

**OPERATIONS PLAN FOR TECHNICAL ASSISTANCE IN
EVALUATING NON-HIGH-LEVEL WASTE DETERMINATIONS
FOR THE U.S. DEPARTMENT OF ENERGY FACILITIES IN
SOUTH CAROLINA AND IDAHO**

Prepared for

**U.S. Nuclear Regulatory Commission
Contract NRC-02-07-006**

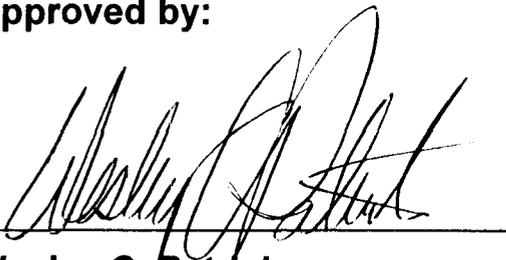
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A handwritten signature in black ink, appearing to read 'Wesley C. Patrick', is written over a solid horizontal line.

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**CENTER FOR NUCLEAR WASTE
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1 INTRODUCTION

Under the Ronald W. Reagan National Defense Authorization Act of Fiscal Year 2005 (NDAA), Section 3116(a), the U.S. Department of Energy (DOE), in consultation with the U.S. Nuclear Regulatory Commission (NRC), conducts non-high-level waste determinations for DOE sites in the states of South Carolina and Idaho. The NDAA, in Section 3116(a), provides criteria to determine whether or not waste resulting from reprocessing spent nuclear fuel is high level. NDAA Section 3116(b) stipulates that NRC monitors DOE disposal actions pursuant to the NDAA, Section 3116, Subsection (a)(3), Subparagraphs (A) and (B) to assess compliance with the performance objectives of 10 CFR Part 61, Subpart C.

The NRC staff use a risk-informed, performance-based approach to review DOE non-high-level waste determinations. The NRC NDAA activities include detailed technical evaluations in areas such as performance assessment, hydrology, chemical engineering, geochemistry, and exposure assessment. A particular aspect of DOE programs involves stabilizing tank wastes with cementitious materials such as grout. In some cases, these materials may be formulated to produce waste forms that enhance waste isolation by limiting radionuclide release and migration. DOE may rely on the properties of the natural system that may attenuate and retard radionuclide migration as part of the waste disposal system performance assessment. These properties depend on the physical and chemical conditions of the specific waste and surrounding site environment under consideration. DOE may also propose engineered covers to limit infiltration into a waste disposal unit. The degree to which DOE relies on the passive, long-term performance of engineered barriers after a period of active institutional controls and on natural system attenuation capacity to meet performance objectives affects the scope of the NRC monitoring responsibilities and the ability to assess whether the DOE disposal actions comply with the performance objectives (10 CFR Part 61, Subpart C).

According to NDAA Section 3116(b), NRC must coordinate with affected states (South Carolina and Idaho) to monitor DOE disposal actions so NRC can assess compliance with the performance objectives in 10 CFR Part 61, Subpart C. The NRC monitoring activities will be performance based and risk informed (e.g., will reflect risk insights gained from reviewing non-high-level waste determination documentation to determine those features of the disposal system most important to meeting the performance objectives). Monitoring activities will include reviewing site environmental monitoring data and radiation records to assess compliance with 10 CFR 61.43 requirements for protection of individuals during operations and may include monitoring performance of engineered barriers (e.g., infiltration and erosion controls) to assess compliance with 10 CFR 61.44 stability requirements. Under NDAA Section 3116(b)(2), if the Commission considers any disposal actions DOE takes pursuant to Subsection (a)(3), Subparagraphs (A) and (B), to be not in compliance with the performance objectives stipulated in those subparagraphs, the Commission shall, as soon as practicable after discovery of the noncompliant conditions, inform DOE, the covered state, and several Congressional committees.

Technical assistance from the Center for Nuclear Waste Regulatory Analyses (CNWRA[®]) is needed to help NRC meet its statutory responsibilities under the NDAA. The technical assistance described in this operations plan will support the NRC consultation [Section 3116(a)] and monitoring [Section 3116(b)] responsibilities.

1.1 Statutory Basis for the Scope of Work

The Atomic Energy Act of 1954 established the policy basis for regulating the development, use, and control of nuclear energy in a manner that would maximize its contribution to the general welfare of the nation, promote peace, and ensure the health and safety of the public and workers in affiliated industries. Although the responsibilities for development and regulation or control of nuclear energy were initially vested in a single entity—the Atomic Energy Commission—the need to separate these functions was recognized and fulfilled in the Energy Reorganization Act of 1974. As a result of this statute, NRC was established in 1974 and given authority to establish and enforce regulations for the issuance of licenses to receive, possess, use, transfer, or deliver source and byproduct materials.

Under the provisions of the Energy Reorganization Act, DOE retained health, safety, and environmental responsibilities for its defense-related activities. Consequently, facilities such as the Savannah River Site (SRS) and Idaho National Laboratory (INL) have historically been exempt from NRC licensing or oversight. To date, DOE has operated these sites as self-regulated facilities.

In NDAA Section 3116, Congress allows DOE to determine whether some wastes at the DOE complex can be classified as not high-level radioactive waste. The criteria outlined in the NDAA are similar to the waste-incident-to-reprocessing approach established in DOE Order 435.1. According to the NDAA, Section 3116 criteria, DOE, in consultation with NRC, may determine that radioactive waste resulting from reprocessing spent nuclear fuel is not high-level waste if the waste

- (1) Does not require permanent isolation in a deep geologic repository for spent fuel or high-level waste
- (2) Has had highly radioactive radionuclides removed to the maximum extent practical
- (3) (A) Does not exceed concentration limits for Class C low-level waste as set out in 10 CFR 61.55, and will be disposed of
 - (i) In compliance with the performance objectives set out in 10 CFR Part 61, Subpart C
 - (ii) Pursuant to a state-approved closure plan or state-issued permit, authority for the approval or issuance of which is conferred on the state outside of this section; or
- (B) Exceeds concentration limits for Class C low-level waste as set out in 10 CFR 61.55, but will be disposed of
 - (i) In compliance with the performance objectives set out in 10 CFR Part 61, Subpart C
 - (ii) Pursuant to a state-approved closure plan or state-issued permit, authority for the approval or issuance of which is conferred on the state outside of this section

- (iii) Pursuant to plans developed by the Secretary [of Energy] in consultation with the Commission

NDAA is applicable only in the states of South Carolina and Idaho and does not apply to waste transported out of those states.

NDAA requires (i) DOE to consult with NRC on all of its non-high-level waste determinations for SRS and INL and (ii) NRC, in consultation with the state, to monitor the DOE disposal actions to assess compliance with NRC regulations in 10 CFR Part 61, Subpart C. NRC monitoring activities will be performance based and risk informed, and include reviewing data and monitoring records. Under Section 3116(b)(2), if the Commission considers any disposal actions DOE takes pursuant to Subsection (a)(3), Subparagraphs (A) and (B), to be not in compliance with the performance objectives stipulated in those subparagraphs, the Commission shall, as soon as practicable after discovery of the noncompliant conditions, inform DOE, the covered state, and several Congressional committees.

1.2 Center for Nuclear Waste Regulatory Analyses

CNWRA was established in 1987 as an NRC-sponsored, federally funded research and development center. As delineated in its charter, the mission of CNWRA is to provide sustained, high-quality technical assistance and research in support of the NRC high-level waste management program. CNWRA was charged with developing and maintaining an organization that possesses high technical competence characterized by permanence, stability, and the capability to provide independent objective recommendations on complex technical topics related to the back end of the fuel cycle. The management and organization of CNWRA is detailed in Section 4 of this operations plan.

CNWRA will provide technical assistance to the Division of Waste Management and Environmental Protection to support NRC reviews of the non-high-level waste determinations DOE prepared for facilities at SRS and INL. These reviews will evaluate information DOE provided to support its non-high-level waste determination, including site characterization data and performance assessments developed by DOE to demonstrate compliance with NDAA criteria, development of requests for additional information (if applicable), and documentation of DOE's review. As directed by the NRC project element manager, CNWRA also will support the development of NRC monitoring plans and review site environmental monitoring reports. As appropriate, CNWRA will work with the NRC staff to develop guidance documents to support NRC reviews of future DOE non-high-level waste determinations. Also, CNWRA will conduct focused, proactive work to provide independent technical tools both to evaluate the analyses DOE presents in its non-high-level waste determinations and to conduct monitoring activities at DOE facilities.

The non-high-level waste determination process described in the NDAA directly affects the quantity and types of waste that would be disposed at a geologic repository. Non-high-level waste determination reviews require in-depth analyses of DOE waste characterizations and performance assessment methodologies, quality assurance programs, assumptions, and conclusions. Consequently, these activities are directly related to the CNWRA charter. In addition, skills needed to execute NRC responsibilities under the NDAA are very similar to the skills required to support other CNWRA charter programs. This experience will be directly

applicable to the safety evaluations of license applications and any associated adjudicatory process related to the back end of nuclear fuel cycle.

2 PROGRAM DESCRIPTION

This chapter of the operations plan summarizes the Center for Nuclear Waste Regulatory Analyses (CNWRA[®]) understanding of the U.S. Nuclear Regulatory Commission (NRC) responsibilities for reviewing non-high-level waste determinations under the Ronald W. Reagan National Defense Authorization Act of Fiscal Year 2005 (NDAA). It also provides an overview of the broad objectives of CNWRA technical assistance to support the Division of Waste Management and Environmental Protection.

Based on previous reviews of the first step in the process, the U.S. Department of Energy (DOE) submits its non-high-level waste determination accompanied by supporting documentation and a performance assessment, if necessary. The NRC and CNWRA staffs review the information, focusing on whether the assumptions, models, and conclusions DOE presents are focused on meeting the performance objectives in 10 CFR Part 61, Subpart C. In conducting the review, the NRC and CNWRA staffs transmit any requests for additional information to DOE. In its response to the requests for additional information, DOE provides stand-alone responses or revises the non-high-level waste determination. The NRC and CNWRA staffs review the revised determination and request for additional information responses and document their findings in a technical evaluation report. The reviews are conducted in a risk-informed, performance-based manner. In carrying out its responsibilities, the NRC staff ensure that stakeholders are appropriately informed of NRC processes and activities. DOE non-high-level waste determinations will be made publicly available, as will NRC requests for additional information and final technical evaluation reports.

As noted in Section 1.1, the NDAA identifies two areas of work not previously considered in NRC reviews of DOE non-high-level waste determinations:

- DOE must now consult with NRC on plans to dispose of non-high-level waste that exceeds Class C concentrations.
- NRC must, in coordination with the state, monitor DOE disposal actions to assess compliance and issue reports if NRC considers any disposal actions DOE takes to be not in compliance with the performance objectives.

In SECY-05-0073, the Division of Waste Management and Environmental Protection staff stated that consultation on disposal plans for waste that exceeds Class C concentrations will require review of onsite disposal facilities to determine whether the performance objectives of 10 CFR Part 61, Subpart C, will be met. This will include activities such as reviewing performance assessments for the disposal facilities and facility designs. Similar to the review of the DOE non-high-level waste determination, the performance assessment review will be conducted through review of other DOE submittals, development of requests for additional information, and documentation of the review in a technical evaluation report.

As outlined in SECY-05-0073, NRC also must monitor DOE compliance with the performance objectives of 10 CFR Part 61, Subpart C. If DOE is not in compliance with these performance objectives, then NRC will report its findings to DOE, Congress, and the affected state. To ensure monitoring is risk informed and performance based, the NRC and CNWRA staffs will focus on key attributes of the disposal facility that are important to meeting the performance objectives in 10 CFR Part 61, Subpart C, that were identified during the review and documented

in the technical evaluation report. NRC will develop a monitoring plan that addresses these key areas. For example, if the reducing conditions of the grout added to stabilize a tank are identified as important to performance, the monitoring phase may include activities such as evaluating DOE laboratory tests of the grout or evaluating the procurement and implementation records to ensure that reducing agents were added to the grout. NRC staff will conduct monitoring in coordination with the affected state. The Division of Waste Management and Environmental Protection staff may reevaluate this monitoring process for efficiency.

To provide efficient and consistent reviews, the Division of Waste Management and Environmental Protection developed a non-high-level waste determination review guidance document for non-high-level waste determination reviews and monitoring that describes the information and process for conducting this work. This guidance document provides a consistent approach to be used for technical reviews. The guidance document also provides insight to DOE and other affected parties for the format and content of the non-high-level waste determinations. The draft guidance document was published for public review and comment in May 2006, and the final guidance document was completed in fiscal year 2007 as NRC Staff Guidance for Activities Related to U.S. Department of Energy Waste Determinations (NUREG-1854).

To assist in implementing this guidance, NRC has tasked CNWRA to provide the following technical assistance to the Division of Waste Management and Environmental Protection.

- Consultation on non-high-level waste determinations for the Savannah River Site
- Monitoring disposal actions at Savannah River Site
- Consultation on non-high-level waste determinations for Idaho National Laboratory
- Monitoring disposal actions at Idaho National Laboratory
- Generic topics and guidance on implementing the NRC NDAA responsibilities
- Enhancements to the biosphere model (BDOSE™) and related work
- Conduct of analyses to support non-high-level waste determinations

Section 3 of this operations plan discusses proposed activities in these task areas. As NRC identifies additional reviews, detailed task descriptions will be prepared and added to this operations plan.

3 TASK DESCRIPTIONS

The description for each task includes task-specific objectives, scope, technical approach, deliverables and schedule, and travel requirements. Center for Nuclear Waste Regulatory Analyses (CNWRA[®]) management and organizational structure are described for the overall program in Section 4.

One major objective of this work scope is to support the U.S. Nuclear Regulatory Commission (NRC) in fulfilling its responsibilities identified in the Ronald W. Reagan National Defense Authorization Act of Fiscal Year 2005 (NDAA) Section 3116. These responsibilities include (i) consulting with the U.S. Department of Energy (DOE) in the DOE non-high-level waste determination process and (ii) monitoring DOE disposal actions to assess compliance with Title 10 CFR Part 61, Subpart C, performance objectives after the Secretary of Energy determines that the waste is not high level. CNWRA technical activities and milestones will be (i) risk informed and performance based; (ii) integrated with NRC regulatory efforts (e.g., technical assistance provided in a particular subject area under the consultation task for a site could require immediate technical assistance for the same subject area in the monitoring task for the site, once the Secretary of Energy determines the waste is not high level); (iii) reactive to demanding DOE-driven schedules and changes; and (iv) transparent and traceable in terms of both quality assurance and fiscal perspectives. These CNWRA tasks will support NRC by providing reactive technical assistance on

- Consulting on non-high-level waste determinations for Savannah River Site (SRS). CNWRA will help the NRC staff perform their consultation responsibilities under the NDAA at the SRS (Task 1).
- Monitoring disposal actions at SRS. CNWRA will help NRC staff perform their monitoring responsibilities under the NDAA at the SRS (Task 2).
- Consulting on non-high-level waste determinations for Idaho National Laboratory (INL). CNWRA will help the NRC staff perform their consultation responsibilities under the NDAA at the INL (Task 3).
- Monitoring disposal actions at INL. CNWRA will help the NRC staff perform their monitoring responsibilities under the NDAA at INL (Task 4).
- Supporting investigation of generic topics and development of guidance on implementing the NRC NDAA responsibilities. CNWRA will help the NRC staff address generic topics that affect non-high-level waste determinations at both SRS and INL and help develop NRC staff guidance for implementing the NRC NDAA responsibilities (Task 5).

The second major objective of this work scope is to provide NRC with information and independent analyses that can be used to support the NRC responsibilities (consultation and monitoring) under the NDAA. The specific tasking includes

- Providing enhancements to the biosphere modeling capability (BDOSE) for use with GoldSim (a registered trademark of GoldSim Technology Group, LLC) performance assessment software and related work (Task 6)

- Evaluating potential bypassing of engineered barriers along preferential or fast pathways through cementitious waste forms and vault systems used for isolation and containment of radioactive wastes by conducting grout monolith experiments, and investigating sulfide contents of ground blast furnace slag necessary to maintain reducing conditions (Task 7)

The following sections provide more detailed discussion of the objectives, scope, and technical approaches to be used for each individual task. In executing this scope of work, reactive activities associated with reviews of DOE non-high-level waste determinations, monitoring activities, and generic guidance development (i.e., Tasks 1 and 2) will receive priority over proactive work related to developing independent modeling capabilities (Tasks 6 and 7).

3.1 Consultation on Waste Determinations for Savannah River Site

3.1.1 Objectives

The main objective under this task is for CNWRA to assist NRC with its consultation review responsibilities under the NDAA at SRS.

3.1.2 Scope

The following are examples of reactive support activities that CNWRA may be tasked to complete as part of an NDAA consultation document review (either a new or previously reviewed document).

- Participating in review team meetings. The CNWRA reviewers will summarize potential issues that are identified during his or her review. The meetings will focus on problem solving and integration. For example, individual reviewers will identify information needs or potential problem areas and share information with other team members to ensure that the entire team has a common understanding of both potential issues and positive aspects of the disposal facility.
- Reviewing DOE documents relevant to the CNWRA-assigned areas of review.
- Identifying DOE information that requires clarification.
- Identifying DOE information the reviewers need to complete or expedite the review.
- Providing written documentation, using the NRC-specified format, of information that needs to be clarified or received from DOE. The quality of input the CNWRA reviewer provides to the NRC lead will be “author-final” (i.e., ready for compilation and NRC concurrence).
- Helping NRC complete the joint document identifying clarification and information needs by reviewing the compiled inputs to ensure consistency between related sections, and provide comments to individuals the NRC review lead identifies.
- Checking NRC calculations used in developing either the review document or the document that identifies NRC clarification and information needs.
- Documenting the review using NRC-specified format. The quality of input the CNWRA reviewer provides to the NRC lead will be “author-final” (ready for compilation and NRC concurrence).
- Helping NRC complete the joint review document by reviewing the compiled inputs to ensure consistency between related sections and providing comments to appropriate individuals the NRC review lead identifies. Comments will be provided to the appropriate team members before any joint writing session.

- Participating in joint writing sessions. The joint writing sessions will focus on resolution of team members' document review comments. The goal for these meetings would be development of team products that are ready for technical editorial review and NRC concurrence review.
- Providing technical editing of NRC author-final products.
- Providing graphic arts and publication support for developing figures in review documents or materials for public meetings.
- Preparing and participating in meetings with DOE during the consultation process.
- Preparing and participating in public meetings on the NRC review process and review document.
- Helping develop briefing material for NRC management.
- Identifying key areas that will need to be monitored as part of the review process.
- Addressing practical issues that may need to be considered in developing a monitoring plan for the disposal actions as part of the identification process (e.g., evaluating whether an industry standard can be used as a basis for monitoring).

3.1.3 Technical Approach

CNWRA will perform the following activities to accomplish this task.

- Establishing early and frequent communication with NRC counterparts to coordinate NRC and CNWRA staff reviews.
- Working with the NRC task project officer to adhere to any NRC protocols for interaction with DOE and its contractors in reviewing DOE documents.
- Participating in visits to SRS with the NRC staff, if necessary, to further the understanding of DOE-proposed non-high-level waste determination and disposal activities.
- Working with the NRC task project officer to provide input to the NRC technical evaluation reports, and identify key parameters for monitoring the DOE disposal activities at SRS.
- Confirming that the work is approved and accurate (e.g., confirming accuracy of calculations in a non-high-level waste determination technical evaluation report) once the NRC task project officer acknowledges receipt of the information and confirms accuracy with the program element manager.

The approach used to date has been that NRC staff receive a document to review from DOE, with a review schedule agreed to between the two agencies, as part of the DOE non-high-level waste determination consultation process. The NRC program element manager determines

whether technical assistance from CNWRA is needed to complete the review. NRC staff develop a schedule for review completion that includes necessary intermediate steps (e.g., a date for providing a written document to DOE that contains information requests that, if DOE chooses to answer, will help staff complete its review; a date for the completed team review document to enter NRC concurrence). Staff conduct their risk-informed and performance-based review following NRC guidance (i.e., NUREG–1854). Staff may meet with DOE during the review to obtain clarification to ambiguous information or to provide a written document to DOE that contains questions that, if DOE answers, will help staff complete their review. The staff complete their technical review based on all the information DOE provides and documents the results of the staff review. Staff could present the results of its review in a public meeting, if requested. If appropriate, the information contained in the documented NRC staff review guides development of a monitoring plan for assessing compliance of DOE disposal actions with respect to the performance objectives (10 CFR Part 61, Subpart C).

For each new document received from DOE as part of the NDAA consultation process (such as a performance assessment or draft non-high-level waste determination), the NRC program element manager will determine whether technical assistance from CNWRA is needed. If assistance is needed, the NRC program element manager, in consultation with CNWRA (necessary to determine assignment of the CNWRA staff to the new task), will task CNWRA in writing. The NRC tasking transmission (electronic mail or letter) will include the NRC review schedule; identification of areas of required expertise; and identification of the types of reactive support required from CNWRA, including any editorial assistance. Because of the short review schedules that must be met, NRC requires that the CNWRA staff identified in the written tasking provide their input directly to the NRC task project officer via electronic mail or via the shared computer storage drive with an electronic mail notification rather than developing a separate deliverable. The NRC program element manager will be copied on the electronic mails so the timeliness of the individual CNWRA inputs can be tracked relative to the required dates on the NRC schedule. NRC staff expect each CNWRA technical staff member participating in the review to complete the relevant identified reactive support activities so that NRC staff can meet the required review schedule. The previous review process will allow NRC staff to complete a timely, technically sound, risk-informed, performance-based, and integrated (NRC and CNWRA) review document in an efficient and effective manner.

3.1.4 Deliverables and Schedule

The current understanding of fiscal year 2011 DOE NDAA non-high-level waste determination activities at SRS that could require NRC consultation, and thus may require assistance from CNWRA, includes a non-high-level waste determination (F-Area Tank Farm) that is scheduled to be submitted early in fiscal year 2011 for NRC review as part of the consultation process, and support for H-Area Tank Farm facility scoping meetings expected late in fiscal year 2011.

The reactive technical assistance provided to NRC on Task 1 will be documented in two deliverables, in combination with input from Tasks 2–5. (See Table 3-1 for the description of deliverables and the scheduled dates.) Each deliverable will identify the broad scope of reactive support provided, the specific inputs provided to NRC, the timeliness of individual input to NRC relative to the NRC-provided schedule, and outcomes of the CNWRA input for the preceding 6-month period. To assist in the transparency and traceability of the CNWRA technical assistance, if CNWRA contributed to a finalized NRC staff document, the finalized document will

Table 3-1. Deliverables for Tasks 1 and 2			
Deliverable Number	Title	Description	Schedule
14003.01.00X.500* (X will be 1, 2, 3, 4, and/or 5 based on reactive tasking actually received)	Summary of Technical Assistance	One letter report (few pages), which summarizes for Tasks 1 and 2 for the 6-month period the broad scope of reactive support provided, the specific inputs provided to NRC, the timeliness of individual input to NRC relative to the NRC-provided schedule, and outcomes of CNWRA input, if any, for each task.	Deliverable due at end of first 6-month period (~ March 30, 2011)
14003.01.00X.510*	Summary of Technical Assistance	One letter report (few pages), which summarizes for Tasks 1 and 2 for the 6-month period the broad scope of reactive support provided, the specific inputs provided to NRC, the timeliness of individual input to NRC relative to the NRC-provided schedule, and outcomes of CNWRA input, if any, for each task.	Deliverable due at end of second 6-month period (~ September 30, 2011)
*Intermediate milestone			

be identified by title and ADAMS accession number. Substantial CNWRA staff inputs to the finalized document will be identified (Table 3-1). Finalized NRC staff documents include publicly available documents such as a review of non-high-level waste determination documents, a compilation of questions that will assist completion of the NRC staff review, and materials provided to the public at an open meeting.

Deliverables will be transmitted via electronic mail with electronic attachments consistent with the word processor in use at NRC (Microsoft® Office® Word) or in portable document format (pdf), as appropriate. CNWRA will also provide one paper copy of each deliverable to the NRC

project officer, program element manager for this job code, and the relevant NRC task project officers.

3.1.5 Meetings and Travel

Table 3-2 presents the proposed travel for Task 1. In practice, travel to Aiken, South Carolina, or Rockville, Maryland, may be identified if DOE provides any non-high-level waste determinations for NRC review. Domestic travel related to this effort will require the prior approval by the NRC program element manager. If additional travel is required that increases cost, CNWRA will promptly notify the NRC contracting officer and program element manager.

To enhance integration and support the collaborative effort expected between the NRC and CNWRA staffs on these tasks, the NRC staff may participate in staff exchanges with CNWRA, subject to prior approval by NRC and CNWRA.

Table 3-2. Travel Requirements for Task 1				
Fiscal Year	No. of Trips	No. of Travelers	Trip Duration, Days	Purpose
2011	2	3	6	<u>Aiken, South Carolina</u>

3.2 Monitoring Disposal Actions at Savannah River Site

3.2.1 Objectives

The main objective of this task is for CNWRA to help the NRC staff perform their monitoring responsibilities under NDAA at SRS.

3.2.2 Scope

To assess compliance with performance objectives in 10 CFR Part 61, Subpart C, the NDAA requires NRC to monitor the DOE disposal actions. The NRC non-high-level waste determination evaluation for the Saltstone Facility identified key DOE model assumptions or parameters for the Saltstone Facility important to demonstrating compliance. The CNWRA staff will provide technical assistance to support the NRC monitoring responsibilities under the NDAA including assisting NRC with (i) evaluation of reports DOE–SRS prepared to assist NRC with its monitoring responsibilities (if relevant); (ii) development and review of NRC monitoring plans, onsite observation plans and reports, and other NRC-generated reports; (iii) coordination with the State of South Carolina Department of Health and Environmental Control on monitoring; (iv) participation in onsite observations during operations and postclosure (e.g., observation of engineered barrier construction and maintenance, sampling, and field and laboratory experiments); and (v) technical (including data) reviews (e.g., radiation records and environmental monitoring data or reports DOE submits to the state or NRC). The CNWRA staff also may be asked to help NRC inform appropriate parties of noncompliant conditions, as NDAA requires.

3.2.3 Technical Approach

In accomplishing this task, CNWRA may take some or all of the following actions, as agreed to by the NRC TPM.

- Establishing early and frequent communication with its NRC counterparts to coordinate the NRC and CNWRA staff reviews and monitoring activities, and identify clearly the scope of the CNWRA support for each of the following bullets
- Working with the NRC task project officer to adhere to any NRC-established protocols for interaction with DOE and its contractors in reviewing DOE documents
- Helping the NRC task project officer review reports DOE–SRS prepares
- Helping the NRC task project officer develop and review NRC-prepared monitoring plans and reports
- Helping the NRC task project officer coordinate monitoring activities with the State of South Carolina Department of Health and Environmental Control
- Participating in onsite observations with the NRC staff to observe disposal actions (e.g., observation of engineered barrier construction and maintenance, inventory or environmental sampling, and field and laboratory experiments)

- Helping NRC review monitoring data (e.g., radiation records and environmental monitoring data or reports DOE submitted to the state or NRC)
- Helping the NRC task project officer, as necessary, inform the relevant parties of noncompliant conditions

3.2.4 Deliverables and Schedule

The schedule of potential reactive support for Task 2, based on the current understanding of fiscal year 2011 DOE NDAA non-high-level waste determination activities, calls for NRC to monitor disposal actions at the Saltstone Facility. Support, which depends somewhat on the DOE disposal actions, began early in fiscal year 2010 and will be required throughout fiscal year 2011.

The reactive technical assistance provided to NRC on this task will be documented in two deliverables, in combination with input from Task 1. (See Table 3-1 for the description of deliverables and the scheduled dates.) Each deliverable will identify the broad scope of reactive support provided, the specific inputs provided to NRC staff, the timeliness of individual input to NRC staff relative to the NRC-provided schedule, and outcomes of CNWRA input for the preceding 6-month period. To assist in the transparency and traceability of the CNWRA assistance, if CNWRA contributed to a finalized NRC document, the finalized document will be identified by title and ADAMS accession number. Substantial CNWRA input to finalized documents will be identified (Table 3-1). Finalized NRC staff documents include publicly available documents such as a review of non-high-level waste determination documents, a compilation of questions that will assist completion of the NRC review, and materials provided to the public at an open meeting.

Deliverables will be transmitted via electronic mail with electronic attachments consistent with the word processor in use at NRC (Microsoft Office Word) or in portable document format (pdf), as appropriate. CNWRA also will provide one paper copy of each deliverable to the NRC project officer, program element manager for this job code, and the relevant NRC task project officer.

3.2.5 Meetings and Travel

Table 3-3 presents the proposed travel for Task 2.

Fiscal Year	No. of Trips	No. of Travelers	Trip Duration, Days	Purpose
2011	3	4	7	<u>Aiken, South Carolina</u> : Monitoring disposal actions at SRS

3.3 Consultation on Waste Determinations for Idaho National Laboratory

The current understanding of planned DOE NDAA non-high-level waste determination activities calls for no new DOE non-high-level waste determination for INL facilities in fiscal year 2011.

3.4 Monitoring Disposal Actions at Idaho National Laboratory

The current understanding of planned DOE NDAA non-high-level waste determination activities calls for no new DOE non-high-level waste determination for INL facilities in fiscal year 2011.

**3.5 Generic Topics and Guidance on Implementing the NRC
National Defense Authorization Act of Fiscal Year 2005
Responsibilities**

There are currently no plans for CNWRA effort in fiscal year 2011 under this Task 5.

3.6 Enhancements to the Biosphere Model (BDOSE) and Related Work

3.6.1 Objectives

The overall objective of this task is to provide NRC staff with an independent biosphere modeling tool to evaluate DOE performance assessments used to support the DOE waste determination reviews under the NDAA. In fiscal year 2007, CNWRA staff developed a biosphere dose model (BDOSE, Version 1.0) to be used in reviewing non-high-level waste determinations. In fiscal year 2008, the model was enhanced to produce BDOSE, Version 2.0. GoldSim was used to develop BDOSE because GoldSim is highly flexible, user friendly, and graphical. In fiscal years 2009 and 2010, sensitivity analyses were conducted using the BDOSE, Version 2.0 code to assess both wet and dry site conditions specific to the Savannah River Site. In fiscal year 2011, the objectives are to revise the sensitivity analysis conducted for the Savannah River Site in fiscal year 2010 and to produce a final report.

3.6.2 Scope

Work scope for fiscal year 2011 includes addressing NRC comments on the fiscal year 2010 sensitivity analysis report for the Savannah River Site. Based on the NRC comments, the 2010 sensitivity analysis report will be revised and a final report will be developed and transmitted to NRC.

3.6.3 Technical Approach

NDAA Section 3116 established a new role for NRC to review non-high-level waste determinations DOE prepared. These reviews evaluate whether DOE can demonstrate that the NDAA criteria and dose-based performance objectives in 10 CFR Part 61, Subpart C, can be met such that certain wastes at DOE sites in South Carolina and Idaho can be considered to be non-high-level waste. The NDAA also requires NRC to monitor the DOE disposal actions to assess compliance with the performance objectives. In addition to the NDAA non-high-level waste determination reviews, NRC is consulting with DOE to review waste-incident-to-reprocessing determinations DOE prepared for closing tanks and decommissioning activities at the Hanford Site in Washington and at the West Valley Demonstration Project Site in New York. Technical support is provided in these NRC reviews through other NRC projects.

In conducting the non-high-level waste determination and waste-incident-to-reprocessing reviews, NRC and CNWRA staffs use risk-informed, performance-based approaches to evaluate compliance with the appropriate performance objectives. One tool for conducting these evaluations is to apply computer simulations in a performance assessment that evaluates potential source terms, links the different contaminant fate and transport pathways, and assesses dose to an appropriate receptor based on reasonable scenarios. Because of the complexity of the operations and sites to be considered in the non-high-level waste and waste-incident-to-reprocessing reviews, sophisticated probabilistic models offer an effective means of identifying risk drivers and evaluating the potential uncertainties associated with the performance assessment. The GoldSim software tool developed by GoldSim Technology Group, LLC provides a flexible platform to link probabilistic modular simulators. GoldSim

includes user-friendly interfaces to facilitate parameter and data input and output. The software also provides the option to link external programs or models to the performance assessment.

The flexible and modular features of Goldsim are well suited to an iterative approach to the BDOSE model development work. This approach allows incremental refinements to be made to the model to improve existing or add new capabilities to meet NDAA program objectives. An important aspect of iterative performance assessment is conducting sensitivity analyses to analyze and document how model input parameters influence results. In fiscal year 2010, CNWRA conducted a sensitivity analysis using BDOSE for the Savannah River Site. Work scope for fiscal year 2011 includes addressing NRC comments on the Savannah River sensitivity analysis report and developing a final report.

CNWRA staff will revise the sensitivity analysis completed last fiscal year to address comments from NRC staff. This sensitivity analysis involved applying modern correlation statistics to evaluate a site specific revision to the scoping-level calculations that were prepared in fiscal years 2008 and 2009. The deliverable will be a revised report in the CNWRA technical series format. The CNWRA staff will consult with the NRC task project officer to establish agreement on the CNWRA staff approach to resolving comments including potential revisions to the analysis, scenarios evaluated, input parameters, and results presented. Based on feedback provided last fiscal year, a single site-specific parameter set will be evaluated that includes a wetter climate site that is applicable to the SRS site.

The CNWRA staff assigned to this task will have expertise in health physics and performance assessment, with particular familiarity with dose assessment, biosphere models, sensitivity analysis, and the GoldSim software. It is anticipated that CNWRA staff will perform most of the work, but consultants, subcontractors, or Southwest Research Institute® (SwRI®) staff determined to be free from potential conflict of interest may be assigned if this would more efficiently complete the assigned work. Staff also will be familiar with the performance objectives in 10 CFR Part 61, Subpart C, and relevant guidance documents (e.g., NUREG-1854, NUREG-1757, and NUREG-1573).

3.6.4 Deliverables and Schedule

Table 3-4 provides the schedule of deliverables identified for this task. As appropriate, the form and content for the deliverables will be based on outlines to which the NRC task project officer and the CNWRA principal investigator mutually concur. The CNWRA reports will be transmitted in hard copy and electronic form consistent with the word processing system in use at NRC, with copies provided in a portable document format (pdf), as appropriate. CNWRA also will provide one paper copy of each deliverable to the NRC project officer, program element manager for this job code, and the relevant NRC task project officers. In execution, it may be necessary to modify this schedule because of changes in DOE non-high-level waste determination schedules and programs that could affect demand for staff on other CNWRA tasks. Specific delivery dates will be determined in consultation with the NRC program element manager and will be documented in the SwRI Tracker System.

Table 3-4. Deliverables for Task 6			
Deliverable Number	Title	Deliverable Description	Delivery Date
14003.01.006.100	Final Biosphere Sensitivity Analysis Using BDOSE Version 2.0	Final version of the sensitivity analysis report that addresses NRC comments	TBD

3.6.5 Meetings and Travel

Teleconferences and video conferences will be conducted with the NRC staff as needed. There is no travel anticipated for this task. Any travel related to this effort will require prior approval by the NRC project element manager.

3.7 Conduct Analyses To Support Non-High-Level Waste Determinations

3.7.1 Objectives

The overall objective of this task is to provide NRC and CNWRA staffs with independent analyses with which to evaluate DOE non-high-level waste determinations and supporting performance assessments.

3.7.2 Scope

CNWRA staff will evaluate potential bypassing of engineered barriers along preferential or fast pathways through cementitious waste forms and vault systems used for isolation and containment of radioactive wastes. The degree to which sulfide contents of ground blast-furnace slag maintain reducing conditions and thereby diminish release of redox-sensitive radionuclides will be investigated.

3.7.3 Technical Approach

3.7.3.1 Subtask 1: Grout Test Bed

Work under this subtask will improve understanding of potential fast pathways that may go through and bypass barriers to radionuclide migration from large, cementitious grout-filled tanks and vaults. The work will build on the experience and insights developed from the mesoscale grout experiments performed during fiscal year 2009 and the intermediate-scale grout monolith constructed in fiscal year 2010 by conducting additional tests and experiments on the intermediate-scale grout monolith, and investigating factors affecting development of cracks. This subtask will consist of the following activities. In fiscal year 2011, work on Subtask 1.2 will be initiated only if funds are available after completing the other subtasks.

Subtask 1.1: Additional Core Sampling of Intermediate-Scale Grout Monolith

Additional core samples will be collected from the intermediate-scale grout monolith for visual inspection of cracks, lift interface properties, and vugs. These core samples will be collected using wet-coring techniques in an effort to obtain intact samples. Approximately five cores will be taken at locations selected to be representative of features such as plastic shrinkage cracks and flow structures observed on the grout surface. The core samples will be photographed, and a written core description prepared before archiving them for future reference and testing.

Subtask 1.2: Testing of Hydraulic Properties of Vertical Stress Fracture

The intermediate-scale grout monolith contains a vertical crack that has been interpreted as a mechanical stress crack. Pneumatic testing of a core hole penetrating the crack during fiscal year 2010 indicated the crack was highly permeable and its permeability beyond the range of the current pneumatic testing apparatus. A test plan will be developed to quantitatively measure the permeability of the crack using either pneumatic or hydraulic methods. Special testing and interpretation techniques will be required because of the significant lateral extent of flow in the fracture observed in preliminary tests during fiscal year 2010 and atmospheric upper boundary

condition. The complex nature of the resulting flow pattern will require using a numerical model to interpret test results. The test will be designed using the same numerical models of either gas or liquid flow that will be used to interpret the tests. This will facilitate evaluating the accuracy and precision of permeability estimates based on alternative test designs. The test design will consider the feasibility of performing a tracer test if funding is sufficient. Once an acceptable test design has been developed, the equipment needed to perform the test will be purchased or constructed and the test performed.

Subtask 1.3: Nondestructive Testing of Grout Bond

Nondestructive evaluation (NDE) methods will be used to determine whether voids are present between the grout in the intermediate-scale grout monolith and the walls of the tank. The most likely NDE method will be ultrasonic testing, but other methods will be evaluated.

Subtask 1.4: Grout Surface Crack Characterization

The surface of the intermediate-scale grout monolith displays multiple cracks ranging from large-aperture plastic shrinkage cracks to relatively small-aperture stress cracks. These cracks will be characterized by mapping their locations in a local coordinate system, measuring their aperture at discrete locations, and probing their depth, to the extent possible. Crack distribution and properties will be summarized as a map showing crack locations, tables and graphs of cracks per unit area, and statistical distribution of crack apertures and depths.

Subtask 1.5: Evaluation of Factors Affecting Crack Formation

As funding permits, future studies will be designed to investigate the key factors affecting the formation of plastic shrinkage and stress cracks in grout monoliths. The designs may include additional intermediate-scale physical experiments. Numerical modeling will support design of these experiments and their interpretation.

Subtask 1.6: Letter Report

The results of the subtasks will be provided to NRC in the form of a letter report.

3.7.3.2 Subtask 2: Longevity of Reducing Conditions in DOE Tank Grouts for Radioactive Waste Disposal

Subtask 2 will continue to investigate the characteristics and maintenance of reducing conditions in tank grouts that mitigate the release of redox-sensitive radionuclides such as Tc-99. Sulfur is released from sulfide minerals in blast furnace slag into the grout pore fluid during slag hydration predominantly as S^{2-} species. The released sulfur imposes a strongly reducing condition on the system and chemically binds several contaminants as insoluble species. However, the degree to which the sulfide in the slag can be relied on to maintain a reducing condition in the tank grouts for the long period relevant to radioactive waste disposal is not well understood.

This task will build on experimental work conducted in fiscal year 2010 that studied technetium leaching from a simulated saltstone waste form. The laboratory experiment initiated in fiscal year 2010 will be continued to provide long-term data on the evolution of system chemistry and

technetium release from the simulated saltstone waste form. Additional laboratory experiments will be initiated to study the effects of various environmental, system (e.g., flow regime), and material composition variables on waste release from grouted waste forms. These experiments will generate leaching data on technetium and/or selenium using column and/or batch methods.

Before starting new laboratory experiments, CNWRA will collect and consolidate literature information, perform calculations, and/or conduct waste release modeling to help optimize experimental design (e.g., flow rate, column length, particle size, etc.) and facilitate interpretation of experimental results (e.g., shape of break-through curves under various release mechanisms). An experimental plan will be transmitted informally to NRC for review prior to conducting the laboratory experiments. NRC staff may assist if time permits in conducting the experiments and in data analysis.

Key outputs from this subtask include information on constituent release rates and associated parameters (e.g., diffusion coefficients and solubility limits), chemical transitions over time, and applicability of different waste release models under various system/flow regimes. The information will support parameterizing performance assessment models and scaling information to real systems under various chemical/physical states over time.

3.7.4 Deliverables and Schedule

Deliverables will be transmitted via email with electronic attachments consistent with the word processor in use at NRC (Microsoft Office Word) or in portable document format (pdf), as appropriate. CNWRA staff will also provide one paper copy of each deliverable to the NRC project officer, program element manager for this job code, and the relevant NRC task project officers. The schedule of deliverables for work for each subtask is outlined in Table 3-6.

Deliverable Number	Title	Deliverable Description	Delivery Date
14003.01.007.440	Status and Results from Intermediate-Scale Grout Tests	Draft letter report on results of subtasks	June 3, 2011
14003.01.007.445	Status and Results from Intermediate-Scale Grout Tests	Final letter report on results of subtasks	8 weeks after receipt of final NRC comments on draft report
14003.01.007.470	Technetium and Selenium Release Experiments	Draft status report on technetium and selenium release mechanism experiments	August 31, 2011
14003.01.007.475	Technetium and Selenium Release Experiments	Final status report on technetium and selenium release mechanism experiments	8 weeks after receipt of final NRC comments on draft report

3.7.5 Meetings and Travel

Travel related to this effort requires prior approval by the NRC program element manager. To enhance integration and support the collaborative effort expected between NRC and CNWRA staffs on this task, staff exchanges may occur, subject to prior NRC and CNWRA approval. No travel currently is planned for this task.

4 MANAGEMENT AND ORGANIZATION

In 1987, the Center for Nuclear Waste Regulatory Analyses (CNWRA[®]) was established as a U.S. Nuclear Regulatory Commission (NRC)-sponsored federally funded research and development center, identified within Southwest Research Institute[®] (SwRI[®]) as Division 20. In 2005, with NRC approval, Division 20 was reorganized as the Geosciences and Engineering Division and a separate Department of Earth, Material, and Planetary Sciences was formed. CNWRA remains a separate business entity and forms an autonomous department within SwRI Division 20. The CNWRA president reports directly to the vice president of the Geosciences and Engineering Division. In turn, the division vice president reports to the SwRI president, who provides general direction to and broad oversight of the CNWRA operations and monitors all aspects of its performance (Figure 4-1). Because CNWRA staff will manage and conduct the activities in this operations plan, the following sections focus on the management and organizational structure of CNWRA.

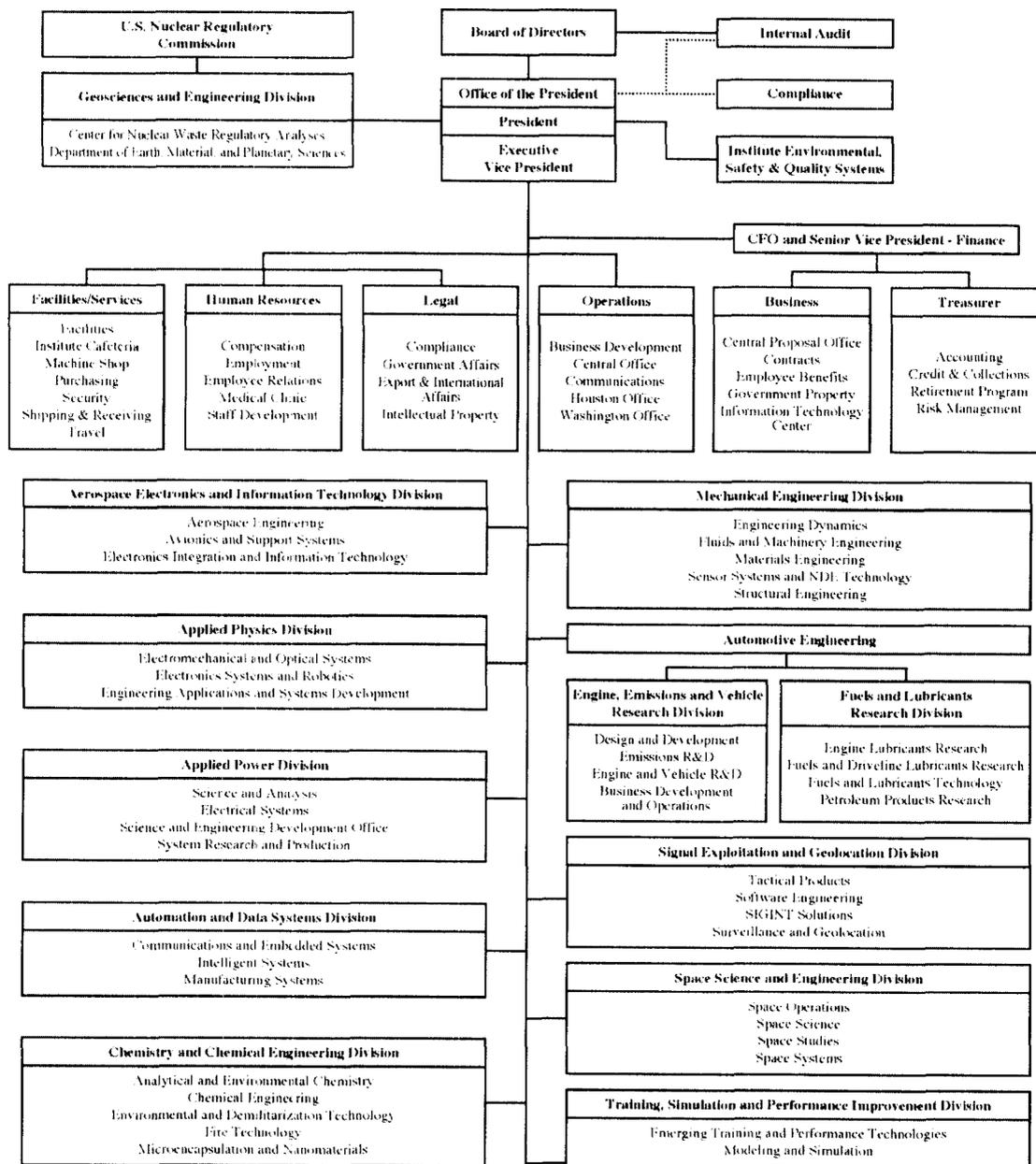
4.1 Organizational Structure and Responsibilities

CNWRA deploys its personnel in a matrix management approach. Staff members are located in specific elements of the line organization but are assigned in a matrix fashion to work on the various projects and tasks CNWRA undertakes on behalf of NRC and other clients (Figure 4-2). This matrix approach provides maximum flexibility for conducting the diverse scope of work within the resource and schedule constraints of the various projects and tasks. CNWRA has used this structure for a number of clients during times of major programmatic change, and the structure has demonstrated our ability to provide highly responsive and effective application of personnel to accomplish assigned scopes of work.

Although CNWRA can accommodate various modes of interactions with a particular client based on the character of the work and the needs and interests of that client, a ladder of communication is generally advocated. Table 4-1 defines a proposed ladder of communication for the National Defense Authorization Act non-high-level waste determination project. Although not intended to restrict other avenues of communication, the ladder identifies the minimum appropriate points of contact to facilitate effective implementation of contractual provisions and to ensure technical direction, product reviews, and concerns are brought to the attention of the appropriate individuals within each organization.

The basis for management control of all projects CNWRA undertakes is a set of technical, cost and schedule, and quality objectives that are established in general terms in the NRC-approved CNWRA Management Plan. Once approved, the content of this operations plan will establish specific technical, cost and schedule, and quality baselines. Management controls currently in place will also be applied to this project to ensure conformance to project-specific baselines. Adherence to technical scope and quality baselines will be addressed through ongoing interactions with NRC and between the CNWRA management and staff. As discussed in Section 4.4, the NRC-approved quality assurance program will ensure that all products delivered to NRC under this contract have received appropriate technical, programmatic, and quality assurance reviews in accordance with Quality Assurance Procedure (QAP)-002, Review of the Documents, Reports, and Papers. The CNWRA management will monitor deliverable

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September 25, 2010

Figure 5-1. Organization of SwRI and Relationship With CNWRA

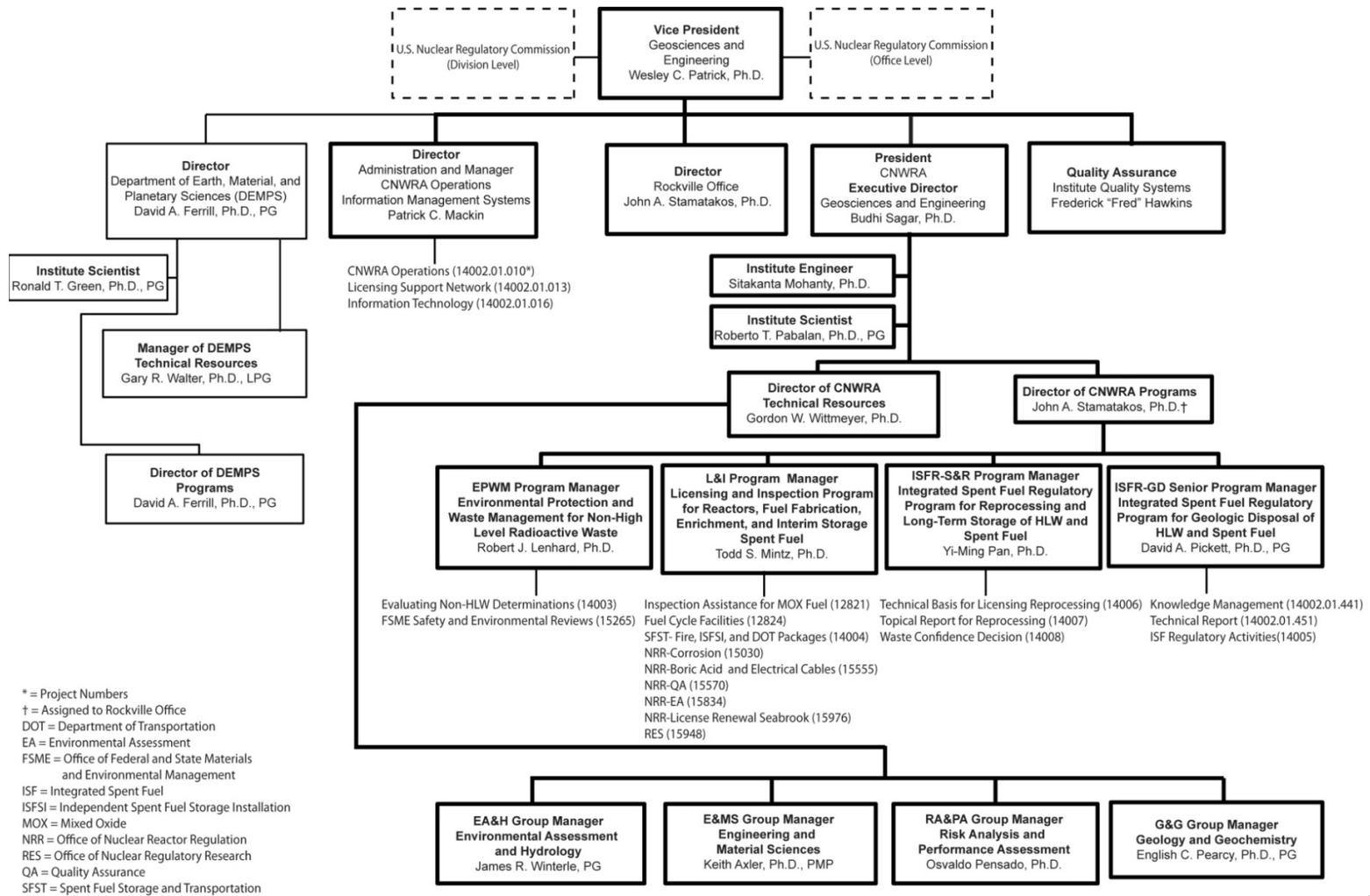


Figure 5-2. Organization of GED and CNWRA

Table 4-1. Proposed Ladder of Communication for the Non-High-Level Waste Determination Project	
NRC Point of Contact	CNWRA Counterpart
Director, Division of Waste Management and Environmental Protection	President
Deputy Director, Division of Waste Management and Environmental Protection/Environmental and Performance Assessment Directorate	Director—Rockville Office and Environmental Program
Contracting Officer, NRC	Director of Administration
Project Officer, Program Planning/Budgeting and Program Staff	Project Manager
Program Element Manager, Division of Waste Management and Environmental Protection/Environmental and Performance Assessment Directorate	Project Manager
Task Project Officer, Division of Waste Management and Environmental Protection/Environmental and Performance Assessment Directorate	Principal Investigator

schedules weekly using the SwRI Tracker System. Costs will be evaluated at the task level biweekly and addressed in detail every 4 weeks. Significant variances between planned and actual costs will be reported to NRC in the Program Manager's Periodic Report and discussed with the appropriate staff. Progress toward completing deliverables will be tracked, technical topics will be discussed, and problems will be identified in the Program Manager's Periodic Report for each task. CNWRA will address changes in the scope of work—either directed by NRC or necessary because of cost variances—in accordance with Administrative Procedure (AP)–009, Work Authorization and Control. These techniques have proven effective for avoiding cost growth in previous NRC work assignments.

Details about management and organization are provided in the CNWRA Management Plan. A current version is available from the NRC contracting officer. Lessons learned from ongoing operations, input received from management oversight groups, changes in staffing requirements, and suggestions for improving the organizational structure are evaluated and incorporated annually in revisions to the CNWRA Management Plan.

4.2 Staffing and Key Personnel

4.2.1 Staffing and Management

The CNWRA staff assigned for this task will have expertise and experience in regulatory analyses, quality assurance, health physics, materials engineering, performance assessment, hydrogeology, chemical engineering, geographic information systems, and geochemistry. The

CNWRA staff selected to review the documents will be familiar with tank waste chemistry issues, cementitious materials, performance assessment, and waste classification criteria. Participants also will have an understanding of the NRC regulatory process.

Dr. Robert Lenhard (Program Manager, CNWRA) will serve as project manager for all tasks. He will be responsible for ensuring all work is within scope and cost. He will be in frequent contact with the NRC project officer and project element manager either by telephone or in person through visits to the NRC headquarters. Mr. Lane Howard (nuclear engineering and health physics) will serve as principal investigator for Tasks 1 and 2, and Mr. Pat LaPlante (environmental science and health physics) will serve as principal investigator for Task 6. Dr. Roberto Pabalan (geochemistry and physical chemistry) will serve as principal investigator for Task 7. The CNWRA principal investigators will coordinate input and supporting reviews by the staff to ensure that all deliverables are completed on schedule. Specific members of the team for this project include Mr. Donald Bannon (Engineering Technologist), Dr. Cynthia Dinwiddie (geohydrology), Dr. Donald Hooper (volcanology), Mr. Patrick LaPlante (environmental science and health physics), Dr. Marius Necsoiu (code analyst), Dr. Roberto Pabalan (geochemistry), Dr. Osvaldo Pensado (performance assessment), Dr. Xihua He (corrosion), Dr. David Pickett (radiochemistry), Dr. Stuart Stothoff (hydrology), Dr. Ronald Green (hydrology), and Dr. Gary Walter (geohydrology). Other staff with specific expertise may be used as required by the applicable task request. In addition, because it may be necessary to review different facilities concurrently, other staff with comparable expertise may be used to balance the work load. Dr. John Stamatakos (Director of CNWRA Programs) and Dr. Budhi Sagar (CNWRA President) will provide management oversight.

Staff resources and direct costs are presented in the associated spending and labor plans in Volume II of this operations plan. Staff resources are expected to be allocated among the broad discipline areas previously identified, with remaining hours provided for support, internal reviews, and management oversight. Additionally, for those areas of expertise beyond the core staff of CNWRA, consultants, subcontractors, or SwRI staff with appropriate experience will supplement the existing CNWRA expertise to ensure the highest quality product and avoid the necessity of hiring permanent staff. Before work on a specific task begins, all identified CNWRA staff, consultants, subcontractors, and SwRI staff will be screened for potential conflicts of interest in accordance with applicable procedures.

CNWRA will maintain effective communications with the NRC program element manager and other NRC staff. As needed, the CNWRA staff participating in this task will be available for teleconferences, videoconferences, or face-to-face meetings. Communications necessary to support the technical activities in this task will be coordinated with the NRC program element manager. Financial and technical status reports for this task will be provided to NRC for each 4-week period.

To assist in the transparency and traceability of the CNWRA assistance, if CNWRA contributed to a finalized NRC document, the finalized document will be attached to the appropriate deliverable. Finalized NRC documents include publicly available documents such as a review of non-high-level waste determination documents, a compilation of questions that will assist completion of the NRC review, and materials provided to the public at a public meeting. CNWRA will coordinate as necessary with the NRC program element manager to control the availability of nonpublic NRC documents. NRC documents that are nonpublic but provided to DOE as part of the DOE non-high-level waste determination consultation process may be

considered for use in finalized documents, based on the most current agreements between DOE and NRC and discussions with the NRC program element manager. In these cases, the nonpublic document will be incorporated into the quality assurance records associated with the appropriate deliverable.

Each person assigned to work on the proposed environmental review project will be carefully selected to ensure NRC receives the highest possible value and quality products. Key personnel include the following.

- Robert Lenhard. Dr. Lenhard is a vadose zone hydrologist who will serve as project manager for the non-high-level waste determination project. In this capacity, he will be fully responsible for all technical, schedule, cost, and quality aspects of the project. As a principal investigator and project manager for other NRC activities at CNWRA, he has many years of experience managing scope and schedule. He will report directly to Dr. Stamatakos to ensure the effective allocation of resources and assignment of appropriate priority to the tasks. Dr. Lenhard will have authority to arrange meetings with the NRC task project officers. He also will be responsible for coordinating technical and programmatic input and ensuring that reviews are completed to meet deliverable schedules on Tasks 1–7.
- Lane Howard. Mr. Howard is a principal engineer in the Risk Analysis and Performance Assessment group. Mr. Howard has previous experience as principal investigator for non-high-level waste determinations at Idaho National Laboratory and Savannah River Site. As a principal investigator for other NRC activities at CNWRA, he has many years of experience managing scope and schedule. Mr. Howard will be the principal investigator for Tasks 1 and 2.
- Pat LaPlante. Mr. LaPlante is a staff scientist in the Environmental Assessment and Hydrology group. He is an environmental scientist with expertise in environmental impact assessment, risk analysis, biosphere pathway and dose modeling, health physics, statistics, and environmental models used in radiological safety assessments. Mr. LaPlante has developed and tested environmental modeling software, has executed a variety of environmental models, and has applied his knowledge of statistics to conducting uncertainty and sensitivity analyses. His in-depth knowledge has been applied to supporting licensing reviews, developing safety regulations, and drafting regulatory guidance. Mr. LaPlante will be the principal investigator for Task 6.
- Roberto T. Pabalan. Dr. Pabalan has a broad background in geology, geochemistry, and physical chemistry, with expertise in a variety of experimental, analytical, and computer simulation methods. He has contributed to advancing the understanding of geochemical processes relevant to geologic and near-surface disposal of low- to high-level nuclear wastes. He has applied various techniques to study radionuclide sorption and transport, including batch sorption experiments, surface-complexation models, atomic-level molecular simulations, and synchrotron-based x-ray absorption spectroscopy. Dr. Pabalan has developed computer codes and exercised commercial software to evaluate the evolution of the chemical environment surrounding metallic waste packages containing high-level nuclear wastes. He also has evaluated potential safety issues in the pretreatment and disposal of radioactive tank wastes. Other investigations Dr. Pabalan conducted include natural and surfactant-modified zeolite

ion-exchange equilibria, degradation of cement-based materials, and assessments of the explosive hazard potential of metal azides. Dr. Pabalan will be the principal investigator for Task 7.

Additional key personnel will be identified as specific tasks are defined. During the execution of the proposed scope of work, the project manager is expected to broadly employ the CNWRA staff with the appropriate skills. Any assigned individuals will be selected based on their education and experience relative to the work scope and will work under the direction of the project manager or the principal investigator.

4.2.2 Consultants and Subcontractors

Specialized skills may occasionally be needed to ensure that all critical aspects of the review and monitoring tasks are addressed. When these cases arise, CNWRA will augment its core staff to the extent appropriate with other skilled staff. Sources will include other divisions of SwRI, independent consultants, and subcontractors. When required, subcontracts will be established in accordance with AP-001, Source Selection and Evaluation, and applicable SwRI Operating Policies and Procedures. The NRC contracting officer has a current version of applicable procedures available for inspection. Selection and assignment of subcontractors to specific activities will be based on consideration of technical expertise, availability in the context of the schedule and priority of work, and freedom from potential conflict of interest for the assigned scope of work. Once assigned, the subcontractor(s) will report to the CNWRA project manager or principal investigator, as appropriate. Required consultant agreements will be established in a similar manner. Selection and assignment of particular individuals will be based on consideration of technical expertise, availability in the context of the schedule and priority of the work, and freedom from potential conflict of interest for the assigned scope of work. Once assigned, the consultant(s) will report to the CNWRA project manager or principal investigator, as appropriate.

4.3 Support Facilities and Services

A wide range of SwRI administrative and technical support services is available on a regular or as-needed basis to help CNWRA conduct this project. These services include, but are not limited to

- Human Resources Department services, including recruiting and hiring core staff and securing consultants and subcontractors
- Institute Quality Systems Department services, including annual oversight review concerning the implementation of CNWRA quality assurance requirements
- Legal counsel and general administrative service, including payroll, employee benefits, internal auditing, accounting, financial data systems, contracts, purchasing, inventory control, and mail collection and distribution
- Physical and information security, including protection of classified, predecisional, and company confidential materials, and an electronic communications firewall
- Safety, health, and fire protection, including radiological health and safety

- Professional support services, including library, photographic laboratory, machine shop, publication services, telecommunication and videoconferencing, and computer systems
- Communications Department, including editorial services, and assistance in public affairs matters in accordance with AP-004, Public, Media, Organizational, and Congressional Inquiries
- Access to all SwRI facilities, including laboratories, equipment, buildings, and other physical assets, as required

A CNWRA statement of qualifications is available for the NRC staff to review in the Division of High-Level Waste Repository Safety. The statement of qualifications contains information regarding the CNWRA staff expertise and experience, facilities, and equipment. Scientific and engineering areas of special competency are also described in the statement of qualifications.

4.4 Quality Assurance

Implementation of an appropriate quality assurance program is important to the successful accomplishment of the technical and programmatic objectives of the proposed change. The Geosciences and Engineering Division has established a Quality Assurance Manual that describes and implements a program designed to be compliant with applicable NRC regulations. The Quality Assurance Manual, associated quality assurance procedures, technical operating procedures, and administrative procedures comprise the policy and implementation components of the quality assurance program that will provide confidence in the results of the CNWRA work conducted under this operations plan. The NRC contracting officer maintains copies of these documents.

Quality assurance will be implemented by applying the criteria set forth in the Quality Assurance Manual. Procedures governing reviews of CNWRA documents are contained in QAP-002, Review of Documents, Reports and Papers, and results of reviews are maintained as quality assurance records. The requirement and rationale for NRC-requested revisions and associated scope of changes will be documented in technical direction from NRC to CNWRA and in CNWRA transmittal letters to NRC that will accompany revised documents.

Existing computer programs that have been verified and have precedent of use by NRC will be used whenever possible to perform any computer-generated calculations required in the course of the change. The CNWRA project manager will inform the NRC project element manager of the names and version numbers of computer programs that will be used. Computer codes will be controlled in accordance with Technical Operating Procedure (TOP)-018, Development and Control of Scientific and Engineering Software. QAP-014, Documentation and Verification of Scientific and Engineering Calculations, will be applied to the appropriate project activities, including specification of responsibilities of document technical reviewers for verifying calculations. Other procedures will be used to control technical studies as appropriate.

4.5 Management Oversight and Controls

SwRI will use three principal means to provide management oversight of the CNWRA performance on the proposed contract. The vice president of the Geosciences and Engineering Division, Dr. Wesley Patrick, provides primary management oversight for overall CNWRA performance. This responsibility is executed by frequent meetings with the CNWRA president, regularly scheduled meetings with the SwRI president and other SwRI vice presidents, frequent informal communication, and periodic formal reviews of CNWRA. In addition, the SwRI Quality Systems Department reports directly to the SwRI president and gives management oversight in quality-related matters. The CNWRA Advisory Board provides management oversight independent of SwRI. This board, which advises the SwRI and CNWRA presidents and division vice president, is composed of recognized leaders from industry, government, and academia.

In addition, it is anticipated that NRC will provide three sources of oversight, control, and evaluation. The NRC program element manager and staff supply the first in accordance with provisions of NRC Contract No. NRC 02-07-006. The second, provided by the NRC Center Review Group, will continue to monitor and appraise the overall performance of CNWRA. This includes assessment of the CNWRA ability to fully satisfy requirements of the NRC high-level waste contract and work for others, including the proposed contract. The third is the evaluation of individual products and deliverables supplied to NRC under the proposed contract and compliance with cost and schedule baselines that the NRC program element manager and other appropriate NRC technical staff ascertain on an ongoing basis.

SPENDING AND LABOR PLANS

SPENDING AND LABOR PLANS

Cost estimates for technical assistance to the Division of Waste Management and Environmental Protection are provided on the basis of thirteen 4-week periods per fiscal year. Planned expenditures are summarized for each task. Estimated labor requirements are also provided.

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14003.01.000 Technical Assistance in Evaluating Non-HLW Determinations for the U.S. DOE in South Carolina and Idaho

	PD 1	PD 2	PD 3	PD 4	PD 5	PD 6	PD 7	PD 8	PD 9	PD 10	PD 11	PD 12	PD 13	Total
Center PI-4	4,665	4,665	4,665	6,561	7,712	7,228	4,570	4,380	4,475	4,665	2,952	3,237	2,856	62,632
Center PI-3	4,649	4,649	4,649	5,944	3,354	3,531	2,472	2,648	2,589	2,531	1,648	1,707	1,883	42,255
Center PI-2	348	348	348	608	565	608	304	348	304	348	304	348	304	5,084
Center PI-1	1,016	1,016	983	819	655	655	655	721	688	623	459	459	360	9,110
Center Tech	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Center Clerical	1,050	1,050	1,050	1,533	945	966	588	567	609	588	546	567	567	10,626
Center Labor	11,728	11,728	11,695	15,466	13,232	12,989	8,589	8,663	8,666	8,754	5,908	6,317	5,971	129,707
Center Burden	5,747	5,747	5,731	7,578	6,484	6,364	4,209	4,245	4,246	4,290	2,895	3,095	2,926	63,556
Center Overhead	12,057	12,057	12,023	15,900	13,604	13,354	8,831	8,907	8,909	9,000	6,074	6,495	6,139	133,350
Total Center Labor	29,532	29,532	29,449	38,945	33,319	32,707	21,629	21,815	21,821	22,044	14,878	15,907	15,036	326,613
SwRI PI-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI PI-3	1,471	1,471	1,471	2,589	2,531	2,589	2,589	2,707	2,354	2,707	1,236	1,236	1,177	26,129
SwRI PI-2	1,086	1,086	1,086	0	0	0	0	0	0	0	0	0	0	3,258
SwRI PI-1	471	471	471	0	0	0	0	0	0	0	0	0	0	1,413
SwRI Tech	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI Clerical	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI Labor	3,029	3,029	3,029	2,589	2,531	2,589	2,589	2,707	2,354	2,707	1,236	1,236	1,177	30,803
SwRI Burden	1,484	1,484	1,484	1,269	1,240	1,269	1,269	1,326	1,153	1,326	606	606	577	15,092
SwRI Overhead	3,457	3,457	3,458	2,662	2,602	2,662	2,662	2,783	2,420	2,783	1,271	1,271	1,210	32,699
Total SwRI Labor	7,970	7,970	7,971	6,520	6,372	6,520	6,520	6,817	5,928	6,817	3,112	3,112	2,964	78,594
Materials and Supplies	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subcontracting	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Machine Shop Services	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Quality Assurance	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Services	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Travel	4,419	4,419	4,419	4,393	4,391	4,393	3,001	3,003	3,001	3,003	3,001	3,003	3,001	47,447
Consultants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Communications	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cler Premium Pay	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Adjustments	0	0	(7,096)	0	0	0	0	0	0	0	0	0	0	(7,096)
												0		
Est excl. CFC, Fee	41,921	41,921	34,573	49,858	44,082	43,620	31,150	31,635	30,749	31,863	20,991	22,022	21,001	445,387
Center CFC	552	552	551	698	609	602	432	439	426	443	276	292	276	6,147
SwRI CFC	53	53	53	0	0	0	0	0	0	0	0	0	0	160
Tot Estimate Cost	42,526	42,526	35,178	50,556	44,691	44,222	31,582	32,075	31,175	32,306	21,267	22,314	21,277	451,695
Fee	4,192	4,192	3,457	4,986	4,408	4,362	3,115	3,164	3,075	3,186	2,099	2,202	2,100	44,539
Tot Cost with Fee	46,719	46,719	38,635	55,541	49,099	48,584	34,697	35,238	34,250	35,493	23,366	24,516	23,377	496,233
% Completion	9.41%	9.41%	7.79%	11.19%	9.89%	9.79%	6.99%	7.10%	6.90%	7.15%	4.71%	4.94%	4.71%	100.00%
Cumulative Cost	46,719	93,437	132,072	187,614	236,713	285,297	319,994	355,232	389,482	424,975	448,340	472,857	496,233	
Cumul Completion	9.41%	18.83%	26.61%	37.81%	47.70%	57.49%	64.48%	71.59%	78.49%	85.64%	90.35%	95.29%	100.00%	

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Center Labor	PD 1	PD 2	PD 3	PD 4	PD 5	PD 6	PD 7	PD 8	PD 9	PD 10	PD 11	PD 12	PD 13	Total
Center PI-4	53	53	53	69	81	76	48	46	47	49	31	34	30	670
Center PI-3	75	75	72	101	57	60	42	45	44	43	28	29	32	703
Center PI-2	8	8	8	14	13	14	7	8	7	8	7	8	7	117
Center PI-1	31	31	30	25	20	20	20	22	21	19	14	14	11	278
Center Technical	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Center Clerical	50	50	50	73	45	46	28	27	29	28	26	27	27	506
Total Center Labor	217	217	213	282	216	216	145	148	148	147	106	112	107	2,274

SwRI Labor	PD 1	PD 2	PD 3	PD 4	PD 5	PD 6	PD 7	PD 8	PD 9	PD 10	PD 11	PD 12	PD 13	Total
SwRI PI-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI PI-3	50	50	50	44	43	44	44	46	40	46	21	21	20	519
SwRI PI-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI PI-1	15	15	15	0	0	0	0	0	0	0	0	0	0	45
SwRI Tech	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI Clerical	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total SwRI Labor	65	65	65	44	43	44	44	46	40	46	21	21	20	564

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14003.01.002 Monitoring Disposal Actions at Savannah River Site

	PD 1	PD 2	PD 3	PD 4	PD 5	PD 6	PD 7	PD 8	PD 9	PD 10	PD 11	PD 12	PD 13	Total
Center PI-4	1,143	1,143	1,143	1,714	1,809	1,809	1,714	1,809	1,714	1,809	1,523	1,809	1,523	20,661
Center PI-3	471	471	471	589	530	530	471	530	471	530	471	530	471	6,532
Center PI-2	174	174	174	348	304	348	304	348	304	348	304	348	304	3,780
Center PI-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Center Tech	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Center Clerical	399	399	399	462	420	441	420	441	420	441	399	441	399	5,481
Center Labor	2,186	2,186	2,186	3,112	3,063	3,127	2,909	3,127	2,909	3,127	2,697	3,127	2,697	36,454
Center Burden	1,071	1,071	1,071	1,525	1,501	1,532	1,425	1,532	1,425	1,532	1,322	1,532	1,322	17,863
Center Overhead	2,248	2,248	2,248	3,199	3,149	3,215	2,990	3,215	2,990	3,215	2,773	3,215	2,773	37,478
SwRI PI-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI PI-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI PI-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI PI-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI Tech	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI Clerical	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI Labor	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI Burden	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI Overhead	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Materials and Supplies	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subcontracting	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Machine Shop Services	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Quality Assurance	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Services	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Travel	2,551	2,551	2,551	2,552	2,551	2,552	2,551	2,552	2,551	2,552	2,551	2,552	2,551	33,168
Consultants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Communications	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Premium Pay	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Adjustments	0	0	(21,550)	0	0	0	0	0	0	0	0	0	0	(21,550)
Est excl. CFC, Fee	8,056	8,056	(13,664)	10,388	10,263	10,427	9,875	10,427	9,875	10,427	9,343	10,427	9,343	103,243
Center CFC	84	84	84	120	118	121	112	121	112	121	104	121	104	1,408
SwRI CFC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tot Estimate Cost	8,140	8,140	(13,580)	10,508	10,382	10,548	9,988	10,548	9,988	10,548	9,447	10,548	9,447	104,652
Fee	806	806	(1,366)	1,039	1,026	1,043	988	1,043	988	1,043	934	1,043	934	10,324
Tot Cost with Fee	8,946	8,946	(14,946)	11,547	11,408	11,590	10,975	11,590	10,975	11,590	10,382	11,590	10,382	114,976
% Completion	7.78%	7.78%	-13.00%	10.04%	9.92%	10.08%	9.55%	10.08%	9.55%	10.08%	9.03%	10.08%	9.03%	100.00%
Cumulative Cost	8,946	17,892	2,946	14,493	25,901	37,491	48,467	60,057	71,032	82,622	93,004	104,594	114,976	
Cumul Completion	7.78%	15.56%	2.56%	12.61%	22.53%	32.61%	42.15%	52.23%	61.78%	71.86%	80.89%	90.97%	100.00%	

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14003.01 007 Analyses to Support Non-HLW Determinations

	PD 1	PD 2	PD 3	PD 4	PD 5	PD 6	PD 7	PD 8	PD 9	PD 10	PD 11	PD 12	PD 13	Total
Center PI-4	2,571	2,571	2,571	2,952	2,952	2,666	2,856	2,571	2,761	2,856	1,428	1,428	1,333	31,515
Center PI-3	1,766	1,766	1,766	2,001	2,001	2,236	2,001	2,119	2,119	2,001	1,177	1,177	1,412	23,540
Center PI-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Center PI-1	623	623	623	655	655	655	655	721	688	623	459	459	360	7,799
Center Tech	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Center Clerical	168	168	168	168	147	147	168	126	189	147	147	126	168	2,037
Center Labor	5,127	5,127	5,127	5,776	5,755	5,705	5,681	5,536	5,757	5,627	3,211	3,190	3,274	64,891
Center Burden	2,512	2,512	2,512	2,830	2,820	2,795	2,783	2,713	2,821	2,757	1,573	1,563	1,604	31,796
Center Overhead	5,271	5,271	5,271	5,938	5,917	5,865	5,840	5,692	5,919	5,785	3,301	3,280	3,366	66,714
SwRI PI-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI PI-3	1,471	1,471	1,471	2,589	2,531	2,589	2,589	2,707	2,354	2,707	1,236	1,236	1,177	26,129
SwRI PI-2	1,086	1,086	1,086	0	0	0	0	0	0	0	0	0	0	3,258
SwRI PI-1	471	471	471	0	0	0	0	0	0	0	0	0	0	1,413
SwRI Tech	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI Clerical	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI Labor	3,029	3,029	3,029	2,589	2,531	2,589	2,589	2,707	2,354	2,707	1,236	1,236	1,177	30,803
SwRI Burden	1,484	1,484	1,484	1,269	1,240	1,269	1,269	1,326	1,153	1,326	606	606	577	15,092
SwRI Overhead	3,457	3,457	3,458	2,662	2,602	2,662	2,662	2,783	2,420	2,783	1,271	1,271	1,210	32,699
Materials and Supplies	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subcontracting	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Machine Shop Services	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Quality Assurance	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Services	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Travel	451	451	451	451	450	451	450	451	450	451	450	451	450	5,858
Consultants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Communications	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Premium Pay	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Adjustments	0	0	(47,400)	0	0	0	0	0	0	0	0	0	0	(47,400)
Est excl. CFC, Fee	21,331	21,331	(26,069)	21,515	21,313	21,336	21,275	21,208	20,874	21,437	11,647	11,596	11,658	200,452
Center CFC	297	297	297	323	320	320	320	318	313	322	172	171	172	3,642
SwRI CFC	53	53	53	0	0	0	0	0	0	0	0	0	0	160
Tot Estimate Cost	21,681	21,681	(25,718)	21,839	21,633	21,657	21,594	21,527	21,187	21,759	11,819	11,767	11,830	204,256
Fee	2,133	2,133	(2,607)	2,152	2,131	2,134	2,127	2,121	2,087	2,144	1,165	1,160	1,166	20,045
Tot Cost with Fee	23,814	23,814	(28,325)	23,990	23,765	23,790	23,722	23,648	23,275	23,902	12,984	12,926	12,995	224,300
% Completion	10.62%	10.62%	-12.63%	10.70%	10.60%	10.61%	10.58%	10.54%	10.38%	10.66%	5.79%	5.76%	5.79%	100.00%
Cumulative Cost	23,814	47,629	19,304	43,294	67,059	90,849	114,571	138,219	161,494	185,396	198,380	211,306	224,300	
Cumul Completion	10.62%	21.23%	8.61%	19.30%	29.90%	40.50%	51.08%	61.62%	72.00%	82.66%	88.44%	94.21%	100.00%	

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14003.01.007 Analyses to Support Non-HLW Determinations

Center Labor	PD 1	PD 2	PD 3	PD 4	PD 5	PD 6	PD 7	PD 8	PD 9	PD 10	PD 11	PD 12	PD 13	Total
Center PI-4	27	27	27	31	31	28	30	27	29	30	15	15	14	331
Center PI-3	30	30	30	34	34	38	34	36	36	34	20	20	24	400
Center PI-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Center PI-1	19	19	19	20	20	20	20	22	21	19	14	14	11	238
Center Technical	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Center Clerical	8	8	8	8	7	7	8	6	9	7	7	6	8	97
Total Center Labor	84	84	84	93	92	93	92	91	95	90	56	55	57	1,066

SwRI Labor	PD 1	PD 2	PD 3	PD 4	PD 5	PD 6	PD 7	PD 8	PD 9	PD 10	PD 11	PD 12	PD 13	Total
SwRI PI-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI PI-3	50	50	50	44	43	44	44	46	40	46	21	21	20	519
SwRI PI-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI PI-1	15	15	15	0	0	0	0	0	0	0	0	0	0	45
SwRI Tech	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SwRI ClericalTech	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total SwRI Labor	65	65	65	44	43	44	44	46	40	46	21	21	20	564