

2. DESIGN BASIS

This section identifies the objectives that govern the remedial design. This includes the objectives defined by the ROD, the major components required in the remedy to meet the ROD objectives, and the bounding INEEL objectives. Standards, requirements, and codes incorporated in the design to meet these project objectives are also presented.

2.1 Remedial Action Objectives

The remedial action objectives (RAOs) for OU 1-10 are developed in accordance with the *National Oil and Hazardous Substances Pollution Contingency Plan* (EPA 1990) and CERCLA RI/FS guidance (EPA 1988) and defined through discussions with the Agencies. The RAOs are based on the results of the human health risk assessment and are specific to the COCs and exposure pathways developed for OU 1-10. To meet the OU 1-10 RAOs, final remediation goals (FRGs) for the COCs were established to ensure a risk-based protectiveness of human health and the environment providing unrestricted land use in 100 years. These goals are quantitative cleanup levels based on ARARs and risk-based doses.

As outlined in the OU 1-10 ROD (DOE-ID 1999), the RAOs for the V-Tanks were established. The RAOs for the soil pathway were established only for Cs-137 because it was the risk driver. The ROD RAOs for the V-Tanks are:

- Reduce risk from external radiation exposure from Cs-137 via the soil pathway to a total excess cancer risk of less than 1 in 10,000 for the hypothetical resident 100 years in the future and the current and future worker
- Prevent release to the environment of the V-Tank contents.

2.2 Remedy Performance Objectives

Remedy performance objectives for the V-Tanks have been identified as part of this RD/RA WP to achieve and augment the RAOs. The remedy performance objectives will be conducted in compliance with the ARARs presented in Section 5.

The remedy performance objectives include:

- Removal of the tank contents, tanks, and ancillary lines/equipment
- Removal of the VCO-managed components within the site
- Characterization of the base of the excavations to determine if releases from the tanks, piping, and ancillary equipment to the environment have occurred
- Characterization of the nature and extent of soil contamination in the area surrounding the V-Tanks
- Removal of contaminated soil above the FRG for Cs-137 (23.3 pCi/g)
- Removal of RCRA-hazardous constituents above remediation goals to facilitate RCRA closure
- Characterization, treatment as required, and disposal of the generated waste.

2.3 Design Objectives

Design objectives have been identified as part of this RD/RA WP to address project-specific constraints. The design objectives for the RD/RA include:

- Buildings surrounding TSF-09 and TSF-18 must not be damaged. The design should demonstrate and ensure that the surrounding structures will not be affected by the remedial action.
- The RD/RA should be a complete solution, taking into consideration all facets of the remediation to provide a cost-effective remedy.
- Waste acceptance criteria (WAC) for TSDFs and waste transportation requirements will be considered throughout all elements of the design.
- The remedial action will be conducted in two field efforts, the tank removal and further soil removal surrounding the V-Tanks. Under the initial effort (tank removal), the design should minimize the volume of contaminated soil removed from the site.
- Techniques to minimize the volume of waste generated will be used when health and safety and cost considerations are not compromised.
- The design should provide for contingencies and changing conditions that may occur during the remedial actions.
- Prevent the spread of contamination by establishing engineering controls and operating procedures.

2.4 Regulatory Requirements

A detailed discussion of the ARARs is presented in Section 5 of this work plan.

2.5 DOE Related Orders and Standards

- DOE Order 231.1, “Environment, Safety, and Health Reporting”
- DOE Order 232.1A, “Occurrence Reporting and Processing of Operations Information”
- DOE Order 414.1A, “Quality Assurance”
- DOE Order 435.1, “Radioactive Waste”
- DOE Order 440.1A, “Worker Protection Management for DOE Federal and Contractor Employees”
- DOE Order 470.1, “Safeguards and Security Program”
- DOE Order 5400.5, “Radiation Protection of the Public and Environment”
- DOE Order 5480.4, “Environmental Protection, Safety, and Health Protection Standards”
- DOE Standard 1090, “Hoisting and Rigging Devices.”

2.6 Industrial Standards

The following list contains industrial standards for specific remedial action work elements:

- EPA, *Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846)*, Third Edition, Final Update III, dated December 1996 (or most recent)
- ASME, NQA-1-1994, Quality Assurance Requirements for Nuclear Facility Applications per Form 414.12B, ASME NQA-1 Applicability Matrix.

Additional industrial standards for specific remedial action work elements are cited in the appropriate specifications in Appendix B.

2.7 INEEL Requirements and Documents

The following list contains INEEL requirements and documents that are applicable to the remedial design:

- DOE-ID, 1998, *INEEL Stormwater Pollution Prevention Plan for Construction Activities*, DOE/ID-10425(98), <http://ea.inel.gov/indappl/swppp/swppp-ca.pdf> or <http://www.inel.gov/x-web/other/framed.shtml?/publicdocuments/pdfs/stormwatermay98.pdf>
- MCP-7, "Radiological Work Permit," *Manual 15B-Radiation Protection Procedures*
- MCP-62, "Waste Generator Services–Conditional Industrial Waste Management," *Manual 17-Waste Management*
- MCP-69, "Waste Generator Services–Hazardous Waste Management," *Manual 17-Waste Management*
- MCP-70, "Waste Generator Services–Mixed Low-Level Waste Management," *Manual 17-Waste Management*
- MCP-124, "Response to Abnormal Radiological Situations," *Manual 15B-Radiation Protection Procedures*
- MCP-187, "Posting Radiological Control Areas," *Manual 15B-Radiation Protection Procedures*
- MCP-227, "Sampling and Analysis Process for CERCLA and D&D Activities," *Manual 18-Closure Management*
- MCP-230, "Environmental Restoration Document Control Interface," *Manual 18-Closure Management*
- MCP-231, "Logbooks," *Manual 18-Closure Management*
- MCP-241, "Preparation of Characterization Plans," *Manual 18-Closure Management*
- MCP-244, "Chain of Custody, Sample Handling, and Packaging for CERCLA Activities," *Manual 18-Closure Management*

- MCP-425, “Radiological Release Surveys and the Disposition of Contaminated Materials,” *Manual 15B-Radiation Protection Procedures*
- MCP-540, “Documenting the Safety Category of Structures, Systems, and Components,” *Manual 10A-Engineering and Research*
- MCP-557, “Managing Records,” *Manual 1-General Administration and Information*
- MCP-2714, “Safety Signs, Color Codes, and Barriers,” *Manual 14A-Safety and Health–Occupational Safety and Fire Protection*
- MCP-2742, “Temporary Facilities,” *Manual 14A-Safety and Health-Occupational Safety and Fire Protection*
- MCP-2783, “Startup and Restart of Nuclear Facilities,” *Manual 9-Operations*
- MCP-2864, “Sample Management,” *Manual 18-Closure Management*
- MCP-3449, “Safety and Health Inspections,” *Manual 14A-Safety and Health–Occupational Safety and Fire Protection*
- MCP-3472, “Identification and Characterization of Environmentally Regulated Waste,” *Manual 17-Waste Management*
- MCP-3475, “Temporary Storage of CERCLA-Generated Waste at the INEEL,” *Manual 18-Closure Management*
- MCP-3562, “Hazard Identification, Analysis, and Control of Operational Activities,” *Manual 9-Operations*
- PLN-114, “Emergency Plan/RCRA Contingency Plan,” *Manual 16A-Emergency Preparedness*
- PRD-160, “Hoisting and Rigging,” *Manual 14A-Safety and Health-Occupational Safety and Fire Protection*
- PRD-183, “Radiation Protection–INEEL Radiological Control Manual,” *Manual 15A-Radiation Protection-INEEL Radiological Control Manual*
- PRD-1007, “Work Coordination and Hazard Control,” *Manual 14A-Safety and Health-Occupational Safety and Fire Protection*
- PRD-2007, “Hoisting and Rigging,” *Subcontractor Requirements Manual*
- PRD-2012, “Lockout and Tagout,” *Manual 14A-Safety and Health-Occupational Safety and Fire Protection*
- PRD-2014, “Excavations and Surface Penetrations,” *Manual 14A-Safety and Health-Occupational Safety and Fire Protection.*
- PRD-5006, “Subcontractor/Supplier Quality Plan,” *Subcontractor Requirements Manual.*

- TPR-80, "Radioanalytical Data Validation," current revision.

3. UNCERTAINTY MANAGEMENT

This section describes the project approach to manage uncertainties that may arise during the course of the remedial design and remedial action for the V-Tanks. Unforeseen events may arise throughout the course of the project, as with the implementation of any remedial action.

In the event that the DOE-ID, EPA, or IDEQ identifies changes from the planned conditions during the execution of the remedial action, the other Agency project managers will be notified. Written concurrence on response actions from the other agencies will be needed for significant changes. Changes that would be considered significant include:

- Changes that affect RAOs of the ROD
- Cost changes that may cause the project cost estimate provided in the ROD to increase by 50% or decrease by 30%
- Changes that alter the intent and the final performance of the remedial design
- Changes that significantly impact project milestones.

An objective of the remedial action is to minimize unforeseen events to ensure smooth implementation of the remedy. As part of the remedial design, several possible events have been analyzed and an approach developed for each to manage the uncertainty. The project uncertainties that have been analyzed are:

- Timing for Tank V-9 criticality results
- Criticality uncertainty for Tank V-9
- Tank V-3 overflow prevention
- Sludge interim storage at the INEEL
- Schedule contingencies
- Off-Site treatment facility for sludge.

3.1 Timing for Tank V-9 Criticality Results

Post-ROD sampling of Tank V-9 was conducted in spring 2001 to obtain sufficient data to perform a criticality analysis. The data from the Tank V-9 sampling were not available as part of the draft final submittal to EPA and IDEQ. The validated data results and criticality evaluation are now incorporated as Appendix G in the draft final submittal of this Group 2 RD/RA WP.

3.2 Criticality Uncertainty for Tank V-9

This Group 2 RD/RA WP design for removal of Tank V-9 contents is based upon an assumption that the contents of Tank V-9 do not pose a criticality concern. This assumption is based upon the results of past tank sampling that indicates criticality is not likely. Additional samples on the inlet side of the tank baffle were collected and generated data used to perform a criticality evaluation, based upon the

U-235 quantity in the tank contents. In the event that the criticality evaluation determined the contents of Tank V-9 pose a criticality concern, this Group 2 RD/RA WP would be finalized to implement the remedial action for Tanks V-1, V-2, and V-3. An addendum to this Group 2 RD/RA WP would be prepared to address the design and remedial action implementation for Tank V-9 to ensure criticality safety during field activities. The preparation of the addendum would require additional planning, which would significantly delay the schedule and increase the costs for the Tank V-9 contents removal. As described in Section 1.4, results of the criticality analysis determined that Tank V-9 does not pose a criticality concern. Therefore, criticality uncertainty is no longer a project risk.

3.3 Tank V-3 Overflow Prevention

Tank V-3 has experienced a level increase during the spring season of each year since at least 1996, based upon data collected by the TAN facility and maintained by WAG 1. Anecdotal information prior to 1996 indicates that the level of Tank V-3 increased consistently during the spring season. Maintenance measures were implemented by WAG 1 during calendar year 2000 to mitigate the annual inflow to Tank V-3. The measures included:

- Obtained video and photographs of the Tank V-3 manhole and interior of Tank V-3 to identify potential sources of inflow to the tank
- Installed a new gasket with rubberized sealant to seal the Tank V-3 manhole cover to the tank flange
- Installed a metal band around the Tank V-3 manhole cover to provide additional seal of manhole cover
- Placed clean soil around the Tank V-3 access riser to level low spots and prevent localized ponding of surface water
- Installed downspout tubing on nearby roof gutters to minimize stormwater runoff and snowmelt into the area.

The schedule presented in this Group 2 RD/RA WP indicates that removal of the V-Tank contents will commence during 2002. There is a slight potential that the level of V-3 could rise prior to implementation of the selected remedy to a depth that requires more immediate overflow prevention measures. This Group 2 RD/RA WP includes an overflow prevention design, included as Appendix I, that can be implemented to ensure no overflow of Tank V-3 contents. This design has been developed to serve as a stand-alone working document, in the event that the Agency WAG managers determine that the preventative measures should be implemented prior to commencement of the remedial action.

3.4 Sludge Interim Storage at the INEEL

This Group 2 RD/RA WP details the separation of V-Tanks sludge and liquid. The separation will minimize the amount of waste that requires treatment at a RCRA/Toxic Substances Control Act (TSCA) compliant TSDF. One treatment facility that has been identified for the treatment of V-Tanks sludge is Allied Technology Group (ATG) in Richland, Washington. Currently, the WAC at ATG will not allow receipt of all V-Tank sludge at one time, and several shipments to ATG may be necessary to treat all the V-Tank sludge. Each waste shipment must be treated and transported to the final disposal facility prior to accepting a new shipment of V-Tank sludge under the existing WAC. In the event that several shipments will be required, interim storage of V-Tank sludge at the INEEL will be required.

As part of the V-Tanks remedial action, the INEEL will pursue a project-specific variance that will allow receipt and treatment of all V-Tank sludge at the TSDF at one time. However, as part of uncertainty management, interim storage at the INEEL for V-Tank sludge is necessary. It is anticipated that the interim storage for the V-Tank sludge is required for approximately two years. The *Waste Management Plan for the V-Tanks, TSF-09/18, at Waste Area Group 1* (INEEL 2001d), as agreed to by the Agencies, will describe the sludge interim storage.

3.5 Schedule Contingencies

Content removal is currently scheduled to begin in 2002. To support the planned start of content removal, it may be beneficial to begin certain site preparation activities before the RD/RA WP becomes final. The Agencies agree that site preparation may begin after completing comment resolutions on the draft final RD/RA WP. All site preparation activities must ultimately meet the requirements in the final RD/RA WP.

3.6 Off-Site Treatment Facility for Sludge

As noted in Section 3.4 above, ATG has been identified as the planned offsite treatment facility for V-Tanks sludge. However, ATG currently is not permitted to accept V-Tanks sludge. If ATG is unable to obtain the necessary permit by approximately April of 2002, they may be unable to accept the V-Tanks sludge for treatment in the fall of 2002. This could prolong the currently planned two-year timeframe for onsite interim sludge storage of V-Tanks sludge. Because of this uncertainty, other potential offsite treatment facility options will continue to be explored and monitored for availability for treatment of the V-Tanks sludge.