	NA	100

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
-	NA	Temporary	NA	Katherine Thompson

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4058.571	0	Sandy Silt (with ~5% clay), Pink (7.5 YR 8/3) and Very Pale Brown (10 YR 8/4) - color change @3', Wet to Saturated, subangular sands (very fine-grained), soft, weak, massive, dry strength not measured in field, moderate reaction, loose to medium dense, non-plastic, ML	PID: 980 FID: 0.0	1	SS69-DP03-5	NA	
4057.571	1						
4056.571	2						
4055.571	3						
4054.571	4						
	5						

HTW DRILLING LOG

HOLE NO. SS69-DP03

PROJECT: Holloman Air Force Base Confirmatory Sampling - SS69

INSPECTOR: Katherine Thompson

SHEET OF 2 SHEETS 2

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4053.571		Silty Sand (with ~5% clay), Light Brown (7.5 YR 6/4), Saturated, subangular to subrounded sands (very fine-grained), soft, weak, massive, dry strength not measured in field, loose to medium dense, non-plastic, SM	PID: 80 FID: 0.0	2	NA	NA	
4052.571	6						
4051.571	7						
		Silty Sand (with ~25% clay), Brown (7.5 YR 5/4), Saturated, subangular to subrounded sands (very fine-grained), soft to medium stiff, weak, massive, dry strength not measured in field, medium dense, non-plastic to slightly plastic, SM	PID: 5.0 FID: 0.86	3	NA	NA	
4050.571	8						
4049.571	9						
4048.571	10						
4047.571	11						
		END OF BOREHOLE					Hit tough caliche at ~12.5' bgs.
4048.571	12						
4047.571	13						

BHATE
Environmental Engineers and Scientists

TEMPORARY WELL CONSTRUCTION DIAGRAM (Flush Mount)

SITE:	SS-69	**WELL/BORING ID:**	SS69-DP01
PROJECT NAME:	Herington AAF Limited RI	**DRILLING METHOD:**	Direct Push Method
PROJECT NO./PHASE:	9050360 01.05	**DATE(S):**	17-Apr-07
DRILLING CONTRACTOR:	ESN	**SURVEYOR:**	Bhate - Craig McGriff
DRILLER:	Chad Grubbs	**NORTHING (NAD 83):**	670728.5394
GEOLOGIST:	Katherine Thompson	**EASTING (NAD 83):**	1684292.1564

NOT TO SCALE

Surface Elevation (NAVD 88): 4059.009

Casing Elevation (NAVD 88): 4059.010

Borehole Diameter (in): 3.25

Well Casing Diameter (in): 1.0

DEPTH TO WATER

During Drilling: 1.25' bgs

Date 4/17/2007

Pre Development: 6.6' BTOC

Date 4/17/2007

Post Development: 7.62' BTOC

Date 4/18/2007

Top of Secondary Filter Pack: NA

Top of Filter Pack: 3' bgs

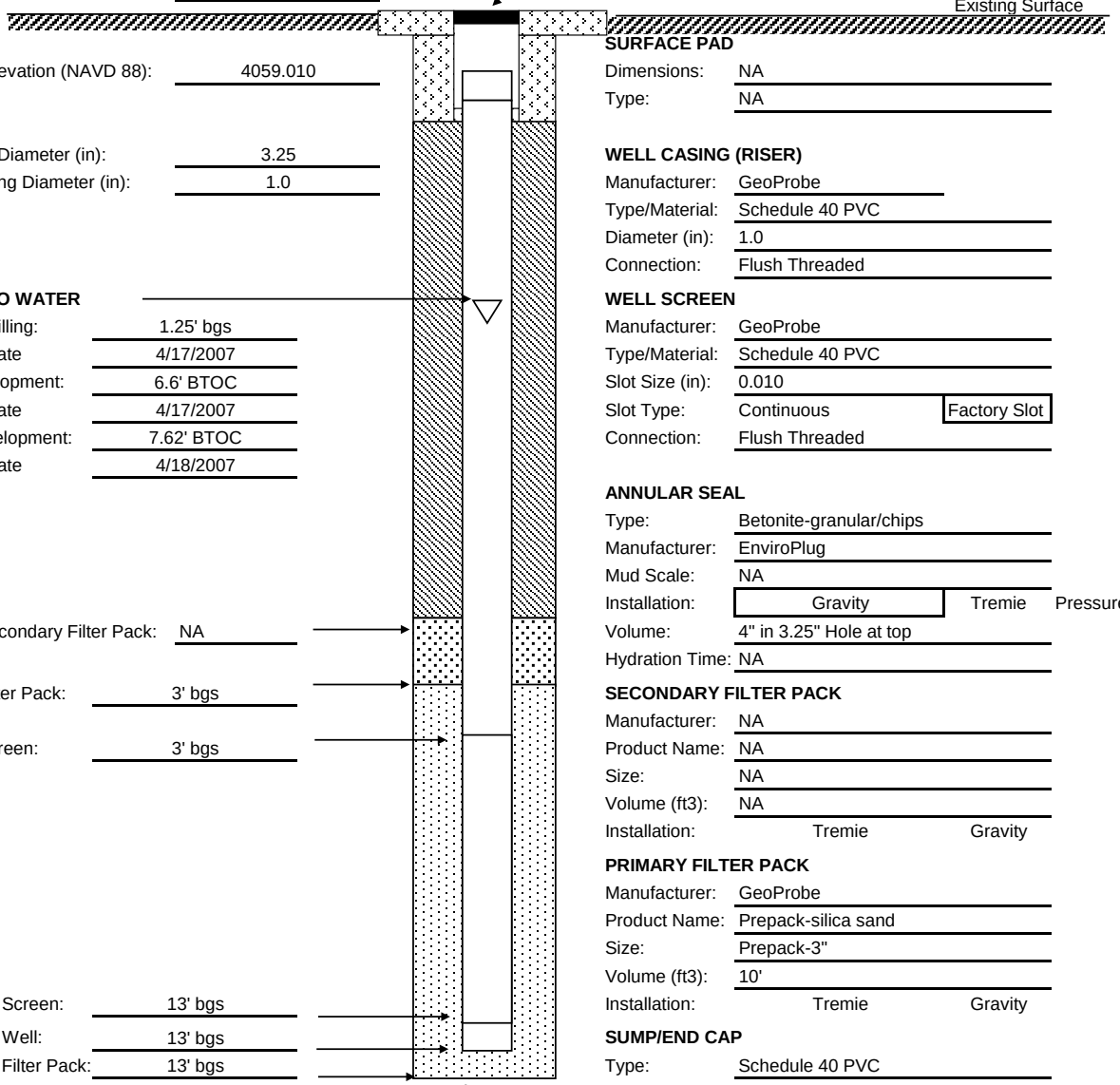
Top of Screen: 3' bgs

Bottom of Screen: 13' bgs

Bottom of Well: 13' bgs

Bottom of Filter Pack: 13' bgs

Borehole Depth: 13' bgs



PROTECTIVE CASING

Type: Steel Plate

Dimensions: 12'x12"

Length: 4"

SURFACE PAD

Dimensions: NA

Type: NA

WELL CASING (RISER)

Manufacturer: GeoProbe

Type/Material: Schedule 40 PVC

Diameter (in): 1.0

Connection: Flush Threaded

WELL SCREEN

Manufacturer: GeoProbe

Type/Material: Schedule 40 PVC

Slot Size (in): 0.010

Slot Type: Continuous | Factory Slot

Connection: Flush Threaded

ANNULAR SEAL

Type: Betonite-granular/chips

Manufacturer: EnviroPlug

Mud Scale: NA

Installation: Gravity | Tremie | Pressure

Volume: 4" in 3.25" Hole at top

Hydration Time: NA

SECONDARY FILTER PACK

Manufacturer: NA

Product Name: NA

Size: NA

Volume (ft3): NA

Installation: Tremie | Gravity

PRIMARY FILTER PACK

Manufacturer: GeoProbe

Product Name: Prepack-silica sand

Size: Prepack-3"

Volume (ft3): 10'

Installation: Tremie | Gravity

SUMP/END CAP

Type: Schedule 40 PVC

Length: 2"

Type: NA

Volume: NA

Comments:

BHATE
Environmental Engineers and Scientists

TEMPORARY WELL CONSTRUCTION DIAGRAM (Flush Mount)

SITE:	SS-69	**WELL/BORING ID:**	SS69-DP02
PROJECT NAME:	Herington AAF Limited RI	**DRILLING METHOD:**	Direct Push Method
PROJECT NO./PHASE:	9050360 01.05	**DATE(S):**	17-Apr-07
DRILLING CONTRACTOR:	ESN	**SURVEYOR:**	Bhate - Craig McGriff
DRILLER:	Chad Grubbs	**NORTHING (NAD 83):**	670602.3652
GEOLOGIST:	Katherine Thompson	**EASTING (NAD 83):**	1684288.6436

NOT TO SCALE

Surface Elevation (NAVD 88): 4058.574

Casing Elevation (NAVD 88): 4058.403

Borehole Diameter (in): 3.25

Well Casing Diameter (in): 1.0

DEPTH TO WATER

During Drilling: 0.25' bgs

Date 4/17/2007

Pre Development: 6.3' BTOC

Date 4/18/2007

Post Development: 6.3' BTOC

Date 4/18/2007

Top of Secondary Filter Pack: NA

Top of Filter Pack: 2.5' bgs

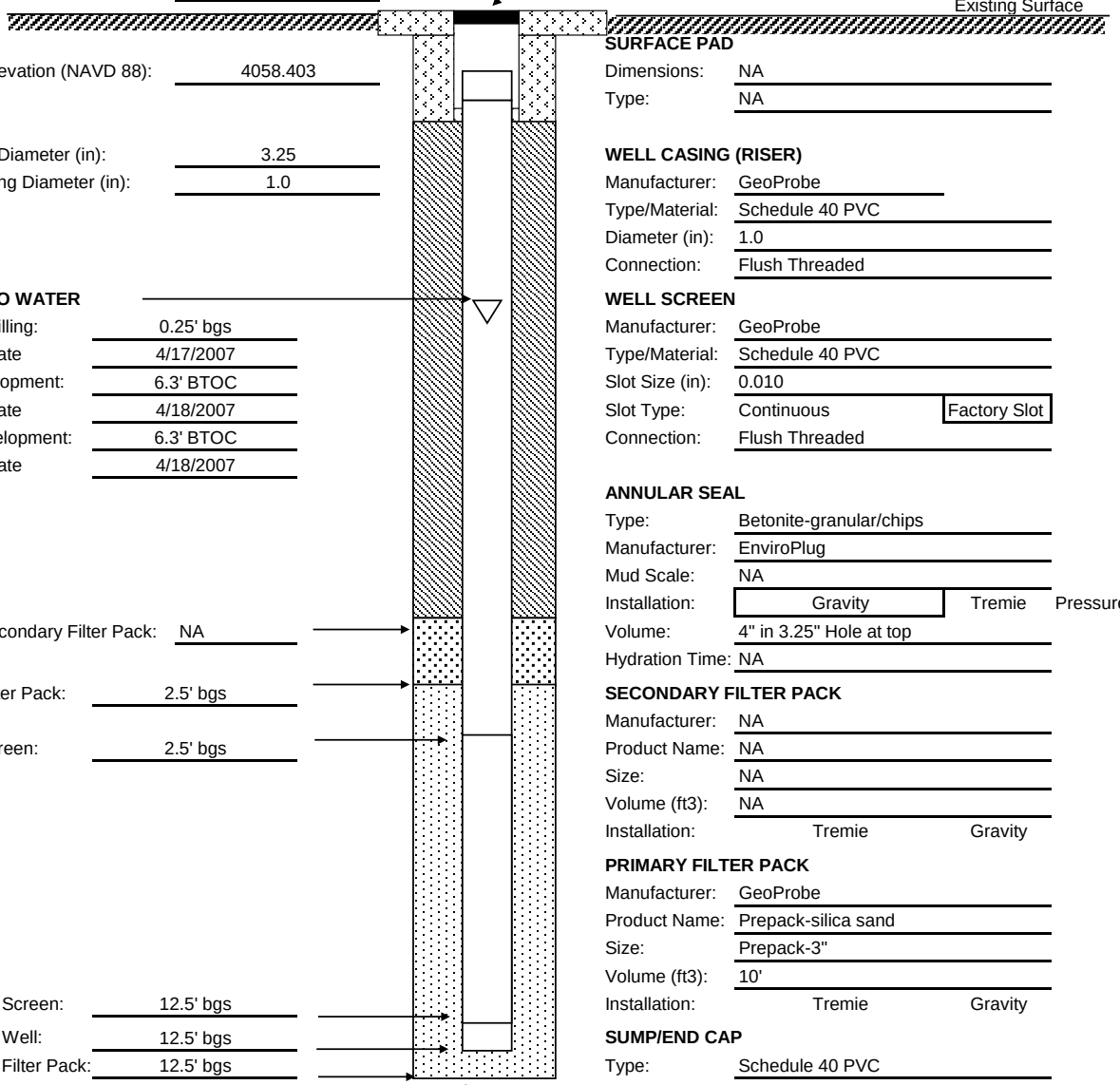
Top of Screen: 2.5' bgs

Bottom of Screen: 12.5' bgs

Bottom of Well: 12.5' bgs

Bottom of Filter Pack: 12.5' bgs

Borehole Depth: 12.5' bgs



PROTECTIVE CASING

Type: Steel Plate

Dimensions: 12'x12"

Length: 4"

SURFACE PAD

Dimensions: NA

Type: NA

WELL CASING (RISER)

Manufacturer: GeoProbe

Type/Material: Schedule 40 PVC

Diameter (in): 1.0

Connection: Flush Threaded

WELL SCREEN

Manufacturer: GeoProbe

Type/Material: Schedule 40 PVC

Slot Size (in): 0.010

Slot Type: Continuous | Factory Slot

Connection: Flush Threaded

ANNULAR SEAL

Type: Betonite-granular/chips

Manufacturer: EnviroPlug

Mud Scale: NA

Installation: Gravity | Tremie | Pressure

Volume: 4" in 3.25" Hole at top

Hydration Time: NA

SECONDARY FILTER PACK

Manufacturer: NA

Product Name: NA

Size: NA

Volume (ft3): NA

Installation: Tremie | Gravity

PRIMARY FILTER PACK

Manufacturer: GeoProbe

Product Name: Prepack-silica sand

Size: Prepack-3"

Volume (ft3): 10'

Installation: Tremie | Gravity

SUMP/END CAP

Type: Schedule 40 PVC

Length: 2"

Type: NA

Volume: NA

Comments:

BHATE
Environmental Engineers and Scientists

TEMPORARY WELL CONSTRUCTION DIAGRAM (Flush Mount)

SITE:	SS-69	**WELL/BORING ID:**	SS69-DP03
PROJECT NAME:	Herington AAF Limited RI	**DRILLING METHOD:**	Direct Push Method
PROJECT NO./PHASE:	9050360 01.05	**DATE(S):**	17-Apr-07
DRILLING CONTRACTOR:	ESN	**SURVEYOR:**	Bhate - Craig McGriff
DRILLER:	Chad Grubbs	**NORTHING (NAD 83):**	670406.2862
GEOLOGIST:	Katherine Thompson	**EASTING (NAD 83):**	1684339.8498

NOT TO SCALE

Surface Elevation (NAVD 88): 4058.571

Casing Elevation (NAVD 88): 4058.507

Borehole Diameter (in): 3.25

Well Casing Diameter (in): 1.0

DEPTH TO WATER

During Drilling: 1.0' bgs

Date 4/17/2007

Pre Development: 6.92' BTOC

Date 4/17/2007

Post Development: NA

Date NA

Top of Secondary Filter Pack: NA

Top of Filter Pack: 2.5' bgs

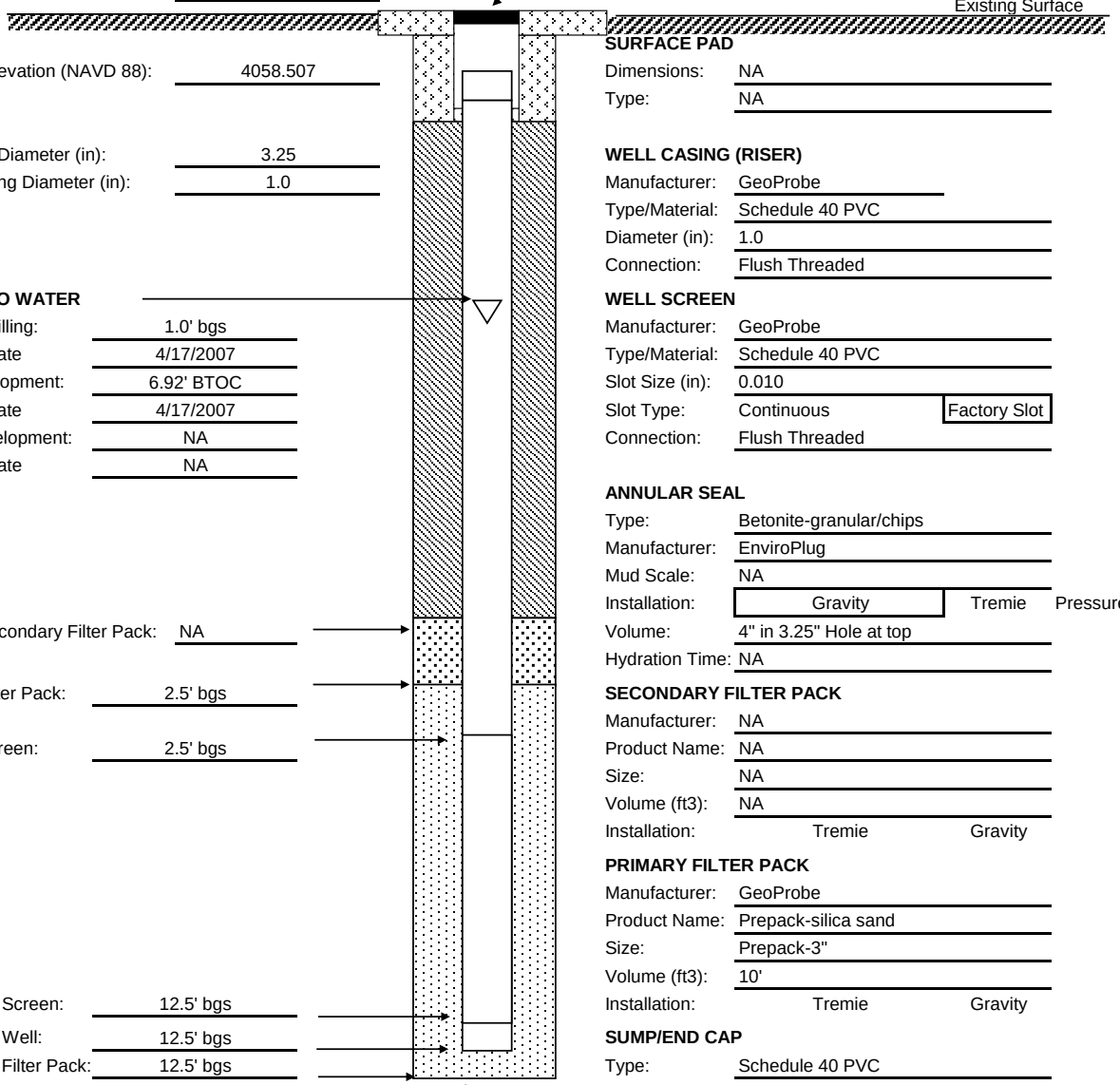
Top of Screen: 2.5' bgs

Bottom of Screen: 12.5' bgs

Bottom of Well: 12.5' bgs

Bottom of Filter Pack: 12.5' bgs

Borehole Depth: 12.5' bgs



PROTECTIVE CASING

Type: Steel Plate

Dimensions: 12'x12"

Length: 4"

SURFACE PAD

Dimensions: NA

Type: NA

WELL CASING (RISER)

Manufacturer: GeoProbe

Type/Material: Schedule 40 PVC

Diameter (in): 1.0

Connection: Flush Threaded

WELL SCREEN

Manufacturer: GeoProbe

Type/Material: Schedule 40 PVC

Slot Size (in): 0.010

Slot Type: Continuous | Factory Slot

Connection: Flush Threaded

ANNULAR SEAL

Type: Betonite-granular/chips

Manufacturer: EnviroPlug

Mud Scale: NA

Installation: Gravity | Tremie | Pressure

Volume: 4" in 3.25" Hole at top

Hydration Time: NA

SECONDARY FILTER PACK

Manufacturer: NA

Product Name: NA

Size: NA

Volume (ft3): NA

Installation: Tremie | Gravity

PRIMARY FILTER PACK

Manufacturer: GeoProbe

Product Name: Prepack-silica sand

Size: Prepack-3"

Volume (ft3): 10'

Installation: Tremie | Gravity

SUMP/END CAP

Type: Schedule 40 PVC

Length: 2"

Type: NA

Volume: NA

Comments:

APPENDIX C
FIELD SAMPLING DOCUMENTATION

SS-65
Field Sampling Documentation

MONITORING WELL DEVELOPMENT FORM

BHATE
Environmental Engineers and Scientist

LOCATION	Site: SS65	Location ID: ~~Source Area~~ SS65-DP01	Date: 4/16/07
	Project Name: HAFB Confirmatory Sampling	Project No./Phase: 9050360 01.01	Recorded By: B. Inlolfe
EQUIPMENT	Pump Type/ID#: Grundfos / 1T0500 2753	Water Quality Meter/ID#: Horiba U22 / U515 39	PID Type/ID#: —
	Water Level Indicator Type/ID#: Heron 3593	Other Equipment/ID#: Lamotte 2020 / 3972-0603	Decon Method: Liquinox / DI rinse
	Tubing Type/Diameter (in): 1/4 x 3/8	Other Equipment/ID#: —	PPE Level: — D C B A
WELL INFO	(A) Initial Depth to Water (ft BTOC): ~~5.82~~ 5.25	Casing: Type PVC Diam. (in) 1	Weather: clear → PC, 68°
	(B) Total Well Depth (ft BTOC): ~~12.01~~ 12.06	(E) Casing Volume Multiplier (gal/lin ft): 0.04	Background PID (ppm): —
	(C) Water Column Thickness (ft) (B-A): ~~6.19~~ 6.81	Screen Length (lin ft): 10	Breathing Zone PID (ppm): —
	(D) Well Volume (gal) (C x E): ~ 0.3	Screen Info: Type: Prepack Size: 1	Well Opening PID (ppm): —

CASING INFO											
Riseer/Well Casing Inner Diameter (in)	0.50	1.00	1.50	2.00	3.00	4.00	5.0	6.0	8.0	10
(D) Casing Volume Multiplier(gal/lin ft)	0.02	0.04	0.10	0.16	0.38	0.65	1.02	1.47	2.61	4.08

DATE (mmddyy)	TIME (24 Hr)	Water Level (BTOC)	Volume Removed (mL)	Pumping Rate (mLpm)	Temp (C)	pH	Cond. (mS/cm)	Dissolved Oxygen (mg/l)	Turbidity (NTU)	Oxidation Reduction Potential (mV)	Remarks (odor, clarity, etc.)
~~4/16/07~~	~~1400~~	~~5.82~~	~~0~~	~~vary~~	~~20.9~~	~~8.27~~	~~0.35~~	~~11.20~~	~~130~~	~~94~~	~~water is orange~~
4/16/07	1455	5.25	0	vary	~~20.3~~ 21.9	8.35	1.0	8.35	430	105	
	1505	—	500	vary	21.0	7.70	1.0	1.27	170	-242	
	1515	—	1000	vary	21.0	7.69	1.0	1.23	140	-244	
			~~1500~~								
		TERMINATE	Development		prior	to	stabilization,	purge,	sample		
DEVELOPMENT CRITERIA											
+/- 10% unless otherwise noted					+/- 0.5	+/- 0.1	+/- 25	+/- 0.2	< 50.0	+/- 20	

COMMENTS:

12.06
5.25
6.81

6.81
.04
2724
000
0.2724

MONITORING WELL SAMPLE COLLECTION FORM

BHATE Environmental Engineers and Scientist

Page 1 of 1

LOCATION	Site: SS65	Location ID: SS65 DP01		Date: 4/16/07	
	Project Name: HAFB Confirm. Sampling	Project No./Phase: 9050360 01.01		Recorded By: B.K.	
EQUIPMENT	Pump Type/ID#: Geopump Hoss00 2753	Water Quality Meter/ID#: Horiba U22 / V51539		PID Type/ID#: —	
	Water Level Indicator Type/ID#: Heron 3593	Other Equipment/ID#: LaMotte 2020 / 3472-0603		Decon Method: Liquinox / DI Rinse	
	Tubing Type/Diameter (in): 1/4 x 3/8	Other Equipment/ID#: —		PPE Level: D C B A	
WELL INFO	(A) Initial Depth to Water (ft BTOC): 5.73	Casing: Type PVC	Diam. (in) 2	Weather: clear → PC, 68°	
	(B) Total Well Depth (ft BTOC): 12.06	(E) Casing Volume Multiplier (gal/lin ft): 0.04		Background PID (ppm): —	
	(C) Water Column Thickness (ft) (B-A): 6.33	Screen Length (lin ft): 10		Breathing Zone PID (ppm): —	
	(D) Well Volume (gal) (C x E): ~0.3	Screen Info: Type: pre pack	Size: 1"	Well Opening PID (ppm): —	

CASING INFO											
Riseer/Well Casing Inner Diameter (in)	0.50	1.00	1.50	2.00	3.00	4.00	5.0	6.0	8.0	10
(D) Casing Volume Multiplier(gal/lin ft)	0.02	0.04	0.10	0.16	0.38	0.65	1.02	1.47	2.61	4.08

DATE (mmddyy)	TIME (24 Hr)	Water Level (BTOC)	Volume Removed (mLl)	Pumping Rate (mLpm)	Temp (C)	pH	Cond. (mS/cm)	Dissolved Oxygen (mg/l)	Turbidity (NTU)	Oxidation Reduction Potential (mV)	Remarks (odor, clarity, etc.)
4/16/07	1525	5.73	0	VARY	21.0	7.70	1.0	2.04	150	-230	
	1530	—	500	VARY	20.9	7.71	1.0	1.92	162	-232	
	1535	—	1000	VARY	21.0	7.68	1.0	1.04	101	-218	
		TERMINATE	PURGING.	Sample	@	1545					

Colorimeter Results					No. Containers/Volume/Type			Preserv.	Filter (Y/N)	Method	Parameter(s)
Time	Analyte	Dilution	Result	Units	3	40 ml	VOAs	HCl	N	8260B	VOCs
					2	1 L	Glass Amber	-	N	8270C	SVOCs
Sample Time					3	40 mL	VOAs	HCl	N	8015	TRPH -GRO
					2	1 L	Glass Amber	H2SO4	N	8015	TRPH - DRO/ORO
Sample Identification					2	1 L	Glass Amber	-	N	8082	PCB
					1	500 mL	Plastic	HNO3	Y	6010/7470	Metals
Conversions	Stabilization Criteria				1	500 mL	Plastic	-	N	Wet Chem	TDS
1 L = 0.26 gals	Temp	+/- 0.5	DO	+/- 0.2							
1 gal = 3.79 L	pH	+/- 0.1	Turb	+/- 10							
	Cond	+/- 25	ORP	+/- 10							

12.06
5.73
6.33

MONITORING WELL S. LE COLLECTION FORM

BHATE
Environmental Engineers and Scientist

Page 1 of

LOCATION	Site: 5565	Location ID: 5565-DP02	Date: 8/21/07
	Project Name: HAFB Confirm. Sampling	Project No./Phase: 9050360 01.01-01.09	Recorded By: CM
EQUIPMENT	Pump Type/ID#: Geopump	Water Quality Meter/ID#: Horiba U22	PID Type/ID#:
	Water Level Indicator Type/ID#: Geotech	Other Equipment/ID#: Oakton T100	Decon Method: Liquinox
	Tubing Type/Diameter (in): 3/8"	Other Equipment/ID#:	PPE Level: D C B A
WELL INFO	(A) Initial Depth to Water (ft BTOC): 5.7	Casing: Type PVC Diam. (in) 1	Weather:
	(B) Total Well Depth (ft BTOC): 12.52	(E) Casing Volume Multiplier (gal/lin ft):	Background PID (ppm):
	(C) Water Column Thickness (ft) (B-A):	Screen Length (lin ft): 5	Breathing Zone PID (ppm):
	(D) Well Volume (gal) (C x E):	Screen Info: Type: Prepack Size: 2	Well Opening PID (ppm):

CASING INFO											
Riseer/Well Casing Inner Diameter (in)	0.50	1.00	1.50	2.00	3.00	4.00	5.0	6.0	8.0	10
(D) Casing Volume Multiplier(gal/lin ft)	0.02	0.04	0.10	0.16	0.38	0.65	1.02	1.47	2.61	4.08

DATE (mmddyy)	TIME (24 Hr)	Water Level (BTOC)	Volume Removed (mLl)	Pumping Rate (mLpm)	Temp (C)	pH	Cond. (mS/cm)	Dissolved Oxygen (mg/l)	Turbidity (NTU)	Oxidation Reduction Potential (mV)	Remarks (odor, clarity, etc.)
082107	1125	5.7	0	200	28.0	7.35	0.65	3.3	240	102	Cloudy / No odor
	1130		1000	200	26.5	7.25	0.60	1.5	57.5	17	Clearing
	1135		2000	200	26.2	7.20	0.57	1.0	22.5	15	" "
	1140		3000	200	26.2	7.20	0.56	0.9	14.12	15	" "
	1145		4000	200	26.2	7.19	0.56	0.9	11.36	15	Clear
	1150		5000	200	26.2	7.19	0.56	0.9	10.19	15	" "

Colorimeter Results

Time	Analyte	Dilution	Result	Units

Sample Time
1155

Sample Identification
5565-DP02

Conversions	Stabilization Criteria			
1 L = 0.26 gals	Temp	+/- 0.5	DO	+/- 0.2
1 gal = 3.79 L	pH	+/- 0.1	Turb	+/- 10
	Cond	+/- 25	ORP	+/- 10

No. Containers/Volume/Type			Preserv.	Filter (Y/N)	Method	Parameter(s)
3	40 ml	VOAs	HCl	N	8260B	VOCs
1	500 mL	Plastic	-	N	Wet Chem	TDS

MONITORING WELL S[illegible]LE COLLECTION FORM

BHATE
Environmental Engineers and Scientist

Page 1 of

LOCATION	Site: SS65	Location ID: SS65-DP03	Date: 8/21/07
	Project Name: HAFB Confirm. Sampling	Project No./Phase: 9050360 01.01-01.09	Recorded By: CM
EQUIPMENT	Pump Type/ID#: Geopump	Water Quality Meter/ID#: Horiba U22	PID Type/ID#:
	Water Level Indicator Type/ID#: Geotech	Other Equipment/ID#: Oakton T100	Decon Method: Liquinox
	Tubing Type/Diameter (in): 3/8"	Other Equipment/ID#:	PPE Level: D C B A
WELL INFO	(A) Initial Depth to Water (ft BTOC): 4.7	Casing: Type PVC Diam. (in) 1	Weather: Hot 84°
	(B) Total Well Depth (ft BTOC): 10.5	(E) Casing Volume Multiplier (gal/lin ft):	Background PID (ppm): 0
	(C) Water Column Thickness (ft) (B-A):	Screen Length (lin ft): 5	Breathing Zone PID (ppm): 0
	(D) Well Volume (gal) (C x E):	Screen Info: Type: Prepack Size: 2	Well Opening PID (ppm):

CASING INFO											
Riseer/Well Casing Inner Diameter (in)	0.50	1.00	1.50	2.00	3.00	4.00	5.0	6.0	8.0	10
(D) Casing Volume Multiplier(gal/lin ft)	0.02	0.04	0.10	0.16	0.38	0.65	1.02	1.47	2.61	4.08

DATE (mmddyy)	TIME (24 Hr)	Water Level (BTOC)	Volume Removed (mLl)	Pumping Rate (mLpm)	Temp (C)	pH	Cond. (mS/cm)	Dissolved Oxygen (mg/l)	Turbidity (NTU)	Oxidation Reduction Potential (mV)	Remarks (odor, clarity, etc.)
082107	1020	4.70	0	200	28.0	7.43	1.1	4.1	743	98	Cloudy / No Odor
	1025		1000	200	26.3	7.40	1.1	2.1	846	9	" "
	1030		2000	200	25.8	7.29	1.0	0.9	274	-1	" "
	1035		3000	200	25.4	7.25	1.0	0.9	78.1	1	Clearing
	1040		4000	200	25.4	7.23	1.0	0.9	55.8	3	" "
	1045		5000	200	25.1	7.21	1.0	0.8	55.2	2	" "

Colorimeter Results

Time	Analyte	Dilution	Result	Units

Sample Time: 1050

Sample Identification: SS65-DP03

Conversions	Stabilization Criteria			
1 L = 0.26 gals	Temp	+/- 0.5	DO	+/- 0.2
1 gal = 3.79 L	pH	+/- 0.1	Turb	+/- 10
	Cond	+/- 25	ORP	+/- 10

No. Containers/Volume/Type			Preserv.	Filter (Y/N)	Method	Parameter(s)
3	40 ml	VOAs	HCl	N	8260B	VOCs
1	500 mL	Plastic	-	N	Wet Chem	TDS

SS-67
Field Sampling Documentation

MONITORING WELL DEVELOPMENT FORM

BHATE
Environmental Engineers and Scientist

LOCATION	Site: SS67	Location ID: SS67 - D701	Date: 4/13/07
	Project Name: HAFB Confirmatory Sampling	Project No./Phase: 9050360 01.03	Recorded By: BWolfe
EQUIPMENT	Pump Type/ID#: Geopump / H050027 53	Water Quality Meter/ID#: Horiba U22 / U51589	PID Type/ID#: —
	Water Level Indicator Type/ID#: Heron Dipper-T 3598	Other Equipment/ID#: Lamotte 2020 / 3972-0603	Decon Method: Liquinox / DI Rinse
	Tubing Type/Diameter (in): 1/4 x 3/8	Other Equipment/ID#: —	PPE Level: (D) C B A
WELL INFO	(A) Initial Depth to Water (ft BTOC): 7.56	Casing: Type PVC Diam. (in) 2	Weather: overcast 60° breezy
	(B) Total Well Depth (ft BTOC): ~~7.56~~ 15.18	(E) Casing Volume Multiplier (gal/lin ft): 0.04	Background PID (ppm): —
	(C) Water Column Thickness (ft) (B-A): 7.62	Screen Length (lin ft): 10	Breathing Zone PID (ppm): —
	(D) Well Volume (gal) (C x E): ~ 0.3	Screen Info: Type: pre-pack Size: 1"	Well Opening PID (ppm): —

CASING INFO										
Riseer/Well Casing Inner Diameter (in)	0.50	1.00	1.50	2.00	3.00	4.00	5.0	6.0	8.0	10
(D) Casing Volume Multiplier(gal/lin ft)	0.02	0.04	0.10	0.16	0.38	0.65	1.02	1.47	2.61	4.08

DATE (mmddyy)	TIME (24 Hr)	Water Level (BTOC)	Volume Removed (mL)	Pumping Rate (mLpm)	Temp (C)	pH	Cond. (mS/cm)	Dissolved Oxygen (mg/l)	Turbidity (NTU)	Oxidation Reduction Potential (mV)	Remarks (odor, clarity, etc.)
4-13-07	1436	7.56	0	Vary	19.0	8.04	1.0	10.81	>990	59	
	1442	—	500	500	18.6	8.05	.86	11.69	>990	70	
	1451	—	1000	Vary	18.8	7.98	.87	11.62	490	66	
		Terminate		development							

DEVELOPMENT CRITERIA										
+/- 10% unless otherwise noted				+/- 0.5	+/- 0.1	+/- 25	+/- 0.2	< 50.0	+/- 20	

COMMENTS:

14 ~~15~~.18
7.56
7.62

7.62
.04
.3048

MONITORING WELL SAMPLE COLLECTION FORM

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LOCATION	Site: SS67	Location ID: SS67 DP01		Date: 4/16/07	
	Project Name: HAFB Confirm. Sampling	Project No./Phase: 9050360 01.03		Recorded By: B. Inloff	
EQUIPMENT	Pump Type/ID#: Geopump/H0500 2753	Water Quality Meter/ID#: Horiba U22/ U51589		PID Type/ID#: —	
	Water Level Indicator Type/ID#: Heron / 3553	Other Equipment/ID#: LaMotte 2020/ 3972-0603		Decon Method: liquinox / DI Rinse	
	Tubing Type/Diameter (in): 1/4 x 3/8	Other Equipment/ID#: —		PPE Level: (D) C B A	
WELL INFO	(A) Initial Depth to Water (ft BTOC): 7.42	Casing: Type PVC	Diam. (in) 1	Weather: clear 65°	
	(B) Total Well Depth (ft BTOC): 15.18	(E) Casing Volume Multiplier (gal/lin ft): 0.04		Background PID (ppm): —	
	(C) Water Column Thickness (ft) (B-A): ~~7.42~~ 7.76	Screen Length (lin ft): 10'		Breathing Zone PID (ppm): —	
	(D) Well Volume (gal) (C x E): ~ 0.3	Screen Info: Type: Prepack	Size: 1"	Well Opening PID (ppm): —	

CASING INFO											
Riseer/Well Casing Inner Diameter (in)	0.50	1.00	1.50	2.00	3.00	4.00	5.0	6.0	8.0	10
(D) Casing Volume Multiplier(gal/lin ft)	0.02	0.04	0.10	0.16	0.38	0.65	1.02	1.47	2.61	4.08

DATE (mmddyy)	TIME (24 Hr)	Water Level (BTOC)	Volume Removed (mLl)	Pumping Rate (mLpm)	Temp (C)	pH	Cond. (mS/cm)	Dissolved Oxygen (mg/l)	Turbidity (NTU)	Oxidation Reduction Potential (mV)	Remarks (odor, clarity, etc.)
4/16/07	0840	7.42	0	vary	18.9	7.08	1.2	6.14	30	-92	water is clear
	0845	—	~~500~~ 500	vary	18.8	7.83	0.82	6.35	26	-27	
	0850	—	1000	vary	18.8	7.84	0.75	6.30	24	-22	
	Terminate purge					Sample @ 0900					

Colorimeter Results				
Time	Analyte	Dilution	Result	Units
Sample Time				
Sample Identification				

No. Containers/Volume/Type			Preserv.	Filter (Y/N)	Method	Parameter(s)
3	40 ml	VOAs	HCl	N	8260B	VOCs
2	1 L	Glass Amber	-	N	8270C	SVOCs
3	40 mL	VOAs	HCl	N	8015	TRPH -GRO
2	1 L	Glass Amber	H2SO4	N	8015	TRPH - DRO /ORO
1	500 mL	Plastic	HNO3	Y	6010/7470	Metals
1	500 mL	Plastic	-	N	Wet Chem	TDS

Conversions	Stabilization Criteria			
1 L = 0.26 gals	Temp	+/- 0.5	DO	+/- 0.2
1 gal = 3.79 L	pH	+/- 0.1	Turb	+/- 10
	Cond	+/- 25	ORP	+/- 10

~~15.18~~ 15
7.42
7.76

7.76
.04
3.04
.00
0.3.04

MONITORING WELL DEVELOPMENT FORM

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LOCATION	Site: SS67	Location ID: SS67-~~DP01~~ DP02		Date: 4/13/07	
	Project Name: HAFB Confirmatory Sampling	Project No./Phase: 9050360 01.03		Recorded By: B.W	
EQUIPMENT	Pump Type/ID#: Grundfos / H05002153	Water Quality Meter/ID#: Horiba / V51589		PID Type/ID#: —	
	Water Level Indicator Type/ID#: Heron 3593	Other Equipment/ID#: Lamotte 2020 / 3972-0603		Decon Method: liquinox / DI rinse	
	Tubing Type/Diameter (in): 1/4 x 3/8	Other Equipment/ID#: —		PPE Level: D C B A	
WELL INFO	(A) Initial Depth to Water (ft BTOC): 5.98	Casing: Type PVC	Diam. (in) 1	Weather: PC → overcast, 70°	
	(B) Total Well Depth (ft BTOC): 13.00	(E) Casing Volume Multiplier (gal/lin ft): 0.04		Background PID (ppm): —	
	(C) Water Column Thickness (ft) (B-A): 7.02	Screen Length (lin ft): 10		Breathing Zone PID (ppm): —	
	(D) Well Volume (gal) (C x E): ~ 0.28	Screen Info: Type: prepack	Size: 1"	Well Opening PID (ppm): —	

CASING INFO											
Riseer/Well Casing Inner Diameter (in)	0.50	1.00	1.50	2.00	3.00	4.00	5.0	6.0	8.0	10
(D) Casing Volume Multiplier(gal/lin ft)	0.02	0.04	0.10	0.16	0.38	0.65	1.02	1.47	2.61	4.08

DATE (mmddyy)	TIME (24 Hr)	Water Level (BTOC)	Volume Removed (mL)	Pumping Rate (mLpm)	Temp (C)	pH	Cond. (mS/cm)	Dissolved Oxygen (mg/l)	Turbidity (NTU)	Oxidation Reduction Potential (mV)	Remarks (odor, clarity, etc.)
4-13-07	1507	5.98	0	50	18.3	8.04	1.3	8.70	990	-4	
	1525		1000	50	17.2	7.85	.78	6.42	990	4	
		Terminate	development								
DEVELOPMENT CRITERIA											
+/- 10% unless otherwise noted					+/- 0.5	+/- 0.1	+/- 25	+/- 0.2	< 50.0	+/- 20	

COMMENTS:

13.00
5.98
7.02

7.02
.04
2808
.00

MONITORING WELL SAMPLE COLLECTION FORM

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LOCATION	Site: SS67	Location ID: SS67 DP02		Date: 4/16/07	
	Project Name: HAFB Confirm. Sampling	Project No./Phase: 9050360 01.03		Recorded By: BWolfe	
EQUIPMENT	Pump Type/ID#: Grundfos / H0500 2753	Water Quality Meter/ID#: Horiba U22 / U51589		PID Type/ID#: —	
	Water Level Indicator Type/ID#: Heron 3593	Other Equipment/ID#: LaMotte 2020 / 3972-0603		Decon Method: Liquinox / DI Rinse	
	Tubing Type/Diameter (in): 1/4 x 3/8	Other Equipment/ID#: —		PPE Level: D C B A	
WELL INFO	(A) Initial Depth to Water (ft BTOC): 5.74	Casing: Type PVC	Diam. (in) 2	Weather: clear, 65°	
	(B) Total Well Depth (ft BTOC): 13.00	(E) Casing Volume Multiplier (gal/lin ft): 0.04		Background PID (ppm): —	
	(C) Water Column Thickness (ft) (B-A): 7.26	Screen Length (lin ft): 10		Breathing Zone PID (ppm): —	
	(D) Well Volume (gal) (C x E): ~0.3	Screen Info: Type: Pre pack	Size: 2	Well Opening PID (ppm): —	

CASING INFO											
Riseer/Well Casing Inner Diameter (in)	0.50	1.00	1.50	2.00	3.00	4.00	5.0	6.0	8.0	10
(D) Casing Volume Multiplier(gal/lin ft)	0.02	0.04	0.10	0.16	0.38	0.65	1.02	1.47	2.61	4.08

DATE (mmddyy)	TIME (24 Hr)	Water Level (BTOC)	Volume Removed (mLl)	Pumping Rate (mLpm)	Temp (C)	pH	Cond. (mS/cm)	Dissolved Oxygen (mg/l)	Turbidity (NTU)	Oxidation Reduction Potential (mV)	Remarks (odor, clarity, etc.)
4/16/07	0955	5.74	0	Vary	19.1	8.07	1.5	9.07	120	-263	Water is slightly opaque
	1000	—	500	Vary	18.9	8.12	0.9	4.55	150	-130	
	1005	—	1000	Vary	18.5	8.23	0.5	4.01	69	-72	
		Terminated	Purge			Sample @		1015			

Colorimeter Results					No. Containers/Volume/Type			Preserv.	Filter (Y/N)	Method	Parameter(s)
Time	Analyte	Dilution	Result	Units	3	40 ml	VOAs	HCl	N	8260B	VOCs
					2	1 L	Glass Amber	-	N	8270C	SVOCs
Sample Time					3	40 mL	VOAs	HCl	N	8015	TRPH -GRO
					2	1 L	Glass Amber	H2SO4	N	8015	TRPH - DRO / ORO
Sample Identification					1	500 mL	Plastic	HNO3	Y	6010/7470	Metals
					1	500 mL	Plastic	-	N	Wet Chem	TDS
Conversions	Stabilization Criteria										
1 L = 0.26 gals	Temp	+/- 0.5	DO	+/- 0.2							
1 gal = 3.79 L	pH	+/- 0.1	Turb	+/- 10							
	Cond	+/- 25	ORP	+/- 10							

13.00
5.74
7.26

7.26
.04
2.904
000
0.2904

MONITORING WELL S[illegible]LE COLLECTION FORM

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LOCATION	Site: SS67	Location ID: SS67-DP03	Date: 8/20/07 (Dry) -
	Project Name: HAFB Confirm. Sampling	Project No./Phase: 9050360 01.01-01.09	Recorded By: CM
EQUIPMENT	Pump Type/ID#: Geotech Bcapump	Water Quality Meter/ID#: Horiba U22	PID Type/ID#:
	Water Level Indicator Type/ID#: Geotech	Other Equipment/ID#: Oakton T100	Decon Method: Liquinox
	Tubing Type/Diameter (in): 3/8"	Other Equipment/ID#:	PPE Level: D C B A
WELL INFO	(A) Initial Depth to Water (ft BTOC): Dry/Recharge	Casing: Type PVC Diam. (in) 1	Weather: Hot 100°
	(B) Total Well Depth (ft BTOC):	(E) Casing Volume Multiplier (gal/lin ft):	Background PID (ppm):
	(C) Water Column Thickness (ft) (B-A):	Screen Length (lin ft): 5	Breathing Zone PID (ppm):
	(D) Well Volume (gal) (C x E):	Screen Info: Type: Prepack Size: 2	Well Opening PID (ppm):

CASING INFO										
Riseer/Well Casing Inner Diameter (in)	0.50	1.00	1.50	2.00	3.00	4.00	5.0	6.0	8.0	10
(D) Casing Volume Multiplier(gal/lin ft)	0.02	0.04	0.10	0.16	0.38	0.65	1.02	1.47	2.61	4.08

DATE (mmddyy)	TIME (24 Hr)	Water Level (BTOC)	Volume Removed (mLl)	Pumping Rate (mLpm)	Temp (C)	pH	Cond. (mS/cm)	Dissolved Oxygen (mg/l)	Turbidity (NTU)	Oxidation Reduction Potential (mV)	Remarks (odor, clarity, etc.)
082007		Dry									

Colorimeter Results

Time	Analyte	Dilution	Result	Units

Sample Time

Sample Identification

Conversions	Stabilization Criteria			
1 L = 0.26 gals	Temp	+/- 0.5	DO	+/- 0.2
1 gal = 3.79 L	pH	+/- 0.1	Turb	+/- 10
	Cond	+/- 25	ORP	+/- 10

No. Containers/Volume/Type			Preserv.	Filter (Y/N)	Method	Parameter(s)
3	40 ml	VOAs	HCl	N	8260B	VOCs
1	500 mL	Plastic	-	N	Wet Chem	TDS

MONITORING WELL S[illegible]LE COLLECTION FORM

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LOCATION	Site: SS67	Location ID: SS67-DP04	Date: 8/20/07
	Project Name: HAFB Confirm. Sampling	Project No./Phase: 9050360 01.01-01.09	Recorded By: CM
EQUIPMENT	Pump Type/ID#: Geopump	Water Quality Meter/ID#: Horiba U22	PID Type/ID#:
	Water Level Indicator Type/ID#: Geotech	Other Equipment/ID#: Oakton T100	Decon Method: Liquinox
	Tubing Type/Diameter (in): 3/8"	Other Equipment/ID#:	PPE Level: D C B A
WELL INFO	(A) Initial Depth to Water (ft BTOC): 6.60	Casing: Type PVC Diam. (in) 1	Weather: Hot 104°
	(B) Total Well Depth (ft BTOC):	(E) Casing Volume Multiplier (gal/lin ft):	Background PID (ppm):
	(C) Water Column Thickness (ft) (B-A):	Screen Length (lin ft): 5'	Breathing Zone PID (ppm):
	(D) Well Volume (gal) (C x E):	Screen Info: Type: Prepack Size: 2	Well Opening PID (ppm):

CASING INFO											
Riseer/Well Casing Inner Diameter (in)	0.50	1.00	1.50	2.00	3.00	4.00	5.0	6.0	8.0	10
(D) Casing Volume Multiplier(gal/lin ft)	0.02	0.04	0.10	0.16	0.38	0.65	1.02	1.47	2.61	4.08

DATE (mmddyy)	TIME (24 Hr)	Water Level (BTOC)	Volume Removed (mLl)	Pumping Rate (mLpm)	Temp (C)	pH	Cond. (mS/cm)	Dissolved Oxygen (mg/l)	Turbidity (NTU)	Oxidation Reduction Potential (mV)	Remarks (odor, clarity, etc.)
082007	1512	6.60	0	150	26.5	6.81	1.2	5.0	171	209	Slightly Cloudy/No Odor
	1517		750	150	25.7	7.35	1.0	2.6	48.6	-55	Clearing/
	1522		1500	150	25.4	7.41	0.9	1.9	20.2	-63	" "
	1527		2250	150	25.0	7.42	0.9	1.7	7.52	-57	" "
	1532		3000	150	25.4	7.42	0.89	1.6	4.97	-54	Clear/No Odor
	1537		3750	150	25.3	7.43	0.88	1.6	3.79	-50	" "

Colorimeter Results				
Time	Analyte	Dilution	Result	Units

No. Containers/Volume/Type			Preserv.	Filter (Y/N)	Method	Parameter(s)
3	40 ml	VOAs	HCl	N	8260B	VOCs
1	500 mL	Plastic	-	N	Wet Chem	TDS

Sample Time
1540

Sample Identification
SS67-DP04

Conversions	Stabilization Criteria			
1 L = 0.26 gals	Temp	+/- 0.5	DO	+/- 0.2
1 gal = 3.79 L	pH	+/- 0.1	Turb	+/- 10
	Cond	+/- 25	ORP	+/- 10

SS-69
Field Sampling Documentation

MONITORING WELL DEVELOPMENT FORM

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LOCATION	Site: SS69	Location ID: SS69 - DP01		Date: 4/17/07	
	Project Name: HAFB Confirmatory Sampling	Project No./Phase: 9050360 01.05		Recorded By: BW	
EQUIPMENT	Pump Type/ID#: Geotech	Water Quality Meter/ID#: Horiba		PID Type/ID#: —	
	Water Level Indicator Type/ID#: Heron	Other Equipment/ID#: Lamotte		Decon Method: liquinox / DI rinse	
	Tubing Type/Diameter (in): 1/4 x 3/8 poly	Other Equipment/ID#: —		PPE Level: (D) C B A	
WELL INFO	(A) Initial Depth to Water (ft BTOC): 6.60	Casing: Type PVC	Diam. (in) 1	Weather: PC, breezy, 78°	
	(B) Total Well Depth (ft BTOC): 12.95	(E) Casing Volume Multiplier (gal/lin ft): 0.04		Background PID (ppm): —	
	(C) Water Column Thickness (ft) (B-A): 6.35	Screen Length (lin ft): 10		Breathing Zone PID (ppm): —	
	(D) Well Volume (gal) (C x E): ~ 0.3	Screen Info: Type: Prepack	Size: 0.010	Well Opening PID (ppm): —	

CASING INFO											
Riseer/Well Casing Inner Diameter (in)	0.50	1.00	1.50	2.00	3.00	4.00	5.0	6.0	8.0	10
(D) Casing Volume Multiplier(gal/lin ft)	0.02	0.04	0.10	0.16	0.38	0.65	1.02	1.47	2.61	4.08

DATE (mmddyy)	TIME (24 Hr)	Water Level (BTOC)	Volume Removed (mL)	Pumping Rate (mLpm)	Temp (C)	pH	Cond. (mS/cm)	Dissolved Oxygen (mg/l)	Turbidity (NTU)	Oxidation Reduction Potential (mV)	Remarks (odor, clarity, etc.)
4/17/07	1308	6.60	0	vary	22.0	7.90	0.34	~~>5.10~~ 5.77	>990	159	very very turbid
	1316	/	250	vary	21.6	8.03	0.32	5.41	>990	80	slightly less turbid
	1322	/	500	vary	21.5	7.81	0.33	3.24	>990	47	"
	~~Sample following~~										
	Terminate development					Sample w/o purge @ 1330					
DEVELOPMENT CRITERIA											
+/- 10% unless otherwise noted					+/- 0.5	+/- 0.1	+/- 25	+/- 0.2	< 50.0	+/- 20	

COMMENTS:

12.95
6.60
6.35

MONITORING WELL SAMPLE COLLECTION FORM

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LOCATION	Site: West POL Yard	Location ID: SS 69 - DR02		Date: 4/18/07	
	Project Name: HAFB West POL	Project No./Phase: 9040238 11.01		Recorded By: J.W.	
EQUIPMENT	Pump Type/ID#: Geopump	Water Quality Meter/ID#: Horiba		PID Type/ID#: —	
	Water Level Indicator Type/ID#: Heron	Other Equipment/ID#: Lamotte		Decon Method: Liquinox / DI rinse	
	Tubing Type/Diameter (in): 1/4 x 3/8 poly	Other Equipment/ID#: —		PPE Level: D C B A	
WELL INFO	(A) Initial Depth to Water (ft BTOC): 6.30	Casing: Type PVC	Diam. (in) 1	Weather: PC, winds, 78°	
	(B) Total Well Depth (ft BTOC): 12.38	(E) Casing Volume Multiplier (gal/lin ft): 0.04		Background PID (ppm): —	
	(C) Water Column Thickness (ft) (B-A): 6.08	Screen Length (lin ft): 10		Breathing Zone PID (ppm): —	
	(D) Well Volume (gal) (C x E): ~ 0.3	Screen Info: Type: pregpack	Size: 0.010	Well Opening PID (ppm): —	

CASING INFO											
Riseer/Well Casing Inner Diameter (in)	0.50	1.00	1.50	2.00	3.00	4.00	5.0	6.0	8.0	10
(D) Casing Volume Multiplier(gal/lin ft)	0.02	0.04	0.10	0.16	0.38	0.65	1.02	1.47	2.61	4.08

DATE (mmddyy)	TIME (24 Hr)	Water Level (BTOC)	Volume Removed (mLl)	Pumping Rate (mLpm)	Temp (C)	pH	Cond. (mS/cm)	Dissolved Oxygen (mg/l)	Turbidity (NTU)	Oxidation Reduction Potential (mV)	Remarks (odor, clarity, etc.)
REMOVE	APPROX	1	LITER	PRIOR	TO	SAMPLING.	NO	WQ			
MEASUREMENTS		RECORDED	DUE	TO	TIME	/	ACCESS	CONSTRAINTS			
WELL	SAMPLED	@	1445								

Colorimeter Results				
Time	Analyte	Dilution	Result	Units
Sample Time				
Sample Identification				

Conversions	Stabilization Criteria			
1 L = 0.26 gals	Temp	+/- 0.5	DO	+/- 0.2
1 gal = 3.79 L	pH	+/- 0.1	Turb	+/- 10
	Cond	+/- 25	ORP	+/- 10

No. Containers/Volume/Type			Preserv.	Filter (Y/N)	Method	Parameter(s)
3	40 ml	VOAs	HCl	N	8260B	VOCs
2	1 L	Glass Amber	-	N	8270C	SVOCs
3	40 mL	VOAs	HCl	N	8015	TRPH -GRO
2	1 L	Glass Amber	H2SO4	N	8015	TRPH - DRO
1	500 mL	Plastic	-	N	Wet Chem	TDS

12.38
6.30
6.08

MONITORING WELL DEVELOPMENT FORM

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LOCATION	Site:	SS69	Location ID:	SS69 DP03	Date: 4/17/07
	Project Name:	HAFB Confirmatory Sampling	Project No./Phase:	9050360 01.05	Recorded By: BJN
EQUIPMENT	Pump Type/ID#:	Geo-pump	Water Quality Meter/ID#:	Horiba	PID Type/ID#: —
	Water Level Indicator Type/ID#:	Heron	Other Equipment/ID#:	LaMotte	Decon Method: Liquinox / DI Rinse
	Tubing Type/Diameter (in):	1/4 x 3/8 poly	Other Equipment/ID#:	—	PPE Level: (D) C B A
WELL INFO	(A) Initial Depth to Water (ft BTOC):	6.92	Casing: Type PVC	Diam. (in) 1	Weather: PC, windy, 78°
	(B) Total Well Depth (ft BTOC):	11.33	(E) Casing Volume Multiplier (gal/lin ft):	0.04	Background PID (ppm): —
	(C) Water Column Thickness (ft) (B-A):	5.41	Screen Length (lin ft):	10	Breathing Zone PID (ppm): —
	(D) Well Volume (gal) (C x E):	~ 0.3	Screen Info: Type: pre-pack	Size: 0.010	Well Opening PID (ppm): —

CASING INFO											
Riseer/Well Casing Inner Diameter (in)	0.50	1.00	1.50	2.00	3.00	4.00	5.0	6.0	8.0	10
(D) Casing Volume Multiplier(gal/lin ft)	0.02	0.04	0.10	0.16	0.38	0.65	1.02	1.47	2.61	4.08

DATE (mmddyy)	TIME (24 Hr)	Water Level (BTOC)	Volume Removed (mL)	Pumping Rate (mLpm)	Temp (C)	pH	Cond. (mS/cm)	Dissolved Oxygen (mg/l)	Turbidity (NTU)	Oxidation Reduction Potential (mV)	Remarks (odor, clarity, etc.)
4/17/07	1410	6.92	0	250	21.3	7.71	0.36	5.40	>990	38	very, very turbid
	1417	/	250	250	21.1	7.62	0.36	2.10	>990	-5	very turbid
					21.5	7.59	0.36	1.69	940	-23	turbid
	Terminate development. Sample w/o purge @ 1430										
DEVELOPMENT CRITERIA											
+/- 10% unless otherwise noted					+/- 0.5	+/- 0.1	+/- 25	+/- 0.2	< 50.0	+/- 20	

COMMENTS:

11.33
6.92
5.41

APPENDIX D
LABORATORY ANALYSIS

(ANALYTICAL DATA PACKAGES ARE PROVIDED ON THE ENCLOSED CD)

APPENDIX E

DATA VALIDATION SUMMARY WITH DATA VALIDATION REPORTS

SS-65
Data Validation Reports

Data Validation Report

This report contains the results of the review and validation of the specified data package performed by Marcia Olive, Bhate Environmental Associates, Denver, Colorado.

Introduction

This data validation report covers samples taken from Holloman Air Force Base, New Mexico, on April 16, 2007. One soil sample and one trip blank were taken from site SS65 for analyses. All analyses were performed by Accutest Laboratories of Orlando, Florida. The specific sample included in this validation was:

Sample ID	Matrix	Collection Date	Lab SDG	Analyses
SS65-DP01-5	Soil	04/16/07	F48764	VOCs (SW8260B), SVOCs (SW8270C), TPH-GRO,ORO,DRO (SW8015M), TAL Metals (SW6010/200.7/7471) and PCBs (SW8082)

This data was validated against the laboratory's QA/QC limits using the guidelines and practices published in the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA, October 2004), and in the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (USEPA, October 1999).

Sample Handling and Holding times

All samples were properly preserved and transferred under chain-of-custody to the laboratory for analysis and analyzed within the required holding times.

Blanks

All method blanks were properly batched with the corresponding field samples, and no compounds/elements of interest were detected in the method blanks except for naphthalene. This compound was non-detect in the samples and using professional judgement, no qualification of the sample data was required.

No analytes were detected in the trip blank.

Blank spike sample (laboratory control sample)/surrogates

The laboratory control sample (LCS) recoveries for ethyl methacrylate and 2-hexanone exceeded QC limits. These compounds were non-detect in the sample. Therefore, using professional judgement, no qualification of the sample data was required.

Matrix spike/matrix spike duplicates

In method SW8260, the matrix spike (MS) and/or matrix spike duplicate (MSD) recoveries for 2-chloroethyl vinyl ether, acetonitrile, acetone, methacrylonitrile, benzyl chloride, methyl ethyl ketone, methyl methacrylate, o-chlorotoluene and propionitrile were outside control limits.

Method performances were cross referenced with the associated Laboratory Control Samples (LCS's), which met the QC requirement. Therefore, qualification of the sample data was not required.

The MS and/or MSD recoveries for calcium, potassium, antimony, aluminum, iron, manganese, thallium and magnesium were outside control limits. Sample non homogeneity was the probable cause and, using professional judgement, these analytes were qualified estimated "J" or non detected estimated "UJ". The relative percent difference (RPD) for antimony, calcium and selenium exceeded QC limits. The non detected compounds were qualified non detected estimated "UJ" and those with a result ≥MDL were qualified estimated "J".

Project specific quality assurance/quality control

No field duplicate samples were submitted as part of this sampling event.

Compound quantitation and reporting limits

Serial dilution for aluminum, antimony, barium, beryllium, cadmium, calcium, chromium, cobalt, iron, manganese, nickel, potassium, selenium, vanadium and zinc exceeded RPD QC control limits. The percent difference was acceptable due to low initial sample concentrations except in the case of aluminum, barium, calcium, chromium, cobalt, iron, manganese, nickel, potassium, vanadium and zinc. Since the sample concentration of these analytes were >50x MDL and their RPDs were >10 they were qualified as estimated "J".

Calcium, magnesium, manganese and potassium required a dilution to quantify the data and reported elevated reporting limits (RLs) and method detection limits (MDLs). Potassium and thallium reported elevated RL/MDL due to bias and exceedances in batch QC criteria. All other compounds were reported down to the specific RL without dilutions.

Overall assessment of data

Overall, the data is suitable for the intended data usage. All analyses were performed, and the data met the required QC criteria except where noted. The data is 100% complete.

Summary of Qualified Data

Sample ID'S	Parameter	*Qualifier
SS65-DP01-5	Antimony	1.2 J
	Aluminum	21300 J
	Calcium	53500 J
	Thallium	0.56 UJ
	Potassium	5050 J
	Iron	16300 J
	Magnesium	31000 J
	Manganese	433 J
	Selenium	0.83 J
	Barium	87.6 J
	Chromium	14.0 J
	Cobalt	6.2 J
	Nickel	14.9 J
	Vanadium	26.4 J
	Zinc	58.7 J

*Results are mg/kg

Data Validation Report

This report contains the results of the review and validation of the specified data package performed by Marcia Olive, Bhate Environmental Associates, Denver, Colorado.

Introduction

This data validation report covers samples taken from Holloman Air Force Base, New Mexico, on April 16, 2007. One aqueous sample and one trip blank were taken from site SS65 for analyses. All analyses were performed by Accutest Laboratories of Orlando, Florida. The specific sample included in this validation was:

Sample ID	Matrix	Collection Date	Lab SDG	Analyses
SS65-DP01	Water	04/16/07	F48807	VOCs (SW8260B), SVOCs (SW8270C), TPH-GRO,DRO,ORO (SW8015M), TAL Metals (SW6010/200.7/7470), PCBs (SW8082) and TDS (160.1)

This data was validated against the laboratory's QA/QC limits using the guidelines and practices published in the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA, October 2004), and in the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (USEPA, October 1999).

Sample Handling and Holding times

All samples were properly preserved and transferred under chain-of-custody to the laboratory for analysis and analyzed within the required holding times.

Blanks

All method blanks were properly batched with the corresponding field samples, and no compounds/elements of interest were detected in the method blanks.

Methylene chloride was detected in the trip blank but not in the associated sample. Therefore, using professional judgement, no qualification of the data was required.

Blank spike sample (laboratory control sample)/surrogates

The laboratory control sample (LCS) recoveries for cis-1,4-dichloro-2-butene and trans-1,4-dichloro-2-butene exceeded QC limits. These compounds were non-detect in the sample. Therefore, using professional judgement, no qualification of the sample data was required.

The semi volatile surrogates 2-fluorophenol and phenol-d5 exceeded upper QC limits in the MS and MSD samples. The surrogates were within QC limits for sample SS65-DP01.

Therefore, using professional judgment qualification of the data was not required. All other surrogates met the %R QC requirements.

Matrix spike/matrix spike duplicates

In method SW8260, the matrix spike (MS) and/or matrix spike duplicate (MSD) recoveries for 2-chloroethyl vinyl ether, acrylonitrile and methyl bromide were outside control limits.

In method SW8270, the matrix spike (MS) and/or matrix spike duplicate (MSD) recoveries for 4-nitrophenol, benzidine, benzoic acid and phenol were outside control limits. The RPD for 3-nitroaniline and 4-chloroaniline exceeded control limits.

Method performances were cross referenced with the associated Laboratory Control Samples (LCS's), which met the QC requirements. Therefore, qualification of the sample data was not required.

The MS and/or MSD recoveries for calcium, potassium, sodium and magnesium were outside control limits. Matrix inference was the probable cause and, using professional judgement, these analytes were qualified estimated "J". The duplicate RPD for antimony, cobalt and thallium exceeded QC limits. The non detected compounds were qualified non detected estimated "UJ" and those with a result ≥MDL were qualified estimated "J".

Project specific quality assurance/quality control

The duplicate result for total dissolved solids (TDS) was within QC limits

Compound quantitation and reporting limits

Serial dilution for arsenic, barium, beryllium, chromium, copper, nickel, calcium and potassium yielded a RPD outside control limits. The percent difference was acceptable due to low initial sample concentrations except in the case of calcium, nickel and potassium. Since the sample concentration of these analytes were >50x MDL and their RPDs were >10, they were qualified as estimated (J).

Calcium, magnesium and sodium required a dilution to quantify the data and reported elevated reporting limits (RLs) and method detection limits (MDLs). Antimony, potassium and selenium reported elevated RL/MDL due to exceedances in batch QC criteria and/or matrix interference. All other compounds were reported down to the specific RL without dilutions.

Overall assessment of data

Overall, the data is suitable for the intended data usage. All analyses were performed, and the data met the required QC criteria except where noted. The data is 100% complete.

Summary of Qualified Data

Sample ID'S	Parameter	*Qualifier
SS65-DP01	Antimony	6.8 UJ
	Cobalt	11.9 J
	Thallium	3.5 J
	Calcium	782000 J
	Potassium	74900 J
	Sodium	897000 J
	Magnesium	519000 J
	Nickel	72.2 J

*Results are µg/l

Data Validation Report

This report contains the results of the review and validation of the specified data package performed by Marcia Olive, Bhate Environmental Associates, Denver, Colorado.

Introduction

This data validation report covers samples taken from Holloman Air Force Base, New Mexico, on August 22, 2007. Two soil samples and one trip blank were taken from the Confirmatory sampling event for analyses. All analyses were performed by Accutest Laboratories of Orlando, Florida. The specific samples included in this validation were:

Sample ID	Matrix	Collection Date	Lab SDG	Analyses
SS65-DP02-5	Soil	08/22/07	F51968	VOCs (SW8260), SVOCs (SW8270), TPH-GRO, DRO, ORO (SW8015M), TAL Metals (SW6010/7471), PCBs (SW8082)
SS65-DP03-5	Soil	8/22/07	F51968	VOCs (SW8260), SVOCs (SW8270), TPH-GRO, DRO, ORO (SW8015M), TAL Metals (SW6010/7471), PCBs (SW8082)

This data was validated against the laboratory's QA/QC limits using the guidelines and practices published in the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA, October 2004), and in the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (USEPA, October 1999).

Sample Handling and Holding times

All samples were properly preserved and transferred under chain-of-custody to the laboratory for analysis and analyzed within the required holding times.

Blanks

Naphthalene was detected in the method blank. This compound was not detected in the samples and no qualification was required.

Blank spike sample (laboratory control sample)/surrogates

The laboratory control sample (LCS) results for the TPH-DRO analysis yielded a recovery below QC limits. The non detected result in the two samples were qualified estimated non detected "UJ".

In the MS/MSD analysis, the PCB surrogate decachlorobiphenyl had recoveries above QC limits. Since all compounds were not detected in the samples, no qualification was required.

Matrix spike/matrix spike duplicates

The volatile MS and/or MSD percent recoveries (%Rs) for acetone, acetonitrile, acrylonitrile, benzyl chloride, ethyl methacrylate, methyl methacrylate, naphthalene, propionitrile, 1,2,3-trichlorobenzene and 1,2,4-trichlorobenzene were outside QC limits.

The semi-volatiles MS and/or MSD %Rs were outside QC limits for benzoic acid and benzidine.

The corresponding LCSs were cross referenced for precision and accuracy and were within limits. Therefore, no qualification was required.

The MS/MSD %Rs and/or relative percent difference (RPD) for aluminum, antimony, calcium, iron, magnesium, manganese, potassium, sodium and zinc were outside QC limits. Matrix inference and/or sample non homogeneity was the probable cause and, using professional judgement, these analytes were qualified estimated “J” or estimated non detected “UJ”. The RPD for barium exceeded QC limits. The results $\geq$ method detection limit (MDL) were qualified estimated “J”.

Project specific quality assurance/quality control

No field duplicate sample was submitted as part of this sampling event.

The RPDs for serial dilution of arsenic, beryllium, cadmium, calcium, chromium, cobalt, iron, lead, magnesium, manganese, nickel, potassium, selenium and vanadium were above QC limits. In both samples, only the serial dilution for calcium, iron, magnesium, manganese, potassium and vanadium indicated physical and chemical interferences in addition to chromium, cobalt and nickel in sample SS65-DP03-5. This may cause data bias and the analytes were qualified estimated “J”.

Compound quantitation and reporting limits

Beryllium and thallium required elevated reporting limits due to matrix interference/baseline drift. Calcium required a ten fold dilution in both samples. Manganese and potassium required a two fold dilution in sample SS65-DP03-5. Elevated reporting limits were reported.

Overall assessment of data

Overall, the data is suitable for the intended data usage. All analyses were performed, and the data met the required QC criteria except where noted. The data is 100% complete.

Summary of Qualified Data

Sample ID	Parameter	*Qualifier
SS65- DP02-5	TPH-DRO	UJ
	Barium	37.0 J
	Aluminum	3970 J
	Antimony	0.21 UJ
	Calcium	177000 J
	Iron	2520 J
	Magnesium	4460 J
	Manganese	52.2 J
	Potassium	1710 J
	Sodium	565 J
	Zinc	14.3 J
	Vanadium	7.6 J
SS65- DP03-5	TPH-DRO	UJ
	Barium	88.2 J
	Aluminum	16500 J
	Antimony	0.69 J
	Calcium	82100 J
	Iron	12500 J
	Magnesium	17700 J
	Manganese	431 J
	Potassium	6830 J
	Sodium	1950 J
	Zinc	53.6 J
	Vanadium	20.8 J
	Chromium	12.2 J
	Cobalt	5.6 J
	Nickel	11.4 J

*Results in mg/kg

Data Validation Report

This report contains the results of the review and validation of the specified data package performed by Marcia Olive, Bhate Environmental Associates, Denver, Colorado.

Introduction

This data validation report covers samples taken from Holloman Air Force Base, New Mexico, on January 16, 2008. Two soil samples and one trip blank were taken from site SS65 for analyses. All analyses were performed by Accutest Laboratories of Orlando, Florida. The specific samples included in this validation were:

Sample ID	Matrix	Collection Date	Lab SDG	Analyses
SS65-DP04-5	Soil	1/16/08	F55136	VOCs (SW8260B), SVOCs (SW8270C), TPH-GRO,ORO,DRO (SW8015M), TAL Metals SW(6010/7471), PCBs (SW8082)
SS65-DP05-5	Soil	1/16/08	F55136	VOCs (SW8260B), SVOCs (SW8270C), TPH-GRO,ORO,DRO (SW8015M), TAL Metals SW(6010/7471), PCBs (SW8082)

This data was validated against the laboratory's QA/QC limits using the guidelines and practices published in the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA, October 2004), and in the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (USEPA, October 1999).

Sample Handling and Holding times

All samples were properly preserved and transferred under chain-of-custody to the laboratory for analysis and analyzed within the required holding times.

Blanks

Acetonitrile and naphthalene were detected in the method blank associated with both samples. These compounds were not detected and no qualification was required.

Methylene chloride was detected in the trip blank. Although this is a common laboratory contaminant it was not detected in the subsequent samples. Therefore, no qualification was necessary.

Blank spike sample (laboratory control sample)/surrogates

All laboratory control sample (LCS) results met the QC requirements for the percent recoveries (%Rs) for all analysis with the following exceptions. Acetonitrile and cis-1,4-

dichloro-2-butene yielded recoveries above QC limits. Since these were not detected in either sample no qualification was required.

For the TPH-GRO analysis the matrix spike (MS)/matrix spike duplicate (MSD) surrogate 4-bromofluorobenzene exceeded QC limits. The exceedance was reported from the flame ionization detector (FID) whereas the surrogate recovery reported from the photo ionization detector (PID) was within QC limits. The PID is more selective at detecting volatiles. Therefore, using professional judgement, no qualification was required.

Matrix spike/matrix spike duplicates

In method SW8260, the MS and/or MSD recoveries for acetone, acrylonitrile, benzyl chloride, 1,2-dibromo-3-chloropropane, 1,2-dichloropropane, methyl ethyl ketone, ethyl methacrylate, 2-hexanone, 4-methyl-2-pentanone, methacrylonitrile, methylene chloride and propionitrile were outside control limits. The relative percent difference (RPD) for 1,2-dichloropropane was above QC limits. Matrix interference was the probable cause.

In method SW8270, the MS/MSD and/or RPD for benzoic acid, 2,4-dinitrophenol, 4,6-dinitro-o-cresol and benzidine were outside QC limits.

Method performances were cross referenced with the associated Laboratory Control Samples (LCS's), which met the QC requirements. Therefore, qualification of the sample data was not required.

The MS and/or MSD recoveries for antimony, aluminum, arsenic, barium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, vanadium, zinc and thallium were outside control limits. The recovery for antimony, arsenic, barium, cadmium, chromium, copper, cobalt, lead, nickel, selenium, thallium, vanadium and zinc indicated possible sample non homogeneity and were qualified estimated "J" where the sample concentration was > method detection limit (MDL). The other metals demonstrated a low spike amount relative to sample amount and were cross reference with their LCS recoveries, which were in control, and no qualification was required.

Project specific quality assurance/quality control

The duplicate RPD for arsenic and selenium were outside control limits. This may be due to nonhomogeneous samples. Therefore, those samples that were non-detects were qualified estimated non-detects "UJ" and those results that were ≥MDL were qualified as estimated "J".

Compound quantitation and reporting limits

Serial dilution for aluminum, antimony, arsenic, barium, beryllium, calcium, chromium, cobalt, iron, lead, manganese, nickel, selenium, vanadium and zinc yielded a RPD outside control limits. Those metals whose concentration was >50x MDL and yielded a RPDs >10 were qualified as estimated "J".

Calcium, manganese and potassium required a dilution to quantify the data and reported elevated reporting limits (RLs) and MDLs in sample SS65-DP04-5. Only calcium

required a dilution in sample SS65-DP05-5 and reported elevated limits. Thallium reported elevated RLs due to matrix interference in both samples.

Overall assessment of data

Overall, the data is suitable for the intended data usage. All analyses were performed, and the data met the required QC criteria except where noted. The data is 100% complete.

Summary of Qualified Data

Sample ID	Parameter	*Qualifier
SS65-DP04-5	Aluminum	23100 J
	Antimony	0.43 J
	Arsenic	4.6 J
	Barium	134 J
	Calcium	53300 J
	Chromium	18 J
	Cobalt	7 J
	Iron	16300 J
	Copper	21.6 J
	Lead	6.8 J
	Manganese	505 J
	Selenium	0.47 J
	Nickel	14.6 J
	Vanadium	28.2 J
	Zinc	59.5 J
SS65-DP05-5	Aluminum	8110 J
	Arsenic	2.4 J
	Barium	45.9 J
	Calcium	206000 J
	Chromium	6.1 J
	Cobalt	2.2 J
	Copper	7.1 J
	Iron	5540 J
	Lead	2.0 J
	Manganese	113 J
	Selenium	0.29 UJ
	Nickel	4.8 J
	Vanadium	11.5 J
	Zinc	19.0 J

*Results are in mg/kg

Data Validation Report

This report contains the results of the review and validation of the specified data package performed by Marcia Olive, Bhate Environmental Associates, Denver, Colorado.

Introduction

This data validation report covers samples taken from Holloman Air Force Base, New Mexico, on September 21, 2007. One aqueous sample and one trip blank were taken from the Confirmatory sampling event for analyses. All analyses were performed by TestAmerica in Nashville, TN. The specific sample included in this validation was:

Sample ID	Matrix	Collection Date	Lab SDG	Analyses
SS65-DP02	Water	09/21/07	NQI2690	VOCs (SW8260), SVOCs (SW8270), TPH-GRO, DRO, ORO (SW8015M), TAL Metals (6010/7470), PCBs (SW8082), TDS (160.1)

This data was validated against the laboratory's QA/QC limits using the guidelines and practices published in the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA, October 2004), and in the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (USEPA, October 1999).

Sample Handling and Holding times

All samples were properly preserved and transferred under chain-of-custody to the laboratory for analysis and analyzed within the required holding times.

Blanks

No compounds/elements of interest were detected in the trip blank. Barium, cadmium and sodium were detected in the method blank. These compounds were detected in the sample at a concentration >reporting limit (RL) and were qualified estimated "J".

Blank spike sample (laboratory control sample)/surrogates

All laboratory control sample (LCS) results met the QC requirements for the percent recoveries (%Rs) for all analysis.

All surrogates met the %R QC requirements.

Matrix spike/matrix spike duplicates

All MS/MSD %Rs and relative percent differences (RPDs) met QC requirements for all analyses.

Project specific quality assurance/quality control

No field duplicate sample was submitted as part of this sampling event.

Compound quantitation and reporting limits

Calcium, magnesium and sodium required a dilution and elevated reporting limits were reported.

Overall assessment of data

Overall, the data is suitable for the intended data usage. All analyses were performed, and the data met the required QC criteria except where noted. The data is 100% complete.

Summary of Qualified Data

Sample ID	Parameter	*Qualifier
SS65-DP02	Barium Cadmium Sodium	0.0249 J .00210 J 387 J

*Results in mg/l

SS-67
Data Validation Reports

Data Validation Report

This report contains the results of the review and validation of the specified data package performed by Marcia Olive, Bhate Environmental Associates, Denver, Colorado.

Introduction

This data validation report covers samples taken from Holloman Air Force Base, New Mexico, on April 13, 2007. Two soil samples and one trip blank were taken from site SS67 for analyses. All analyses were performed by Accutest Laboratories of Orlando, Florida. The specific samples included in this validation were:

Sample ID	Matrix	Collection Date	Lab SDG	Analyses
SS67-DP01-5	Soil	04/13/07	F48700	VOCs (SW8260B), SVOCs (SW8270C), TPH-GRO,ORO,DRO (SW8015M), TAL Metals SW(6010/7471)
SS67-DP02-5	Soil	4/13/07	F48700	VOCs (SW8260B), SVOCs (SW8270C), TPH-GRO,ORO,DRO (SW8015M), TAL Metals (SW6010/7471)

This data was validated against the laboratory's QA/QC limits using the guidelines and practices published in the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA, October 2004), and in the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (USEPA, October 1999).

Sample Handling and Holding times

All samples were properly preserved and transferred under chain-of-custody to the laboratory for analysis and analyzed within the required holding times.

Blanks

All method blanks were properly batched with the corresponding field samples, and no compounds/elements of interest were detected in the method blanks.

Methylene chloride was detected in the trip blank. Although this is a common laboratory contaminant it was not detected in the subsequent samples. Therefore, no qualification was necessary.

Blank spike sample (laboratory control sample)/surrogates

All laboratory control sample (LCS) results met the QC requirements for the percent recoveries (%Rs) for all analysis.

All surrogates met the %R QC requirements.

Matrix spike/matrix spike duplicates

In method SW8260, the matrix spike (MS) and/or matrix spike duplicate (MSD) recoveries for 2-chloroethyl vinyl ether, acetone, acetonitrile, acrylonitrile, methyl ethyl ketone, ethyl methacrylate, methyl bromide, benzyl chloride, hexachlorobutadiene, 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, vinyl acetate and propionitrile were outside control limits. Matrix interference was the probable cause.

Method performances were cross referenced with the associated Laboratory Control Samples (LCS's), which met the QC requirements. Therefore, qualification of the sample data was not required.

The MS and/or MSD recoveries for antimony, aluminum, copper, iron, manganese, sodium, zinc, potassium and calcium were outside control limits. Since antimony resulted in a recovery <30% the result ≥MDL was qualified estimated "J" and the non-detect result was qualified as non-detect estimated "UJ". Copper, iron, calcium, manganese, potassium, sodium and zinc resulted in recoveries >120%, the affected data was qualified estimated "J".

The MS and/or MSD relative percent difference (RPD) for antimony, arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, silver, zinc, mercury and nickel were outside control limits. This may be due to nonhomogeneous samples. Therefore, those samples that were non-detects were qualified estimated non-detects "UJ" and those results that were ≥MDL were qualified as estimated "J".

Project specific quality assurance/quality control

No field duplicate samples or other project specific samples were submitted as part of this sampling event.

Compound quantitation and reporting limits

Serial dilution for aluminum, antimony, beryllium, cadmium, potassium, silver and sodium yielded a RPD outside control limits. The percent difference was acceptable due to low initial sample concentrations except in the case of aluminum and potassium. Since the sample concentration of these analytes were >50x MDL and their RPDs were >10 they were qualified as estimated (J).

Calcium required a dilution to quantify the data and reported elevated reporting limits (RLs) and method detection limits (MDLs). Thallium reported elevated RLs due to negative bias of the method blank. All other compounds were reported down to the specific RL without dilutions.

Overall assessment of data

Overall, the data is suitable for the intended data usage. All analyses were performed, and the data met the required QC criteria except where noted. The data is 100% complete.

Summary of Qualified Data

Sample ID	Parameter	*Qualifier
SS67-DP01-5	Antimony	0.93 J
	Arsenic	4.1 J
	Cadmium	0.30 J
	Chromium	3.7 J
	Cobalt	2.3 J
	Copper	59.8 J
	Iron	3470 J
	Lead	13.4 J
	Manganese	56.5 J
	Silver	0.14 J
	Zinc	49.6 J
	Mercury	0.0092 UJ
	Nickel	3.0 J
	Aluminum	3080 J
	Potassium	1090 J
	Calcium	218000 J
	Sodium	481 J
SS67-DP02-5	Antimony	0.35 UJ
	Arsenic	0.54 J
	Cadmium	0.066 UJ
	Chromium	0.48 J
	Cobalt	0.57 J
	Copper	1.8 J
	Iron	462 J
	Lead	0.13 UJ
	Manganese	9.1 J
	Silver	0.060 UJ
	Zinc	1.7 J
	Mercury	0.016 J
	Nickel	0.99 J
	Aluminum	681 J
	Potassium	331 J
	Calcium	181000 J
	Sodium	472 J

*Results are in mg/kg

Data Validation Report

This report contains the results of the review and validation of the specified data package performed by Marcia Olive, Bhate Environmental Associates, Denver, Colorado.

Introduction

This data validation report covers samples taken from Holloman Air Force Base, New Mexico, on April 16, 2007. Three aqueous samples and three trip blanks were taken from site SS67 for analyses. All analyses were performed by Accutest Laboratories of Orlando, Florida. The specific samples included in this validation were:

Sample ID	Matrix	Collection Date	Lab SDG	Analyses
SS67-DP01	Water	04/16/07	F48769	VOCs (SW8260B), SVOCs (SW8270C), TPH-GRO,ORO,DRO (SW8015M), TAL Metals (SW6010/200.7/7470) and TDS (160.1)
SS67-DP02	Water	04/16/07	F48769	VOCs (SW8260B), SVOCs (SW8270C), TPH-GRO,ORO,DRO (SW8015M), TAL Metals (SW6010/200.7/7470) and TDS (160.1)
SS67-DP01FD	Water	4/16/07	F48769	VOCs (SW8260B), SVOCs (SW8270C), TPH-GRO,ORO,DRO (SW8015M), TAL Metals (SW6010/200.7/7470) and TDS (160.1)

This data was validated against the laboratory's QA/QC limits using the guidelines and practices published in the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA, October 2004), and in the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (USEPA, October 1999).

Sample Handling and Holding times

All samples were properly preserved and transferred under chain-of-custody to the laboratory for analysis and analyzed within the required holding times.

Blanks

All method blanks were properly batched with the corresponding field samples, and no compounds/elements of interest were detected.

Acetone and methylene chloride were detected in the trip blanks. These are common laboratory contaminants and were not detected in the samples. Therefore, using professional judgement, no qualification of the data was required.

Blank spike sample (laboratory control sample)/surrogates

The laboratory control sample (LCS) recoveries for cis-1,4-dichloro-2-butene and trans-1,4-dichloro-2-butene exceeded QC limits. These compounds were non-detect in the sample. Therefore, using professional judgement, no qualification of the sample data was required.

The semi volatile surrogates 2-fluorophenol and phenol-d5 exceeded upper QC limits in the MS and MSD samples. The surrogates were within QC limits for the samples. Therefore, using professional judgment qualification of the data was not required. All other surrogates met the %R QC requirements.

Matrix spike/matrix spike duplicates

In method SW8260, the matrix spike (MS) and/or matrix spike duplicate (MSD) recoveries for 2-chloroethyl vinyl ether, acrylonitrile and methyl bromide were outside control limits.

In method SW8270, the MS and/or MSD recoveries for 4-nitrophenol, benzidine, benzoic acid and phenol were outside control limits. The RPD for 3-nitroaniline and 4-chloroaniline were outside control limits for the samples.

Method performances were cross referenced with the associated Laboratory Control Samples (LCS's), which met the QC requirements. Therefore, qualification of the sample data was not required.

The MS and/or MSD recoveries for calcium, potassium, magnesium and sodium were outside control limits. Matrix inference was the probable cause and, using professional judgement, these analytes were qualified estimated "J". The relative percent difference (RPD) for antimony, cobalt and thallium exceeded QC limits. The non detected compounds were qualified non detected estimated "UJ" and those with a result $\geq$MDL were qualified estimated "J".

Project specific quality assurance/quality control

One field duplicate was dispatched with this sample group.

The duplicate result for total dissolved solids (TDS) was within QC limits.

Compound quantitation and reporting limits

Serial dilution for arsenic, barium, beryllium, calcium, chromium, copper, nickel and potassium exceeded RPD QC control limits. The percent difference was acceptable due to low initial sample concentrations except in the case of calcium and potassium. Since the sample concentration of these analytes were >50x MDL and their RPDs were >10 they were qualified as estimated "J".

Sodium required a dilution to quantify the data and reported elevated reporting limits (RLs) and method detection limits (MDLs). Potassium and antimony reported elevated RL/MDL due to exceedances in batch QC criteria. All other compounds were reported down to the specific RL without dilutions.

Overall assessment of data

Overall, the data is suitable for the intended data usage. All analyses were performed, and the data met the required QC criteria except where noted. The data is 100% complete.

Summary of Qualified Data

Sample ID'S	Parameter	*Qualifier
SS67-DP01	Calcium Magnesium Potassium Sodium Antimony Cobalt Thallium	484000 J 343000 J 78200 J 642000 J 6.8 UJ 0.81 J 2.9 UJ
SS67-DP02	Calcium Magnesium Potassium Sodium Antimony Cobalt Thallium	500000 J 396000 J 68000 J 733000 J 6.8 UJ 0.70 J 2.9 UJ

Summary of Qualified Data

Sample ID'S	Parameter	*Qualifier
SS67-DP01FD	Calcium	483000 J
	Magnesium	447000 J
	Potassium	77500 J
	Sodium	930000 J
	Antimony	6.8 UJ
	Cobalt	0.89 J
	Thallium	4.2 J

*Results are μg/l

Data Validation Report

This report contains the results of the review and validation of the specified data package performed by Marcia Olive, Bhate Environmental Associates, Denver, Colorado.

Introduction

This data validation report covers samples taken from Holloman Air Force Base, New Mexico, on August 20, 2007. Three soil samples and one trip blank were taken from the Confirmatory sampling event for analyses. All analyses were performed by Accutest Laboratories of Orlando, Florida. The specific sample included in this validation was:

Sample ID	Matrix	Collection Date	Lab SDG	Analyses
SS67-DP03-5	Soil	08/20/07	F51947	VOCs (SW8260), SVOCs (SW8270), TPH-GRO, DRO, ORO (SW8015M), TAL Metals (6010/7471)
SS67-DP03-5a	Soil	08/20/07	F51947	VOCs (SW8260), SVOCs (SW8270), TPH-GRO, DRO, ORO (SW8015M), TAL Metals (6010/7471)
SS67-DP04-5	Soil	08/20/07	F51947	VOCs (SW8260), SVOCs (SW8270), TPH-GRO, DRO, ORO (SW8015M), TAL Metals (6010/7471)

This data was validated against the laboratory's QA/QC limits using the guidelines and practices published in the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA, October 2004), and in the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (USEPA, October 1999).

Sample Handling and Holding times

All samples were properly preserved and transferred under chain-of-custody to the laboratory for analysis and analyzed within the required holding times.

Blanks

No compounds/elements of interest were detected in the trip blank or method blanks.

Blank spike sample (laboratory control sample)/surrogates

All laboratory control sample (LCS) results met the QC requirements for the percent recoveries (%Rs) for all analysis with the following exceptions. 2-Chloroethyl vinyl ether %R was above QC limits associated with all samples. This compound was not detected in the subsequent samples and no qualification was warranted. The %R for TPH-DRO was

below QC limits. The detected result was qualified estimated "J" and the non detected results were qualified estimated non detect "UJ" in the three samples.

All surrogates met the %R QC requirements.

Matrix spike/matrix spike duplicates

The volatile MS and/or MSD %Rs for acetone, benzyl chloride, ethyl methacrylate, 2-hexanone, 4-methyl-2-pentanone, methyl bromide, methyl ethyl ketone, propionitrile, trichlorofluoromethane and trans-1,4-dichloro-2-butene were outside QC limits.

The semi-volatiles MS and/or MSD %Rs were outside QC limits for 2,4-dinitrophenol, 4-nitrophenol, benzidine and 3-nitroaniline.

The corresponding LCSs were cross referenced for precision and accuracy and were within limits. Therefore, no qualification was required.

The MS and/or MSD %Rs for antimony, calcium, selenium, silver and magnesium were outside QC limits. Matrix inference and/or sample non homogeneity were the probable cause and, using professional judgement, these analytes were qualified estimated "J" or estimated non detected "UJ". The duplicate relative percent difference (RPD) for aluminum, arsenic, chromium, iron, lead, nickel, thallium, vanadium and zinc exceeded QC limits. The non detected compounds were qualified estimated non detected "UJ" and those with a result $\geq$MDL were qualified estimated "J".

Project specific quality assurance/quality control

One field duplicate sample was submitted as part of this sampling event.

The RPDs for serial dilution of arsenic, chromium, cobalt, copper, nickel, potassium, sodium, thallium, vanadium, zinc, calcium and iron were above QC limits. Only the serial dilution for calcium and iron indicated physical and chemical interferences. This may cause data bias and the analytes were qualified estimated "J" in the three samples.

Compound quantitation and reporting limits

With the exception of mercury, the metals analysis for all three samples required a ten fold dilution. Therefore, elevated RLs were reported.

Overall assessment of data

Overall, the data is suitable for the intended data usage. All analyses were performed, and the data met the required QC criteria except where noted. The data is 100% complete.

Summary of Qualified Data

Sample ID	Parameter	*Qualifier
SS67-DP03-5	TPH-DRO	UJ
	Calcium	201000 J
	Iron	1090 J
	Aluminum	1370 J
	Antimony	2.4 UJ
	Arsenic	4.8 J
	Chromium	1.1 J
	Lead	1.5 UJ
	Magnesium	2150 J
	Nickel	1.6 UJ
	Selenium	2.9 UJ
	Silver	0.89 UJ
	Thallium	5.3 J
	Vanadium	3.4 J
	Zinc	3.7 J
SS67-DP03-5a	TPH-DRO	15.5 J
	Calcium	183000 J
	Iron	1850 J
	Aluminum	1960 J
	Antimony	2.2 UJ
	Arsenic	2.3 UJ
	Chromium	4.1 J
	Lead	7.1 J
	Magnesium	4280 J
	Nickel	2.6 J
	Selenium	2.6 UJ
	Silver	0.81 UJ
	Thallium	3.2 UJ
	Vanadium	4.8 J
	Zinc	15.6 J
SS67-DP04-5	TPH-DRO	UJ
	Calcium	160000 J
	Iron	1980 J
	Aluminum	2390 J
	Antimony	2.4 UJ
	Arsenic	2.5 UJ
	Chromium	2.0 J
	Lead	1.7 J
	Magnesium	2100 J
	Nickel	2.3 J
	Selenium	2.8 UJ
	Silver	0.88 UJ
	Thallium	3.5 UJ
	Vanadium	7.2 J
	Zinc	6.4 J

*Results in mg/kg

Data Validation Report

This report contains the results of the review and validation of the specified data package performed by Marcia Olive, Bhate Environmental Associates, Denver, Colorado.

Introduction

This data validation report covers samples taken from Holloman Air Force Base, New Mexico, on August 20, 2007. One aqueous sample and one trip blank were taken from the Confirmatory sampling event for analyses. All analyses were performed by Accutest Laboratories of Orlando, Florida. The specific sample included in this validation was:

Sample ID	Matrix	Collection Date	Lab SDG	Analyses
SS67-DP04	Water	08/20/07	F51966	VOCs (SW8260), SVOCs (SW8270), TPH-GRO, DRO, ORO (SW8015M), TAL Metals (SW6010/7470), TDS (160.1)

This data was validated against the laboratory's QA/QC limits using the guidelines and practices published in the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA, October 2004), and in the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (USEPA, October 1999).

Sample Handling and Holding times

All samples were properly preserved and transferred under chain-of-custody to the laboratory for analysis and analyzed within the required holding times with the following exception. The non detected compounds in the trip blank were confirmed by reanalysis one day beyond hold time. Since all compounds were non detected, using professional judgement, no qualification of the sample data was required.

Also, the batch sample used for the volatile MS/MSD analysis was received in a bulk container and not preserved within 48 hours. Using professional judgement no qualification was necessary since this MS/MSD data was not used for validation purposes. Instead, an examination of the laboratory control sample was employed.

Blanks

Chloroform, p-dichlorobenzene, naphthalene and 1,2,3-trichlorobenzene were detected in the VOC method blank. These compounds were not detected in SS67-DP04 and no qualification was required. Methylene chloride was detected in the method blank associated with the trip blank. This is a common laboratory contaminant and not detected in the trip blank or sample. Therefore, no qualification was required.

Blank spike sample (laboratory control sample)/surrogates

All laboratory control sample (LCS) results met the QC requirements for the percent recoveries (%Rs) for all analysis.

In the MS/MSD analysis, the VOC surrogate 4-bromofluorobenzene had a %R above QC limits. This recovery was confirmed by reanalysis. The SVOC surrogates 2-fluorophenol and phenol-d5 had %Rs above QC limits as well. Since the samples used for these analyses were part of the batch and not the specific data package, the data is considered suspect and was not used as a parameter for validation purposes. Instead the LCS was used as an indicator of method precision and accuracy.

Matrix spike/matrix spike duplicates

The volatile MS and/or MSD %Rs for acrylonitrile and 2-chloroethyl vinyl ether were outside QC limits associated with sample SS67-DP04. The MS/MSD and/or relative percent difference (RPD) associated with the trip blank yielded acetone, acrolein, benzyl chloride, n-butylbenzene, tert-butylbenzene, 1,2-dibromo-3-chloropropane, cis-1,4-dichloro-2-butene, m-dichlorobenzene, o-dichlorobenzene, p-dichlorobenzene, hexachlorobutadiene, hexane, isopropylbenzene, p-isopropyltoluene, methacrylonitrile, methyl methacrylate, methyl ethyl keton, naphthalene, pentachloroethane, propionitrile, 1,1,2,2-tetreachloroethane, 1,1,2-trichloroethane, 1,2,3-trichlorobenzene, 1,2,3-trichloropropane, 1,2,4-trichlorobenzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, tetrachloroethylene, trans-1,4-dichloro-2-butene and vinyl acetate outside QC limits. Matrix interference was deemed present only in the samples used for these analyses and not in the sample associated with this data package.

The semi-volatiles MS and/or MSD %Rs were outside QC limits for 4-nitrophenol and phenol.

The corresponding LCSs were cross referenced for precision and accuracy and were within limits. Therefore, no qualification was required.

The duplicate RPD for beryllium and selenium exceeded QC limits. The non detected compounds were qualified estimated non detected “UJ”.

Project specific quality assurance/quality control

No field duplicate sample was submitted as part of this sampling event.

The RPDs for serial dilution for beryllium, potassium and sodium were above QC limits. Only the serial dilution for potassium and sodium indicated physical and chemical interferences. This may cause data bias and since these analytes were >50x the method detection limit (MDL) they were qualified estimated “J”.

Compound quantitation and reporting limits

With the exception of mercury, the metals analysis required a dilution. Therefore, elevated RLs were reported.

Overall assessment of data

Overall, the data is suitable for the intended data usage. All analyses were performed, and the data met the required QC criteria except where noted. The data is 100% complete.

Summary of Qualified Data

Sample ID	Parameter	*Qualifier
SS67-DP04	Potassium Sodium Beryllium Selenium	65600 J 989000 J 5.0 UJ 100 UJ

*Results in μg/l

Data Validation Report

This report contains the results of the review and validation of the specified data package performed by Marcia Olive, Bhate Environmental Associates, Denver, Colorado.

Introduction

This data validation report covers samples taken from Holloman Air Force Base, New Mexico, on December 26, 2007. One soil sample was taken from site SS67 for analysis. The analysis was performed by Accutest Laboratories of Orlando, Florida. The specific sample included in this validation was:

Sample ID	Matrix	Collection Date	Lab SDG	Analyses
SS67-SS01	Soil	12/26/07	F54812	TAL Metals (SW6010//7471)

This data was validated against the laboratory's QA/QC limits using the guidelines and practices published in the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA, October 2004).

Sample Handling and Holding times

The sample was properly preserved and transferred under chain-of-custody to the laboratory for analysis and analyzed within the required holding times.

Blanks

No metals were detected in the method blank analysis.

Blank spike sample (laboratory control sample)/surrogates

The laboratory control sample (LCS) recoveries for all metals met requisite QC requirements.

Matrix spike/matrix spike duplicates

The MS/MSD recoveries and/or relative percent difference (RPD) for antimony, arsenic, barium, calcium, chromium, cadmium, cobalt, copper, iron, lead, manganese, magnesium, potassium, mercury, zinc and silver were outside control limits. Control limits did not apply to calcium, chromium, copper, iron, lead, manganese and zinc due to the sample concentration exceeding the spike concentration by a factor of four or more. The remaining metals were qualified estimated, "J" or estimated non detected, "UJ".

Project specific quality assurance/quality control

No duplicate sample was included in this laboratory package.

Compound quantitation and reporting limits

Where a dilution was required elevated reporting limits were reported.

Overall assessment of data

The RPD for the lab duplicate of silver and mercury exceeded QC limits. Due to low duplicate and sample concentrations the RPDs were acceptable.

The serial dilution percent difference (%D) for mercury, beryllium, calcium, chromium, cobalt, iron, lead, magnesium, manganese, nickel, potassium, selenium, silver, vanadium and zinc was above QC limits. All analyte concentrations were >50x method detection limit (MDL), with the exception of beryllium, selenium, mercury and silver, and qualified estimated "J".

Overall, the data is suitable for the intended data usage. All analyses were performed, and the data met the required QC criteria except where noted. The data is 100% complete.

Summary of Qualified Data

Sample ID	Parameter	Qualifier
SS67-SS01	Antimony	46.6 J
	Arsenic	110 J
	Barium	86 J
	Cadmium	6.6 J
	Calcium	132000 J
	Chromium	99.1 J
	Cobalt	34.6 J
	Iron	45500 J
	Lead	703 J
	Magnesium	4120 J
	Manganese	326 J
	Nickel	8.2 J
	Potassium	1170 J
	Vanadium	10.6 J
	Zinc	1700 J
	Silver	2.8 J
	Mercury	0.013 UJ

*in mg/kg

Data Validation Report

This report contains the results of the review and validation of the specified data package performed by Marcia Olive, Bhate Environmental Associates, Denver, Colorado.

Introduction

This data validation report covers samples taken from Holloman Air Force Base, New Mexico, on June 26, 2012. Six soil samples and associated quality control samples were collected from site SS-67. All analyses were performed by Accutest Laboratories, Inc., Orlando, Florida. The specific samples included in this validation were:

Sample ID	Matrix	Collection Date	Analyses
SS67-SS02	Soil	6/26/12	TAL Metals (SW6010/7471)
SS67-SS02A			
SS67-SS03			
SS67-SS04			
SS67-SS05			
SS67-SS06			

This data was validated against the laboratory's QA/QC limits using the guidelines and practices published in the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review* (USEPA, January 2010).

Sample Handling and Holding times

The samples were properly preserved and transferred under chain-of-custody to the laboratory for analysis and analyzed within the required holding time.

Blanks

No target analytes were detected in the method blank analysis.

Blank spike sample (laboratory control sample-LCS)

The LCS recoveries for all metals were within quality control limits.

Matrix spike/matrix spike duplicates (MS/MSD)

Due to matrix interferences, the MS/MSD recoveries and/or relative percent difference (RPD) for multiple metals were outside control limits. Quality control limits were not applicable to those sample results greater than 4x the spike amount. The remaining metals (antimony, arsenic, barium, beryllium, cobalt, nickel, silver, thallium and vanadium) were qualified either estimated, "J" or estimated non-detected, "UJ" and applied only to the MS/MSD parent sample (SS67-SS06).

Project specific quality assurance/quality control

One field duplicate sample (SS67-SS02A) was submitted as part of this sampling event. Due to sample nonhomogeneity, the RPD for antimony, arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel, vanadium and zinc was outside project defined control limits. These compounds were qualified estimated, "J", in both the parent and duplicate sample.

The RPD between the sample and laboratory duplicate was outside control limits for arsenic, chromium, cobalt and selenium. Due to low duplicate and sample concentrations the RPD for selenium was acceptable. The remaining analytes were qualified estimated (J) in all associated samples.

The serial dilution percent difference (%D) for beryllium, cadmium, calcium, chromium, lead, selenium, silver and zinc was outside control limits. Those compounds with results >50x the MDL were qualified estimated, “J”.

Compound quantitation and reporting limits

Where a dilution was required elevated reporting limits were reported.

Overall assessment of data

The post digestate spikes (PDS) are used to assess the ability of the method to successfully recover metals from the actual sample matrix after the digestion process. Multiple analytes exceeded PDS recovery limits. Since the native concentrations of the target analytes in the sample (digestate) were high relative to the spiking concentrations of those analytes, the PDS recoveries may not be representative of actual method performance. Matrix spike results were used in conjunction with PDS data to evaluate matrix interferences and the data was qualified accordingly.

All analyses were performed, and the data met the required QC criteria except where noted. The data is 100% complete.

Summary of Qualified Data

Sample ID	Parameter	Qualifier*
SS67-SS02	Antimony	7.4 J
	Arsenic	19.8 J
	Cadmium	1.7 J
	Calcium	141000 J
	Chromium	68.8 J
	Cobalt	7.3 J
	Copper	246 J
	Iron	12000 J
	Lead	124 J
	Manganese	156 J
	Nickel	4.4 J
	Vanadium	11.1 J
	Zinc	209 J
SS67-SS02A	Antimony	18.2 J
	Arsenic	46.5 J
	Cadmium	3.5 J
	Calcium	102000 J
	Chromium	166 J
	Cobalt	18.3 J
	Copper	701 J
	Iron	28000 J
	Lead	326 J
	Manganese	323 J
	Nickel	8.1 J
	Vanadium	18.5 J
	Zinc	577 J
SS67-SS03	Arsenic	6.3 J
	Calcium	158000 J
	Chromium	20.6 J
	Cobalt	3.3 J
	Lead	33.8 J
SS67-SS04	Arsenic	2.3 J
	Calcium	221000 J
	Chromium	8.9 J
	Cobalt	1.3 J

Summary of Qualified Data

Sample ID	Parameter	Qualifier*
SS67-SS05	Arsenic	28.4 J
	Calcium	157000 J
	Chromium	42.2 J
	Cobalt	8.4 J
	Lead	162 J
	Zinc	342 J
SS67-SS06	Antimony	41.9 J
	Arsenic	92.7 J
	Barium	71.4 J
	Calcium	125000 J
	Chromium	57.6 J
	Cobalt	27.2 J
	Nickel	7.9 J
	Silver	1.1 J
	Vanadium	9.0 J
	Beryllium	0.20 UJ
	Thallium	1.0 UJ
	Lead	328 J
	Zinc	1050 J

*in mg/kg

Data Validation Report

This report contains the results of the review and validation of the specified data package performed by Marcia Olive, Bhate Environmental Associates, Denver, Colorado.

Introduction

This data validation report covers samples taken from Holloman Air Force Base, New Mexico, on September 20, 2007. One aqueous sample and one trip blank were taken from the Confirmatory sampling event for analyses. All analyses were performed by TestAmerica in Nashville, TN. The specific sample included in this validation was:

Sample ID	Matrix	Collection Date	Lab SDG	Analyses
SS67-DP03	Water	09/20/07	NQI2692 NQI3016	VOCs (SW8260), SVOCs (SW8270), TPH-GRO, DRO, ORO (SW8015M), TAL Metals (6010/7470), TDS (160.1)

This data was validated against the laboratory's QA/QC limits using the guidelines and practices published in the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA, October 2004), and in the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (USEPA, October 1999).

Sample Handling and Holding times

All samples were properly preserved and transferred under chain-of-custody to the laboratory for analysis and analyzed within the required holding times.

Blanks

No compounds/elements of interest were detected in the trip blank. Barium, cadmium and sodium were detected in the method blank. Barium and sodium were detected in the sample at a concentration >reporting limit (RL) and were qualified estimated "J".

Blank spike sample (laboratory control sample)/surrogates

All laboratory control sample (LCS) results met the QC requirements for the percent recoveries (%Rs) for all analysis.

All surrogates met the %R QC requirements.

Matrix spike/matrix spike duplicates

All MS/MSD %Rs and relative percent differences (RPDs) met QC requirements for all analyses.

Project specific quality assurance/quality control

No field duplicate sample was submitted as part of this sampling event.

Compound quantitation and reporting limits

The metals analysis, with the exception of mercury, required a dilution and elevated reporting limits were reported.

Overall assessment of data

Overall, the data is suitable for the intended data usage. All analyses were performed, and the data met the required QC criteria except where noted. The data is 100% complete.

Summary of Qualified Data

Sample ID	Parameter	*Qualifier
SS67-DP03	Barium Sodium	.127 J 1220 J

*Results in mg/l

SS-69
Data Validation Reports

Data Validation Report

This report contains the results of the review and validation of the specified data package performed by Marcia Olive, Bhate Environmental Associates, Denver, Colorado.

Introduction

This data validation report covers samples taken from Holloman Air Force Base, New Mexico, on April 17, 2007. Three soil samples and one trip blank were taken from site SS69 for analyses. All analyses were performed by Accutest Laboratories of Orlando, Florida. The specific samples included in this validation were:

Sample ID	Matrix	Collection Date	Lab SDG	Analyses
SS69-DP01-5	Soil	04/17/07	F48777	VOCs (SW8260B), SVOCs (SW8270C), TPH-GRO,ORO,DRO (SW8015M), TAL Metals (SW6010/200.7/7471)
SS69-DP02-5	Soil	4/17/07	F48777	VOCs (SW8260B), SVOCs (SW8270C), TPH-GRO,ORO,DRO (SW8015M), TAL Metals (SW6010/200.7/7471)
SS69-DP03-5	Soil	4/17/07	F48777	VOCs (SW8260B), SVOCs (SW8270C), TPH-GRO,ORO,DRO (SW8015M), TAL Metals (SW6010/200.7/7471)

This data was validated against the laboratory's QA/QC limits using the guidelines and practices published in the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA, October 2004), and in the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (USEPA, October 1999).

Sample Handling and Holding times

All samples were properly preserved and transferred under chain-of-custody to the laboratory for analysis and analyzed within the required holding times.

Blanks

All method blanks were properly batched with the corresponding field samples, and no compounds/elements of interest were detected in the method blanks except for naphthalene. This compound was non detect in the samples and using professional judgement, no qualification of the sample data was required.

Methylene chloride was detected in the trip blank and in the associated samples. This is a common laboratory contaminant and samples SS69-DP02-5 and SS69-DP03-5 had a concentration <10x the amount in the trip blank. Therefore, this sample compound was qualified estimated "J".

Blank spike sample (laboratory control sample)/surrogates

The laboratory control sample (LCS) recoveries for cis-1,4-dichloro-2-butene and trans-1,4-dichloro-2-butene, associated with the trip blank, exceeded QC limits. The LCS recoveries for 2-hexanone and ethyl methacrylate, associated with the three soil samples, exceeded QC limits. These compounds were non-detect in the sample. Therefore, using professional judgement, no qualification of the sample data was required.

All surrogates met the %R QC requirements for all organic analyses and samples.

Matrix spike/matrix spike duplicates

In method SW8260, the matrix spike (MS) and/or matrix spike duplicate (MSD) recoveries for 2-chloroethyl vinyl ether, cis-1,4-dichloro-2-butene, 2-hexanone, 4-methyl-2-pentanone, methyl bromide, trans-1,4-dichloro-2-butene, acetone, acetonitrile, methacrylonitrile, methyl ethyl ketone, methyl methacrylate, o-chlorotoluene, benzyl chloride, and propionitrile were outside control limits possibly due to matrix interference.

Method performances were cross referenced with the associated Laboratory Control Samples (LCS's), which met QC requirements and/or the compounds were non detect in the samples. Therefore, qualification of the sample data was not required.

The MS and/or MSD recoveries for calcium, potassium, antimony, aluminum, thallium, iron, manganese and magnesium were outside control limits. Sample non homogeneity was the probable cause and, using professional judgement, these analytes were qualified estimated "J" or non detect estimated "UJ". The duplicate RPD for antimony, calcium and selenium exceeded QC limits. The non detected compounds were qualified non detected estimated "UJ" and those with a result ≥MDL were qualified estimated "J".

Project specific quality assurance/quality control

No field duplicate samples were collected and reported with this SDG.

Compound quantitation and reporting limits

Serial dilution for aluminum, antimony, barium, beryllium, cadmium, calcium, chromium, cobalt, iron, manganese, nickel, selenium, sodium, vanadium, zinc and potassium yielded a RPD outside control limits. The percent difference was acceptable due to low initial sample concentrations except in the case of aluminum, barium, calcium,

cobalt, iron, manganese, nickel, vanadium, zinc and potassium. Since the concentration of these analytes were >50x MDL and their RPDs were >10 they were qualified as estimated "J" in the specific samples.

Calcium required a dilution to quantify the data and reported elevated reporting limits (RLs) and method detection limits (MDLs). Thallium and potassium reported elevated RL/MDL due to bias and/or exceedances in batch QC criteria. All other compounds were reported down to the specific RL without dilutions.

Overall assessment of data

Overall, the data is suitable for the intended data usage. All analyses were performed, and the data met the required QC criteria except where noted. The data is 100% complete.

Summary of Qualified Data

Sample ID'S	Parameter	*Qualifier
SS69-DP01-5	Antimony	0.29 UJ
	Calcium	102000 J
	Selenium	0.11 UJ
	Aluminum	3570 J
	Iron	2660 J
	Magnesium	3770 J
	Manganese	58.5 J
	Potassium	876 J
	Thallium	0.52 UJ
	Barium	30.8 J
	Nickel	2.8 J
	Vanadium	6.8 J
	Zinc	10.5 J

Summary of Qualified Data

Sample ID'S	Parameter	*Qualifier
SS69-DP02-5	Methylene chloride	12.2 J
	Antimony	0.32 UJ
	Calcium	86700 J
	Selenium	0.12 UJ
	Aluminum	2740 J
	Iron	1820 J
	Magnesium	4530 J
	Manganese	39.7 J
	Potassium	662 J
	Thallium	0.56 UJ
	Barium	23.5 J
	Vanadium	8.0 J
	Zinc	6.3 J
SS69-DP03-5	Methylene chloride	8.2 J
	Antimony	0.30 UJ
	Calcium	123000 J
	Selenium	0.11 UJ
	Aluminum	1340 J
	Iron	1780 J
	Magnesium	3750 J
	Manganese	38.5 J
	Potassium	271 J
	Thallium	0.52 UJ
	Barium	20.3 J
	Cobalt	7.8 J
	Vanadium	3.6 J
	Zinc	5.5 J

*Results are mg/kg

Data Validation Report

This report contains the results of the review and validation of the specified data package performed by Marcia Olive, Bhate Environmental Associates, Denver, Colorado.

Introduction

This data validation report covers samples taken from Holloman Air Force Base, New Mexico, on April 17, 2007. Two aqueous samples and two trip blanks were taken from site SS69 for analyses. All analyses were performed by Accutest Laboratories of Orlando, Florida. The specific samples included in this validation were:

Sample ID	Matrix	Collection Date	Lab SDG	Analyses
SS69-DP01	Water	04/17/07	F48811	VOCs (SW8260B), SVOCs (SW8270C), TPH-GRO,ORO,DRO (SW8015M), TAL Metals (SW6010/200.7/7470) and TDS (160.1)
SS69-DP03	Water	04/17/07	F48811	VOCs (SW8260B), SVOCs (SW8270C), TPH-GRO,ORO,DRO (SW8015M), TAL Metals (SW6010/200.7/7470) and TDS (160.1)

This data was validated against the laboratory's QA/QC limits using the guidelines and practices published in the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA, October 2004), and in the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (USEPA, October 1999).

Sample Handling and Holding times

All samples were properly preserved and transferred under chain-of-custody to the laboratory for analysis and analyzed within the required holding times.

Blanks

All method blanks were properly batched with the corresponding field samples, and no compounds/elements of interest were detected in the method blanks except for methylene chloride.

Methylene chloride was also detected in the trip blanks. This is a common laboratory contaminant and was not detected in the samples. Therefore, using professional judgement, no qualification of the data was required.

Blank spike sample (laboratory control sample)/surrogates

The laboratory control sample (LCS) recoveries for bromoform, cis-1,4-dichloro-2-butene and trans-1,4-dichloro-2-butene exceeded QC limits. These compounds were non-detect in the sample. Therefore, using professional judgement, no qualification of the sample data was required.

All surrogates recoveries met QC limits.

Matrix spike/matrix spike duplicates

In method SW8260, the matrix spike (MS) and/or matrix spike duplicate (MSD) recoveries for 2-chloroethyl vinyl ether, 2-hexanone, 4-methyl-2-pentanone, acetone, methyl methacrylate, cis-1,4-dichloro-2-butene and trans-1,4-dichloro-2-butene, cis-1,2-dichloroethylene and methyl bromide were outside control limits. The relative percent difference (RPD) for 2-chloroethyl vinyl ether was outside associated limits.

In method SW8270, the MS and/or MSD recoveries for 4-nitrophenol, benzidine, benzoic acid and phenol were outside control limits. The relative percent difference (RPD) for 3-nitroaniline and 4-chloroaniline were outside control limits for the sample.

Method performances were cross referenced with the associated Laboratory Control Samples (LCS's), which met the QC requirements and/or the analytes were non-detect in the sample. Therefore, qualification of the sample data was not required.

The MS and/or MSD recoveries for calcium, potassium, magnesium and sodium were outside control limits. Matrix inference was the probable cause and, using professional judgement, these analytes were qualified estimated "J". The RPD for antimony, cobalt and thallium exceeded QC limits. The non detected compounds were qualified non detected estimated "UJ" and those with a result ≥MDL were qualified estimated "J".

Project specific quality assurance/quality control

The duplicate result for total dissolved solids (TDS) was within QC limits.

Compound quantitation and reporting limits

Serial dilution for arsenic, barium, beryllium, calcium, chromium, copper, nickel and potassium exceeded RPD QC control limits. The percent difference was acceptable due to low initial sample concentrations except in the case of barium, calcium and potassium. Since the sample concentration of these analytes were >50x MDL and their RPDs were >10 they were qualified as estimated "J".

Calcium and sodium required a dilution to quantify the data and reported elevated reporting limits (RLs) and method detection limits (MDLs). Potassium and antimony reported elevated RL/MDL due to exceedances in batch QC criteria. All other compounds were reported down to the specific RL without dilutions.

Overall assessment of data

Overall, the data is suitable for the intended data usage. All analyses were performed, and the data met the required QC criteria except where noted. The data is 100% complete.

Summary of Qualified Data

Sample ID'S	Parameter	*Qualifier
SS69-DP01	Calcium	619000 J
	Magnesium	97800 J
	Potassium	23100 J
	Sodium	85000 J
	Antimony	6.8 UJ
	Cobalt	1.5 J
	Thallium	2.9 UJ
	Barium	22.5 J
SS69-DP03	Calcium	634000 J
	Magnesium	160000 J
	Potassium	23000 J
	Sodium	120000 J
	Antimony	6.8 UJ
	Cobalt	0.85 J
	Thallium	2.9 UJ
	Barium	20.5 J

*Results are μg/l

Data Validation Report

This report contains the results of the review and validation of the specified data package performed by Marcia Olive, Bhate Environmental Associates, Denver, Colorado.

Introduction

This data validation report covers samples taken from Holloman Air Force Base, New Mexico, on April 18, 2007. One aqueous sample and one trip blank were taken from site SS69 for analyses. All analyses were performed by Accutest Laboratories of Orlando, Florida. The specific sample included in this validation was:

Sample ID	Matrix	Collection Date	Lab SDG	Analyses
SS69-DP02	Water	04/18/07	F48894	VOCs (SW8260B), SVOCs (SW8270C), TPH-GRO,ORO,DRO (SW8015M), TAL Metals SW(6010/7470), TDS (160.1)

This data was validated against the laboratory's QA/QC limits using the guidelines and practices published in the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA, October 2004), and in the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (USEPA, October 1999).

Sample Handling and Holding times

All samples were properly preserved and transferred under chain-of-custody to the laboratory for analysis and analyzed within the required holding times.

Blanks

Methylene chloride was detected in the trip blank. Acetone and methylene chloride were detected in the method blank associated with the trip blank. These are common laboratory contaminants but since the detection of acetone was only associated with the trip blank and not the sample, no qualification of the sample data was required. Also, methylene chloride was non detect in the sample and did not required qualification.

Blank spike sample (laboratory control sample)/surrogates

All laboratory control sample (LCS) results met the QC requirements for the percent recoveries (%Rs) for all analysis.

The MS/MSD recovery for the semi volatile surrogate, phenol-d5, exceeded QC limits due to matrix interference. This surrogate recovery was within QC limits for all other QC samples as well as the sample SS69-DP02. Therefore, using professional judgment no qualification was required.

Matrix spike/matrix spike duplicates

In method SW8260, the matrix spike (MS), matrix spike duplicate (MSD) recoveries and/or relative percent difference (RPD) for acetone, allyl chloride, benzene, bromobenzene, bromochloromethane, bromodichloromethane, bromoform, n-butylbenzene, sec-butylbenzene, tert-butylbenzene, chlorobenzene, chloroethane, chloroform, 1-chlorohexane, o-chlorotoluene, p-chlorotoluene, 2-chloroethyl vinyl ether, carbon disulfide, carbon tetrachloride, 1,1-dichloroethane, 1,1-dichloroethylene, 1,1-dichloropropene, 1,2-dibromo-3-chloropropane, 1,2-dibromoethane, 1,2-dichloroethane, 1,2-dichloropropane, 1,3-dichloropropane, 2,2-dichloropropane, dibromochloromethane, dichlorodifluoromethane, cis-1,2-dichloroethylene, cis-1,3-dichlropropene, cis-1,4-dichloro-2-butene, m-dichlorobenzene, o-dichlorobenzene, p-dichlorobenzene, trans-1,2-dichloroethylene, trans-1,3-dichloropropene, ethylbenzene, ethyl methacrylate, Freon 113, hexachlorobutadiene, hexane, isopropylbenzene, p-isopropyltoluene, methyl bromide, methyl iodide, methylene bromide, methylene chloride, methyl tert butyl ether, naphthalene, pentachloroethane, n-propylbenzene, styrene, 1,1,1,2-tetrachloroethane, 1,1,1-trichloroethane, 1,1,2-trichloroethane, 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, tetrachloroethylene, toluene, trichloroethylene, trichlorofluoromethane, trans-1,4-dichloro-2-butene, m,p-xylene and o-xylene were outside control limits. This MS/MSD summary applied to the trip blank and was due to matrix interference. The MS/MSD recovery for 2-chloroethyl vinyl ether was the only compound outside control limits for the sample.

In method SW8270, the MS and/or MSD recoveries for 3,3'-dichlorobenzidine and benzidine were outside QC limits.

Method performances were cross referenced with the associated Laboratory Control Samples (LCS's), which met the QC requirements. Therefore, qualification of the sample data was not required.

The MS and/or MSD recoveries for calcium, magnesium potassium and sodium were outside control limits. Calcium, sodium and magnesium resulted in recoveries >130%, the affected data was qualified estimated "J". Potassium resulted in a recovery less than the associated QC limits and was qualified estimated "J".

The relative percent difference (RPD) for antimony, cobalt and thallium were outside control limits. Therefore, those samples that were non-detects were qualified estimated non-detects "UJ" and those results that were ≥MDL were qualified as estimated "J".

Project specific quality assurance/quality control

The TDS concentration was confirmed by reanalysis. The duplicate result for TDS was within QC limits.

Compound quantitation and reporting limits

Serial dilution for arsenic, barium, beryllium, calcium, chromium, copper, nickel and potassium yielded a RPD outside control limits. The percent difference was acceptable due to low initial sample concentrations except in the case of barium and calcium. Since

the sample concentration of these analytes were >50x MDL and their RPDs were >10 they were qualified as estimated "J".

Calcium and sodium required a dilution to quantify the data and reported elevated reporting limits (RLs) and method detection limits (MDLs). Antimony and potassium reported elevated RLs due to exceedances in batch QC criteria. All other compounds were reported down to the specific RL without dilutions.

Overall assessment of data

Overall, the data is suitable for the intended data usage. All analyses were performed, and the data met the required QC criteria except where noted. The data is 100% complete.

Summary of Qualified Data

Sample ID	Parameter	*Qualifier
SS69-DP02	Calcium	623000 J
	Magnesium	89000 J
	Potassium	9250 J
	Sodium	78800 J
	Antimony	6.8 UJ
	Cobalt	1.2 J
	Thallium	2.9 UJ
	Barium	31.4 J

*Results are in µg/l

APPENDIX F

SS-67 SANDBLAST RESIDUE/SOIL - WASTE CHARACTERIZATION AND WASTE MANIFESTS

Table 1
Waste Characterization Surface Soil Analysis (February 2013)
Site SS-67, Building 903-909 Sandblast Residue
Holloman Air Force Base, New Mexico

Client Sample Identification:	**Soil Screening Levels**	**SS67-WC01**	
Lab Sample Identification:	**NMED**	**FA1511-1**	
Date Sampled:	**Residential[1]**	**2/6/2013**	
Analyte		**Result [3]**	**Q**
Volatile Organic Compounds	**mg/kg**	**µg/kg**	
All VOCs	NV	ND	
Semi-Volatile Organic Compounds	**mg/kg**	**µg/kg**	
bis(2-Ethylhexyl)phthalate	347	1,330	
Total Petroleum Hydrocarbons	**mg/kg**	**mg/kg**	
Gasoline Range Organics (C6-C10)	1,000 [4]	2.4	U
Diesel Range Organics (C10-C22)	1,000 [4]	3.6	U
Oil Range Organics (>C22-C36)	1,000 [4]	13.4	
RCRA Metals TCLP Analysis	**mg/L**	**mg/L**	
Arsenic	5.0 [2]	0.093	J
Barium	100.0 [2]	0.092	J
Cadmium	1.0 [2]	0.079	
Chromium	5.0 [2]	0.042	J
Lead	5.0 [2]	0.56	
Mercury	0.2 [2]	0.0005	U
Selenium	1.0 [2]	0.02	U
Silver	5.0 [2]	0.005	U
General Chemistry	**%**	**%**	
Solids, Percent	NV	92.3	

Notes:

[1] Table A-1, NMED Soil Screening Levels. *Risk Assessment Guidance for Site Investigations and Remediation* (NMED, June 2012).

[2] Table 1, Maximum Concentration of Contaminants for the Toxicity Characteristic (40 CFR 261.24)

[3] If results are not detected (U) then the value is set at the Method Detection Limit (MDL)

[4] Table 6-3, TPH Screening Guidelines for Kerosene and Jet Fuel, Residential Direct Exposure. Risk Assessment Guidance for Site Investigations and Remediation (NMED, June 2012).

NMED = New Mexico Environment Department

RCRA = Resource Conservation and Recovery Act
TCLP = Toxicity Characteristic Leaching Procedure
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
ND = Not Detected
NV = No Value
Q = Qualifier
U = Not detected
J = Indicates an estimated value
% = percent

WASTE MANAGEMENT

EZ Profile™

Requested Facility: Rio Rancho Landfill ❑ Unsure Profile Number: 102731NM

❑ Check if there are multiple generator locations. Attach locations. ❑ Renewal? Original Profile Number: _____

A. GENERATOR INFORMATION (MATERIAL ORIGIN)

1. Generator Name: Holloman Air Force Base
2. Site Address: 550 Tabosa Avenue
   (City, State, ZIP) Holloman AFB NM 88330
3. County: Otero
4. Contact Name: John Hamann
5. Email: John.Hamann@holloman.af.mil
6. Phone: (575) 572-6644 7. Fax: _____
8. Generator EPA ID: _____ ☑ N/A
9. State ID: _____ ☑ N/A

B. BILLING INFORMATION ❑ SAME AS GENERATOR

1. Billing Name: John Hymer
2. Billing Address: 1509 A 10th Street
   (City, State, ZIP) Alamogordo NM 88310
3. Contact Name: John Hymer
4. Email: John.Hymer@nationview.net
5. Phone: (575) 491-9171 6. Fax: _____
7. WM Hauled? ❑ Yes ❑ No
8. P.O. Number: _____

C. MATERIAL INFORMATION

1. Common Name: soil/sandblast residue

   Describe Process Generating Material: ❑ See Attached

   Metal surface preparation and painting operations took place at Bldg 905, as part of a corrosion control operation that served HAFB, NM. Sandblasting of metal parts (Al and steel) took place in Bldg 905 and was performed as a surface

2. Material Composition and Contaminants: ❑ See Attached

1. soil	98 %
2. black grit	2 %
3.	
4.	
	≥100%

3. State Waste Codes: _____ ☑ N/A
4. Color: brown with minor amounts of blk grit
5. Physical State at 70°F: ☑ Solid ❑ Liquid ❑ Other: _____
6. Free Liquid Range Percentage: _____ to _____ ☑ N/A (Solid)
7. pH: _____ to _____ ☑ N/A (Solid)
8. Strong Odor: ❑ Yes ☑ No Describe: _____
9. Flash Point: ❑ <140°F ❑ 140°–199°F ❑ ≥200° ☑ N/A (Solid)

D. REGULATORY INFORMATION

1. EPA Hazardous Waste? ❑ Yes* ☑ No
   Code: _____
2. State Hazardous Waste? ❑ Yes ☑ No
   Code: _____
3. Excluded waste under 40 CFR 261.4 (a) or (b)? ❑ Yes* ☑ No
4. Contains Underlying Hazardous Constituents? ❑ Yes* ☑ No
5. Contains benzene **and** subject to Benzene NESHAP? ❑ Yes* ☑ No
6. Facility remediation subject to 40 CFR 63 GGGGG? ❑ Yes* ☑ No
7. CERCLA or State-mandated clean-up? ❑ Yes* ☑ No
8. NRC or State-regulated radioactive or NORM waste? ❑ Yes* ☑ No

***If Yes, see Addendum (page 2) for additional questions and space.**

9. Contains PCBs? → If Yes, answer a, b and c. ❑ Yes ☑ No
   a. Regulated by 40 CFR 761? ❑ Yes ❑ No
   b. Remediation under 40 CFR 761.61 (a)? ❑ Yes ❑ No
   c. Were PCB imported into the US? ❑ Yes ❑ No
10. Regulated and/or Untreated Medical/Infectious Waste? ❑ Yes ☑ No
11. Contains Asbestos? ❑ Yes: Friable ❑ Yes: Non-Friable ☑ No

E. ANALYTICAL AND OTHER REPRESENTATIVE INFORMATION

1. Analytical attached ☑ Yes

   Please identify applicable samples and/or lab reports:

   Waste Characterization Sample: SS67-WC01 Accutest Lab Job Number: FA1511

2. Other information attached (such as MSDS)? ❑ Yes

F. SHIPPING AND DOT INFORMATION

1. ☑ One-Time Event ❑ Repeat Event/Ongoing Business
2. Estimated Quantity/Unit of Measure: 40
   ❑ Tons ☑ Yards ❑ Drums ❑ Gallons ❑ Other: _____
3. Container Type and Size: _____
4. USDOT Proper Shipping Name: ☑ N/A

G. GENERATOR CERTIFICATION (PLEASE READ AND CERTIFY BY SIGNATURE)

By signing this EZ Profile™ form, I hereby certify that all information submitted in this and all attached documents contain true and accurate descriptions of this material, and that all relevant information necessary for proper material characterization and to identify known and suspected hazards has been provided. Any analytical data attached was derived from a sample that is representative as defined in 40 CFR 261 - Appendix 1 or by using an equivalent method. All changes occurring in the character of the material (i.e., changes in the process or new analytical) will be identified by the Generator and be disclosed to Waste Management prior to providing the material to Waste Management.

If I am an agent signing on behalf of the Generator, I have confirmed with the Generator that information contained in this Profile is accurate and complete.

Name (Print): John Hamann Date: 02/27/2013

Title: Hazardous Waste Program Manager

Company: Holloman AFB, NM

Certification Signature

John H

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EZ Profile™ Addendum

WASTE MANAGEMENT

Only complete this Addendum if prompted by responses on EZ Profile™ (page 1) or to provide additional information. Sections and question numbers correspond to EZ Profile™.

Profile Number: 102731NM

C. MATERIAL INFORMATION

Describe Process Generating Material (Continued from page 1): If more space is needed, please attach additional pages.

preparation step prior to painting. Sandblasting residue was historically (1970s) staged outside of Bldg 905. During a site walk conducted in 2006 minor amounts of a black grit were observed on the surface along the south side of Bldg 905.

Material Composition and Contaminants (Continued from page 1): If more space is needed, please attach additional pages.

5.	
6.	
7.	
8.	
9.	
10.	
	≥100%

D. REGULATORY INFORMATION

Only questions with a "Yes" response in Section D on the EZ Profile™ form (page 1) need to be answered here.

1. EPA Hazardous Waste
   a. Please list all USEPA listed and characteristic waste code numbers:
   b. Is the material subject to the Alternative Debris standards (40 CFR 268.45)? ❑ Yes ❑ No
   c. Is the material subject to the Alternative Soil standards (40 CFR 268.49)? → If Yes, complete question 4. ❑ Yes ❑ No
   d. Is the material exempt from Subpart CC Controls (40 CFR 264.1083 and 265.1084)? ❑ Yes ❑ No
      → If Yes, please select one of the following:
      ❑ Waste has been determined to be LDR exempt [265.1083(c)(4) and 265.1084(c)(4)] based on the fact that it meets all applicable organic treatment standards (including UHCs for D-coded characteristic wastes) or a Specified Technology has been utilized.
      ❑ Waste does not qualify for a LDR exemption, but the average VOC at the point of origination is <500 ppmw and this determination was based on analytical testing (upload copy of analysis) or generator knowledge.
2. State Hazardous Waste → Please list all state waste codes: _____
3. Excluded Waste → Please select which of the following categories apply to your material:
   ❑ Delisted Hazardous Waste ❑ Excluded Waste under 40 CFR 261.4 → Specify Exclusion: _____
   ❑ Treated Hazardous Waste Debris ❑ Treated Characteristic Hazardous Waste → If checked, complete question 4.
4. Underlying Hazardous Constituents → Please list all Underlying Hazardous Constituents:
5. Benzene NESHAP → Please include benzene concentration and percent water/moisture in chemical composition.
   a. Are you a TSDF? → If yes, please complete Benzene NESHAP questionnaire. If not, continue.
   b. What is your facility's current total annual benzene quantity in Megagrams? ❑ <1 Mg ❑ 1–9.99 Mg ❑ ≥10 Mg
   c. Is this waste soil from remediation at a closed facility? ❑ Yes ❑ No
   d. Has material been treated to remove 99% of the benzene or to achieve <10 ppmw? ❑ Yes ❑ No
   e. Is material exempt from controls in accordance with 40 CFR 61.342? ❑ Yes ❑ No
      → If yes, specify exemption: _____
   f. Based on your knowledge of your waste and the BWON regulations, do you believe that this waste stream is subject to treatment and control requirements at an off-site TSDF? ❑ Yes ❑ No
6. 40 CFR 63 GGGGG → Does the material contain <500 ppw VOHAPs at the point of determination? ❑ Yes ❑ No
7. CERCLA or State-Mandated clean up → Please submit the Record of Decision or other documentation to assist others in the evaluation for proper disposal.
8. NRC or state regulated radioactive or NORM Waste → Please identify Isotopes and pCi/g: _____

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river's Signature

WASTE MANAGEMENT

WM of New Mexico - Rio Rancho Landfill
Northern & 33rd Street
Rio Rancho, NM, 87124
Ph: (505) 892-2055

Original
Ticket# 745673

Customer Name NATIONVIEW NATIONVIEW LLC
Ticket Date 04/25/2013
Payment Type Credit Account
Manual Ticket#
Hauling Ticket#
Route
State Waste Code
Manifest 60864
Destination
PO
Profile 102731NM (HOLLOMAN AFB)
Generator 153-HOLLOMANAFB HOLLOMAN AFB

Carrier CTI CTI
Vehicle# 819
Container
Driver
Check#
Billing # 0000394
Gen EPA ID

Grid

Volume

	Time	Scale	Operator	Inbound		
In	04/25/2013 11:22:22	Inbound	jander27		Gross	62100 lb
Out	04/25/2013 12:12:35	Outbound	jander27		Tare	38260 lb
					Net	23840 lb
					Tons	11.92

Comments Truck 891

	Product	LD%	Qty	UOM	Rate	Tax	Amount	Origin
1	ContSoilPet-Tons-C	100	11.92	Tons				ALBU
2	FUEL-T-Fuel Surcha	100		%				ALBU
3	EVFt-P-Standard En	100		%				ALBU
4	TOL-Transportation	100	1	Each				ALBU
5	LINER FEE-LINER FE	100	1	Each				ALBU

Jeff Perez

Total Tax
Total Ticket

402WM

891

SPECIAL WASTE SHIPMENT RECORD

Rio Rancho Sanitary Landfill / Valencia Regional Landfill & Recycling Facility Shipment № 60864

Mailing Address:
P.O. Box 15700
Rio Rancho, NM 87174
505/892-2055

❑ *Physical Address:*
33rd St. & Northern Blvd.
Rio Rancho, NM 87144
SWM #231402

❑ *Physical Address:*
1600 W. Highway 6
Los Lunas, NM 87031
SWM #013230 (sp)

Profile # 102731 NM

1. Generator's work site name and address
SS-67 Building 905 Holloman AFB, NM 88330

2. Generator's name and address
49 CES/CEAN
550 Tabosa Ave
Holloman AFB, NM 88330

Generator's Telephone no.
575 572-3931

3. Authorized Agent's name and mailing address (if different from #2)
DeAnna Rothhaupt
(SAME Address)

Agent's Telephone no.
575 572 3931

4. Proper name and type of waste	5. Containers No.	Type	6. Total quantity (yd3)	(tons)
Soil/Sandblast Residue				

7. Special handling instructions:

8. GENERATOR'S OR AUTHORIZED AGENT'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway in accordance with applicable international and government regulations.

I hereby certify that the above named material does not contain free liquid as defined by 40CFR Part 258.28 and is not a hazardous waste as defined by 40CFR 261 or any applicable state law.

Generator's or Authorized Agent's printed/typed name	Signature	Month / Day / Year
DeAnna Rothhaupt	[signature]	04 / 24 / 2013

9. Transporter 1 (Acknowledgement of receipt of materials)

Printed/typed name, address, telephone no.	Signature	Month / Day / Year
Jeff Perez 3713 Broadway St NE ABQ NM - 505-505-1556 Commercial Tank Line	Jeff Perez	4 / 24 / 13

10. Transporter 2 (Acknowledgement of receipt of materials)

Printed/typed name, address, telephone no.	Signature	Month / Day / Year
		/ /

11. Discrepancy indication space
N35°16.774 W106°39.55.1 5551

12. Waste disposal site location coordinates

Received By (printed/typed name):	Signature	Month / Day / Year
Judie Anderson	[signature]	4 / 25 / 13

White/GEN Yellow/CUSTOMER Pink/LANDFILL

Driver's Signature

WASTE MANAGEMENT

WM of New Mexico - Rio Rancho Landfill
Northern & 33rd Street
Rio Rancho, NM, 87124
Ph: (505) 892-2055

Original
Ticket# 745807

Customer Name NATIONVIEW NATIONVIEW LLC
Ticket Date 04/26/2013
Payment Type Credit Account
Manual Ticket#
Hauling Ticket#
Route
State Waste Code
Manifest 60862
Destination ACTIVE FACE
PO
Profile 102731NM (HOLLOMAN AFB)
Generator 153-HOLLOMANAFB HOLLOMAN AFB

Carrier CTI CTI
Vehicle# 748
Container
Driver
Check#
Billing # 0000394
Gen EPA ID

Grid

Volume

	Time	Scale	Operator	Inbound		
In	04/26/2013 10:05:15	Inbound	C Lopez		Gross	53340 lb
Out	04/26/2013 10:32:35	Outbound	C Lopez		Tare	34840 lb
					Net	18500 lb
					Tons	9.25

Comments

	Product	LD%	Qty	UOM	Rate	Tax	Amount	Origin
1	ContSoilPet-Tons-C	100	9.25	Tons				ALBU
2	FUEL-T-Fuel Surcha	100		%				ALBU
3	EVFt-P-Standard En	100		%				ALBU
4	TOL-Transportation	100	1	Each				ALBU
5	LINER FEE-LINER FE	100	1	Each				ALBU

Total Tax
Total Ticket

403WM

SPECIAL WASTE SHIPMENT RECORD

Rio Rancho Sanitary Landfill / Valencia Regional Landfill & Recycling Facility

Shipment № 60862

Mailing Address:
P.O. Box 15700
Rio Rancho, NM 87174
505/892-2055

❑ *Physical Address:*
33rd St. & Northern Blvd.
Rio Rancho, NM 87144
SWM #231402

❑ *Physical Address:*
1600 W. Highway 6
Los Lunas, NM 87031
SWM #013230 (sp)

Profile # 102 731 NM

1. Generator's work site name and address
SS-67 Bld 905

2. Generator's name and address
~~Holloman AFB~~
49CES/CEAN
550 Tabosa Ave
Holloman AFB, NM 88330

Generator's Telephone no.
575-572-3931

3. Authorized Agent's name and mailing address (if different from #2)
DeAnna Rothhaupt
(same address)

Agent's Telephone no.
575-572-3931

4. Proper name and type of waste	5. Containers No.	Type	6. Total quantity (yd3) (tons)
Soil/Sandblast Residue			
	985	BEN	17 yd's

7. **Special handling instructions:**

8. GENERATOR'S OR AUTHORIZED AGENT'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway in accordance with applicable international and government regulations.

I hereby certify that the above named material does not contain free liquid as defined by 40CFR Part 258.28 and is not a hazardous waste as defined by 40CFR 261 or any applicable state law.

Generator's or Authorized Agent's printed/typed name	Signature	Month / Day / Year
DeAnna Rothhaupt	[signature]	04/23/2013

9. Transporter 1 (Acknowledgement of receipt of materials)

Printed/typed name, address, telephone no.	Signature	Month / Day / Year
JEFF PEREZ CHEMICAL TRANS INC. 2717 BROADWAY ST. ALB NM 520-404-4558	[signature]	4/23/2013

10. Transporter 2 (Acknowledgement of receipt of materials)

Printed/typed name, address, telephone no.	Signature	Month / Day / Year
		/ /

11. Discrepancy indication space
No wh to sheet Date: 04-26.2013

12. Waste disposal site location coordinates
N35°16.774 W106°39.951591

Received By (printed/typed name):	Signature	Month / Day / Year
[illegible]	[signature]	04/26/13

White/GEN Yellow/CUSTOMER Pink/LANDFILL

Driver's Signature

WASTE MANAGEMENT

WM of New Mexico - Rio Rancho Landfill
Northern & 33rd Street
Rio Rancho, NM, 87124
Ph: (505) 892-2055

Original
Ticket# 745672

Customer Name NATIONVIEW NATIONVIEW LLC
Ticket Date 04/25/2013
Payment Type Credit Account
Manual Ticket#
Hauling Ticket#
Route
State Waste Code
Manifest 60863
Destination ACTIVE FACE
PO
Profile 102731NM (HOLLOMAN AFB)
Generator 153-HOLLOMANAFB HOLLOMAN AFB

Carrier CTI CTI
Vehicle# 748
Container
Driver
Check#
Billing # 0000394
Gen EPA ID

Grid

Volume

	Time	Scale	Operator	Inbound		
In	04/25/2013 11:19:49	Inbound	jander27		Gross	57200 lb
Out	04/25/2013 12:11:15	Outbound	jander27		Tare	34660 lb
					Net	22540 lb
					Tons	11.27

Comments

	Product	LD%	Qty	UOM	Rate	Tax	Amount	Origin
1	ContSoilPet-Tons-C	100	11.27	Tons				
2	FUEL-T-Fuel Surcha	100		%				
3	EVFt-P-Standard En	100		%				
4	TOL-Transportation	100	1	Each				
5	LINER FEE-LINER FE	100	1	Each				

Total Tax
Total Ticket

403WM

SPECIAL WASTE SHIPMENT RECORD

Rio Rancho Sanitary Landfill / Valencia Regional Landfill & Recycling Facility Shipment № 60863

Mailing Address:
P.O. Box 15700
Rio Rancho, NM 87174
505/892-2055

❑ *Physical Address:*
33rd St. & Northern Blvd.
Rio Rancho, NM 87144
SWM #231402

❑ *Physical Address:*
1600 W. Highway 6
Los Lunas, NM 87031
SWM #013230 (sp)

Profile # 102731 NM

1. Generator's work site name and address
SS-67 Building 905 HAFB

2. Generator's name and address
Holloman AFB 49CES/CEAN
550 Tabosa Ave. Holloman AFB 88330

Generator's Telephone no.
575-572-3331

3. Authorized Agent's name and mailing address (if different from #2)
LeAnna Rothhaupt
(same address)

Agent's Telephone no.
575-572-3931

4. Proper name and type of waste	5. Containers No.	Type	6. Total quantity (yd3) (tons)
Soil / Sandblast Residue			
	998	BZN	17 yd's

7. Special handling instructions:

8. GENERATOR'S OR AUTHORIZED AGENT'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway in accordance with applicable international and government regulations.

I hereby certify that the above named material does not contain free liquid as defined by 40CFR Part 258.28 and is not a hazardous waste as defined by 40CFR 261 or any applicable state law.

Generator's or Authorized Agent's printed/typed name	Signature	Month / Day / Year
De Anna Rothhaupt		04 / 23 / 2013

9. Transporter 1 (Acknowledgement of receipt of materials)

Printed/typed name, address, telephone no.	Signature	Month / Day / Year
CHEMECA TRANS INC 5717 BROADWAY SE ALB NM 520-404-4598		4 / 23 / 2013

10. Transporter 2 (Acknowledgement of receipt of materials)

Printed/typed name, address, telephone no.	Signature	Month / Day / Year
		/ /

11. Discrepancy indication space

12. Waste disposal site location coordinates
N35°16.774 W106°39.55.1 559

Received By (printed/typed name):	Signature	Month / Day / Year
Jodie Anderson		11 / 25 / 13

White/GEN Yellow/CUSTOMER Pink/LANDFILL