DOE/EIS-0238-SA-03

Supplemental Analysis Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory

Supplement Analysis

Bolas Grande Project

September 3, 2003

Department of Energy
National Nuclear Security Administration
Los Alamos Site Office

Contents

Figure

Tables

Introduction

This Supplement Analysis (SA) has been prepared to determine if the *Site-Wide Environmental Impact Statement for Continued Operations of Los Alamos National Laboratory* (SWEIS) (DOE/EIS-0238) (DOE 1999a) adequately addresses the environmental effects of introducing the proposed Bolas Grande Project and its associated actinide processing and recovery operations into Wing 9 of the Chemistry and Metallurgy Research (CMR) Building located at Los Alamos National Laboratory (LANL) Technical Area (TA) 3, or if the SWEIS needs to be supplemented.

Council on Environmental Quality regulations at Title 40, Section 1502.9 (c) of the Code of Federal Regulations (40 CFR 1502.9[c]) require federal agencies to prepare a supplement to an environmental impact statement (EIS) when an agency makes substantial changes in the proposed action that are relevant to environmental concerns, or there are changed circumstances or new or changed information relevant to concerns and bearing on the proposed action or its impacts. This SA is prepared in accordance with Section 10 CFR 1021.314(c) of the Department of Energy's (DOE's) regulations for *National Environmental Policy Act* (NEPA) implementation stating that "When it is unclear whether or not an EIS supplement is required, DOE shall prepare a Supplement Analysis."

This SA specifically compares key impact assessment parameters of the Bolas Grande Project's hydrodynamic testing support activity associated with the actinide processing and recovery capability evaluated in the SWEIS with those of a proposal to introduce this support activity and its associated actinide processing and recovery operations into the CMR Building. It also provides an explanation of any differences between the proposed action and activities described in the previous SWEIS analysis.

The Bolas Grande Project Proposed Action would support DOE's long-term hydrodynamic testing program at LANL. The Proposed Action would require introducing the decontamination (DECON) of certain containment vessels and associated actinide processing and recovery activities used in support of dynamic experiments into Wing 9 of the CMR Building. The SWEIS analyzed the impacts of performing several plutonium (Pu) activities, including the hydrodynamic testing support activity, at either TA-55 or the CMR Building. This activity, associated with the actinide processing and recovery capability, was conducted at TA-55 several years ago and is now being proposed to be introduced into the CMR Building as the Bolas Grande Project.

Background

The DOE must maintain its capability to perform dynamic experiments to assess the condition and behavior of its nuclear weapons. Historically, dynamic experiments have been required to support the DOE's mission and stewardship of the nuclear weapons stockpile. Dynamic experiments remain an essential element of the Stockpile Stewardship and Management Program and assist in the understanding and evaluation of nuclear weapon performance. Dynamic experiments are used to gain information on the physical properties and dynamic behavior of materials used in nuclear weapons, including potential changes due to aging. The information that comes from these tests cannot be obtained in any other fashion.

The proposed Bolas Grande Project would facilitate the disposal of the containment vessels used in support of dynamic experiments performed at LANL. Previously, these vessels have been transported to the LANL Plutonium Facility at TA-55 for cleanout and debris removal before disposal at LANL's Area G as low-level waste (LLW). However, due to other essential LANL missions being conducted at TA-55, it is now more expedient to relocate, manage, and dispose of these dynamic experiment containment vessels using the CMR Building instead of the Plutonium Facility at TA-55.

Proposed Action

The Bolas Grande Project would provide for the disposition of large vessels used to contain experimental explosive shots involving Pu and other actinides. These used vessels contain actinides in a matrix of metal, powdered silica (sand), graphite, electrical wires, and other hardware debris. There are currently nine legacy vessels staged at TA-55 that would be dispositioned beginning in 2004; the project setup could be used for future dynamic experiment vessel support shots if needed.

The Bolas Grande Project would take place in Room 9141, Wing 9 of the CMR Building where an enclosure suitable for this project is located. Room 9141 is approximately 1,600 square feet. The enclosure with its airlock occupies about 750 square feet, or less than half of the available floor space in Room 9141. The enclosure is double filtered with high-efficiency particulate air (HEPA) filters; its internal pressure is maintained at a negative 0.2 inches water column room pressure with respect to the surrounding Wing 9 air pressure. No major modifications to the enclosure would be required to accommodate the proposed process.

The large containment vessels at TA-55 would be transported individually from TA-55 to the CMR Building. Once at the CMR Building, the containment vessel would be off-loaded from the transport vehicle and the material recovery process would be initiated.

The proposed project operations would consist of two distinct phases: first, the clean-out (removal) of the material inside the vessels, and second, the DECON of the inside of the vessels to remove any residual nuclear material not removed in the initial clean-out effort. The material removed from inside the vessels would be either disposed of as transuranic[1] (TRU) waste or sent to TA-55 for processing. The disposition path would depend on the quality and desirability of the actinides removed from the inside of the vessel. The final disposition of the cleaned out vessels would be as low-level waste[2] (LLW). The proposed project expects to process (clean-out and DECON) a minimum of two vessels per year and a maximum of four vessels per year. All actinide types introduced by the

[1] TRU waste is radioactive waste containing more than 100 nanocuries (3,700 becquerels) of alpha-emitting TRU isotopes per gram of waste, with half-lives greater than 20 years, except for (1) high-level radioactive waste; (2) waste that the Secretary of Energy has determined, with the concurrence of the Administrator of the Environmental Protection Agency, does not need the degree of isolation required by the 40 CFR Part 191 disposal regulations; or (3) waste that the Nuclear Regulatory Commission has approved for disposal on a case-by-case basis in accordance with 10 CFR Part 61 (DOE Order 435.1).

[2] LLW is radioactive waste that is not high-level waste, spent nuclear fuel, TRU waste, byproduct material (as defined in Section 11e (2) of the A*tomic Energy Act of 1954*, as amended), or naturally occurring radioactive material (DOE Order 435.1).

proposed project are currently handled at the CMR Building and are within the scope of CMR Building operations. The clean-out of each vessel would generate approximately 25 to 35 55-gallon drums (300 to 400 lbs) of solid TRU waste. Each 55-gallon drum would be only about 20 percent full, or less, due to the criticality constraint on the amount of material that a drum can accommodate. The waste would be designated TRU because of the Pu content, although most of the waste volume would actually be silica (sand). A certified drum assay would be performed by the CMR Building's Segmented Gamma Drum Assay System to ensure compliance with the Waste Isolation Pilot Plant (WIPP) waste acceptance criteria (WAC) before transfer of the waste drums to TA-54. In addition to the TRU waste generated by the vessel clean-out, there may be an additional five gallons of solution per vessel required to DECON the vessel to LLW criteria. The disposition of the DECON solution would depend on the composition of the solution. If the DECON solution were to be disposed of as waste, it would be solidified and placed in a 55-gallon drum. If the DECON solution were to be processed, the nuclear material would be precipitated out of solution and sent to TA-55. The remaining solution would be solidified and disposed of as TRU waste. After precipitation of the Pu, the residual solution would be solidified and disposed of as TRU waste, since the solution would still contain some TRU constituents.

After the clean-out and DECON procedure, the vessel would be disposed of as LLW at TA-54, Area G, or, as appropriate, at a DOE or commercial off-site permitted LLW-regulated landfill. In accordance with LANL waste minimization requirements, the cleaned and DECONed vessel could, itself, be filled with LLW; then, the vessel and its contents would be disposed of as LLW.

Step by Step Description of Operations

Step 1: The vessels would be transported from their current storage location at TA-55 one at a time to the CMR Building by truck. The vessel would be off-loaded from the truck at the CMR Building by overhead crane and placed onto a vessel-handling fixture (Figure 1) that would be used to both move and manipulate the vessel.

Figure 1. Vessel-handling fixture.

Step 2: The vessel-handling fixture would be used to move the vessel into the enclosure airlock and subsequently into the Room 9141 enclosure via a winch and cable.

Step 3: The large port cover would be removed from the vessel using a crane located inside the enclosure. The clean-out workstation located on a support stand would be attached to the vessel port. This workstation would then move with the vessel.

Step 4: A robotic arm would be attached to the smaller side port located at right angles to the workstation. This robotic arm would be controlled remotely and would have its own lighting and video cameras attached. The robotic arm would be used to aid the workstation operator in handling debris and material, as well as various pieces of equipment (such as a vacuum hose and radiation meter).

Step 5: To begin the clean-out operation, debris and material large enough to be handled would be removed first from inside the vessel with the aid of the robotic arm and its ancillary equipment. Debris would consist of such items as pieces of metal from equipment racks, electrical wires, and metal plates.

Step 6: Most of the nuclear material contained in the vessel would be found in the loose silica (sand) and powder located in the bottom of the vessel. A vacuum cleaner inside the workstation would be used to vacuum out the loose material. The vessel would be maintained at a negative pressure with respect to the inside of the enclosure; the enclosure would be maintained at a negative pressure with respect to the outside room. All ventilation systems would be exhausted through a double HEPA filter.

Step 7: The material that is removed from the vessel would be bagged-out through the bottom of the workstation into 30-gallon (or smaller) containers depending on the amount of nuclear material. A gamma detector would be used to monitor the drum-filling process. This is a Go-No Go assay performed during drum loading so that the maximum drum loading of 200 grams of Pu would not be exceeded. The 200-gram limit is the criticality limit set by the WIPP WAC.

Step 8: Each filled 30-gallon drum (or drums) would then be placed into a 55-gallon drum (or drums) and transported to the CMR Building's Segmented Gamma Drum Assay System for a certified drum assay. This measurement would verify that the 200-gram Pu WAC limit for each drum has not been exceeded.

Step 9: The empty vessels would be prepared for disposition as non-hazardous LLW at TA-54. Verification that the empty vessel meets the low-level and non-hazardous WAC for TA-54 (less than 100 nanocuries [100E-09] per gram) would be performed.

Step 10: If the empty vessel does not meet the low-level WAC for TA-54, a DECON Operation would be initiated by attaching a new chemical workstation to the sphere. The chemical workstation would be Kynar-lined and contain chemical cleaning attachments, in addition to a reservoir full of DECON chemicals.

Step 11: The robotic arm would be removed to prevent chemical damage to the arm's mechanism. The large port cover would be re-attached to the sphere. The DECON

operation would be performed using routine DECON techniques usually involving weak acid etching with inhibited fluorides, abrasive attack, and, perhaps, electrolytic DECON.

Step 12: The disposition of the DECON solution collected in the chemical reservoir would depend on the composition of the solution. If the DECON solution were to be disposed of as waste, it would be solidified and placed in a 55-gallon drum prior to disposal through LANL's waste management program. If the DECON solution were to be processed, the nuclear material would be precipitated out of solution within the Room 9141 enclosure at the CMR Building and then sent to TA-55. The remaining solution would be solidified and disposed of as TRU waste.

Step 13: Once again, verification that the empty vessel would meet the TA-54 low-level and non-hazardous WAC would be performed at the CMR Building.

Step 14: When the WAC is verified, the clean-out operation would be complete. LANL personnel equipped with respirators would remove the clean-out workstation and re-attach the large port cover.

Step 15: A number of smear samples of the exterior of the vessel surface would be taken to verify that the exterior surface was free of contamination. Once verified as having a non-contaminated exterior, the vessel would then be transferred into the enclosure airlock and, subsequently, into the Wing 9 High Bay area via a winch and cable.

Step 16: Finally, a truck bed would be backed into Wing 9 and the DECONed vessel would be loaded for shipment to TA-54, Area G for disposal as LLW.

Discussion of SWEIS and ROD for the Continued Operation of LANL

The objective of the SWEIS was to evaluate the environmental impacts of the ongoing operations and the potential impacts of operations into the future for four different alternatives. The SWEIS developed scenarios of levels of operations to project environmental parameters (such as type and quantity of hazardous and radioactive material, air, wastewater, and solid waste). In the SWEIS ROD, DOE made the determination to proceed with the Preferred Alternative, which is the Expanded Operations Alternative analyzed in the SWEIS with the exception of the level of nuclear weapon's pit manufacture. Thus, DOE has provided NEPA coverage, through its analysis in the SWEIS, for ongoing or proposed operations and capabilities for operations at LANL over the foreseeable future (defined as being about 10 years) as envisioned in 1999.

Under the Preferred Alternative in the SWEIS, DOE analyzed the impacts of Actinide Materials and Science Processing, Research and Development, including support for dynamic experiments at TA-55 and support to hydrodynamic testing and tritium separation activities at the CMR Building. In addition, the SWEIS analyzed environmental impacts of operations at 13 other key facilities. Under the SWEIS ROD, DOE projected that annual operations of the CMR Building would generate up to 988 cubic feet (28 cubic meters) of TRU waste and up to 13,738 cubic feet (1,820 cubic meters) of LLW (LANL 2001).

Potential Consequences of Proposed Action

This section addresses the potential environmental effects of the Proposed Action and compares them to the projected operations levels of LANL as described for the Preferred Alternative analyzed in the SWEIS. Environmental effects are identified and addressed based on the sliding scale approach discussed in DOE's NEPA guidance (DOE 1993); that is, certain aspects of the Proposed Action have a greater potential for creating environmental impacts than others. Therefore, they are discussed in greater detail in this SA than those aspects of the action that have little potential for effect. For instance, waste generation would be affected by the Proposed Action, while it is not expected that land use would be affected. Table 1 lists the potential environmental consequences and identifies those that are not likely to be affected by the Proposed Action.

Table 1. Potential Effects of the Proposed Action

Resource Area	SWEIS ROD Preferred Alternative	Proposed Action
Land Use	No changes projected	No changes projected
Visual resources	Temporary and minor changes due to equipment associated with construction and environmental restoration activities	No changes projected
Noise	Continued ambient noise at existing levels, temporary and minor noise associated with construction and explosives testing	No changes projected
Geology	LANL activities are not expected to change geology in the area, trigger seismic events, or substantively change slope stability	No changes projected
Soils	Minimal deposition of contaminants to soils and continued removal of existing contaminants under the Environmental Restoration project.	No changes projected
Surface Water Quality	Outfall water quality should be similar to or better than in recent experience, so surface water quality on the site is not expected to change substantially as compared to existing quality	No changes projected
Groundwater Quality	Mechanisms for recharge to groundwater are highly uncertain; thus, the potential for LANL operations to contaminate groundwater is highly uncertain	No changes projected
Air Quality: Radioactive Air Emissions	21,700 curies emissions projected	No changes projected
Public Health-Radiological	Air pathway dose: LANL maximally exposed individual: 5.4 mrem/year of operation	No changes projected
Environmental Justice	No disproportionately high or adverse impacts to minority or low-income populations identified	No changes projected
Cultural Resources	Negligible to minor potential for effects	No changes projected
Traditional Cultural Properties	Unknown due to lack of information on specific traditional cultural properties	No changes projected
Waste Management Annual LLW (Includes low-level mixed) Annual TRU waste (includes Mixed TRU)	 16,938 cubic yards (12,873 cubic meters) 718 cubic yards (546 cubic meters)	 12.1 to 24.1 cubic yards (9.2 to 18.3 cubic meters) 3.8 to 7.6 cubic yards (2.9 to 5.8 cubic meters) - see additional discussion below

The resource identified in Table 1 that would be affected by the Proposed Action is waste management, specifically, TRU and LLW generation. The following paragraphs discuss these potential effects and describe how these effects are bounded by the projected total effects in the SWEIS. Comparison of operations of the proposed Bolas Grande Project with the SWEIS ROD projection is shown in Table 2. The projected waste generation volumes are bounding estimates and assume that 35 drums of TRU waste would be generated for each vessel processed. It is estimated that between 25 and 35 drums of TRU waste would result from the clean-out of each vessel. However, each waste drum resulting from the vessel clean-out would be only about 20 percent full because of the 200-gram criticality limit set by the WIPP WAC. A full 55-gallon drum contains approximately 0.206 cubic meters of waste. Therefore, 35 drums, each 20 percent full, would be equivalent to 7 full drums; 7 full drums would contain about 1.449 cubic meters of TRU waste.

Table 2. Comparison of Environmental Effects of Operations of the Proposed Action with the SWEIS ROD Projection for CMR Building Operations

Waste Type	Units	SWEIS ROD Projection For CMR Building	2002 Operations	Projected Operational Volume (2 Vessels per year)	Projected Operational Volume (4 Vessels per year)
Total Actinide Air Emissions	Ci/yr	7.60E-04	2.7E-05	None expected	None expected
Chemical	10^3 kg/yr	10,800	707	None expected	None expected
LLW	m^3/yr	1,820	389	9.2	18.3
TRU	m^3/yr	28	10.2	2.9	5.8

Waste Management: It is not expected that any RCRA-regulated hazardous waste would be generated by the Proposed Action. All waste generated by the clean-out and DECON phases of this project would be solidified TRU waste and would be sent to TA-54 for eventual disposition at WIPP. The total in one year would be a maximum of 5.8 cubic meters. This volume, 5.8 cubic meters, added to the annual CMR Building TRU waste generation for a representative year (LANL in preparation), 10.2 cubic meters, totals 16 cubic meters, which would be well under the projected 28 cubic meters TRU waste generation per year. The vessels themselves would be disposed of as LLW at Area G, or, as appropriate, at a DOE or commercial off-site permitted LLW-regulated landfill. Four vessels would be a maximum of 18.3 cubic meters that, when added to the annual CMR Building LLW generation for a representative year (LANL 2003), 389 cubic meters, would be a total of 407.3 cubic meters, well under the projected annual volume of 1,820 cubic meters per year of LLW generation.

Total Actinide Air Emissions: It is not expected that the proposed project would contribute to any CMR Building actinide air emissions. There are no known air emissions including iodine, tritium, or fission gases resulting from this process. In addition, the Room 9141 enclosure that would house this project is double HEPA filtered.

Accidents: Appendix G of the SWEIS contains detailed discussions of the process used for screening, binning, and selection of events for detailed analysis from all operations described in the SWEIS. The accidents analyzed in detail and described in the SWEIS are those that bound the accident risks at LANL. Accidents RAD-15 and RAD-16 in the

SWEIS describe a Pu release from a wing fire at the CMR Building and an aircraft crash with explosion or fire at the CMR Building, respectively (DOE 1999a). The Unreviewed Safety Question Determination analysis for the Proposed Action resulted in a negative finding, so the proposed Bolas Grande Project would be within the envelope of the CMR Building safety documentation. Thus, the results of any accident involving the proposed project would be bounded by the effects analyzed in the SWEIS accident analysis.

Conclusion

The SWEIS analyzed four different alternatives for continuing to operate LANL and evaluated the environmental effects of operations under these alternatives. In its ROD for the SWEIS, DOE announced its decision to continue to operate LANL under the preferred alternative, which was the expanded operations alternative with a modification to certain weapons related activities. The SWEIS provides the NEPA analysis for the projected activities of LANL facilities under this preferred alternative; capabilities at the operations levels analyzed in the SWEIS would not require further NEPA analysis.

The SWEIS review addresses the proposal to locate the Bolas Grande Project capability support for dynamic experiments and its associated actinide processing and recovery activities in the CMR Building. Under the Preferred Alternative, the SWEIS analyzed the environmental impacts of several Pu operations, including hydrodynamic testing support, tritium separation activities, and actinide research, development, and processing activities, to be performed at TA-55 and the CMR Building.

DOE found that the potential environmental effects of the proposed relocation of the actinide processing and recovery capability to the CMR Building are bounded by the effects of CMR Building operations in the SWEIS ROD. There would be no increase to the total radioactive air emissions. The amounts of TRU waste and LLW projected for this Proposed Action combined with the annual TRU waste and LLW from other CMR Building operations are below those projected by the SWEIS ROD for the CMR Building.

References

10 CFR 1021 — U.S. Department of Energy, "National Environmental Policy Act Implementing Procedures," *Code of Federal Regulations*, Washington, D.C. Revised as of January 1, 1999.

40 CFR 1500-1508 — Council on Environmental Quality, "Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act," *Code of Federal Regulations*, Washington, D.C. Revised as of July 1, 2001.

DOE 1993 — United States Department of Energy, *Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statements*, Office of NEPA Oversight, May 1993.

DOE 1999a — United States Department of Energy, *Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory*, DOE/EIS-0238, Albuquerque, NM, January 1999.

DOE 1999b — United States Department of Energy, *Record of Decision: Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory in the State of New Mexico*, 64 FR 50797, September 20, 1999.

DOE Order 435.1 — Radioactive Waste Management. U.S. Department of Energy, Washington D.C., August 2001.

LANL in preparation — Los Alamos National Laboratory, *SWEIS Yearbook-2002*, in preparation, Los Alamos, NM. August 2003.

LANL 2001 — Los Alamos National Laboratory, *SWEIS Yearbook-2000*, LA-UR-01-2965, Los Alamos, NM. July