Response to the "Notice of Disapproval for the Phase II Investigation/Remediation Work Plan for Material Disposal Area A, Solid Waste Management Unit 21-014, at Technical Area 21, Los Alamos National Laboratory, EPA ID #NM0890010515, HWB-LANL-09-028," Dated July 28, 2009

INTRODUCTION

To facilitate review of this response, the New Mexico Environment Department's (NMED's) comments are included verbatim. Los Alamos National Laboratory's (LANL's or the Laboratory's) responses follow each NMED comment. This response contains data on radioactive materials, including source, special nuclear, and by-product material. Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to NMED in accordance with U.S. Department of Energy (DOE) policy.

Note: The 2006 investigation report (IR) for Material Disposal Area (MDA) A evaluated the residential and industrial scenarios for present-day risk. The report states that the total estimated excess cancer risk for the residential scenario is approximately 3×10^{-5}, which is slightly above the NMED target level of 1×10^{-5}, and the total estimated excess cancer risk for the industrial scenario is approximately 8×10^{-6}, which is below the NMED target level of 1×10^{-5}. The hazard indices (HIs) and total doses for the two scenarios are below the respective NMED and DOE target levels. The elevated cancer risk for the residential scenario is primarily (79%) attributed to 2,3,7,8-tetrachlorodibenzodioxin (TCDD[2,3,7,8-]) following toxicity equivalency calculations.

Upon further review of the carcinogenic screening table (I-4.1-7) in Appendix I of the MDA A IR risk assessment, it was found that the soil screening levels (SSLs) for TCDD[2,3,7,8-], which were obtained from the U.S. Environmental Protection Agency Region 6 screening value table, were not corrected from a 1×10^{-6} cancer risk level to a 1×10^{-5} cancer risk level to conform to NMED's cancer risk target level. The corrected values are shown in a new Table 2.3-1 of the revised Phase II work plan. The correction (see footnote "c" in Table 2.3-1) of the SSLs results in screening values of 3.9×10^{-5} mg/kg for the residential scenario and 1.8×10^{-4} mg/kg for the industrial scenario. When compared with the exposure point concentrations for TCDD[2,3,7,8-], the cancer risks become 2×10^{-6} and 7×10^{-7} for the residential and industrial scenarios, respectively (i.e., an order of magnitude lower than originally calculated). This change in cancer risks results in total estimated excess cancer risks of approximately 5×10^{-6} and 2×10^{-6} for the residential and industrial scenarios, respectively. Therefore, cancer risks for both scenarios are below the NMED target level of 1×10^{-5}.

COMMENTS

NMED Comment

1. *The Permittees must excavate and remove all waste from Material Disposal Area (MDA) A and the Plutonium Tanks and remediate the site to residential cleanup levels (see NMED's "Technical Background Document for Developing Soil Screening Levels"). Remediation to residential cleanup levels will allow for future development of the DP Road corridor with no land use restrictions. The Permittees must revise the Work Plan and state that residential cleanup levels rather than industrial cleanup levels will be utilized.*

LANL Response

1. Consistent with the March 1, 2005, Compliance Order on Consent (Consent Order), cleanup levels are based on current and expected future land uses. At MDA A, the current and reasonably foreseeable land use is industrial, and this was the basis of the cleanup levels presented in the work plan. As the owner of the site, DOE is committed to cleanup to at least industrial levels to allow continued use of the site for industrial purposes. At present, no commitment has been made concerning future development of the site for other than industrial purposes. However, DOE recognizes the advantage of cleanup to residential levels in terms of eliminating potential future land-use restrictions. DOE has therefore established the goal of meeting residential cleanup levels at MDA A if practicable. Site conditions will be evaluated during implementation of the cleanup to determine whether attainment of residential cleanup levels is practicable.

   While the site currently meets criteria for residential risk screening, residential screening action levels (SALs) or SSLs are slightly exceeded for arsenic at several locations at a depth impracticable to excavate. Arsenic is not a chemical of potential concern for the IR risk screening because of depth and will remain below a depth of 10 ft from final grade. In addition, the concentrations are within the range of the background data for arsenic in the upper tuff geologic units.

   Based on the reevaluation of the cancer risk and assessment of the contaminant data collected for the IR and presented in the note above, the Laboratory proposes to clean up the site to residential SALs and SSLs to the extent practicable but not less than industrial cleanup levels. The Laboratory will excavate a minimum of 2 ft into the media below or adjacent to the waste if sample confirmation results indicate contamination above residential cleanup levels. However, it is not practicable to excavate all areas where residential SSLs and SALs are exceeded at depth, as in the case of arsenic. A depth limit will be established below which contamination exceeding residential levels will not be excavated. The depth limit will be 10 ft below final grade or 2 ft below the limit of the waste excavation, whichever is deeper at the location being considered. If contamination is still present above residential SALs and SSLs, industrial SALs and SSLs will be applied at these locations for contamination removal purposes. The proposed removal criteria will allow the site to meet residential risk screening levels regardless of the point where cleanup is terminated (see revised work plan section 4.1.1).

NMED Comment

2. *The Permittees state in several sections (e.g., Section 4.1.5, Section 5.2.1, Section 5.3.3, Section 5.3.7), using similar language, that, "[e]astern trenches and central pit contents will be handled as waste and processed for disposal. Overburden material will be removed from above the pits and trenches and staged in piles or containers in an environmentally protective manner. The material will be stockpiled within the boundary of the area of contamination until analytical results are received and reviewed. If the analytical results indicate hazardous waste and/or that contaminants exceed industrial cleanup levels, the material will be managed as waste. If results indicate that hazardous waste and cleanup goals are met, the material will be stockpiled for use as site restoration and grading fill. The placement of the material as backfill will be controlled so that analytical data may be linked to specific areas of the site." Any excavated material that is re-used onsite as fill or cover material must meet residential soil screening levels (SSLs) and ecological screening action levels (SALs). The Permittees must revise the Work Plan to state that excavated material must meet residential SSLs and SALs or it will not be used as fill and/or cover material on the site.*

LANL Response

2. The Laboratory has revised the management criteria of soil for reuse on the site from industrial to residential SSLs and SALs. Because the corrected risk screening (see the note above) shows the top foot of site soil will likely meet residential cleanup levels, it will be excavated, stockpiled for use as topsoil backfill at MDA A, and sampled a minimum of each 100 yd^3 to confirm the soil meets residential screening levels.

   The overburden underlying the topsoil in the area of the eastern trenches and central pit will likely meet residential cleanup levels and will be sampled in a systematic grid pattern such that one sample is collected for a minimum of each 100 yd^3 of overburden. EPA recommends the use of grid sampling to spatially identify areas of contamination, including "hot spots" (http://www.epa.gov/QUALITY/qksampl.html#adaptive). An advantage of systematic grid sampling is that it ensures uniform coverage of the site. It also avoids the situation created by excavating and placing soils in piles or containers where clean soils are mixed with contaminated soils, resulting in dilution of the contaminated soils or contamination of the clean soils. The proposed systematic grid sampling will allow the Laboratory to excavate and segregate contaminated soils before they are mixed with clean soils.

   Based on the maximum overburden thickness measured in the IR (5 ft), the sampling grid will be 400-ft^2 rectangles, 20 ft on each side. Each sample point will be the midpoint of the grid and composited for the entire depth to represent mixing during the excavation process. The results will determine the disposition of overburden soil within the grid area. Soil that is within a specific grid area represented by a sample with analytical results below residential SSLs or SALs will be removed and stockpiled for use as backfill at MDA A. Soil that is within a specific grid area represented by a sample with analytical results above residential SSLs or SALs will be excavated as waste.

   In the area of the plutonium tanks where soil radiological contamination is thought to be present in the overburden around the fill pipe locations, based on screening data collected in 1980 (see the historical investigation report, section 3.2.3), overburden will be selectively removed, based on screening data (primarily radiological) and handled as waste until sample results can confirm the status of the soil. A minimum of one sample will be taken for each 100 yd^3 removed. If soil is below residential SSLs or SALs, it will be stockpiled for backfill at MDA A. Soil above residential SSLs or SALs will be disposed of as waste.

   Discussion of overburden soil reuse has been deleted from sections 4.1.5 and 5.2.1 and is discussed in new sections 4.1.4, 5.1, and 5.3.3, and Appendix A.

NMED Comment

3. *The Work Plan outlines a presumptive remedy for MDA A and replaces the corrective measures evaluation (CME). In order to ensure that all of the information for the evaluation of the presumptive remedy is presented, without requiring the evaluation of other remedial alternatives, NMED requires that the Permittees revise the Work Plan to provide the following information:*

   a. *an alternate plan in the event that residential cleanup levels cannot be achieved. The Permittees must revise the Work Plan to describe alternatives to the proposed plan. The Permittees may follow the format of the alternative plan in the MDA B Work Plan.*

b. costs associated with the proposed activities. The Permittees must revise the Work Plan to include cost estimates related to all corrective actions proposed for MDA A. The cost estimates may be presented in a similar manner to cost estimates provided for MDA B.

LANL Response

3. As stated in the Laboratory's response to Comment 1, MDA A will be cleaned up to meet industrial standards. However, DOE is committed to meeting residential cleanup levels wherever practicable. Based on existing data, the cleanup should allow the site to pass residential risk screening, although some soils and/or bedrock at isolated locations may remain at depth with contamination above residential SALs or SSLs and less than industrial SALs and SSLs. Therefore, contingency actions and alternate plans will only be needed if it appears industrial SALs or SSLs cannot be met. An alternative plan (see revised work plan, section 4.1.2) for specific actions that may be taken include

    - performing assessments to determine enhancements (e.g., geochemical barriers) to the remediation,
    - establishing deed restrictions and/or other institutional controls if ownership of the property is transferred,
    - developing a long-term monitoring plan and/or other institutional controls if DOE retains ownership of the property, and
    - selecting a combination of the above options based on discussions with NMED.

    Any contingency action will be designed to meet the cleanup goals contained in the Consent Order (i.e., 10^{-5} cancer risk and an HI of 1) as well as the DOE dose limit of 15 millirem per year, based on the reasonably foreseeable future land use of the site.

    The Laboratory has revised the work plan (a new Appendix B) to include a cost estimate of the proposed corrective action.

NMED Comment

4. The excavation activities and waste stream at MDA A will likely be similar to that of MDA B, where an enclosure is being used to protect the activities from weather and prevent releases to the atmosphere. The Permittees must revise the Work Plan to include the use of an enclosure during excavation activities at MDA A.

LANL Response

4. The Laboratory has evaluated the safety hazards and risk to the public and site workers associated with the remediation of MDA A and has concluded that an enclosure is not necessary to safely perform the work. Safety requirements for the removal action at MDA B are not appropriate for evaluating the requirements at MDA A.

    Proximity to the public resulted in the Laboratory selecting the use of an enclosure at MDA B. MDA A is located inside the main part of Technical Area 21 (TA-21) and is not adjacent to DP Road or to the businesses along DP Road. The closest distance from MDA A to a site boundary where the public may be present is 550 ft to the north, where vacant land was transferred from DOE to Los Alamos County, and 2420 ft from the closest business on DP Road. This is compared with 66 ft, the closest distance from MDA B to the businesses along DP Road.

Excavation of the waste in the eastern trenches and central pit can be achieved outdoors without an enclosure. Radiological control limits will be set so that workers and the public will not be exposed to unsafe levels of airborne radioactivity. Proper personal protective equipment will be selected commensurate with the hazards present during waste removal. Air-monitoring stations will monitor the amount of contamination being generated during removal operations. Surfactants will be applied to the waste to prevent unsafe levels of radiological and chemical contamination from becoming airborne. If an unusual condition is encountered within an excavation area, local containment may be used to cover or otherwise contain the area until the hazard has been removed. Work will be allowed to continue in areas not affected by the unusual condition.

Rainwater will be prevented from running into the excavation and runoff from leaving the excavation by using best management practice controls for surface water. Rain falling directly on the excavation will be minimized by limiting the area of open excavation at any one time. If rainfall is of sufficient magnitude to cause ponding within an excavation, the water will be immediately removed after rainfall cessation and tested for contamination before release for land application or treatment at the Laboratory's wastewater treatment facility, whichever is appropriate.

During short periods of shutdown, such as weekends and holidays, the waste will be covered by a thin temporary soil cover, soil surfactant, or geomembrane to prevent rainfall from directly entering the waste.

Based on the specific remedy selected for the Plutonium Tanks, the need for an enclosure during waste removal operations will be evaluated. The evaluations will be conducted as part of the preparation of a documented safety analysis, as required by 10 Code of Federal Regulations (CFR) 830, Subpart B.

NMED Comment

5. *Confirmation sampling is integral to the success of the corrective action at MDA A; however, the sections of the Work Plan describing confirmation sampling lack sufficient detail for NMED to determine if the proposed confirmation sampling is adequate. In Section 4.1.8, Confirmation Sampling, the Permittees state, "[s]amples will be collected to confirm that waste material that exceeds industrial risk standards have been removed. Samples of geologic material will be collected from beneath the excavation floor (Fig 4.1-1), including the entire [solid waste management unit] SWMU area. In addition, confirmation sampling results will be used in conjunction with the MDA IR data to help define the horizontal and vertical extent of potential contamination in the media. The results will be evaluated to determine if additional excavation is necessary." It is not clear what the Permittees mean by collecting samples of geologic material from "the entire SWMU." NMED assumes the entire SWMU to be the 1.25 acres of MDA A. Do the Permittees propose that confirmation samples will be obtained at the excavation depth as well as throughout the SWMU? The Permittees must define the meaning of "the entire SWMU" and clarify the confirmation sampling plan.*

   Additionally, the Work Plan states, "[t]he site will be recontoured to allow surface drainage to DP Canyon, balance cuts and fills, and provide stable slopes;" however, Figure 4.1-1 which presents the bounding limits of the confirmation sampling appears to depict a final grade with a depression. The alignment of the drawing is not clear. The Permittees must revise Figure 4.1-1 to better depict the final grade of the site. The Permittees must provide figures that show the proposed approximate sample locations. Confirmation sampling is further discussed in Section 5.2.4, Confirmation Sampling Methods for Soil and Tuff, where the Permittees state that "[a]t each location, a minimum of two samples will be collected at depths corresponding [to] approximately 0-0.5 ft and 1.5-2.0 ft below the

excavation bottom. The deeper samples should be collected at a depth with little or no evidence of contamination, based on visual observation and field-screening methods." The Permittees must revise the Work Plan and describe the data collection strategy (sampling frequency, locations, and sample analysis) in more detail. Samples must be taken from areas that have visible staining, visible fractures, elevated moisture, contaminated zones identified by field screening, and areas with residual contamination. The Permittees must revise the text to describe the confirmation sampling in greater detail. See Comment 1 regarding the required cleanup levels.

LANL Response

5. The Laboratory modified sections 4.1.8 and 5.2.4 of the work plan and added a more detailed description of the confirmation sampling activities. The confirmation sampling grid for each waste trench and pit is shown in a new Figure 4.1-2 of the revised Phase II work plan. Samples of geologic material will be collected from beneath the excavation floor at two depth intervals (0–0.5 and 1.5–2.0 ft) and from the excavation sidewalls perpendicular to the excavation face at two depth intervals (0–0.5 and 1.5–2.0 ft) to help define the horizontal and vertical extent of potential contamination. In addition, samples will be collected at areas where elevated field screening, visual staining, fractures, or areas of elevated moisture are observed. Samples will be analyzed for inorganic chemicals, organic chemicals, and radionuclides. Analyses will include pH, target analyte list metals, gamma-emitting radionuclides, isotopic uranium, isotopic plutonium, tritium, americium-241, strontium-90, volatile organic compounds, semivolatile organic compounds, dioxins/furans, perchlorate/nitrate, asbestos, and cyanide (new Table 5.2-1 has been added to the work plan). Confirmation samples will be processed under chain-of-custody protocols through the Sample Management Office and sent to off-site analytical laboratories for the requested analyses. The results will be evaluated to determine if additional excavation is necessary and if residual contamination poses any unacceptable risk to human health or the environment and to support further contingencies if cleanup levels are not achieved.

   The IR data indicate it will not be necessary to perform confirmation sampling beyond a few feet below the bottom and outside the sidewalls of the waste trenches and pit. Confirmation sampling after removal of the Plutonium Tanks will be limited to the footprint of the trenches used for the original construction of the tanks. Sampling and analysis will follow the approach used for the eastern trenches and central pit.

   The Laboratory has changed its approach by eliminating the recontouring of the site after completion of waste and contaminated soil/bedrock removal. The Laboratory will use the overburden soil tested to be below residential SALs and SSLs and clean imported soil to establish final grade at an elevation similar to the site's original grade (see section 4.1.10).

NMED Comment

6. *NMED believes that DPT will not help the Permittees to accomplish the objectives described in the sampling and analysis plan (SAP) in Appendix B. Most likely, the DPT will encounter refusal because it will be difficult for 2-inch plastic lined steel tubes to be driven through solid items likely to be found in the pits at MDA A. NMED does not believe that drilling through the middle of a landfill is either a more effective or a safer field practice than using a backhoe to systematically expose soil and waste material. The backhoe method is a standard industry practice and is both more practical and effective because it enables observation of a cross-section of the entire trench contents and is already proposed to be used for test pits in the central pit. However, if DPT proves successful at MDA B, NMED may reconsider.*

LANL Response

6. In light of NMED's comment, the Laboratory has reevaluated the need for a waste characterization program, The Laboratory proposes to eliminate a separate waste characterization component of the work plan (original sections 4.1.4, 5.1, and Appendix B) and has determined that an separate characterization of the eastern trenches and central pit using DPT or test pits is an unnecessary step in the remediation process.

   An observational approach to determine the best and safest application of excavation practices when approaching unknown or uncertain subsurface conditions has been successfully used for decades in geo-exploration activities including the excavation of landfills, to define subsurface physical conditions and allow safe excavation. The Laboratory proposes to use the observational approach to provide an additional margin of safety during the removal of the waste from the eastern trenches and central pit.

   The geometry of the eastern trenches and central pit has been determined through the review of historic documents and photographs to allow successful planning of the excavation of the eastern trenches and central pit contents.

   The Laboratory proposes to use information collected from the characterization effort and the planned waste removal action at MDA B (which should be complete before excavation at MDA A begins) to provide the waste characteristics and approach needed for eastern trenches of MDA A. Records of the disposal history of the central pit will alleviate the need for additional characterization before beginning removal activities. Excavation of the central pit has little probability of encountering liquids or other hazardous chemicals because demolition debris was the only authorized waste disposed of. Because of the depth of the central pit (approximately 22 ft), large test pits would be required to penetrate the full depth.

   An observational approach will be used in advance of excavation to further reduce the uncertainty inherent with the waste excavation activities. The approach is to excavate a trench where the MDA A waste can be screened and observed before full excavation of a trench/pit section. This approach (section 4.1.5 and Figure 4.1-1) will provide confirmatory information, minimize waste generated from backfilling test pits excavated in a separate characterization phase, and eliminate the time needed for a separate characterization phase.

   Characterization of the Plutonium Tanks through physical entry and screening activities remains a critical component of selecting the appropriate treatment and disposal determination. These activities will be performed as described in the work plan in sections 4.2.4 and 5.3.2.

NMED Comment

7. *In Section B-2. 1.2 (Waste Sampling), the Permittees state that the direct push sampling locations are shown on Figures B-2.1-1 and B-2.1-2. These figures were not included as a hard copy in the Work Plan. The Permittees must submit two paper copies and one electronic copy in accordance with Section XI.A of the Order.*

LANL Response

7. A separate characterization effort for the eastern trenches and central pit has been eliminated for MDA A, as described in the Laboratory's response to Comment 6, and the figures are no longer applicable. The pertinent text and figures for the sampling of the waste have been moved to

sections 4 and 5 of the main text of the revised work plan. Appendix B has been replaced with a cost estimate appendix.

NMED Comment

8. *NMED cannot approve the schedule as it is presented in the Work Plan. The Order requires that the Remedy Completion Report (i.e., the Phase II Investigation/Remediation Report) be submitted no later than March 11, 2011. The schedule in the Work Plan, however, states that waste characterization and removal for the central and eastern pits will be completed by March 20, 2013 and the waste characterization and removal of the Plutonium Tanks will be completed by August 21, 2014 with a Phase II Investigation Report submitted to NMED by December 18, 2014. The Permittees must revise the schedule in the Work Plan or otherwise resolve the discrepancy regarding the completion dates.*

LANL Response

8. The Laboratory proposes to resolve the discrepancy in completion dates by changing the Consent Order schedule for the date for the MDA A remedy completion report from March 11, 2001, to December 21, 2013. This extension is required to safely perform the waste removal and packaging activities in the MDA A pits and trenches and the Plutonium Tanks. The work activities for MDA A have started now and will be continuous until completion in December 2013. This schedule is 1 yr shorter than estimated in the June 2009 work plan but is still beyond the 2011 date. The proposed date is based on a resource-loaded, activity-based schedule for all preparatory, field, and restoration work involved with the removal. The Laboratory must conduct the field activities in two integrated, yet separate work sequences to mitigate nuclear safety risk. A justification for the schedule change is described below.

   The removal of the MDA A pits and trenches will utilize lessons learned from the MDA B removal. The removal of the MDA A eastern trenches and central pit will start after MDA B removal is complete. Subcontracting will be completed so that MDA A safety documents, training, and mobilization are ready to start once the MDA B excavations are complete. Waste excavation, sorting, characterization, and packaging are estimated to take approximately 13 mo. Confirmation sampling, data validation and verification, and reporting are estimated to take approximately 4 mo and will be conducted concurrently with demobilization and site restoration. The removal of the pits and trenches is scheduled to be complete just before waste removal from the Plutonium Tanks so that confirmation sampling can occur below the pits and trenches, once they are removed, and then move directly to below the tanks, once they are removed.

   The work activities at the Plutonium Tanks are more complex because the configuration and contents of the tanks are unique to the Laboratory and do not exist elsewhere in the DOE Complex. The Laboratory is required to maintain the tanks and all work activities as nuclear facilities under 10 CFR 830, “Nuclear Safety Management,” to ensure adequate protection of the workers, the public, and the environment. The Plutonium Tanks are classified as a Hazard Category 2 nuclear facility because of their estimated inventory of plutonium-equivalent curies. The actual inventory is estimated on the basis of samples collected in 1980 and on the radioactive decay of plutonium-238/239, plutonium-240/241, and in the growth of americium-241. The americium-241 is particularly important because of the related gamma exposure to workers. As described in the MDA A IR, dated November 2006, the tanks contain an unknown amount of sludge that remain in the bottom (heel). At this writing, the actual condition of the mild-steel tanks themselves and the characteristics of the heels are not known. The tanks are suspected to be intact because sampling beneath the tanks has

indicated no elevated contamination above SALs and SSLs. The characteristics of the heels will dictate the type of safety precautions and equipment required to address the material.

The tanks will be tested for the potential buildup of hydrogen gas from the process of hydrolysis of water molecules. The Laboratory has obtained engineered shoring boxes that will be installed in the next 6 to 7 mo that will allow access to the surface of the tanks and inspections of the tanks themselves and then the waste heels. Once the inspections are complete, the Laboratory can devise a sampling device for the waste heel materials. This is the important step to designing the equipment necessary to remove and package the heel materials. The resulting waste packages are currently estimated to be transuranic (TRU) waste that will be characterized for disposal at the Waste Isolation Pilot Plant. At this writing, the Laboratory cannot completely dismiss the potential that the TRU wastes will require remote handling.

The preparations for tank waste removal include the engineering estimate for the actual waste removal (5 mo) and approval of the documented safety analysis (2 mo). Interim milestones are provided on the MDA A proposed schedule that indicate that work activities on the Plutonium Tanks is scheduled from now to completion in December 2013.

The Laboratory requests a change of the Consent Order schedule date for the MDA A remedy completion report from March 11, 2011, to December 21, 2013 (see Table 8.0-1 of the revised Phase II work plan), based on the extensive preparation, remediation work, and safety issues described above, which must be properly addressed.