HAZARDOUS WASTE PERMIT
EPA ID No. NM5890110518

to

UNITED STATES DEPARTMENT OF ENERGY
AND SANDIA CORPORATION

for

SANDIA NATIONAL LABORATORIES

Located in

BERNALILLO COUNTY, NEW MEXICO

October 2009

Prepared by the

New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East Building 1
Santa Fe, New Mexico, 87505
STATE OF NEW MEXICO
BEFORE THE SECRETARY OF ENVIRONMENT

IN THE MATTER OF APPLICATION FOR
A POST-CLOSURE CARE HAZARDOUS
WASTE PERMIT FOR THE CHEMICAL
WASTE LANDFILL, SANDIA NATIONAL
LABORATORIES No. NM5890110518

No. HWB-09-SNL-CWL

FINAL ORDER

This matter comes before the Secretary of Environment through a permit application for a Post-Closure Care Hazardous Waste Facility Permit for the Sandia National Laboratories' Chemical Waste Landfill ("CWL"), originally filed with the New Mexico Environment Department ("Department") on May 20, 2003, by Sandia Corporation and the United States Department of Energy ("Sandia"). Pursuant to the New Mexico Hazardous Waste Act ("the Act") at NMSA 1978 § 74-4-4.2 (H), the Department has provided an opportunity for a public hearing. The Department issued a draft permit on May 20, 2007, and provided a public comment period of 60 days. The comment period was later extended another 30 days. During that period, six interested parties requested a hearing.

Consistent with 20.4.1.901.A (4) NMAC the Department in conjunction with Sandia negotiated with permit opponents to resolve the issues giving rise to their opposition. As a result, all opponents withdrew their requests for hearing, contingent upon my issuance of a permit identical in its substantive terms to the revised draft permit they agreed upon. See Exhibit A, Settlement Agreement.
Subsequent to execution of the Settlement Agreement, the Department determined that certain non-substantive clarifications were appropriate in permit conditions relating to the effective date of the permit.

IT IS THEREFORE ORDERED:

The CWL Post-Closure Care Permit, as proposed in Exhibit 1 to the Settlement Agreement, is hereby issued, with the following changes:

1) The last sentence of Permit Part 1, Section 1.0 is changed to read:

   This Permit is designed to meet RCRA post-closure care requirements in 40 C.F.R. §§ 264.117 through 264.120 and shall become effective and immediately supersede the CWL Closure Plan (SNL/NM December 1992) upon the date of the Department's written approval of the Permittees' certification of the closure of the CWL.

2) Permit Part 1, Section 1.6.1 is changed to read:

   This Permit shall be effective for a fixed period of 10 years from the effective date as specified in Section 1.0 of this Permit, in accordance with 40 C.F.R. § 270.50(a), subject to Section 1.6.2 of this Permit Part.

3) The first sentence of Permit Part 3, Section 3.2.1 is changed to read:

   The Permittees shall conduct post-closure care for the CWL to begin upon the Department’s written approval of the Permittees’ certification of closure of the unit and continue for 30 years after that date, except that the 30-year post-closure care period may be shortened or extended, as follows:

   Once effective according to the above provisions, the permit shall remain in effect for ten years from the effective date in accordance with section 20.4.1.900 NMAC, incorporating 40 CFR § 270.50(a), unless the permit is modified, suspended or revoked under the Act, NMSA 1978, § 74-4-4.2, or under section 20.4.1.901 NMAC, or section 20.4.1.900 NMAC, incorporating 40 CFR § 270.41, §270.42, and § 270.43, or the post-closure care period is shortened pursuant to Permit Part 3, Section 3.2.1 of the permit.
Sandia shall comply with all terms and conditions of this Permit. This Permit consists of all the terms and conditions therein including those in the Attachments.

Ron Curry
Secretary, Environment Department

Date 10/15/09
TABLE OF CONTENTS

PERMIT PART 1: GENERAL PERMIT CONDITIONS................................................................. 1

1.0 GENERAL ..................................................................................................................... 1

1.1. Legal Authority .......................................................................................................... 1

1.2. Permit Construction .................................................................................................... 2

1.3. Severability ................................................................................................................ 2

1.4. Definitions .................................................................................................................. 2

1.5. Effect of Permit ......................................................................................................... 3

1.5.1. Compliance with Permit (Permit Shield)................................................................. 4

1.6. Permit Actions ........................................................................................................... 4

1.6.1. Term of Permit ...................................................................................................... 4

1.6.2. Permit Modification, Suspension, Revocation, and Termination ......................... 4

1.6.2.1. Permit Modification ............................................................................................ 4

1.6.2.2. Permit Modification at the Request of the Permittees ....................................... 5

1.6.2.3. Permit Suspension, Revocation, and Termination ............................................ 5

1.6.3. Permit Renewal/Duty to Reapply .......................................................................... 5

1.6.4. Continuation of Expiring Permit .......................................................................... 5

1.6.5. Transfer of Permit ................................................................................................ 5

1.6.6. Permit Review ....................................................................................................... 5

1.7. Points of Contact During Post-Closure Care ......................................................... 6

1.8. Duties and Requirements ......................................................................................... 6

1.8.1. Duty to Comply ...................................................................................................... 6

1.8.2. Need to Halt or Reduce Activity Not a Defense ...................................................... 7

1.8.3. Duty to Mitigate .................................................................................................... 7

1.8.4. Proper Operation and Maintenance ...................................................................... 7

1.8.5. Duty to Provide Information ................................................................................ 7

1.8.6. Inspection and Entry ............................................................................................. 7

1.8.7. Monitoring and Records ....................................................................................... 8

1.8.8. Reporting Planned Changes ................................................................................ 8

1.8.9. Reporting Anticipated Noncompliance ................................................................. 8

1.8.10. Certification of Construction or Modification ..................................................... 9

1.8.11. Twenty-Four Hour and Subsequent Reporting .................................................... 9

1.8.11.1. Oral Report ....................................................................................................... 9

1.8.11.2. Written Report .................................................................................................. 9

1.8.11.3. Reports Required by Contingency Plan ............................................................ 10

1.8.12. Admissibility of Data ........................................................................................ 10

1.8.13. Other Noncompliance ....................................................................................... 10

1.8.14. Other Information .............................................................................................. 10

1.9. Reports, Notifications, and Information Submittals ............................................. 11

1.9.1. Information Submittal .......................................................................................... 11

1.9.2. Incorporation of Plans and Schedules into the Permit ......................................... 11

1.10. Confidential Information ....................................................................................... 11
# TABLE OF CONTENTS, CONTINUED

**PERMIT PART 2: GENERAL FACILITY CONDITIONS** .......................................................... 12

## 2.0 INTRODUCTION ........................................................................................................... 12

### 2.1. Hazardous Waste Prohibition ............................................................................... 12

### 2.2. Security ................................................................................................................... 12

### 2.3. General Inspection Requirements .................................................................. 12

### 2.4. Preparedness and Prevention .............................................................................. 12

#### 2.4.1. Required Equipment ....................................................................................... 12

#### 2.4.2. Testing and Maintenance of Equipment ......................................................... 12

#### 2.4.3. Access to Communications or Alarm System ................................................... 12

#### 2.4.4. Arrangements with Local Authorities .............................................................. 12

### 2.5. Contingency Plan ................................................................................................. 13

#### 2.5.1. Implementation of Contingency Plan .............................................................. 13

#### 2.5.2. Copies of the Contingency Plan ................................................................. 13

#### 2.5.3. Amendments to Contingency Plan ............................................................... 13

#### 2.5.4. Emergency Coordinator ................................................................................. 13

### 2.6. Record Keeping and Reporting ......................................................................... 14

#### 2.6.1. Data Retention ................................................................................................. 14

#### 2.6.2. Operating Record ............................................................................................ 14

#### 2.6.3. Annual Report ................................................................................................. 14

#### 2.6.4. Personnel and Telephone Number Changes ................................................... 14

#### 2.6.5. Post-Closure Notices ....................................................................................... 14

#### 2.6.6. Certification of Completion of Post-Closure Care ............................................. 15

### 2.7. Cost Estimate and Financial Assurance for Facility Post-Closure Care ........ 15

### 2.8. Financial Responsibility ......................................................................................... 15

### 2.9. Documents to be Maintained at the Facility ......................................................... 15

**PERMIT PART 3: POST-CLOSURE CARE REQUIREMENTS FOR THE CWL** ........ 17

## 3.0 GENERAL .................................................................................................................. 17

### 3.1. Residual Soil Contamination at Risk-Based Levels ............................................... 18

### 3.2. Post-Closure Care Procedures and Use of Property ........................................... 24

#### 3.2.1. Duration of Post-Closure Care ....................................................................... 24

#### 3.2.2. Groundwater Monitoring System ................................................................. 24

#### 3.2.3. Special Post-Closure Requirements for Landfills ........................................... 24

#### 3.2.4. Security Requirements .................................................................................... 24

#### 3.2.5. Future Land Use Requirements ................................................................... 25

### 3.3. Inspection ............................................................................................................. 25

### 3.4. Groundwater Sampling and Analysis Plan ......................................................... 25

### 3.5. Soil Gas Sampling and Analysis ......................................................................... 25

### 3.6. Personnel Training for Post-Closure Care Period .............................................. 25

### 3.7. Post-Closure Permit Modifications .................................................................. 25

### 3.8. References ........................................................................................................... 25
TABLE OF CONTENTS, CONTINUED

PERMIT ATTACHMENT 1: POST-CLOSURE CARE PLAN FOR THE CWL .......... 26

1.0 INTRODUCTION....................................................................................................... 26
  1.1. General Description of the Facility ....................................................................... 26
  1.2. Location, Conditions, and Description of the CWL ............................................ 26
    1.2.1. Location and General Description ................................................................. 26
    1.2.2. Current Landfill Conditions .......................................................................... 27
    1.2.3. Description of Cover Installation .................................................................... 27
    1.2.4. Seismic Considerations .................................................................................. 27
    1.2.5. Floodplain ....................................................................................................... 27
  1.3. Description of the Final Cover............................................................................... 28
    1.3.1. Surface Topsoil Layer ..................................................................................... 28
    1.3.2. Native Soil Layer ............................................................................................ 29
    1.3.3. Surface Drainage Controls .............................................................................. 29
  1.4. Description of the Compliance Monitoring System............................................. 29
    1.4.1. Groundwater Monitoring System .................................................................. 29
    1.4.2. Soil-Gas Monitoring System .......................................................................... 33
  1.5. Description of Storm-Water Diversion Structures.............................................. 33
  1.6. Description of Security Fences ............................................................................ 34
  1.7. Post-Closure Care ................................................................................................ 34
  1.8. Monitoring Process ............................................................................................... 34
      1.8.1.1. Frequency ................................................................................................. 35
      1.8.1.2. Assessment ............................................................................................... 36
    1.8.2. Soil-Gas Monitoring Process .......................................................................... 37
      1.8.2.1. Frequency ................................................................................................. 37
      1.8.2.2. Assessment ............................................................................................... 38
    1.8.3. Corrective Action ............................................................................................ 40
  1.9. Inspection/Maintenance/Repair Activities and Frequencies .............................. 41
    1.9.1. Final Cover System Inspection/Maintenance/Repair ........................................ 42
      1.9.1.1. Vegetation Inspection and Monitoring ....................................................... 42
      1.9.1.2. Cover Inspection ....................................................................................... 42
      1.9.1.3. Maintenance/Repair ............................................................................... 42
    1.9.2. Storm-Water Diversion Structure Inspection/Maintenance/Repair .................. 43
      1.9.2.1. Inspection ................................................................................................. 43
      1.9.2.2. Maintenance/Repair ............................................................................... 43
    1.9.3. Monitoring Well Network Inspection/Maintenance/Repair ............................. 43
      1.9.3.1. Inspection ................................................................................................. 43
      1.9.3.2. Maintenance/Repair ............................................................................... 44
    1.9.4. Security Fence Inspection/Maintenance/Repair ............................................. 44
      1.9.4.1. Inspection ................................................................................................. 44
      1.9.4.2. Maintenance/Repair ............................................................................... 44
TABLE OF CONTENTS, CONTINUED

1.10. Inspection Schedule, Corrective Actions, and Recorded Results ........................................... 44
1.11. Personnel Training ................................................................................................................. 45
1.12. Record Keeping and Reporting ............................................................................................. 47
1.13. Potential for Exposure ............................................................................................................. 49
1.14. Potential for Emergency ......................................................................................................... 49
1.15. References ............................................................................................................................. 49

PERMIT ATTACHMENT 2: GROUNDWATER SAMPLING AND ANALYSIS PLAN .......

2.0 INTRODUCTION ............................................................................................................. 66

2.1. Data Quality Objectives and Quality Control ......................................................................... 66
2.2. Accuracy ................................................................................................................................. 67
2.3. Precision ................................................................................................................................. 68
2.4. Completeness .......................................................................................................................... 68
2.5. Data Representativeness ......................................................................................................... 68
2.6. Comparability .......................................................................................................................... 68
2.7. Sampling Locations and Frequency ....................................................................................... 68
2.8. Field Operations ..................................................................................................................... 69
2.9. Safety ..................................................................................................................................... 69
2.10. Water Level Measurements ................................................................................................. 69
2.11. Field Water Quality Parameters ......................................................................................... 70
2.12. Sample Collection ............................................................................................................... 70
2.13. Monitoring Equipment Field Checks ................................................................................... 71
2.14. Equipment Decontamination ............................................................................................... 71
2.15. Waste Management ............................................................................................................ 71
2.16. Sample Documentation and Custody .................................................................................. 71
2.17. Sample Shipment .................................................................................................................. 72
2.18. Laboratory Analytical Procedures ....................................................................................... 72
2.19. Analytical Laboratory .......................................................................................................... 72
2.20. Quality Control ...................................................................................................................... 73
   2.20.1. Field Quality Control .................................................................................................. 73
   2.20.2. Laboratory Quality Control ......................................................................................... 74
2.21. Data Validation, Review, and Reporting .............................................................................. 74
   2.21.1. Field Water Quality Data and Documentation Review ............................................. 75
   2.21.2. Laboratory Data Verification and Validation ............................................................... 75
   2.21.3. Data Reporting ........................................................................................................... 75
   2.21.4. Records Management ................................................................................................. 75
2.22. Non-Conformances and Variances ....................................................................................... 76
2.23. References ............................................................................................................................ 76
TABLE OF CONTENTS, CONTINUED

PERMIT ATTACHMENT 3: SOIL-GAS SAMPLING AND ANALYSIS PLAN .......... 83

3.0 INTRODUCTION ................................................................................................................ 83
3.1. Purpose .................................................................................................................................. 83
3.2. Historical Soil-Gas Monitoring .......................................................................................... 83
3.3. Post-Closure Care Soil-Gas Monitoring Objectives ......................................................... 83
3.4. Data Quality Objectives ..................................................................................................... 84
3.5. Sampling Locations and Frequency ................................................................................. 84
  3.5.1. Sample Locations ........................................................................................................... 84
  3.5.2. Frequency ...................................................................................................................... 84
3.6. Data Accuracy ..................................................................................................................... 84
3.7. Data Consistency and Comparability ................................................................................ 86
3.8. Monitoring Activities ........................................................................................................ 86
3.9. Field Sampling ................................................................................................................... 86
  3.9.1. Pre-Field Sampling Preparations ...................................................................................... 87
  3.9.2. Purging and Field Estimation of Total Concentration of VOCs ................................... 87
  3.9.3. Sample Collection .......................................................................................................... 88
3.10. Laboratory Analysis and Data Review .......................................................................... 88
  3.10.1. Data Verification .......................................................................................................... 88
  3.10.2. Data Validation ............................................................................................................. 88
3.11. Data Management and Reporting .................................................................................. 90
3.12. Records Management ....................................................................................................... 90
3.13. References ......................................................................................................................... 90

PERMIT ATTACHMENT 4: INSPECTION FORMS ................................................................. 98

PERMIT ATTACHMENT 5: PERSONNEL TRAINING PROGRAM .................................... 107

5.0 INTRODUCTION ................................................................................................................ 107
5.1. Relevance of Training to Job Position .............................................................................. 107
5.2. Implementation of Training Program ............................................................................. 107
5.3. Outline of the Training Program ....................................................................................... 107
5.4. Job Title/Job Description ................................................................................................. 107
5.5. Training Content, Frequency, and Techniques ............................................................... 110
5.6. Emergency Training ......................................................................................................... 110
5.7. Training Records .............................................................................................................. 112

PERMIT ATTACHMENT 6: CONTINGENCY PLAN ............................................................... 113

6.0 INTRODUCTION ................................................................................................................ 113
6.1. Distribution of Contingency Plan and Amendments ....................................................... 114
6.2. Emergency Response Resources .................................................................................... 114
  6.2.1. Emergency Coordinator (EC) and Responsibilities ..................................................... 114
### TABLE OF CONTENTS, CONCLUDED

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.2.2. Emergency Response Groups</td>
<td>115</td>
</tr>
<tr>
<td>6.2.3. Emergency Chain of Command</td>
<td>115</td>
</tr>
<tr>
<td>6.2.4. Support Agreements and Coordination with Outside Agencies</td>
<td>116</td>
</tr>
<tr>
<td>6.3. Emergency Equipment</td>
<td>116</td>
</tr>
<tr>
<td>6.4. Contingency Plan Implementation</td>
<td>117</td>
</tr>
<tr>
<td>6.4.1. Emergencies</td>
<td>117</td>
</tr>
<tr>
<td>6.4.1.1. Fire</td>
<td>119</td>
</tr>
<tr>
<td>6.4.1.2. Explosion</td>
<td>120</td>
</tr>
<tr>
<td>6.4.1.3. Uncontrolled Release</td>
<td>120</td>
</tr>
<tr>
<td>6.4.2. Evacuation</td>
<td>121</td>
</tr>
<tr>
<td>6.4.3. Coordination with Off-Site Parties and Emergency Notification</td>
<td>122</td>
</tr>
<tr>
<td>6.5. Post-Emergency Actions</td>
<td>122</td>
</tr>
<tr>
<td>6.6. Emergency Response Records And Reports</td>
<td>123</td>
</tr>
</tbody>
</table>
LIST OF FIGURES

Figure 1  Location of the Chemical Waste Landfill with respect to Kirtland Air Force Base and the City of Albuquerque.................................................................55
Figure 2  Location of the Chemical Waste Landfill within Technical Area III..................56
Figure 3  Topographic map of Kirtland Air Force Base Showing Location of CWL.........57
Figure 4  Post-VE VCM Volatile Organic Compound Soil-Gas Plume - September 2004.....58
Figure 5  Extent of LE VCM Excavation and Final Verification Soil Sampling Grid Locations.................................................................59
Figure 6  Site Layout for the Post-Closure Care Period Chemical Waste Landfill.........60
Figure 7  Panoramic Photographs of the CWL prior to and After Cover Installation.......61
Figure 8  Schematic of the CWL Excavation Backfill and Cover Layers.......................62
Figure 9  Potentiometric Surface of the Upper Aquifer and Post-Closure Groundwater Monitoring Wells....................................................63
Figure 10 Soil-Gas Monitoring Wells and Depth Specific Sampling Ports.....................64
Figure 11 Schematic of Passive Soil-Gas Venting Well Equipped with a Baroball™ Device...65
Figure 12 CWL Cover Grading Plan Showing Surface Drainage Features and Flow Lines.....66
LIST OF TABLES

Permit Part 3
Table 3-1  Residual Soil Concentrations in the CWL – Replaceable and Unexcavated Soil.....20

Permit Attachments 1-6
Table 1-1  Native Plant Species and Seeding Rate Calculations for the CWL Cover............29
Table 1-2  Concentration Limits for Three Hazardous Constituents........................................31
Table 1-3  Final Use/Disposition Summary CWL Groundwater Monitoring and Vapor
Extraction Well Inventory..................................................................................................32
Table 1-4  CWL Groundwater and Soil-Gas Monitoring Frequency, Parameters, and
Methods..............................................................................................................................36
Table 1-5  CWL Post-Closure Care Soil-Gas Monitoring EPA Compendium Method TO-14
Analyte List......................................................................................................................40
Table 1-6  CWL Post-Closure Inspection and Maintenance/Repair Schedules and Prescribed
Maintenance/Repairs of the CWL and Associated Systems........................................47
Table 2-1  Reference Documentation CWL Groundwater Monitoring................................68
Table 2-2  CWL Groundwater Monitoring Wells and Sampling Frequency........................70
Table 2-3  Laboratory Analytical Methods, Container Types, and Preservatives..................74
Table 3-1  Soil-Gas Monitoring Ports to be Sampled during CWL Post-Closure Care............86
Table 3-2  Reference Documentation CWL Post-Closure Care Soil-Gas Monitoring...........88
Table 3-3  EPA Compendium Method TO-14 Analyte List....................................................90
Table 5-1  Job Title, Description, and Qualifications CWL Project Leader/Operations
Coordinator......................................................................................................................109
Table 5-2  Job Title, Description, and Qualifications CWL Field Technician........................110
Table 5-3  Job Title, Description, and Qualifications CWL Staff Biologist............................110
Table 5-4  Training Content....................................................................................................112
Table 6-1  Agreements and Memoranda of Understanding for Emergency Response.........117
Table 6-2  CWL Emergency Response Equipment Inventory............................................118
Table 6-3  Facility Emergency Response System Notification.............................................119
Table 6-4  Emergency Equipment for the CWL, Located at the CAMU...............................119
Table 6-5  Emergency Coordinator List for the Chemical Waste Landfill............................125
LIST OF ABBREVIATIONS/ACRONYMS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
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<td>AOP</td>
<td>Administrative Operating Procedure</td>
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<tr>
<td>bgs</td>
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<td>CAMU</td>
<td>Corrective Action Management Unit</td>
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LIST OF ABBREVIATIONS/ACRONYMS, CONCLUDED
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<td>Remedial Action Proposal</td>
</tr>
<tr>
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<td>Resource Conservation and Recovery Act</td>
</tr>
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<td>SAP</td>
<td>Sampling and Analysis Plan</td>
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<td>Vapor Extraction</td>
</tr>
<tr>
<td>VOC</td>
<td>Volatile organic compound</td>
</tr>
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</table>
PERMIT PART 1: GENERAL PERMIT CONDITIONS

1.0 GENERAL

This Permit Part contains general permit conditions pertaining to post-closure care of the Chemical Waste Landfill (CWL) at the Sandia National Laboratories (SNL) Facility, as permitted under the New Mexico Hazardous Waste Act (HWA), NMSA 1978, §§ 74-4-1 to 74-4-14, and in accordance with the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. §§ 6901 to 6992k.

In accordance with 40 C.F.R. § 270.1(c), owners and operators of landfills that received waste after July 26, 1982, or that certified closure after July 26, 1983, must have a Post-Closure Care permit. This permit addresses applicable 40 C.F.R. Part 264 groundwater monitoring, corrective action, and post-closure requirements. The CWL was an interim status landfill that was closed in accordance with 40 C.F.R. Part 265 Subpart G and the 1992 CWL Final Closure Plan, as amended. This Post-Closure Care Permit (the Permit) identifies the post-closure activities that shall be performed at the CWL. This Permit is designed to meet RCRA post-closure care requirements in 40 C.F.R. §§ 264.117 through 264.120 and shall become effective and immediately supersede the CWL Closure Plan (SNL/NM December 1992) upon the date of the Department's written approval of the Permittees’ certification of the closure of the CWL.

1.1. LEGAL AUTHORITY

The Department issues this Post-Closure Care Permit to the United States Department of Energy and Sandia Corporation (the Permittees) pursuant to Section 74-4-10 of the HWA. Additionally, Section 6001 of RCRA provides, in part, that "[e]ach department, agency, and instrumentality of the executive branch of the Federal Government (1) having jurisdiction over any solid waste management facility or disposal site, or (2) engaged in any activity resulting, or which may result, in the disposal or management of solid waste or hazardous waste shall be subject to, and comply with, all Federal, State, interstate, and local requirements, both substantive and procedural... respecting control and abatement of solid waste or hazardous waste disposal and management in the same manner, and to the same extent, as any person is subject to such requirements....” [42 U.S.C. § 6961(a)].

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

Whenever provisions of this Permit or of the New Mexico Hazardous Waste Management Regulations (HWMR), 20.4.1 NMAC, incorporating 40 C.F.R. Parts 260 through 270 are cited, the citation shall include all subordinate provisions of the cited provision paragraphs of this Permit or of the HWMR. When subordinate sections are cited, such citations shall include all subsections of the cited paragraphs.

Hazardous waste management regulations are frequently cited throughout this Permit. The federal Hazardous Waste Management Regulations, 40 C.F.R. Parts 260 through 273, are generally cited rather than the New Mexico Hazardous Waste Management Regulations, 20.4.1 NMAC. The federal regulations are cited because only the federal regulations set forth the detailed regulatory requirements; the State regulations incorporate by reference, with certain exceptions, the federal regulations in their entirety. Citing only the federal regulations also serves to avoid encumbering each citation with references to two sets of regulations. However, it is the State regulations that are legally applicable and enforceable. Therefore, for the purpose of this Permit, and enforcement of its terms and conditions, all references to provisions of federal regulations that have been incorporated into the State regulations shall be deemed to include the State incorporation of those provisions.

If there is a conflict between the provisions of the Permit Parts and the provisions of the Permit Attachments, then the provisions of the Permit Parts shall override the provisions of the Permit Attachments.

1.3. SEVERABILITY

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

1.4. DEFINITIONS

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

“Chemical Waste Landfill” (CWL) is a 1.9-acre RCRA hazardous waste landfill undergoing post-closure care. It is located in the southeastern corner of Technical Area III at the Facility. From 1962 through 1985 the CWL was used for the disposal of chemical, radioactive, and solid wastes into unlined pits and trenches. These wastes were generated by SNL research activities. It is the regulated unit subject to this Permit.

“Corrective Action Management Unit” (CAMU) is a site adjacent to the CWL that is used for the containment of hazardous waste that was generated during environmental restoration project remediation activities at the Facility.

“Days” refers to calendar days unless specified otherwise in this Permit.
“Department” or “NMED” means the New Mexico Environment Department and any successor agencies.

“DOE” means the United States Department of Energy, which is a Department of the United States government, and any successor departments or agencies.

“EPA” means the United States Environmental Protection Agency and any successor agencies.

“Facility” means Sandia National Laboratories including all contiguous land, and structures, other appurtenances, and improvements on the land. For the purposes of implementing corrective action under 40 C.F.R. § 264.101, or RCRA Section 3008(h), or the HWA, NMSA 1978, § 74-4-10(E), the Facility includes all contiguous property under the control of the owner or operator seeking a Permit under Subtitle C of RCRA, that is, 40 C.F.R. Parts 260 through 273.

“Hazardous Constituent” or “Hazardous Waste Constituent” means any constituent identified in 40 C.F.R. Part 261 Appendix VIII, or 40 C.F.R. Part 264 Appendix IX.

“Hazardous waste” shall have the meaning set forth in the HWA, Section 74-4-3(K) and the HWMR, 20.4.1 NMAC.

“Hazardous Waste Regulations” or “HWMR” means the New Mexico Hazardous Waste Management Regulations, 20.4.1 NMAC and all provisions of 40 C.F.R. Parts 260 through 273 incorporated therein.

“Permit” means this Permit issued to the Permittees for the Facility, pursuant to the HWA and the HWMR for the Facility to conduct post-closure care of the CWL following the procedures in this Permit, EPA ID No. NM5890110518-2, as it may be modified or amended.

“Permittees” mean Sandia Corporation and the United States Department of Energy.


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

“Solid Waste” means a solid waste as defined in 40 C.F.R. § 261.2.

“Technical Area” (TA) means a specific parcel of land controlled by Sandia National Laboratories and owned by the DOE.

If, subsequent to the issuance of this Permit, regulations are promulgated which redefine any of the above terms, the Department may, at its discretion, apply the new definition to this Permit.

1.5. EFFECT OF PERMIT

The New Mexico Environment Department issues this Permit to the Permittees, the owner and operators of the CWL, located at the Facility (EPA I.D. Number NM5890110518). This Permit requires the Permittees to conduct post-closure care of the CWL, and establishes the general and specific standards for these activities, pursuant to the HWA and the HWMR.
1.5.1. **Compliance with Permit (Permit Shield)**

Compliance with this Permit during its term constitutes compliance, for purposes of enforcement, with 40 C.F.R. Parts 264 and 268, only for those management practices specifically authorized by this permit. The Permittees must also comply with 40 C.F.R. Parts 260, 261, 262, and 263; to the extent the requirements of those Parts are applicable. The Permittees must also comply with all applicable self-implementing provisions imposed by statute or rule. Compliance with this Permit shall not constitute a defense to any order issued or any action brought under HWA, NMSA 1978, § 74-4-10(E) or § 74-4-13; RCRA § 3008(a), § 3008(h), § 3013, § 7002, or § 7003; the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C. § 9601 et seq., or any other law providing for protection of public health or the environment. Pursuant to 40 C.F.R. § 270.4 and § 270.30(g), this Permit does not convey any property rights of any sort or any exclusive privilege, nor authorize any injury to persons or property, any invasion of other private rights, or any infringement of State or local laws or regulations in accordance with 40 C.F.R. § 270.4 and § 270.30(g).

The complete Permit consists of Permit Parts 1 through 3 and Permit Attachments 1 through 6 as follows.

<table>
<thead>
<tr>
<th>Part</th>
<th>Description</th>
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<tbody>
<tr>
<td>Part 1</td>
<td>General Permit Conditions</td>
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<tr>
<td>Part 2</td>
<td>General Facility Conditions</td>
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<tr>
<td>Part 3</td>
<td>Post-Closure Care Requirements for the Chemical Waste Landfill</td>
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<td>Attachment 1</td>
<td>Post-Closure Care Plan for the Chemical Waste Landfill</td>
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<tr>
<td>Attachment 2</td>
<td>Groundwater Sampling and Analysis Plan</td>
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<tr>
<td>Attachment 3</td>
<td>Soil-Gas Sampling and Analysis Plan</td>
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<tr>
<td>Attachment 4</td>
<td>Inspection Forms</td>
</tr>
<tr>
<td>Attachment 5</td>
<td>Personnel Training Program</td>
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<tr>
<td>Attachment 6</td>
<td>Contingency Plan</td>
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1.6. **PERMIT ACTIONS**

1.6.1. **Term of Permit**

This Permit shall be effective for a fixed period of 10 years from the effective date as specified in Section 1.0 of this Permit, in accordance with 40 C.F.R. § 270.50(a), subject to Section 1.6.2 of this Permit Part.

1.6.2. **Permit Modification, Suspension, Revocation, and Termination**

1.6.2.1. **Permit Modification**

If at any time for any of the reasons specified in 40 C.F.R. § 270.41, the Department determines that modification of this Permit is necessary, in accordance with 20.4.1.901 NMAC, the Department may modify or revoke and reissue the Permit accordingly.
1.6.2.2. **Permit Modification at the Request of the Permittees**

The Permittees may initiate permit modifications in accordance with 40 C.F.R. § 270.42 and 20.4.1.901 NMAC. All applicable requirements specified in 40 C.F.R. § 270.42 shall be followed.

1.6.2.3. **Permit Suspension, Revocation, and Termination**

This Permit may be modified, suspended, revoked or terminated for cause in accordance with the provisions of HWA, NMSA 1978, § 74-4-4.2, 40 C.F.R. §§ 270.41 through 270.43 and 20.4.1.901 NMAC. The filing of a request by the Permittees for a Permit modification, suspension, or revocation, or the notification of planned changes or anticipated noncompliance, shall not stay any Permit condition, in accordance with 40 C.F.R. § 270.30(f).

Modifications to this Permit do not constitute a reissuance of this Permit.

1.6.3. **Permit Renewal/Duty to Reapply**

The Permittees shall renew this Permit by submitting an application for a new permit at least one hundred eighty (180) days before the expiration date of this Permit, as required by 40 C.F.R. § 270.10(h) and 40 C.F.R. § 270.30(b).

1.6.4. **Continuation of Expiring Permit**

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

1.6.5. **Transfer of Permit**

The Permittees may only transfer this Permit after providing notice to and receiving approval from the Department. The prospective new owner or operator must file a disclosure statement with the Department as specified at HWA, NMSA 1978, § 74-4-4.7. The Department may require modification or revocation and reissuance of this Permit in accordance with 40 C.F.R. §§ 270.40(b) and 270.41(b)(2).

Before transferring ownership or post-closure care of the CWL, the Permittees shall notify the new owner or operator in writing of the requirements of 40 C.F.R. Parts 264 and 270, and 40 C.F.R. §§ 264.12(c) and 270.30(l)(3) and shall provide the Department with a copy of this notice.

1.6.6. **Permit Review**

In accordance with 40 C.F.R. § 270.50(d), the Department will review this Permit five years after the effective date of Permit issuance, and may modify this Permit as necessary pursuant to Section 74-4-4.2 of the HWA and 40 C.F.R. § 270.41. Nothing in this section shall preclude the Department from reviewing and, in accordance with applicable requirements, modifying the Permit at any time during its term.
In accordance with 40 C.F.R. § 270.50(b), such modification(s) shall not extend the effective term of this Permit as specified in Permit Condition 1.6.2. Nothing in this Section shall preclude the Department from reviewing and modifying the Permit at any time during its term.

1.7. POINTS OF CONTACT DURING POST-CLOSURE CARE

Points of contact during the compliance monitoring and post-closure care periods are identified below.

The DOE contact person is:

Site Office Manager  
U.S. Department of Energy  
P.O. Box 5400,  
Albuquerque, NM 87185-0184

The Sandia contact person is:

Vice President  
Waste Management Operations  
Sandia National Laboratories  
P.O. Box 5800,  
Albuquerque, NM 87185-5800

All reports required by the permit shall be signed by a responsible corporate officer or principal executive officer or their duly authorized representatives in accordance with 40 C.F.R. § 270.11(b). The Permittees shall provide written notification to the Department within thirty days of any changes concerning the names of and contact information for the responsible corporate and principal executive officers or their duly authorized representatives.

1.8. DUTIES AND REQUIREMENTS

1.8.1. Duty to Comply

In accordance with 40 C.F.R. § 270.30(a), the Permittees shall comply with all conditions in this Permit, except to the extent and for the duration such noncompliance is authorized in an emergency permit specified in 40 C.F.R § 270.61. Any Permit noncompliance, except under the terms of an emergency permit, constitutes a violation of HWA and RCRA and may subject the Permittees, its successors and assigns, officers, directors, employees, parents, or subsidiaries, to:

1. An administrative or civil enforcement action, including civil penalties and injunctive relief, as specified under Section 74-4-10 of the HWA or Sections 3008(a) and (g), 7002, or 7003 of RCRA;

2. Permit modification, suspension, or revocation, or to denial of a permit application or modification request, under Section 74-4-4.2 of the HWA; or

3. Criminal fines or imprisonment under the HWA, NMSA § 74-4-11, or Section 3008(d), (e), or (f) of RCRA; or to a combination of the foregoing.
1.8.2. **Need to Halt or Reduce Activity Not a Defense**

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

1.8.3. **Duty to Mitigate**

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

1.8.4. **Proper Operation and Maintenance**

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

1.8.5. **Duty to Provide Information**

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

This Permit Condition shall not be construed to limit, in any manner, the Department's authority under HWA, NMSA 1978, § 74-4-4.3 or RCRA § 3007(a).

1.8.6. **Inspection and Entry**

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

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

This Permit Condition shall not be construed to limit, in any manner, the Department's authority under HWA, NMSA 1978, § 74-4-4.3 or RCRA § 3007(a).

**1.8.7. Monitoring and Records**

1. **Representative sampling** - For purposes of monitoring, in accordance with 40 C.F.R. § 270.30(j)(1), the Permittees shall take samples and measurements that are representative of the monitored activity.

2. **Record Retention** - In accordance with 40 C.F.R. § 270.30(j)(2), the Permittees shall retain records of all monitoring information, including all calibration and maintenance records, and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, the certification required by 40 C.F.R. § 264.73(b)(9) and records of all data used to complete the Permit application for a period of at least three (3) years from the date of the sample, measurement, report, record, certification, or application. The Permittees shall maintain records from all groundwater monitoring wells and associated groundwater surface elevations for the post-closure period.

   In addition, all records must be furnished upon request, and made available at all reasonable times for inspection by any representative of the Department. The record retention period may be extended by request of the Department at any time and is automatically extended during the course of any unresolved enforcement action regarding this Facility.

3. **Monitoring Records Contents** - In accordance with 40 C.F.R. § 270.30(j)(3), records of monitoring information shall include:
   
   a. The dates, exact place, and times of sampling or measurements;
   b. The names of the individuals who performed the sampling or measurements;
   c. The name and address of the laboratory that performed the analysis;
   d. The dates analyses were performed;
   e. The names of the individuals who performed the analyses;
   f. The analytical techniques or methods used; and
   g. The results of such analyses.

**1.8.8. Reporting Planned Changes**

In accordance with 40 C.F.R. § 270.30(l)(1), the Permittees shall give notice to the Department, as soon as possible, of any planned physical alterations or additions to the CWL.

**1.8.9. Reporting Anticipated Noncompliance**

In accordance with 40 C.F.R. § 270.30(l)(2), the Permittees shall give advance notice to the Department of any planned changes to the CWL or in any activities which may result in noncompliance with Permit requirements.
1.8.10. **Certification of Construction or Modification**

In accordance with 40 C.F.R. § 270.30(l)(2), if the CWL is modified, the Permittees shall not treat, store or dispose of hazardous waste in the modified portion of the CWL, except as provided in Sections 1.6.2 and 1.6.3 of this Permit Part 1 and 40 C.F.R. § 270.42, unless the following conditions have been satisfied:

1. The Permittees have submitted to the Department, by certified mail or hand delivery, a letter signed by the Permittees and an independent professional engineer registered in New Mexico stating that the CWL’s modification meets the requirements of this Permit; and

2. The Department has:
   a. inspected the modified or newly constructed portion of the CWL and it meets the requirements and conditions of this Permit; or
   b. waived the inspection or, within fifteen (15) calendar days from the date of submission of the letter required by Permit Condition 1.8.11.a., has not notified the Permittees of its intent to inspect.

1.8.11. **Twenty-Four Hour and Subsequent Reporting**

1.8.11.1. **Oral Report**

In accordance with 40 C.F.R. § 270.30(l)(6)(i) and (ii), the Permittees shall report to the Department any noncompliance which may endanger human health or the environment. Any such information shall be reported orally within 24 hours from the time the Permittees become aware of the circumstances. The report shall include the following:

1. Information concerning release of any hazardous waste, or hazardous constituents, that may cause an endangerment to public drinking water supplies; and

2. Any information about a release or discharge of hazardous waste, or hazardous constituents, or of a fire or explosion at the permitted unit which could threaten the environment or human health outside the permitted unit.

3. The description of the occurrence and its cause shall include:
   a. Name, address, and telephone number of the owner or operator and the name and phone number of the contact person;
   b. Name, address, and telephone number of the Facility;
   c. Date, time, and type of incident;
   d. Name and quantity of material(s) involved;
   e. The extent of injuries, if any;
   f. An assessment of actual or potential hazards to the environment and human health at or outside of the permitted unit, where this is applicable; and
   g. Estimated quantity and disposition of recovered material that resulted from the incident.

1.8.11.2. **Written Report**

In accordance with 40 C.F.R. § 270.30(l)(6)(iii), the Permittees shall also submit a written report within five (5) calendar days from the time the Permittees become aware of the noncompliance. The
written report shall contain a description of the noncompliance and its cause; the period of
noncompliance including exact dates and times, and if the noncompliance has not been corrected,
the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and
prevent reoccurrence of the noncompliance. The report shall also include the following:

1. Information concerning release of any hazardous waste, or hazardous constituents, that may
cause an endangerment to public drinking water supplies; and

2. Any information about a release or discharge of hazardous waste, or hazardous constituents,
or of a fire or explosion at the permitted unit which could threaten the environment or human
health outside the permitted unit.

3. The description of the occurrence and its cause shall include:
   a. Name, address, and telephone number of the owner or operator and the name and
      phone number of the contact person;
   b. Name, address, and telephone number of the Facility;
   c. Date, time, and type of incident;
   d. Name and quantity of material(s) involved;
   e. The extent of injuries, if any;
   f. An assessment of actual or potential hazards to the environment and human health at
      or outside of the permitted unit, where this is applicable; and
   g. Estimated quantity and disposition of recovered material that resulted from the
      incident.

The Department, at its discretion, may extend the time for submitting the written report to up to
fifteen (15) calendar days.

1.8.11.3. Reports Required by Contingency Plan

Any time the Contingency Plan in Permit Attachment 6 is implemented, the Permittees shall comply
with the reporting requirements required by 40 C.F.R. § 264.56(j).

1.8.12. Admissibility of Data

In any administrative or judicial action to enforce a condition of this Permit, the Permittees waive
any objection to the admissibility as evidence of any data generated pursuant to this Permit.

1.8.13. Other Noncompliance

In accordance with 40 C.F.R. § 270.30(l)(10), the Permittees shall report all other instances of
noncompliance not otherwise required to be reported under this Permit at the time monitoring
reports are submitted. The reports shall contain the information listed in Permit Condition 1.8.11.

1.8.14. Other Information

In accordance with 40 C.F.R. § 270.30(l)(11), whenever the Permittees become aware that they
failed to submit any relevant facts in the Permit Application, or submitted incorrect information in
the Permit Application or in any report to the Department, the Permittees shall promptly submit such
facts or information in writing to the Department.
1.9. REPORTS, NOTIFICATIONS, AND INFORMATION SUBMITTALS

1.9.1. Information Submittal

The Permittees shall submit by certified mail, courier/delivery service or hand delivery all reports, notifications, or other submittals that are required by this Permit to be sent or given to the Department.

In accordance with 40 C.F.R. § 270.43, failure to comply with any condition of the Permit, including relevant information submittal, constitutes a violation of the Permit and is grounds for enforcement action, Permit amendment, termination, revocation, suspension, or denial of Permit renewal application. Misrepresentation of any relevant facts at any time is grounds for termination of this Permit.

The Permittees shall ensure that all plans, reports, notifications, and other submittals to the Department required in this Permit are signed and certified in accordance with 40 C.F.R. § 270.11. Two (2) copies each of these plans, reports, notifications or other submissions shall be submitted to the Department by certified mail, courier/delivery service, or hand delivered to:

New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Telephone Number: (505) 476-6000
Facsimile Number: (505) 476-6030

1.9.2. Incorporation of Plans and Schedules into the Permit

All plans and schedules required by this Permit are, upon approval by the Department, incorporated into this Permit by reference and become an enforceable part of this Permit. Because required items are essential elements of this Permit, failure to submit any of the required items or submission of inadequate or insufficient relevant information may subject the Permittees to enforcement action under Section 74-4-10 of the HWA, which may include penalties and suspension or revocation of this Permit.

Any noncompliance with approved plans and schedules shall be deemed noncompliance with this Permit. Written requests for extensions of due dates for submittals may be granted by the Department.

1.10. CONFIDENTIAL INFORMATION

The Permittees may claim confidentiality for any information required to be submitted by this Permit. Any such claim must be asserted at the time of submittal in the manner prescribed on the application form, or in the case of other submittals, by stamping the words “confidential business information” on each page containing such information. If no claim is made, the Department may make the information available to the public without further notice. If a claim is asserted, the information will be treated in accordance with 40 C.F.R. § 270.12, the Inspection of Public Records Act, NMSA 1978, 14-2-1 to -12, and the HWA, NMSA 1978, 74-4-1 to -14.
PERMIT PART 2: GENERAL FACILITY CONDITIONS

2.0 INTRODUCTION

This Permit requires the Permittees to conduct post-closure care of the Chemical Waste Landfill (CWL), which is located at Technical Area III (TA-III), in compliance with the post-closure care requirements at 40 C.F.R. §§ 264.117 through 264.120 and this Permit.

The Permittees must comply with the groundwater protection standard at 40 C.F.R. § 264.92. Trichloroethene (TCE), chromium, and nickel have been detected in groundwater in the uppermost aquifer underlying the CWL. Therefore, in accordance with 40 C.F.R. § 264.91(a)(1), the Permittees must institute a compliance monitoring program meeting the requirements of 40 C.F.R. § 264.99.

2.1. HAZARDOUS WASTE PROHIBITION

The Permittees shall not accept hazardous waste for treatment, storage or disposal at the CWL.

2.2. SECURITY

In order to prevent the unknowing entry and to minimize the possibility of unauthorized entry of persons or livestock into the CWL, the Permittees shall comply with the security provisions and procedures described in Section 1.6 of Permit Attachment 1, in accordance with 40 C.F.R. § 264.14.

2.3. GENERAL INSPECTION REQUIREMENTS

In accordance with 40 C.F.R. § 264.15, the Permittees shall implement the inspection schedule required by Section 1.10 of Permit Attachment 1 and shall remedy any container and equipment malfunctions and deteriorations, operator errors, and discharges in accordance with 40 C.F.R. § 264.15(c). Records of inspection shall be kept in accordance with 40 C.F.R. § 264.15(d).

2.4. PREPAREDNESS AND PREVENTION

2.4.1. Required Equipment

The Permittees shall maintain at the Facility the equipment required by 40 C.F.R. § 264.32 as well as the additional equipment set forth in Permit Attachment 6, Tables 6-2, 6-3 and 6-4.

2.4.2. Testing and Maintenance of Equipment

The Permittees shall test and maintain the equipment specified in Permit Attachment 6, as necessary, to assure its proper operation in time of emergency in accordance with 40 C.F.R. § 264.33.

2.4.3. Access to Communications or Alarm System

The Permittees shall maintain at the CWL access to a communications or alarm system in accordance with 40 C.F.R. § 264.34.

2.4.4. Arrangements with Local Authorities

The Permittees shall maintain coordination agreements with the New Mexico Department of Homeland Security and Emergency Management, the KAFB 377th Air Base Wing, and the City of Albuquerque as well as with the University of New Mexico Medical Center, Lovelace Medical Center and Presbyterian Health Care Services, as described in Permit Attachment 6, Table 6-1. These arrangements shall be either Memoranda of Understanding (MOU) or Mutual Aid Agreements.
between the Permittees and the off-site cooperating agencies, and shall include the elements required by 40 C.F.R. § 264.37(a). Copies and descriptions of these MOUs and MAAs shall be maintained at the Facility office in the operating record. If such coordination agreements can not be reached through Permittees’ best efforts, the Permittees shall document their attempts to reach such agreements which failed.

2.5. CONTINGENCY PLAN

2.5.1. Implementation of Contingency Plan

The Permittees shall immediately implement the Contingency Plan contained in Permit Attachment 6 whenever there is a fire, explosion, or release of hazardous waste or hazardous waste constituents that could threaten human health or the environment in accordance with 40 C.F.R. § 264.51(b).

2.5.2. Copies of the Contingency Plan

The Permittees shall maintain copies of the Contingency Plan and all revisions and amendments to the Plan at the CAMU Administration Office, the Facility EOC and the Facility Records Center, in accordance with 40 C.F.R. § 264.53 and Section 6-1 of Attachment 6 of this Permit. Any person working at the CWL shall have a copy of the current Contingency Plan in their possession while at the CWL, or shall have ready access and be aware that a copy of the CWL Contingency Plan is available at the CAMU Administration Office. The Permittees shall provide copies of the current Contingency Plan and all revisions of the Plan to the Department and all entities with which the Permittees have emergency MOUs or MAAs in accordance with 40 C.F.R. § 264.53.

2.5.3. Amendments to Contingency Plan

In accordance with 40 C.F.R. § 264.54, the Permittees shall review and immediately amend, if necessary, the Contingency Plan whenever:

1. The Facility permit is revised;
2. The plan fails in an emergency;
3. The Facility or CWL changes—in design, construction, operation, maintenance, or other circumstances—in a way that materially increases the potential for fires, explosions, or releases of hazardous waste or hazardous waste constituents, or changes the response necessary in an emergency;
4. The list of emergency coordinators changes; or
5. The list of emergency equipment changes.

2.5.4. Emergency Coordinator

An Emergency Coordinator (EC) and an alternate EC, as specified in Permit Attachment 6, shall be available at all times in case of an emergency. The EC and alternate EC shall be thoroughly familiar with the Contingency Plan and shall have the authority to commit the resources needed to implement the Contingency Plan in accordance with 40 C.F.R. § 264.55. In the event of an imminent or actual emergency, the EC shall activate the internal emergency alarms, notify the appropriate State or local agencies with designated response roles, and implement other procedures in accordance with 40 C.F.R. § 264.56, and as described in Permit Attachment 6.
2.6. RECORD KEEPING AND REPORTING

In addition to the record keeping and reporting requirements specified elsewhere in this Permit and 40 C.F.R. § 264.73(a), the Permittees shall comply with the following conditions:

2.6.1. Data Retention

All raw data, such as laboratory reports, drilling logs, bench scale or pilot scale data, and other supporting information gathered or generated during activities undertaken pursuant to this Permit shall be maintained at the Facility during the term of this Permit, including any reissued Permits. In accordance with 40 C.F.R. § 270.32(b)(2), raw data shall be made available to the Department upon request.

2.6.2. Operating Record

The Permittees shall maintain a written Operating Record at the Corrective Action Management Unit administration trailer, and at the Environmental Safety and Health Records Center.

2.6.3. Annual Report

The Permittees shall submit a post-closure care report to the Department on an annual basis, as specified in Section 1.12 of Attachment 1 of this Permit.

2.6.4. Personnel and Telephone Number Changes

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

2.6.5. Post-Closure Notices

A copy of the post-closure notice required by 40 C.F.R. § 264.119 shall be submitted to the local zoning authority (Bernalillo County Zoning, Building, and Planning Commission and County Clerk) and the Department within 60 days of certification of closure. The post-closure notice shall include a legal description of the CWL and associated land-use restrictions. The following general restrictions apply to the CWL:

1. Industrial land-use designation shall be maintained;
2. The elevation of the surface of the landfill (the engineered cover) shall not be lowered;
3. The cover and surrounding area shall not be altered in any manner such that drainage onto and infiltration of moisture into the landfill is increased; and
4. Excavation, drilling, or construction involving intrusive activities are prohibited during the post-closure care period, unless authorized by the Department.
2.6.6. Certification of Completion of Post-Closure Care

In accordance with 40 C.F.R. § 264.120, within 60 days of the end of the post-closure care period for the CWL, the Permittees shall submit to the Department, by registered mail, a written certification that post-closure care for the CWL was performed in accordance with the specifications of this Permit. Responsible officials of the Permittees, as well as an independent professional engineer, registered in the State of New Mexico, shall sign the certification. The Permittees shall furnish documentation supporting the independent registered professional engineer’s certification of completion of post-closure care to the Department upon request and at cost to the Permittees. In addition, the Permittees shall prepare a final post-closure care report containing, in an appendix, all Post-Closure Care Inspection Forms (PCIFs) generated during the post-closure care period. The final post-closure care report shall summarize pertinent PCIF information regarding post-closure care and compliance monitoring, inspections, maintenance, and repair activities and any variances from this Permit and the reasons for the variances, summarize results of groundwater and soil gas monitoring conducted during the compliance and post-closure care periods, and summarize the results of any corrective actions taken. The final post-closure care report shall be provided with the certification to the Department for approval within 60 days of the end of the post-closure period. Transmittal of the report shall include a request from the Permittees for the Department to approve termination of the post-closure care period for the CWL. However, submittal of the latter request does not obligate the Department to terminate post-closure care, and the Department, instead, may extend the period of post-closure care if necessary to protect human health and the environment in accordance with 40 C.F.R. 264.117(a)(2)(ii).

2.7. COST ESTIMATE AND FINANCIAL ASSURANCE FOR FACILITY POST-CLOSURE CARE

Pursuant to 40 C.F.R. § 264.140(c), DOE as an agency of the Federal government is exempt from the requirement to provide a cost estimate for post-closure care as required by 40 C.F.R. § 264.144 and to provide for financial assurance for post-closure care as required by 40 C.F.R. § 264.145. Pursuant to Pub. L. 108-199 (Jan. 23, 2004), Sandia Corporation is not required to fulfill any financial responsibility requirement relating to closure or post-closure care and monitoring of Sandia National Laboratories and is therefore exempt from the requirement to provide a cost estimate for post-closure care as required by 40 C.F.R. § 264.144 and to provide for financial assurance for post-closure care as required by 40 C.F.R. § 264.145.

2.8. FINANCIAL RESPONSIBILITY

Reserved.

2.9. DOCUMENTS TO BE MAINTAINED AT THE FACILITY

The Permittees shall maintain at the Facility, until post-closure care is approved as completed by the Department, the following documents and all amendments, revisions, and modifications to these documents:

1. This Permit and its Attachments;
2. The Inspection Plan described in Permit Attachment 1 and the inspection schedules and results in accordance with 40 C.F.R. § 264.15(b);
3. The Operating Record described in Permit Attachment 1, in accordance with 40 C.F.R. § 264.73;

4. The Personnel Training documents and records described in Permit Attachment 5, in accordance with 40 C.F.R. § 264.16(d) and (e);

5. The Contingency Plan described in Permit Attachment 6, in accordance with 40 C.F.R. § 264.53(a), and including summary reports and details of all incidents or emergencies that require implementation of the Contingency Plan, in accordance with 40 C.F.R. § 264.56(j);

6. The names, addresses, and phone numbers of the Emergency Coordinator (EC) and all persons designated as alternate EC, in accordance with Permit Condition 2.6.4, and as contained in Permit Attachment 6;

7. A list of all emergency equipment, as contained in Permit Attachment 6;

8. Groundwater monitoring and soil gas sampling analytical results and data included in the semi-annual and annual reports required under Part 3, Permit Conditions 3.4 and 3.5, and as described in detail in Attachments 2 and 3 of this Permit; and

9. Copies of manifests for any shipments off-site of any hazardous waste generated at the CWL.
PERMIT PART 3: POST-CLOSURE CARE REQUIREMENTS FOR THE CHEMICAL WASTE LANDFILL

3.0 GENERAL

The CWL Closure Plan, which contained mandatory closure requirements for the CWL, was approved by the NMED in February 1993. A few years earlier, in 1990, trichloroethene (TCE) was detected in groundwater at a concentration exceeding the U.S. Environmental Protection Agency (EPA) Maximum Contaminant Level (MCL) of 0.005 mg/L. This finding led to the development and incorporation of a corrective action program into the approved Closure Plan (as Appendix S). Groundwater and subsurface soil and soil-gas investigations, as well as two Voluntary Corrective Measures (VCMs) were subsequently conducted according to Closure Plan requirements and related documents.

The CWL was excavated from September 1998 through February 2002 to remove the contents of the landfill and contaminated soil (the Landfill Excavation VCM). Soil-vapor extraction was conducted prior to the Landfill Excavation VCM and removed a portion of the VOC soil-gas plume in the vadose zone (the Vapor Extraction VCM). Numerous intact containers of waste were removed as a result of excavation of the landfill; the wastes within these containers were treated and disposed of off-site. Soil having the highest levels of contaminants was treated as necessary and placed permanently into the containment cell at the nearby Corrective Action Management Unit. After excavation was completed, the CWL was backfilled with soil to a uniform depth of four feet below ground surface. Some of the soil used as backfill was originally excavated from the landfill (this soil is referred to as replaceable soil). Concentrations of contaminants in the replaceable soil meet industrial risk levels, consistent with the projected future land use for the CWL site. Since completing the Landfill Excavation and Vapor Extraction VCMs, levels of contaminants in the groundwater have dropped to concentrations below applicable EPA MCLs and New Mexico Water Quality Control Commission water quality standards. Construction of the at-grade cover for the CWL was completed in September 2005, originally as an interim measure.

This Permit Part includes information on the requirements for the length of post-closure care, planned monitoring and maintenance activities, and other requirements for post-closure care. More detailed post-closure care requirements for the CWL are presented in the Attachments to this Permit.

In addition to the post-closure care requirements of 40 C.F.R. §§ 264.117 through 264.120, the Permittees must comply with the groundwater protection standard at 40 C.F.R. § 264.92. Trichloroethene (TCE), chromium, and nickel have been detected in groundwater in the uppermost aquifer underlying the CWL. Therefore, in accordance with 40 C.F.R. § 264.91(a)(1), the Permittees must institute a compliance groundwater monitoring program meeting the requirements of 40 C.F.R. § 264.99. In accordance with 40 C.F.R. § 264.96(a), the compliance period shall last for 47 years, and shall begin when the Permittees initiate the required compliance monitoring program in accordance with 40 C.F.R. § 264.99. In accordance with 40 C.F.R. § 264.96(c), if the Permittees are engaged in a corrective action program at the end of the compliance period, the compliance period shall be extended until the Permittees can demonstrate that the groundwater protection standard of 40 C.F.R. § 264.92 has not been exceeded for a period of three consecutive years.
3.1. **RESIDUAL SOIL CONTAMINATION AT RISK-BASED LEVELS**

Residual soil contamination that remains at the landfill currently meets risk-based levels for industrial land use. Table 3-1 summarizes the maximum concentrations of contaminants detected in replaceable soil and unexcavated soil. As noted above, replaceable soils are soils placed back into the landfill following completion of the Landfill Excavation VCM. Unexcavated soils are soils that were not removed during the LE VCM, but may contain low levels of hazardous constituents meeting risk-based criteria.
## Table 3-1

### Residual Soil Concentrations in the Chemical Waste Landfill - Replaceable Soil and Unexcavated Soil

<table>
<thead>
<tr>
<th>COC</th>
<th>SNL/NM Background Concentration (mg/kg)</th>
<th>Concentration Range in Replaceable Soils above Background (mg/kg)</th>
<th>Number of Detections in Replaceable Soils above Background</th>
<th>Concentration Range in Unexcavated Soils (mg/kg)</th>
<th>Number of Detections in Unexcavated Soils</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inorganic</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arsenic</td>
<td>4.4</td>
<td>86.3</td>
<td>30</td>
<td>4.51-73.1</td>
<td>40</td>
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<tr>
<td>Barium</td>
<td>214</td>
<td>563 J</td>
<td>4</td>
<td>215-519</td>
<td>8</td>
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<tr>
<td>Beryllium</td>
<td>0.65</td>
<td>1.14</td>
<td>3</td>
<td>0.741-0.846</td>
<td>4</td>
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<tr>
<td>Cadmium</td>
<td>0.9</td>
<td>15.6</td>
<td>7</td>
<td>1.79</td>
<td>1</td>
</tr>
<tr>
<td>Chromium</td>
<td>15.9</td>
<td>1800</td>
<td>31</td>
<td>17.7-1800</td>
<td>23</td>
</tr>
<tr>
<td>Chromium VI</td>
<td>1</td>
<td>24.6</td>
<td>10</td>
<td>1.02-24.6</td>
<td>29</td>
</tr>
<tr>
<td>Copper</td>
<td>18.2</td>
<td>545 J</td>
<td>25</td>
<td>18.6-261</td>
<td>9</td>
</tr>
<tr>
<td>Lead</td>
<td>11.8</td>
<td>338</td>
<td>48</td>
<td>11.9-162</td>
<td>42</td>
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<tr>
<td>Mercury</td>
<td>&lt;0.1</td>
<td>236</td>
<td>49</td>
<td>0.104-2.35</td>
<td>42</td>
</tr>
<tr>
<td>Nickel</td>
<td>11.5</td>
<td>26.1</td>
<td>7</td>
<td>12.4-23.4</td>
<td>4</td>
</tr>
<tr>
<td>Selenium</td>
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<td>9.61</td>
<td>2</td>
<td>1.07-9.61</td>
<td>3</td>
</tr>
<tr>
<td>Silver</td>
<td>&lt;1</td>
<td>1.5</td>
<td>2</td>
<td>All results &lt; bkgd</td>
<td>0</td>
</tr>
<tr>
<td><strong>Organic</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acenaphthene</td>
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<td>0.406</td>
<td>10</td>
<td>0.00484-0.406</td>
<td>6</td>
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<td>Acenaphthylene</td>
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<td>Acetone</td>
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<td>0.617&lt;sup&gt;b&lt;/sup&gt; J</td>
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<td>0.00152-0.617</td>
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<td>Aniline</td>
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<td>0.312 J</td>
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<td>0.23-0.293</td>
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<tr>
<td>Anthracene</td>
<td>NA</td>
<td>0.347</td>
<td>14</td>
<td>0.00522-0.209</td>
<td>9</td>
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<tr>
<td>Benzo(a)anthracene</td>
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<td>6</td>
<td>0.0174-0.531</td>
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<tr>
<td>Benzo(a)pyrene</td>
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<td>4</td>
<td>0.0374-0.0859</td>
<td>4</td>
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<td>Benzo(b)fluoranthene</td>
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<td>9</td>
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<td>6</td>
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<tr>
<td>Benzo(ghi)perylene</td>
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<td>0.408 J</td>
<td>1</td>
<td>0.0293-0.408</td>
<td>2</td>
</tr>
<tr>
<td>COC</td>
<td>SNL/NM Background Concentration (mg/kg)</td>
<td>Maximum Concentration (mg/kg)</td>
<td>Concentration Range in Replaceable Soils above Background (mg/kg)</td>
<td>Number of Detections in Replaceable Soils above Background</td>
<td>Concentration Range in Unexcavated Soils (mg/kg)</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>----------------------------------------</td>
<td>------------------------------</td>
<td>------------------------------------------------------------------</td>
<td>---------------------------------------------------------</td>
<td>-----------------------------------------------</td>
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<tr>
<td>Benzo(k)fluoranthene</td>
<td>NA</td>
<td>0.218</td>
<td>0.0399-0.218</td>
<td>3</td>
<td>0.00515-0.121</td>
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<tr>
<td>Bromodichloromethane</td>
<td>NA</td>
<td>0.0175&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.00076</td>
<td>1</td>
<td>ND</td>
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<tr>
<td>Bromoform</td>
<td>NA</td>
<td>0.018&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.000554-0.006</td>
<td>21</td>
<td>0.00182</td>
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<tr>
<td>4-Bromophenyl phenyl ether</td>
<td>NA</td>
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<td>ND</td>
<td>0</td>
<td>0.00843</td>
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<td>2-Butanone</td>
<td>NA</td>
<td>0.187&lt;sup&gt;J&lt;/sup&gt;</td>
<td>0.00388-0.00739</td>
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<td>0.00104-0.187</td>
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<td>Butylbenzene, tert-</td>
<td>NA</td>
<td>0.015&lt;sup&gt;b&lt;/sup&gt;</td>
<td>ND</td>
<td>0</td>
<td>0.00161</td>
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<tr>
<td>Butylbenzyl phthalate</td>
<td>NA</td>
<td>0.0728&lt;sup&gt;J&lt;/sup&gt;</td>
<td>ND</td>
<td>0</td>
<td>0.0131-0.0728</td>
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<td>Carbazole</td>
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<td>0.0572&lt;sup&gt;J&lt;/sup&gt;</td>
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<td>Carbon disulfide</td>
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<td>bis(2-Chloroethyl)ether</td>
<td>NA</td>
<td>0.248&lt;sup&gt;J&lt;/sup&gt;</td>
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<td>ND</td>
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<tr>
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<td>Chloromethane</td>
<td>NA</td>
<td>0.00175&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.00034</td>
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<tr>
<td>2-Chloronaphthalene</td>
<td>NA</td>
<td>0.01835&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>0</td>
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<td>2-Chlorophenol</td>
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<td>0.025&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>NA</td>
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<td>Chrysene</td>
<td>NA</td>
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<td>Di-n-butyl phthalate</td>
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<td>0.0256-9.3</td>
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<td>Dibenzofuran</td>
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<td>0.118&lt;sup&gt;J&lt;/sup&gt;</td>
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<td>Dibromochloromethane</td>
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<td>0.0205&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>2,4-Dichlorophenol</td>
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<td>ND</td>
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<tr>
<td>COC</td>
<td>SNL/NM Background Concentration (mg/kg)a</td>
<td>Maximum Concentration (mg/kg)</td>
<td>Concentration Range in Replaceable Soils above Background (mg/kg)</td>
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<td>Concentration Range in Unexcavated Soils (mg/kg)</td>
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<td>---------------------------------</td>
<td>----------------------------------------</td>
<td>------------------------------</td>
<td>---------------------------------------------------------------</td>
<td>----------------------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Diethylphthalate</td>
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<td>0.025</td>
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<td>2,4-Dimethylphenol</td>
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<td>Methylene chloride</td>
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<td>2-Methylnapthalene</td>
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<td>0.00414-0.0295</td>
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<td>4-Methylphenol (same as p-Cresol)</td>
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<tr>
<td>COC</td>
<td>SNL/NM Background Concentration (mg/kg)</td>
<td>Concentration Range in Replaceable Soils above Background (mg/kg)</td>
<td>Number of Detections in Replaceable Soils above Background</td>
<td>Concentration Range in Unexcavated Soils (mg/kg)</td>
<td>Number of Detections in Unexcavated Soils</td>
</tr>
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<td>------------------------------</td>
<td>-----------------------------------------</td>
<td>---------------------------------------------------------------</td>
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<td>Naphthalene</td>
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<td>PCBs, total</td>
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<td>4-methyl-2-Pentanone</td>
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<td>Phenanthrene</td>
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<td>Phenol</td>
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<td>n-Propylbenzene</td>
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<tr>
<td>Pyrene</td>
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<td>0.0114-1.46</td>
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<td>0.00951-1.51</td>
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<tr>
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<td>0.000333-0.00445</td>
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<td>0.11</td>
<td>0.0021-0.11</td>
<td>4</td>
<td>0.00158-0.0108</td>
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<td>Tetrahydrofuran</td>
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<tr>
<td>Toluene</td>
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<td>0.000369-0.0183</td>
<td>12</td>
<td>0.0005123-0.894</td>
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<tr>
<td>o-Toluidine</td>
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<td>ND</td>
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<td>1,2,3-Trichloropropane</td>
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<td>Xylene</td>
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<td>m-,p-Xylene</td>
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<td>o-Xylene</td>
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<td>0.000313-0.000919</td>
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### Radiological Constituents

<table>
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<tr>
<th>COC</th>
<th>SNL/NM Background Concentration (pCi/g)&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Maximum Concentration (pCi/g)</th>
<th>Activity Range in Replaceable Soils Above Background (pCi/g)</th>
<th>Number of Detections in Replaceable Soils Above Background</th>
<th>Activity Range in Unexcavated Soils Above Background (pCi/g)</th>
<th>Number of Detections in Unexcavated Soils Above Background</th>
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<td>Co-60</td>
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<tr>
<td>Cs-137</td>
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<td>0.0811-0.163</td>
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<td>H-3</td>
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<td>9.9</td>
<td>0.0237-9.9</td>
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<td>1.02-2.3</td>
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<tr>
<td>U-235</td>
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<td>0.454&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.179-0.219</td>
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<td>0.161-0.227</td>
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<td>U-238</td>
<td>1.4</td>
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<td>11</td>
<td>1.43-3.26</td>
<td>25</td>
</tr>
</tbody>
</table>

Note: Data qualifiers (i.e., “J”) are not included in this table except in the Maximum Concentration column.

<sup>a</sup> Dinwiddie, September 1997.

<sup>b</sup> Maximum value reported is ½ the maximum detection limit, which was greater than the maximum detected value.

<sup>c</sup> Maximum value from a clean fill soil sample – only one detection of this constituent.

<sup>d</sup> All total PCB concentrations greater than 1 part per million represent soil at depths greater than 5 feet below ground surface.

<sup>e</sup> Tharp, February 1999.

COC = Constituent of concern.

J = Estimated concentration.

mg/kg = Milligram(s) per kilogram.

NA = Not applicable.

PCB = Polychlorinated biphenyl.

pCi/g = Picocurie(s) per gram.
3.2. POST-CLOSURE CARE PROCEDURES AND USE OF PROPERTY

3.2.1. Duration of Post-Closure Care

The Permittees shall conduct post-closure care for the CWL to begin upon the Department’s written approval of the Permittees’ certification of closure of the unit and continue for 30 years after that date, except that the 30-year post-closure care period may be shortened or extended, as follows:

1. In accordance with 40 C.F.R. § 264.117(a)(2)(i), the Department may, in accordance with the permit modification procedures in 40 C.F.R. Part 270 and 20.4.1.901 NMAC, shorten the post-closure care period if it finds that human health and the environment will be protected sufficiently (e.g., groundwater and soil-gas monitoring results indicate that the CWL is secure).

2. In accordance with 40 C.F.R. § 264.117(a)(2)(ii), the Department may, in accordance with the permit modification procedures in 40 C.F.R. Part 270 and 20.4.1.901 NMAC, extend the post-closure care period if it finds that this is necessary to protect human health or the environment (e.g., groundwater or soil-gas monitoring results indicate a potential for migration of hazardous wastes at levels which may be harmful to human health and the environment).

3.2.2. Groundwater Monitoring System

The Permittees shall operate and maintain the groundwater monitoring system and shall comply with all applicable requirements of 40 C.F.R. Part 264, Subpart F during the post-closure care and compliance periods, in accordance with 40 C.F.R. § 264.117(a)(1), and as specified in this Permit.

3.2.3. Special Post-Closure Requirements for Landfills

The Permittees shall comply with the requirements for landfills at 40 C.F.R. § 264.310(b), except for the requirements for a leachate collection and removal system, and as described in Attachment 1 of this Permit, as follows.

1. Maintain the integrity and effectiveness of the final cover, including making repairs to the cover, as necessary, to correct the effects of settling, subsidence, erosion, or other events;

2. Operate and maintain the groundwater monitoring system described in Section 1.4 of Attachment 1 of this Permit, and comply with all other applicable requirements of 40 C.F.R. Part 264 Subpart F;

3. Prevent run-on and run-off from eroding or otherwise damaging the final cover; and

4. Protect and maintain surveyed benchmarks used in complying with the surveying and recordkeeping requirements of 40 C.F.R. § 264.309.

3.2.4. Security Requirements

In accordance with 40 C.F.R. § 264.117(b), the Permittees shall comply with all security requirements, as specified in Attachment 1 of this Permit, and as required by 40 C.F.R. § 264.14.
3.2.5. **Future Land Use Requirements**

The Permittees shall not allow any use of the CWL that will disturb the integrity of the final cover or the function of the unit’s monitoring systems during the post-closure care period, as required by 40 C.F.R. § 264.117(c).

3.3. **INSPECTION**

The Permittees shall inspect the components, structures, and equipment at the CWL in accordance with the Inspection and Maintenance/Repair Schedule described in Section 1.9 of Attachment 1 of this Permit using the Inspection Checklists in Permit Attachment 4, and in accordance with the inspection requirements of 40 C.F.R. § 264.15.

3.4. **GROUNDWATER SAMPLING AND ANALYSIS PLAN**

The Permittees shall conduct groundwater sampling and analysis following the procedures and requirements described in Attachments 1 and 2 of this Permit.

3.5. **SOIL GAS SAMPLING AND ANALYSIS**

The Permittees shall conduct soil-gas sampling and analysis following the procedures and requirements described in Attachments 1 and 3 of this Permit.

3.6. **PERSONNEL TRAINING FOR POST-CLOSURE CARE PERIOD**

The Permittees shall implement the CWL-specific personnel training program for the post-closure care period specified in Attachment 5 of this Permit, and as required by 40 C.F.R. § 264.16.

3.7. **POST-CLOSURE PERMIT MODIFICATIONS**

In accordance with 40 C.F.R. § 264.118(d), the Permittees must request a permit modification to authorize a change in this Permit. This request must be in accordance with applicable requirements of 40 C.F.R. Part 270 and 20.4.1.901 NMAC, and must include a copy of the proposed amended portions of this Permit for approval by the Department. The Permittees shall request a permit modification whenever changes in operating plans or facility design affect any part of this Permit, there is a change in the expected year of final closure, or other events occur during the post-closure care period of the CWL that affect this Permit. The Permittees must submit a written request for a permit modification to the Department at least sixty (60) days prior to the proposed change in CWL design or operation, or no later than 60 days after an unexpected event has occurred which has affected the post-closure care requirements contained in this Permit.

3.8. **REFERENCES**


PERMIT ATTACHMENT 1: POST-CLOSURE CARE PLAN FOR THE CHEMICAL WASTE LANDFILL

1.0 INTRODUCTION

This Permit Attachment presents general information and provides the context by which post-closure care activities at the Chemical Waste Landfill (CWL) shall be conducted.

1.1. GENERAL DESCRIPTION OF THE FACILITY

Sandia National Laboratories (the Facility), EPA Identification Number NM5890110518, is a multidisciplinary laboratory engaged in the research and development of weapons and alternative energy sources. Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, manages the Facility for the Department of Energy (DOE). Work at the laboratory is also performed for the U.S. Department of Defense and the Nuclear Regulatory Commission as well as other entities. Generation and management of solid, hazardous, and mixed waste occur at the Facility as a result of these activities. The Facility is located south of Albuquerque, New Mexico, within the boundaries of Kirtland Air Force Base (KAFB) in Bernalillo County (Figure 1).

1.2. LOCATION, CONDITIONS, AND DESCRIPTION OF THE CWL

1.2.1. Location and General Description

The CWL is a 1.9-acre site located in the southeast corner of Technical Area (TA) III (TA-III). A Facility map, which shows the topography of the area, the location of the TAs, and the location of the CWL is presented in Figure 1. A more detailed map of TA-III is presented in Figure 2.

The regional aquifer is located within the Santa Fe Group, with the water table at a depth of approximately 485 feet below ground surface (bgs). Groundwater appears to flow toward the northwest at a rate of approximately 2 feet per year (SNL/NM December 1992; SNL/NM May 1993).

Several major well fields have been developed in the regional aquifer to supply drinking water to Albuquerque, KAFB, and surrounding areas. The closest well field is located approximately 4 miles north-northwest and down gradient of the CWL. Within that well field, the closest down gradient water supply well is KAFB-4, located approximately 4.3 miles north-northwest of the CWL. Water levels at the CWL have been declining at an approximate rate of 0.6 feet/year. Over the past 15 years, the water level has decreased by approximately 9 feet at the CWL (SNL/NM July 2004).

The surface winds at the Facility are light. Winds from the east and southwest are particularly common and generally less than 8 miles per hour (Figure 3).

From 1962 until 1981, the CWL was used for the disposal of chemical, radioactive, and solid waste generated by research activities at the Facility. The CWL was used as a hazardous waste storage unit from 1981 to 1989. Disposal of liquid waste in unlined pits and trenches ended in 1981, and after 1982 all liquid waste disposal was terminated. From 1982 through 1985, only solid waste was disposed of at the CWL. Waste disposal at the landfill after 1982 included the disposal of hazardous waste. After 1985 all waste disposal ended. After 1989, the CWL was no longer used as a hazardous waste storage unit.
1.2.2. **Current Landfill Conditions**

The CWL was excavated from September 1998 through February 2002 as part of the Landfill Excavation (LE) Voluntary Corrective Measure (VCM). Soil-vapor extraction was also conducted as a VCM from 1997 through 1998 prior to landfill excavation to reduce the concentrations of volatile organic compound (VOC) soil vapor in the vadose zone and to reduce groundwater TCE concentrations below the MCL of 5 micrograms per liter (µg/L). All former disposal areas were excavated. Approximately 52,000 cubic yards of contaminated soil and debris were removed during the landfill VCM. Figure 4 shows the post-LE VCM subsurface configuration of the volatile organic compound (VOC) soil-gas contaminant plume. The extent of the excavation and the associated confirmatory soil sampling grid locations on the excavation floor and sidewalls are shown in Figure 5.

The CWL excavation was backfilled with soil, some of it having low concentrations of contaminants, to a uniform depth of 4 feet bgs from June 2002 through February 2003, following the construction specifications in the CWL Backfill and Compaction Plan (DOE/SNL July 2002). An at-grade vegetative soil cover was installed over the CWL. The cover is described in Section 1.3 of this Permit Attachment. Figure 6 presents the current configuration and features of the CWL and delineates the area subject to post-closure care.

Due to the remote location of the CWL in TA-III, general Facility traffic patterns will neither affect nor be affected by CWL post-closure activities. Traffic within the CWL will be light and normally will only occur during periodic inspection and sampling periods.

During the LE VCM, the CWL site operational boundary (SOB) was expanded to the east and north to include an additional 11.4 acres for waste management activities. The current conditions of the SOB meet the New Mexico Environment Department (Department)-approved cleanup standards/criteria (Lewis October 2000).

1.2.3. **Description of Cover Installation**

The vegetative at-grade soil cover was installed from March through August 2005, originally as an interim measure, which was conditionally approved by the Department in September 2004 (Kieling September 2004a). Conditions were addressed in the revised remedial action proposal (RAP) that was included as Annex I of the revised Corrective Measures Study Report. The cover comprises two layers, a native soil layer (approximately 3 feet thick) and a topsoil layer (approximately 1.5 feet thick), and is described in more detail in Section 1.3 of this Permit Attachment.

1.2.4. **Seismic Considerations**

With respect to 40 C.F.R. § 264.18(a), there are no known faults with Holocene displacements located within 200 feet of the CWL.

1.2.5. **Floodplain**

The locations of the 100-year floodplains in the vicinity of the CWL are shown in Figure 3. With respect to 40 C.F.R. § 264.18(b)(2)(i), the CWL is not located within a 100-year floodplain.
1.3. DESCRIPTION OF THE FINAL COVER

The vegetative soil cover consists of two discrete layers: 1) a 3-foot-thick native soil layer (sub-grade for topsoil layer) installed from 4 feet bgs to 1 foot bgs, and 2) a 1.5-foot-thick (minimum 1-foot-thickness) topsoil layer comprised of minimally compacted topsoil admixed with 3/8-inch, crushed gravel installed from 1 foot bgs to the local grade. Both the native soil and topsoil layers consist of soil excavated from the TA-III borrow pit located west of the CWL. The soil utilized for the cover was sampled to confirm that it meets both the risk-based criteria for surface soil and the construction specifications for the two layers documented in the revised RAP (SNL/NM December 2004). The topsoil layer was revegetated with native plants according to the specifications contained in the RAP (SNL/NM December 2004). Table 1-1 shows the seed mix and seeding rate from the general seeding specifications presented in the RAP. Figure 7 shows the CWL excavation backfilled to 4 feet below ground surface (bgs) (March 2004) and the newly installed cover prior to drainage swale installation, reseeding, and completing the perimeter security fence (August 2005).

<table>
<thead>
<tr>
<th>Species</th>
<th>Percent of Total Seed Mix</th>
<th>Calculated Seeding Rate (lbs/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indian Rice grass</td>
<td>39.0%</td>
<td>7.8 lbs/acre</td>
</tr>
<tr>
<td>Galleta</td>
<td>19.5%</td>
<td>3.9 lbs/acre</td>
</tr>
<tr>
<td>Blue Grama Grass</td>
<td>29.5%</td>
<td>5.9 lbs/acre</td>
</tr>
<tr>
<td>Sand Dropseed</td>
<td>6.0%</td>
<td>1.2 lbs/acre</td>
</tr>
<tr>
<td>Alkali sacaton</td>
<td>6.0%</td>
<td>1.2 lbs/acre</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
<td><strong>20 lbs/acre</strong></td>
</tr>
</tbody>
</table>

*Calculated seeding rate when mixed with the other listed seed species and normalized to a combined seeding rate of 20 lbs/acre.

The primary objectives for the CWL vegetative cover system are to minimize infiltration of moisture into the former landfill and to minimize long-term maintenance consistent with 40 C.F.R. § 264.111(a). A secondary objective is to provide a physical barrier between the surface and excavation floor, where the highest concentrations of residual soil contamination occur. Figure 8 shows a conceptual schematic diagram of the CWL excavation, backfill layers, and cover layers. The cover system utilizes soil-water balance properties to minimize infiltration/percolation by using vegetation growing on the cover to transpire water from the soil and as well as natural evaporation processes. Once established, native vegetation on the cover will require little or no maintenance, is best adapted to removing moisture from the local soil, and is best suited for local climatic conditions.

1.3.1. Surface Topsoil Layer

The minimally compacted topsoil layer is designed to support and facilitate the development of maximum root density and will act as the primary moisture storage layer. The topsoil layer is a blend of 75 percent local topsoil and 25 percent 3/8-inch, crushed gravel. The installed thickness of this layer is 18 to 24 inches to ensure that the minimum thickness requirement of 12 inches is
maintained. The topsoil-gravel blend and minimum thickness specifications are intended to reduce the effects of erosion, facilitate the development of maximum near-surface root density, and optimize near-surface moisture for seedlings. Once vegetation is established, it will minimize potential surface erosion, maintain the topsoil thickness over time, and transpire moisture to the atmosphere. Infiltration/percolation of surface moisture will be minimized through a combination of evaporation and transpiration to the atmosphere. For the dominant native grass species of the local east mesa ecosystem, maximum root density occurs in the upper 1 foot of soil (Peace et al. November 2004).

1.3.2. Native Soil Layer

A 3-foot-thick native soil layer comprises the subgrade for the topsoil layer and provides a secondary moisture storage layer designed to limit deeper moisture penetration.

1.3.3. Surface Drainage Controls

In addition to the topsoil layer and vegetation, engineering controls shall be applied to minimize erosion losses and control run-on/run-off. These include slope control, surface run-off control, and perimeter surface water flow control. The CWL cover is an “at grade” landfill cover and is crowned to prevent ponding. The crown of the cover slopes to the north and south at a 1-percent grade, and east to west at a 3-percent grade. This design facilitates low-profile mounding and gentle slopes that enhance resistance to erosion caused by wind and precipitation.

1.4. DESCRIPTION OF THE COMPLIANCE MONITORING SYSTEM

Groundwater monitoring shall be conducted during the compliance and post-closure care periods. Soil-gas monitoring shall be conducted during the post-closure period. Groundwater monitoring shall include monitoring of the uppermost aquifer, utilizing Department-approved monitoring wells. VOC soil-gas plume monitoring shall include monitoring of the approximately 500-foot-thick vadose zone in accordance with Permit Attachment 3.

1.4.1. Groundwater Monitoring System

Groundwater monitoring shall be performed to ensure the protection of groundwater during the compliance and post-closure care periods. The monitoring network shall include the following monitoring wells that are shown in Figures 6 and 9.

- One hydraulically upgradient well—CWL-BW5
- Three hydraulically down gradient wells—CWL-MW9, CWL-MW10, and CWL-MW11

Sampling frequency and additional analytical requirements are addressed in Section 1.8.1 of this Permit Attachment. If any of the compliance wells listed above cannot be sampled during the compliance or post-closure care periods due to the declining water table or other reasons, the Permittees shall apply for a permit modification to change this Permit (see Permit Part 1, Section 1.6.2). Any well that is part of the monitoring network that cannot be sampled shall be replaced, if at the time, the Department determines that a replacement well is necessary. If a replacement well is deemed necessary by the Department, the Permittees shall submit to the Department for approval a plan to replace the well, and to plug and abandon the well that is to be replaced in accordance with the Office of the State Engineer requirements. The plan shall include a schedule to implement the
work and shall be submitted to the Department within 90 days of written notification by the Department that the well must be replaced.

Well completion diagrams for all compliance and post-closure care groundwater monitoring wells are provided in Attachment 2 of this Permit. All of these wells are constructed with polyvinyl chloride screens installed across the water table.

The Chemical Waste Landfill is subject to 40 C.F.R. § 264.90(a)(1) and is a “regulated unit” as defined in 40 C.F.R. § 264.90(a)(2). Thus, the Permittees must comply with the requirements of 40 C.F.R. §§ 264.91 through 264.100 in lieu of § 264.101 for purposes of detecting, characterizing and responding to releases to the uppermost aquifer. Among these applicable provisions is the groundwater protection standard at 40 C.F.R. § 264.92.

In accordance with 40 C.F.R. § 264.95, the point of compliance at which the groundwater protection standard at 40 C.F.R. § 264.92 applies and at which monitoring must be conducted is hereby established as the western and northern boundaries of the landfill. (The point of compliance is a vertical surface located at the hydraulically down gradient limit of the waste management area that extends down into the uppermost aquifer.) For the purpose of complying with the requirements of this Permit and 40 C.F.R. Part 264 Subpart F, the background well for the CWL shall be CWL-BW5, and the compliance wells (located at the point of compliance) shall be CWL-MW9, CWL-MW10, and CWL-MW11 (see Figure 6).

In accordance with 40 C.F.R. § 264.93, the hazardous constituents to which the groundwater protection standard at 40 C.F.R. § 264.92 applies are hereby specified to be trichloroethene (TCE), chromium (Cr), and nickel (Ni). In accordance with 40 C.F.R. § 264.94, the concentration limits in the groundwater for these hazardous constituents are as specified in Table 1-2:

<table>
<thead>
<tr>
<th>Hazardous Constituent</th>
<th>Concentration Limit</th>
<th>Basis of Concentration Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trichloroethene</td>
<td>0.005 mg/L</td>
<td>EPA MCL, 40 C.F.R. § 264.94(b)</td>
</tr>
<tr>
<td>Chromium</td>
<td>0.050 mg/L</td>
<td>Table 1, 40 C.F.R. § 264.94(a)(2)</td>
</tr>
<tr>
<td>Nickel</td>
<td>0.028 mg/L</td>
<td>Background level, 40 C.F.R. § 264.94(a)(1)</td>
</tr>
</tbody>
</table>

mg/L = milligrams per liter

40 C.F.R. § 264.91(a)(1) requires that whenever hazardous constituents (under 40 C.F.R. § 264.93) from a regulated unit are detected at a compliance point (under 40 C.F.R. § 265.95), the owner or operator must institute a compliance monitoring program under 40 C.F.R. § 264.99. Hazardous constituents, especially TCE, have long been known to be present in the groundwater at the CWL. Therefore, the Permittees shall institute a compliance monitoring program at the CWL that meets the requirements of 40 C.F.R. § 264.99. In response to the detection of TCE in groundwater in 1990 exceeding the MCL of 5 µg/L, the Permittees conducted a corrective action program through two interrelated VCMs from 1997 through 2002 as briefly described in Part 3, Section 3.0 of this Permit and Section 1.2.2 of this Permit Attachment.

1 Hazardous constituents are constituents identified in Appendix VIII of Part 261 that have been detected in the groundwater in the uppermost aquifer underlying a regulated unit and that are reasonably expected to be in or derived from waste contained in the unit.
In accordance with 40 C.F.R. § 264.96, the compliance period during which the groundwater protection standard of 40 C.F.R. § 264.92 applies is hereby established as 47 years. (The compliance period is the number of years equal to the active life of the waste management area, including the closure period. The CWL was established in 1962; thus, the compliance period for the CWL is 47 years.) In accordance with 40 C.F.R. § 264.96(b), the compliance period begins when the Permittees initiate a compliance monitoring program meeting the requirements of 40 C.F.R. § 264.99.

The Permittees shall comply with the general groundwater monitoring requirements at 40 C.F.R. § 264.97. The Permittees shall also discharge the responsibilities under 40 C.F.R. § 264.99 for a compliance monitoring program.

The current status and final use/disposition of all former groundwater monitoring wells and former VE system wells at the CWL are summarized in Table 1-3. All wells that do not have a defined future purpose for compliance monitoring/post-closure care shall be properly plugged and abandoned.

In accordance with 40 C.F.R. § 264.99(j), the Permittees shall submit an application for a permit modification if they determine that the compliance monitoring program no longer satisfies the requirements of 40 C.F.R. § 264.99 within 90 days of that determination.

<table>
<thead>
<tr>
<th>Well Name</th>
<th>Current Status</th>
<th>Future Status/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Compliance and Post-Closure Care Groundwater Monitoring Wells</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BW5</td>
<td>Compliance and Post-closure care background groundwater monitoring well</td>
<td>Plug and abandon following completion of compliance and post-closure care groundwater monitoring.</td>
</tr>
<tr>
<td>MW9</td>
<td>Compliance and Post-closure care down gradient groundwater monitoring well</td>
<td>Plug and abandon following completion of compliance and post-closure care groundwater monitoring.</td>
</tr>
<tr>
<td>MW10</td>
<td>Compliance and Post-closure care down gradient groundwater monitoring well</td>
<td>Plug and abandon following completion of compliance and post-closure care groundwater monitoring.</td>
</tr>
<tr>
<td>MW11</td>
<td>Compliance and Post-closure care down gradient groundwater monitoring well</td>
<td>Plug and abandon following completion of compliance and post-closure care groundwater monitoring.</td>
</tr>
<tr>
<td><strong>Post-Closure Care Soil-Gas Monitoring Wells</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UI-1 and UI-2</td>
<td>Former VE system wells with dedicated sampling ports for soil-gas monitoring (shallow ports only)</td>
<td>Plug and abandon following completion of post-closure care VOC soil-gas monitoring (potential future VE well)</td>
</tr>
<tr>
<td>D-1, D-2, and D-3</td>
<td>Former VE system wells with dedicated sampling ports for soil-gas monitoring (shallow and deep ports)</td>
<td>Plug and abandon following completion of post-closure care VOC soil-gas monitoring (potential future VE well)</td>
</tr>
</tbody>
</table>

**Wells for Potential Future Use**
<table>
<thead>
<tr>
<th>Well Name</th>
<th>Current Status</th>
<th>Future Status/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMW1</td>
<td>Former VE system well with multiple screen sections</td>
<td>Retain for potential future use (VE)–plug and abandon based upon post-closure care monitoring results</td>
</tr>
</tbody>
</table>

**Wells for Plug and Abandonment**

<table>
<thead>
<tr>
<th>Well Name</th>
<th>Current Status</th>
<th>Future Status/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>MW2BU/2BL</td>
<td>Nested well pair located ~70 ft south of former MW2A location</td>
<td>Plug and abandon. MW2BU suitable for low-flow sampling only. MW2BL screen section is below water table surface. Both wells represent potential VOC soil-gas conduits.</td>
</tr>
<tr>
<td>MW1A and MW3A</td>
<td>Wells not suited for monitoring due to sediment in well screen and lack of water</td>
<td>Plug and abandon–potential VOC soil-gas conduits</td>
</tr>
<tr>
<td>UI3</td>
<td>Shallow former VE well located east of CWL and away from VOC soil-gas plume core</td>
<td>Well not needed for future use–plug and abandon</td>
</tr>
<tr>
<td>BW3</td>
<td>Well is located 20 ft away from BW-4A–background well with stainless steel screen</td>
<td>Well not needed for future use–plug and abandon</td>
</tr>
</tbody>
</table>

**Deep Regional Aquifer Monitoring Wells for Chromium Evaluation**

<table>
<thead>
<tr>
<th>Well Name</th>
<th>Current Status</th>
<th>Future Status/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>MW7 and MW8</td>
<td>Deep regional wells installed in March 2003</td>
<td>Wells not needed for future use–screen intervals too deep for monitoring of upper aquifer–plug and abandon</td>
</tr>
</tbody>
</table>

**Previously Plugged and Abandoned Wells**

<table>
<thead>
<tr>
<th>Well Name</th>
<th>Current Status</th>
<th>Future Status/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>BW1</td>
<td>Plugged and abandoned in 2004</td>
<td>NA</td>
</tr>
<tr>
<td>BW-2</td>
<td>Plugged and abandoned in 2003</td>
<td>NA</td>
</tr>
<tr>
<td>BW-4</td>
<td>Plugged and abandoned in 1994</td>
<td>NA</td>
</tr>
<tr>
<td>MW-1</td>
<td>Plugged and abandoned in 1997</td>
<td>NA</td>
</tr>
<tr>
<td>BW4A</td>
<td>Plugged and abandoned in 2010</td>
<td>NA</td>
</tr>
<tr>
<td>MW4</td>
<td>Plugged and abandoned in 2010</td>
<td>NA</td>
</tr>
<tr>
<td>MW5U/L</td>
<td>Plugged and abandoned in 2010</td>
<td>NA</td>
</tr>
<tr>
<td>MW6U/L</td>
<td>Plugged and abandoned in 2010</td>
<td>NA</td>
</tr>
</tbody>
</table>

BW = Background Well.  
D = VE System Well.  
ft = Foot (feet).  
MW = Monitoring Well.  
NA = Not applicable.  
UI = VE System Well.  
VMW = VE System Well.
1.4.2. Soil-Gas Monitoring System

The post-closure care soil-gas monitoring program is designed to ensure the protection of groundwater quality by providing data to be used to analyze whether the VOC soil-gas plume has the potential to contaminate groundwater. The VOC soil-gas monitoring system shall include a network of five former VE/injection wells designed to monitor the vadose zone at various depths beneath the CWL in the area most contaminated by past disposal of organic liquid waste. The monitoring network shall include the following wells that are shown in Figures 6 and 10. Depth-specific sampling ports are shown in Figure 10 and are also indicated as follows for each soil-gas monitoring well:

- **D1**—Sampling Ports at 100, 160, 240, 350, and 470 feet bgs (5 ports)
- **D2**—Sampling Ports at 120, 240, 350, 440, and 470 feet bgs (5 ports)
- **D3**—Sampling Ports at 120, 170, 350, 440, and 480 feet bgs (5 ports)
- **UI1**—Sampling Ports at 40, 80, and 120 feet bgs (3 ports)
- **UI2**—Sampling Ports at 36, 76, and 136 feet bgs (3 ports)

Well completion diagrams for all of the soil-gas monitoring wells are provided in Attachment 3 of this Permit. BaroBalls™ may be maintained on all soil-gas and groundwater monitoring wells. The BaroBall™ allows controlled, passive soil-gas venting to the atmosphere and helps prevent the downward migration of VOC soil gas in the well casing. These devices seal on the top of the well casing to allow soil gas to vent to the atmosphere during periods of low barometric pressure and prevent soil gas from being driven downward during periods of high atmospheric pressure. Figure 11 shows how the BaroBall™ device works.

1.5. DESCRIPTION OF STORM-WATER DIVERSION STRUCTURES

The function of the storm-water diversion features associated with the CWL shall be to prevent storm-water run-on and run-off from eroding the cover and to reduce the amount of water that could potentially infiltrate into the cover. Drainage features designed to control surface-water run-on and run-off are shown in Figure 12. A culvert at the southeastern corner of the CWL diverts the existing road ditch drainage from the east (north side of the road) under the asphalt road and to the south. This diversion prevents surface water coming from the east from flowing over the southern footprint of the CWL (Figures 6 and 12). Existing and new road ditches and swales channel surface water along the southern, western, and northern sides of the cover to the north and west, respectively, away from the cover (Figures 6 and 12). The revegetated, gently sloping topography (approximately 3-percent grade from east to west) and slight northeast and southeast inflection to the east of the landfill will prevent significant run-on by directing the upgradient surface water toward the northern and southern boundary swales (Figure 12). Surface water that falls directly on the cover shall be diverted toward the boundary swales that intersect at the northwestern and southwestern corners of the site.
1.6. **DESCRIPTION OF SECURITY FENCES**

The CWL is located about 100 yards southeast of the Corrective Action Management Unit (CAMU) and approximately 150 yards due east of the Radioactive and Mixed Waste Management Unit inside Technical Area III (TA-III), which is controlled by fences, security patrols, and limited access through security gates. TA-III access control procedures are designed to assure that only properly identified personnel with appropriate Facility issued access badges and identification, and authorized persons, vehicles, or escorted visitors, are allowed access to the CWL.

The perimeter boundary of the Chemical Waste Landfill is illustrated on Figures 6 and 12 of this Permit Attachment. A four-strand, barbed-wire fence with two main gates delineates this boundary. The gates shall remain locked except when inspections, maintenance, and monitoring activities are occurring, and only authorized personnel shall control the keys to the locks. Warning signs stating “Danger—Unauthorized Personnel Keep Out” in both Spanish and English shall be posted on all sides of the CWL fence at 100-foot intervals, at the main gate, and at the emergency exit. The warning signs shall be legible from a distance of at least 25 feet and visible from any approach to the CWL.

1.7. **POST-CLOSURE CARE**

The Permittees shall comply with all applicable post-closure requirements contained in 40 C.F.R. §§ 264.117 through 264.120. This section outlines procedures necessary to protect human health and the environment, including monitoring and maintenance activities, and the frequency with which such activities shall be performed to ensure the integrity and proper functioning of the final cover and the groundwater and soil-gas monitoring networks. Among the other requirements in this Permit, the Permittees shall conduct the following activities to protect human health and the environment.

1. Maintain the integrity and effectiveness of the cover by making repairs necessary to correct the effects of settling, subsidence, erosion, animal intrusion, or other events that compromise the cover;
2. Maintain surface water controls to prevent run-on and run-off from eroding or otherwise damaging the cover;
3. Perform groundwater and VOC soil-gas monitoring as specified herein;
4. Conduct corrective action as necessary to protect human health and the environment;
5. Maintain fencing, security signs, and locks (i.e., site-specific access controls);
6. Maintain training, operating, inspection, and monitoring, and other required records; and
7. Submit an annual report to the Department providing the results of the required inspections, sampling results, and a summary of any needed repairs and whether the repairs were effective.

1.8. **MONITORING PROCESS**

Monitoring of environmental media shall consist of groundwater and soil-gas monitoring. The compliance groundwater monitoring program is designed to monitor water quality to ensure the protection of groundwater by addressing the requirements of 40 C.F.R. Part 264 Subpart F. Soil-gas data, including that for TCE, shall be acquired in a manner that is consistent with historic
soil-gas monitoring data and so that results obtained during post-closure can be evaluated to
determine if any significant changes in soil-gas concentrations have occurred. Soil-gas constituents
of concern (COCs) include numerous VOCs, which are to be analyzed for by Compendium Method
TO-14 (EPA January 1999).

A summary of groundwater and soil-gas monitoring frequency, parameters, and analytical methods
is presented in Table 1-4 of this Permit Attachment. If changes to the monitoring program are
warranted, the Permittees shall initiate a permit modification request to modify this Permit.

### TABLE 1-4

**Chemical Waste Landfill**

**Groundwater and Soil-Gas Monitoring Frequency, Parameters, and Methods**

<table>
<thead>
<tr>
<th>Monitoring System</th>
<th>Monitoring Frequency</th>
<th>Monitoring Parameters/Constituents of Concern</th>
<th>Monitoring Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groundwater</td>
<td>Semi-Annuallyc</td>
<td>TCE by EPA Method 8260a and Cr and Ni by EPA Methods 6020a</td>
<td>Sampling and Analysis as per Attachment 2</td>
</tr>
<tr>
<td>Soil Gas</td>
<td>Annually</td>
<td>Compendium Method TO-14 VOCsb</td>
<td>Sampling and Analysis as per Attachment 3</td>
</tr>
</tbody>
</table>

aEPA November 1986.
bEPA January 1999.
cSemi-Annually: An enhanced list of constituents must be analyzed on an annual basis (see Section 1.8.1.1 of Permit Attachment 1).

**TO-14** = EPA Method TO-14.

Additionally, in accordance with 40 C.F.R. § 264.99(g), the Permittees shall collect water samples
at least annually from wells located at the point of compliance and analyze them for an enhanced list
of constituents (see Section 1.8.1.1 of Permit Attachment 1 for the enhanced list of constituents).

### 1.8.1. Groundwater Monitoring Process

#### 1.8.1.1. Frequency

The groundwater monitoring network defined in Section 1.4.1 of this Permit Attachment shall be
sampled according to the Groundwater Sampling and Analysis Plan (SAP) provided in Attachment 2
of this Permit. The Groundwater SAP describes the procedures, methods, and analytical protocols
for collecting and analyzing groundwater samples that shall be followed.

In accordance with 40 C.F.R. § 264.97(f), the Permittees shall determine the groundwater surface
elevation each time groundwater is sampled. Additionally, in accordance with 40 C.F.R.
§ 264.99(e), the Permittees shall determine the groundwater flow rate, hydraulic gradient, and flow
direction at least annually.

In accordance with 40 C.F.R. § 264.99(f), the Permittees shall collect and analyze at least one
sample from each well (background and compliance wells) at least semi-annually during the
compliance period. The Permittees shall also collect groundwater samples at least annually from
wells located at the point of compliance and analyze them for an enhanced list of constituents
pursuant to 40 C.F.R. § 264.99(g). The enhanced list of constituents is comprised of TCE; chromium; nickel;
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113); tetrachloroethene (PCE); 1,1-dichloroethene (1,1-DCE); chloroform; and trichlorofluoromethane (Freon 11).

1.8.1.2. Assessment

The Permittees shall monitor the groundwater for the hazardous constituents listed in Table 1-2 of this Permit Attachment semi-annually (twice each year), with one of these events each year to include an enhanced list of constituents, (see Section 1.8.1.1 of Permit Attachment 1) to determine whether the groundwater beneath the CWL is in compliance with the groundwater protection standard under 40 C.F.R. § 264.92. The Permittees shall also record the groundwater data for the determination of statistical significance under 40 C.F.R. § 264.97(h) for the compliance period, pursuant to 40 C.F.R. § 269.99(c).

In order to comply with 40 C.F.R. § 264.97(h) for the hazardous constituents specified above, on a well by well basis the Permittees shall statistically evaluate ground-water monitoring data using prediction and confidence intervals, and in accordance with the procedures discussed below. The analysis shall comply with the performance standards outlined in 40 C.F.R. § 264.97(i)(1-6), as appropriate. Data values below the level of detection shall be set equal to their corresponding detection limits for the purpose of calculating the statistics required by this Permit. Historical groundwater sampling results shall be used as described in this Section to augment the data sets for wells in order to increase the amount of data for statistical analysis. Such historical groundwater data shall be limited to data obtained after completion of the Landfill Vapor Extraction VCM.

The Permittees shall calculate via the use of prediction intervals the probability that each semi-annual sample result for a given hazardous constituent will fall within the range of previous sample results for the hazardous constituent. The Permittees shall also note whether each semi-annual sample result actually falls within, below, or above the range of previous sample results. Additionally, for each hazardous constituent, the Permittees shall calculate the confidence interval for the mean at a 95% confidence level, and compare the lower confidence limit to the concentration limit for the hazardous constituent. If the lower confidence limit exceeds the concentration limit, this finding shall be considered statistically significant evidence that the concentration limit for the particular hazardous constituent has been exceeded. If there is statistically significant evidence that a concentration limit has been exceeded, corrective action must be initiated in accordance with Section 1.8.3 of this Permit Attachment.

Furthermore, in order to comply with 40 C.F.R. § 264.99(d), on a well by well basis and for each hazardous constituent, the Permittees shall calculate and summarize the cumulative percentage of sample results that are greater than the median. Such a cumulative percentage at a value of 80% or greater shall be considered statistically significant evidence of increased contamination. No action by the Permittees is required due to statistically significant evidence of increasing contamination unless a concentration limit is exceeded as described in the previous paragraph of this Section of this Permit Attachment.

In the event that a well must be replaced during the term of this Permit, the Permittees shall statistically evaluate groundwater monitoring data using sampling results obtained from the replacement well and historical sampling results from the well that was replaced (Replacement wells are wells located adjacent to the wells that they replace. Replacement wells are not new wells).
New wells are wells placed at locations that are significantly different from those of other wells at the CWL, and are not intended to replace existing wells. Wells CWL-MW9, CWL-MW10, and CWL-MW11 are new wells. For new wells, data sets representing fewer than six semi-annual sampling events will be typical for the first three years that the wells exist. Because too few data would be initially available for analysis, the Permittees are not required to statistically evaluate ground-water monitoring data for a new well until after the first 3 years of groundwater sampling has been conducted for the well. After the first 3 years of sampling has been conducted for a new well, the Permittees must statistically evaluate the groundwater monitoring data for the well in accordance with the requirements of this Permit. Regardless of whether a statistical evaluation is required, the Permittees must report timely all groundwater sampling results for all wells, including all new wells, in the annual reports required under Section 1.12 of this Permit Attachment.

In accordance with 40 C.F.R. § 264.99(g), if the Permittees find any constituents on the enhanced list (see Section 1.8.1.1 of Permit Attachment 1) in the groundwater that are not already identified in the Permit, the Permittees may resample within one month and repeat the analysis for the constituents. If the second analysis confirms the presence of new constituents, the Permittees must report the concentrations of the new constituents to the Department within seven days of receipt of the results of the second analysis and add them to the monitoring list (See Table 1-4). If the Permittees choose not to resample, then the Permittees must report the concentrations of the new constituents to the Department within seven days of receipt of the results of the analysis and add them to the monitoring list (Table 1-4).

In accordance with 40 C.F.R. § 264.99(d), the Permittees must determine after each semi-annual sampling event whether there is statistically significant evidence of increased contamination for each of the hazardous constituents specified in Table 1-2. The Permittees shall compare the data collected at the compliance points to the concentration limits specified in Table 1-2 using the method specified in this Section of this Permit Attachment.

In accordance with 40 C.F.R. § 264.99(h), the Permittees shall notify the Department in writing within seven days if any concentration limits (Table 1-2) are being exceeded at any monitoring well at the point of compliance. The notification must indicate what concentration limits have been exceeded. Within 180 days of the determination that a concentration limit has been exceeded, the Permittees must submit to the Department an application for a permit modification to establish a corrective action program for the CWL meeting the requirements of 40 C.F.R. § 264.100. The application at a minimum shall meet the requirements of 40 C.F.R. § 264.99(h)(2)(i-ii).

Regulations at 40 C.F.R. § 264.99(i) allow the Permittees the opportunity to demonstrate that sampling or analysis error or a source other than the CWL caused a concentration limit (Table 1-2) to be exceeded. In making such a demonstration, the Permittees must notify the Department in writing within seven days that the Permittees wish to make a demonstration under 40 C.F.R. § 264.99(i). The Permittees shall also meet the requirements of 40 C.F.R. § 264.99(i)(1-4), including the requirement to submit a report to the Department within 90 days, which demonstrates that error or another source caused the concentration limit to be exceeded.

1.8.2. Soil-Gas Monitoring Process

1.8.2.1. Frequency

The soil-gas monitoring network defined in Section 1.4.2 of this Permit Attachment shall be sampled.
annually in accordance with the Soil-Gas SAP provided in Attachment 3 of this Permit. The SAP describes the procedures, methods, and analytical protocols for collecting and analyzing soil-gas samples that shall be followed during the post-closure care period.

1.8.2.2. **Assessment**

The soil-gas monitoring network shall be used to document VOC soil-gas plume conditions over time and to determine whether the plume may potentially contaminate groundwater such that a maximum contaminant level (MCL) or State of New Mexico water quality standard is exceeded. The five soil-gas monitoring well depth-specific sampling ports shall be sampled annually for Compendium Method TO-14 VOCs (EPA January 1999). Table 1-5 of this Permit Attachment presents the analyte list for Compendium Method TO-14. If a sample result for one or more of the deepest sampling ports (Port 1) from CWL-D1 through D3 exceeds the trigger level of 20 parts per million volume basis (ppmv) TCE or for any other compound listed in Table 1-5, the Permittees shall immediately confirm the results by collecting and analyzing additional samples. If the second analysis confirms that the trigger level has been exceeded, the Permittees must notify the Department in writing within seven days after receipt of the second analysis, confirming that the trigger level has been exceeded during the particular sampling event.

Annually, the Permittees shall calculate the upper and lower confidence limits about the mean at a 95% confidence level using current data and all previous data obtained during the post-closure care period for the three deepest sampling ports (Port 1) of wells CWL-D1 through D3 and for each compound detected at a concentration greater than 0.5 ppmv listed in Table 1-5 of Permit Attachment 1. For the first 5 years after the effective date of this Permit, historical data shall be used whenever it is available and appropriate to augment data obtained during the post-closure care period for the purpose of calculating the upper and lower confidence limits. After the first five years after the effective date of this Permit, only data obtained during the post-closure care period shall be used for the purpose of calculating the upper and lower confidence limits.

For soil-gas samples collected from the deepest sampling ports (Port 1 from CWL-D1 through D3), the Permittees shall compare the lower confidence limit for each compound listed on Table 1-5 of this Permit Attachment detected at a concentration of greater than 0.5 ppmv to the trigger level of 20 ppmv. If the lower confidence limit for any compound listed in Table 1-5 exceeds the trigger level of 20 ppmv at any of the deepest sampling ports, corrective action shall be initiated by the Permittees in accordance with Section 1.8.3 of this Permit Attachment.

All soil-gas monitoring data for all wells and the 95% upper and lower confidence limits about the mean for each compound listed in Table 1-5 detected at a concentration greater than 0.5 ppmv for the three deepest sampling ports (Port 1) of wells CWL-D1 through D3 shall be reported annually in the reports required under Section 1.12 of this Permit Attachment.
<table>
<thead>
<tr>
<th>Compound</th>
<th>Compound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetone</td>
<td>1,2-Dichloropropane</td>
</tr>
<tr>
<td>Benzene</td>
<td>cis-1,3-Dichloropropene</td>
</tr>
<tr>
<td>Benzyl chloride</td>
<td>trans-1,3-Dichloropropene</td>
</tr>
<tr>
<td>Bromodichloromethane</td>
<td>Ethyl benzene</td>
</tr>
<tr>
<td>Bromoform</td>
<td>4-Ethyltoluene</td>
</tr>
<tr>
<td>Bromomethane</td>
<td>Hexachlorobutadiene</td>
</tr>
<tr>
<td>2-Butanone</td>
<td>2-Hexanone</td>
</tr>
<tr>
<td>Carbon disulfide</td>
<td>Methylene chloride</td>
</tr>
<tr>
<td>Carbon tetrachloride</td>
<td>4-Methyl-2-pentanone</td>
</tr>
<tr>
<td>Chlorobenzene</td>
<td>Styrene</td>
</tr>
<tr>
<td>Chloroethane</td>
<td>1,1,2,2-Tetrachloroethane</td>
</tr>
<tr>
<td>Chloroform</td>
<td>Tetrachloroethene</td>
</tr>
<tr>
<td>Chloromethane</td>
<td>Toluene</td>
</tr>
<tr>
<td>Dibromochloromethane</td>
<td>1,1,2-Trichloro-1,2,2-trifluoroethane</td>
</tr>
<tr>
<td>1,2-Dibromoethane</td>
<td>1,2,4-Trichlorobenzene</td>
</tr>
<tr>
<td>1,2-Dichloro-1,1,2,2-tetrafluoroethane</td>
<td>1,1,1-Trichloroethane</td>
</tr>
<tr>
<td>1,2-Dichlorobenzene</td>
<td>1,1,2-Trichloroethane</td>
</tr>
<tr>
<td>1,3-Dichlorobenzene</td>
<td>Trichloroethene</td>
</tr>
<tr>
<td>1,4-Dichlorobenzene</td>
<td>Trichlorofluoromethane</td>
</tr>
<tr>
<td>Dichlorodifluoromethane</td>
<td>1,2,4-Trimethylbenzene</td>
</tr>
<tr>
<td>1,1-Dichloroethane</td>
<td>1,3,5-Trimethylbenzene</td>
</tr>
<tr>
<td>1,2-Dichloroethane</td>
<td>Vinyl acetate</td>
</tr>
<tr>
<td>1,1-Dichloroethene</td>
<td>Vinyl chloride</td>
</tr>
<tr>
<td>cis-1,2-Dichloroethene</td>
<td>m-, p-Xylene</td>
</tr>
<tr>
<td>trans-1,2-Dichloroethene</td>
<td>o-Xylene</td>
</tr>
</tbody>
</table>

1.8.3. Corrective Action

Pursuant to Section 3004(u) and (v) of RCRA, 42 U.S.C. § 6924(u) and (v); NMSA 1978, § 74-4-4.2(B) and 40 C.F.R. Part 264, Subparts F and G, the Permittees shall implement corrective action as necessary to protect human health and the environment from any releases of hazardous waste or hazardous constituents at the CWL.

If corrective action is underway at the end of the post-closure care period, the post-closure care period may be extended by the Department in accordance with 40 C.F.R. § 264.117(a)(2)(ii). If the Permittees are engaged in a corrective action program at the end of the compliance period, the compliance period shall be extended until the Permittees can demonstrate that the groundwater protection standard of 40 C.F.R. § 264.92 has not been exceeded for a period of three consecutive years in accordance with 40 C.F.R. § 264.96(c).

Pursuant to 40 C.F.R. § 264.99(h), and Section 1.8.1.2 of this Permit Attachment, if there is statistically significant evidence that any concentration limits under 40 C.F.R. § 264.94 are being exceeded at any groundwater monitoring well at or beyond the point of compliance the Permittees must notify the Department of this finding within seven days of receipt of the final results of the analysis, as a second analysis may be performed for confirmation prior to any notification to the Department. The notification must indicate what concentration limits have been exceeded. The Permittees must also submit to the Department an application for a permit modification to establish a corrective action program meeting the requirements of 40 C.F.R. § 264.100 within 180 days. The application must at a minimum include the following information: a detailed description of corrective actions that will achieve compliance with the groundwater protection standard specified under 40 C.F.R. § 264.99(a), and a plan for a groundwater monitoring program that will demonstrate the effectiveness of the corrective action. Such a groundwater monitoring program may be based on compliance monitoring program developed to meet the requirements of 40 C.F.R. § 264.99. The plan shall also include a schedule for implementation of the corrective action.

In accordance with 40 C.F.R. § 264.99(i), if the Permittees determine that a groundwater concentration limit is being exceeded at any monitoring well at the point of compliance, the Permittees may attempt to demonstrate to the Department that a source other than the CWL caused the contamination or that the detection is an artifact caused by error in sampling, analysis, statistical evaluation, or natural variation in groundwater.

Pursuant to Section 1.8.2.2 of this Permit Attachment, if the lower confidence limit for any soil-gas compound listed in Table 1-5 exceeds the trigger level of 20 ppmv at any of the deepest sampling ports (Port 1 of CWL-D1 through D3), the Permittees shall submit, within 180 days of discovery of this fact, an application for a permit modification to establish a corrective action program. The application must at a minimum include the following information: a detailed description of corrective actions that will be taken by the Permittees to reduce the concentrations of soil gas to levels that do not exceed the trigger level of 20 ppmv at the deepest sampling ports, and a plan for a soil-gas monitoring program that will demonstrate the effectiveness of the corrective action. Such a soil-gas monitoring program may include existing soil-gas monitoring wells at and near the CWL, as appropriate. The plan shall also include a schedule for implementation of the corrective action.
1.9. INSPECTION/MAINTENANCE/REPAIR ACTIVITIES AND FREQUENCIES

Systems associated with the CWL shall be routinely inspected during the compliance monitoring and post-closure care periods. The CWL systems that shall require inspection and maintenance/repair include: 1) the cover; 2) surface-water diversion structures; 3) groundwater and soil-gas monitoring networks; and 4) the perimeter security fence, security signs, gate locks and survey benchmarks and monuments. Inspection, maintenance and repair of these systems shall be performed throughout the compliance monitoring and post-closure care periods on a regularly scheduled basis to ensure the integrity and proper functioning of the cover, the monitoring networks, the surface-water diversion structures, the perimeter fence, security signs, gates, locks (i.e., access controls), and monuments. These routines are described in more detail in the following sections.

Criteria for Successful Re-Vegetation

In addition to routine inspection and maintenance/repair, the cover shall be monitored to ensure the re-vegetation effort is successful, a critical element in the long-term performance of the cover.

The following information summarizes a climax plant community typical of the undisturbed east mesa ecosystem of TA-III (Peace et al. November 2004, Table 1-5).

- Total percent foliar coverage equals 22.5 percent (i.e., 22.5 percent of the land surface is covered with living plants versus 77.5 percent bare surface area);
- Of the 22.5 percent of total foliar coverage, 19.2 percent is comprised of native perennial species and 3.3 percent is comprised of annual species, which includes native annual species and non-native, transitory (or invasive) plant species; and
- Considering only the total percentage of foliar coverage, 85.3 percent consists of native perennial species, and 14.67 percent comprises annual species (the majority of the annual species are non-native, transitory species).

Based upon this information, the operational criteria for achieving successful re-vegetation for the CWL cover are presented as follows.

- Total percent foliar coverage equals 20 percent (i.e., 20 percent of the land surface is covered with living plants versus 80 percent bare surface area);
- Of the 20 percent total foliar coverage, 50 percent or greater comprises native perennial species, and 50 percent or less comprises annual species; and
- No contiguous bare spots greater than 200 square feet (approximately 14 by 14 feet) are present.

If these criteria are met, it shall be concluded that the native community is successfully re-established.

Successful re-vegetation is projected to take three to five years. The cover monitoring, inspection, and maintenance/repair activities described in Section 1.9.1 of this Permit Attachment shall document the cover re-vegetation effort and whether or not the criteria are met. Local climate trends will have an impact on plant growth and health and shall be documented, evaluated, and summarized along with vegetation survey results in the annual CWL post-closure care reports.
1.9.1. Final Cover System Inspection/Maintenance/Repair

1.9.1.1. Vegetation Inspection and Monitoring

Cover vegetation monitoring shall be accomplished in a two-phase approach. The first phase shall concentrate on establishing the vegetation on the cover from seed to a mature plant community. This phase is anticipated to take from three to five years. If the criteria for successful revegetation (per Section 1.9 of this Permit Attachment) are not met within five years of the effective date of this Permit, the Permittees shall submit a plan to the Department for approval that describes the work that will be done to rectify the problem. Normal succession processes should occur and continue once native flora has been established, which is when native perennials comprise 50% of the 20% foliar coverage. During this period, a staff biologist shall inspect and document the inventory of the main flora populating the cover on a quarterly basis, inspect the cover for contiguous areas lacking vegetation in excess of 200 square feet, and recommend soil augmentations, surface scarification, reseeding, or other corrective actions as deemed appropriate to establish a long-term sustainable native plant community. During this monitoring period, the staff biologist shall also be responsible for noting and interpreting signs of animal intrusion. These inspections shall be documented on the Biology Checklist for the CWL Cover inspection form (Attachment 4 of this Permit). At the end of the fourth quarter of each year, the staff biologist shall compile the results of the quarterly inspections in a summary report that shall be included in the annual CWL post-closure care report submitted to the Department.

Once native flora has been established in a self-sustaining manner on the cover, the second phase of monitoring shall begin. Cover vegetation monitoring by the staff biologist shall transition to an annual frequency to assess the overall health of the cover vegetation. Based upon those observations, the staff biologist shall recommend in writing any soil augmentation, surface scarification, and reseeding as necessary to meet the criteria for successful re-vegetation as defined in Section 1.9 of this Permit Attachment. The Permittees shall implement corrective actions in consideration of the staff biologist’s recommendations within 60 days of receipt of the recommendations, except as noted in Section 1.9.1.3 and Table 1-6 of this Permit Attachment. The results of the staff biologist’s inspections shall be reported in each of the annual post-closure care reports to be submitted to the Department.

1.9.1.2. Cover Inspection

A qualified technician shall perform cover inspections on a quarterly basis. Settlement of the cover surface in excess of 6 inches, erosion of the cover soil in excess of 6 inches deep, areas of ponding water, animal intrusion burrows in excess of 4 inches in diameter, contiguous areas lacking vegetation in excess of 200 square feet, and any other conditions that may impact the cover’s integrity shall be noted on the Cover Inspection Checklist (Attachment 4 of this Permit). Documentation of animal intrusion burrows in excess of 4 inches in diameter and contiguous areas lacking vegetation in excess of 200 square feet may be noted quarterly on the Biology Checklist for the CWL Cover (Attachment 4 of this Permit) instead of the Cover Inspection Checklist.

1.9.1.3. Maintenance/Repair

The Permittees shall perform soil augmentations, surface scarification, reseeding, or other vegetation maintenance/repair as necessary. Cover damage shall be repaired within 60 days to a condition that
meets or exceeds the original design. Corrective action to repair inadequate cover vegetation as defined by the above mentioned criteria (Section 1.9 of Permit Attachment 1) shall be implemented within 60 days. However, repairs to fix inadequate cover vegetation may be delayed until the appropriate growing season if approved by the Department in advance, and if any necessary measures are taken by the Permittees to prevent excessive erosion of the cover during the delay period. In the case of delaying repair of inadequate cover vegetation, advanced Department approval can be gained in writing via electronic mail or formal letter request. Repairs to the cover shall be done using materials consistent with the cover installation specifications, according to soil classification and gradation specifications in the RAP (SNL/NM December 2004). Repair specifications include, but are not limited to, the following.

- Soil augmentations, surface scarification, reseeding, supplemental watering, or other corrective actions for areas lacking vegetation in excess of 200 square feet and re-establishing the topsoil layer to provide a suitable seedbed; and
- Backfilling and compacting settlement areas, areas of ponding water, and areas of erosion in excess of 6 inches deep using either stockpiled clean soil from the cover installation or locally derived clean fill with properties meeting the same design criteria as the soil used to construct the CWL cover.

1.9.2. Storm-Water Diversion Structure Inspection/Maintenance/Repair

1.9.2.1. Inspection

The function of storm-water diversion structures associated with the cover shall be to prevent storm-water run-on and run-off from eroding the cover and to reduce the amount of water that could potentially infiltrate the cover. The storm-water diversion structures shall be inspected on a quarterly basis to verify structural integrity and to ensure adequate performance. Inspections shall document erosion of the channels or sidewalls in excess of 6 inches deep and accumulations of silt greater than 6 inches deep or debris that block more than one-third of the channel width.

1.9.2.2. Maintenance/Repair

Based upon the results from the storm-water diversion structure inspections, erosion or other damage that exceeds the above mentioned criteria shall be repaired within 60 days to a condition that meets or exceeds the original design. Silt and debris accumulations that exceed these limits shall be removed within 60 days. Reseeding of the surface drainage features shall also be performed to facilitate re-vegetation and erosion resistance, if needed.

1.9.3. Monitoring Well Network Inspection/Maintenance/Repair

1.9.3.1. Inspection

Monitoring wells shall be inspected during all groundwater and soil-gas monitoring events. The inspection shall note the condition of the components including protective casings and bollards, wellhead covers/caps/locks, soil-gas sampling ports, well identification markings, and passive venting BaroBalls™. Groundwater pumps and sample tubing shall be inspected during each sampling event (pumps are not dedicated to the wells). Pump replacement and maintenance/repair and tubing replacement shall be performed on an as-needed basis based upon pump and tubing
1.9.3.2. **Maintenance/Repair**

The monitoring well components shall be maintained/repaired/replaced as needed within 60 days of discovery of any needed repairs. Maintenance/repair activities shall also include ensuring that all monitoring well components are protected from the weather.

1.9.4. **Security Fence Inspection/Maintenance/Repair**

1.9.4.1. **Inspection**

The fence, gates, locks, and warning signs at the CWL shall be inspected on a quarterly basis. The inspections shall document in writing the condition of the fence, including fence wires, posts, gates, gate locks, and warning signs, and note excessive accumulations of wind-blown plants and debris that would obscure warning signs, block access to the CWL, or interfere with any of the groundwater or soil-gas monitoring network components, or any sampling using said components. Local survey benchmarks and/or monuments shall also be inspected.

1.9.4.2. **Maintenance/Repair**

The fence, gates, locks, warning signs, and survey benchmarks and monuments shall be maintained/repaired within 60 days of discovery by routine inspections. Activities may include, but are not limited to, removing excessive accumulations of wind-blown plants and debris, repairing broken wire sections and posts, repairing and oiling gates, cleaning or replacing locks, repairing or replacing warning signs, and removing excess soil and/or vegetation covering survey monuments. Maintenance records shall be maintained with the PCIFs.

1.10. **INSPECTION SCHEDULE, CORRECTIVE ACTIONS, AND RECORDED RESULTS**

A schedule for implementing inspections and prescribed maintenance of the CWL cover, surface-water drainage features, monitoring network, and access controls is provided in Table 1-6. Inspection results for the CWL monitoring systems shall be recorded on the Post-Closure Inspection Forms (PCIFs) included in Attachment 4 of this Permit. Copies of completed forms shall be provided and summarized in the annual CWL post-closure care report. The completed forms shall document in writing the inspector, a notation of the observations made, and the date and nature of any repairs or other corrective actions taken. Incomplete inspection forms shall be considered representative of incomplete inspections, and shall constitute a violation of this Permit.

Repairs and maintenance shall be undertaken to ensure protection of human health and the environment and mitigate any potential hazards. If an inspection of the CWL reveals that a non-emergency problem has developed, the needed repairs, maintenance, or replacement shall be initiated within three days, unless circumstances beyond the control of the Permittees cause further delay. The Permittees shall limit any such delays to as short a time period as reasonably possible. Repairs shall not take longer than 60 days to complete. If a hazard appears imminent or a hazardous situation already exists, remedial action shall be initiated immediately. Any action taken pursuant to an inspection shall be noted on the CWL PCIF. If any identified hazard meets the definition of an emergency, as specified in Section 1.14 of this Permit Attachment, the Facility’s Contingency Plan...
for the CWL shall be implemented by the Permittees, and required notification procedures shall be followed. The Permittees shall report to the Department any remedial activities related to an emergency within one (1) business day.

1.11. PERSONNEL TRAINING

The personnel training program for inspection, monitoring, maintenance and repair of the CWL during the compliance monitoring and post-closure care periods is included in this Permit as Attachment 5. All personnel working at the CWL shall be trained, at a minimum, in accordance with the requirements of this Permit.
## TABLE 1-6
Chemical Waste Landfill
Post-Closure Inspection and Maintenance/Repair Schedules and Prescribed
Maintenance/Repairs of the CWL and Associated Systems

<table>
<thead>
<tr>
<th>System to be Inspected</th>
<th>Inspection Parameters</th>
<th>Inspection Frequency</th>
<th>Maintenance Implementation</th>
<th>Maintenance/Repair Frequencya</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final Cover Surface</td>
<td>Vegetation Inventory</td>
<td>Quarterly for 3 to 5 years, annually thereafter by a qualified staff biologist</td>
<td>Soil augmentations and/or reseeding</td>
<td>Within 60 days of discovery of needed repairs. May be delayed to await appropriate growing season if approved by the Department in advance.</td>
</tr>
<tr>
<td></td>
<td>Contiguous areas of no vegetation &gt;200 ft²</td>
<td></td>
<td>Revegetate barren areas that exceed prescribed limits</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Animal intrusion burrows in excess of 4 inches in diameter</td>
<td></td>
<td>Repair cover system damage that exceeds prescribed limits</td>
<td></td>
</tr>
<tr>
<td>Final Cover Surface</td>
<td>Settlement of cover surface in excess of 6 inches</td>
<td>Quarterly by a qualified field technician</td>
<td>Repair cover system damage that exceeds prescribed limits</td>
<td>Within 60 days of discovery of needed repairs</td>
</tr>
<tr>
<td></td>
<td>Erosion of cover soil in excess of 6 inches deep</td>
<td></td>
<td>Revegetate barren areas that exceed prescribed limits</td>
<td>Within 60 days of discovery of needed repairs</td>
</tr>
<tr>
<td></td>
<td>Animal intrusion burrows in excess of 4 inches in diameter</td>
<td></td>
<td></td>
<td>Within 60 days of discovery of needed repairs</td>
</tr>
<tr>
<td></td>
<td>Contiguous areas of no vegetation &gt;200 ft²</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storm-Water Diversion Structures</td>
<td>Channel or sidewall erosion in excess of 6 inches deep</td>
<td>Quarterly by a qualified field technician</td>
<td>Repair erosion that exceeds prescribed limits</td>
<td>Within 60 days of discovery of needed repairs</td>
</tr>
<tr>
<td></td>
<td>Accumulations of silt in excess of 6 inches deep or debris that blocks more than 1/3 of the channel width</td>
<td></td>
<td>Maintain, clean, repair, replace, relabel, as appropriate</td>
<td>Within 60 days of discovery of needed repairs</td>
</tr>
<tr>
<td>Soil-Gas and Groundwater Monitoring Wells</td>
<td>Concrete pads, bollards, and protective casings</td>
<td>Groundwater Network Components: semi-annually by a qualified field technician during sampling events</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Well cover caps and Swagelok® (or equivalent) dust caps</td>
<td></td>
<td>Maintain, clean, repair, replace, relabel, as appropriate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Passive venting BaroBalls™</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monitoring wells and soil-gas sample port labels</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Locks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sampling pumps and tubing</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## System to be Inspected

<table>
<thead>
<tr>
<th>System to be Inspected</th>
<th>Inspection Parameters</th>
<th>Inspection Frequency</th>
<th>Maintenance Implementation</th>
<th>Maintenance/Repair Frequency&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security Fence</td>
<td>Presence of wind-blown plants and debris</td>
<td>Quarterly by a qualified field technician</td>
<td>Remove wind-blown plants and debris</td>
<td>Within 60 days of discovery of needed repairs</td>
</tr>
<tr>
<td></td>
<td>Condition of fence wires, posts, gates, gate locks, warning signs, and survey monuments in the local area</td>
<td></td>
<td>Repair broken wire sections and posts, repair/oil gates, clean/replace locks, repair/replace warning signs, clear dirt/debris from monuments</td>
<td></td>
</tr>
<tr>
<td>Emergency Equipment</td>
<td>See Attachment 6, CWL Site-Specific Contingency Plan</td>
<td>Quarterly by a qualified field technician</td>
<td>Repair/replace as needed</td>
<td>Within 60 days of discovery of needed repairs</td>
</tr>
</tbody>
</table>

<sup>a</sup> Maintenance/repairs shall be performed as necessary, based upon the results of inspections.

<sup>b</sup> As explained in Section 1.9.1 of this Permit Attachment, the transition from quarterly to annual inspections by a staff biologist is based upon the establishment of native flora in a self-sustaining manner as determined by the staff biologist.

**ft<sup>2</sup>** = Square feet.

### 1.12. RECORD KEEPING AND REPORTING

The following records shall be maintained at the Corrective Action Management Unit (CAMU) administration trailer and at the Facility’s Environmental Safety and Health (ES&H) and Security Records Center.

1. Current and complete copy of this Permit, including all Attachments;
2. Written current versions of operating procedures (administrative, standard, and laboratory) and related guidance referenced in this Permit;
3. Personnel training records required by this Permit for current personnel covering the past 12 months;
4. A written Operating Record that includes:
   a. All completed inspection forms,
   b. Post-closure care annual reports for the last three years, and
   c. All waste management documentation for the last three years;
   d. Emergency or incident response records and reports
5. Site-specific health and safety plan (current version).

The following records shall be maintained at the ES&H and Security Records Center:

1. All correspondence and other documents from the Department and any other governmental agencies related to compliance monitoring and post-closure care;
2. All training records for current employees and training records for any former employee for a minimum of three years from the last date the employee worked at the CWL;
3. All completed post-closure care annual reports;
4. All groundwater monitoring results and records, including full laboratory data packages/reports;
5. All soil-gas monitoring results and records, including full laboratory data packages/reports; and
6. All records of actions taken to prevent or mitigate releases of hazardous waste or hazardous constituents to the environment.

The Permittees shall comply with the record-keeping provisions of 40 C.F.R. § 264.74, concerning the availability, retention, and disposition of records.

During the compliance monitoring and post-closure care periods, the Permittees shall submit a CWL post-closure care report to the Department on an annual basis. The report shall:

1. Summarize inspection, maintenance, and repair activities, and indicate whether any implemented repairs were effective and met the original specifications;

2. Provide groundwater monitoring results, including control charts for groundwater monitoring results for each hazardous constituent (see Section 2.21.3 of Permit Attachment 2);

3. Provide soil-gas monitoring results, i.e., summary data tables showing TCE and total VOC results organized by well and port as well as laboratory data sheets providing all TO-14 results, provide the upper and lower confidence limits for each compound listed in Table 1-5 detected at a concentration greater than 0.5 ppmv for the three deepest sampling ports (Port 1) of wells CWL-D1 through D3, and indicate if the trigger level was exceeded for soil gas and for which compound;

4. For groundwater monitoring results, indicate whether there has been any statistically significant increase in the concentration of a hazardous constituent in groundwater in any of the wells at the point of compliance, and indicate the cumulative percentage of sampling results exceeding the median;

5. For groundwater monitoring results, indicate whether any hazardous constituents exceeded their corresponding concentration limits, provide the upper and lower confidence limits for each hazardous constituent, provide based on prediction intervals the probability that the semi-annual sample result for each hazardous constituent should fall within the range of previous results, and specify if the semi-annual result fell within, below, or above the range of previous results;

6. For groundwater monitoring results, indicate whether any new hazardous constituents were identified as a result of enhanced sampling (see Section 1.8.1.1 of Permit Attachment 1) and whether they were added to the monitoring list; and

7. Summarize any problems that either endangered or presented significant potential to endanger human health and the environment for the reporting period and what was done to mitigate such problems.

The annual reports are due by March 31 of each calendar year and may be combined with other site annual reports.
1.13. POTENTIAL FOR EXPOSURE

The cover provides a barrier between the surface environment and contaminated soil beneath the cover. The following measures have been implemented to reduce the risk of exposure from contaminants at the CWL:

1. The engineered cover is designed to minimize the potential for the migration of liquid into the former CWL and the transport of liquid from the CWL into the surrounding environment;
2. Monitoring of the groundwater and VOC soil-gas plume shall be conducted to determine whether contaminants are being released that pose a threat to groundwater;
3. Security measures shall maintain restricted access to the area;
4. Land-use designation shall prevent inappropriate use of the CWL site; and
5. Inspections, maintenance, and repairs shall be performed as needed, on a regular scheduled basis, and in accordance with this Permit.

1.14. POTENTIAL FOR EMERGENCY

Due to the current conditions of the CWL, the potential for fire, explosion, or unplanned sudden or gradual release of RCRA-regulated hazardous waste or hazardous waste constituents that would significantly threaten human health or the environment is low. However, the Facility’s Contingency Plan shall be maintained in the CAMU administrative trailer in the event of an incident or emergency. The Facility’s Emergency Operations Center also provides coordination/resources and appropriate emergency equipment on a Facility-wide basis.

1.15. REFERENCES


EPA, see U.S. Environmental Protection Agency.

IT, see IT Corporation.


Sandia National Laboratories/New Mexico (SNL/NM), March 1999. “Interim Change Notice (ICN) #1 for the Chemical Waste Landfill Excavation Sampling and Analysis Plan.” Sandia
National Laboratories, Albuquerque, New Mexico.


SNL/NM, see Sandia National Laboratories/New Mexico.


FIGURES of PERMIT ATTACHMENT 1
Figure 1 Location of the Chemical Waste Landfill with respect to Kirtland Air Force Base and the City of Albuquerque.
Figure 4
Post-VE VCM Volatile Organic Compound Soil-Gas Plume - September 2004
Chemical Waste Landfill
Figure 5
Extent of LE VCM Excavation and Final Verification Soil Sampling Grid Locations

Legend

- Verification Grid Sample
- Judgemental Sample
- Area Boundary
- Fence

Depth of Excavation

- 0 - 4'
- 4' NDA Floor
- 4 - 12'
- 12' Floor
- 12 - 14'
- 14 - 16'
- 16 - 18'
- 12-20'
- 20'
- 25'
- 30'

Sandia National Laboratories, New Mexico
Environmental Geographic Information System

840857.01100000 A3
Figure 6
Site Layout for the Post-Closure Care Period
Chemical Waste Landfill

Legend
- Post-Closure Groundwater Monitoring Well
- Post-Closure Soil Gas Monitoring Well
- Approximate location of surface water
  drainage swales. Arrows indicate
  flow direction
- Tech. Area III Fence
- Paved and Unpaved Road
- Perimeter Security Fence
- Building / Structure
- Contour Intervals (approximate) for the
  Cover Area and Immediate Vicinity
- Former CWL Footprint

Sandia National Laboratories, New Mexico
Environmental Geographic Information System
Figure 7
Panoramic Photographs of the CWL Prior to and After Cover Installation
Figure 8
Schematic of the CWL Excavation Backfill and Cover Layers
Figure 9
Potentiometric Surface of the Upper Aquifer and Post-Closure Groundwater Monitoring Wells
Figure 10
Soil-Gas Monitoring Wells and Depth-Specific Sampling Ports
Chemical Waste Landfill
Figure 11
Schematic of Passive Soil-Gas Venting Well Equipped with a Baroball™ Device
Chemical Waste Landfill
PERMIT ATTACHMENT 2: GROUNDWATER SAMPLING AND ANALYSIS PLAN

2.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) provides additional requirements that shall be adhered to by the Permittees for the collection and analysis of water samples from groundwater monitoring wells located at the Chemical Waste Landfill (CWL) during the post-closure care and compliance monitoring periods. The post-closure care and compliance groundwater monitoring program is designed to address the requirements of 40 C.F.R. Part 264 Subpart F.

The Permittees must comply with the groundwater protection standard at 40 C.F.R. § 264.92. The hazardous constituents that shall be monitored in accordance with 40 C.F.R. § 264.93 are trichloroethene, chromium, and nickel. Additionally, in accordance with 40 C.F.R. § 264.99(g), the Permittees shall collect and analyze water samples for an enhanced list of constituents (see Section 1.8.1.1 of Permit Attachment 1 for the enhanced list of constituents) at least annually from wells located at the point of compliance and the background well.

The purpose of this SAP is to document procedures for the collection and reporting of consistent, reliable, defensible, and comparable groundwater sampling results. This SAP provides additional instructions for sample collection, data management, and reporting of data that shall be adhered to during the post-closure care and compliance periods. Other instructions are provided in Sandia National Laboratories/NM (SNL/NM) Field Operating Procedures (FOPs), SNL/NM Administrative Operating Procedures (AOPs), and the SNL/NM Statement of Work (SOW) for Analytical Laboratories; however, the requirements of this SAP and the CWL Post-Closure Care Permit (Permit) shall take precedence over any FOPs, AOPs, or SOWs. Table 2-1 summarizes documents that are referenced in this SAP, which can be obtained from the SNL/NM Environmental Safety and Health (ES&H) and Security Records Center. The most current versions of these documents shall be consulted for the purpose of conducting groundwater sampling.

The Permittees shall provide to the New Mexico Environment Department (the Department) within 60 days of the effective date of this Permit in hard copy and electronic format the current versions of the FOPs and AOPs listed above. The Permittees shall provide the Department with any updated versions of the FOPs/AOPs within 30 days of their acceptance by the Permittees. If any requirement or procedure in the FOPs or AOPs is found by the Department to be unacceptable for reasons including, but not limited to, the requirement or procedure will or could prevent the acquisition of representative and reliable groundwater sampling results, the requirement or procedure shall be replaced by the Permittees with a different requirement or procedure that is acceptable to the Department.

2.1. DATA QUALITY OBJECTIVES AND QUALITY CONTROL

The data quality objective (DQO) for groundwater monitoring is to collect accurate and defensible data of high quality to assess the concentrations of hazardous constituents in the groundwater in the uppermost aquifer underlying the CWL such that they can be compared to the concentration limits in Table 1-2 in Permit Attachment 1, as it may be amended. The Permittees shall evaluate accuracy, precision, representativeness, completeness, and comparability of the groundwater data to verify that data are of high quality and ensure that the DQO is met. Quality control (QC) procedures discussed in Section 2.20 of this Permit Attachment shall also be used to determine whether the DQO has been attained. QC samples generated in both the field and the laboratory shall be analyzed and evaluated.
Laboratory measurements shall comply with SNL/NM Sample Management Office (SMO) procedures and protocols listed in Table 2-1, including qualification or validation of laboratory analytical data, and shall also comply with this Permit. This procedure for determining the quality and usability of analytical data acquired during groundwater sampling shall be summarized in data validation reports regarding the overall quality of the data and the resulting data qualifiers. All associated data validation reports shall be submitted to the Department in the post-closure care annual report along with the results for each monitoring event. Data not meeting DQO requirements are subject to corrective action(s) as discussed in SNL/NM SMO procedures and protocol and as discussed in Section 2.22 of this Permit Attachment.

### TABLE 2-1

<table>
<thead>
<tr>
<th>Document Number</th>
<th>Document Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOP 00-03</td>
<td>Data Validation Procedure for Chemical and Radiochemical Data</td>
</tr>
<tr>
<td>AOP 95-16</td>
<td>Sample Management and Custody</td>
</tr>
<tr>
<td>FOP 05-01</td>
<td>Groundwater Monitoring Well Sampling and Field Analytical Measurements</td>
</tr>
<tr>
<td>FOP 05-02</td>
<td>Groundwater Monitoring Equipment Field Check For Water Quality Measurements</td>
</tr>
<tr>
<td>FOP 05-03</td>
<td>Groundwater Sampling Equipment Decontamination</td>
</tr>
<tr>
<td>FOP 05-04</td>
<td>Groundwater Monitoring Waste Management</td>
</tr>
<tr>
<td>LOP 94-03</td>
<td>Sample Handling, Packaging, and Shipping</td>
</tr>
<tr>
<td>PLA 05-09</td>
<td>Groundwater Health and Safety Plan</td>
</tr>
<tr>
<td>SMO 05-03</td>
<td>Procedure for Completing the Contract Verification Review</td>
</tr>
<tr>
<td>Not Applicable</td>
<td>SNL/NM Statement of work for Analytical Laboratories</td>
</tr>
<tr>
<td>Not Applicable</td>
<td>Quality Assurance Project Plan for the Sample Management Office</td>
</tr>
</tbody>
</table>

*a Sandia National Lab’s Documents (procedures/documents will be used as revised and updated).

2.2. **ACCURACY**

Accuracy is the agreement between a measured value and an accepted reference value. When applied to a set of observed values, accuracy is influenced by a combination of a random component and a systematic bias. Accuracy shall be maintained and evaluated through referenced calibration standards, laboratory control samples (LCS), matrix spike (MS) samples, and surrogate spike samples. The bias component shall be evaluated and expressed as percent recovery (%R), as indicated in the equation below:

\[
%R = \left( \frac{\text{measure sample concentration}}{\text{true concentration}} \right) \times 100\%
\]

The acceptable range for %R shall be 50-130% for volatile organic compounds (VOCs) and 75-125% for metals.
2.3. **PRECISION**

Precision is the agreement among a set of replicate measurements. Precision data shall be derived from field and laboratory duplicate samples. Precision shall be reported as relative percent difference (RPD), which is calculated as follows:

\[
RPD = \left( \frac{|measured\ value\ sample\ 1 - measured\ value\ sample\ 2|}{average\ of\ samples\ 1\ and\ 2} \right) \times 100\%
\]

The acceptable range for RPD is ±20% for VOCs and ±35% for metals.

2.4. **COMPLETENESS**

Completeness is defined as a measure of the amount of usable data compared to the total amount of data required. Examples of events that reduce the amount of usable data include improperly collected and preserved samples, missed holding times, sample container breakage, and operating outside prescribed QC limits. The completeness objective is 100% for compliance data. If the completeness objective is not met and sufficient sample material remains for re-analysis, and if still appropriate, the laboratory shall repeat the analysis. Otherwise, the incomplete portion of the sampling shall be made complete by repeating the sampling and analysis as necessary. Percent completeness is expressed in the equation below:

\[
\%\text{Completeness} = \frac{number\ of\ useable\ data\ points}{total\ number\ of\ samples\ required} \times 100\%
\]

2.5. **DATA REPRESENTATIVENESS**

Data representativeness is the degree to which samples represent the media they are intended to represent. To help ensure that samples are representative of formation water, the Permittees shall implement the procedures in this Permit for groundwater purging and sampling. Monitoring wells shall be adequately purged and stability of field parameters achieved prior to the collection of water samples.

2.6. **COMPARABILITY**

Comparability is the extent to which one data set or value can be related to another. Comparability between data sets shall be achieved through the collection and analysis of samples using consistent methods and QC criteria.

2.7. **SAMPLING LOCATIONS AND FREQUENCY**

The compliance and post-closure care groundwater monitoring network at the CWL consists of four monitoring wells. The monitoring well network shall include one upgradient and three downgradient wells located near the CWL. These wells are identified as background well CWL-BW5, and downgradient compliance monitoring wells, CWL-MW9, CWL-MW10, and CWL-MW11.

Table 2-2 summarizes the monitoring well network and groundwater sampling frequency. Well completion diagrams for these wells are provided in Appendix 2-1 of this Permit Attachment.

In accordance with 40 C.F.R. § 264.97(g)(2), at least one sample shall be collected from each well (background and compliance wells) during each of two semi-annual sampling events and shall be
analyzed for trichloroethene (TCE), chromium (Cr), and nickel (Ni). Additionally, in accordance with 40 C.F.R. § 264.99(g), the Permittees shall collect and analyze water samples at least annually from wells located at the point of compliance and analyze them for an enhanced list of constituents (see Section 1.8.1.1 of Permit Attachment 1 for the enhanced list of constituents). The Permittees shall conduct semi-annual (twice each year) groundwater sampling for the entire compliance and post-closure care-periods, with one of these events each year including the enhanced sampling list (see Section 1.8.1.1 of Permit Attachment 1 for the enhanced list of constituents). Aqueous samples shall be reported in units of milligrams per liter (mg/L) or micrograms (µg)/L.

<table>
<thead>
<tr>
<th>Well Number</th>
<th>Installation Year</th>
<th>Semi-Annual Sampling</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>CWL-BW5</td>
<td>2010</td>
<td>X X</td>
<td>Upgradient well.</td>
</tr>
<tr>
<td>CWL-MW9</td>
<td>2010</td>
<td>X X</td>
<td>Downgradient well</td>
</tr>
<tr>
<td>CWL-MW10</td>
<td>2010</td>
<td>X X</td>
<td>Downgradient well</td>
</tr>
<tr>
<td>CWL-MW11</td>
<td>2010</td>
<td>X X</td>
<td>Downgradient well</td>
</tr>
</tbody>
</table>

Note: Refer to Table 2-3 for specific information regarding analytical methods and constituents.

2.8. FIELD OPERATIONS

Groundwater sampling shall be conducted in accordance with this SAP and this Permit to ensure accurate, precise, representative, complete, and comparable groundwater sampling results. Other groundwater monitoring activities shall include the measurement of water levels and calculating the direction, flow rate, and gradient of groundwater flow, the decontamination of equipment, inspection of monitoring equipment, monitoring field water quality parameters, collecting and handling samples, and managing waste.

2.9. SAFETY

Field operations shall be conducted in a manner that protects the health and safety of field personnel. Every team member has the authority and responsibility to stop operations if an unsafe condition develops or is observed. All groundwater monitoring personnel shall perform field activities safely in accordance with the SNL/NM Groundwater Health and Safety Plan, PLA 05-09.

2.10. WATER LEVEL MEASUREMENTS

Water level information is used to calculate the volume of water in a well casing and the minimum amount required for purging. It is also used to determine the direction and gradient of groundwater flow, as required by 40 C.F.R. § 264.99(e). Measurements shall be referenced to a surveyed mark of known elevation at the top of each well casing. The static water level shall be measured in each well prior to purging or obtaining a sample, and measurements shall be taken to the nearest 0.01-foot using a water level indicator. Other requirements for water level measurements are provided in SNL/NM FOP 05-01. Water levels in all compliance wells shall be measured during every sampling event.
2.11. FIELD WATER QUALITY PARAMETERS

Field water quality parameters shall be collected during purging in accordance with SNL/NM FOP 05-01 and this Permit Attachment. Measurements taken shall include potential of hydrogen (pH), specific conductance (SC), temperature, and turbidity. Additional field water quality parameters shall include dissolved oxygen (DO) and oxidation-reduction potential (ORP). Field water quality parameters are as follows.

**DO** – The DO content of the water in percent saturation or in mg/L.

**SC** – The ability of a cubic centimeter of water to conduct electricity. It varies directly with the amount of ionized minerals in the water and is measured in micro-mhos per centimeter at 25 degrees Celsius (°C).

**pH** – A measure of the acidity or alkalinity of a solution. Numerically equal to 7 for neutral solutions, increasing with increasing alkalinity and decreasing with increasing acidity.

**ORP** – Potential for an oxidation (loss of electrons to another atom or molecule) or reduction (gain of electrons from another atom or molecule) reaction in millivolts.

**Temperature** - The temperature of the water in °C.

**Turbidity (nephelometric)** - The cloudiness in water due to suspended and colloidal organic and inorganic material. Water turbidity is measured in Nephelometric Turbidity Units (NTUs).

2.12. SAMPLE COLLECTION

Sample collection procedures are provided in SNL/NM FOP 05-01 and this Permit Attachment. Groundwater monitoring shall be performed using conventional sampling methods. The Permittees shall purge monitoring wells with a portable Bennett™ submersible pump system or equivalent. The pump intake shall be set at or near the bottom of the screened interval. In an effort to lower the rate of discharge for wells that purge dry, the existing Bennett pump system used at the CWL shall be equipped with a flow meter valve located along the water discharge line, and with small-diameter tubing (no less than 0.25 inches inside diameter) for both the water discharge and air (or other drive gas) intake lines. These actions represent best faith efforts that shall be employed by the Permittees to attain a pumping rate of 0.3 liters per minute or less. If the desired pumping rate of 0.3 liters per minute is not achieved during a particular sampling event for a particular well that purges dry, the Permittees will document in the annual reports submitted pursuant to Section 1.12 of Permit Attachment 1 their attempts to achieve the desired pumping rate that failed.

Regardless of the desired pumping rate mentioned above, the maximum pumping rate in any case shall not exceed 12 liters per minute, and groundwater samples collected for VOC analyses shall be collected by filling the sample containers at a flow rate not to exceed 0.1 liter per minute. The Permittees may modify the sampling system in order to split the flow of water, such that the flow of water through one side can be reduced to a rate of 0.1 liter per minute or less to facilitate the filling of sample containers. The flow rate through the other side shall be the minimum rate that is reasonably achievable. Each monitoring well shall be purged a minimum of one borehole volume (a borehole volume is the volume of all static water in the well plus the volume of water in the primary and secondary filter packs). Prior to the collection of groundwater samples, purging shall continue beyond one well borehole volume until four stable measurements are obtained for turbidity, pH, temperature, and SC. Groundwater stability shall be considered acceptable when measurements are
less than 5 NTU for turbidity, ± 0.1 pH units for pH, ± 1.0 °C for temperature, and ± 5% for SC. If a monitoring well is purged dry prior to meeting the above purging and stability requirements, then sampling shall be conducted once the well has recovered such that the volume of water available in the well is the minimum necessary to collect the required water samples.

Samples shall be placed into clean laboratory-supplied containers. Groundwater samples shall be collected for VOC and metals analyses, in that order, from each well. Samples shall not be filtered. Sample documentation and custody shall be performed in accordance with SNL/NM SMO procedures and protocols (AOP 95-16 and LOP [Laboratory Operating Procedure] 94-03) and this Permit. Samples shall be delivered to the shipping facility for repackaging in shipping coolers in accordance with appropriate U.S. Department of Transportation shipping regulations (49 C.F.R. Parts 170–179).

2.13. **MONITORING EQUIPMENT FIELD CHECKS**

Monitoring instruments used to measure field water quality parameters shall be calibrated where appropriate or function-checked prior to sampling activities. Calibration and field-check instructions are presented in FOP 05-02.

2.14. **EQUIPMENT DECONTAMINATION**

All equipment that would come into contact with a sample, the interior of a well, or groundwater shall be decontaminated prior to entering any well or contacting any sample to prevent cross-contamination. Equipment and materials (including chemicals and protective clothing), decontamination procedures, and waste management procedures are presented in the FOPs 05-01, 05-02, 05-3, and 05-04.

2.15. **WASTE MANAGEMENT**

All waste generated during groundwater sampling activities shall be managed in accordance with federal, state, and local regulations. All purge and decontamination water shall be managed as listed hazardous waste. Analytical data from sampling events shall be compared to discharge and disposal criteria. The anticipated disposal path for purge water and decontamination water is discharge to the sanitary sewer. If the City of Albuquerque discharge standards are not met, purge and decontamination water shall be managed appropriately through the Facility’s Hazardous Waste Management Unit. Personal protective equipment that comes into contact with groundwater shall be managed as listed hazardous waste and disposed of through the Hazardous Waste Management Unit. Waste management activities associated with groundwater monitoring are discussed in FOP 05-04.

2.16. **SAMPLE DOCUMENTATION AND CUSTODY**

To ensure the integrity of samples from the time of collection through the reporting of analytical results, sample collection, handling, and custody shall be documented in writing. Primary elements in the documentation of samples are: sample identification numbers, sample labels, custody tape, and Analysis Request/Chain of Custody (AR/COC) forms. Standardized forms shall be used to document sample information. Sample custody and documentation procedures for sampling activities are outlined in SNL/NM AOP 95-16 and LOP 94-03. These procedures, and the procedures in this Permit Attachment, shall be followed throughout each groundwater-sampling event.
2.17. SAMPLE SHIPMENT

Samples shall be shipped to the analytical laboratory in accordance with SMO procedures detailed in LOP 94-03. Prior to shipment, sample collection documentation shall be verified. Any error shall be noted in writing and corrected. Samples shall be packaged and shipped in accordance with LOP 94-03.

2.18. LABORATORY ANALYTICAL PROCEDURES

The Permittees shall ensure that the analytical laboratory analyzes samples using EPA-approved analytical methods. The analytical laboratory shall provide appropriate sample containers prepared with the required preservative. The analytical laboratory shall prepare and submit to the Permittees an analysis data report as described in Section 4.0 of the SOW for Analytical Laboratories and as required by the conditions of this Permit. Table 2-3 summarizes EPA Methods (EPA November 1986), container types and preservation methods applicable to groundwater sampling at the CWL; however, the Permittees may use other appropriate test methods, container types, and preservation methods that meet the data quality requirements of this Permit subject to the procedures in 40 C.F.R. § 270.42(a)(2).

2.19. ANALYTICAL LABORATORY

The Permittees shall ensure that the analytical laboratory performs the analyses in accordance with this SAP, this Permit, and regulatory requirements. The laboratory shall maintain written documentation of sample handling and custody, analytical results, and internal QC data. The laboratory shall analyze QC samples in accordance with this SAP and its own internal QC program. The Permittees shall direct the laboratory to investigate and if necessary conduct corrective action where data are found to be outside quality acceptance limits.

Two types of additional analytical laboratory audits shall be performed as part of the sampling program: system audits and performance audits. A system audit determines whether appropriate project systems (i.e., equipment, procedures) are in place. Performance audits indicate whether the projects systems are functioning properly and are capable of meeting project DQOs. These audits shall be completed as required by SMO procedures and protocols.
TABLE 2-3
LABORATORY ANALYTICAL METHODS, CONTAINER TYPES AND PRESERVATIVES
CWL GROUNDWATER SAMPLING

<table>
<thead>
<tr>
<th>Analysis</th>
<th>SW-846 EPA Methoda</th>
<th>Volume and Container Type/Preservation</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOCs, including TCE</td>
<td>8260</td>
<td>3 x 40 mL glass/HCL, 4°C</td>
</tr>
<tr>
<td>Metalsb, including Cr, and Ni</td>
<td>6020/7191/7421/7470</td>
<td>1 x 500 mL polyethylene/HNO₃, 4°C</td>
</tr>
</tbody>
</table>

bmetals = including chromium and nickel
HCL = Hydrochloric acid
HNO₃ = Nitric acid
mL = Milliliter(s)
SW = Solid waste

2.20. QUALITY CONTROL

Quality Control (QC) samples shall be collected in the field and prepared in the laboratory to ensure that the data generated meet the DQO. QC shall be achieved through adherence to requirements and procedures listed and described in Section 2.1 of this Permit Attachment. Mandatory QC samples are identified in the following sections.

2.20.1. Field Quality Control

Field QC samples are used to document data quality and identify errors that may be introduced by field conditions, in sample collection, storage, transportation, and equipment decontamination. Field QC samples submitted to the analytical laboratory shall be handled and analyzed in an identical manner as environmental samples. The Permittees shall collect and analyze the following Field QC sample types: equipment blanks, duplicates, field blanks, and trip blanks.

Equipment blanks demonstrate the effectiveness of equipment decontamination and monitor the cleanliness of the sampling system. After sampling equipment decontamination has been completed, an equipment blank is produced by pouring de-ionized water over the sampling equipment and collecting a sample of this water. Equipment blanks shall be collected at a frequency of 10 percent (minimum of one per CWL sampling event) and shall be analyzed for all of the constituents required by this Permit.

Duplicate environmental samples are collected in the field and analyzed to document the precision of the sampling and analysis process. The duplicate samples shall be collected immediately after the original environmental sample in order to reduce variability caused by time and/or the sampling process. Duplicates shall be collected and analyzed at a frequency of at least 10 percent. At least one duplicate groundwater sample shall be collected and analyzed per sampling event for each of the constituents required by this Permit.

Field blanks are collected for VOCs (including TCE) to assess whether any contamination of the samples was caused by ambient field conditions. The field blanks shall be prepared by pouring deionized water into sample containers at wellheads to simulate the transfer of environmental
samples from the sampling system to the sample container. Field blank samples shall be collected and analyzed at a frequency of 10 percent (minimum of one per sampling event).

Trip blanks (TBs) are used to assess the potential for cross-contamination between environmental samples during sample handling and shipping activities. The TBs are to be analyzed for VOCs (including TCE) only. Each batch of groundwater samples to be analyzed for VOCs shall be accompanied by at least one TB during shipping. The Analytical Laboratory shall prepare the TB by filling a VOC-sample vial with deionized water and using the same sample preservation method designated for VOC environmental samples. Each vial shall be sealed with custody tape and dated when it is prepared. The TBs shall accompany the empty sample containers when they are shipped to the field supervisor prior to the start of sample collection. The TBs shall be taken into the field during sample collection and shall be included in the shipment of environmental samples to the laboratory. The TBs must remain sealed during this entire cycle and may be opened only for analysis on return to the analytical laboratory.

### 2.20.2. Laboratory Quality Control

The analytical laboratory must have established procedures that demonstrate the analytical process is always in control during each sample analysis step. The procedures include Laboratory Control Samples (LCSs), method blank samples, and Matrix Spike (MS) samples.

A LCS consists of a control matrix (e.g., deionized water) spiked with known concentrations of analytes representative of the target analytes. LCSs shall be prepared and analyzed for each analytical procedure performed. LCSs shall be analyzed with each analytical batch containing environmental samples to determine accuracy of the data. The laboratory shall also evaluate the precision of the data by analyzing twice either the environmental samples, LCSs, or MS samples and calculating the RPD between corresponding results.

Method blank samples shall be used to check for contamination in the laboratory during sample preparation and analysis. Method blank samples shall be concurrently prepared and analyzed with each analytical batch. Method blanks shall be reported in the same units as corresponding environmental samples, and the results shall be included with each analytical report.

Surrogate spike analysis shall be performed for all samples analyzed by Gas Chromatography/ Mass Spectroscopy. The surrogate compounds added to the sample shall be those specified in the applicable EPA analytical method procedure (EPA November 1986). Recovery values for surrogate compounds that are outside specified control limits require corrective action, which is detailed in the SOW for Analytical Laboratories.

The analytical process shall be systematically evaluated for the effects of indigenous constituents present in the environmental sample matrix. MS/matrix spike duplicate (MSD) analyses shall be performed in accordance with the specified analytical procedures.

### 2.21. DATA VALIDATION, REVIEW, AND REPORTING

Data validation and review of analytical and field documentation shall be performed. Field and analytical QC data shall be reviewed for conformance to QC acceptance criteria. The entire data package shall be reviewed for completeness, comparability, representativeness, precision, and accuracy to determine whether the DQO has been met. All groundwater monitoring data shall be reported in the CWL post-closure care annual reports for the year for which the data were obtained.
2.21.1. Field Water Quality Data and Documentation Review

Completed field documentation shall be reviewed and checked for errors, completeness, and conformance with the procedures required by this Permit. The review shall occur at the end of each day in the field to allow verification, correction, and retrieval of missing information as appropriate. Field documentation found to be incomplete or to contain questionable data shall be corrected prior to finalizing the field reports. If necessary, measurements of field water quality parameters shall be repeated.

2.21.2. Laboratory Data Verification and Validation

The Permittees shall review laboratory reports for completeness and conformance to the requirements of this Permit and to the performance criteria of the laboratory contract according to the “Procedure for Completing the Contract Verification Review,” SMO 05-03.

Upon receipt of the analytical results from the Analytical Laboratory, the Permittees shall arrange for the validation of the data. The purpose of the validation is to determine the usability and establish the defensibility of the results in support of environmental and waste management activities. Data qualification shall be based upon review of field and laboratory-supplied QC data, the specific QC criteria identified in the procedures for the EPA-approved analytical methods, and the QC criteria for meeting the DQO identified in this Permit Attachment. Data validation shall be conducted according to the requirements of this Permit and AOP 00-03, “Data Validation Procedure for Chemical and Radiochemical Data.” All associated data validation reports shall be submitted in the CWL post-closure care annual report.

2.21.3. Data Reporting

All groundwater monitoring data shall be reported in the CWL post-closure care annual reports for the year for which the data were obtained. This report shall include a description of sampling activities, field water quality data, laboratory analytical data, a discussion of QC evaluations and data reviews, a description of any project variance or nonconformance, and data validation summaries. The reports shall also include control charts for each hazardous constituent for every well in the monitoring well network. The control charts shall show laboratory analytical results for each hazardous constituent (TCE, chromium, and nickel) plotted against the times the samples were collected. Additionally, after the first six sampling events have been completed for a well, the concentration limit, and the upper and lower confidence limits about the mean (at a 95% confidence level) shall also be shown on the control chart for each hazardous constituent.

Additional reporting requirements are found in Section 1.12 of Permit Attachment 1.

Copies of the annual reports and post-closure care groundwater monitoring records shall be maintained in the Facility’s ES&H and Security Records Center.

2.21.4. Records Management

Records associated with groundwater monitoring, including field documentation, chains of custody, laboratory analytical results, data validation reports, post-closure care reports and technical data evaluations shall be maintained at the Facility’s ES&H and Security Records Center. The Permittees shall comply with the record-keeping provisions of 40 C.F.R. § 264.74, concerning the availability, retention, and disposition of records.
2.22. NON-CONFORMANCES AND VARIANCES

Corrective actions must be taken to rectify or prevent a nonconformance or variance that could adversely affect the quality of data generated. Corrective actions must be documented in writing by the persons identifying the need for action.

Any purposeful change to or deviation from the requirements of this SAP and Permit shall take effect only after approval by the Department of a permit modification request.

A nonconformance is any action or condition that does not meet the requirements of this Permit. The analytical laboratory, SMO, groundwater monitoring team members, or the Project Leader may identify a nonconformance. The person noting a nonconformance shall document the nonconformance in writing and suggest an appropriate corrective action. Resolution of the nonconformance shall be documented in writing and acknowledged by the Permittees.

The Permittees and the analytical laboratories shall have systems in place to identify QC issues and initiate corrective actions. In accordance with SMO procedures, the laboratories are required to notify the SMO of QC problems that may affect data quality. The Permittees shall evaluate and determine whether data are comparable to historical values and whether or not corrective action is required based upon the specific issue. Corrective action may include documentation of QC issues in an analytical laboratory report, data qualifiers, and/or sample re-analysis. In all cases, the DQO in Section 2.1 of this Permit Attachment shall be met.

2.23. REFERENCES

EPA, see U.S. Environmental Protection Agency.


Sandia National Laboratories/New Mexico (SNL/NM), December 2003. “Data Validation Procedure for Chemical and Radiochemical Data,” AOP 00-03, Revision 01, Sandia National Laboratories, Albuquerque, New Mexico.


SNL/NM, see Sandia National Laboratories/New Mexico.


APPENDIX 2-1 of PERMIT ATTACHMENT 2

CWL GROUNDWATER MONITORING WELL NETWORK
WELL CONSTRUCTION DIAGRAMS
RESERVED FOR WELL CONSTRUCTION DIAGRAM:
CWL-MW9
RESERVED FOR WELL CONSTRUCTION DIAGRAM:
CWL-MW10
RESERVED FOR WELL CONSTRUCTION DIAGRAM:
CWL-MW11
RESERVED FOR WELL CONSTRUCTION DIAGRAM:
CWL-BW5
PERMIT ATTACHMENT 3: SOIL-GAS SAMPLING AND ANALYSIS PLAN

3.0  INTRODUCTION

This Sampling and Analysis Plan (SAP) provides requirements that shall be adhered to for collecting and analyzing volatile organic compound (VOC) soil-gas samples from soil-gas monitoring wells located at the Chemical Waste Landfill (CWL) during the post-closure care period.

Soil-gas monitoring is designed to provide spatial and temporal soil-gas concentration data for the approximately 500-foot-thick vadose zone beneath the former liquid organic disposal areas (southern portion of the inactive CWL) and to utilize existing vapor extraction/injection wells.

3.1.  PURPOSE

The post-closure care soil-gas monitoring program is designed to provide data to determine if soil vapor has the potential to contaminate groundwater. Soil-gas monitoring shall be conducted in conjunction with groundwater monitoring to accomplish this objective. In addition to establishing data quality objectives (DQOs), this SAP presents requirements for field sampling, laboratory analysis, data validation and evaluation, and reporting. The VOC soil-gas trigger level is described in Section 1.8.2 of Attachment 1 to this Permit.

3.2.  HISTORICAL SOIL-GAS MONITORING

Historical soil-gas sampling involved the pneumatic extraction of discrete volumes of soil gas resident within pore spaces of the vadose zone immediately surrounding in situ sampling devices at specified locations and depths. After sample collection, the soil gas was analyzed using on-site (field) and off-site (fixed-base) laboratories to determine the presence and magnitude of VOC contaminants. Specific field and laboratory procedures were followed in an effort to produce representative, defensible, and comparable results. These results were used to delineate concentration trends over time for each sampling location and to delineate overall soil-gas plume trends. This SAP is designed to ensure that post-closure care soil-gas monitoring procedures are consistent with past practices and to ensure that soil-gas monitoring data obtained pursuant to the requirements of this Permit are of high quality. Soil-gas data will be used to evaluate whether the VOC soil-gas plume has a significant potential to contaminate groundwater.

3.3.  POST-CLOSURE CARE SOIL-GAS MONITORING OBJECTIVES

Soil-gas monitoring is required to detect whether there has been any significant expansion and/or increase in concentration of the soil-gas plume to the extent that human health and the environment will be adversely impacted. The main concern is that trichloroethylene (TCE) could exceed the regulatory standard for groundwater (5 micrograms per liter) as a result of the transfer of TCE mass from the soil-gas phase to groundwater. Therefore, the primary focus of soil-gas monitoring is to determine the concentration trends of TCE vapor in the vadose zone capillary fringe (approximately 10 to 20 feet above the water table based upon the deepest soil-gas sampling ports). The soil-gas monitoring program shall also provide VOC data from various depth intervals that will be used to track the concentrations of constituent contaminants in the VOC plume.
3.4. **DATA QUALITY OBJECTIVES**

Appropriate sampling locations, depths, number of samples collected per event, and sampling frequency are required to ensure that the data are representative of site conditions and meet the objectives of this SAP. The main Data Quality Objective (DQO) is to produce representative, accurate, defensible, and comparable soil-gas analytical results. This SAP is designed to ensure that post-closure care soil-gas monitoring procedures meet the DQO. The DQO shall be accomplished by implementing standard field methods, analytical procedures/methods, and data validation and evaluation protocols consistent with the historic soil-gas monitoring program.

3.5. **SAMPLING LOCATIONS AND FREQUENCY**

3.5.1. **Sample Locations**

Soil-gas data shall be collected from within the plume core and at various distances laterally and vertically from the core. Figure 4 shows the configuration of the plume based upon the data set collected in September 2004. The monitoring network shall include five wells equipped with a total of 21 depth-specific sampling ports specifically designed for soil-gas monitoring. Well completion diagrams are presented in Section 3 of this Permit Attachment. The five wells and associated depth-specific sampling ports are listed in Table 3-1 and shown in Figure 10. Well construction diagrams are provided in Appendix 3-1 of Attachment 3. The five soil-gas monitoring wells are spatially located to monitor the area of the vadose zone most affected by past disposal of organic liquid waste. The deepest sampling ports from wells CWL-D1 through D3 (Port 1 in each of these wells) are located in the vadose zone immediately above the capillary fringe zone and water table.

3.5.2. **Frequency**

Soil-gas sampling shall be conducted annually during the post-closure care period. All sampling locations shown in Table 3-1 and Figure 10 shall be sampled.

3.6. **DATA ACCURACY**

The Permittees shall follow proper sampling procedures, including purging, preparation of sampling containers, and use of quality assurance/quality control (QA/QC) samples. Accurate estimates of contaminant concentrations shall be obtained through use of qualified laboratories, appropriate analytical methods, and effective QA/QC procedures.

A range in deviation from actual (true) concentration of 50-130% (percent recovered or %REC) for each detected VOC shall be considered acceptable.

At least two duplicate samples shall be collected and analyzed during each sampling event. A relative percent difference (RPD) of 20% or less for each detected VOC is considered to be acceptable. The Permittees shall immediately repeat the sampling and analysis for any sample results where the above specified quality control targets (%REC and RPD) are not met.
### TABLE 3-1
Soil-Gas Monitoring Ports to be Sampled During CWL Post-Closure Care

<table>
<thead>
<tr>
<th>In Situ Monitoring Port</th>
<th>Depth (ft bgs)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Well CWL-U1</strong></td>
<td></td>
</tr>
<tr>
<td>Port P1</td>
<td>120</td>
</tr>
<tr>
<td>Port P2</td>
<td>80</td>
</tr>
<tr>
<td>Port P3</td>
<td>40</td>
</tr>
<tr>
<td><strong>Well CWL-U2</strong></td>
<td></td>
</tr>
<tr>
<td>Port P1</td>
<td>136</td>
</tr>
<tr>
<td>Port P2</td>
<td>76</td>
</tr>
<tr>
<td>Port P3</td>
<td>36</td>
</tr>
<tr>
<td><strong>Well CWL-D1</strong></td>
<td></td>
</tr>
<tr>
<td>Port P1(^a)</td>
<td>470</td>
</tr>
<tr>
<td>Port P2</td>
<td>350</td>
</tr>
<tr>
<td>Port P3</td>
<td>240</td>
</tr>
<tr>
<td>Port P4</td>
<td>160</td>
</tr>
<tr>
<td>Port P5</td>
<td>100</td>
</tr>
<tr>
<td><strong>Well CWL-D2</strong></td>
<td></td>
</tr>
<tr>
<td>Port P1(^a)</td>
<td>470</td>
</tr>
<tr>
<td>Port P2</td>
<td>440</td>
</tr>
<tr>
<td>Port P3</td>
<td>350</td>
</tr>
<tr>
<td>Port P4</td>
<td>240</td>
</tr>
<tr>
<td>Port P5</td>
<td>120</td>
</tr>
<tr>
<td><strong>Well CWL-D3</strong></td>
<td></td>
</tr>
<tr>
<td>Port P1(^a)</td>
<td>480</td>
</tr>
<tr>
<td>Port P2</td>
<td>440</td>
</tr>
<tr>
<td>Port P3</td>
<td>350</td>
</tr>
<tr>
<td>Port P4</td>
<td>170</td>
</tr>
<tr>
<td>Port P5</td>
<td>120</td>
</tr>
</tbody>
</table>

\(^a\)Only sampling ports subject to the VOC soil-gas trigger level as described in Section 1.8.2 of Permit Attachment 1.

**ft** = Foot (feet).

**PCCP** = Post-Closure Care Permit.
3.7. DATA CONSISTENCY AND COMPARABILITY

Future soil-gas monitoring results must be comparable with historic VOC soil-gas data sets. The Permittees shall maintain consistency in methods and procedures by conducting sampling and analysis:

- Using consistent field sample collection and management methods;
- Using an off-site contract laboratory that complies with the Facility’s Sample Management Office (SMO) analytical laboratory statement of work (SOW) and meeting U.S. Environmental Protection Agency (EPA) standards for quality assurance and quality control (QA/QC);
- Using soil-gas analytical method EPA Compendium Method TO-14 (EPA January 1999); and
- Using the soil-gas analytical data review and validation procedure in Administrative Operating Procedure (AOP) 00-03.

After soil-gas analytical results are received from the laboratory, the Permittees shall review the laboratory report for completeness and conformance to the performance criteria, and arrange for data validation. If problems are noted that require corrective action during these verification and validation reviews, corrective action shall be implemented. The scope of the data verification and validation process shall address field sample management and custody requirements, as well as adherence to QA/QC requirements by the off-site laboratory performing the analyses. These processes are discussed in more detail in Section 3.10 of this Permit Attachment.

3.8. MONITORING ACTIVITIES

This section describes the field and laboratory procedures that shall be followed to produce soil-gas analytical results that meet the requirements of this Permit.

3.9. FIELD SAMPLING

The methods and procedures used to obtain soil-gas samples for laboratory analysis are described below in Sections 3.9.1 through 3.9.3. Additional measurements beyond those described in this SAP may be obtained to support evaluation of the soil-gas plume.

Activities that shall be conducted by the Permittees in preparation for or during soil-gas sampling include:

- Pre-field work planning;
- Vacuum check of SUMMA® canisters;
- Visual inspection of all CWL soil-gas wells and sampling ports;
- Purging and field estimation of total VOC concentration;
- Sample acquisition;
- Sample container documentation and packaging; and
- Sample delivery to laboratory within the method holding time.

The Facility Operating Procedures for these activities, as well as SMO procedures, guidance, and laboratory procedures that apply to the post-closure care soil-gas monitoring program are listed in Table 3-2 and this Permit. All personnel directly involved in field activities related to soil-gas monitoring shall review and abide by these procedures.
The Permittees shall provide to the New Mexico Environment Department (the Department) within sixty (60) days of the effective date of this Permit in hard copy and electronic format the current versions of the FOPs and AOPs listed in Table 3-2. The Permittees shall provide the Department with any updated versions of the FOPs/AOPs within 30 days of their acceptance by the Permittees. If any requirement or procedure in the FOPs or AOPs is found by the Department to be unacceptable for reasons including, but not limited to, the requirement or procedure will or could prevent the acquisition of representative and reliable soil-gas sampling results, the requirement or procedure shall be replaced by the Permittees with a different requirement or procedure that is acceptable to the Department. The requirements of this SAP take precedence over those of any FOP or AOPs listed in Table 3-2.

### TABLE 3-2

**Reference Documentation**

**CWL Post-Closure Care Soil-Gas Monitoring**

<table>
<thead>
<tr>
<th>FOP or AOP</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOP 94-28</td>
<td>Health and Safety Monitoring of Organic Vapors (FID and PID)</td>
</tr>
<tr>
<td>ASSOP 01-04</td>
<td>Activity Specific Standard Operating Procedure For Active Soil-Gas Sampling Using Method TO-14 at the Corrective Action Management Unit and Former CWL</td>
</tr>
<tr>
<td>AOP 95-16</td>
<td>Sample Management and Custody</td>
</tr>
<tr>
<td>AOP 00-03</td>
<td>Data Validation Procedure for Chemical and Radiochemical Data</td>
</tr>
<tr>
<td>LOP 94-03</td>
<td>Sample Handling, Packaging, and Shipping</td>
</tr>
<tr>
<td>SMO 05-03</td>
<td>Procedure for Completing the Contract Verification Review</td>
</tr>
<tr>
<td>NA</td>
<td>SNL/NM SOW for Analytical Laboratories</td>
</tr>
<tr>
<td>NA</td>
<td>Quality Assurance Project Plan for the Sample Management Office</td>
</tr>
</tbody>
</table>

*Sandia National Lab’s Documents (procedures/documents will be used as revised and updated):*

- **ASSOP** = Activity-Specific Standard Operating Procedure.
- **FID** = Flame Ionization Detector.
- **NA** = Not applicable.
- **PID** = Photoionization Detector.

### 3.9.1. Pre-Field Sampling Preparations

Prior to initiating soil-gas sampling, field personnel shall ensure that all necessary equipment is ready and properly functioning in accordance with applicable FOPs and this Permit and that the necessary arrangements have been made with the SMO and off-site analytical laboratory for sample shipment and analysis. As appropriate, operating procedures shall be reviewed and support personnel notified.

### 3.9.2. Purging and Field Estimation of Total Concentration of VOCs

At the wellhead, a vacuum pump connected to the sample tubing via a Swagelok® or equivalent fitting shall be used to purge stagnant and/or pre-existing soil gas from the monitoring ports and sample tubing. The stream of soil gas extracted from the sampling port shall be screened with a photoionization detector (PID) containing an ultraviolet lamp with an ionization potential of 11.8 electron volts. PID measurements shall be monitored during purging and recorded in the field book.
or on a sampling form. Sample collection shall commence only after at least 30 minutes of purging has taken place and after at least three PID measurements have stabilized to within plus or minus 10 percent.

3.9.3. Sample Collection

Soil-gas samples shall be collected in 6-liter SUMMA® canisters for off-site laboratory analysis of VOCs by EPA Compendium Method TO-14 (EPA January 1999). The SUMMA® canisters shall be shipped from the laboratory under vacuum and connected directly to the sampling ports by Swagelok® fittings or equivalents. Soil gas shall be drawn into the sample container by the pressure differential between the atmosphere and the container interior. After sample collection, the valve shall be closed, and the canister shall be shipped back to the laboratory with an analysis request/chain-of-custody form containing the sample identification number, sample location, date and time, elevation, and ambient pressure. Field sample management shall follow AOP 95-16 and the requirements of this Permit. A plug Swagelok® or equivalent fitting shall be fastened to the canister opening to ensure that the canister remains airtight during shipment to the laboratory. The canisters require no special preservation during transport and storage.

3.10. LABORATORY ANALYSIS AND DATA REVIEW

All samples shall be submitted to an off-site analytical laboratory. The samples shall be analyzed using EPA Compendium Method TO-14 (EPA January 1999). The Permittees shall ensure that the off-site laboratory implements the requirements of the method, including analytical method, target analytes for quantification, and internal QA/QC procedures. The target analytes are listed in Table 3-3.

3.10.1. Data Verification

After soil-gas analytical results are received from the laboratory, the Permittees shall review the laboratory report for completeness and conformance to the performance criteria of the contract according to the “Procedure for Completing the Contract Verification Review,” SMO 05-03 and the requirements of this Permit. If problems are noted that require corrective action, the appropriate corrective action shall be implemented.

3.10.2. Data Validation

After the data verification review is completed, the Permittees shall arrange for the validation of the data. The data validation process shall address field sample management and custody requirements, as well as adherence to the analytical method and internal laboratory QA/QC requirements by the off-site laboratory performing the analyses. Data qualification is based upon review of field QC data, laboratory-supplied QC data, the specific QC criteria, and the DQOs identified in the EPA Compendium Method TO-14 procedure (EPA January 1999), the DQO in Section 3.4 of this Permit Attachment and the requirements of this Permit. Data validation shall be conducted according to the requirements of this Permit and AOP 00-03, “Data Validation Procedure for Chemical and Radiochemical Data.” All associated data validation reports shall be submitted to the Department along with the results for each monitoring event.
<table>
<thead>
<tr>
<th>Compound</th>
<th>Compound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetone</td>
<td>Dichloropropane, 1,2-</td>
</tr>
<tr>
<td>Benzene</td>
<td>Dichloropropene, cis-1,3-</td>
</tr>
<tr>
<td>Benzyl chloride</td>
<td>Dichloropropene, trans-1,3-</td>
</tr>
<tr>
<td>Bromodichloromethane</td>
<td>Ethyl benzene</td>
</tr>
<tr>
<td>Bromoform</td>
<td>Ethyltoluene, 4-</td>
</tr>
<tr>
<td>Bromomethane</td>
<td>Hexachlorobutadiene</td>
</tr>
<tr>
<td>Butanone, 2-</td>
<td>Hexanone, 2-</td>
</tr>
<tr>
<td>Carbon disulfide</td>
<td>Methylene chloride</td>
</tr>
<tr>
<td>Carbon tetrachloride</td>
<td>Pentanone, 4-methyl-, 2-</td>
</tr>
<tr>
<td>Chlorobenzene</td>
<td>Styrene</td>
</tr>
<tr>
<td>Chloroethane</td>
<td>Tetrachloroethane, 1,1,2,2-</td>
</tr>
<tr>
<td>Chlorof orm</td>
<td>Tetrachloroethene</td>
</tr>
<tr>
<td>Chloromethane</td>
<td>Toluene</td>
</tr>
<tr>
<td>Dibromochloromethane</td>
<td>Trichloro-1,2,2-trifluoroethane, 1,1,2-</td>
</tr>
<tr>
<td>Dibromoethane, 1,2-</td>
<td>Trichlorobenzene, 1,2,4-</td>
</tr>
<tr>
<td>Dichloro-1,1,2,2-tetrafluoroethane, 1,2-</td>
<td>Trichloroethene, 1,1,1-</td>
</tr>
<tr>
<td>Dichlorobenzene, 1,2-</td>
<td>Trichloroethene, 1,1,2-</td>
</tr>
<tr>
<td>Dichlorobenzene, 1,3-</td>
<td>Trichloroethene</td>
</tr>
<tr>
<td>Dichlorobenzene, 1,4-</td>
<td>Trichlorofluoromethane</td>
</tr>
<tr>
<td>Dichlorodifluoromethane</td>
<td>Trimethylbenzene, 1,2,4-</td>
</tr>
<tr>
<td>Dichloroethane, 1,1-</td>
<td>Trimethylbenzene, 1,3,5-</td>
</tr>
<tr>
<td>Dichloroethane, 1,2-</td>
<td>Vinyl acetate</td>
</tr>
<tr>
<td>Dichloroethene, 1,1-</td>
<td>Vinyl chloride</td>
</tr>
<tr>
<td>Dichloroethene, cis-1,2-</td>
<td>Xylene, m-, p-</td>
</tr>
<tr>
<td>Dichloroethene, trans-1,2-</td>
<td>Xylene, o-</td>
</tr>
</tbody>
</table>

\(^a\)EPA, January 1999.
3.11. DATA MANAGEMENT AND REPORTING

The following activities comprise data management and reporting tasks, and shall be conducted by the Permittees:

- Program-side QA/QC;
- Technical evaluation; and
- Reporting

Program-side QA/QC involves ensuring QA/QC measures are being implemented across the soil-gas monitoring program according to this SAP and this Permit, including field and laboratory methods, protocol, and procedures. Technical evaluation and reporting activities shall be initiated after data validation is completed.

The following specific data evaluation and reporting steps shall be followed and documented as part of the annual post-closure care report for soil-gas monitoring. Data interpretation and evaluation shall follow the procedures outlined below.

1. Add results (VOC soil-gas concentrations) to existing tabulated summaries in EXCEL and WORD (or equivalent) file formats;
2. Perform an assessment of each data point for reasonableness and comparability against historical data and trends;
3. Add the data to the appropriate graphical charts in EXCEL (or equivalent) format to illustrate concentration versus time trends for specified monitoring ports;
4. Compare detected VOC concentrations for the deepest sampling ports (Port 1) of CWL-D1 through D3 to the trigger level of 20 ppmv using the procedure discussed in Section 1.8.2.2 of Permit Attachment 1;
5. Provide a brief summary discussion of the soil-gas plume trend(s);
6. Provide a summary of the groundwater sampling results as they may relate to the soil-gas results; and
7. Plot selected soil-gas concentrations (e.g., TCE) on a site map and/or profiles to show spatial relationships both laterally and vertically.

3.12. RECORDS MANAGEMENT

Records associated with soil-gas monitoring include this Permit and SAP, personnel training, field documentation, laboratory analytical results, data validation reports, and post-closure care reports and technical data evaluations. These records shall be maintained at the Facility’s Environmental Safety & Health and Security Records Center and comply with the record-keeping provisions of 40 C.F.R. § 264.74, concerning the availability, retention, and disposition of records.

3.13. REFERENCES


Sandia National Laboratories/New Mexico (SNL/NM), December 2003. “Data Validation Procedure for Chemical and Radiochemical Data,” AOP 00-03, Revision 01, Sandia National Laboratories, Albuquerque, New Mexico.


APPENDIX 3-1 of PERMIT ATTACHMENT 3

CWL SOIL-GAS MONITORING WELL NETWORK
WELL CONSTRUCTION DIAGRAMS
**Boring ID:** UI-1

**Installation Date:** January 23, 1997

**Dimensions:**
- Total Boring Depth: 168.5 ft
- Well Casing Diameter: 5 in
- Total Well Length: 150 ft
- Well Screen Length: 50 ft
- Upper Annular Seal Thickness: 27.3 ft

**Materials Data:**
- Well Casing: 8"-diameter Schedule 80 PVC
- Sanitary Seal: 1 Bentonite grout
- Annular Seal: 2 Granular bentonite
- Sand Pack: 3 10/20 Sand; 40/60 sand at top of each filter pack
- 4 Formation Material
- 5 Soil Gas Sampling Port

---

**Extraction Well UI-1 Construction Diagram**

Chemical Waste Landfill, Sandia National Laboratories/New Mexico
Boring ID: UI-2

Installation Date: December 18, 1996

Dimensions:
- Total Boring Depth: 178.3 ft
- Well Casing Diameter: 5 in
- Total Well Length: 146.4 ft
- Well Screen Length: 50 ft
- Upper Annular Seal Thickness: 22.6 ft

Materials Data:
- Well Casing: 5 in. I.D. Schedule 80 PVC
- Sanitary Seal: 1 Bentonite pellets
- Annular Seal: 2 Granular bentonite
- Sand Pack: 3 10/20 Sand; 40/60 sand at top of each filter pack
- Soil Gas Sampling Port

SECTION VIEW (not to scale)

Extraction Well UI-2 Construction Diagram
Chemical Waste Landfill, Sandia National Laboratories/New Mexico
Boring ID: D-1

Installation Date: January 16, 1997

Dimensions:
- Total Boring Depth: 494 ft
- Well Casing Diameter: 5 in
- Total Well Length: 485 ft
- Well Screen Length: 30 ft
- Upper Annular Seal Thickness: 88.3 ft

Materials Data:
- Well Casing: 5 in. I.D. Schedule 80 PVC
- Sanitary Seal: Bentonite grout
- Annular Seal: Granular bentonite
- Sand Pack: 10/20 Sand; 30/70 sand at top of each filter pack

SECTION VIEW (not to scale)

Extraction Well D-1 Construction Diagram
Chemical Waste Landfill, Sandia National Laboratories/New Mexico
Boring ID: D-2
Installation Date: December 10, 1996

Dimensions:
- Total Boring Depth: 493 ft
- Well Casing Diameter: 5 in
- Total Well Length: 485 ft
- Well Screen Length: 30 ft
- Upper Annular Seal Thickness: 101.5 ft

Materials Data:
- Well Casing: 5 in. I.D. Schedule 80 PVC
- Sanitary Seal: 1 Bentonite grout
- Annular Seal: 2 Granular bentonite
- Sand Pack: 3 10/20 Sand; 30/60 sand at top of each filter pack
  - Soil Gas Sampling Port

Extraction Well D-2 Construction Diagram
Chemical Waste Landfill, Sandia National Laboratories/New Mexico
Boring ID: D-3

Installation Date: November 12, 1996

Dimensions:
- Total Boring Depth: 494 ft
- Well Casing Diameter: 5 in
- Total Well Length: 486.2 ft
- Well Screen Length: 30 ft
- Upper Annular Seal Thickness: 109 ft

Materials Data:
- Well Casing: 5 in I.D. Schedule 80 PVC
- Sanitary Seal: Bentonite grout
- Annular Seal: Granular bentonite
- Sand Pack: 10/20 Sand; 30/60 sand at top of each filter pack
  - Soil Gas Sampling Port

Extraction Well D-3 Construction Diagram
Chemical Waste Landfill, Sandia National Laboratories/New Mexico
BIOLOGY CHECKLIST FOR CWL COVER
Chemical Waste Landfill  
Post-Closure Inspection Form  
Biology Inspection Checklist for the CWL Cover

**Mandatory requirement:**
The inspector has read the CWL Post-Closure Care Permit and activity-related procedures in the last 12 months, and completed all required training: *(Inspector must initial box before proceeding with the inspection.)*

Date read ______________________

Approximate vegetative coverage (actively photosynthesizing): ______%  
Approximate percent native vegetation of the total vegetative cover: ______%

Listed below are the main plant species identified growing on the CWL cover and the approximate percent cover for each species.

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name (optional)</th>
<th>photosynthesizing</th>
<th>% Total cover</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>
Chemical Waste Landfill
Biology Inspection Checklist for the CWL Cover (Continued)

Are there any contiguous areas of no vegetation greater than 200 square feet? (Approximately 14 x14 ft.): _______

If “Yes,” mark such areas on a map and attach to this checklist, and improve such area(s) with native vegetation via soil augmentation, scarification, and/or reseeding.

Are there any very deeply rooted (roots greater than 8 feet deep at maturity) plant species present on the cover? _______

If “Yes,” mark such areas on a map and attach to this checklist, and remove plant(s) from the cover.

Notes: ______________________________________
_____________________________________________
_____________________________________________

Inspection for animal burrow intrusion into CWL cover

Are any burrows present on the cover? _______

Does any burrow(s) appear to be active? _______

Does any active burrow(s) appear to be that of a species that is able to burrow 6 feet or greater? _______

If any of the active burrows appear to be that of a species that is able to burrow 6 feet or greater, mark such burrow(s) on a map and attach at the end of this checklist, and take appropriate actions as necessary to prevent damage to the cover.

Notes: ______________________________________
_____________________________________________

Biological Aspects Map – [note: sketch map to locate specific features will be attached]

Survey Biologist Name: ____________________________ Date: _____________

Original to: Chemical Waste Landfill Operating Record
CHEMICAL WASTE LANDFILL
INSPECTION CHECKLIST
Chemical Waste Landfill  
Post-Closure Inspection Form  
Inspection Checklist

1. Date of Inspection ________________________
2. Time of Inspection ________________________
3. Name of Inspector ________________________

**Mandatory requirement:**
The inspector has read the CWL Post-Closure Care Permit and activity-related procedures in the last 12 months, and completed all required training: (*Inspector must initial box before proceeding with the inspection.*)

Date read _______________________

Provide explanatory notes for each parameter not inspected or each action required. Include any remedial steps required.

<table>
<thead>
<tr>
<th>I. COVER SYSTEM [Quarterly]</th>
<th>Parameter Inspected (Yes or No)</th>
<th>Action Required (Yes or No)</th>
<th>Note Number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inspection Parameters</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>A. Visible settlement of the soil cover in excess of 6 inches.</td>
<td></td>
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<tr>
<td>B. Erosion of the soil cover in excess of 6 inches deep.</td>
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<tr>
<td>C. Evidence of water ponding.</td>
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<tr>
<td>D. Animal intrusion burrows in excess of 4 inches in diameter.</td>
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<tr>
<td>Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist.</td>
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<tr>
<td>E. Contiguous areas of no vegetation greater than 200 ft².</td>
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<tr>
<td>Note: For first 3 to 5 years this inspection requirement may be covered on the Cover Biology Checklist.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>II. SURFACE-WATER (STORM-WATER) DIVERSION STRUCTURES [Quarterly]</th>
<th>Parameter Inspected (Yes or No)</th>
<th>Action Required (Yes or No)</th>
<th>Note Number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inspection Parameters</strong></td>
<td></td>
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<tr>
<td>A. Channel or sidewall erosion in excess of 6 inches deep.</td>
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<tr>
<td>B. Channel sediment accumulation in excess of 6 inches deep.</td>
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<tr>
<td>C. Debris that blocks more than 1/3 of the channel width.</td>
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</tbody>
</table>
### III. SECURITY FENCE [Quarterly]

<table>
<thead>
<tr>
<th>Inspection Parameters</th>
<th>Parameter Inspected (Yes or No)</th>
<th>Action Required (Yes or No)</th>
<th>Note Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Accumulation of wind-blown plants and debris.</td>
<td>[ ]</td>
<td>[ ]</td>
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<tr>
<td>B. Fence wires and posts in need of repair/maintenance.</td>
<td>[ ]</td>
<td>[ ]</td>
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<tr>
<td>C. Gates in need of oiling/repair/maintenance.</td>
<td>[ ]</td>
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<tr>
<td>D. Locks in need of cleaning or replacement.</td>
<td>[ ]</td>
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<tr>
<td>E. Warning signs in need of repair or replacement.</td>
<td>[ ]</td>
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<tr>
<td>F. Survey monuments in vicinity of CWL visible.</td>
<td>[ ]</td>
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</tbody>
</table>

### IV. SOIL-GAS AND GROUNDWATER MONITORING WELLS [Semi-Annually]

<table>
<thead>
<tr>
<th>Inspection Parameter</th>
<th>Parameter Inspected (Yes or No)</th>
<th>Action Required (Yes or No)</th>
<th>Note Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Concrete pads, bollards, and protective casings in need of repair/maintenance.</td>
<td>[ ]</td>
<td>[ ]</td>
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<tr>
<td>B. Well cover caps and Swagelok®, dust caps in need of repair/maintenance.</td>
<td>[ ]</td>
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<tr>
<td>C. Passive venting Baroballs™, soil-gas sampling ports, pumps and tubing in need of repair/maintenance.</td>
<td>[ ]</td>
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<tr>
<td>C. Monitoring wells and soil-gas sample port locations properly labeled.</td>
<td>[ ]</td>
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<tr>
<td>D. Locks in need of cleaning or replacement.</td>
<td>[ ]</td>
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</tbody>
</table>

### V. PREVIOUS DEFICIENCIES [Quarterly]

<table>
<thead>
<tr>
<th>Inspection Parameter</th>
<th>Parameter Inspected (Yes or No)</th>
<th>Action Required (Yes or No)</th>
<th>Note Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Uncorrected/undocumented previous deficiencies.</td>
<td>[ ]</td>
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</table>
## Chemical Waste Landfill
### Inspection Checklist (Continued)

**NOTES**

<table>
<thead>
<tr>
<th>Note Number</th>
<th>Description</th>
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</tbody>
</table>

PERMIT ATTACHMENT 4
Page 105 of 125
Chemical Waste Landfill
Inspection Checklist (Continued)

Action (Note Number) _____ assigned to _________________ Date action completed ______

Action (Note Number) _____ assigned to _________________ Date action completed ______

Action (Note Number) _____ assigned to _________________ Date action completed ______

Action (Note Number) _____ assigned to _________________ Date action completed ______

Action (Note Number) _____ assigned to _________________ Date action completed ______

Action (Note Number) _____ assigned to _________________ Date action completed ______

Additional Comments:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Inspector's Signature ___________________________

Original to: Chemical Waste Landfill Operating Record

Copy to: Environmental Safety and Health (ES&H) and Security Records Center, MS-1309
PERMIT ATTACHMENT 5: PERSONNEL TRAINING PROGRAM

5.0 INTRODUCTION

In accordance with 40 C.F.R. § 264.16, this Permit Attachment describes the personnel-training program that shall be adhered to for conducting safe operations, inspection, monitoring, and maintenance of the Chemical Waste Landfill (CWL) final cover system, access controls, and monitoring systems. The objective of this training program is to prepare CWL personnel to perform job duties in a safe, environmentally sound, and technically competent manner. To achieve this objective, the program provides all employees with training relevant to their positions. CWL personnel receive classroom and on-the-job training designed specifically to teach them how to perform their duties safely and in conformance with this Permit. CWL personnel shall receive all required training before being allowed to work in unsupervised positions.

The same personnel may be performing post-closure care work at both the CWL and adjacent Corrective Action Management Unit (CAMU); therefore, the training programs detailed in this Permit Attachment may be tailored to address both CWL and CAMU activities. Training records shall be maintained at the CAMU administration trailer for both CWL and CAMU personnel, along with the CWL Contingency Plan, emergency response procedures, and emergency response equipment.

5.1. RELEVANCE OF TRAINING TO JOB POSITION

This training program shall provide employees with training relevant to their positions and training necessary to safely perform their actual job tasks. Personnel shall be trained in operations specific to their job duties, and, where applicable, CAMU and CWL training will be integrated.

5.2. IMPLEMENTATION OF TRAINING PROGRAM

The training program shall be implemented to ensure that all CWL personnel receive the appropriate training in a timely manner. Personnel shall not work in unsupervised positions unless and until they successfully complete the indicated training requirements. Personnel must complete the training program described herein within six months of their assignment to the CWL.

5.3. OUTLINE OF THE TRAINING PROGRAM

5.4. JOB TITLE/JOB DESCRIPTION

Job titles, descriptions, and qualifications are provided in Tables 5-1, 5-2, and 5-3. The job descriptions include job duties and required education, skills, and experience.
### TABLE 5-1
Job Title, Description, and Qualifications
CWL Project Leader/Operations Coordinator

**Job Title:** Chemical Waste Landfill (CWL) Project Leader/Operations Coordinator

**Job Description:** To provide ongoing oversight, supervision, and coordination at the CWL during the compliance and post-closure care periods for monitoring, inspection, and maintenance of the final cover system; groundwater and soil-gas monitoring; and access control, inspection, and maintenance in compliance with this Permit. Duties include, but are not limited to:

- Coordinate and implement final cover system and access controls, monitoring, inspection and maintenance activities.
- Coordinate and implement groundwater and soil-gas monitoring activities with the Facility’s Sample Management Office (SMO) and off-site analytical laboratory.
- Compile and archive groundwater and soil-gas monitoring data into the Facility’s Environmental Restoration Data Management System and ES&H and Security Record Center.
- Produce monitoring, inspection, and maintenance reports.
- Maintain and revise sampling and analysis plans and associated operating/field procedures for post-closure care groundwater and soil-gas monitoring, as necessary.
- Coordinate and oversee waste management activities associated with groundwater and soil-gas monitoring activities.
- Assure the maintenance of records, such as training records, inspection and maintenance records, and data reports, as specified in this Permit.
- Supervise the inventory, maintenance, and repair of all tools, supplies, equipment, and vehicles (i.e., ensure that they are in good working order) used for monitoring and maintenance operations.
- Provide oversight of CWL Field Technicians.

**Required Education, Skill, and/or Experience:**

- Bachelor’s degree in chemistry, biology, physical science, engineering, environmental science, or
- Minimum of 5 years experience in waste management operations and/or environmental restoration, and
- Project management experience.
**TABLE 5-2**

**Job Title, Description, and Qualifications**

**CWL Field Technician**

<table>
<thead>
<tr>
<th>Job Title</th>
<th>Chemical Waste Landfill (CWL) Field Technician</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Job Description:</strong></td>
<td>To perform compliance and post-closure monitoring, inspection, and maintenance activities as instructed by the CWL Project Leader/Operations Coordinator.</td>
</tr>
<tr>
<td></td>
<td>Perform groundwater and soil-gas monitoring activities.</td>
</tr>
<tr>
<td></td>
<td>Perform inspection, maintenance, and repair activities.</td>
</tr>
<tr>
<td></td>
<td>Implement waste management associated with groundwater and soil-gas monitoring activities.</td>
</tr>
<tr>
<td></td>
<td>Assist CWL Project Leader/Operations Coordinator with waste management documentation and reporting activities.</td>
</tr>
<tr>
<td><strong>Required Education, Skill, and/or Experience:</strong></td>
<td>High school diploma or equivalent (e.g., General Education Development [GED])</td>
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<tr>
<td></td>
<td>A minimum of 1 year of prior field work experience in environmental restoration, monitoring, and/or waste management activities.</td>
</tr>
</tbody>
</table>

**TABLE 5-3**

**Job Title, Description, and Qualifications**

**CWL Staff Biologist**

<table>
<thead>
<tr>
<th>Job Title</th>
<th>Chemical Waste Landfill (CWL) Staff Biologist</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Job Description:</strong></td>
<td>To perform post-closure final cover system vegetation monitoring and inspection activities as instructed by the CWL Project Leader/Operations Coordinator.</td>
</tr>
<tr>
<td></td>
<td>Perform cover biology inspections.</td>
</tr>
<tr>
<td></td>
<td>Assist CWL Project Leader/Operations Coordinator with goal of establishing a self-sustaining community of native plants, addressing undesirable animal and plant disturbances/intrusions, documenting successful revegetation, and associated reporting.</td>
</tr>
<tr>
<td><strong>Required Education, Skill, and/or Experience:</strong></td>
<td>Bachelor's degree in biology, physical science, or environmental science, or</td>
</tr>
<tr>
<td></td>
<td>A minimum of 2 years of experience in botany and/or vegetation processes.</td>
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</table>
5.5. TRAINING CONTENT, FREQUENCY, AND TECHNIQUES

The Permittees’ Department Manager responsible for CWL operations, or designee, will function as the Training Director. The Manager maintains responsibility for ensuring that all CWL-specific required training is obtained. The Manager/Training Director shall be knowledgeable about the applicable hazardous waste management regulations and specific RCRA-regulated waste management operations employed at the CWL. The Manager/Training Director determines the content and duration of training required for individual employees to ensure compliance with the training requirements of this Permit. The training program shall be administered by the Training Director, who is responsible for identifying and coordinating training required by the Post-Closure Care Permit, hazardous waste regulations, and Facility requirements. In accordance with 40 C.F.R. § 264.16(a)(2), the Training Director shall be a person trained in hazardous waste management procedures. The Training Director must review fully the CWL Operating Procedures and Refresher Training outlined in Table 5-1 before discharging his/her duties.

Training is required at the frequencies shown in Table 5-1. The Occupational Safety and Health Administration (OSHA) Hazardous Waste Worker Training and a minimum of 24 hours of initial OSHA Hazardous Waste Worker Training are required of all personnel that will work on-site at the CWL. All on-site personnel shall participate in a minimum of eight hours of annual refresher training. The CWL Operating Procedures and Refresher Training are function-specific so that an employee is provided training that is appropriate for his job function. A minimum of two hours of initial CWL Operating Procedures and Refresher Training and a minimum of two hours annual refresher training are required of all on-site CWL personnel.

5.6. EMERGENCY TRAINING

All personnel assigned to work at both the CWL and the adjacent CAMU are required to participate in unit-specific emergency training to ensure that they are able to respond effectively in an emergency situation. The training consists primarily of classroom training and on-site exercises. Topics covered shall include, at a minimum:

1. Emergency or incident notification procedures
2. Response to incidents or emergencies, including fires and releases of hazardous wastes
3. Procedures for using, inspecting, maintaining, and replacing emergency/monitoring/spill cleanup equipment
4. Procedures for shutdown operations (if any)
5. Procedures for evacuation
6. Post-emergency/incident reports and actions
7. CWL Contingency Plan
# TABLE 5-4

## Training Content

### Occupational Safety and Health Administration

#### Hazardous Waste Worker Training and Refresher

- **Duration:** 24-40 hours initial, 8-hour annual refresher
- **Frequency:** Initial and annual
- **Method:** Classroom
- **Required CWL Attendees:** Project Leader/Operations Coordinator, Field Technician, and Staff Biologist

**Minimum Content:**
- Proper use of personal protective equipment
- Overview of federal regulations related to hazardous materials and hazardous waste management
- Guidelines for safe practices while managing hazardous waste
- Overview of hazardous materials (i.e., properties, compatibility, toxicology)

### CWL

#### Operating Procedures and Refresher

- **Duration:** 2-24 hours initial, 2-8 hours annual refresher
- **Frequency:** Initial and annual
- **Method:** Procedure review, on-the-job training
- **Required CWL Attendees:** Project Leader/Operations Coordinator; Field Technician; Staff Biologist; Training Director

**Minimum Content:** This training is function-specific, divided into sections or modules. Each employee must participate in the sections that apply to his specific job function. Example sections include, but are not limited to, the following:

  - Post-Closure Care Permit and associated training requirements
  - Post-closure inspection requirements, frequency, and documentation (i.e., forms)
  - Written standard operating procedures
  - Post-Closure Care and Compliance Groundwater and Soil-Gas Sampling and Analysis Plans
  - Referenced operating procedures and SMO guidance/procedures
  - Groundwater Monitoring Waste Management Plan (FOP 05-04)
  - Groundwater Health and Safety Plan (PLA 05-09)
  - Security, site entry, and site control at the CWL and adjacent CAMU
  - Operation, maintenance, and inspection of CWL monitoring equipment
  - Record keeping and maintenance
  - Review of the CWL Contingency Plan and emergency response procedures
  - RCRA facility or operating permit Module IV requirements
  - Review of emergency procedures, emergency equipment, and emergency systems
5.7. TRAINING RECORDS

In accordance with 40 C.F.R. § 264.16(d) training records shall be kept to document the type, amount, and dates of training received for each assigned employee. Contents of these records shall include the following, at a minimum:

- The name of the employee
- Job title and a written job description
- Training requirements for each job position
- Records that document training received, such as amount, dates, and certificates; attendance or signature lists; memoranda of training; or reports from computerized training databases

Training records for current employees shall be kept until the end of the post-closure care period. Training records for any former employee shall be kept for a minimum of three years from the last date the employee worked at the CWL. A current approved training program and training records for personnel for the previous 12 months shall be maintained at the CAMU administration trailer for both CWL and CAMU personnel. All other training records and documentation shall be maintained by the CWL Project Leader/Operations Coordinator or designee at the Environmental Safety and Health (ES&H) and Security Records Center.
PERMIT ATTACHMENT 6: CONTINGENCY PLAN

6.0 INTRODUCTION

The Permittees shall comply with the requirements at 40 C.F.R. Part 264 Subpart D, “Contingency Plan and Emergency Procedures,” and 40 C.F.R. § 270.14(b)(7). Information specific to the Chemical Waste Landfill (CWL) is included in this Permit Attachment. Current copies of this Contingency Plan shall be maintained at both the Corrective Action Management Unit (CAMU) administrative trailer and the Facility’s Emergency Operations Center (EOC). The CAMU is a RCRA-regulated remediation-waste management unit that is located about 100 yards northwest of the CWL. Emergency response resources for the CAMU are shared with the CWL.

The inactive CWL is a 1.9-acre hazardous waste landfill located in the southeastern corner of Technical Area (TA)-III (TA-III). A map that shows the locations of the Facility’s TAs and the location of the CWL is presented on Figure 1 in Attachment 1 of this Permit. A more detailed map of the CWL area is presented.

Table 6-4 lists the emergency equipment that shall be maintained at the CAMU for use at the CWL. This equipment shall be tested on a quarterly basis and be shall maintained as necessary to ensure proper operation. Table 6-5 lists the emergency coordinators.

Waste Types

Hazardous waste generated at the CWL includes purge water derived from the sampling of groundwater monitoring wells, and personal protective equipment (PPE) waste generated during the sampling and management of purge water and the sampling of soil gas. Hazardous constituents may include, but are not limited to, volatile organic compounds and toxic and heavy metals. Waste generated at the CWL will be stored and managed at the CAMU less-than-90-day waste accumulation area or another established less-than-90-day waste accumulation area.

Purge Water Management

Purge water shall be collected and managed during groundwater monitoring activities by personnel who have received training in hazardous waste management. Whenever purge water is being pumped, poured, or otherwise handled, all personnel involved in the operation shall have access to a phone or radio to contact Facility and Kirtland Air Force Base (KAFB) emergency personnel, if necessary.

Facility personnel shall clean up spills immediately, and shall notify the Emergency Coordinator (EC) of the incident as required by Section 6.4 of this Contingency Plan; the EC will determine if the incident is an emergency. At least two samples shall be collected and analyzed to ensure complete cleanup has been achieved. Additional samples may be required by the New Mexico Environment Department (the Department) depending on the magnitude and character of the spill. The samples shall be analyzed for the same parameters as those required in this Permit for groundwater sampling. Field quality control samples, consisting of at least one field and one trip blank and one duplicate (for all analytes) shall also be collected and analyzed in a laboratory for each sampling event associated with a spill.
Container Management

Typical containers used to store waste generated during post-closure care monitoring activities at the CWL include 55-gallon drums that shall be managed in accordance with applicable provisions of 40 C.F.R. Part 262 and 40 C.F.R. Part 264 Subpart I.

6.1. DISTRIBUTION OF CONTINGENCY PLAN AND AMENDMENTS

Copies of this Contingency Plan shall be maintained at: 1) The CAMU, 2) The Facility EOC, and 3) The Facility Records Center. The Permittees shall also provide copies of this Plan and any amendments and updates of this Plan to the KAFB Fire Department and the Department.

The Permittees' EC(s) and the Facility emergency response organization (ERO) personnel shall periodically review this Contingency Plan. The Plan shall be amended, if necessary, whenever one or more of the following occurs:

   1. Applicable regulations or Permit conditions are revised;
   2. There is a significant change in Facility or Unit design, construction, maintenance, operation, or other circumstance that increases the potential for emergencies or changes the response necessary in an emergency;
   3. The list of designated emergency coordinators changes;
   4. The list of required emergency equipment changes; or
   5. The Plan fails during an incident or an emergency.

6.2. EMERGENCY RESPONSE RESOURCES

Resources are available at the Facility, within KAFB, and in Albuquerque as described in this section.

6.2.1. Emergency Coordinator (EC) and Responsibilities

The EC and alternate ECs shall be thoroughly familiar with this Contingency Plan, the layout of the CWL, sampling and monitoring operations, the location of records, and the emergency equipment and supplies. The EC shall have the authority to commit the necessary resources (including personnel, materials, and funds) to respond to any incident or emergency at the CWL.

During an incident or emergency at the CWL, or until the Facility emergency response Incident Commander (IC) arrives, the EC has three primary responsibilities:

   1. **Assess the Situation.** By observing the scene, interviewing personnel, and/or reviewing records, the EC must gather information relevant to the response, such as the type of event, quantity and type of released material, and actual or potential hazards to human health or the environment.
   2. **Protect Personnel.** The EC shall take any reasonable measures to ensure the safety of personnel, such as activating the fire alarm, accounting for personnel, attending to injuries, or coordinating the evacuation of personnel, if necessary. If evacuation is indicated for other personnel, the IC must be informed.
   3. **Contain or Mitigate the Hazards.** The EC shall take reasonable measures to ensure that fires, explosions, or releases do not occur, recur, or spread.
After an incident or emergency, the EC shall ensure that the CWL and equipment are cleaned, waste is properly managed and disposed of, the CWL is safe, and all information necessary for notifications and reports is provided to Facility personnel, as outlined in Section 6.6.

In the event that the EC is not on site or immediately available during an incident or emergency, an alternate EC shall be contacted. The names, addresses, and phone numbers of the primary and alternate ECs for the CWL are included in Table 6-5. The EC or alternate EC shall be on site or immediately available during sampling and analysis events.

6.2.2. Emergency Response Groups

The Facility ERO consists of two response groups that respond to an emergency situation: (1) a field response group led by an IC under the Incident Command System (ICS) and (2) an EOC cadre. The ICS also includes Facility Security, the KAFB Fire Department, and the Facility personnel with relevant technical skills. An IC shall be on site at the Facility at all times (24 hours per day, 7 days per week). Facility security personnel shall also be available at all times. The Permittees shall maintain their MOU with the 377th Air Base Wing of KAFB for fire protection and other support as referenced in Section 6.2.4 of this Permit Attachment. Facility technical personnel are available on site from 8:00 am to 4:30 pm Monday through Friday and are on call the rest of the time. Facility EOC staff shall include an Emergency Director and a staff of Sandia Corporation and Department of Energy (DOE) personnel who are responsible for management decisions and notifications to outside parties that are required during an emergency response. EOC staff personnel shall be available on site at the Facility from 8:00 am to 4:30 pm, Monday through Friday, except for holidays and Facility closure, and shall be on call at all times.

In the field, the IC shall maintain overall management and control of response operations during an emergency. The IC shall work in a unified command with the KAFB Fire Department and in concert with safety personnel, CWL personnel, and other emergency responders to develop and execute response plans, including on-site protective actions and recommendations for off-site protective actions. The ICS system shall be implemented at the time an emergency occurs and shall be expanded to control the emergency as needs arise, and shall remain in effect until the need for emergency management no longer exists.

6.2.3. Emergency Chain of Command

When the EC is notified of an incident, he shall first determine if the procedures for emergencies should be implemented. If an incident is an emergency, the EC shall manage the emergency response until the IC arrives at the CWL, then the EC will relinquish control to the IC. If possible, the EC shall maintain communication with the IC by telephone or radio before the IC arrives at the CWL. The EC shall remain at the CWL and assist in the emergency response as directed by the IC. The EC shall advise the IC, as needed, on CWL operations, CWL layout, characteristics of hazardous waste on site, location of records, radio and cellular communication systems, and other information as necessary to respond to the emergency.

The Facility IC is the liaison for communications with other emergency response organizations and functions, including medical and fire protection support. The EC can request both medical and fire protection services, if necessary, at the same time that he/she notifies the IC of an emergency.
6.2.4. Support Agreements and Coordination with Outside Agencies

The Facility shall maintain sufficient response resources to handle most emergencies arising from hazardous waste management activities as described in this Contingency Plan. These response resources include personnel, emergency equipment, medical facilities, and communications systems. The Facility has also established mutual aid agreements and memoranda of understanding with several off-site agencies and facilities for additional response capabilities for the Facility. These agencies and facilities include the establishments listed in Table 6-1.

### TABLE 6-1
Agreements and Memoranda of Understanding for Emergency Response

<table>
<thead>
<tr>
<th>Agency or Facility</th>
<th>Type of Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>The New Mexico Department of Homeland Security and Emergency Management</td>
<td>Mutual aid involving an actual or potential emergency, assistance in training and emergency response for local and tribal governments.</td>
</tr>
<tr>
<td>The 377th Air Base Wing, Kirtland Air Force Base</td>
<td>Various types of support, including fire protection, police services, communications, and utilities.</td>
</tr>
<tr>
<td>The City of Albuquerque</td>
<td>Mutual support and responsibilities during a potential or actual emergency requiring the combined resources of DOE and the City of Albuquerque.</td>
</tr>
<tr>
<td>The University of New Mexico Medical Center</td>
<td>Mutual cooperation and assistance in providing timely and effective emergency medical services.</td>
</tr>
<tr>
<td>Lovelace Medical Center</td>
<td>Mutual cooperation and assistance in providing timely and effective emergency medical services.</td>
</tr>
<tr>
<td>Presbyterian Health Care Services</td>
<td>Mutual cooperation and assistance in providing timely and effective emergency medical services.</td>
</tr>
</tbody>
</table>

6.3. EMERGENCY EQUIPMENT

A list of equipment available through the Facility emergency response system is provided in Table 6-2. A list of emergency equipment to be maintained at the Corrective Action Management Unit for use at the CWL is presented in Table 6-4.
### TABLE 6-2
**Chemical Waste Landfill Emergency Response Equipment Inventory**

<table>
<thead>
<tr>
<th>Item or Equipment</th>
<th>Description/Telephone</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Emergency Vehicles (owned by the Facility unless noted)</strong></td>
<td></td>
</tr>
<tr>
<td>Emergency Response Vehicle</td>
<td>Mobile Command Post equipped with communications equipment, typically located at SNL EOC(^a). SNL Emergency Response System: Call 911 or (505) 844-0911</td>
</tr>
<tr>
<td>Ambulance</td>
<td>Typically located at SNL medical facility. SNL Emergency Response System: Call 911 or (505) 844-0911</td>
</tr>
<tr>
<td>Security Vehicles</td>
<td>Vans and trucks equipped with communications equipment and utilized for transportation of personnel and equipment, typically located throughout SNL. SNL Emergency Response System: Call 911 or (505) 844-0911</td>
</tr>
<tr>
<td>Fire Trucks (owned by KAFB Fire Department)</td>
<td>Fire-fighting vehicles outfitted with equipment for fighting fires, typically located at KAFB fire stations. SNL Emergency Response System: Call 911 or (505) 844-0911</td>
</tr>
<tr>
<td><strong>Medical Supplies</strong></td>
<td></td>
</tr>
<tr>
<td>Stretchers/Stokes Litter</td>
<td>Equipment for movement of injured personnel. Stokes litter will immobilize personnel so they may be moved vertically. Typically located in ambulance or at SNL medical facility. SNL Emergency Response System: Call 911 or (505) 844-0911</td>
</tr>
<tr>
<td>Blankets</td>
<td>Normal blankets, typically located in ambulance or at SNL medical facility. SNL Emergency Response System: Call 911 or (505) 844-0911</td>
</tr>
<tr>
<td>Medical Kits</td>
<td>Emergency first-aid supplies, typically located in ambulance or at SNL medical facility. SNL Emergency Response System: Call 911 or (505) 844-0911</td>
</tr>
<tr>
<td><strong>Safety Supplies</strong></td>
<td></td>
</tr>
<tr>
<td>Air Packs</td>
<td>Self-contained breathing apparatus for use by personnel entering hazardous atmospheres, typically located in ambulance or response vehicle. SNL Emergency Response System: Call 911 or (505) 844-0911</td>
</tr>
<tr>
<td>Monitoring Instruments</td>
<td>Typically located in ambulance or emergency response vehicle. SNL Emergency Response System: Call 911 or (505) 844-0911</td>
</tr>
</tbody>
</table>

\(^a\)The Facility EOC is located at Technical Area I (TA-I).
EOC = Emergency Operations Center
KAFB = Kirtland Air Force Base
SNL = Sandia National Laboratories

**6.4. CONTINGENCY PLAN IMPLEMENTATION**

Facility personnel who become aware of an incident or emergency shall contact the EC immediately. If the incident is an emergency, personnel shall implement evacuation procedures identified in Section 6.4.2. Personnel shall also immediately notify the EC or alternate EC of the incident or emergency. The EC shall then assess the situation and determine whether the incident is an emergency.

If the EC determines that an emergency situation exists at the CWL, he shall immediately notify the EOC. The methods for contacting emergency response representatives are listed in Table 6-3.

PERMIT ATTACHMENT 6
Page 117 of 125
TABLE 6-3
Facility Emergency Response System Notification

<table>
<thead>
<tr>
<th>Method</th>
<th>Emergency Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephone</td>
<td>911</td>
</tr>
<tr>
<td>Mobile Telephone</td>
<td>(505) 844-0911</td>
</tr>
</tbody>
</table>

Note: Any person is authorized to implement the evacuation procedures, notify the EC or alternate EC, and/or contact the emergency response representatives in the unlikely event that the EC or alternate EC cannot be contacted or respond in a timely manner.

6.4.1. Emergencies

In the event of an emergency, the EC, a designee, or CWL personnel shall immediately telephone the EOC (by calling 911 or 844-0911) or notify them in some other way. The EC shall relinquish authority to the IC upon arrival. The EC and the IC shall:

1. Determine the extent of the emergency;
2. Identify the character, source, amount, and extent of released materials by observation, records reviews, or chemical analysis;
3. Assess possible resulting hazards to human health or the environment, considering both direct and indirect effects;
4. Take all reasonable measures necessary to ensure fires, explosions, and releases do not occur, recur, or spread to other hazardous waste at the CWL, including collecting and containing released waste, and removing or isolating containers; and

Monitor for leaks, pressure buildup, gas generation, and ruptures in equipment.

TABLE 6-4
Emergency Equipment for the Chemical Waste Landfill, Located at the Corrective Action Management Unit

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Specific Location at CAMU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spill Control Equipment</td>
<td>Spill control materials, including sorbent material, brooms and shovels</td>
<td>Leachate Storage Area Shed</td>
</tr>
<tr>
<td>Fire Extinguisher</td>
<td>Portable, Multi-Class</td>
<td>One near the Leachate Storage Area and Containment Cell, and one in CAMU Administration Trailer</td>
</tr>
<tr>
<td>Communications:</td>
<td>Cellular Phone or Red Site radio</td>
<td>In the vicinity of the Leachate Storage Area</td>
</tr>
<tr>
<td>(Internal/External)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Supply</td>
<td>Fire Hydrant</td>
<td>One outside the southeast entrance to the CAMU</td>
</tr>
<tr>
<td></td>
<td>Ground Hydrant</td>
<td>Two near the former Treatment Pad and two near the former Bulk Waste Staging Area</td>
</tr>
<tr>
<td>Environmental Safety and Health</td>
<td>Portable eyewash station</td>
<td>Leachate Storage Area Shed (during waste handling activities)</td>
</tr>
<tr>
<td>Evacuation</td>
<td>Voice command by on-site personnel or signaled by three blasts of a vehicle warning horn.</td>
<td>Designated Assembly Area (See Figure 2)</td>
</tr>
</tbody>
</table>

CAMU = Corrective Action Management Unit.
6.4.1.1. Fire

The following steps shall be implemented as needed in the event of an emergency involving an imminent or existing fire.

1. All non-essential personnel shall evacuate following the evacuation route described in this Permit Attachment or to an alternate assembly location as directed by the EC. All personnel shall evacuate as soon as possible if it becomes necessary to ensure their health and safety.

2. The EC (or Unit personnel) shall immediately notify the Facility ERO and KAFB Fire Department by activating a manual pull alarm or by dialing the EOC at 911 or 844-0911. Medical response can also be requested at the same time. The KAFB Fire Department and the Facility ERO shall also be notified by activation of an automatic fire alarm.

3. CWL personnel may consider taking action to put out a fire or minimize its spread ONLY if safe to do so. These actions may be taken only after the IC and KAFB Fire Department have been notified. Personnel must not jeopardize their own safety or the safety of other personnel.

4. If a fire is small and the fuel source is small, portable fire extinguishers may be used to put out the fire.

5. Fire extinguishers shall only be used by personnel trained in their use, and only for very small fires.

6. Flammable materials shall be removed from the area of a fire if safe to do so.

7. If the fire spreads or increases in intensity, all remaining personnel must evacuate.

8. The EC shall remain near the CWL, but at a safe distance, so he can advise personnel responding to a fire of the known hazards.

9. Upon arrival at a fire, the KAFB Fire Department officer-in-charge shall be in command of fire fighting. He shall accept and evaluate the advice of the CWL and emergency response personnel, but he retains the responsibility of selecting the fire-fighting methods and tactics.

10. The IC shall be in overall control of the Facility emergency response efforts until the emergency is terminated.

11. Hazardous wastes involved in a fire can be identified in the following ways: The location of the container may indicate the contents. If the location does not indicate its contents, the label number can be used to identify the waste. Records on the contents of each container can be accessed from outside the CWL. If the label has been burned and the container cannot be identified, the waste shall be treated as an unknown.

12. Residues of hazardous wastes may be collected and contained by stabilizing or neutralizing the spilled waste, as appropriate; pouring an absorbent over the spilled waste; and sweeping or shoveling the absorbed waste into drums or other appropriate containers.

13. If needed, affected surfaces shall be cleaned using cleaners appropriate for the chemicals and wastes involved.
14. If possible and safe, responding personnel shall take measures to contain potentially hazardous runoff and keep it away from storm drains and/or sewers. If possible, personnel shall build dikes around storm drains.

6.4.1.2. Explosion

The following steps shall be implemented as needed in the event of an emergency involving an imminent or existing explosion.

1. Personnel shall immediately evacuate the area.

2. The EC (or CWL personnel) shall immediately notify the Facility ERO and KAFB Fire Department by activating a manual pull alarm or by dialing the EOC at 911 or 844-0911. Medical response can also be requested at the same time. The KAFB Fire Department and the ERO shall also be notified by activation of an automatic fire alarm.

3. The EC shall remain near the CWL, but at a safe distance, so that he/she can advise the response personnel of the known hazards involved and the degree and location of the explosion and associated fires.

4. Upon arrival at the site, the KAFB Fire Department officer-in-charge shall be in command of fire fighting. He/she will accept and evaluate the advice of the CWL personnel and emergency response organization members, but retains the responsibility of selecting the fire-fighting methods and tactics.

5. The IC shall be in overall control of Facility emergency response efforts until the emergency is terminated.

6. Residues of hazardous wastes may be collected and contained by stabilizing or neutralizing the spilled waste, as appropriate; pouring an absorbent over the spilled waste; and sweeping or shoveling the absorbed waste into drums or other appropriate containers. If needed, affected surfaces shall be cleaned using cleaners appropriate for the chemicals and wastes involved.

7. If possible, responding personnel will take measures to contain potentially hazardous runoff and keep it away from storm drains and/or sewers, such as building dikes around storm drains.

8. The EC shall secure the CWL once it has been determined to be safe by the IC or a safety officer.

6.4.1.3. Uncontrolled Release

The following steps shall be implemented as needed in the event of an incident or emergency involving an imminent or existing release of hazardous waste and/or radioactive mixed waste or constituents:

1. Evacuate the immediate area.

2. If it is an emergency, the EC (or CWL personnel) shall immediately notify the ERO and KAFB Fire Department by activating a manual pull alarm or by dialing the EOC at 911 or 844-0911. Medical response can also be requested at the same time. The KAFB Fire Department and ERO shall also be notified by activation of an automatic fire alarm.
3. Take actions to minimize, contain, and clean up the release only if safe to do so.
4. Review Facility records (e.g., waste inventory database) to determine the identity and chemical nature of the released material.
5. Wear appropriate personal protective equipment to clean up the spill or release.
6. If possible, secure the source of the release.
7. If necessary and possible, build a dike to contain runoff.
8. Take measures to contain potentially hazardous runoff and keep it away from storm drains and/or sewers and if possible, build dikes around the storm drains.
9. Released wastes shall be collected and contained by stabilizing or neutralizing the spilled waste, as appropriate; pouring an absorbent over the spilled waste; and sweeping or shoveling the absorbed waste into drums or other appropriate containers.
10. No waste that may be incompatible with the released material shall be managed at the CWL until the cleanup procedures are completed.
11. After collection of a released waste, soil at the affected site shall be sampled and analyzed. If contamination is found to exist, contaminated soil shall be collected, contained (if appropriate), and removed from the site for disposal at a permitted disposal facility. Depending on the specific conditions, however, the Facility may choose to implement an alternative decontamination method such as surface cleaning or in-situ neutralization or stabilization. Any such alternative shall be approved by the Department prior to implementation.

6.4.2. Evacuation

During an emergency that threatens the health or safety of CWL personnel, the following steps shall be taken as needed to facilitate safe coordinated evacuation:

1. Stop work.
2. If safe, close containers and shut down equipment or otherwise place it in a safe mode.
3. Alert personnel in the affected area by announcing the evacuation by voice command, “Evacuate the Area.”
4. Activate the available evacuation signal consistent with the internal communications and alarm systems.
5. Notify the Facility ERO by activating a manual pull alarm or by dialing the EOC at 911 or 844-0911. Medical response can also be requested at the same time. The KAFB Fire Department and the ERO shall also be notified by activation of an automatic fire alarm.
6. Check to see whether there is evidence that the designated evacuation route is not safe.
7. If there is no evidence of danger or obstacles, exit the CWL according to the evacuation route.
8. If there is evidence of danger or obstacles, exit the CWL by any safe route available.
9. If safe, check for other personnel in other areas of the CWL.
10. Proceed to the designated assembly area for roll call to be taken by the EC or designee.

11. If the EC and CWL personnel are assembling at an alternate location, proceed to that location.

12. Inform the EC or designee about any other people still believed to be inside the CWL.

13. Do not re-enter the CWL until the IC or EC determines that is safe.

The evacuation route to be used during an emergency is shown in Figure 2 of Attachment 1 of this Permit.

6.4.3. Coordination with Off-Site Parties and Emergency Notification

The Facility EOC shall notify DOE of all emergencies at the Facility. The Permittees shall notify State and Local agencies if State or Local response resources are needed, if human health or the environment is threatened outside the Facility, or if areas outside the SNL Facility may require protective action. The Facility will verbally inform the City of Albuquerque and Isleta Pueblo as soon as possible, in the unlikely event that residents of Albuquerque or Isleta Pueblo could be affected. The notification shall include available information about the nature and location of the emergency, the waste and materials involved, and the recommended protective actions. The most likely protective actions are expected to include evacuation or sheltering indoors with doors and windows closed and ventilation systems shut off.

In the event of emergency involving injuries that require medical services from one of the hospitals listed in Table 6-1, the Permittees shall provide all available information about the incident and the wastes and materials involved to the responders as soon as possible.

The Permittees shall also notify the National Response Center (1-800-424-8802) if human health or the environment is threatened outside the Facility. The notification shall include the following.

1. Name and telephone number of the responsible official
2. Facility name and address
3. Time and nature of emergency
4. Type and quantities of wastes and materials involved to the extent known
5. Personnel injuries, and
6. Potential hazards to human health, or the environment, outside the Facility.

Further, the Permittees shall also provide this information to the Department in accordance with regulatory requirements, including verbal notification via the 24-hour emergency reporting number (1-505-827-9329) or other emergency notification number designated by the Department.

6.5. POST-EMERGENCY ACTIONS

Immediately after an emergency, the EC and the IC shall:

1. Continue to monitor for leaks, pressure buildup, gas generation, and ruptures in valves, pipes, or other equipment;
2. Provide for properly treating, storing, or disposing of recovered waste, contaminated soil or other media, or any other material or waste;
3. Ensure that no waste that may be incompatible with released material or waste is managed at the CWL until cleanup procedures are completed; and

4. Ensure that all equipment used in responding to the emergency is cleaned and fit for its intended use before resuming operations at the CWL.

Before resuming operations after an emergency, the Permittees shall notify the Department that incompatible waste will not be managed until cleanup procedures are complete and equipment listed in this Contingency Plan is cleaned and fit for use.

6.6. EMERGENCY RESPONSE RECORDS AND REPORTS

The time, date, and details of an incident or emergency involving implementation of this Contingency Plan shall be noted in the Operating Record. Within fifteen (15) calendar days following the incident or emergency, a written report shall be submitted to the Department identifying:

1. Name, address, and telephone number of the responsible official;
2. Name, address, and telephone number of the Facility;
3. Date, time, and type of emergency or incident (e.g., fire, explosion, release);
4. Name and quantity of wastes and material(s) involved;
5. Extent of injuries (if any);
6. Assessment of actual or potential hazards to human health or the environment, where applicable; and
7. Estimated quantity and disposition of recovered material and wastes that resulted from the incident or emergency.
### TABLE 6-5
Emergency Coordinator List for the Chemical Waste Landfill

<table>
<thead>
<tr>
<th>Emergency Coordinators&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Home Telephone</th>
<th>Office Telephone</th>
<th>Cellular or Pager</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary:</strong> Donald P. Schofield</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office Location: MO 203</td>
<td>268-6888</td>
<td>844-4088</td>
<td>259-7098 (Cell)</td>
</tr>
<tr>
<td>P.O. Box 5800</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS-1089</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Albuquerque, NM 87185</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>1st Alternate:</strong> Bruce Reavis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office Location: MO 200</td>
<td>296-0007</td>
<td>845-8403</td>
<td>250-6388 (Cellular)</td>
</tr>
<tr>
<td>P.O. Box 5800</td>
<td></td>
<td></td>
<td>530-7538 (Pager)</td>
</tr>
<tr>
<td>Environmental Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS-1042</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Albuquerque, NM 87185</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2nd Alternate:</strong> Robert Ziock</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office Location: MO 202</td>
<td>255-4714</td>
<td>845-0845</td>
<td>None</td>
</tr>
<tr>
<td>P.O. Box 5800</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS-1088</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Albuquerque, NM 87185</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>At least one emergency coordinator must be at the CWL or CAMU unit or on call.