National Nuclear Security Administration

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

Modification of Management Methods for Transuranic Waste Characterization at Los Alamos National Laboratory

DOE Albuquerque Operations Office
Office of Los Alamos Site Operations

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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) adequately addresses the environmental effects of a waste management proposal for installing and operating modular units for the characterization of transuranic (TRU) waste[1] at the Los Alamos National Laboratory (LANL) Technical Area (TA)-54, Area G, 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 EIS when an agency makes substantial changes in the proposed action that are relevant to environmental concerns or there are circumstances or information relevant to concerns and bearing on the proposed action or its impacts. This SA is prepared according to the requirements for determining the need for supplemental EISs (10 CFR 1021.314 [c]) in the Department of Energy's (DOE's) regulations for NEPA implementation that direct that when it is unclear whether a supplement to an EIS is required, an SA be prepared to assist in making that determination.

This SA specifically compares key impact assessment parameters of the waste management program evaluated in the SWEIS with those of a proposal that would change the approach of a portion of this management program. It also provides an explanation of any differences between the proposed action and activities described in the previous SWEIS analysis.

DOE proposes to expedite the shipment of legacy TRU waste to the Waste Isolation Pilot Plant (WIPP) in Carlsbad, New Mexico. The Cerro Grande Fire in 2000 and events of September 11, 2001, have focused attention on the potential risk to the public and the credible security hazard posed by the amount of plutonium stored above ground at LANL and the increased necessity to safeguard our nation's nuclear waste. The safest place for

[1] TRU waste: Radioactive waste that is not classified as high-level radioactive waste and that contains more than 100 nanocuries (3,700 becquerels) per gram of alpha-emitting transuranic isotopes with half-lives greater than 20 years. Derived from 40 CFR 191.02

defense-generated TRU waste has been determined to be DOE's permitted repository for TRU waste 2100 feet underground at WIPP. The proposed accelerated plan to dispose of TRU waste at WIPP would result in the complete disposition of LANL legacy TRU waste by 2010; this accelerated disposition would be 20 years ahead of schedule, at a savings of $500 million in life-cycle costs and result in 3,000 fewer shipments to WIPP. However, the current individual small facilities at LANL lack the buildings, equipment, and trained personnel to conduct efficient characterization activities on an increased scale. Installing new, modular structures and equipment close to the drum storage location at TA-54 in housings designed for a large inventory and high throughput would save both time and money involved in waste characterization, repackaging, and transfer to WIPP, and it would also decrease on-site transportation vulnerabilities.

Background

DOE's complex-wide waste management strategy includes shipping TRU waste from generator sites to WIPP. LANL generates TRU waste as part of its ongoing operations; in addition, LANL has stored approximately 9,000 cubic meters of legacy waste, or waste from its past operations. Both the SWEIS and DOE's Waste Management Programmatic EIS (DOE 1997) have analyzed the impacts of shipping LANL's TRU waste to WIPP.

WIPP has established waste acceptance criteria (WAC) for TRU waste. As described in its Waste Management Strategies Document (LANL 1997) prepared as background information for the SWEIS, before LANL can ship TRU waste to WIPP, LANL is required to demonstrate that the TRU waste packages (drums) meet the WIPP WAC. If individual drums do not meet these WAC requirements (specifically, if they contain unacceptable items or exceed the total per drum radioactivity limits), the drums must be opened so that waste items within the drums can be removed and repackaged. Waste characterization is the process of identifying and quantifying the constituents of concern in waste streams. The principal elements in the characterization of waste drums include:

- *Non-destructive examination (NDE)*, which generally involves X-raying a drum to examine its contents;

- *Non-destructive assay (NDA)*, which involves the measurement of the type and amount of radioactive material in a drum without opening it;
- *headspace gas analysis*, which involves taking a sample of the gas in the drum headspace to ensure the volume is not dangerous (i.e., explosive);
- *gas generation rate analysis*, which involves sampling the gas over time to ensure the rate of increase is not dangerous;
- *visual examination*, which requires opening a drum and inspecting its contents; and
- *repackaging*, which includes redistributing a particular drum's contents into multiple drums.

WIPP WAC and Department of Transportation (DOT) regulations impose limitations on the concentration of flammable gases in a drum headspace prior to transportation; there are also limits to the concentrations of gases that could present concerns to workers in the repository at WIPP or above ground workers if the gases were released in the shipping container. Repackaging is performed for four principal reasons: to divide waste between multiple drums to meet individual drum disposal requirements for wattage (heat generated by radioactive material) and hydrogen generation rate; to remove individual waste items that do not meet disposal requirements; to repackage waste drums with flammable headspace gas concentration; and to visually examine wastes. Drums with waste that exceed the wattage limit or that have a hydrogen generation rate that exceeds the WIPP WAC limit must be opened and the waste divided into multiple drums, each of which does not exceed these acceptance limits; this is known as "volume expansion." NDE and NDA can reveal individual waste items that cannot be shipped to WIPP and must be removed from the drums. NDA may also indicate an amount of radioactive material that exceeds transportation limits. Waste drums with flammable headspace gas (gases of concern are primarily volatile organic compounds, but can include hydrogen) concentrations that exceed flammability or toxicity limits must be repackaged, and often the waste must be remediated or treated before disposal can occur. Items that have to be visually examined to ensure WIPP WAC are met also must be repackaged after examination has occurred.

Currently, TRU wastes are characterized (including equilibration and headspace gas analysis) and repackaged at TA-50 within the Waste Characterization, Reduction, and Repackaging (WCRR) facility located in Building 50-69. The facility contains a high-efficiency particulate air (HEPA)-filtered glovebox that can repackage one waste drum at a time. A waste drum is placed into a plastic bag, brought to a glovebox bag-on port, and the bag sealed around this port. The lid of the bagged-on waste drum is removed, waste is pulled out into the glovebox and sorted into an empty drum attached to the bag-out port. Because there is only one bag-out port in this glovebox, only one "daughter" drum can be filled at a time (daughter drums are new drums that result from the repackaging operation). If volume expansion is necessary, successive daughter drums must be attached to the bag-out port and filled to accommodate all of the waste in compliance with the WIPP WAC. Empty waste drums are disposed of as low-level radioactive waste. Under present conditions, characterization of LANL's inventory is slower than the generation of new waste.

Because the buildings at TA-50 do not have the necessary rating for substantial storage and processing, wastes are then transported to TA-54 for storage pending disposition to WIPP. A road closure is required to transfer material from TA-50 to TA-54, a distance of 4.5 miles (7.3 kilometers).

Proposed Action

LANL is proposing to install a series of modular units (MUs) in previously developed land at TA-54. Three MUs would be used for repackaging operations. Two of the repackaging MUs would be dedicated to repackaging operations and would be connected by to a third MU that would be used as a command and oversight capability. As part of the Proposed Action, a new unit for headspace gas analysis and gas generation rate testing would be relocated to Building 54-33, a building that is currently used for drum venting. Each of the repackaging MUs would contain two HEPA-filtered gloveboxes, allowing a total of four waste drums to be repackaged simultaneously. Each glovebox would have four bag-out ports so that four daughter drums could be generated at one time per glovebox. A waste drum would be placed into a plastic bag and brought to each

glovebox bag-on port, and the bag would be sealed around this port. The lid of the bagged-on waste drum would then be removed, waste would be pulled out into the glovebox and would be sorted into empty drums attached to each of the four bag-out ports. The net result is that 16 daughter drums could be readied for shipment to WIPP in the same time that current operations at TA-50 can produce only one drum for shipment. Drums to be repackaged would include legacy waste inventory that falls under the four categories listed above and newly generated waste drums as needed. There are about 15,000 drums containing legacy waste in storage at LANL. Current analysis of approximately 5,000 drums indicates that about 25 percent of the total would require repackaging, or a bounding number of 4,000 drums. Currently generated TRU waste is packaged to meet WIPP WAC and would not ordinarily need to be repackaged. Empty waste drums would be disposed of as low-level radioactive waste at LANL. Personnel would follow hazard control plans and wear appropriate personal protective equipment (PPE) when conducting the proposed work at the MUs.

All of the MUs would meet the requirements for a Hazard Category 2, Performance Category 3 nuclear facility. The MUs and safety-significant equipment would meet the requirements for dynamic seismic analysis, wind loading requirements, and all Hazard Category 2, Performance Category 3 design requirements that apply to concrete fixed nuclear facilities. Standard construction equipment and practices would be used to install the MUs. Lifting points on the MUs are designed for use by cranes. The MUs would serve as a protective shell for the characterization or repackaging operation for TRU waste characterization. The outside dimensions of the MUs are about12-ft wide by 12-ft high and 45-ft long. Walls and floors are about 6-inches thick. The MUs are fire-rated and insulated with non-combustible insulation; the inside of the MUs is lined with stainless steel, which provides a radioactive material release barrier and can be decontaminated easily. Seams of the MUs are sealed. There is one door opening on each end of an MU, and two door openings on each side, any of which can be sealed with a blind metal plate if they are not needed. The MUs would be equipped with HEPA filtration and other necessary engineering controls. All penetrations, such as for ducts, pipes, and conduits, would be hermetically sealed.

The existing Storm Water Pollution Prevention Plan (SWPPP) for TA 54 Area G would be amended before the MUs were installed. Best Management Practices (BMPs) would be used to prevent erosion and migration of disturbed soil from the site. LANL's air quality staff has developed, submitted, and received approval for a Radiological National Emission Standards for Hazardous Air Pollutants (Rad-NESHAP) pre-construction application to the Environmental Protection Agency (EPA).

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 in order 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 from the SWEIS with the exception of the level of 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.

The inventory of TRU waste to be processed under the Proposed Action would not change from the inventory described in the SWEIS. The inventory to be processed is the total quantity of TRU waste that would be received and managed over the next ten years by the waste management program. The material under consideration for the Proposed Action is the legacy waste to be shipped to WIPP for disposal; it is expected that the TRU waste generated from current operations would be packaged according to current waste acceptance criteria, The SWEIS analysis addressed the annual generation of 19,300 cubic feet (546 cubic meters) of TRU waste and the characterization of a total of 318,000 cubic

feet (9,010 cubic meters) of legacy TRU waste for shipment to WIPP over a ten-year period. This proposal to increase the facilities for characterizing and repackaging TRU waste would not change those estimated waste operation and characterization amounts and would allow the TRU waste drums to be shipped to WIPP in the timeframe analyzed in the SWEIS.

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 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 effects 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, air emissions or 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.

The resources identified in Table 1 that would be affected by the Proposed Action are radioactive air emissions and air pathway dose, and low-level waste generation. The following paragraphs discuss these potential effects and describe how these effects are bounded by the projected total effects in the SWEIS.

Radioactive Air Emissions and Air Pathway Dose The SWEIS analysis projected annual total radioactive air emissions of 21,700 curies for LANL (LANL 2001). The actual total annual emissions for the year 2000 (LANL 2001) was 3100 curies, or approximately 15 percent of the projected amount. The EPA-approved pre-construction application projects annual emissions for the Proposed Action of 0.25 curies for Pu-238 and 0.0171 curies for Pu-239 (LANL 2002). These would be the only radioactive emissions for the process, giving total annual emissions of 0.27 curies for this process. The increase of 0.27 curies

Table 1. Potential Effects of the Proposed Action

Resource Area	SWEIS/ROD	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-environment already disturbed
Noise	Continued ambient noise at existing levels, temporary and minor noise associated with construction and explosives testing.	No effect except for temporary construction.
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	0.27 curies would be added to actual annual emissions - see additional discussion below
Public Health-Radiological	Air pathway dose: LANL MEI: 5.4 mrem/year of operation	Air pathway dose: LANL MEI: 0.077 mrem/ yr - see additional discussion below
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; construction would take place in developed area
Traditional Cultural Properties	Unknown due to lack of information on specific traditional cultural properties.	No changes projected; construction would take place in developed area
Waste Management Annual LLW (Includes low-level mixed)	16,813 cubic yards (12,873 cubic meters)	142 cubic yards (108 cubic meters) - see additional discussion below

from the proposed action added to the actual total emissions would be well below the projected amount analyzed in the SWEIS ROD.

The SWEIS analysis projected an annual maximum offsite dose, or dose to the LANL maximally exposed individual (MEI), from radioactive air emissions of 5.4 millirem (mrem). The estimated air pathway dose for the year 2000 is estimated to have been 0.65 mrem (LANL 2001). The Proposed Action would result in an annual dose of about 0.077

mrem; thus the incremental dose projected from installing and operating the MUs would not cause LANL operations to approach the maximum offsite dose projected by the SWEIS analysis and ROD.

Radioactive Waste The SWEIS projected that LANL annual low-level waste generation would be 16,813 cubic yards (12, 230 cubic meters) per year. LLW generation in 2000 was approximately one-third of this volume, or 5,482 cubic yards (4,217 cubic meters) (LANL 2001). Repackaging operations under this Proposed Action would result in emptying up to 4,000 parent drums of TRU waste. The parent drums would be compacted and disposed of as low-level waste. The total LLW waste volume would be about 142 cubic yards (108 cubic meters), which would not cause LANL annual LLW generation to approach the larger amount of LLW generation projected in the SWEIS. In addition, there would be some LLW generated from operations; this waste was included in the original SWEIS analysis.

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. Accident RAD-08 in the SWEIS describes an airline crash into a waste storage dome once it was fully loaded (DOE 1999a). The MU for repackaging could contain up to 4 drums; thus the results of any accident involving the MUs 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 the level of plutonium pit production. 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.

This SA addresses the proposal to install and operate certain MUs at TA-54 for characterizing and repackaging TRU waste that is to be shipped to WIPP in the next ten years. The SWEIS included analysis of the waste characterization capability and the shipment of legacy and annually generated TRU waste to WIPP in the ten-year timeframe covered by the SWEIS. The amount of TRU waste in this proposal is the same as that analyzed in the SWEIS; however, the SWEIS did not specifically analyze the repackaging of approximately 4000 drums of TRU waste that might not meet the WIPP WAC. This SA describes the potential environmental effects of the repackaging operations and demonstrates that the effects are bounded by the effects of LANL operations in the SWEIS ROD.

The environmental effects of the Proposed Action would be slightly increased annual radioactive air emissions (by an additional 0.27 curies) and a corresponding increase of 0.077 mrem dose to the off-site MEI; these are bounded by the projected SWEIS air emissions and doses, which are well above the demonstrated actual level of emissions and radioactive doses. There would be some low-level waste generated by emptying drums of TRU waste that would not be accepted at WIPP; this amount of low-level waste added to LANL's annual level of generating low-level waste from current operations is still well within the SWEIS projections of annual low-level waste generation and disposal.

FINDING: The United States Department of Energy, National Nuclear Security Administration finds that the environmental effects of the Proposed Action are adequately bounded by the analyses of impacts projected by the 1999 *Site-wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory*, and no Supplemental EIS is required. The Department of Energy, National Nuclear Security Administration makes this Finding pursuant to the National Environmental Policy Act of 1969 [42 U.S.C. 4321 et seq.], the Council on

Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act [40 CFR 1500] and the Department of Energy National Environmental Policy Act Implementing Procedures [10 CFR 1021].

Signed in Los Alamos, New Mexico this _____ day of _____, 2002

Ralph E. Erickson, Director
Office of Los Alamos Site Operations

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