



Assessment of Radioactive Waste Management at the Los Alamos National Laboratory

Interim Report

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Office of Enterprise Assessments
U.S. Department of Energy

Assessment of Radioactive Waste Management at the Los Alamos National Laboratory August 16-30, 2019 Interim Report

Overview

This assessment is in response to the Deputy Secretary of Energy's July 9, 2019, memorandum directing the Office of Enterprise Assessments (EA) to undertake a U.S. Department of Energy (DOE)-wide assessment of the procedures and practices for packaging and shipping radioactive waste. The assessment activities focused on waste management performance of Los Alamos National Laboratory (LANL) management and operating contractor, Triad National Security, LLC (Triad). Waste management activities include characterizing, packaging, and shipping low-level waste (LLW) and mixed low-level waste (MLLW) for disposal. An assessment of Triad's and the DOE Office of Environmental Management's transuranic waste management practices will be completed separately in December 2019. The first week of the assessment of LLW and MLLW waste management was conducted concurrently with Nevada National Security Site radioactive waste acceptance program personnel, using a collaboratively developed assessment approach. The assessment team, identified in Appendix A, examined a sample of waste generator operations representing about 80% of the total waste shipped to a disposal facility. Triad's diverse control strategy (defense-in-depth) for its waste management processes, from the generator to final packaging, is illustrated in Appendix B.

This report provides the interim results of the assessment of LLW and MLLW management at LANL, addressing non-compliances and apparent causes contributing to weaknesses. At the conclusion of the enterprise-wide assessment, a final compilation report will include the results of this summary. The perspective gained by conducting this assessment could change as additional information becomes available from subsequent site assessments. The final compilation report will identify best practices, lessons learned, and cross-cutting recommendations.

DOE Order 227.1A, *Independent Oversight Program*, describes and governs the DOE independent oversight program, which EA implements through a comprehensive set of internal protocols, operating practices, assessment guides, and process guides. DOE Order 227.1A defines the terms best practices, findings, deficiencies, opportunities for improvement, and recommendations. In accordance with DOE Orders 227.1A and 226.1B, *Implementation of Department of Energy Oversight Policy*, it is expected that the site will analyze the causes of identified findings and deficiencies in this summary, develop corrective action plans for findings, and implement compensatory corrective actions for program and performance deficiencies.

Summary

Overall, Triad's waste management program ensures proper characterization, packaging, and shipping of radioactive waste for disposal, and the National Nuclear Security Administration (NNSA) Los Alamos Field Office (NA-LA) maintains adequate operational awareness of radioactive waste management activities. The assessment found no findings, one interim recommendation, and no opportunities for improvement. The assessment identified four Triad deficiencies, including radiological detectors with calibration stickers with expired dates, potentially inaccurate waste package shipping records, some issues not entered into the issues management system, and lack of assessments of waste stream control at the point of generation. Two NA-LA deficiencies were also identified in lack of timely completion of the Federal technical qualification for waste management oversight staff and not including waste stream

control at the point of generation in radioactive waste management program oversight. In addition, this assessment found that the self-assessments performed by Triad, as required by the NNSA Chief of Staff's July 16, 2019, memorandum, addressed all but one element of the memo. NA-LA and Triad conducted a collaborative self-assessment consisting of document reviews of previous assessments and interviews that addressed the specified elements but did not evaluate any field practices, contrary to the memorandum's direction. NA-LA stated that the scope of the self-assessment was negotiated with NNSA Headquarters (HQ), NA-50, Associate Administrator for Safety, Infrastructure, and Operations. Although the deficiencies did not result in mishandling of LLW and MLLW, management attention is warranted to reduce the risk of mishandling in the future. Although the peer reviews are underway, the peer review for this site had not been completed at the time of this assessment. The results of the peer reviews will be addressed in the compilation report.

Positive Attributes

Waste Characterization

- Triad uses surrogate containers to model the potential error in estimation of the isotope activity caused by waste distribution and geometries. These models provide a reasonable determination of potential impacts of variations in source distribution and self-shielding within standard waste matrices.
- The isotopic activity of all waste packages destined for disposal is measured by gamma spectroscopy as part of waste package certification. The computer software used for gamma spectroscopy energy line analysis appropriately tracks all gamma energy lines to a complete library of nuclides.

Waste Stream Control

- Waste management coordinators (WMCs), assigned to all waste generators, engage with waste generators at the point of waste generation by reinforcing waste management requirements and providing guidance. Interviewed waste generators emphasized the importance of WMC involvement in their activities.
- WMCs have the appropriate security clearances, and waste generators provide sufficient access to classified information to allow proper characterization of classified items in the waste stream.
- Some WMCs have instituted waste container inventory forms to validate waste profile conformance, improving waste generator accountability and assurance of waste stream integrity.

Packaging and Shipping

- Triad verifies waste package compliance through a dual independent verification process that provides increased confidence that waste packages do not contain prohibited items.
- An in-depth review of three shipping records, which compared the documented package and contents with the requirements and waste profiles, confirmed compliance with Department of Transportation regulations and the disposal facility waste acceptance criteria.
- Triad provides in-depth briefings to waste shipment drivers, including authorized and restricted routes, emergency contacts, and response to accidents or other delays.

Quality Assurance

- The Triad automated Waste Compliance and Tracking System (WCATS) assists all organizations in implementing the waste management program requirements to ensure that waste is properly managed.

WCATS provides tracking from the waste generator, through characterization, packaging, certification, and shipping.

- Ten Triad Institutional Quality and Performance Assurance (IQPA) independent assessments conducted over the past year exhibited proper attention to waste packaging and shipping performance and a self-critical approach.

Federal Oversight

- The NA-LA waste management subject matter expert (SME) was knowledgeable of Triad's waste management activities and exhibited a questioning attitude.

Findings

The assessment identified no findings.

Deficiencies

Deficiencies are inadequacies in the implementation of an applicable requirement or standard. Deficiencies that did not meet the criteria for findings are listed below, with the expectation from DOE Order 227.1A for site managers to apply their local issues management processes for resolution.

- **Deficiency D-Triad-1:** Contrary to SD330, *Los Alamos National Laboratory Quality Assurance Program*, Section 301, three gamma spectroscopy detectors available for radiological characterization of waste packages had incorrect and expired calibration stickers, and the equipment was not removed from service to prevent use. Subsequent to the site visit, NA-LA provided indication that the gamma spectroscopy detectors were calibrated and within the appropriate three year calibration interval. In addition, NA-LA updated the incorrect calibration stickers with the correct expiration information.
- **Deficiency D-Triad-2:** Contrary to 49 CFR 173.433, (c) (2) and (g), three shipping records that were reviewed did not reflect the activity levels of all potentially significant isotopic constituents. Reported isotopes were exclusively based on gamma spectroscopy results, which do not identify low energy x-rays and beta emitters. Given the known isotopic parent-daughter relationships, the low energy x-rays and beta-emitting parent isotopes should have been determined and identified on the shipping records.
- **Deficiency D-Triad-3:** Contrary to P322-4, *Issues Management*, Section 3.2.1, three reviewed Triad Environmental Protection and Compliance Division (EPC) management assessments identified performance deficiencies (i.e., bags of waste containing prohibited items and personnel not completing required waste management training) as "recommendations" that were not entered into the Triad Issues Management System, thereby precluding the opportunity for trending. Although the recommendations were not entered into the Issues Management System, Triad implemented corrective actions.
- **Deficiency D-Triad-4:** Contrary to DOE Order 226.1B, Contractor Requirements Document, Section 2.b (2), IQPA independent assessments and EPC management assessments over the past year have not routinely evaluated waste stream control at the point of waste generation. None of the 10 reviewed IQPA independent assessments and only one of three reviewed EPC management assessments provided any indication of an interview with waste stream generators. Triad interviewees stated that except for the required hazardous waste inspections, neither Triad nor

external assessors have ever focused on waste generators' performance. These elements of the waste management processes provide the first line of defense that ensures control of the waste stream.

- **Deficiency D-NA-LA-1:** Contrary to DOE Order 426.1A, *Federal Technical Capability Program*, 4.b.(5)(a), NA-LA's two personnel assigned as waste management SMEs have not completed the waste management technical qualification program within the prescribed time period, and no associated compensatory measures have been implemented. NA-LA is evaluating ways to expedite qualification of the waste management SMEs.
- **Deficiency D-NA-LA-2:** Contrary to DOE Manual 435.1-1, *Radioactive Waste Management Manual*, Chapter I, Section 2.F.(10), NA-LA's oversight of radioactive waste management program activities is limited. Specifically, NA-LA oversight has not included any focus on individual waste generators' activities (e.g., waste segregation and control) prior to WMC waste accumulation activities. This assessment approach, similar to Triad's discussed in Deficiency D-Triad-4, misses the opportunity to evaluate the primary waste stream's greatest potential for uncertainty or vulnerability.

Other Areas of Weakness

Other areas of weakness represent potential vulnerabilities that warrant site management's consideration but do not rise to the level of a finding or deficiency as defined in DOE Order 227.1A. The site should review these vulnerabilities and take appropriate actions. These weaknesses will be further reviewed against subsequent enterprise-wide site assessments to determine whether the vulnerability is cross-cutting and warrants an enterprise-wide response.

Federal Oversight

- Contrary to the NNSA Chief of Staff's memorandum of July 16, 2019, NA-LA and Triad's collaborative self-assessment did not evaluate implementation of waste management procedures and practices through observation of field performance. However, the assessment reports reviewed did evaluate implementation of waste management procedures and practices in the field. NA-LA stated that the self-assessment was limited to the scope conducted based on negotiations with NNSA-HQ, NA-50.

Interim Recommendations

Interim recommendations are intended to capture the evolving need for possible DOE management attention based on identified conditions from a single or multiple-site assessment. Interim recommendations should be considered suggestions for improving program or management effectiveness.

- It is recommended that the Federal office and the management and operating contractor increase their oversight focus on waste generator activities (i.e., at the point of waste origination) to ensure the adequacy of waste stream segregation and control to prevent introduction of prohibited items or incompatible materials.

Opportunities for Improvement

No opportunities for improvement resulted from this assessment.

Appendix A
Supplemental Information

Dates of Office of Enterprise Assessments (EA) Onsite Assessment

August 16-30, 2019

Assessment Team

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Appendix B Description of Waste Control Defense-in-Depth as Applied at LANL

This figure shows the various engineering and administrative controls implemented throughout the radioactive waste management process to ensure that waste shipped to a disposal site meets all waste acceptance criteria and that no prohibited items are accidentally introduced into waste streams. Defense in depth is intended to reduce the likelihood of a non-compliant waste package by implementing a diverse defensive control strategy, so that if one layer of defense turns out to be inadequate, another layer of defense will prevent a non-compliance. In this figure, the generator is the point of origin of any waste stream. As waste progresses through the process, it can be accumulated and stored at various locations. Along the way, the waste is characterized and verified to be appropriate for the approved waste stream. Once finally packaged, the waste is certified to have met all requirements and is shipped to its final disposal site.

