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Date: OCT 19 2017
Symbol: EPC-DO: 17-414
LA-UR: 17-29089
Locates Action No.: *N/A*

Mr. John E. Kieling, Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505

Subject: Quarterly Report--Alternative Inspections of Building 1028 at Technical Area 54, Area G, Pad 5 (TA-54-1028)

Dear Mr. Kieling:

The letter transmits the October quarterly report regarding alternative inspections for waste containers stored at a permitted unit at Technical Area (TA) 54 at the Los Alamos National Laboratory (LANL). This report is being submitted by the U.S. Department of Energy (DOE) and Los Alamos National Security, LLC (the Permittees) to the New Mexico Environment Department-Hazardous Waste Bureau (NMED-HWB), as required by NMED-HWB in its March 8, 2017 approval of a 365-day extension for alternative inspections at TA-54, Building 1028 (TA-54-1028).

With personnel safety as the priority, the Permittees will continue the alternative inspections described previously as a recovery plan is developed and finalized for the waste containers within TA-54-1028. In addition, as required by NMED-HWB in its March 8, 2017 letter, the Permittees will submit a subsequent and final quarterly update to this report by January 8, 2018.

As described in the enclosed quarterly report, the Permittees are continuing to develop options for long-term safe storage and/or pressure mitigation of the four containers within TA-54-1028. An updated safety evaluation of the current situation is also in progress and discussed in the report.

If you have comments/questions or would like to meet regarding this submittal, please contact Mark P. Haagenstad at (505) 665-2014 or Karen Armijo at (505) 665-7314.

Sincerely,

John C. Bretzke
Division Leader

Sincerely,

Karen E. Armijo
Permitting and Compliance Program Manager

JCB/KEA/MPH/TAD:am

Enclosure: 1.) Quarterly Report: Alternative Inspections of Building 1028 at Technical Area 54, Area G, Pad 5 (TA-54-1028)

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As described in the enclosed quarterly report, the Permittees are continuing to develop options for long-term safe storage and/or pressure mitigation of the four containers within TA-54-1028. An updated safety evaluation of the current situation is also in progress and discussed in the report.

ENCLOSURE 1

October 2017 Quarterly Report: Alternative Inspections of Building 1028 at Technical Area 54, Area G, Pad 5 (TA-54-1028)

EPC-DO: 17-414

LA-UR-17-29089

Date: OCT 19 2017

Enclosure 1

October 2017 Quarterly Report

Alternative Inspections of Building 1028 at Technical Area 54, Area G, Pad 5 (TA-54-1028)

Introduction

As required by the New Mexico Environment Department-Hazardous Waste Bureau (NMED-HWB) in its March 8, 2017 approval letter, the purpose of this quarterly report is to describe actions and analyses undertaken by the U.S. Department of Energy (DOE) and Los Alamos National Security, LLC (the Permittees) between July 1 and September 30, 2017 regarding four Flanged Tritium Waste Containers (FTWCs) stored in the Resource Conservation and Recovery Act (RCRA) permitted unit at TA-54, Building 1028 (TA-54-1028). These waste containers hold tritium waste with trace amounts of lead, making the contents RCRA regulated mixed low-level waste (MLLW), subject to the RCRA Hazardous Waste Facility Permit (HWFP) (EPA ID No. NM0890010515). The schedules for evaluations, options and final disposition of the four MLLW FTWCs are discussed as appropriate in this report.

The previous quarterly report that was submitted to NMED-HWB in July 2017 described the following activities:

- The Permittees' efforts during the previous reporting quarter to develop and finalize a plan for the long-term safe storage of the four MLLW FTWCs.
- The Permittees' efforts during the previous reporting quarter to develop and evaluate options for pressure mitigation that will enable off-site RCRA treatment and disposal of the four MLLW FTWCs.
- Current and planned future activities during the upcoming reporting quarter.

This quarterly report includes the following:

1. A description of the potential hazards and how the implementation of the 50-foot exclusion zone mitigates the hazards posed to human health.
2. Status of evaluations to identify the level of safety required for near- and long-term management of the MLLW FTWCs at TA-54-1028. These will provide a basis for making decisions on resumption of visual inspections of the containers that are fully compliant with the RCRA HWFP requirements.
3. Status of the Permittees' options, prior to and during the reporting quarter, that have been considered to develop and finalize a plan for the mitigation and/or long-term safe storage of the four MLLW FTWCs.
4. Status of the Permittees' efforts during the reporting quarter to develop and evaluate options for pressure mitigation and containment that would ultimately enable off-site RCRA treatment and disposal of the four MLLW FTWCs.
5. Planned future activities projected for the upcoming reporting quarter.

The current controls in place, as well as the recovery process being prepared, have been and will be developed in accordance with the nuclear facility safety requirements mandated by DOE for management of nuclear facilities such as TA-54, Area G.

1. Potential Hazards and Mitigating Efforts

The initial, conservative hazard analyses performed upon discovery of the issue, identified the potential hazards to human health (e.g., potential hearing loss and other injuries associated with a high-pressure gas release) and tritium contamination. The hazards are associated with event scenarios, work related and external, such as accidental impacts from employees physically handling the containers holding the FTWCs, accidental impacts from machinery or vehicles, and seismic events of large scale. As examples, accident scenarios could result in two possible events: 1) failure of the flange seal that would release the contained gases into the atmosphere along with tritium contamination; and 2) deflagration of the contained gases causing a failure of the flange. No self-initiating events were deemed plausible under current storage conditions.

The realization of these safety issues resulted in the issuance of a standing order restricting access to TA-54-1028 and the establishment of the 50-foot exclusion zone within a few days after initial identification of the issues in late August 2016. The very conservative standing order prohibits entry into the 50-foot exclusion zone, which includes an area inside Dome 49, without special authorization which is granted on a case-by-case basis only, with DOE approval. Barriers and postings prohibiting access without authorization are in place. Dome 49 is situated west of the general facility of the containers and there are currently 50-foot exclusion zone markings and postings within the southern portion of the dome. No activity is occurring at the southern end of Dome 49. Any activity inside of Dome 49 is outside of the respective boundary in the extreme north end. The standing order and training records of personnel required to comply with the standing order are available for inspection.

Based on the very limited activities occurring in the general vicinity of TA-54-1028, the safety basis team determined that this distance was sufficient to ensure that (1) the containers would not be exposed to work-related energy sources; and (2) all personnel would be out of range of the anticipated hazards in the event that a container failed due to natural phenomena or other accident scenarios.

2. Status of Safety Evaluations

During the previous quarter, the team of subject matter experts continued to revise and refine their hazard analyses, following formal processes, in order to identify the activities (including normal RCRA inspections) that may be allowed to occur within the 50-foot exclusion zone if they could be resumed safely without impacting or disturbing the MLLW FTWCs. These analyses were also performed to identify whether and to what extent the containers may be safely handled, moved, or potentially vented or opened in order to remove, manage, transport or repackage their contents.

These safety evaluations follow a formal DOE process for analyzing safety hazards codified in 10 CFR 830.203. Such a comprehensive safety analysis and review process must be entered into when a DOE contractor, such as LANS, identifies or learns of a situation that is not sufficiently

bounded by the existing safety analysis supporting the DOE-approved safety basis for the nuclear facility (in this case, for TA-54 Area G). These regulations require LANS to submit this safety evaluation to DOE for approval prior to removing any controls, such as the 50-foot exclusion zone. The MLLW FTWC safety evaluation that defines the 50-foot standoff distance has been approved by the DOE. A revised evaluation has been transmitted to the DOE by LANS and will be discussed later in this report.

3. Planning for Remediation and/or Long-term Management and Safe Storage

As detailed in the April 6, 2017 baseline report (EPC-DO 17-142), the LANL Integrated Project Team (IPT) initially identified a variety of options for remediation and/or long-term management and safe storage of the MLLW FTWCs. In order to identify and compare options, the IPT utilized criteria of applicability, technical feasibility, effectiveness, the ability to be implemented, impacts to human health and the environment, and cost. This resulted in consideration of the following potential options, as shown in Table 1.

Table 1
Mitigation and Final Disposition Options

Potential Option	Current Status of Option
Option 1: Request a RCRA temporary authorization (TA) from NMED-HWB for the facilities at the Weapons Engineering Tritium Facility (WETF) and return the MLLW FTWCs to the WETF in order to safely vent and open the MLLW FTWCs for segregation of the hazardous constituents (lead containing valves).	No longer considered a viable option due to the safety concerns with moving and transporting the FTWCs, as well as impacts on the WETF mission.
Option 2: Packaging the MLLW FTWCs in DOE-approved Type B over-pack containers for transport to Savannah River National Laboratory (SRNL) for venting, segregation of hazardous constituents and capture of tritium for reuse.	No longer considered a viable option due to the pressure build-up in the MLLW FTWCs above allowable DOT levels for transportation in any currently-available certified Type B containers.
Option 3: Construct a temporary structure at TA-54 Area G adjacent to building 1028 and perform venting and segregation in a glove-bag facility.	No longer considered viable due to the long term technical requirements for construction of a facility capable of supporting these efforts.
Option 4: Relocation of the MLLW FTWCs to a remote part of Area G and install remote monitoring technologies to comply with some permitted container storage requirements.	No longer considered viable due to the safety and permitting constraints of Area G. This option still would not meet all RCRA HWFP storage and inspection requirements.
Option 5: Acquisition of a commercially available containment vessel capable of holding all four MLLW FTWCs.	This option was still under consideration at the time the alternative inspections were initiated and was reported in the baseline

Potential Option	Current Status of Option
Dynamically open the MLLW FTWCs inside the vessel in order to render them capable of transport to an authorized facility for treatment and disposal.	report and July 6, 2017 quarterly report. It may still be considered but faces challenges as outlined below.
Option 6: Construction of a worker protection barrier enclosing TA-54 building 1028 and using remote monitoring technology to comply with permitted container storage requirements.	This is not a preferable option, as it does not provide a long term solution or disposition path for the containers.
Option 7: Development and implementation of a manifold which attaches to the flange on each MLLW FTWC and allows access via the port on the flange for venting.	Considered the most viable option for long term hazard mitigation as it mitigates the pressure and flammable gas hazard and allows for safe handling, segregation, and disposition.

After evaluating and rejecting the options that were deemed unattainable or posed essentially the same or greater hazards as compared to a more comprehensive solution, these initial options were narrowed down to two identified in the baseline report for further detailed analysis: Option 5 - use of a commercially available containment system (see Dynasafe® [or similar] http://www.dynasafe.com/protection-systems for description and information); and Option 6 - a worker protection barrier enclosing TA-54 building 1028. Meanwhile, work continued on Option 7 – the development and implementation of a manifold to enable venting.

Option 5: In the July 6, 2017 quarterly report, the possibility was stated that the two options undergoing detailed evaluation may be reduced to the single option of constructing a protective barrier. This was because at the time of the July report it was becoming evident to the IPT, based on vendor-supplied information and other data, that the second option being evaluated (i.e., placing the MLLW FTWCs into a Dynasafe® (or similar) containment system) in fact may not meet two key criteria: (1) the selected containment unit must provide sufficient worker protection from unanticipated releases; and (2) the selected containment unit must provide effective long-term containment of the gaseous components inside the units once the MLLW FTWCs were emplaced and inner containers were punctured dynamically. The Dynasafe® vendor was not able to guarantee compliance with the second criterion. In addition, the vendor could not offer implementable, RCRA-compliant options for inspecting or monitoring the FTWCs inside the containment vessels.

Despite DOE/LANS's most diligent searches, no similar commercially-available containment system has been identified to date that is capable of meeting LANL and DOE's worker protection and long-term gas-containment criteria. After careful evaluation, the Permittees have determined that the timeframe to complete design, construction, and certification in-house of a containment vessel meeting LANL and DOE's worker protection and long-term gas-containment criteria would take many years. Though challenging, Option 5 may still be achievable if a vendor can be identified who is capable of meeting all of the above criteria.

Option 6: The concept of a barrier enclosing TA-54 building 1028 to provide additional worker protection is still being analyzed. Barrier options identified and being evaluated include an earth-filled barrier surrounding TA-54 building 1028 and a welded steel plate enclosure designed to be lowered by crane over TA-54 building 1028. Although this option would provide a higher level of immediate hazard mitigation from an over-pressurization event, it is not a long-term solution for disposition and does not provide any radiological protection. Further, DOE/LANS would still be unable to comply with the RCRA HWFP routine container inspection requirements, necessitating NMED-HWB approval of a long-term alternate monitoring/ inspection method through a permit modification request.

Option 7: Development continues on a manifold which would attach to the flange on the MLLW FTWCs to allow for the venting of the contained gases. This option has the potential to mitigate the pressure and flammable gas mixtures, allowing safe handling, segregation and, ultimately, off-site transport. This option, is discussed in Section 4 below in detail.

4. Option for Pressure Mitigation and Final Disposition

The IPT continues to work to identify and evaluate options to safely mitigate the pressure in the MLLW FTWCs. The most viable option for this task is a manifold (Option 7 above), that can be attached to the flange of each FTWC and allow access through a vent port. It is being designed and constructed on-site and is currently undergoing initial testing. This manifold is intended to enable the safe removal of the contained gases. Once the gases are removed and pressure is relieved, LANS would be able to comply with the RCRA HWFP routine container inspection requirements and the containers could be handled, transported and otherwise managed safely with the ultimate goal of shipment off-site to an approved RCRA-compliant treatment and disposal facility.

Use of the manifold is not possible under the current safety restrictions imposed on the MLLW FTWCs in TA-54 building 1028. If the revised safety evaluations allow the DOE/LANS to adjust the access and handling restrictions currently in place, then the manifold could potentially be attached to each MLLW FTWC. This would be a complex process and would require additional analysis and approval.

5. Current and Planned Future Activities

The current safety basis standing order that establishes an exclusion zone of 50-feet from the MLLW FTWCs remains in effect at Area G at the time of this report. Additionally, all materials located in the exclusion zone are in long-term storage and there are no active waste-processing activities occurring in the area. No wastes are being added to or removed from the area of the exclusion zone. Weekly alternative RCRA inspections continue from outside of the 50-foot exclusion boundary as approved in the March 8, 2017 letter from the NMED-HWB.

Actions during the upcoming quarter will continue to focus on: (1) further development and testing of the flange manifold as a potential pressure mitigation option and (2) the approval of the revised safety evaluation. If the revised safety evaluation redefines the level of access to the MLLW FTWCs, then DOE/LANS will notify NMED that the alternative inspections

requirement has been lifted and that normal visual inspections in compliance with the RCRA HWFP will be resumed. LANS anticipates the comprehensive review of the revised safety evaluation will require approximately 90 days for review, comment, approval, and implementation. It is anticipated this will occur before the expiration of the 365 day extension.

The next phases of remediation and final disposition will be pursued concurrent with the efforts described in 1 and 2 above of the previous paragraph. The first phase will consist of determining the best Option(s) as discussed previously for a path forward. This determination is also anticipated prior to the expiration of the 365 day extension. The second phase will consist of developing a timeline for execution of that Option. Based on the best path forward, the Permittees will confirm the acceptability of the waste stream with candidate facilities that have been identified for final disposition. Changes in the management of the MLLW FTWCs and the schedule of final disposition/disposal will be reported to NMED-HWB.