10. O&M Plan

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Phase I Operations and Maintenance Plan for the OU 7-10 Glovebox Excavator Method Project

Prepared for:
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Idaho National Engineering and Environmental Laboratory

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EXECUTIVE SUMMARY

This document is the *Phase I Operations and Maintenance Plan for the OU 7-10 Glovebox Excavator Method Project*. Under the *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory*, the Radioactive Waste Management Complex was designated as Waste Area Group 7 and was subdivided into 13 operable units (OUs), including OU 7-10, which is the designation for Pit 9. The glovebox excavator method is the selected alternative for demonstrating successful retrieval of waste from OU 7-10. Once construction of facility structures is complete and turnover has occurred, operation and maintenance activities will begin and continue through shutdown of the project.

This Operations and Maintenance Plan delineates the operations and maintenance activities and procedures required to perform retrieval demonstration at a specific and preselected Idaho National Engineering and Environmental Laboratory transuranic waste site, located in OU 7-10. This plan also defines the administrative and technical programs necessary to support the project and ensure worker and environmental safety.

The operations and maintenance life cycle included in this plan is divided into three periods. The first period spans from turnover of the completed facility by Construction until operations begin. The second period spans from startup through waste zone material retrieval until safe shutdown of the facility has begun. The third period includes performance of safe shutdown activities and the subsequent facility lay up while plans and preparations for the deactivation, decontamination, and decommissioning phase take place. Although continued monitoring and inspection of the stored waste will be required pending its final disposition, the majority of the operations and maintenance scope for this third period will conclude with the transfer of the facility to the INEEL Inactive Sites organization for deactivation, decontamination, and decommissioning.

This Operations and Maintenance Plan is being developed in four phases. Phase I (this document) delineates the activities and procedures planned to operate and maintain the facility and its related systems. As the project progresses through construction and turnover to Operations, some of the activities and procedures currently envisioned may evolve and further develop. Phase II of this Operations and Maintenance Plan will expand on information presented in Phase I by including information acquired and decisions made because of that natural project evolution. Phase III, if needed, will incorporate into this document all applicable information that is received from reviews by regulators, a management self-assessment, and operational readiness reviews. Phase IV, if needed, will be developed for inclusion in the Remedial Action Report and will address any remaining operations and maintenance elements specific to the post-retrieval life-cycle periods, including shutdown, lay up, and deactivation, decontamination, and decommissioning of the project facility.

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CONTENTS

FIGURES

TABLES

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ACRONYMS

ALARA	as low as reasonably achievable
ARAR	applicable or relevant and appropriate requirement
ASME	American Society of Mechanical Engineers
BBWI	Bechtel BWXT Idaho, LLC
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	*Code of Federal Regulations*
CTPS	Cold Test Pit South
D&D&D	deactivation, decontamination, and decommissioning
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy Idaho Operations Office
EAR	emergency and alarm response
EC	emergency coordinator
EPA	U.S. Environmental Protection Agency
EPI	emergency plan implementing
ER	Environmental Restoration
ESD	explanation of significant differences
ES&H	environment, safety, and health
ESH&QA	environment, safety, health, and quality assurance
FFA/CO	Federal Facility Agreement and Consent Order
GDE	guide
HASP	health and safety plan
HEG	hazard evaluation group
HEPA	high-efficiency particulate air

ICARE	Issue Communication and Resolution Environment
ICDF	INEEL CERCLA Disposal Facility
IDEQ	Idaho Department of Environmental Quality
INEEL	Idaho National Engineering and Environmental Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
ISMS	Integrated Safety Management System
IWTS	integrated waste tracking system
JSA	job safety analysis
LMAES	Lockheed Martin Advanced Environmental Systems
LO/TO	lockout/tagout
LST	list
MCP	management control procedure
MSA	management self-assessment
MWO	maintenance work order
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFM	nuclear facility manager
O&M	operations and maintenance
OJT	on-the-job training
ORR	operational readiness review
OU	operable unit
PCB	polychlorinated biphenyl
PDD	program description document
PGS	Packaging Glovebox System
PLN	plan

POC	point of contact
PPE	personal protective equipment
PRD	program requirements document
QA	quality assurance
QAPjP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RCS	Retrieval Confinement Structure
RCT	radiological control technician
RD/RA	remedial design/remedial action
ROD	record of decision
RPP	Radiation Protection Program
RWMC	Radioactive Waste Management Complex
SAD	site area director
SAR	safety analysis report
SDA	Subsurface Disposal Area
S&H	safety and health
SOW	scope of work
SSC	structure, system, and component
STD	standard
T&FR, TFR	technical and functional requirement
TIM	training implementation matrix
TPR	technical procedure
TRU	transuranic
USQ	unreviewed safety question

VPP	Voluntary Protection Program
WAG	waste area group
WES	Weather Enclosure Structure
WGS	Waste Generator Services

1. INTRODUCTION

1.1 About This Document

1.1.1 Purpose and Scope

This Operations and Maintenance (O&M) Plan defines and describes the activities and procedures required for safe and efficient testing, operation, and maintenance of the Operable Unit (OU) 7-10 Glovebox Excavator Method Project while protecting human health and the environment. This plan provides an overview of the project activities and identifies the associated strategies for efficient operation of the facility. It describes the breadth of programmatic support necessary for the facility and how project goals will be achieved within the Idaho National Engineering and Environmental Laboratory (INEEL) -defined administrative and safety programs and processes. This plan also provides annotated outlines of normal, off-normal, and emergency operating procedures.

The *Record of Decision: Declaration of Pit 9 at the Radioactive Waste Management Complex Subsurface Disposal Area at the Idaho National Engineering Laboratory, Idaho Falls, Idaho* (DOE-ID 1993) specifies environmental remediation of transuranic (TRU) waste from OU 7-10. On October 1, 2001, the INEEL published the *Waste Area Group 7 Analysis of OU 7-10 Stage II Modifications* (INEEL 2001), which identifies a feasible approach for retrieving waste from OU 7-10. The OU 7-10 Glovebox Excavator Method Project was established to accomplish the objectives presented in that report.

1.1.2 Phasing Approach

Four phases are planned for this O&M Plan:

- Phase I (this document) provides initial planning of operations and maintenance management processes and delineates the activities and procedures required to operate and maintain the facility and its related systems. A description of the project operations organizational structure, a summary of the O&M strategy and operating procedures, and a description of O&M supporting processes are included within this document. Inputs to the development of the Phase I O&M Plan include applicable laws, regulations, and U.S. Department of Energy (DOE) orders, project technical and functional requirements (T&FR) documents, INEEL management control procedures (MCPs), hazard assessments, and project design documents.

- Phase II will expand on information presented in Phase I by including information acquired up to the beginning of the operational readiness review (ORR) process. As such, Phase II supports ORRs and the prefinal inspection. Included in the Phase II O&M Plan will be updates to O&M activities and procedures based on information obtained during construction (e.g., vendor data and as-built drawings) and mockup testing.

- Phase III, if needed, will incorporate information (e.g., corrective actions) received from reviews by regulators, a management self-assessment (MSA), ORRs, and the prefinal inspection. This O&M Plan update may not be necessary if significant changes are not identified during the ORR and prefinal inspection process.

- Phase IV, if needed, will be developed for inclusion in the remedial action report and will address any remaining O&M elements specific to the post-retrieval life-cycle periods, including shutdown,

lay up, and deactivation, decontamination, and decommissioning (D&D&D) of the project facility. This O&M Plan update may not be necessary if the final inspection is agreed upon by U.S. Department of Energy Idaho Operations Office (DOE-ID) and the Agencies (i.e., U.S. Environmental Protection Agency [EPA] and Idaho Department of Environmental Quality [IDEQ]) to occur after or during the facility D&D&D.

Note: Refer to the draft prefinal inspection checklist included in the remedial design submittal for further discussion on the timing for the final inspection.

Figure 1 illustrates the four phases of the O&M Plan.

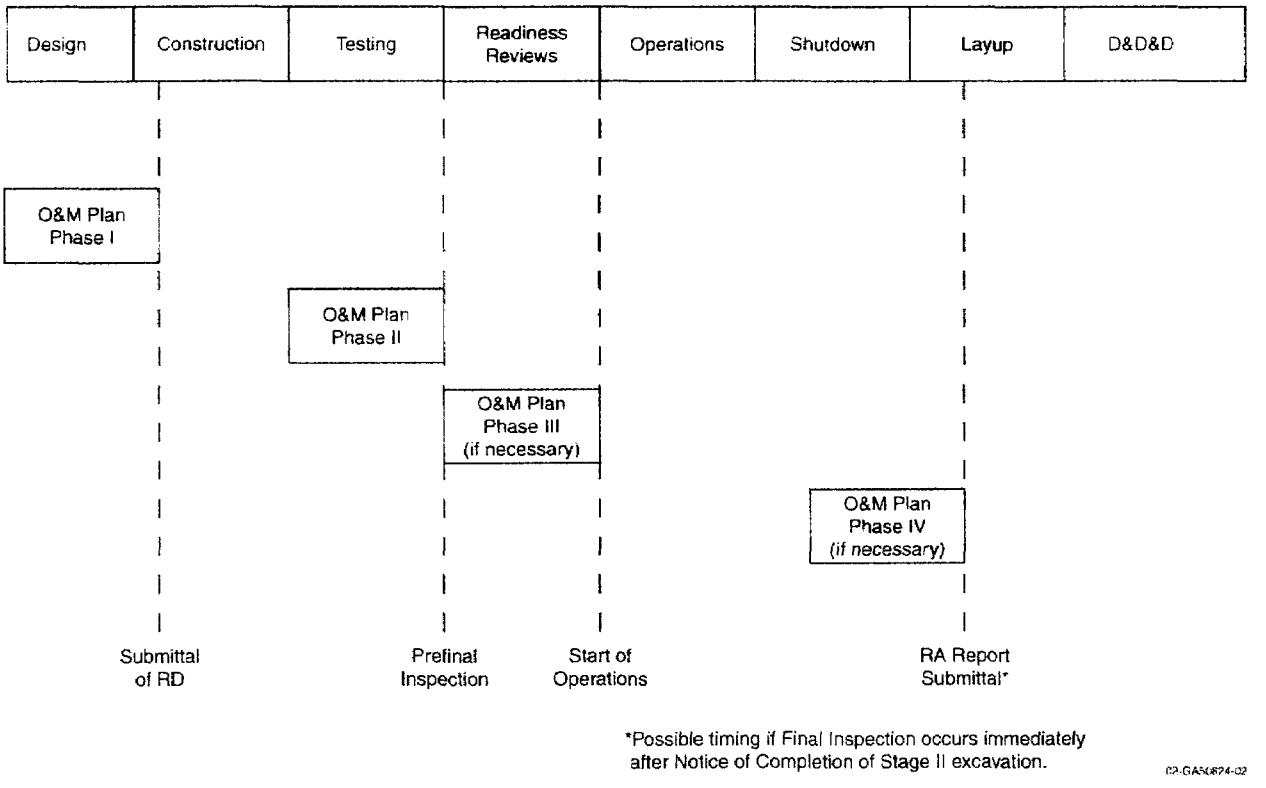

Figure 1. Four phases of the OU 7-10 Glovebox Excavator Method Project Operations and Maintenance Plan.

1.1.3 Operable Unit 7-10 Project Operations and Maintenance Activities and the Comprehensive Environmental Response, Compensation and Liability Act Process

Stage II of the project contingency approach, as defined in the OU 7-10 Record of Decision (ROD) (DOE-ID 1993), is unique and does not follow the usual Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (42 USC § 9601 et seq.) process for a removal action. It has elements of a remedial investigation/feasibility study, as well as an interim remedial action. As a result,

the O&M phase for the project, which implements Stage II of the OU 7-10 contingency approach, does not include the usual CERCLA O&M activities.

For example, rather than beginning after the removal action has occurred, the project O&M phase begins after a facility has been constructed for the removal (i.e., retrieval) of the buried TRU waste. Instead of surveillance and monitoring, the primary project O&M activities include operation and maintenance of the retrieval and waste packaging equipment and storing the retrieved waste. Also, because the removal is an interim (and partial) action for the project site, the O&M surveillance and monitoring activities that typically follow implementation of the remedial action will not be necessary. The only anticipated O&M activities to be performed after completion of project activities and facility D&D&D are the continued inspection and monitoring of the stored waste.

1.1.4 Document Structure and Layout

This O&M Plan contains five major sections:

- Section 1, "Introduction"
- Section 2, "Operations and Maintenance Life Cycle and Activities"
- Section 3, "Supporting Processes and Procedures"
- Section 4, "Procedure Outlines"
- Section 5, "References."

Section 1 provides the purpose and scope of this document and explains the phased approach as it applies to this document and the project, as well as describing the document structure and layout. Section 1 also provides background information about the project, the INEEL, and OU 7-10. Summaries of both the project organizational structure and the interfaces between the project and other organizations and entities necessary to the project are also provided in Section 1.

Section 2 of this plan offers concise descriptions of the three operational cycles between construction turnover and facility shutdown. These include (1) facility turnover through operations startup, (2) operations, and (3) operations transition to shutdown. Use and application of a full-scale mockup in preparing for actual facility operation are also discussed. Each of the three cycles requires different activities, but each constitutes an operating process.

Section 3 describes the underlying INEEL processes and procedures used to conduct the required project tasks. It is intended to provide additional information about such subjects as waste management, radiological control, training, conduct of operations requirements, conduct of maintenance requirements, and the INEEL Quality Assurance Program. These subjects, as they apply to the project, are introduced in the appropriate locations in Section 2, but are described in further detail, and by topic, in Section 3.

Section 4 describes the various types of procedures the project will use for testing, operations, maintenance, and emergency response. Annotated outlines of the procedures currently envisioned for the project are included in Appendices A through C, and these annotated outlines provide further detail about specific O&M methods and emergency response actions.

Section 5 provides a list of the various references for this document.

1.2 Background

Documentation of OU 7-10 has been extensive. The OU 7-10 ROD (DOE-ID 1993), two explanations of significant differences (ESDs) documents (DOE-ID 1995a; 1998), a remediation subcontractor termination, and an 18,000-page Remedial Design/Remedial Action (RD/RA) Work Plan with a 90% design submittal[a] have been completed in association with OU 7-10. Following is an overview of the history of OU 7-10 that identifies the purposes and major changes of these pertinent documents.

The INEEL actively placed Rocky Flats Plant[b] and INEEL waste material in OU 7-10 from 1967 until OU 7-10 was closed in 1969. In 1989, the INEEL was placed on the National Priorities List of Uncontrolled Hazardous Waste Sites (54 FR 48184) and the *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory* (DOE-ID 1991a) specifically identified OU 7-10 for an interim action.

In 1993, the OU 7-10 ROD (DOE-ID 1993) was signed. The associated *Remedial Design/Remedial Action Scope of Work and Remedial Design Work Plan: Operable Unit OU 7-10 (Pit 9 Project Interim Action)* (EG&G 1993) documented the schedule and approach for implementation of the OU 7-10 ROD, and the DOE management and operating contractor subcontracted with Lockheed Martin Advanced Environmental Systems (LMAES) to perform the OU 7-10 Scope of Work (SOW) (EG&G 1993).

The INEEL revised the OU 7-10 SOW in 1995 (LMITCO 1995) to address details for design, construction, and operation approaches. This resulted in significant changes in the OU 7-10 ROD cost estimates, which in turn required the issuance of an *Explanation of Significant Differences for the Pit 9 Interim Action Record of Decision at the Radioactive Waste Management Complex at the Idaho National Engineering Laboratory* (DOE-ID 1995a).

The DOE prepared a contingency plan to accommodate the possibility that LMAES might not fulfill the terms of the OU 7-10 SOW (EG&G 1993). This contingency plan developed into the staged interim action approach that was formalized in the revised OU 7-10 SOW (LMITCO 1997), *Remedial Design/Remedial Action Scope of Work and Remedial Design Work Plan: Operable Unit OU 7-10 (Pit 9 Project Interim Action)* (LMITCO 1997), which was issued in 1997. The revised OU 7-10 SOW (LMITCO 1997) identified performance objectives, milestones, and deliverables in the event that the LMAES contract was not completed. The LMAES contract was subsequently terminated and the INEEL began work on the Staged Interim Action Project.

The 1998 ESD to the OU 7-10 ROD (DOE-ID 1998), which launched the Staged Interim Action Project, also formalized the adoption of the three-stage (i.e., Stages I, II, and III) approach to satisfy the requirements of the OU 7-10 ROD, its two associated ESDs, and the OU 7-10 SOW (LMITCO 1997). Also in 1998, the *OU 7-10 Staged Interim Action Project System Requirements Document* (LMITCO 1998a) and the *OU 7-10 RD/RA Contingency Program Stage II Technical and Functional*

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a. DOE-ID, 2000, "Draft Operable Unit 7-10 (OU 7-10) Staged Interim Action Project, Stage II, RD/RA Work Plan Primary Deliverable Submittal (Draft)," DOE/ID-10767, Binder I-A, "Remedial Design/Remedial Action Work Plan for Stage II of the Operable Unit 7-10 (OU 7-10) Staged Interim Action Project," U.S. Department of Energy Idaho Operations Office, Idaho Falls, Idaho.

b. The Rocky Flats Plant is located 26 km (16 mi) northwest of Denver. In the mid-1990s, the Rocky Flats Plant was renamed the Rocky Flats Plant Environmental Technology Site. In the late 1990s, it was renamed again, to its current name, the Rocky Flats Plant Closure Project.

Requirements Document (LMITCO 1998b) identified the project requirements and traced them to the OU 7-10 ROD, the 1995 and 1998 ESDs, and the OU 7-10 SOW (LMITCO 1997).

The three stages of the Staged Interim Action Project were to be as follows:

- **Stage I** involved subsurface exploration of OU 7-10 to support site selection for Stage II.
- **Stage II** involved the retrieval of a select area of OU 7-10, including a waste retrieval demonstration, characterization of waste zone material and soils, and storage of retrieved waste zone material. Stage II also included design and construction; excavation and retrieval; and sampling, packaging, and storage of materials.
- **Stage III** was to perform the overall remediation of OU 7-10 using information from Stage II.

The requirements that apply to all three stages of the OU 7-10 Staged Interim Action Project were identified in the systems requirement document (LMITCO 1998a), while the *Technical and Functional Requirements for the Operable Unit 7-10 Glovebox Excavator Method Project* (LMITCO 1998b) defined the Stage II scope and activities. Following the formal review and acceptance of both documents, the Stage II T&FR document (LMITCO 1998b) became the technical baseline, which was used to develop the conceptual (10%), Title I (30%), and Title II (90%) designs. The Title II design for Stage II was submitted on June 30, 2000, as part of the RD/RA Work Plan (see footnote a).

While the Stage II design met all technical requirements, the associated project schedule did not meet the enforceable deadline for completion of the remedial action report. The DOE requested a schedule extension that was denied by the State of Idaho and resulted in a formal dispute. As part of the dispute resolution process, alternate concepts to demonstrate retrieval were developed that reduced the schedule. The concept selected was the glovebox excavator method. The dispute was settled in April 2002. The dispute resolution document (DOE 2002) reconfirmed the glovebox excavator method for accomplishing the project mission and established enforceable milestones for the project.

1.2.1 Location and Description of the Idaho National Engineering and Environmental Laboratory

The INEEL is a DOE facility, located 52 km (32 mi) west of Idaho Falls, Idaho, that occupies 2,305 km^2 (890 mi^2) of the northeastern portion of the Eastern Idaho Snake River Plain. The Radioactive Waste Management Complex (RWMC) is located in the southwestern portion of the INEEL, as shown in Figure 2. The Subsurface Disposal Area (SDA) is a 39-ha (97-acre) area located in the RWMC. Waste Area Group (WAG) 7 is the designation recognized by CERCLA and specified in the Federal Facility Agreement and Consent Order (FFA/CO) (DOE-ID 1991a) for the RWMC. It encompasses the SDA buried waste site. WAG 7 has been subdivided into 13[c] OUs. Pit 9, designated as OU 7-10, is located in the northeast corner of the SDA.

Chemicals, radioactive materials, and sludge from DOE weapons plants and other government programs were buried in the OU 7-10 site. While such disposal at the RWMC began in 1952, OU 7-10 was used and filled in the late 1960s. The pit contains characteristic hazardous, listed hazardous, low-level radioactive, and TRU waste. The project involves a designated portion of OU 7-10, as illustrated in Figure 3.

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c. Operable Units 13 and 14 were combined into the comprehensive remedial investigation/feasibility study in 1995 (Huntley and Burns 1995).

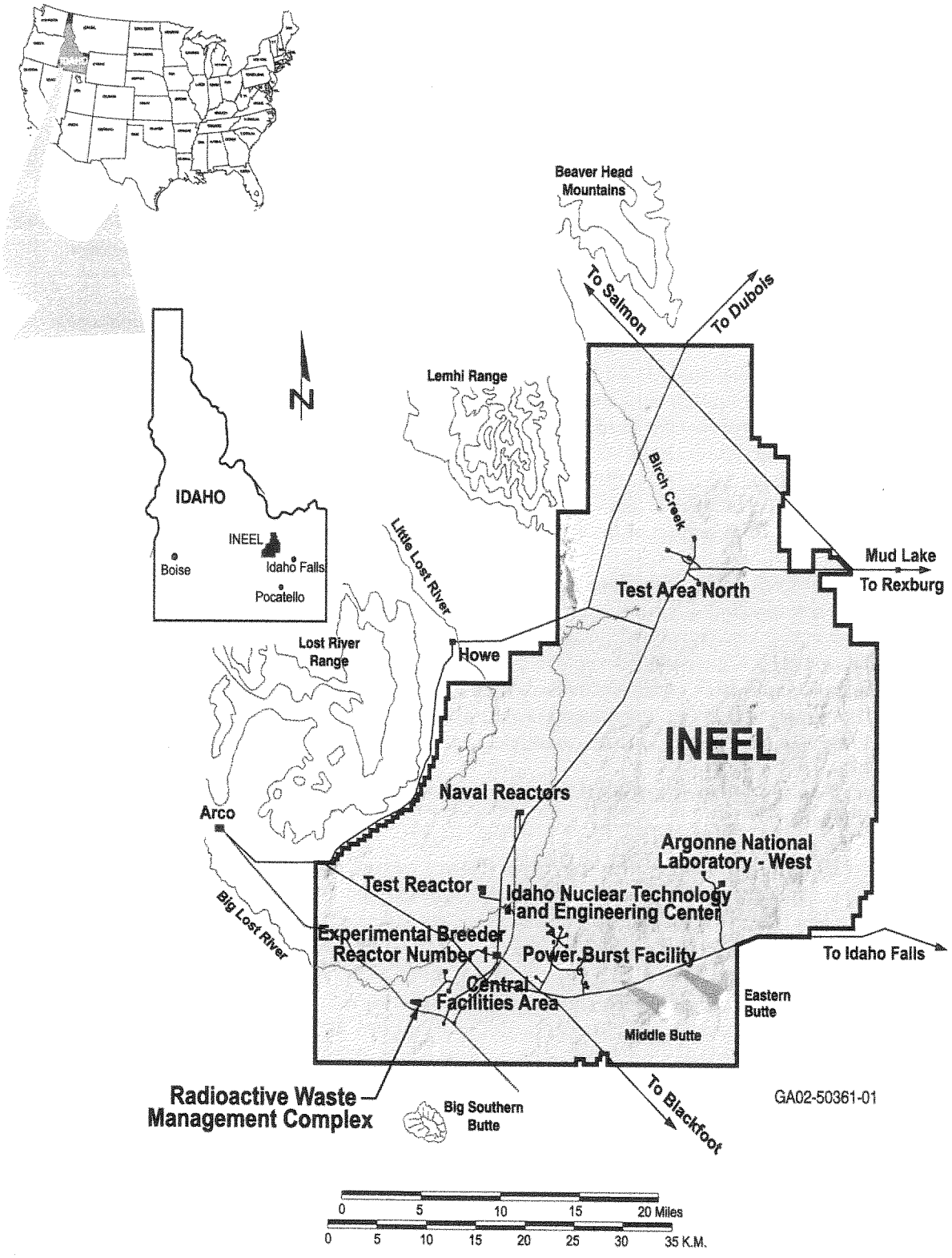

Figure 2. Location of the Radioactive Waste Management Complex and other major facilities at the Idaho National Engineering and Environmental Laboratory.

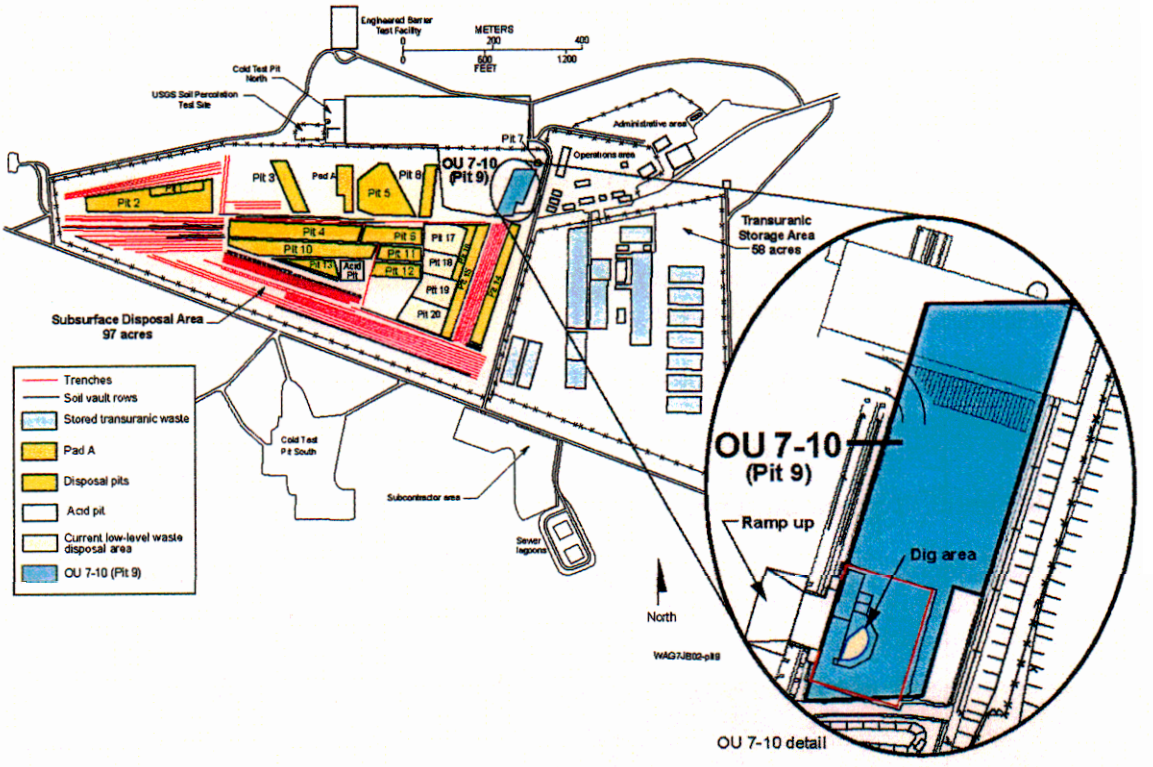

Figure 3. Graphic presentation of the Radioactive Waste Management Complex with an expanded view of the OU 7-10 Glovebox Excavator Method Project area.

1.2.2 Objectives of the Operations and Maintenance Plan

This project was developed in accordance with the FFA/CO action plan (DOE-ID 1991b). This O&M Plan communicates how the O&M phase of the project will be conducted to ensure that the project objectives are met. The overall objectives for the project are:

- Demonstrate waste zone material retrieval
- Provide information on any contaminants of concern present in the underburden
- Characterize waste zone material for safe and compliant storage
- Package and store waste onsite, pending decision on final disposition.

Objectives of the O&M Plan, related to the overall project objectives, are:

- Provide an overview of the project
- Describe the breadth of programmatic support necessary for the facility, including:
  - Describing the activities and procedures required for safe and efficient testing, operation, and maintenance of the project

- Describing normal procedures used to operate the facility and accomplish the project goals

- Define and describe the activities and procedures required to protect human health and the environment

  - List procedures to be developed that will define responses to foreseeable abnormal conditions.

The above objectives will be accomplished using procedures and practices that ensure the safety of personnel and protection of the environment.

The Construction Management organization is responsible for construction and initial-scope testing of the project facility. Testing, operations, and maintenance activities will begin once construction turnover has occurred.

1.2.3 Retrieval Process Summary

The major project phases consist of design, construction, testing, excavation, retrieval, sampling, packaging, and interim storage, followed by shutdown, lay up, and D&D&D. As shown in Figure 4, project facilities include a Weather Enclosure Structure (WES), inside of which is a Retrieval

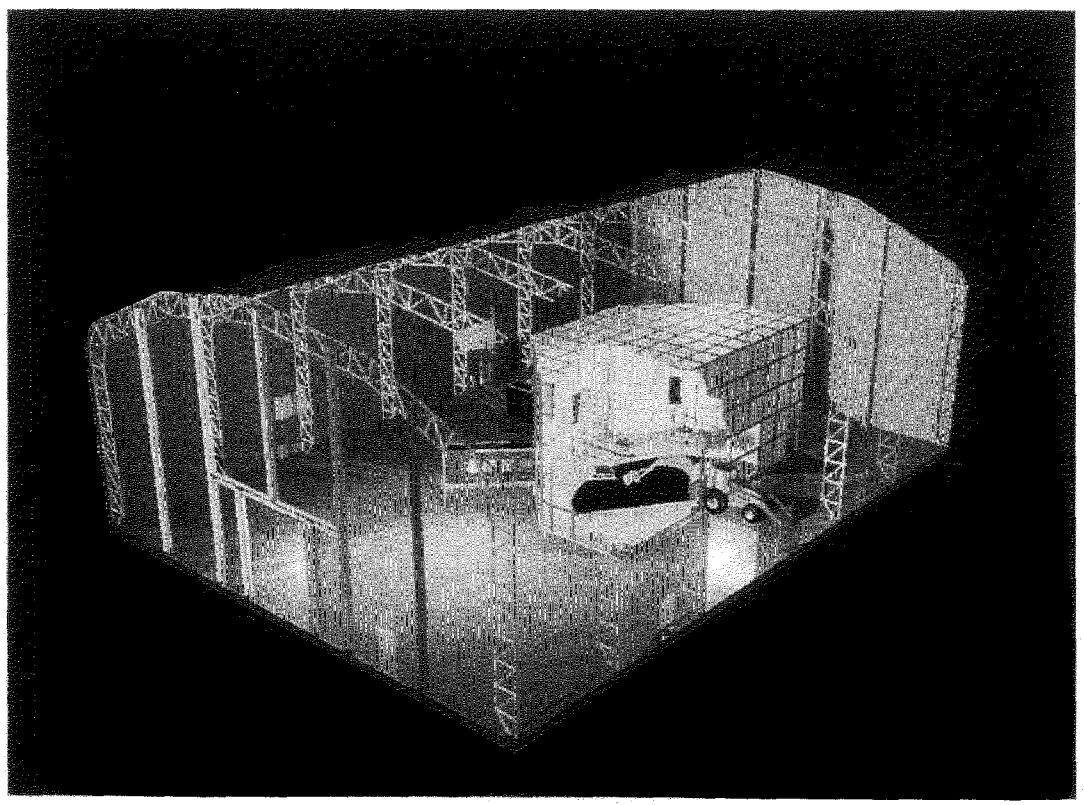

Figure 4. Major components of the OU 7-10 Glovebox Excavator Method Project facility.

Confinement Structure (RCS), a modified backhoe for material retrieval, a Packaging Glovebox System (PGS), radiation monitoring equipment, a dust-suppression system, a ventilation system, safety systems, and utilities. The transfer vestibule and personnel access air locks are not shown in the figure to enhance clarity.

Project operation and maintenance activities will begin after construction turnover is complete. This includes testing and readiness review. The major processes performed during operation will be removing and staging the overburden, retrieving waste zone material, sampling waste zone material, packaging waste zone material in drums, drum radioassaying, transferring waste to storage, underburden sampling, and retrieval pit grouting. Figure 5 illustrates the major project operational phases. The WES, RCS, and PGS will be placed in a safe shutdown condition at the completion of the retrieval, packaging, and assaying operations, and the facilities then will be maintained in a lay-up status pending D&D&D.

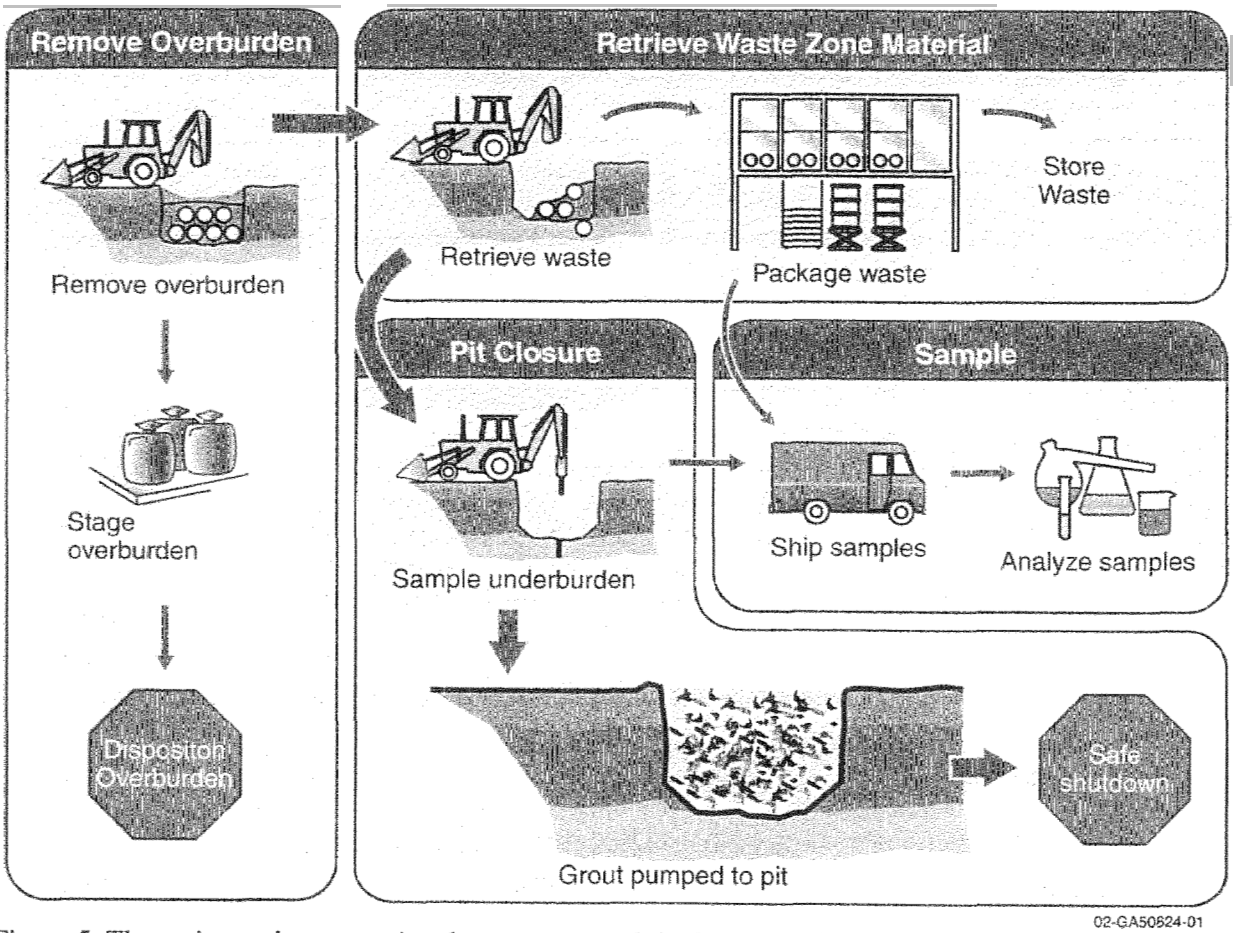

Figure 5. The major project operational processes result in demonstrating waste zone material retrieval, generating required data, transferring waste zone material to storage, and safely shutting down the facility.

1.3 Organizational Structure

The overall organizational structure of the project is provided in the *OU 7-10 Glovebox Excavator Method Project Execution Plan for Critical Decision 1* (INEEL 2002a). The organizational structure and responsibilities for implementing the project operations and maintenance are discussed in this section.

The operations organization includes project operations management and supervision; operators and technicians; Environment, Safety, Health, and Quality Assurance (ESH&QA) organization representatives; and support personnel. Figure 6 illustrates the project operations organizational interfaces.

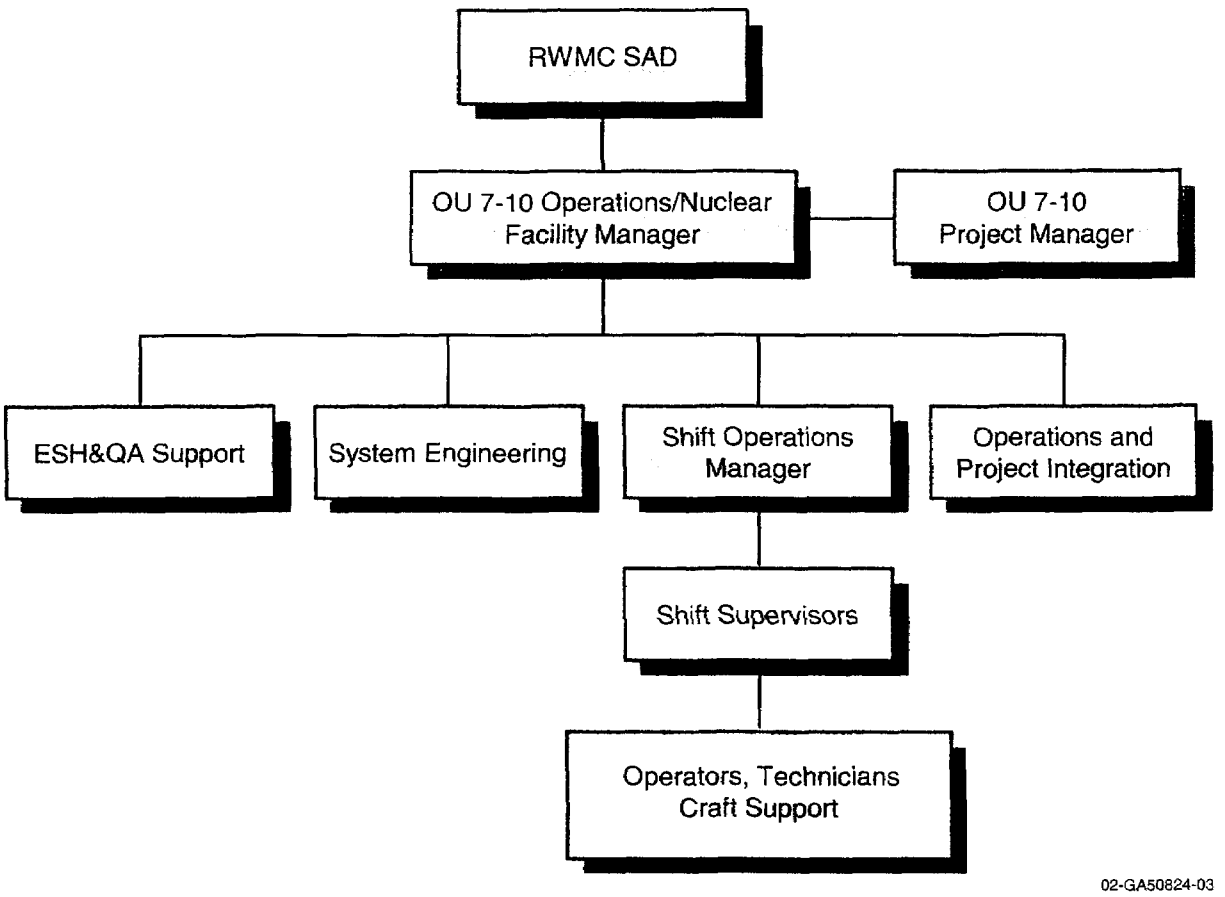

Figure 6. Operations organizational interfaces for the OU 7-10 Glovebox Excavator Method Project.

1.3.1 Management

1.3.1.1 Radioactive Waste Management Complex Site Area Director. The RWMC site area director (SAD) reports to the vice president and general manager of operations and, as the SAD, is responsible for the project.

The RWMC SAD is responsible for ensuring that project work activities are performed in compliance with the Site-wide conduct of operations and conduct of maintenance programs and that Integrated Safety Management System (ISMS) principles are applied to all work planning, control, and execution.

The RWMC SAD will provide the necessary coordination with the project nuclear facility manager (NFM) to accomplish an effective waste retrieval and packaging process (refer to Section 1.3.1.2).

Additionally, because project construction, operations, maintenance, and D&D&D activities will occur within the RWMC boundary, the RWMC SAD will provide landlord support to the project. Because of the landlord support function, the RWMC SAD will ensure that documents identified within the RWMC Authorization Basis (i.e., safety analysis report [SAR], technical safety requirements [TSRs], and permits) remain current and adequately address the scope and hazards encountered for activities within the scope of RWMC operations.

1.3.1.2 Operations and Nuclear Facility Manager. The NFM is responsible to the RWMC SAD for all OU 7-10 area operational activities and to the project manager as the work package manager for startup, operations, and maintenance activities related to project scope, schedule, and budget performance. The NFM is responsible for the safe operation of project equipment and facilities, and for ensuring that safety systems protect human health and the environment.

The NFM authorizes all mock-up testing, preoperational testing, operations, and maintenance work activities within the project area and at the Cold Test Pit South (CTPS), ensuring that work is performed in accordance with the principles of ISMS and requirements identified in authorization agreement documents and operating procedures.

1.3.1.3 Shift Operations Manager. The shift operations manager is responsible for the day-to-day operational and maintenance activities of the project and is the designated NFM alternate, with signature authority for all matters regarding operations, maintenance, and nuclear facility management. Specific duties and responsibilities include directing performance of operational activities in accordance with approved schedules, communicating expectations to the crews, assessing their readiness to perform work in a manner consistent with all applicable safety and health (S&H) requirements and company procedures, and managing the operational shift crews.

1.3.2 Shift Operations

1.3.2.1 Shift Supervisor. The shift supervisor is the individual responsible on-shift during project operations and has authority to act for management during normal and abnormal operations. Specific duties and responsibilities include ensuring the safe and efficient execution of work with respect to waste retrieval, segregation, handling, and storage, and ensuring operations and maintenance are conducted in such a way as to protect human health and the environment.

1.3.2.2 Operators (Retrieval, Soil Handling, and Material Handling). Operators are assigned to each shift to perform retrieval, soil handling, and glovebox operations. They will be fully qualified to perform their prescribed duties. In addition, a roving operator is assigned to assist with drum-out operations and fissile monitoring and will support these activities as required.

1.3.2.3 Data Recorder. The data recorder helps identify and characterize waste zone material in the PGS, records data, enters data into the drum tracking system, and acts as a verifier of waste disposition locations, when required.

1.3.2.4 Laborers or Heavy Equipment Operators. Specific duties and responsibilities include operating the forklift and flatbed to transport drums, handling the drums within the secondary confinement area, and understanding and applying project-specific S&H policies.

1.3.2.5 System Engineers (Shift Technical Advisor). System engineers are responsible to the NFM and will receive day-to-day direction through the lead system engineer. Specific duties and responsibilities include verifying that all proposed design changes meet all applicable requirements,

establishing and maintaining technical baselines, managing the engineering change control process, and implementing configuration management for each structure, system, and component (SSC) for which he/she is or will be responsible.

Additionally, system engineers provide expertise in support of preventive and corrective maintenance activities and they provide technical input for the development and validation of operating procedures. Specific system engineer assignments are excavation, glovebox process, drum handling and sampling, and balance of plant.

1.3.2.6 Radiological Control Technicians. Radiological control technicians (RCTs) report directly to the facility RCT foreman, and they are responsible for ensuring compliance with the INEEL Radiological Control Program within the project, including acting as a radiological control information resource for project personnel. Also, during emergencies, RCTs are responsible for stopping work or ordering an area evacuated when an imminent radiation hazard exists and such actions are necessary to ensure worker safety.

1.3.2.7 Radiological Control Technician Foreman. Specific duties and responsibilities include directing and supervising day-to-day activities for RCTs, reviewing radiological work permits, and ensuring that requirements of applicable DOE orders, company programs, and the *Manual 15A - Radiation Protection – INEEL Radiological Control Manual* (PRD-183) are properly incorporated into project-specific procedures, practices, and controls.

1.3.2.8 Maintenance Crafts. Maintenance personnel are responsible for maintenance and repair of project mechanical and electrical equipment. Personnel in this category include all maintenance crafts, life-safety systems technicians, and their line management. Technicians are responsible for specific maintenance and monitoring activities that include equipment maintenance, troubleshooting, repair, testing, instrument calibration, inspections, and data surveys.

1.3.3 Environment, Safety, Health, and Quality

1.3.3.1 Radiological Engineer. The radiological engineer provides radiological engineering support within the project. Specific duties and responsibilities include acting as point of contact (POC) for all radiation protection issues related to the project, ensuring that radiological hazards are identified and appropriate controls are implemented to minimize worker exposure to those hazards, supporting as low as reasonably achievable (ALARA) objectives, and identifying conditions that may impede implementation of company standards for safety, quality, and operations and maintenance.

1.3.3.2 Environmental Engineer. Responsibilities of the environmental engineer include providing overall technical expertise for regulatory issues, natural and cultural resources, and environmental risk assessment for the project. The environmental engineer identifies environmental and regulatory issues that affect operations or maintenance and develops solutions in coordination with the project engineer and other project task leads. The environmental engineer also works with the project task leads and management to develop appropriate mitigation measures that minimize potential noncompliance with environmental requirements when environmental issues are identified.

1.3.3.3 Safety and Health Engineers. Safety and health engineers prepare the health and safety plan (HASP), hazard identification analyses, confined space permits, fall protection work plans, exposure assessments, ergonomic evaluations, and other safety documents as required by federal regulation or company procedure. In addition, they assist project personnel in complying with applicable S&H standards and related INEEL procedures, support project management by investigating accidents and

injuries and preparing written reports to project and functional management, and review work packages for completeness of S&H content, hazard identification, and appropriate mitigation efforts.

1.3.3.4 Operations Quality Assurance Engineer. Duties and responsibilities of the Operations quality assurance (QA) engineer include implementing internal quality monitoring, assessment, and surveillance by establishing and maintaining an internal assessment and monitoring schedule; reviewing design and performance specifications and other design documents to determine if quality requirements are properly included; and ensuring that QA compliance is achieved in accordance with applicable requirements established by the company, DOE, state, and federal regulations.

1.3.4 Operations Support

1.3.4.1 Operations Integration Specialist. Specific duties and responsibilities of the operations integration specialist include interfacing between Operations and all other project teams (e.g., project management, design, S&H, environmental, criticality protection, radiological controls, records management, and document control) to help ensure that the Operations organization is informed of requirements that impact operational activities; the underlying driver for all requirements impacting operational activities is known and understood; and project deliverables that are not created by operations, but impact Operations' documents and responsibilities, are coordinated and scheduled for delivery in time to support operational deadlines.

1.3.4.2 Safety Analyst. The safety analyst performs nuclear safety analyses and prepares and maintains the nuclear safety analysis documents required by 10 CFR 830, Subpart B, "Safety Basis Requirements." Specific duties and responsibilities include acting as the POC for safety analysis issues related to the project, scheduling and tracking the safety analysis work, preparing and maintaining the documented safety analyses and technical safety analysis requirements, and preparing the unreviewed safety question screens and evaluations.

1.3.4.3 Planner and Scheduler. Duties and responsibilities of the planner and scheduler include generating and maintaining baseline, resource-loaded, integrated, and detailed project schedules; reporting status and generating variance reports; developing and presenting workaround strategies, schedule and cost change control, and what-if scenarios; and generating and maintaining the plan-of-the-day and plan-of-the-week schedules.

1.3.4.4 Waste Generator Services Facility Representative and Technical Specialist. Duties and responsibilities of the Waste Generator Services (WGS) facility representative and technical specialist include collaborating with project personnel to complete initial evaluation of waste types generated as part of process operations, assigning a probable waste type, and maintaining the waste management records in the INEEL Integrated Waste Tracking System (IWTS) database. Meets with the waste generator to obtain and document the following information: identification of the waste generation process, schedule, and potential pollution prevention opportunities; identification of starting materials for the waste generation process; and definition of the expected waste material components and characteristics and all process knowledge data. The Waste Generator Services facility representative and technical specialist assumes waste management responsibilities (initial waste determination, waste inspection, and disposal) for a given waste stream and ensures that all activities in this process are completed. Identification of the waste generation process, schedule, and potential pollution prevention opportunities.

The WGS facility representative and technical specialist assumes waste management responsibilities (e.g., initial waste determination, waste inspection, and disposal) for a given waste stream and ensures that all activities in that process are completed.

1.3.4.5 Radioactive Waste Management Complex Classification Officer and Security Personnel. Protective Forces personnel supporting the project provide facility security and surveillance. The RWMC physical security officer and classification officer review procedures and plans before waste retrieval or relocation. The physical security officer addresses security concerns expressed by project personnel. Safeguards and Security personnel also conduct damage assessments in the event of a security incident, coordinate with DOE-ID Security and the classification officer, and identify any added security measures required.

1.3.4.6 Training Specialist. Duties and responsibilities include supporting line management through training analysis, design, development, implementation, and evaluation to ensure all personnel on the project are properly trained and qualified to perform their assigned tasks.

1.3.4.7 Administrative Support. Administrative and office personnel are responsible for support functions that do not involve actual facility operations or maintenance. Activities performed (e.g., word processing, filing, stocking office supplies, and answering the phone) are performed exclusively in an office environment. Operations Administration will work in concert with the Project Administrator.

1.4 Project Interface Structure

Successful project execution is dependent on the timely communication and effective cooperation of many groups. Some of these exist within the Bechtel BWXT Idaho, LLC (BBWI) organization and some are external to BBWI and the INEEL. The following sections highlight the interfacing relationships of these interested or affected groups.

1.4.1 Idaho Nuclear Technology and Engineering Center

The Idaho Nuclear Technology and Engineering Center (INTEC) will provide to the RWMC SAD with additional support services to ensure safe and efficient execution of operational objectives. Supporting INTEC services will include:

- Analytical laboratory support for the handling and analysis of samples generated during project operations
- Disposal of certain waste materials generated from project operational activities at the INEEL CERCLA Disposal Facility (ICDF).

1.4.2 Waste Generator Services

The WGS is the internal organization responsible for the cradle-to-grave stewardship of hazardous waste generated as part of project operational activities. The WGS will interface in the following areas:

- Collaborating with project personnel to complete initial evaluation of waste types generated as part of process operations and evaluating process knowledge, assigning a probable waste type, and maintaining the waste management records in the INEEL IWTS database

- Identifying starting materials for the waste generation process and defining the expected waste material components and characteristics
- Planning and coordinating the disposal of D&D&D-derived waste.

1.4.3 Sample Management Office

The Sample Management Office will support the project in the following areas:

- Coordinate sampling requirements, sampling and analysis plan tables, and sample labels
- Assist in defining requirements for the sample analyses
- Develop a statement of work for the INTEC laboratories.

1.4.4 Waste Area Group 7, Operable Unit 7-13/14, Remedial Investigation/Feasibility Study Project

Data gathered from this project will be provided to the OU 7-13/14 Project to support completion of remedial investigation/feasibility study activities with respect to waste-site remediation decisions for that portion of the SDA. The project will provide the following to the OU 7-13/14 Project:

- Drummed waste material excavated from the project site for characterization and treatability studies
- Sample soil data from beneath the excavation site
- Video tape footage of OU 7-10 retrieved waste being sorted and segregated
- Information about OU 7-10 retrieved waste, specifically characterization data, physical forms, radiation levels, and nondestructive assay information
- Information about administrative controls used during OU 7-10 waste retrieval activities.

1.4.5 Inactive Sites Organization Interface

Once the facility has been placed into a safe shutdown status, the project will initiate the process of turning the facility over to the Inactive Sites organization. The Project Operations organization will maintain the facility in a known and stable condition while transition occurs. The interface between the two organizations is expected to include the following:

- Coordination of sampling and sample analysis
- Documentation (e.g., drawings, reports, and radiological measurement results) and information transfer and access
- Planning and coordination of funding for D&D&D.

1.4.6 Agency Interface with Operations

During the operations phase, the facility shift supervisor will serve as the primary POC for communications between Agency representatives and project operations personnel.

2. OPERATIONS AND MAINTENANCE LIFE CYCLE AND ACTIVITIES

Once facility construction is complete, O&M activities commence. Three distinct operating life cycles comprise the overall project operating life cycle:

- Facility turnover through testing and operations startup
- Waste zone material retrieval, sampling, and packaging operations
- Operations transition to D&D&D (includes shutdown and lay-up activities).

The following sections describe the activities associated with each cycle. The emphasis during each cycle is to accomplish the overall project objective of safely retrieving waste material from the excavation site within OU 7-10 while protecting human health and the environment.

2.1 Facility Turnover Through Operations Startup

The following paragraphs describe the O&M activities performed during the facility turnover through operations life cycle.

Site preparation, construction of facilities, and installation of process equipment supporting the OU 7-10 Glovebox Excavator Method Project operation will be performed by subcontracted or Force Account construction personnel, working under the direction of Construction Management and Project Management.

On completion of facility construction and installation of all support equipment, a formal turnover of responsibility for the facility from Project and Construction Management to the project Operations organization will occur. Turnover will be accomplished by completing the process directed in MCP-2869, "Construction Project Turnover and Acceptance," and Plan (PLN) -1113, "Integrated Acceptance Test/Turnover Plan for the OU 7-10 Glovebox Excavator Method Project (Draft)."[d]

To aid in preparation for operations startup, a full-scale equipment mockup will be erected at the CTPS at the RWMC. The mockup will consist of a CAT 446B excavator, glovebox, and support equipment staged to simulate facility operations. Surrogate waste also will be staged and used to simulate waste forms expected to be found in the pit. The mockup will be used to conduct specific prestartup activities (e.g., equipment testing, procedure validation, operator training, and validation of staffing estimates). Use of the mockup will allow these prestartup activities to occur earlier in the schedule and will provide more time for their performance, thus promoting safer operation of actual project equipment. This mockup will be transitioned from construction to operations following completion of construction.

Activities associated with the mockup will be performed in accordance with *Mockup Testing of the Backhoe and End Effectors for the Operable Unit 7-10 Glovebox Excavator Method Project* (Preussner

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d. PLN-1113, 2002, "Integrated Acceptance Test/Turnover Plan for the OU 7-10 Glovebox Excavator Method Project (Draft)," Rev. A, September 2002.

and Miller 2002) and PLN-347, "Glovebox Mockup Test Plan for the OU 7-10 Glovebox Excavator Method Project (Draft)."[e]

2.1.1 Facility Acceptance and Turnover

Effective, formal, and structured turnover of project structures and equipment, in accordance with MCP-2869, "Construction Project Turnover and Acceptance," will ensure that facility systems are operable and safe in preparation for future waste retrieval activities. Proper turnover of project facilities and equipment includes:

- Occupancy safety review
- Facility systems tests
- Review of acceptance test results
- Facility walk-downs.

An occupancy safety review will be performed by ESH&QA professionals to ensure that safety equipment required for occupancy is in place and that safety hazards have been identified and mitigated.

Testing will be conducted for specific facility equipment before turnover to operations, in accordance with MCP-3056, "Test Control." The project engineering personnel will review acceptance test results and verify facility systems operability.

Facility walk-downs will be conducted to allow visual inspection of the facility. A turnover checklist will be used to document deficient items that must be corrected before turnover, and the checklist will serve as a tool for tracking closure of these issues.

When project operations personnel have verified that test results meet acceptance standards and all turnover checklist deficiencies have been corrected, formal turnover from construction to operations will occur.

2.1.2 Testing After Turnover

Upon turnover of project facilities from Project and Construction Management, operations personnel will initiate further process equipment testing. Testing will be accomplished in accordance with test plans and procedures to be developed for specific equipment. Successful equipment testing provides a controlled mechanism that verifies compliance with design and operating requirements for project SSCs, and it ensures that safety features function properly.

Some limited equipment testing will have been performed before facility construction and turnover are completed. This testing will be conducted on a full-scale equipment mockup located at the CTPS. The mockup will be used to test and collect data about OU 7-10 process equipment in a controlled environment. Test data will be used to document equipment, operating conditions, and parameters that may affect equipment and system performance and procedures used during actual operations.

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e. PLN-347, 2002, "Glovebox Mockup Test Plan for the OU 7-10 Glovebox Excavator Method Project (Draft)," Rev. A, August 2002.

2.1.3 Staffing

The project Operations organization staffing began during the design phase of the project and will be ongoing through facility startup. The project Operations organization will staff and provide training for the following positions (for a description of the roles and responsibilities of each position, see Section 1.3):

- Nuclear facility manager
- Shift operations manager
- Shift supervisors
- Operators
- Maintenance crafts
- Radiological control technicians
- Radiological control technician foreman
- Environment, Safety, Health, and Quality Assurance representatives
- Planning and Controls personnel
- Training staff
- Procedure writers
- Operations integration specialist
- System engineers.

Operations staffing will be conducted in accordance with the company Management Resource Manual (Human Resources 2002) staffing procedures and Program Description Document (PDD) -1004, "Integrated Safety Management System."

As personnel are identified to support project operations activities, indoctrination to the project and job location requirements is accomplished through completion of a new employee checklist. Additional project-specific training will be provided as training materials and operational requirements are defined. Operations personnel will receive facility-specific equipment and S&H training before performing work involving the handling of hazardous materials.

2.1.4 Procedure Development and Validation

Operating procedures will be developed to support the safe operation and control of project equipment. Procedures will be developed in accordance with MCP-135, "Creating, Modifying, and Canceling Procedures and Other DMCS-Controlled Documents," and MCP-2985, "Chapter XVI - Operations Procedures."

Procedures will be developed using the expertise of Engineering, Operations, and Maintenance personnel. Doing so ensures that instructions within each procedure accurately describe the use of affected equipment and ensure safe operation and protection of the environment. Operations procedures provide specific direction for operating systems and equipment during normal, abnormal, and emergency or casualty conditions.

To support project operations and maintenance, the following types of procedures will be developed:

- Technical procedures (TPRs) supporting mockup activities
- Test procedures
- Technical procedures supporting actual operations
- Emergency and alarm response (EAR) procedures.

The extent of detail in an operations procedure depends on the complexity of the task, the experience and training of the user(s), the frequency of performance, and the significance of the consequences of error. Procedures incorporate appropriate information from applicable source documents, such as facility design documents, facility safety analysis, field sampling and analysis plan, and technical safety requirements.

Project-operating procedures will be developed and issued for specific cycles of the operation. The following development strategy will be employed for operating procedures (i.e., TPRs and EARs) to be used for the actual retrieval, characterization, handling, and storage of OU 7-10 waste materials:

- **Initial procedures:** This first version of operating procedures will be developed by writing teams comprising engineers, operations personnel, and technical writers. Content will include requirements derived from other project documents. Drafts of each procedure will be validated and a hazard evaluation group (HEG) review will be performed using mockup equipment staged at the CTPS, when appropriate. When validation and safety reviews are complete, these procedures will be issued as Revision 0, and they will be used to develop training materials and reference materials during the on-the-job training phase of the project. A job safety analysis (JSA) for each procedural activity also will be developed. Revision 0 procedures will be used for training purposes only and will not be used to support actual waste retrieval operations.

- **Operating procedures:** This second, verified and validated version of the operating procedures will be derived from Revision 0; however, final validation and HEG reviews will be performed on actual project process equipment and systems. Any updates from requirements documents (SARs and TSRs), process step changes, and information about new hazards not previously identified will be incorporated into this revision. Substantive changes from Revision 0 to Revision 1 procedures will be communicated through training sessions and required reading to operators and supervisory personnel before actual performance of waste-handling activities. Verified and validated procedures will be used to perform actual waste handling operations, and they will be issued before the contractor ORR.

2.1.5 Training

The project Operations personnel will be trained to perform operational duties before assuming job assignments involving actual handling of hazardous materials. Training programs will consist of classroom, self-study, computer-based, and on-the-job training (OJT) using the full-scale mockup of the excavator and glovebox process equipment.

Training materials will be developed based on an analysis of worker job tasks and will include written and performance examinations to test trainee knowledge and skills.

The project operations and maintenance personnel training will begin after the development of the Revision 0 O&M procedures is complete (see Section 2.1.4 for a description of the procedure development process).

Operators and supervisors will receive classroom and OJT in the following areas:

- Fundamentals of the project operation
- Conduct of operations
- Facility safety analysis
- Technical safety requirements
- Normal operating procedures
- Emergency and alarm response procedures
- Health and safety plan and JSA requirements
- Applicable industry operating experience
- Environment, safety, and health training specific to facility and operational hazards (e.g., hazard communication, radiation worker, and hazardous waste operations and emergency response).

Support personnel (e.g., crafts, RCTs, and foreman) will receive training on applicable elements from the above list. Personnel who perform work on safety-significant systems and equipment will receive specific training on those systems or be supervised when performing this work.

Formal training using the mockup at the CTPS will continue until facility startup. Operators, supervisors, and support personnel will complete written and performance examinations, as applicable, when training (i.e., classroom and OJT) is complete.

On successful completion of all required training program elements, operators (i.e., heavy equipment operator and glovebox operator) and supervisors will receive a provisional certification endorsement from project operations management. Provisional endorsement designates that the candidate has completed all initial training and examination requirements to support facility operations. A final certification will be established after each candidate has performed actual project job duties for a minimum of 8 hours.

Upon completion of all required training, personnel will be deemed qualified to perform project job duties. As necessary, additional training will be provided for nuclear facility authorization basis and procedure changes, and additional training will be provided if new hazards are identified as part of routine operations or maintenance. After project operations begin, operations personnel will receive continuing training, as needed.

The training program will be developed and implemented in accordance with PLN-127, "Radioactive Waste Management Complex Training Implementation Matrix," and PDD-108, "Training Program Description for the OU 7-10 Glovebox Excavator Method Project." Section 3.10 contains additional information about the training and qualification process supporting project operations and maintenance.

2.1.6 Management Self-Assessment

A MSA will be conducted by the contractor management team to assist project operations to prepare for readiness to startup operations. An MSA plan will be developed to identify evaluation criteria, POCs, and a schedule for completion of the MSA. The MSA will be conducted as testing is being completed, and it will focus on key areas of operational readiness (e.g., authorization basis compliance, operator training, hazard identification and mitigation, and ISMS implementation).

Company-level subject matter experts will perform the MSA and findings identified will be documented and a corrective action plan will be established to track closure of issues. Issues required to be closed before the contractor ORR, or before startup, will be identified and tracked to completion.

2.1.7 Operational Readiness Reviews

A contractor ORR will be conducted, in accordance with MCP-2783, "Startup and Restart of Nuclear Facilities." The ORR will be performed after all facility testing has been completed, operating procedures have been developed and issued, and operations and maintenance personnel have completed all initial training requirements. Additionally, all pre-ORR findings from the MSA must be closed before start of the ORR. The scope of the ORR will be identified in the Plan of Action that will be written and submitted to DOE-ID for approval approximately 6 months before the contractor ORR.

A contractor ORR implementation plan that identifies the criteria and review approaches to be used during the ORR will be developed. Criteria will include industry and ORR lessons learned, and those criteria will be documented.

The ORR team will consist of company-level subject matter experts and they will evaluate facility operational readiness to the predetermined set of criteria identified in the ORR implementation plan. Findings identified during the ORR will be documented, and a corrective action plan will be established to track closure of issues. Issues required to be closed before the DOE ORR, or before startup, will be identified and tracked to completion.

In preparation and support of the ORR, the following documents will be developed and disseminated at the appropriate interval:

- Startup notification report
- Quarterly startup notification reports

- ORR plan of action
- Contractor ORR implementation plan
- Readiness to proceed memorandum
- Contractor ORR final report.

Upon completion of the contractor ORR, DOE will conduct an ORR to verify operational readiness. The DOE ORR will include expertise from within DOE and will use evaluation criteria established within the ORR implementation plan. Issues identified within the DOE ORR will be identified and tracked to closure. When all prestartup issues have been closed and post-start corrective action plans are approved and entered into Issue Communication and Resolution Environment (ICARE) system, DOE will provide formal certification to proceed with startup, pending completion of the prefinal inspection.

2.1.8 Prefinal Inspection

Upon completion of construction activities and as a part of the readiness review process, representatives from the EPA, IDEQ, and DOE-ID, or their designees, will perform a prefinal inspection. This process will be facilitated by the use of a prefinal inspection checklist. The prefinal inspection checklist, as approved, documents the areas agreed upon by all parties to be inspected that will constitute acceptance of project construction activities and readiness for operation of project. The inspection will focus on regulatory-type issues, specific project systems, startup procedures, and facility components that the agencies will want to verify have been addressed and are functional before facility operation. Issues identified from the inspection will be resolved at closeout of the inspection or a corrective action plan will be established to track remaining deficiencies. Results and conclusions from the inspection will be documented in a prefinal inspection report (see Section 2.4).

2.2 Operations

2.2.1 Basis for Operation

The overall objective of the project operations phase is to safely retrieve, package, and store waste zone materials from the excavation site in an efficient manner, while protecting human health and the environment.

Once operations have begun, operations will continue around the clock until they are completed. This strategy minimizes exposure risk. Therefore, retrieval and packaging operations run 24 hours per day using four crews, working shifts of 12-hour days, 4 days on and 4 days off. The process retrieves a minimum 75 yd^3 and up to a maximum of 125 yd^3 of waste zone material, resulting in roughly 500 to 650 filled drums. The amount over 75 yd^3 is dependent on meeting underburden sampling objectives (i.e., removing additional waste material necessary to uncover and core sample the underburden).

Day-to-day waste retrieval operations will be performed under the direction of the following individuals:

- **Nuclear facility manager** has full responsibility and authority for startup, operation, and shutdown activities

- **Shift operations manager** is responsible for the day-to-day operational activities of the project

- **Shift supervisor** is the responsible individual on the shift during operations and has authority to act for management during normal and abnormal operations.

Only trained and qualified personnel will conduct project operational activities. Work activities will be planned and implemented using the plan-of-the-week and plan-of-the-day process and will be approved by the NFM before execution.

Although the conduct of work activities is under the direction of project operations management, any employee may stop work if the individual thinks that the work activity is unsafe. The stop work authority process is described in MCP-553, "Stop Work Authority."

The project operational activities will be performed in accordance with DOE Order 5480.19, "Conduct of Operations Requirements for DOE Facilities," and *Manual 9 – Operations* (Nuclear Operations 2002). Supplemental procedures will be developed as necessary to address project-specific operational needs. Further information addressing processes supporting effective project conduct of operations is available in Section 3.2.

2.2.2 Environmental Checklist

The "Approved Environmental Checklist (EC) - RWMC OU 7-10 Glovebox Excavator Method Project," (RWMC 2002) for the project lists conditions and situations that must be reviewed before operations begin. Any conditions listed below will be completed before initiation of the project:

- **Storm water pollution prevention plan preparation:** A storm water pollution prevention plan for construction activities will be approved before any soil disturbing activities. More than one plan may be prepared to address specific project elements.

- **Cultural resources:** An exemption for the stop work requirement has been requested and approved for waste retrieval activities should cultural resources be encountered.

- **Water discharge:** Approval must be obtained from Environmental Affairs before discharging water to the OU 7-10 area.

- **Environmental Checklist compliance:** Requirements from companywide documents listed in the Environmental Checklist (RWMC 2002) must be completed or complied with before and during the activity.

2.2.3 Overview of Waste Retrieval Process

This section briefly describes the sequential process performed during the operations portion of the project. Figure 7 illustrates these sequential process activities. This process supports the overall project objectives:

- Demonstrate waste zone material retrieval from OU 7-10

- Provide information on any contaminants of concern present in the underburden

- Characterize waste zone material for safe and compliant storage
- Package and store waste onsite.

2.2.3.1 Overburden Removal. The overburden removal process begins after the project has received project startup authorization. First, air quality within the RCS is checked as one of the administrative checks preceding overburden excavation, although air contamination issues are not expected. After air quality is verified as acceptable, operators and RCT personnel wearing appropriate personal protective equipment (PPE) enter the RCS area, bringing appropriate tools to manually remove approximately 2 ft of overburden soil from around the probe clusters, probes, and moisture probe located near shoring walls, where the excavator cannot reach. Once this overburden material has been moved, excavator removal of remaining overburden begins. Working right to left (as viewed by the excavator operator), the excavator removes the overburden to a depth of about 2 ft across the entire dig area.

After the initial 2-ft layer of overburden is removed, the excavator then returns to the right side of the pit and removes the last 1 to 1.5 ft of overburden across the entire dig area, unless:

- The hard-pack zone of overburden is encountered, which generally corresponds with the top of the waste zone
- Waste zone material is encountered
- Contamination that exceeds operating limits is encountered.

During excavation, a water spray system minimizes the amount of airborne dust. Each bucketful of overburden soil is loaded into a 4 × 4 × 4-ft soil sack. After each scoop of soil has been loaded into a soil sack, an RCT may survey the soil that was just loaded or survey the excavator bucket for contamination. This survey reduces the risk of spreading potential contamination that could be encountered as overburden is removed.

Once soil sacks are filled, the RCT and operators prepare them for removal from the RCS. Even though no air contamination issues are expected within the RCS, the RCT must check RCS air before allowing the RCS doors to be opened for soil sack removal. Soil sacks are then removed from the RCS and placed in the transfer vestibule. Additional radiation and contamination surveys are performed before release of the sacks from the WES to disposition at the ICDF or within the RWMC.

2.2.3.2 Waste Zone Material Retrieval and Packaging. Waste zone material retrieval and packaging will commence on completion of overburden removal. Water spray may be applied, as needed, to the dig face surface during excavation to reduce dust generation and spread of contamination. Procedures will be developed for the PGS water-misting dust-suppression system.

First, the excavator positions waste zone materials and prepares waste objects for moving or lifting waste zone material into a transfer cart. The operator deploys the excavator arm and fills the excavator bucket or grabs a waste object. The target batch size is 2 to 2.5 ft^3, weighing less than 350 lb (approximately two batches fit into each 55-gal drum). The loaded bucket of waste zone material is then moved toward the available transfer cart, and the bucket is positioned over the transfer cart where an RCT positioned on the outside of the RCS wall measures the waste load for radiological activity. This is a coarse screening for very high radiation fields.

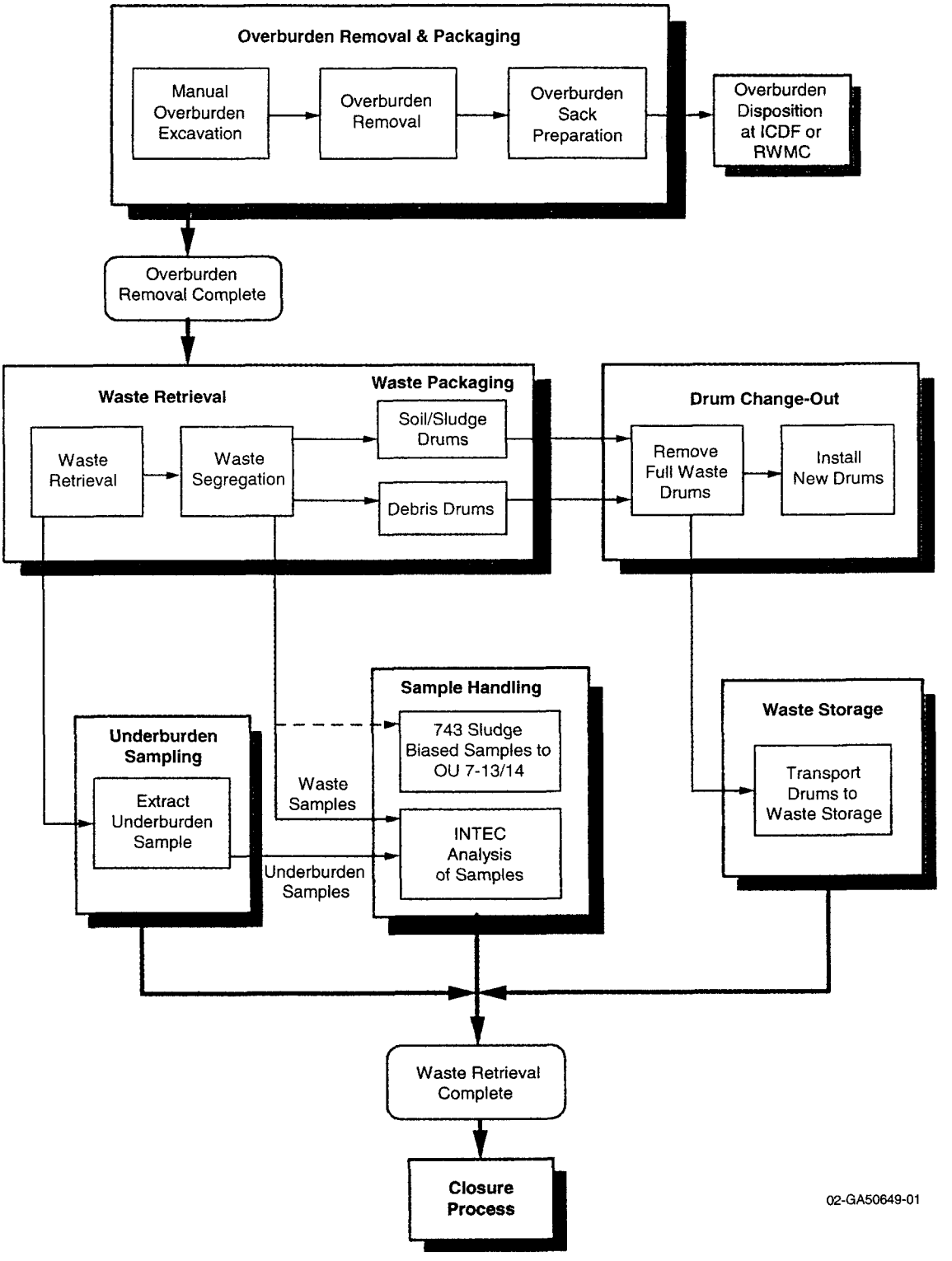

Figure 7. Process overview of the OU 7-10 Glovebox Excavator Method Project.

When a load of waste zone material is cleared by the RCT, it is ready to be loaded in a transfer cart. If the load has a high radiological reading, it is replaced in the pit for further handling or disposition. After the contents of the bucket are dumped into the transfer cart, the cart is moved into the PGS. Once the soil/waste load is moved into the glovebox, an RCT monitors radiological levels before allowing workers to handle the load of material. The RCT monitoring occurs throughout the glovebox packaging process from outside of the glovebox confinement boundary, near the window at which personnel are working, and is performed as frequently as is deemed necessary by the RCT.

During the packaging portion of the process, waste zone materials are segregated into two basic waste streams: soil/sludge and combustibles/metal debris. The contents of the lined transfer cart are visually examined, and a record is kept of the waste processed. Specific waste processing and packaging steps are dependent on the waste type. Hold points exist throughout the process and include, but are not limited to, encountering suspect high-efficiency particulate air (HEPA) filter material (fissile measurement), project outliers, and items requiring special handling.

As waste zone materials are processed, samples are taken to characterize the waste zone material being packaged (including biased sampling for suspected nitrate-contaminated waste). In addition, if retrieved waste zone material exhibits visual characteristics of Series 743 sludge, biased samples are taken and provided to the OU 7-13/14 program for testing and analysis. Samples are passed out of the PGS through a bag-in/out system known as a French can. The RCT performing this sample removal from the PGS sets up a contamination area around the French can during this activity. Glovebox operators then handle waste zone materials (as appropriate) for placement in drums, with each waste stream being placed in a separate drum. The transfer cart liner is normally used to lift and place soil and sludge directly in a 55-gal drum. Large items that are segregated from soil and sludges are placed into a separate 55-gal drum, or in an 85-gal drum if they are not easily sized, to minimize sizing activities.

2.2.3.3 Underburden Sampling. Waste zone material retrieval and packaging operations will be performed in a series of campaigns; that is, a section of the waste site will be retrieved and packaged, after which the uncovered underburden will be sampled. Then, another section of the waste site will be retrieved and packaged, and another section of underburden will be sampled.

The core soil sampler is attached to the excavator and positioned, in accordance with the "Field Sampling Plan for the Operable Unit 7-10 Glovebox Excavator Method Project (Draft),"[f] over the excavation site location where an underburden core sample is to be taken. After taking the sample, operators and an RCT pass the sample out of the RCS through a bag-out port. An RCT sets up a contamination area around the bag-in/out port and positions a localized ventilation system (e.g., vacuum) for bagging out the core sample. The sample is then transported to an analytical laboratory for analysis.

2.2.3.4 Drum Change Out. The drum-liner bag in which the waste material is placed has an in-wall HEPA filter and is attached to the drum port to maintain a primary confinement seal. A 90-mil polyethylene liner is placed inside the bag to protect the bag against punctures. The liner does not have a separate lid. The drum lid has a filter. Metal debris and drum remnants are packaged in 55- or 85-gal drums, with liners and bags.

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f. Salomon, Hopi, Daryl R. Haefner, Beth A. McIlwain, Jila Banaee, Jeffrey J. Einerson, and Anna K. Podgorney, 2002, "Field Sampling Plan for the Operable Unit 7-10 Glovebox Excavator Method Project (Draft)," INEEL/EXT-02-00542, Rev. B, Idaho National Engineering and Environmental Laboratory, Bechtel BWXT Idaho, LLC, Washington Group International, Idaho Falls, Idaho, September 2002.

When waste drums are filled, a cover is placed on the porthole in the PGS, and drum change-out activities are performed to remove full drums and install new empty drums. Change-out operations occur within the drum load-out enclosure located underneath each glovebox. Personnel in appropriate PPE enter the drum loadout enclosure to bring a new drum into the enclosure. The drum load-out enclosure is closed and inspected to verify closure. The RCT continuously monitors for airborne contamination throughout the drum change-out effort within the drum load-out enclosure. With the porthole cover in place, the filled drum is lowered and the bag sleeve integrity is monitored, after which the drum is rotated, twisting the bag liner until tight. Operators place clamps in two places on the bag liner and the bag is then cut between the two clamps and tape is placed over the ends, thereby sealing the bag ends. During this activity, a localized air-sweep HEPA vacuum is placed next to the location where the bag is cut. The lid is placed on the waste drum and a locking ring is fastened. The drum is then surveyed for contamination before being released from the drum load-out enclosure area.

A new drum is then installed at the vacant drum-out port. Once the full drum and enclosure contamination control area have passed radiation control surveys, the enclosure door is opened, the drum is removed, and a label is attached to the drum and annotated with pertinent information (e.g., radiological survey levels and unique bar code). The drum is weighed and the weight also is recorded and annotated on the drum label, after which the drum is moved to the WES full-drum staging area to await transportation.

2.2.3.5 Waste Drum Transportation. Before moving a filled drum from the WES full-drum staging area, an RCT once again surveys the drum to be removed. Then, before opening the transfer vestibule roll-up door into the drum staging area of the WES, a check is made to ensure that the RCS door is closed and that all WES doors to the exterior are also closed. A forklift or equivalent (e.g., motorized pallet jack) then enters the WES from the vestibule and takes the identified drum(s) to the WES exterior door. If the drum(s) are not to be transferred out of the WES immediately, an RCT must survey the drum(s) again before opening the exterior door and releasing the drum(s). Finally, before the drum(s) are released, a check is made to ensure that the RCS doors, personnel monitoring door, and transfer vestibule rollup door are all closed before opening the WES exterior doors. This step maintains the differential air pressures that are required between confinement boundaries.

An equipment operator brings a forklift to the WES door and transports the waste drum to a temporary storage area. Drum assay is then performed. (Currently, the specific approach for assaying full drums has not been determined.)

On completion of drum assay, drums are placed in temporary compliant storage. (Currently, the specific approach for this storage has not been determined.)

2.2.4 Equipment and Facility Maintenance

The INEEL maintenance program that supports project operations includes the preventive and corrective maintenance that ensures the availability and reliability of SSCs important to safe and productive facility operations. The project SSCs are classified in accordance with their importance to safety and mission success, and they are assembled on a equipment list. The list of SSCs included in the maintenance program, including special tools and equipment, is entered on the project Master Equipment List in accordance with the requirements of MCP-6402, "Master Equipment List and Maintenance History."

Maintenance activities that support project facilities and equipment will be performed using the existing INEEL processes and controls to ensure safety, effectiveness, and timeliness of all preventive and

repair activities. Maintenance activities are performed in compliance with Standard (STD) -101, "Integrated Work Control Process," and procedures found in *Manual 6 – Maintenance* (Maintenance 2001). Throughout the maintenance process, project personnel will apply the principles of ISMS and the Voluntary Protection Program (VPP).

Elements of the project maintenance program include the following:

- **Preventive maintenance:** Maintenance tasks that are selected based on their importance and cost-benefit that, when performed at the appropriate frequency, anticipate and correct equipment problems before equipment breakdown occurs.
- **Corrective maintenance:** The repair or rework of failed or malfunctioning equipment, systems, or facilities to restore the intended function or design condition. This maintenance does not result in a significant extension of the expected useful life.
- **Repetitive or routine maintenance:** Routine maintenance required to maintain equipment and facilities in good working order. Repetitive or routine maintenance is usually a part of preventive maintenance.
- **Calibrations:** The set of operations that establish, under specified conditions, the relationship between values indicated by a measuring instrument or measuring system and the corresponding standard or known values derived from the standard.
- **Surveillance:** Monitoring or observing to verify whether an item or activity conforms to specified requirements.
- **Testing:** Actions performed to verify that components will fulfill their design function when returned to service after maintenance.

Maintenance work orders will be developed in accordance with STD-101 and implemented using the PassPort System, which is an electronic work control system found at http://passport.inel.gov/.

Work orders will be developed for periodic maintenance of the following project systems and equipment:

- Criticality alarm system
- Water-misting fire protection system for the PGS
- Radiation monitoring systems
- Emissions monitoring system
- Eye wash and safety showers
- Breathing air system
- Emergency lighting

- Dry pipe fire detection alarms and fire suppression systems (including deluge)
- Standby power system
- High-efficiency particulate air filtration system
- Ventilation systems
- Plant air systems
- Forklifts
- Excavator
- One-ton hoist (in gloveboxes)
- Instrumentation
- Drum scales
- Drum lift and rotator
- Fissile material monitor
- Dust-suppression system.

Maintenance tasks are performed in compliance with maintenance work orders (MWOs) developed for the specific maintenance task and they include hazard identification, hazard mitigation actions, and performance instructions for the specific task. Maintenance activities will be implemented through the plan-of-the-day process and conducted by skilled craft-persons under the supervision of trained personnel.

Prejob briefings and post-job reviews are used to make workers aware of job-site hazards and to critique activities and identify ways in which work activities can be improved.

Maintenance and calibration of applicable project equipment will be performed by qualified craft personnel in accordance with company procedures. Calibrations on pressure differential indicators, fissile material monitors, and the emissions monitoring system will be performed before startup and should not require recalibration for the expected short duration of the project. However, daily calibration checks will be performed on criticality alarm systems, radiation area monitors, continuous air monitors, and the fissile material monitor to ensure that this equipment is maintaining its expected calibration tolerance.

Dedicated craft support will be assigned to the project. However, if craft expertise not assigned to project operations is required, such support will be obtained from other INEEL sources.

To minimize downtime during operations, the critical spare parts list will be expanded to include additional equipment and parts, thereby ensuring the availability of those components in the event of equipment failure.

Lockout and tagout (LO/TO) will be performed in accordance with Program Requirements Document (PRD) -5051, "Lockout and Tagout," and will be implemented as follows:

- For systems, processes, and equipment maintained by project operations, LO/TO will be performed under the control of project operations personnel
- For systems and equipment routinely maintained by RWMC Operations that require LO/TO as a result of project construction, process operations, or D&D&D activities, LO/TO will be performed under the control of the RWMC Operations LO/TO process and requirements.

Additional information about the INEEL maintenance process supporting project operations is contained in Section 3.5.

2.2.5 Forms

Forms will be developed, as needed, to capture significant information and preserve it. Forms will be initialized to document surveillance data, instrumentation and systems checks, and the tracking of operational events. A listing of the forms to be used in support of project O&M activities are contained in Section 4.5.

2.3 Operations Transition to Shutdown

As described fully in the *OU 7-10 Glovebox Excavator Method Project Facility Shutdown Plan and Deactivation, Decontamination, and Decommissioning Pre-Plan* (PLN-343), a three-phase approach will be used for conducting the post-retrieval operations and maintenance activities. These phases include (1) safe shutdown, (2) lay up, and (3) D&D&D. These shutdown activities are planned to occur as quickly and safely as possible in order to minimize exposures and the risk presented by the open excavation site.

2.3.1 Safe Shutdown

Safe shutdown involves those activities necessary to identify and mitigate the hazards present in the facility following completion of project objectives. The primary goal of safe shutdown is to place the facility in a stable and known condition that is cost-effective to maintain. The operations work schedule of 24 hours a day, 7 days per week will be continued through shutdown using the four existing crews. While these crews will be scaled back somewhat and undergo some adjustment for skill mix, many of the functional areas supported will remain the same (e.g., radiological control, industrial safety, operations supervision, and excavator operations). Subcontractor and Inactive Sites (D&D&D) organization personnel will be used to supplement these crews as necessary, providing technical as well as operational support. Major work activities during shutdown include the following:

- Sampling and surveying
- Performing initial facility and equipment decontamination to reduce surface contamination to levels that allow subsequent disposal (i.e., after D&D&D) by the preferred disposal path
- Performing characterization of facility and equipment
- Backfilling the excavation site with grout to stabilize the excavation area and to reduce the releasable inventory

- Performing immobilization of the residual removable contamination by spraying contaminated surfaces with strippable or latex paint, depending on the results of characterization and the effectiveness of the initial decontamination

- Securing equipment in the WES by draining and depressurizing storage tanks, de-energizing electrical equipment not required during lay up, removing unnecessary gas cylinders, demobilizing and removing any subcontractor-owned portable systems, and reducing heating and ventilating set points or flows.

Necessary training will be conducted to orient any new personnel, as well as retained personnel, to the specific hazards posed by the facility and by the activities to be performed during the shutdown period. All conduct of operations and conduct of maintenance processes and procedures apply to the performance of safe shutdown work.

2.3.2 Facility Lay Up

Activities performed during facility lay up involve efforts on two fronts. First, maintenance and surveillance activities will be performed to keep the facility in stable and known conditions until the facility can be transferred to the Inactive Sites organization for D&D&D. These activities will be performed by skeleton crews reporting to the project or by expanding the role and scope of existing RWMC maintenance and surveillance personnel to cover these project activities. The latter is the preferred approach. The second effort relates to the preparation of the necessary paperwork (e.g., plans, procedures, reports, and work packages) to define, initiate, and conduct the D&D&D work. It is this effort that actually defines the length of the lay-up period. The lay-up period will be kept as short as possible and will conclude upon transition of the facility to Inactive Sites. The timing of this transfer will coincide with the completion of the D&D&D readiness review and mobilization of the D&D&D workforce. Major work activities during lay up include the following:

- Facility and equipment preventive maintenance, calibrations, and corrective maintenance required to maintain SSCs in a safe and protected status

- Facility radiological control surveillances to ensure operability of radiation monitoring and personnel contamination monitoring equipment and to ensure continued control of radioactive contamination within confinement areas

- Physical security surveillances to ensure access controls are in place and operational

- Transition of the facility to the INEEL Inactive Sites organization for D&D&D

- Completion of the D&D&D readiness review

- Mobilization of the D&D&D workforce and facilities.

Necessary training will be conducted to orient any new personnel, as well as retained personnel, with the specific hazards posed by the facility and by the activities to be performed during the lay-up period. All Conduct of Operations and Conduct of Maintenance processes and procedures apply to the performance of this work.

2.3.3 Deactivation, Decontamination, and Decommissioning

The primary goals of the D&D&D phase are to safely (1) remove the facility and associated equipment and materials from the surface of OU 7-10, (2) restore the protective cover of the pit to near preproject conditions, and (3) dispose of or disposition the resultant waste, materials, and equipment. This work will likely be performed by the INEEL Inactive Sites organization outside the scope of this O&M Plan. However, this work is addressed here to provide an understanding of what will be involved and to provide a basis for O&M transition and associated interfaces.

The O&M activities during this phase (and thereafter) will include continued storage and monitoring of waste.

Necessary training will be conducted to orient any new personnel, as well as retained personnel, with the specific hazards posed by remaining O&M activities to be performed during and after the D&D&D period. All Conduct of Operations and Conduct of Maintenance processes and procedures apply to the performance of this work.

2.4 Operations and Maintenance Reporting and Project Closeout

A reporting process has been established to report the status of project remedial actions, O&M activities, and planning for D&D&D actions related to meeting the requirements set forth in the FFA/CO, 1993 ROD, RD/RA SOW (LMITCO 1997), and the March 16, 2001, Agreement to Resolve Disputes.

The remedial action and O&M reporting process will include the following reports:

- **Prefinal Inspection Report:** Upon completion of construction activities, representatives from the EPA, IDEQ, and DOE-ID, or their designees, will perform a prefinal inspection. At the conclusion of the inspection, a report will be generated by DOE as a means to document prefinal inspection conclusions. The report includes, as applicable, checklists used to perform the inspection, findings, corrective action plans, updates to the O&M Plan, outstanding construction requirements, and the date of the final inspection.

- **Remedial Action Report:** Using the Prefinal Inspection Report as a basis, a Remedial Action Report will be developed upon completion of project remedial action activities. The purpose of the Remedial Action Report is to document that project facilities and equipment are operational and functional. The report will include outstanding items from the Prefinal Inspection Report, a synopsis of work agreed to and certification that this work was performed, and an explanation of any modifications to the Remedial Action Work Plan. A draft Remedial Action Report will be submitted to IDEQ and EPA within 60 days of the final inspection of the project excavation.

- **Operations and Maintenance Report:** Upon completion of project operational activities, an O&M Report will be developed. The O&M Report will include a description of the project O&M activities performed, results of site monitoring, verification that the remedy meets the performance criteria, and an explanation of any additional O&M to be undertaken at the site (e.g., sampling and monitoring).

Depending on the agreed-upon timing of the final inspection, the O&M Report could be combined with the Remedial Action Report as a single primary document. The nature of the O&M activities and the expected short duration of the project provide a valid argument for this approach.

Specific reporting for unusual or abnormal events that might occur during routine project operations will be conducted as described in Section 3.2.7, "Event Investigation and Occurrence Reporting."