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Corrective Action Plan for INEL Low-Level Waste Management ES&H Vulnerabilities

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**Corrective Action Plan for INEL
Low-Level Waste Management ES&H Vulnerabilities**

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**Idaho National Engineering Laboratory
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Idaho Falls, Idaho 83415**

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ACRONYMS

ALARA	As Low As Reasonably Achievable
ATR	Advanced Test Reactor
ANL-W	Argonne National Laboratory-West
CAP	Corrective Action Plan
DNFSB	Defense Nuclear Facilities Safety Board
DOE-HQ	Department of Energy Headquarters
DOE-ID	Department of Energy Idaho Operations Office
EDF	Engineering Design File
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
GWMP	Groundwater Monitoring Plan
ICPP	Idaho Chemical Processing Plant
INEL	Idaho National Engineering Laboratory
LMITCO	Lockheed Martin Idaho Technologies Company
LLW	Low-level waste
MOU	Memorandum of Understanding
MLLW	mixed low-level waste
NEPA	National Environmental Policy Act
NRC	Nuclear Regulatory Commission
NRF	Naval Reactors Facility
NR-IBO	Naval Reactors Idaho Branch Office
PRP	Peer Review Panel
PATT	Performance Assessment Task Team
PA	performance assessment
RWMC	Radioactive Waste Management Complex

ACRONYMS

RWMIS	Radioactive Waste Management Information System
RRWAC	Reusable Property, Recyclable Materials, and Waste Acceptance Criteria
SCW	Special Case Waste
SDA	Subsurface Disposal Area
TAN	Test Area North
TRA	Test Reactor Area
USGS	United States Geological Survey
WCP	Waste Certification Program
WERF	Waste Experimental Reduction Facility
WMCT	Waste Management Compliance Team
WGAT	Working Group Assessment Team

Corrective Action Plan for INEL Low-Level Waste Management ES&H Vulnerabilities

1.0 EXECUTIVE SUMMARY

Idaho National Engineering Laboratory (INEL) is a multi-program laboratory whose primary mission is to provide the nation with innovative nuclear technologies and with unique scientific and engineering capabilities in non-nuclear programs that provide commercialization potential or enhance the quality of the environment. Areas of primary emphasis include nuclear reactor technology research and development, waste management and environmental restoration, advanced energy production, defense-related support, safety and health, technology transfer, education, and non-nuclear research and development projects. Low-level waste (LLW) activities at the INEL include numerous waste generators, storage facilities, three treatment facilities, and one disposal facility.

The Working Group Assessment Team (WGAT) conducted an assessment of the LLW management program in response to the Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 94-2 "Conformance with Safety Standards at Department of Energy Low-Level Nuclear Waste and Disposal Facilities". The assessment included a review of waste generators, liquid effluent treatment, storage facilities and practices, and a disposal facility with vaults and a shallow subsurface burial site. The WGAT reviewed relevant documents and conducted tours concerning these LLW operations. The vulnerabilities that the WGAT had identified were similar in nature to those self-identified by INEL and in most cases the vulnerabilities identified did not raise any issues that had not been previously brought to the attention of INEL. The vulnerabilities that INEL had identified are concerned with storage and disposal of LLW. INEL has concentrated on these vulnerabilities due to their impacts on facilities operations and environmental restoration activities.

This assessment resulted in the documentation of eight vulnerabilities and three conditions. The WGAT assessed the overall LLW/mixed low-level waste (MLLW) management program at INEL as being generally effective. As recommended by the DNFSB, a site-specific Corrective Action Plan (CAP) has been prepared and constitutes the initial site improvement activities.

2.0 INTRODUCTION

The WGAT conducted an assessment of the LLW management program in response to the DNFSB Recommendation 94-2 "Conformance with Safety Standards at Department of Energy Low-Level Nuclear Waste and Disposal Facilities". The assessment included a review of waste generators, liquid effluent treatment, storage facilities and practices, and a disposal facility with vaults and a shallow subsurface burial site.

The assessment of INEL was performed during the period February 26, 1996 through March 8, 1996. The assessment has been documented and the results published in the Final Report, Complex-Wide Review of DOE's Low-Level Waste Management ES&H Vulnerabilities (DOE/EM-0280), May 1996. Facilities assessed included liquid effluent treatment, storage facilities, and a disposal facility with vaults and a shallow subsurface burial site.

This CAP was prepared to meet the commitment in DOE's Implementation Plan responding to the DNFSB Recommendation 94-2 "Conformance with Safety Standards at Department of Energy Low-Level Nuclear Waste and Disposal Facilities". The actions described in this CAP are intended to resolve the eight site-specific vulnerabilities and the three conditions identified for the INEL:

INEL Vulnerabilities

- INEL-001 Design of Surface Water Control Systems at the Subsurface Disposal Area (SDA)
- INEL-002 Lack of a Closure Plan
- INEL-003 Groundwater Monitoring for Radiological Constituents at the SDA
- INEL-004 Inadequate LLW Storage Conditions/Lack of Path Forward
- INEL-005 Lack of Proceduralized Requirements for the Conduct of Waste Management Compliance Team (WMCT) Audits and Follow-up Corrective Actions to Audit Findings
- INEL-006 Generators May Not Be Adequately Characterizing Their Wastes for Radiological Constituents
- INEL-007 Impact to Groundwater from the Interactive Source Term at the Radioactive Waste Management Complex (RWMC)
- INEL-008 The INEL Performance Assessment is Not Approved

INEL Conditions

- Condition 001 There is no objective evidence of a formal information exchange between Naval Reactors Facility (NRF) and the RWMC
- Condition 002 LLW is not emplaced in a systematic manner at the bulk pit to minimize void space and this practice may lead to subsidence of either the operational or final cover
- Condition 003 There is a lack of National Environmental Policy Act (NEPA) documentation for Pits 18, 19, and 20

3.0 ORGANIZATION AND MANAGEMENT STRUCTURE TO IMPLEMENT THE CORRECTIVE ACTION PLAN

The INEL is operated by Lockheed Martin Idaho Technologies Company (LMITCO) under direction of the Department of Energy (DOE) through the Idaho Operations Office (DOE-ID). DOE-ID as the site representative, has the lead responsibility for ensuring that the CAP is implemented by LMITCO.

The following personnel are the points of contact for their respective organization:

<u>Organization</u>	<u>Name</u>	<u>Phone Number</u>
DOE-ID	Karl J. Hugo	(208) 526-5375
DOE-ID	Jeffery N. Perry	(208) 526-7025
LMITCO	Thomas L. Clements, Jr.	(208) 526-0664

4.0 FINDINGS, RESPONSES AND PLANNED ACTIONS

Provided below are the responses and planned corrective actions for each of the eight site-specific LLW management ES&H vulnerabilities identified for the INEL.

Finding No.:

INEL-001

Finding Description:

Design of Surface Water Control Systems at the Subsurface Disposal Area (SDA) Documentation is inadequate for the design of engineered structures and systems intended to prevent surface water run-on/run-off. The assessment concluded that the potential exists for precipitation run-on run-off events to inundate the LLW disposal units at the SDA; thereby posing potential releases of radioactive material.

Specific concerns regarding surface water control systems at the SDA are as follows:

Surface water run-off is collected in a sump in the operating LLW disposal unit and is transferred to the channel outside the bermed SDA area. A lack of documentation exists to support the adequacy of the design of this engineered system to drain accumulated water from a maximum precipitation event in the disposal units. This condition could result in internal flooding of the LLW disposal unit which in turn could allow the release of the LLW into the environment.

The SDA is located in a topographical low to the surrounding surface water drainage patterns. INEL has constructed an earthen berm or dike to prevent surface water run-on in response to its location. This berm has been surveyed as to location and height, but no as-built drawings exist as to its design and construction specifications. A diversion channel has been constructed to allow surface water to drain around the SDA.

A diversion dam has been placed on the Big Lost River to influence the natural surface water drainage patterns. These water spreading areas are also diked to prevent a backflow of water to the RWMC. Two hydrologic studies have been conducted to address

the adequacy of the berm at the SDA in the event of the probable maximum flood event. These studies have conflicting conclusions and have not provided definitive evidence as to the efficacy of the berm on the diversion controls for the Big Lost River. This condition could result in an external flooding of the SDA which in turn could allow the release of LLW into the environment.

Risk Ranking:

The assessment rated the vulnerability as a medium risk level for the performance of the disposal facility. The assessment rated the vulnerability as a low risk level for workers and the environment. Risk from the vulnerability was determined to be not applicable to the public.

Response:

It should be noted that the collection sump referred to in the first specific concern is not in the operating LLW disposal unit, but is in a topographical low point near the SDA east access road gate. The pumping station was installed to enhance drainage of the SDA in addition to a gravity flow discharge system. The SDA Pumping Station Design (EDF RWMC 194), provides design criteria for the SDA drainage pumping station.

The United States Geological Survey (USGS) is currently reviewing flood plain studies related to the RWMC. The USGS determined the *Flood Evaluation Study of RWMC at INEL* (Dames and Moore 1993) for the Radioactive Waste Management Complex, Idaho National Engineering Laboratory, 100 year flood plain study is credible and is satisfactory for future use^a. The Dames and Moore study concludes that the SDA perimeter engineered barriers (dikes) will withstand a 100 year flood event. The USGS is still considering the Dames and Moore analysis of 500 year plus storm/flood events.

The SDA has been flooded three times in the past (February of 1962, January of 1969, and February of 1982) by local runoff from rapid spring thaws. Since 1982, the SDA drainage system has been significantly upgraded. New larger drain culverts were installed,

basalt was removed to enlarge the main drainage channel, berms were constructed around open excavations, the SDA surface was contoured to promote drainage, and existing dikes were raised in height. Various documentation of SDA drainage system upgrades such as Engineering Design Files (EDFs) need to be reviewed and reconciled with the as built status.

Planned

Corrective Action:

INEL will assess all existing documentation regarding the SDA drainage system and will reconcile design documentation as necessary. Furthermore INEL will evaluate the adequacy of the existing system against the appropriate requirements which depend in part on the outcome of the ongoing floodplain study review and propose modifications to the existing drainage system as necessary.

Schedule and Costs:

Review and reconciliation of existing design documentation will be completed by 3Q FY 1997. Once the ongoing floodplain study review is completed, the adequacy of the existing system will be evaluated. Any proposed modifications will be documented by the end of FY 1998. The cost of generating as-built drawings, specifications, and reconciling information contained in numerous documents is estimated to be \$75K. Costs of further evaluation of the SDA drainage system and any proposed modifications are dependent on the outcome of the ongoing flood plain study work and are unavailable at this time. The proposed corrective action constitutes additional work scope.

Tracking Mechanism:

LMITCO is adding milestones at the Control Account level (WBS-23601) in ADS 4311-02 to track the above corrective actions.

References:

SDA Pumping Station Design (EDF RWMC 194); SDA Interior Drainage Design (EDF RWMC 252); Evaluation of Cover and Drainage Improvements for Interim Stabilization of the Subsurface Disposal Area at the INEL RWMC (EDF BWP-SC-03); Dames and Moore, 1993, *Flood Evaluation Study of the Radioactive Waste Management Complex*, Idaho National Engineering

Laboratory, Idaho Falls, ID; SDA Perimeter Maintenance Plan (EDF-RWMC-270); The RWMC Facility Drainage Site Plan (Drawing No. 175608, 6/20/96); ^aLetter of May 24, 1996, C. Parrett, Supervisory Hydrologist USGS to G. Sehlke, LMITCO; EG&G, 1992, *Conceptual Design for Surface Water Drainage Control Upgrades for the RWMC, Watershed and the Transuranic Storage Area*, EGG-ESQ-9994, August 1992; EG&G 1993, A-E Construction Specification, RWMC Local Runoff Flood Channels, A-ECS-40643, September 1993.

Finding No.: INEL-002

Finding Description: Lack of a Closure Plan INEL lacks a closure plan for the implementation of a design of a final cover system. The cover system design must be consistent with the performance objectives of the performance assessment (PA). The lack of a closure plan is of concern when operations cease at the LLW disposal facility.

Risk Ranking: The assessment rated the lack of a closure plan as a low risk level for both the environment and the performance of the disposal facility. Risk from the vulnerability was determined to be not applicable to site workers or the public.

Response: INEL is aggressively pursuing development of a comprehensive Closure/Post Closure Plan for the SDA. A draft preliminary closure plan has been developed and will be completed in the current fiscal year. The final closure plan must be approved prior to closing the current disposal operations as required by DOE Order 5820.2A and as requested by the State of Idaho^a. The final Closure/Post Closure Plan will also include the site security and D&D plan for the SDA.

To date, INEL has taken significant steps toward development of a final closure plan for the SDA. In 1991 a task to evaluate

Engineered Barriers for the closure cover of the RWMC SDA was initiated. Environmental Protection Agency (EPA) and Nuclear Regulatory Commission (NRC) design guidance documents were consulted in the selection of closure cover alternatives for the RWMC SDA. Neither set of guidance is binding on DOE, but both provide more detailed design guidance than the closure cover guidance provided in DOE Order 5820.2A "Radioactive Waste Management". An adaptation of the CERCLA process for identification and screening of remedial alternatives was used for evaluating closure cover design alternatives. Data needs for detailed analysis and four design alternatives were identified, and field testing of two of the four alternatives identified was proposed. In FY 1996, INEL completed construction of the Engineered Barriers Test Facility and system tests are currently being performed.

Planned

Corrective Action:

The development of a comprehensive closure plan is a long-term sequential process that requires site-specific studies and demonstrations to ensure adequate performance. INEL will perform the following activities to complete the development of a final comprehensive closure plan:

Engineered Cover System: The selection of an engineered closure cover will involve performance testing and analysis of several types of closure covers. A final cover for application at the SDA will be selected on the basis of test data. Evaluation of engineered barriers for the closure cover at the SDA was initiated in 1991. The Engineered Barriers Test Facility was completed this year and system tests have started.

Soil Characterization and Waste Stabilization Methods:

Characterization of the soil and its effects on waste forms is fundamental to assessing and improving the performance of the LLW disposal units at the SDA. Site specific methods for stabilization of the waste disposal zones and waste units are a

fundamental aspect of closure. The determination of waste stabilization methods will remove the most tenuous aspect of the closure system. The site specific stabilization methods will be included in the Closure Plan.

Environmental Monitoring Plan: Post-closure monitoring will be required at the LLW disposal site for at least 100 years per DOE Order 5820.2A. An Environmental Monitoring Plan will be developed for the LLW disposal units at the SDA to provide early warning of potential closure system failure thus allowing for timely remedial response.

Corrective Measures Plan: A Corrective Measures Plan will be developed to identify corrective actions that must be taken during the post-closure period to mitigate any release of radioactivity from the disposal facility. The plan will be based on the results of the PA and environmental monitoring data.

Final Closure Plan: Finalization of the Closure Plan will incorporate the information from all of the other closure activities discussed above. Final closure cover design will be the last closure activity to be incorporated, when the results of tests from the Engineered Barriers Test Facility will be used in the final cover design.

Schedule and Costs:

INEL has scheduled work to perform tests and collect moisture migration data from the test plots at the Engineered Barriers Test Facility until FY 2001 when the closure cover design is scheduled to be completed. The study for soil characterization and soil effects on waste forms is scheduled to be conducted in FY 1997 and FY 1998. The Waste Stabilization Study is also scheduled to be performed in FY 1997 and FY 1998. The development of the Environmental Monitoring Plan is scheduled to be performed in FY 1998 and FY 1999. The development of the Corrective Measures Plan is scheduled to be conducted in FY 1999 and FY 2000. Final closure cover design is scheduled for development in

FY 2000 and FY 2001 with final tests on the closure cover test plots being concluded in FY 2001. The cost of developing the comprehensive Closure/Post-Closure Plan for the SDA is estimated to be \$1.9M over the next 6 year period and does not constitute additional work scope.

Tracking Mechanism: The closure Plan activities are tracked at the Control Account level (WBS-23601) in ADS 4311-02.

References: ^aLetter of November 15, 1993, S. R. Hill, State of Idaho to A. A. Pitrolo, DOE-ID, "Low-Level Waste Disposal Practices at the Subsurface Disposal Area"; *Draft Preliminary Closure Plan for the SDA Active Low Level Radioactive Waste Disposal Area*, INEL-96/0215, LMITCO, May 1996; Letter of June 12, 1996, T. L. Clements, Jr., Manager LMITCO Transuranic Waste Department to J. T. Case, Manager, Waste Management Programs, DOE-ID, "REPORT ON COMPLETION OF CONSTRUCTION OF ENGINEERED BARRIERS TEST FACILITY", TLC-50-96; LMITCO Work Package Documentation: "5820 Implementation Planning Support, LLW Technical Support", May 1996.

Finding No.: INEL-003

Finding Description: Groundwater Monitoring for Radiological Constituents at the SDA
Although groundwater monitoring is performed at the RWMC for specific radiological parameters; the groundwater monitoring plan for the RWMC is not consistent with the radiological constituents of concern identified in the PA. Specifically ³H (tritium), ¹²⁹I, and ⁹⁹Tc are identified by the PA as radiological constituents of concern; however, these parameters are not included in the current groundwater monitoring plan for the RWMC. The inconsistency is an indication of the potential for releases from the disposal facility that would not be identified in a timely manner. There is an apparent lack of program interaction to provide periodic review

and revision of the groundwater monitoring plan to include all potential radiological constituents of concern based on the source term for the site.

Risk Ranking:

Inconsistencies in groundwater monitoring were assessed as a low risk for both the environment and the performance of the disposal facility. Risk from inconsistencies in groundwater monitoring is not applicable to workers or the public.

Response:

INEL has an established Groundwater Protection Management Program (DOE 1993a) which meets the requirements of DOE Order 5400.1 *General Environmental Protection Program*. Under the Groundwater Protection Management Program, INEL developed a Groundwater Monitoring Plan (GWMP) to fulfill the groundwater monitoring requirements of DOE Order 5400.1 (DOE 1993b). The INEL GWMP is a dynamic document which is modified as necessary to reflect evolving requirements, to incorporate new information, and to accommodate the changing needs of DOE programs. As required by DOE Order 5400.1, the plan identifies all DOE requirements and regulations applicable to groundwater protection and provides a comprehensive monitoring strategy.

Planned

Corrective Action:

The PA for the RWMC was not completed until 1994, after the GWMP was issued in 1993; therefore, monitoring concerns raised in the PA were not initially incorporated into the GWMP. The INEL Groundwater Monitoring Program is currently in the process of making the first revision of the GWMP^a. The revision of the plan is being performed to allow facilities and programs to make input specific to their monitoring requirements. Based on PA results, a monitoring program for radionuclides of concern was initiated in FY 1996 in conjunction with the USGS. The inconsistencies in the GWMP will be corrected by incorporating the newly established monitoring program for the PA into the GWMP.

Schedule and Costs: The ongoing revision of the GWMP is scheduled to be completed by September 30, 1996. Subsequent periodic revision of the elements of the INEL Groundwater Protection Management Program including the INEL GWMP will be performed as required by DOE Order 5400.1. The cost estimate for revising the INEL GWMP is \$63K. The revision of the GWMP is a planned activity and does not constitute additional work scope.

Tracking Mechanism: Periodic review and revision of INEL Groundwater Protection Management Program elements is required by DOE Order 5400.1. The GWMP activities are tracked under ADS 4313-01.

References: DOE, 1993a, *Groundwater Protection Management Program*, U. S. Department of Energy, Idaho Operations Office, DOE/ID-10274, March 1993; DOE, 1993b, *Idaho National Engineering Laboratory Groundwater Monitoring Plan*, U. S. Department of Energy, Idaho Operations Office, DOE/ID-10441, June 1993; ^aLMITCO Interdepartmental Communication of June 10, 1996, M. V. Carpenter to Distribution, "INEL GROUNDWATER MONITORING PLAN REVISION REVIEW REQUEST", MVC-04-96.

Finding No.: INEL-004

Finding Description: Inadequate LLW Storage Conditions/Lack of Path Forward There is no path forward for the planned and current generation and storage of LLW at INEL. Forecasted LLW generation greatly exceeds the disposal capacity of the RWMC. Opportunities for waste minimization and pollution prevention are not being pursued in an aggressive manner. Special case waste (SCW) generated by reactor operations is being stored indefinitely. LLW is being stored on-site in various ad-hoc locations and lacks engineering controls to prevent personnel exposure or environmental releases.

Specific concerns regarding LLW storage are as follows:

Blocks of contaminated beryllium are currently being generated and stored at the Advanced Test Reactor (ATR) that exceed the limits of DOE Order 5820.2A (Greater Than Class C waste) and are treated as SCW. These blocks are not acceptable for disposal at the RWMC.

D&D activities at the Idaho Chemical Processing Plant (ICPP) have created over 2000 boxes of LLW with no disposal path determined. These boxes are in varying stages of disrepair. At one storage area at the ICPP, boxes of LLW were found with the lids partially open (warped wooden covers) exposing the contents to the elements. Radiation surveys of these same boxes were last completed in October 1993.

Risk Ranking:

The inadequate LLW storage conditions and lack of a path forward was rated as a low risk to workers and the environment. Risk to the public and disposal facility performance is not applicable.

Response:

INEL is in the process of evaluating current and future LLW storage and disposal options. INEL will conduct a comprehensive inventory of all LLW presently in storage across the INEL. Cost-benefit analysis will be performed to evaluate disposition of each LLW stream generated at the INEL. Site-wide LLW minimization and recycling initiatives are being evaluated.

Planned

Corrective Action:

Problems associated with on site storage of LLW will be corrected through development of company level procedure(s) that provide uniform site-wide requirements for LLW storage including engineering controls, container management and integrity requirements, as well as radiological surveillance requirements for stored LLW.

A disposal path has been determined and implemented for the boxes of LLW at ICPP. The boxes will be repackaged and then are to be shipped for disposal at an off-site LLW disposal facility (Envirocare facility in Utah).

A task to evaluate SCW (e.g. beryllium blocks) storage options is planned to be initiated in FY 1997. This task will investigate storage requirements and propose a preferred storage alternative for long-term storage of SCW that cannot be disposed at RWMC. Options include use of several facilities, consolidation to a single INEL facility, or shipment to an off-site DOE-owned facility.

To effectively address LLW minimization and recycling, INEL is evaluating the following initiatives: (a) incentivize waste minimization by implementing a full recovery charge back system; create a program which establishes a contaminated tool/equipment pool; and require the Radiological Control organization to use reusable material where practicable (b) use volume efficient waste disposal containers such as "zero clearance" (i.e., no bottom spacers) metal boxes instead of the currently used wooden boxes and square 71 gallon drums instead of the round 55 gallon drums.

Schedule and Cost:

The company procedure(s) for LLW storage will be developed and implemented in FY 1997 and FY 1998. The repackaging and shipment of the ICPP LLW is scheduled to be completed by the end of FY 1996. Evaluation of SCW storage options is planned to be initiated in FY 1997. The cost of repackaging and shipment of the ICPP LLW is estimated to be \$750K. The cost of evaluation of SCW storage options is estimated to be \$188K. Both of the above activities are planned and do not constitute additional work scope. The estimated cost of developing a comprehensive inventory of all LLW presently in storage across the INEL, performing cost-benefit analysis of each LLW stream generated at the INEL, and developing site-wide procedures is \$130K. These activities constitute additional work scope.

Tracking Mechanism: Repackaging and shipment of the ICPP LLW is tracked under ADS 4301. The remaining activities will be tracked under ADS 4311-02 in Control Account 23601.

References: ADS 4301 and ADS 4311-02.

Finding No.: INEL-005

Finding Description: Lack of Proceduralized Requirements for the Conduct of Waste Management Compliance Team (WMCT) Audits and Follow-up Corrective Actions to Audit Findings At INEL there is a potential for lack of appropriate LLW generator oversight which could allow disposal of unacceptable wastes that might adversely affect the ability of the disposal facility to meet its performance objectives. Requirements for the conduct of waste management audits of LLW generators, including follow-up corrective actions to audit findings, have not been proceduralized. The audits must be conducted on a periodic basis by the WMCT to meet the requirements of Section 2.3 of the INEL Reusable Property, Recyclable Materials, and Waste Acceptance Criteria (RRWAC).

A specific concern regarding the vulnerability was noted. The audit of the Waste Experimental Reduction Facility (WERF), Audit Number DLH-37-95, conducted on August 1, 1995, resulted in a Category II finding. This finding indicates the WERF had not developed a Waste Certification Program (WCP) for the LLW generated during waste processing at the WERF. This finding documented on Quality Program Report No. WMCT-643, remains open. While interviewing INEL personnel, including a RWMC Generator Interface, and a WMCT Auditor, the WGAT determined that an impediment to closing this finding is that WERF – management, contrary to DOE 5820.2A, Definition 40, and Section 111.3.e, does not consider waste processing at the WERF,

with the exception of incineration, to be a point of generation of LLW.

Risk Ranking:

The assessment rated the vulnerability as a low risk for the performance of the disposal facility. Risk is not applicable to the public, worker, or environment.

Response:

WERF is not considered by LMITCO management to be a generator in regard to compacting and sizing operations which provide intermediate volumetric processing capability prior to disposing the waste at the RWMC^a. WERF is considered a generator with respect to WERF-incinerated waste. WERF-incinerated waste disposed at the RWMC experiences the full characterization process as required by the INEL RRWAC and is handled with WERF classified as the waste generator.

Planned

Corrective Action:

A procedure for the conduct of waste management audits of LLW generators at INEL has been drafted^b. The site-wide procedure will be issued as a LMITCO company procedure. The LMITCO draft audit procedure will undergo LMITCO Environmental Management Branch and company-wide review prior to issuance. In addition to the audit procedure, a revision will be submitted to the RRWAC to clarify the requirements that the LLW generators complete the follow-up corrective actions from the audits.

Since WERF is not considered a generator for the case described above and the generic RRWAC therefore does not apply, RWMC is requiring a Memorandum of Understanding (MOU) be generated and approved by both WERF and RWMC management. The MOU will provide specific criteria along with a process accounting for waste stream characteristics and activity content of all waste disposed of at the RWMC. The MOU is currently being - negotiated. Completion of the MOU will constitute closure of finding WMCT-643.

Schedule and Costs:

The LMITCO draft audit procedure will undergo LMITCO Environmental Management Branch and company-wide review in July of 1996. The formal procedure is expected to be issued as final by September 30, 1996. The RRWAC revision request will be submitted by July 31, 1996, and is scheduled to be completed by February of 1997. The MOU is scheduled to be completed and implemented by the end of the current FY. The cost of developing the audit procedure is estimated to be \$2K and does not constitute additional work scope.

Tracking Mechanism:

The development of the audit procedure is tracked at the Control Account level (WBS-28201) in ADS 4301.

References:

^aInterdepartmental Communication of December 12, 1995, G. E. Ellis, General Manager, LMITCO Environmental Management to Distribution, "Waste Experimental Reduction Facility (WERF) Generator Status", GEE-126-95; ^bDraft Procedure for Waste Management Compliance Audits (in revision).

Finding No.:

INEL-006

Finding Description:

Generators May Not Be Adequately Characterizing Their Wastes for Radiological Constituents Generators of LLW at INEL may not be adequately documenting and justifying radioisotope distributions and radiological quantification methods for their respective waste streams. Therefore, compliance with the performance objectives in the PA may be compromised.

Risk Ranking:

The assessment rates the inadequate characterization practices as a low risk for the performance of the disposal facility. Risk to the public, workers, and the environment is not applicable. -

Response:

INEL is in the process of improving generator practices for radiological characterization of LLW waste. The work scope of

the effort has been defined through 2003. The ongoing work involves assessing INEL LLW waste generator practices for characterizing LLW and then assisting generators in improving the characterization practices to provide adequate radionuclide data regarding their past, present and future LLW shipments. The characterization data in turn will be used in the RWMC PA. The recently held INEL LLW value engineering session identified additional efforts that will improve radionuclide inventory practices. Results of the value engineering session concluded that INEL should establish a program to adequately characterize major radionuclides of interest. Adequate radionuclide characterization will require defining adequate radionuclide characterization and defining adequate process knowledge. The proposed value engineering resolution recommended that INEL implement a team approach for review and development of the WCP for ongoing and one-time waste streams. The team will use a graded approach to develop adequate requirements for each waste stream. The waste stream requirements will be reviewed on an annual basis in accordance with the RRWAC. The proposed value engineering resolution also recommended future characterization efforts include only radionuclides of concern, i.e., as required by the PA, transportation requirements (49 CFR 173), and manifesting requirements (10 CFR 20). Based on PA results, a list of critical radionuclides will be developed. A team approach will be employed to determine which radionuclides must be measured as part of a waste stream characterization. Guidance will be developed for activity limits of any given radionuclide that must be reported based on the PA for the RWMC.

Planned

Corrective Action:

INEL will develop and implement uniform radionuclide characterization procedures to ensure waste disposed at the RWMC is adequately characterized. Additionally, previously planned work for the near term includes (a) assessing radiological characterization practices at Argonne National Laboratory-West (ANL-W) and recommending improvements necessary to provide

adequate data regarding future LLW shipments; and (b) assisting the Test Reactor Area (TRA), which was previously evaluated (Akers et al. 1994, Randolph and Akers 1995), to issue revisions necessary for past shipment records regarding the radionuclide inventory in the Radioactive Waste Management Information System (RWMIS). Outyear radionuclide characterization work includes activities to assess the radiological characterization practices of the remaining LLW generators at the INEL: ICPP, NRF, and Test Area North (TAN). Additionally, the planned work includes activities that will be performed to induce all INEL generators to improve their practices sufficiently to provide satisfactory radionuclide data regarding all their past and future LLW shipments.

Schedule and Costs:

Development and implementation of uniform radionuclide characterization procedures will be completed in FY 1997. Planned work for FY 1997 includes: (a) assessing radiological characterization practices at ANL-W and recommending improvements; and (b) assisting the TRA to issue revisions necessary for past shipment records regarding the radionuclide inventory in the RWMIS. Follow-up assessment of the radiological characterization practices of ICPP, NRF, and TAN is scheduled to be conducted from FY 1998 through FY 2003. The cost of the planned activities is estimated at \$854K and does not constitute additional scope. The cost of development of uniform radionuclide characterization procedures is estimated to be \$130K and constitutes additional work scope.

Tracking Mechanism:

All radionuclide characterization efforts are tracked under ADS 4311-02 in Control Account 23601.

References:

Ackers, D. W., Randolph, P. D., and Ottewitte, E. H., 1994, *Evaluation of INEL Facilities' Low-Level Waste Characterization Practices, Part 1: Advanced Test Reactor*, EGG-WM-10987, September 1994. Randolph, P. D. and Ackers, D. W., 1995,

Finding No.: INEL-007

Finding Description: Impact to Groundwater from the Interactive Source Term at the RWMC The interactive source term from the active disposal pits and WAG-7 has not been developed. Furthermore the total source term for WAG-7 is undetermined because historical data are insufficient.

Risk Ranking: The assessment rated the lack of an interactive source term analysis as a medium risk for the environment as well as the performance of the disposal facility. Risk to the public from this vulnerability was ranked as low. Risk to workers from the lack of an interactive source term was determined to be not applicable.

Response: Per the recommendations of the DNFSB, INEL is preparing a composite analysis to account for radionuclide sources at the SDA not originally required for evaluation by DOE Order 5820.2A, i.e., the interactive source term at the SDA. Whereas DOE Order 5820.2A specifies that PAs are required only for waste disposed after September 1988, the current PA for the RWMC includes LLW disposed from 1984 onward.

Extensive inventory analysis of historical data (LITCO 1995) on wastes disposed in the now inactive portion of the SDA (WAG-7) has been performed by INEL Environmental Restoration. The inventory analysis covers radiological and nonradiological contaminants in waste disposed in the SDA from 1952 through 1983. The existing ER data will be used to facilitate the composite analysis of the SDA source term.

Planned

Corrective Action:

The DOE-Headquarters (HQ) guidance for performing composite analyses (DOE 1996) was issued in April of 1996. Phase I of the SDA composite analysis effort, "Source Term/Scenario Development", has commenced. The second phase of the composite analysis will be the Performance Analysis, and the third phase will be the Options Analysis. A Composite Analysis Report will be prepared and submitted to DOE-HQ.

Schedule and Costs:

Phase I "Source Term/Scenario Development", was initiated on April 15, 1996 and is scheduled to be completed in December 1996. Phase II "Performance Analysis" is scheduled to be performed from January through April of 1997. Phase III "Options Analysis" is scheduled to be conducted from May to July of 1997. The Composite Analysis Report is scheduled to be developed from May to December of 1997, with submittal to DOE-HQ scheduled for January 1998. The estimated cost of the composite analysis activities is \$258K. The composite analysis is planned activity; however, \$187K constitutes additional scope based on revised guidance issued in April 1996.

Tracking Mechanism:

The composite analysis efforts are tracked under ADS 4311-02 in Control Account 23601.

References:

LITCO, 1995, *A Comprehensive Inventory of Radiological and Nonradiological Contaminants in Waste Buried in the Subsurface Disposal Area of the INEL RWMC During the Years 1952-1983*, Lockheed Idaho Technologies Company, INEL-95/0310, August 1995; DOE, 1996, *Guidance for a Composite Analysis of the Impact of Interacting Source Terms on the Radiological Protection of the Public from Department of Energy Low-Level Waste Disposal Facilities*, U. S. Department of Energy, April 1996; Memorandum of April 10, 1996, J. T. Case, Manager, Waste Management Programs, DOE-ID, to M. Frye, DOE-ID, - "Comments on DNFSB 94-2 Implementation Plan Resource/Milestone/Commitment Schedule or INEL", (OPE/WMPO-96-042).

Finding No.:

INEL-008

Finding Description:

The INEL Performance Assessment is Not Approved The current PA should be revised on the basis of revised waste disposal inventories, and PA documentation (i.e. PA and EDFs). PA revision will only occur through DOE-HQ resolution to Peer Review Panel (PRP) concerns as well as PRP approval; however, DOE-HQ resolution has yet to be received.

Risk Ranking:

The assessment rated the lack of PA approval as a medium risk for the performance of the disposal facility and a low risk for the public and the environment. Risk to workers is not applicable.

Response:

In July 1995, the Performance Assessment Task Team (PATT) convened in Grand Junction, Colorado to resolve remaining PA policy issues. Agreement on how to resolve groundwater protection issues was reached by the PRP, PATT, the DOE-HQ, and DOE-ID representatives. In December of 1995, DOE-ID sent a letter to DOE-HQ which requested that DOE-HQ formalize its position on the issues which were resolved in Grand Junction^a. In June of 1996, DOE-HQ formally responded to DOE-ID^b.

Planned**Corrective Action:**

PRP meetings were held on July 15 and 16 of 1996 to complete detailed review and make recommendations as to the final disposition of the PA. The PRP chairman has communicated to the DOE-ID representative that based on the information provided, the INEL RWMC PA is technically acceptable and complete, and the PRP will recommend DOE-HQ acceptance of the PA.

Schedule and Costs:

The effort to support completion of the review and approval of the PA is a planned activity estimated to cost \$40K and is expected to be completed by August 1996.

Tracking Mechanism: The PA activities are tracked under ADS 4311-02 in Control Account 23601.

References: ^aLetter of December 14, 1995, J. T. Case, Manager, Waste Management Programs, DOE-ID to L. Stevens, EM-331, DOE-HQ; ^bLetter of June 20, 1996, S. P. Cowan, Deputy Assistant Director, Office of Waste Management, DOE-HQ to J. T. Case, Manager, Waste Management Programs, DOE-ID.

Condition No.: 001

Condition Description: There is no objective evidence of a formal information exchange between NRF and the RWMC

Risk Ranking: Not applicable

Response: Although Executive Order 12344 exempts the Naval Nuclear Propulsion program from requirements identified in DOE Order 5820.2A, and the exemption has been interpreted by DOE-ID and NR-IBO as being applicable to LLW generated by NRF, formal communications between NRF and RWMC exist in the form of waste stream characterization information and waste shipment requests. Also the RRWAC requires that Naval Reactors Idaho Branch Office (NR-IBO) conduct audits at the NRF.

Planned

Corrective Action: DOE-ID will evaluate the adequacy of the information exchange between NRF and RWMC as it relates to environmentally sound LLW disposal practices. Any identified deficiencies will be documented and communicated to DOE management.

Schedule and Costs: The review and documentation of current practices will be completed by 2Q FY 1997. The cost of the activity is estimated to be \$15K.

Tracking Mechanism: This activity will be tracked under ADS 4311-02 in Control Account 23601.

References: DOE Order 5820.2A, Radioactive Waste Management, September 1988.

Condition No.: 002

Condition Description: LLW is not emplaced in a systematic manner at the bulk pit to minimize void space and this practice may lead to subsidence of either the operational or final cover.

Risk Ranking: Not applicable

Response: The bulk pit constitutes a single disposal unit which is used for the disposal of remote handled odd-sized packages of LLW that cannot be disposed in the concrete vaults for remote handled waste. Remote handled waste presents special radiation exposure concerns (> 500 mR/hr at 0.9 m) and cannot be directly handled, i.e., stacked by workers as is the contact handled waste (≤ 500 mR/hr at 0.9 m). Unlike normal contact handled waste, which is placed in standard-sized boxes, the odd-sized remote handled waste packages in the bulk pit are not readily amenable to orderly stacking. Current operating practices place the odd-sized remote handled waste forms into the bulk pit in a consistent manner in accordance with detailed operating procedures; however, regular stacking is not feasible due to worker safety and DOE-mandated As Low As Reasonably Achievable (ALARA) exposure concerns. The bulk pit is backfilled with soil as required to minimize radiation exposure, and is closely monitored for subsidence.

Personnel are not allowed into the bulk pit because it violates safe work and ALARA practices.

Planned

Corrective Action:

INEL will evaluate the waste forms being disposed in the bulk pit to assess the feasibility of reconfiguring waste for disposal in the remote handled LLW concrete vaults.

Schedule and Costs:

Evaluation of reconfiguring waste forms for vault disposal is an ongoing process. The annual cost of this activity is estimated at \$10K.

Tracking Mechanism:

This activity is performed under ADS 4311-02 in Control Account 23311.

References:

INEL Reusable Property, Recyclable Materials, and Waste Acceptance Criteria, DOE/ID-10381.

Condition No.:

003

Condition Description:

There is a lack of National Environmental Policy Act (NEPA) documentation for Pits 18, 19, and 20

Risk Ranking:

Not applicable

Response:

In accordance with NEPA, DOE prepared a programmatic Environmental Impact Statement (EIS) for spent nuclear fuel management and INEL environmental restoration and waste management programs. The EIS analyzed the potential environmental consequences over the next 40 years of alternatives for the transportation, receipt, processing, storage of spent nuclear fuel, as well as environmental restoration and waste management programs. LLW disposal operations are included in the site-wide EIS which provides adequate NEPA documentation. DOE-HQ will

determine what activities are necessary to integrate the LLW program and identify essential LLW management requirements.

Planned

Corrective Action:

The condition is a complex-wide concern which will be addressed by the DOE-HQ Corrective Action Plan as part of the DOE's 94-2 response effort. If any additional requirements are identified by DOE-HQ, INEL will initiate efforts to meet new NEPA documentation requirements as necessary.

Schedule and Costs:

No additional costs are anticipated for the corrective action since the site-wide EIS is in place. Future INEL tasks are dependent on DOE-HQ identification of requirements.

Tracking Mechanism:

The efforts are tracked in the DOE-HQ Corrective Action Plan.

References:

Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement, DOE/EIS-0203-F, April 1995.

INEL CORRECTIVE ACTION PLAN SUMMARY TABLE

Site Name: Idaho National Engineering Laboratory

Vulnerability/ Concern Number	Title	Corrective Action Activities/Status	Start Date	Completion Date
INEL-001	Design of Surface Water Control Systems at the Subsurface Disposal Area (SDA)	Review and reconcile existing design documentation.	10/1/1996	6/30/1997
		Evaluate adequacy of the existing system and document any proposed modifications.	7/1/1997	9/30/1998
INEL-002	Lack of a Closure Plan	Complete Draft Preliminary Closure Plan.	ongoing	9/30/1996
		Perform tests, collect moisture migration data at Engineered Barrier Test Facility.	10/1/1996	9/30/2001
		Study for Soil Characterization and Effect on Waste Forms.	10/1/1996	9/30/1998
		Waste Stabilization Study	10/1/1996	9/30/1998
		Develop Post-Closure Environmental Monitoring Plan	10/1/1997	9/30/1999
		Develop Corrective Measures Plan	10/1/1999	9/30/2000
		Closure Cover Design	10/1/1999	9/30/2001
INEL-003	Groundwater Monitoring for Radiological Constituents at the SDA	Finalize Closure Plan	10/1/2000	9/30/2002
		Revise the INEL Groundwater Monitoring Plan	ongoing	9/30/1996

**INEL CORRECTIVE ACTION PLAN
SUMMARY TABLE
(Continued)**

Site Name: Idaho National Engineering Laboratory

INEL-004	Inadequate LLW Storage Conditions/Lack of Path Forward	Repackaging and shipment of ICPP LLW	ongoing	9/30/1996
		Evaluate SCW storage options	10/1/1996	9/30/1998
		Develop and implement procedure(s) for LLW storage and radiological surveillance.	10/1/1996	9/30/1998
INEL-005	Lack of Proceduralized Requirements for the Conduct of Waste Management Compliance Team (WMCT) Audits and Follow-up Corrective Actions to Audit Findings	Finalize and implement audit procedure	ongoing	9/30/1996
		Finalize and implement Memorandum of Understanding between RWMC and WERF.	ongoing	9/30/1996
		Revise RRWAC to clarify generator follow-up corrective actions.	ongoing	2/28/1997
INEL-006	Generators May Not Be Adequately Characterizing Their Wastes for Radiological Constituents	Develop and implement uniform radionuclide characterization procedures.	1/1/1997	9/30/1997
		Assess radiological characterization at ANL-W and recommend improvements and assist TRA in issuing revisions necessary for past shipment records.	10/1/1996	9/30/1997
		Conduct follow-up assessment of radiological characterization practices of ICPP, NRF, and TAN and improve practices.	10/1/1998	9/30/2003

**INEL CORRECTIVE ACTION PLAN
SUMMARY TABLE
(Continued)**

Site Name: Idaho National Engineering Laboratory

INEL-007	Impact to Groundwater from the Interactive Source Term at the RWMC	Source term/scenario development	ongoing	12/15/1996
		Performance Analysis	1/2/1997	4/30/1997
		Options Analysis	5/1/1997	7/10/1997
		Prepare and submit Composite Analysis Report to DOE-HQ.	5/1/1997	1/15/1998
INEL-008	The INEL Performance Assessment is Not Approved	Completion of review and approval of the PA.	ongoing	8/31/1996
Condition-001	There is no objective evidence of a formal information exchange between NRF and the RWMC	Evaluate adequacy of information exchange between NRF and RWMC.	10/1/1996	6/30/1997
Condition-002	LLW is not emplaced in a systematic manner at the bulk pit	Evaluate the waste forms being disposed in the bulk pit to assess the feasibility of reconfiguring waste.	ongoing	ongoing
Condition-003	Lack of National Environmental Policy Act (NEPA) documentation for Pits 18, 19, and 20	DOE-HQ completion of essential LLW management requirements document.	ongoing	2/28/1997