

## 12.0 REMEDIATION, CLOSURE, AND POST-CLOSURE CARE

Since approval of the Chemical Waste Landfill (CWL) Closure Plan on February 22, 1993, the approach to closure of the CWL has been modified to include a Voluntary Corrective Measure (VCM) program. Figure 12-1 summarizes the CWL closure process, which has been updated to reflect the NMED rejection of the May 2003 submittal of the Corrective Measures Study (CMS) Report (Kieling December 2003). The May 2003 submittal also contained the Remedial Action Proposal (RAP) and Post-Closure Care Plan and Permit Application (PCCP/PA), which were not included in the NMED review (Kieling December 2003). This chapter was revised in September 2002 and again in February 2003 to incorporate the VCM part of the Corrective Action program and to include an updated discussion of the Corrective Measure Study (CMS) process, including CMS planning and the CMS Report. Updated requirements associated with final site closure and post-closure care were also presented in these earlier revisions. This revision of Chapter 12 addresses scope, submittal, and permitting requirements needed to complete remediation of, certify closure for, and establish post-closure conditions for the CWL consistent with NMED direction (Kieling December 2003).

### 12.1 Voluntary Corrective Measures Program

This Closure Plan was amended through a Class 1 modification requiring prior approval to include the VCM program. The VCM program is described in Appendix S that was approved on March 7, 1997. Appendix S provides a description of two VCMs; a vapor extraction (VE) VCM and a landfill excavation (LE) VCM, which have been completed at the CWL. Figure 12-1 shows how the VCMs, that were intended to be consistent with final remediation of the CWL, have been integrated into the closure process. The main objectives for these VCMs were to reduce and control the VOC soil gas plume, to prevent further degradation of groundwater beneath the CWL, and to remove wastes from the buried pits such that post-VCM site conditions are protective of human health and the environment. The VE VCM was completed in July 1998, and the LE VCM was completed in September 2005. The CWL has been excavated and the remaining soils and backfill meet NMED-approved risk-based criteria for industrial land use as per the NMED approval of the LE VCM Final Report in December 2003 (Moats December 2003).

Beginning in November 1996 and continuing to the present, quarterly reports have been prepared documenting the performance of these two VCMs. Additional information on the VE and LE VCMs can be found in the VE VCM Final Report (SNL/NM May 2000), and the LE VCM Final Report (SNL/NM April 2003).

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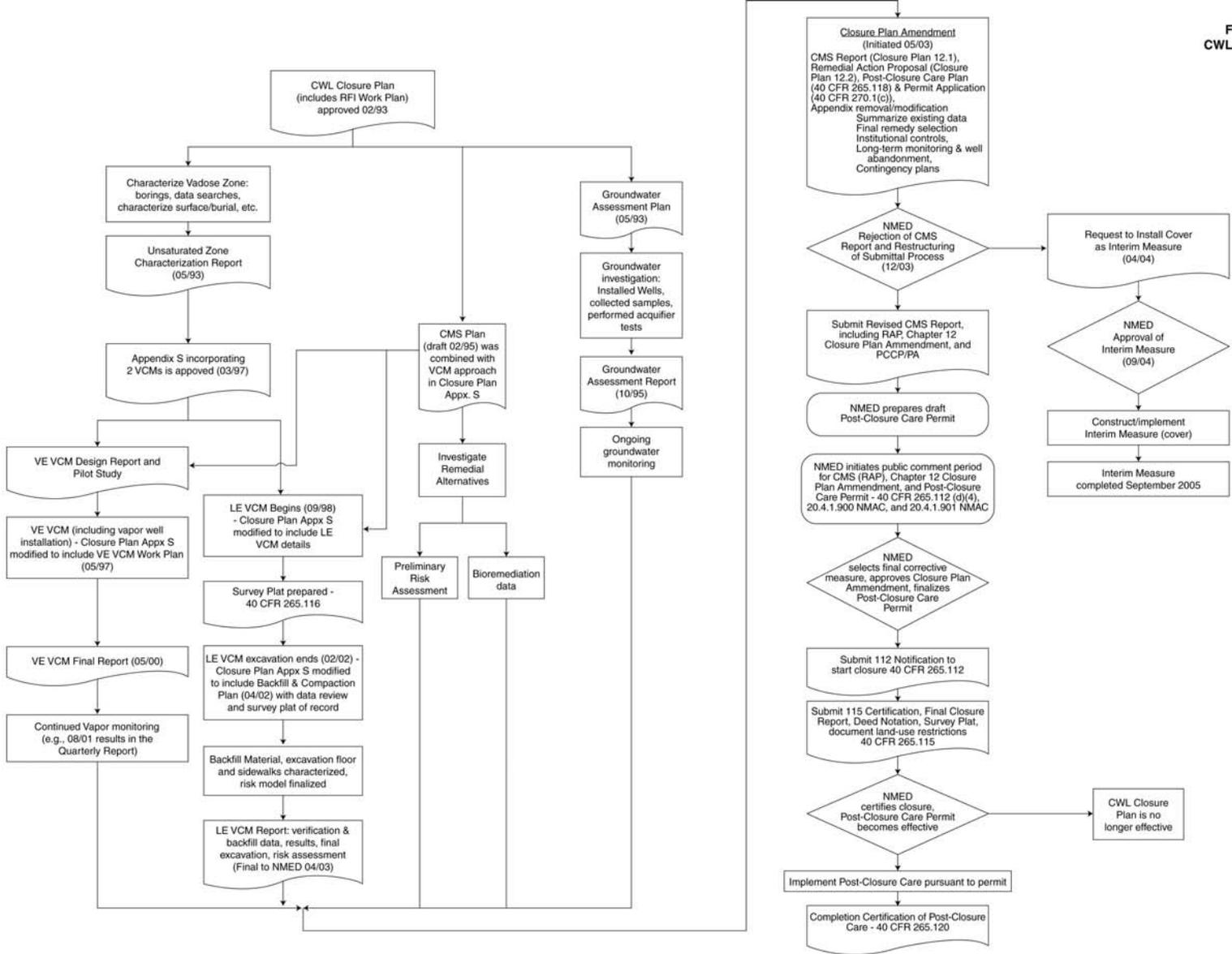


Figure 12-1  
 CWL Closure Path

## 12.2 LE VCM Final Report and Backfill Plan

The LE VCM Final Report was submitted to the NMED in April 2003. NMED issued a request for supplemental information in August 2003 (Moats August 2003), and DOE and Sandia responded in October 2003 (Boardman October 2003). The LE VCM Final Report was approved by the NMED in December 2003 without conditions (Moats December 2003). The LE VCM Final Report includes information associated with excavation and waste management; analytical results from the excavation and backfill material verification soil samples; and results of the final risk-screening assessment.

The following information shall be submitted to the NMED in addendums to the LE VCM Final Report or in the Final Closure Report: 1) information associated with final disposition of waste, 2) a description of site operational boundary sampling and scraping activities related to closure of the LE VCM site operational boundary, 3) analytical results for site operational boundary and backfill/cover materials that were not included in the LE VCM Final Report, and 4) an updated risk assessment integrating all relevant analytical results representing end-state conditions of the CWL that were not included in the final risk assessment presented in the LE VCM Final Report.

Any addendums to the LE VCM Final Report shall be submitted to the NMED prior to the submittal of the Final Closure Report. Otherwise, such addendums shall be submitted as part of the Final Closure Report.

The Backfill and Compaction Plan (Addendum C to Appendix S of the Closure Plan) for the LE VCM was approved by the NMED on June 26, 2002 with three conditions (Bearzi June 2002). The NMED approval letter also required submittal of a final risk-screening assessment, which was provided later in the LE VCM Final Report. The three conditions of approval were integrated into Revision 1 of the Backfill and Compaction Plan that was submitted to NMED in August 2002 (Zamorski August 2002).

## 12.3 Chemical Waste Landfill Closure and Post-Closure Care Process

On May 20, 2003, DOE and Sandia submitted a compilation of documents containing the CWL CMS Report, RAP, and PCCP/PA transmitted as a Class 3 amendment to this Closure Plan as set forth in the amended Chapter 12 of the Closure Plan (SNL/NM February 2003). On December 12, 2003, the NMED rejected the CWL CMS Report and postponed the review of the PCCP/PA and RAP pending the approval of a revised CMS Report, and redefined the steps to closure. The modified closure process and the modified post-closure care process are reflected in Figure 12-1 and are described in this section.

Two main documents shall be submitted to the NMED as part of the closure process. They are the revised CMS Report (including the RAP as an annex) and the Final Closure Report. The revised CMS Report has already been submitted to the NMED. The CMS Report contains information to support an NMED determination as to whether site conditions, as achieved by the two VCMs, are adequately protective of human health and the environment. The CMS Report also contains a recommendation for a final corrective measures alternative for NMED's consideration and approval.

DOE and Sandia have also submitted a revised PCCP/PA under 20.1.4.900 NMAC incorporating 40 CFR 270.1(c), addressing information requirements of 20.1.4.900 NMAC incorporating 40 CFR 270.28. Upon NMED issuance of a post-closure care permit (required by 20.4.1.900 NMAC incorporating 40 CFR 270.1(c)), and after NMED certification of closure, the post-closure care permit shall be considered the sole source of operating conditions for the CWL post-closure care period. The CWL Closure Plan will no longer be effective.

The CWL Closure Plan and post-closure care permit lay the groundwork for final CWL closure and post-closure care activities, respectively. The Final Closure Report will document closure of the CWL, including completion of all final corrective measures. Table 12-1 lists the main closure and post-closure care documents and provides descriptive summaries of each document and schedule information. After approval of the Closure Plan amendment, the final corrective measure selected by the NMED shall be implemented within 30 days of said approval.

Post-closure care will begin after NMED approval of the Final Closure Report and NMED certification of closure, and will be conducted in accordance with the post-closure care permit to be issued by the NMED. Table 12-2 lists the regulatory notifications and certifications required as part of the closure and post-closure process, which are also shown on Figure 12-1.

### 12.3.1 Corrective Measures Study Report

A CMS Report has been completed for the CWL and summarizes historic investigations, presents the results of two completed VCMs, and documents current site conditions based upon recent monitoring analytical results. After seeking public comment, the NMED will make a final determination regarding whether or not additional remediation of the CWL is necessary to assure protection of human health and the environment.

Section 1.0 of the CMS Report provides introductory information including site operational and regulatory history. A comprehensive summary of site investigations and the two VCMs are also provided, focusing on groundwater (e.g. chromium and solvent contamination) and the vadose zone VOC soil gas plume.

**Table 12-1 Closure Reporting Requirements**

Submittal	Regulatory Driver	Scope and CWL Reference	Due Date
<p>CMS Report, including the Remedial Action Proposal (RAP)</p>	<p>Closure Plan</p>	<p>The CMS Report summarizes historic investigations, presents the results of two completed VCMs, and documents current site conditions based upon recent monitoring analytical results. The recommended final corrective measures alternative and evaluation process are also presented.</p>	<p>Submitted and under NMED review</p>
		<p>The RAP is included as an annex to the CMS Report and documents the at-grade vegetative soil cover design that was approved by the NMED as an interim measure (Kielling September 2004). The RAP includes a detailed conceptual engineering design and supporting documentation so the adequacy of the design relative to design criteria/objectives can be assessed. This document will remove/replace Appendices J and K of the Closure Plan.</p>	
<p>Post-Closure Care Plan and Permit Application</p>	<p>40 CFR 270.1(c)</p>	<p>PCCP/PA was submitted under 40 CFR 270.1(c). The PCCP/PA addresses the information requirements of 40 CFR 270.28.</p>	<p>Submitted and under NMED review</p>
<p>Final Closure Report</p>	<p>Closure Plan and 40 CFR 265.115</p>	<p>The Final Closure Report shall document completion of closure activities and corrective measures.</p>	<p>Within 60 days of completion of closure activities and corrective measures, but no later than June 30, 2007</p>

**Table 12-2 Closure and Post-Closure Notifications and Certifications**

<b>Notification/ Certification</b>	<b>Regulatory Driver</b>	<b>Scope and CWL Reference</b>	<b>Schedule/ Timing</b>
112 Notification	40 CFR 265.112 (d)(1)	Notification to start closure.	Within 60 days of notice of approval of this closure plan amendment.
115 Notifications	40 CFR 265.115	Notifications for certification of completion of closure. As per Section 1.2.1.2 of the Closure Plan these certifications shall be submitted with the Final Report.	Within 60 days of completion of closure activities and corrective measures, but no later than June 30, 2007.
116 and 119 Notice	40 CFR Part 265.116 (survey plat) and 119 (deed notation)	Submit to County Zoning Authority a notation on the property deed. Submit survey plat as per 40 CFR 265.116 to county zoning authority, DOE property management, NMED and EPA. Document land-use restrictions. Send notification to NMED that the property deed notation has been submitted.	No later than 60 days after certification of closure.
Certification of Post-Closure Care Completion	40 CFR 265.120	Notification for completion of post-closure care.	Within 60 days of completion of post-closure care.

A detailed, updated conceptual site model is presented in Section 1.0 of the CMS Report. Section 2.0 documents the identification, screening, and selection of the final corrective measures alternative based upon conditions established in Section 1.0, and presents the DOE/Sandia preferred corrective measures alternative. Section 3.0 provides an overview of the PCCP/PA and the associated monitoring program that is intended to address future uncertainty. Section 4.0 presents a brief summary of the path to closure, which is modified by this revision of Chapter 12. Several annexes are included as part of the CMS Report and contain important supporting documentation from past and recent investigations, VCMs, and monitoring activities.

### 12.3.2 Remedial Action Proposal

The RAP is included as an annex to the CMS Report and documents the at-grade vegetative soil cover design that was approved by the NMED as an interim measure (Kieling September 2004). A detailed conceptual engineering design and supporting documentation are presented so the adequacy of the design and related features can be assessed, including the following design criteria:

- Minimize infiltration and percolation of water through the former landfill,
- Minimize future maintenance,
- Assure adequate drainage and minimize erosion,
- Minimize damage to cover integrity caused by any settling and subsidence, and
- Ensure that the hydraulic conductivity of the cover shall be less than or equal to that of natural soil situated immediately adjacent to the bottom of the landfill.

### 12.3.3 Post-Closure Care Plan and Permit Application

The PCCP/PA was prepared for submittal under 20.1.4.900 NMAC incorporating 40 CFR 270.1(c). The PCCP/PA addresses the information requirements of 20.1.4.900 NMAC incorporating 40 CFR 270.28 and contains information required for the post-closure period. The NMED will prepare a post-closure care permit from the PCCP/PA; said permit shall supersede the Closure Plan as the governing regulatory document for the CWL after NMED certifies closure of the CWL.

## 12.4 Final Closure Report

A Final Closure Report is required to document the completion of closure activities and corrective measures.

The Final Closure Report will describe the closure activities performed and include a description of the "end state" of the site. The general topics to be covered in this report include:

- Survey plat,
- Quality Assurance/Quality Control summary of the final cover, including final as-built engineering drawing(s),
- Backfill and compaction completion report (as defined in Addendum C to Appendix S of the Closure Plan),
- Summary of wastes removed from the CWL,
- Summary of remaining residual contamination and the associated risks,
- End-state conditions,

- Any additional information as described in Section 12.2 of this Chapter that is not included as an addendum to the LE VCM Final Report, and
- Certification of the accuracy of the report.

The Final Closure Report will also describe any land use restrictions and remaining risks or hazards that the site may pose to the public and the environment.

### References for Section 12

Bearzi, J.P. (New Mexico Environment Department), June 2002. Letter to M.J. Zamorski (U.S. Department of Energy) and R.J. Eagan (Sandia Corporation), "Approval with Conditions: Class 1 Modification: Backfill and Compaction Plan, Addendum C to Appendix S, Chemical Waste Landfill Closure Plan, April 2002, Sandia National Laboratories NM5890110518, HWB-SNL-02-003." June 26, 2002.

Boardman, K. . (U.S. Department of Energy), October 2003. Letter to J.E. Kieling (New Mexico Environment Department), transmitting the responses to NMED comments on the Chemical Waste Landfill, Landfill Excavation Voluntary Corrective Measure Final Report. October 28, 2003.

Kieling, J. E. (New Mexico Environment Department), December 2003. Letter to Karen K.L. Boardman (U.S. Department of Energy) and Peter P.B. Davies (Sandia Corporation), "Chemical Waste Landfill, Corrective Measures Study, May 2003, Sandia National Laboratories NM5890110518, HWB-SNL-03-013." December 12, 2003.

Kieling, J. E. (New Mexico Environment Department), September 2004. Letter to Patty P. Wagner (U.S. Department of Energy) and Peter P.B. Davies (Sandia Corporation), "Approval with Conditions of the Landfill Cover Interim Measure at the Chemical Waste Landfill, Sandia National Laboratories NM5890110518, HWB-SNL-04-027." September 22, 2004.

Moats, W. P. (New Mexico Environment Department), August 2003. Letter to Karen K.L. Boardman (U.S. Department of Energy) and Peter P.B. Davies (Sandia Corporation), "Request for Supplemental Information for the Chemical Waste Landfill – Landfill Excavation Voluntary Corrective Measure Final Report, April 2003." August 29, 2003.

Moats, W. P. (New Mexico Environment Department), December 2003. Letter to Karen K.L. Boardman (U.S. Department of Energy) and Peter P.B. Davies (Sandia Corporation), "Approval of the Chemical Waste Landfill, Landfill Excavation Voluntary Corrective Measure Final Report, April 2003." December 16, 2003.

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Sandia National Laboratories/New Mexico (SNL/NM), February 2003. "Chemical Waste Landfill Closure Plan Amendment, Chapter 12," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), April 2003. "Chemical Waste Landfill – Landfill Excavation Voluntary Corrective Measure – Final Report," Sandia National Laboratories, Albuquerque, New Mexico.

U.S. Department of Energy (DOE), February 2002. "Comprehensive Part B Permit Request," US Department of Energy, February 4, 2002.

Zamorski, M.J. (U.S. Department of Energy), August 2002. Letter to J.E. Kieling (New Mexico Environment Department), providing responses to NMED conditions of approval for the Chemical Waste Landfill Backfill and Compaction Plan submitted on April 29, 2002 and transmitting a revised plan incorporating NMED conditions. August 27, 2002.