DOE/EIS-0238-SA-04

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

Recovery and Storage of Strontium-90 (Sr-90) Fueled Radioisotope Thermal Electric Generators at Los Alamos National Laboratory

January 2004

Department of Energy
National Nuclear Security Administration
Los Alamos Site Office

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 recovery and storage for disposal of six strontium-90 (Sr-90) fueled radioisotope thermal electric generators (RTGs) 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 when there are new circumstances or information relevant to environmental 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 NEPA implementation that state "When it is unclear whether or not an EIS supplement is required, DOE shall prepare a Supplement Analysis."

DOE's National Nuclear Security Administration (NNSA) proposes to recover and store six Sr-90 RTGs[1] from the commercial sector as part of its Offsite-Source Recovery Project (OSRP). The OSRP focuses on the proactive recovery and storage of unwanted radioactive sealed sources exceeding the United States Nuclear Regulatory Commission (NRC) limits for Class C low-level waste (also known as Greater than Class C waste, or GTCC). In response to the events of September 11, 2001, NRC conducted a risk-based evaluation of potential vulnerabilities to terrorist threats involving NRC-licensed nuclear facilities and materials. NRC's evaluation concluded that possession of unwanted radioactive sealed sources with no disposal outlet presents a potential vulnerability (NRC 2002). In a November 25, 2003 letter to the manager of the NNSA's Los Alamos Site Office, the NRC Office of Nuclear Security and Incident Response identified recovery of several Sr-90 RTGs as the highest priority and requested that DOE take whatever actions necessary to recover these sources as soon as possible.

This SA specifically compares key impact assessment parameters of this proposal to the offsite source recovery program evaluated in the SWEIS and a subsequent SA that evaluated a change to the approach of a portion of the recovery program. It also provides an explanation of any differences between the Proposed Action and activities described in the previous SWEIS and SA analyses.

[1] An RTG is a source of self-contained power for various independent types of equipment with a steady voltage ranging typically 7 to 30 volts or less and the power capacity of a few watts up to 80 watts. RTGs are used in conjunction with various electrotechnical devices that accumulate and transform the electric energy produced by the generators. Common applications for RTGs include uses as power sources for navigation beacons and seamarks, or other low wattage devices employed in remote locations without reliable sources of electrical energy.

Background

History of Radioactive Sealed Sources

Radioactive sealed sources have been used by qualified public and private organizations since the early 1950s. Since the passage of the Atomic Energy Act of 1954, qualified public and private organizations have been licensed to possess and use nuclear material for a wide variety of applications such as measuring the thickness of materials. Tens of thousands of radioactive sealed sources containing materials such as cobalt-60, cesium-137, americium-241, and plutonium-239 and -238 were manufactured, licensed by NRC, and distributed. These radioactive materials were placed within multiple stainless steel jackets and welded closed; hence, they are referred to as "sealed" sources. In most cases, the radioactive material for use in the sealed sources was produced and provided by the Atomic Energy Commission, a predecessor agency to DOE. Most of these sealed sources are still held under NRC or Agreement State radioactive materials licenses. During this period of radioactive source manufacture and use, future disposal mechanisms were not defined.

Sealed sources are now becoming excess and unwanted to their holders because: (1) design specification and certification requirements change over time, rendering older types of sealed sources obsolete for their originally intended purposes; (2) economic downturns in commercial industries using sealed sources result in many nuclear businesses no longer having a need for the sealed sources; and (3) in some instances, firms are going out of business and can no longer ensure responsible handling and storage of the sealed sources. Unwanted and excess sealed sources present a public health and safety risk when abandoned, lost, or disposed of inappropriately. There are no NRC-licensed disposal facilities currently available for these sealed sources. GTCC sealed sources exceed the requirements for disposal at existing NRC-licensed facilities.

Recognizing the public danger posed by excess and unwanted radioactive sealed sources, Congress included their disposal in Public Law 99-240 (the *Low-Level Radioactive Waste Policy Amendments Act of 1985*). This Act assigned DOE the responsibility for disposal of NRC-regulated low-level radioactive waste categorized as GTCC (commercial). Approximately 21,000 GTCC sealed sources that have no disposal path exist within the commercial sector. Sealed source recovery by DOE has been limited to emergency recoveries and long-term disposition strategies have not been aggressively studied.

From 1979 to 1999, DOE recovered excess and unwanted radioactive sealed sources containing plutonium-239 and beryllium on a case-by-case basis as requested by NRC. Approximately 1,100 of these unwanted neutron-generating sealed sources and other sealed sources were recovered from regulated licensees, DOE sites, and other governmental agencies and sent to LANL. At LANL, these plutonium-239 and beryllium sealed sources were opened, their radioactive contents chemically separated, and their radioactive products and wastes were separately stored.

However, since the early 1990s, DOE has encountered increased costs and inefficiencies associated with the mechanics of case-by-case-type response to NRC requests for the recovery and management of unwanted or abandoned sealed sources. Facing an overall scope of several thousand of these sealed sources, a more proactive approach to recovery and management was required. Consequently, in 1995, LANL received additional DOE funding to build on the existing ability of LANL to receive and chemically process plutonium-239 and beryllium sealed neutron sources. The University of California (UC), as the Management and Operations contractor of LANL, was asked to develop and recommend a plan to receive surplus sealed sources containing americium-241 or plutonium-238 blended with beryllium. UC chose a management strategy that would continue and enhance the process of chemically separating the radioactive components from certain recovered sources, and store this nuclear material for future reuse, and process the generated waste to the Waste Isolation Pilot Plant (WIPP) for appropriate disposal and DOE approved the implementation of this plan. This strategy, identified as the Radioactive Sources Recovery Program (RSRP), and its environmental effects were evaluated in the DOE's *Environmental Assessment for the Radioactive Source Recovery Program* (DOE/EA-1059) issued December 20, 1995. An expanded RSRP was subsequently incorporated into the 1999 SWEIS and the attendant environmental effects assessed.

Site-Wide Environmental Impact Statement and Record of Decision for the Continued Operation of the Los Alamos National Laboratory

The September 1999 Record of Decision (ROD) for the SWEIS documents DOE's decision to continue to operate LANL for the foreseeable future and to expand the scope and level of its operations. Pursuant to the ROD, DOE implemented the selected Expanded Operations Alternative at LANL. This alternative expanded most operations at LANL, and, as the need arises, allows UC to increase the level of existing operations to their highest reasonably foreseeable levels analyzed in the SWEIS Expanded Operations Alternative, and to fully implement the mission elements assigned to the LANL site. This alternative includes the expansion of the low-level waste disposal site and of TRU waste storage at Technical Area (TA)-54, Area G.

The Expanded Operations Alternative reflects the activities described for the RSRP (see above); specifically, sealed source receipt, storage, radioactive material separation of certain isotopes, radioactive material and waste disposal and storage, but at higher rates or greater volumes than analyzed previously in the 1995 EA. The projected sealed source material chemical separation rate is identified in the SWEIS as being 10,000 curies (Ci)/year for the 10-year analysis period of the SWEIS (or 100,000 Ci total for 10 years). These activities are reflected as integral elements of facility capabilities, such as the Plutonium Facility Complex and the Chemical Research and Metallurgy Building. All parameters from this activity related to the environmental impacts were included in the SWEIS analysis. The SWEIS also addressed the overall planned expansion of Area G and associated environmental effect. The SWEIS envisioned a 10-year period for the management of radioactive sealed sources with a plan for final disposition developed during this period.

Supplement Analysis for Modification of RSRP

In 2000, NNSA prepared a SA (DOE/EIS-0238-SA-01) (DOE 2000) to evaluate the environmental impacts of changing the management approach of the recovery program at DOE as it was previously identified and evaluated in the 1995 EA and the LANL SWEIS described above. Rather than a program that would provide for chemical separation of certain radioactive materials from the recovered sources, and storage of this separated nuclear material with the processing of the resulting waste material to WIPP, sealed sources would be packaged (at the origination point or consolidated at a licensed commercial facility under contract to DOE) in multifunctional shielded containers and shipped directly to LANL for storage as waste items at TA-54. Except for those containers of sealed sources that would be eligible for shipment to WIPP (defense-related sources), the waste containers would be placed in interim retrievable storage along with similar transuranic (TRU) waste[2] that is stored at TA-54, Area G and held there until an appropriate waste disposal facility became available.

The SA demonstrated that the environmental impacts of the proposed management strategy were bounded by the environmental impacts analyzed in the SWEIS. NNSA made a determination that the SWEIS analysis was adequate and that no further NEPA review was required and this management approach was then implemented at LANL

Proposed Action

NNSA is now proposing to recover six Sr-90 RTGs from the commercial sector and to place these RTGs in storage at TA-54, Area G pending their future disposal when an appropriate disposal site becomes available. These six RTGs, which are different from the sealed sources previously evaluated through the NEPA compliance process for storage at LANL, are located at two sites outside the institutional control of a DOE or Department of Defense (DOD) facility. These RTGs are considered to be a number one priority for recovery from the public sector by the NRC. These six RTGs vary in radioactivity from 3000 to 65000 ci. Each RTG was constructed as a certified Department of Transportation (DOT) Type B container, meeting the DOT requirements for transport on public roadways. Radiation levels on the outside of the packages are less than 10 mRem/hr at 1 meter (3.2 feet) distance.

Operations in the recovery of the RTGs would be the same as those currently used by the OSRP for recovery of plutonium-238, plutonium-239 and americium-41 sealed sources. The RTGs would be examined at their current location by LANL OSRP staff to ensure that a DOT-compliant transfer of the RTGs to LANL could be made. All six of the RTGs would have NRC Type-B certification for transportation, as required by 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."

[2] Transuranic waste is radioactive waste containing more than 100 nanocuries (3700 becquerels) of alpha-emitting transuranic isotopes per gram of waste, with half-lives greater than 20 years. Transuranic isotopes are those alpha emitting elements having an atomic number greater than that of uranium (90), and a half life greater than 20 years.

The RTGs would be transported to LANL by commercial carriers in two shipments. Upon receipt at TA-3, General Receiving, the RTGs would be inspected to ensure that they meet LANL waste management requirements. Radiation and contamination surveys would be performed by LANL Radiological Control Technicians. The RTGs would then be shipped from TA-3 to TA-54 in accordance with routine LANL waste management operations, using a road closure if required. Upon receipt at TA-54, the necessary inspections and radiological surveys required for placement within Area G would be completed. The data required for storing the RTGs would be entered into the Waste Management Database under the designated waste profile form.

The RTGs would be stored in Shaft 300 within Area G. A lifting platform capable of supporting, lowering and raising all six RTGs while maintaining the appropriate safety factor is available for dedicated use to perform these actions. Because the RTGs would be shipped to LANL in two different shipments, the RTGs would be loaded into Shaft 300 in two separate operations. The RTGs would be stored directly on the lifting platform within the shaft.

As discussed in the SWEIS and the 1990 SA, DOE has not yet determined the disposition path for the sealed sources. After that determination is made sometime in the future, the RTGs would be raised from Shaft 300 and dispositioned as appropriate.

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 foreseeable future over about the next ten years 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 a certain nuclear weapons related manufacturing operation. Thus, DOE has complied with NEPA, through its analysis in the SWEIS, for ongoing or proposed operations and capabilities for operations at LANL over the foreseeable future as these were envisioned in 1999.

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 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, low-level waste storage 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	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-Storage would be in area that is already disturbed.
Noise	Continued ambient noise at existing levels, temporary and minor noise associated with construction and explosives testing.	No effect.
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. The proposal concerns sealed sources. No air emissions would be expected from storage of these sources.
Public Health-Radiological	Air pathway dose: LANL MEI: 5.4 mrem/year of operation	Air pathway dose: No emissions, no change 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; storage would take place in developed area.
Traditional Cultural Properties	Unknown due to lack of information on specific traditional cultural properties.	No changes projected; storage would take place in developed area.
Waste Management: Annual LLW (Includes low-level mixed)	16,813 cubic yards (12,873 cubic meters)	6.55 cubic yards (5 cubic meters) occupied within the storage shaft.
Transportation		Two onsite shipments that may require road closures.

The only resource identified in Table 1 that would be affected by the Proposed Action is low-level waste generation. Although the Proposed Action does not address the ultimate disposal of the RTGs, these RTGs would be stored at TA-54, Area G for an indeterminate interim period until an appropriate disposal site became available. (The construction and operation of such a facility would undergo a separate NEPA compliance process.) The SWEIS projected that LANL annual low-level waste generation would be 16,813 cubic yards (12,230 cubic meters) per year. The average annual low-level waste generation for LANL from 1999 through 2002 was about a quarter of this volume, or about 4310 cubic yards (3954 cubic meters) (based on LANL 2003). The total low-level waste that would

result from implementing the Proposed Action would be about 6.55 cubic yards (five cubic meters). This amount, when combined with a projection of low-level waste generation for LANL based on the average actual waste generation figures from 1999 through 2002, would not be expected to result in an exceedance of the LANL annual LLW generation amount projected and analyzed in the SWEIS.

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 accident scenario in which an airline crashes into the four waste storage domes that were fully loaded with drums of low-level waste (DOE 1999). Each dome was assumed to contain 4,041 PE-Ci (plutonium equivalent curies) as combustible TRU waste and 7,854 PE-Ci of noncombustible TRU waste. The total decayed content of the six RTGs identified for recovery and storage is 269 PE-Ci; these would be stored in a shaft that does not contain other radioactive material, so that the material at risk would be far less than the material at risk in a breached fully loaded waste storage dome such as the one analyzed in the SWEIS accident scenario. Thus, the results of any accident involving the RTGs 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 at the Expanded Operations Level with a modification to a certain nuclear weapons related manufacturing operation.(the Preferred Alternative). The SWEIS provides the NEPA compliance analysis for the Preferred Alternative projected activities of LANL facilities and the facility capabilities at the operations level analyzed in the SWEIS would not require further NEPA compliance analysis.

This SA addresses the proposal to recover and store six specific Sr-90 RTGs within LANL's TA-54, Area G. The SA demonstrates that the effects are bounded by the effects of LANL operations analyzed in the SWEIS ROD. The Proposed Action would result in a small amount of GTCC low-level waste with no disposal path forward to be stored at TA-54 for an indeterminate period of time; this amount of low-level waste is not projected to result in an exceedance of the SWEIS projections for 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 _____, 2004

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Ralph E. Erickson, Manager
Los Alamos Site Office

References

10 CFR Part 71 Code of Federal Regulations "Packaging and Transportation of Radioactive Material."

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