Office of Environment, Health, Safety and Security
Operating Experience Level 3

OE-3: 2017-06 **August 2017**

Waste Packaging and Transport

PURPOSE

This Operating Experience Level 3 (OE-3) document provides information about concerns related to waste packaging and transport. Recent Department of Energy (DOE) events demonstrate the importance of ongoing quality assurance (QA) reviews of waste packaging and transporting programs and operations. The Waste Isolation Pilot Plant (WIPP) radiological release on February 14, 2014, highlighted the importance of properly managing waste streams, yet packaging and transport issues continue to occur across DOE.

BACKGROUND

A review of the Occurrence Reporting and Processing System (ORPS) reports submitted since the February 14, 2014, WIPP radiological release, which highlighted the importance of properly managing waste streams, reveals more than 50 reports documenting issues with material shipments. Of those, 19 pertained to Waste Acceptance Criteria (WAC), 23 referred to documentation, and 10 indicated faulty packaging, including incorrect packaging selection, unsecured or loose bolts, and other issues. More than 40 of the reports noted QA issues. The following are a few examples of events from across the DOE Complex.

1) On February 7, 2017, two Encapsulated-Lead Steel Specification 7A Type A Packages (ELSPs) were transported onsite from Savannah River National Laboratory (SRNL) to the E Area Solid Waste for disposal. Solid Waste personnel removed one of the ELSP's outer lids, and when the inner contamination control liners lid was surveyed, activity of 4600 disintegrations per minute alpha contamination was found, exceeding the Solid Waste Radiological Waste Permit suspension guides. On February 8, Solid Waste determined that the ELSP's contamination level on the contamination control liner exceeded the Solid Waste facility's WAC. The ELSP was returned to SRNL. (ORPS Report EM-SR--SRNS-SRNL-2017-0001)

2) On March 10, 2015, a low-level waste shipment arrived at the Energy Solutions Clive Treatment and Disposal facility with a B-12 box improperly secured. The lid of the B-12 box is required to be secured with straps, nuts, and bolts. Personnel discovered that, during waste transit, most of the nuts backed off and fell to the trailer deck. The lid remained secured by two straps and the remaining nuts and bolts. The container was surveyed and no contamination was identified on the exterior. On March 12, a fact finding determined that the loss of the integrity of the secured nuts resulted in a Department of Transportation Regulation violation. In response, procedure changes were developed, which included the addition of appropriate torque specifications. (ORPS Report NA--LASO-LANL-WASTEMGT-2015-0003)

3) On November 13, 2014, a hazardous material shipment from Los Alamos National Laboratory (LANL) to Pacific Northwest National Laboratory (PNNL) may have had the incorrect classification as a result of separate analyses by LANL and PNNL using different

versions of Radcalc software. The shipment consisted of 30 milligrams of 93-percent highly enriched uranium dissolved in three 10-milliliter aliquots of 3M nitric acid, packaged in a Viking Type A liquid packaging. The PNNL shippers used the then-current version of the Radcalc software (4.1) and the conservative criteria. However, the LANL shipper used a different version of Radcalc, which was supplied by a vendor and used less conservative criteria, resulting in two different classifications for the shipment. The LANL shippers were notified of the Radcalc software discrepancy and instructed not to use the software until it was updated. Two other shipments made that same day were reviewed but no discrepancies were found. (ORPS Report NA--LASO-LANL-MATWAREHS-2014-0001)

Analysis and Observations

Packaging and shipping events reported to ORPS from January 2013 through January 2017 were reviewed to determine common factors and identify lessons learned. One hundred and four reports were reviewed and exhibited the following issues:

Issue	Packaging Events	Shipping Events	Total Events
Missing, improper or incomplete paperwork	5	21	**26**
Mislabeled shipments	6	4	**10**
Process error or incomplete process,	9	12	**21**
Shipments not correctly marked	0	1	**1**
Loose or missing bolts, seals, or bands	10	3	**13**
Unexpected material or contamination outside of container encountered upon receipt	10	10	**20**
Materials exceed thresholds	5	5	**10**
Inadequate training on packaging procedures	1	2	**3**

Discussion

These occurrences serve as evidence that improved vigilance and application of QA procedures to all packaging and shipping operations is needed. This is particularly true for radiological waste, but it can be applied to any hazardous waste that is shipped from DOE sites.

Following the radiological release at WIPP in 2014, the DOE Office of Environmental Management (EM) called for an extent of condition (EOC) review at all EM waste generator sites. A 2006 Energy Facility Contractors Group White Paper on EOC Evaluations stated that the following steps should be considered and incorporated into EOC reviews:

- Review the background and circumstances that led to identification of the issue or condition triggering the review. There may be multiple issues or conditions that should be evaluated.
- Assure that the level of effort will help identify all relevant causal factors.
- Evaluate the issue or condition for uniqueness, recurrence, and potential or actual consequences.
- Determine what issues require follow-up and whether a subject matter expert (SME) needs to be utilized in the evaluation.
- Determine the breadth of facilities and activities at the site that might be similarly situated.
- Consider what might have been inadequate in previous assessments, investigations, critique results, and cause determinations if this is a repetitive issue.
- Identify and/or investigate the extent of applicability to other activities, processes, equipment, programs, facilities, operations, and organizations.
- Assure involvement by both the appropriate SME and management in the development of findings.
- Document such findings and assure incorporation of the findings in corrective actions.

- Recognize that the problem-solving loop might require going back to EOC issues during implementation of a corrective action plan if new information or insights develop during the implementation process.

RECOMMENDATIONS

It is recommended that the following actions be completed at all sites, for the QA of packaging and transportation operations:

- Perform EOC reviews of packaging and transportation issues to develop more complete and comprehensive corrective action plans.
- Implement corrective action plans.

Depending on the findings of the EOC, recommendations will be different for each site or waste generator. The EOC should identify areas needing improvement, whether they be contamination control, packaging selection, documentation, software compatibilities, QA of WAC application, or transportation issues.

CONCLUSION

In conclusion, it is important to ensure that waste packaging and transport programs are compliant and are being effectively implemented, with appropriate QA controls in place. EOC reviews and associated corrective actions should be completed to ensure that safe transport of radiological waste can continue across the DOE complex.

REFERENCES

EM-SR--SRNS-SRNL-2017-0001. *Noncompliance with Waste Acceptance Criteria*

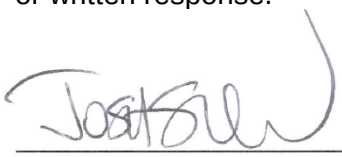
NA--LASO-LANL-WASTEMGT-2015-0003. *LLW Shipment Non-Compliance with DOT P&T Hazardous Materials Regulations Results in Receipt of Notice of Violation*

NA--LASO-LANL-MATWAREHS-2014-0001. *Hazardous Material Shipment Classification Discrepancy*

EFCOG. White Paper: Extent of Conditions Evaluations. August 2006.

Questions regarding this OE-3 document can be directed to Ashley Ruocco at 301-903-7010 or ashley.ruocco@hq.doe.gov.

This OE-3 document requires no follow-up report or written response.



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