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 1-1
Native Plant Species and Seeding Rate Calculations for the Chemical Waste Landfill Cover

Species	Percent of Total Seed Mix	Calculated Seeding Rate (lbs/acre)[a]
Indian Rice grass	39.0%	7.8 lbs/acre
Galleta	19.5%	3.9 lbs/acre
Blue Grama Grass	29.5%	5.9 lbs/acre
Sand Dropseed	6.0%	1.2 lbs/acre
Alkali sacaton	6.0%	1.2 lbs/acre
Total	**100%**	**20 lbs/acre**

[a]Calculated seeding rate when mixed with the other listed seed species and normalized to a combined seeding rate of 20 lbs/acre.
lbs/acre = Pound(s) per 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[1] 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 1-2
Concentration Limits for Three Hazardous Constituents

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

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.

In accordance with 40 C.F.R. § 264.96, the compliance period during which the groundwater

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.

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 1-3
Final Use/Disposition Summary
Chemical Waste Landfill Groundwater Monitoring and Vapor Extraction Well Inventory

Well Name	Current Status	Future Status/Comments
Compliance and Post-Closure Care Groundwater Monitoring Wells		
BW5	Compliance and Post-closure care background groundwater monitoring well	Plug and abandon following completion of compliance and post-closure care groundwater monitoring.
MW9	Compliance and Post-closure care down gradient groundwater monitoring well	Plug and abandon following completion of compliance and post-closure care groundwater monitoring.
MW10	Compliance and Post-closure care down gradient groundwater monitoring well	Plug and abandon following completion of compliance and post-closure care groundwater monitoring.
MW11	Compliance and Post-closure care down gradient groundwater monitoring well	Plug and abandon following completion of compliance and post-closure care groundwater monitoring.
Post-Closure Care Soil-Gas Monitoring Wells		
UI-1 and UI-2	Former VE system wells with dedicated sampling ports for soil-gas monitoring (shallow ports only)	Plug and abandon following completion of post-closure care VOC soil-gas monitoring (potential future VE well)
D-1, D-2, and D-3	Former VE system wells with dedicated sampling ports for soil-gas monitoring (shallow and deep ports)	Plug and abandon following completion of post-closure care VOC soil-gas monitoring (potential future VE well)
Wells for Potential Future Use		
VMW1	Former VE system well with multiple screen sections	Retain for potential future use (VE)–plug and abandon based upon post-closure care monitoring results

Well Name	Current Status	Future Status/Comments
Wells for Plug and Abandonment		
MW2BU/2BL	Nested well pair located ~70 ft south of former MW2A location	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.
MW1A and MW3A	Wells not suited for monitoring due to sediment in well screen and lack of water	Plug and abandon–potential VOC soil-gas conduits
UI3	Shallow former VE well located east of CWL and away from VOC soil-gas plume core	Well not needed for future use–plug and abandon
BW3	Well is located 20 ft away from BW-4A–background well with stainless steel screen	Well not needed for future use–plug and abandon
Deep Regional Aquifer Monitoring Wells for Chromium Evaluation		
MW7 and MW8	Deep regional wells installed in March 2003	Wells not needed for future use–screen intervals too deep for monitoring of upper aquifer–plug and abandon
Previously Plugged and Abandoned Wells		
BW1	Plugged and abandoned in 2004	NA
BW-2	Plugged and abandoned in 2003	NA
BW-4	Plugged and abandoned in 1994	NA
MW-1	Plugged and abandoned in 1997	NA
BW4A	Plugged and abandoned in 2010	NA
MW4	Plugged and abandoned in 2010	NA
MW5U/L	Plugged and abandoned in 2010	NA
MW6U/L	Plugged and abandoned in 2010	NA

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™ or equivalent passive venting equipment may be maintained on all soil-gas and groundwater monitoring wells. The BaroBall™ or equivalent passive venting equipment 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) or an equivalent method such as TO-15 that includes the same analyte list, method detection limits equal to or lower than the TO-14 limits, and provides the same or higher level of data quality. If TO-15 or another equivalent method meeting these requirements is used in place of TO-14, the Permittees shall provide justification for the change in the subsequent post-closure care report.

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

Monitoring System	Monitoring Frequency	Monitoring Parameters/Constituents of Concern	Monitoring Method
Groundwater	Semi-Annually[c]	TCE by EPA Method 8260[a] and Cr and Ni by EPA Methods 6020[a]	Sampling and Analysis as per Attachment 2
Soil Gas	Annually	Compendium Method TO-14 VOCs[b]	Sampling and Analysis as per Attachment 3

[a]EPA November 1986.
[b]EPA January 1999.
[c]Semi-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 40C.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 VOCs listed in Compendium Method TO-14 (EPA January 1999) using TO-14 or an equivalent method as described in Section 1.8. 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 (Port1) of wells CWL-D1 through D3 shall be reported annually in the reports required under Section 1.12 of this Permit Attachment.

TABLE 1-5
Chemical Waste Landfill Post-Closure Care Soil-Gas Monitoring EPA Compendium Method TO-14 Analyte List[a]

Compound	Compound
Acetone	1,2-Dichloropropane
Benzene	cis-1,3-Dichloropropene
Benzyl chloride	trans-1,3-Dichloropropene
Bromodichloromethane	Ethyl benzene
Bromoform	4-Ethyltoluene
Bromomethane	Hexachlorobutadiene
2-Butanone	2-Hexanone
Carbon disulfide	Methylene chloride
Carbon tetrachloride	4-Methyl-2-pentanone
Chlorobenzene	Styrene
Chloroethane	1,1,2,2-Tetrachloroethane
Chloroform	Tetrachloroethene
Chloromethane	Toluene
Dibromochloromethane	1,1,2-Trichloro-1,2,2-trifluoroethane
1,2-Dibromoethane	1,2,4-Trichlorobenzene
1,2-Dichloro-1,1,2,2-tetrafluoroethane	1,1,1-Trichloroethane
1,2-Dichlorobenzene	1,1,2-Trichloroethane
1,3-Dichlorobenzene	Trichloroethene
1,4-Dichlorobenzene	Trichlorofluoromethane
Dichlorodifluoromethane	1,2,4-Trimethylbenzene
1,1-Dichloroethane	1,3,5-Trimethylbenzene
1,2-Dichloroethane	Vinyl acetate
1,1-Dichloroethene	Vinyl chloride
cis-1,2-Dichloroethene	m-, p-Xylene
trans-1,2-Dichloroethene	o-Xylene

[a]EPA January 1999

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.FR. § 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 on the CWL cover surface in excess of 100 square feet, 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 in excess of 6 inches, areas of ponding water on the CWL cover surface in excess of 100 square feet, 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™ or equivalent. 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 performance, inspections, and review of analytical sampling results.

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

System to be Inspected	Inspection Parameters	Inspection Frequency	Maintenance Implementation	Maintenance/Repair Frequency[a]
Final Cover Surface	Vegetation Inventory	Quarterly for 3 to 5 years, annually thereafter by a qualified staff biologist[b]	Soil augmentations and/or reseeding	Within 60 days of discovery of needed repairs. May be delayed to await appropriate growing season if approved by the Department in advance.
	Contiguous areas of no vegetation >200 ft^2		Revegetate barren areas that exceed prescribed limits	
	Animal intrusion burrows in excess of 4 inches in diameter		Repair cover system damage that exceeds prescribed limits	
Final Cover Surface	Settlement of cover surface in excess of 6 inches	Quarterly by a qualified field technician	Repair cover system damage that exceeds prescribed limits	Within 60 days of discovery of needed repairs
	Erosion of cover soil in excess of 6 inches deep			Within 60 days of discovery of needed repairs
	Animal intrusion burrows in excess of 4 inches in diameter			Within 60 days of discovery of needed repairs
	Contiguous areas of no vegetation >200 ft^2		Revegetate barren areas that exceed prescribed limits	Within 60 days of discovery of needed repairs. May be delayed to await appropriate growing season if approved by the Department in advance.
Storm-Water Diversion Structures	Channel or sidewall erosion in excess of 6 inches deep	Quarterly by a qualified field technician	Repair erosion that exceeds prescribed limits	Within 60 days of discovery of needed repairs
	Accumulations of silt in excess of 6 inches deep or debris that blocks more than 1/3 of the channel width		Remove silt and debris accumulations that exceed prescribed limits	
Soil-Gas and Groundwater Monitoring Wells	Concrete pads, bollards, and protective casings	Groundwater Network Components: semi-annually by a qualified field technician during sampling events Soil-Gas Network Components: annually by a qualified field technician during sampling events	Maintain, clean, repair, replace, relabel, as appropriate	Within 60 days of discovery of needed repairs
	Well cover caps and Swagelok® (or equivalent) dust caps			
	Passive venting BaroBalls™ or equivalent			
	Monitoring wells and soil-gas sample port labels			
	Locks			
	Sampling pumps and tubing			

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

[a]Maintenance/repairs shall be performed as necessary, based upon the results of inspections.
[b]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^2 = 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 or equivalent 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

Bearzi, J. May 2003. Letter to K. Boardman (U.S. Department of Energy) and R. Egan (Sandia Corporation), "Conditional Approval for Class 1 Modification, Chapter 12 Chemical Waste Landfill Closure Plan, Sandia National Laboratories NM5890110518, HWB SNL-02-008." May 15, 2003.

Boardman, K. (U.S. Department of Energy), May 2003. Letter to J. Bearzi (New Mexico Environment Department) transmitting the "Chemical Waste Landfill (CWL) Corrective Measures Study Report, the CWL Remedial Action Proposal, and CWL Post-Closure Care Plan and Permit Application." May 20, 2003.

Boardman, K. (U.S. Department of Energy), February 2003. Letter to J.E. Kieling (New Mexico Environment Department), transmitting the revised Chapter 12 of the Chemical Waste Landfill Closure Plan and requesting approval. February 13, 2003.

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