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CERTIFIED MAIL – RETURN RECEIPT REQUESTED

July 17, 2015

Christine Gelles, Acting Manager
U.S. Department of Energy
National Nuclear Security Administration
Los Alamos Field Office
3747 West Jemez Rd, MS A316
Los Alamos, NM 87544

**RE: DISAPPROVAL
WORK PLAN FOR LOS ALAMOS COUNTY AIRPORT LANDFILL
COVER REPLACEMENT
LOS ALAMOS NATIONAL LABORATORY
EPA ID#NM0890010515
HWB-LANL-15-018**

Dear Ms. Gelles:

The New Mexico Environment Department (NMED) has received the United States Department of Energy (DOE) Work Plan and associated design documents for the Los Alamos County Airport Landfill Cover Replacement (Work Plan) dated May 7, 2015, and received May 11, 2015.

NMED has reviewed the Work Plan and hereby issues this Disapproval for the Work Plan with the following comments:

General Comments:

1. The Construction Implementation Plan and Technical Specifications do not appear to contain specific procedures that address application of the daily cover. Please revise the Construction Implementation Plan and Technical Specifications to indicate that a minimum of 6 inches of clean dry material or an alternative



landfill cover will be placed over all exposed waste surfaces at the end of every working day as required in subsection N of 20.9.5.9 NMAC.

2. Several sections of the Work Plan are very general in nature and do not include sufficient detail to ensure that the reader can understand the overall design without having to frequently refer to another document. For example, Section 9.0 Construction Schedule does not include any schedule for the proposed actions and the reader is referred to the Construction Implementation Plan. Revise the Work Plan to include, at a minimum, a summary level of detail of the actions covered by the Work Plan.
3. NMED noted that the Work Plan and Design Report relied heavily on references primarily authored by the designer (Dr. Stephen F. Dwyer) and a guidance document for closing small tribal landfills and open dumps (EPA-909-R-11-007), the latter of which does not appear relevant to the Los Alamos County Airport Landfill Cover Replacement. The Interstate Technology and Regulatory Council (ITRC) guidance has a broad range of authors that includes Dr. Dwyer. No changes are necessary at this time; however, in the future, the documents referenced must include independent authors to ensure that design documents do not appear to be self-substantiating and are more defensible.
4. It is unclear from the Work Plan and Design Report how the Permittees will assess and repair potential future differential settlement of the hangar pad or the evapotranspiration (ET) cap. The unit has already experienced two-feet of differential settlement, resulting in cracks to the existing MATCON cap and ponding of surface water on the site. Please include a discussion of the future potential settlement of the landfill after placement of the ET Cover in the Design Report.
5. The Work Plan, Design Report, Specifications, CQA Plan, Borrow Report, and Drawings do not uniquely and consistently refer to the three layers which comprise the ET Cover, the existing subgrade surface, and the existing waste which is being moved within the landfill from the location of the proposed new-hanger. This could have an impact on the construction process and may result in a poorly constructed ET Cover. For example, Drawing 3002, refers to a compacted soil clay mixture, but none of the other documents refer to some of the cover layers as a "clay." The Design Report refers to the ET Cover layers as "desert pavement," "cover soil," and "blended soil," but these terms are not used in any of the other design documents. Given that the soils used to construct the ET Cover are each critical design elements, revise the Work Plan, Design Report, Specifications, CQA Plan, Borrow Report, and Drawings to identify each ET Cover component by material property type. Ensure, where appropriate (*i.e.*, all materials except for waste to be placed on top of the landfill), that the specifications include material gradations and material properties.

6. Various documents reference different compaction criteria. The Drawing 2001 indicates compacted soil is to be placed in no more than 6-inch lifts compacted to 95% maximum density, which is not what is indicated in Specification 02200 which specifies both a 95% as well as a 90% maximum compaction, and placement of 18-inches of material in two equal (i.e., 9-inch) lifts. The CQA Plan only specifies a 90% compaction criterion with tolerances which allow for less than 90% compaction. It is also unclear how the DOE intends to demonstrate that a 95% compaction has been achieved. Revise the document to include consistent and achievable compaction criteria.
7. Include a discussion of the remedial strategy. Specifically, please explain how the ET Cap will: protect human health and the environment; attain protective levels specified by NMED (i.e., reduces gas emissions, meets RSLs); control releases (i.e., to groundwater or air); comply with all waste handling standards during waste excavation and relocation; is reliable and effective over the short- and long-term, and is implementable. In addition, the Permittees must demonstrate that the proposed ET Cover satisfies the original closure criteria listed in the 2004 Work Plan (North Wind 2004).

Specific Comments

8. Work Plan: 5.1 Los Alamos County Requirements (p.26)

The responsibility for installation of the 40 mil polyethylene vertical barrier (liner); the schedule for the installation of the liner; and additional supporting design information for this liner is unclear from the text in this section and in the Construction and Implementation Plan. Documentation of the method for safe installation of this liner, and descriptions of how it will be designed to meet the stated objectives and how it will successfully remain intact over the 30-year design life by resisting friction, shear, and tensile forces were not provided in the Design Report or the specifications.

DOE must clarify where the supporting design information is for this feature that demonstrates that it will serve its intended purpose. Please provide descriptions for how landfill gas will be successfully vented to the surface once captured by the vertical barrier, and how landfill gas will be prevented from migrating around the vertical barrier to the hangar expansion area. As discussed during June 10th 2015 meeting and June 16th, 2015 phone conference DOE must propose to install a methane monitoring well west of the liner to ensure methane migration is prevented by the vertical liner. Revise the text of the Work Plan accordingly.

9. Work Plan: 5.2 Borrow Soil Investigation (p. 26)

- a. Revise the Work Plan to include the borrow soil site history identifying all potential contaminants and a sampling and analysis plan to verify that those contaminants do not pose a risk to human health or the environment. If there is no evidence that potential contaminants could be present in the borrow material, provide NMED with relevant references and documents justifying

that determination. If an analysis of the borrow soil has already been performed, provide NMED with the results in a tabular format that compares analytical results with residential soil screening levels (RSLs).

- b. The Work Plan does not appear to discuss the availability of the materials tested. Information from the Borrow Report must be utilized for the Specifications in the Design Report and include a description of the methods for soil testing that will be used to construct the various ET Cover layers and how these materials meet the daily cover requirements for the relocated wastes. Please revise the ET Cover design documents to combine all of this information in a manner that will demonstrate that adequate soil volumes of appropriate gradation are available for all the various soil needs of the project.

10. Work Plan: 5.5 Geoprobe and VOC Investigation (p.30)

Revise the statement "Observed differential settlement is most significant toward the east and decreases toward the east" to read "Observed differential settlement is most significant toward the east and decreases toward the west."

11. Work Plan: 5.5 Geoprobe and VOC Investigation, Table 2 (p. 33-34)

Revise Table 2 to include the following:

- Provide the entire soil boring ID (*e.g.*, SB-01 instead of 1) to be consistent with the IDs used throughout the document.
- Identify the units of measurement used for soil and waste depth measurements.
- Include the units of measurement.
- The term "na" in the last two columns is not defined in the table; it is unclear if *no* waste was observed or if the soil boring did not extend into the waste. Revise the table to define "na".

12. Work Plan: Cover System Design (p.37)

The proposed cover design does not include features designed to address burrowing animals. NMED considers the top five feet of soil cover to be subject to burrowing animals. The proposed cover will not be more than three feet thick and does not include a rock layer or other design feature to prevent animals from burrowing into wastes and bringing contaminants to the surface or generating preferential pathways for surface water infiltration. Revise the Post-Closure Care Monitoring Plan (PCCMP) section to describe management procedures to discourage animals from burrowing at the site, and the timely repair of observed burrows greater than 3 inches in diameter.

13. Work Plan: 9.0 Construction Schedule (p. 40)

In the Construction Implementation Plan, the Permittees describe the removal of the MATCON cap (proposed for July, 2015) during what is typically the monsoon season for northern New Mexico. Please describe what precautions or emergency

measures will be implemented by the contractor to prevent flooding and manage run-on/run-off of the landfill during monsoon events.

14. Work Plan: 11.0 Reply to NMED Concerns (p. 42)

- a. The Permittees state that the ET Cover will not concentrate gases via a specific collection system, but will allow it to vertically migrate up through the soil profile distributed over the entire cover surface. The Work Plan further indicates that the methane is expected to undergo oxidization as it moves through the new cover profile prior to release to the atmosphere. This design approach is not supported by landfill gas calculations, and should excessive landfill gas be emitted, it could negatively affect the ability of the vegetation to germinate and achieve the desired amount of vegetation to support the ET Cover design. DOE shall propose to monitor migration and decomposition of landfill gas through the soil profile to demonstrate such decomposition through moisture, landfill gas and vegetation monitoring. DOE must also propose that if it is determined that excessive landfill gas production is negatively affecting vegetation growth on the ET cover, the DOE will propose to NMED corrective action measures to reduce the concentration beneath the ET cover.
- b. DOE states that “Dave Ploeger, Los Alamos County Airport Manager, stated that procedures in place at the airport for snow removal do not allow for piling of snow on the cover. There are designated locations in place where the snow is pushed to away from the cover area.” In a meeting on June 10th, 2015, DOE indicated that there is a signed assurance from the Los Alamos County Airport Manager indicating that controls are in place to prevent the stacking of snow on the ET cover. Provide a copy of that assurance in the revised Work Plan.

15. Work Plan: 12.0 Groundwater Monitoring Data (p. 46)

DOE quotes a section of text that mentions “the existing monitoring wells.” Please provide information on the location and depth of these monitoring wells in the revised Work Plan.

16. Work Plan: 13.0 Post-Closure Care and Monitoring Plan (p.47)

- a. The Work Plan only discusses a schedule for landfill cover inspections for the first five years. DOE must revise the Work Plan to address the inspection schedule after the initial five years, which would be dependent on data collected during the first five years.
- b. In addition to the scheduled inspections of the landfill cover, DOE must revise the text to require that landfill cover inspections be performed after each major precipitation event that exceeds 50% of the design rainfall event until vegetation is established.

17. ET Cover Design Report: 4.1.7 Soil Properties (p. 21)

- a. In the second paragraph, the Permittees state that the installed density of cover soil will be between 85% and 92% of maximum dry density. This is inconsistent with the Permittees statement in the Technical Specifications, Section 02200, Part 3.07.D, which states, “90% of maximum dry density plus or minus 5 pcf [pounds per cubic foot]”. Revise the text to resolve this discrepancy.
- b. The third paragraph states that the upper 6-inches of the cover profile will be mixed with rock at a volumetric ratio of 25% rock to 75% soil (with a rock size of D50 or 0.5-inches), effectively altering its hydraulic properties. It then presents the equation used to alter the saturated hydraulic conductivity based on the addition of rock. Please provide an explanation of why an equation was used to alter the material properties in lieu of actual testing of the 25% rock to 75% soil mixture.
- c. The last sentence in the last paragraph on page 21 incorrectly references “Section 3.1.5”; the reference should be revised to read “Section 4.1.5”.
- d. The DOE states that prior to performing the UNSAT H computer simulation, they adjusted the calculated saturated hydraulic conductivities (K_{sat}) for the top 3 feet of landfill cover (0 – 3 ft below ground surface (bgs)) in order to account for dynamic processes that increase K_{sat} . The K_{sat} for rock/soil admixture (0 – 0.5 ft bgs) and for cover soil between 0.5 and 1 ft bgs were increased by an order of magnitude, and K_{sat} for cover soil between 1 and 2 ft bgs was increased by half an order of magnitude. This appears to be inconsistent with the soil input parameters for the UNSAT H simulation in Table 2, which shows unadjusted K_{sat} values. The DOE must revise Table 2 and verify the K_{sat} values used in the UNSAT H simulation. If the incorrect K_{sat} values were used, repeat the UNSAT H simulation with correct values and, if necessary, adjust cover design based on the output of the simulation.

18. ET Cover Design Report: 4.1.8 Model Output (p. 23)

The DOE states that Table 3 provides “the remaining water storage capacity in the modeled soil profile.” However, the numerical values in the last column of Table 3 are greater for the wettest year on record than for the average year, suggesting that these values represent used storage. Revise the table and/or text to clarify if the values represent the remaining water storage capacity or the total used storage in the modeled soil profile.

19. ET Cover Design Report: 4.1.8 Model Output, Figure 10 (p. 24)

The caption at the top of Figure 10 states, “Espanola Transit Blended – 50% Overburden 50% Clay.” It is unclear whether Figure 10 represents computer simulation results for a soil profile where the blended soil constitutes the bottom layer of the profile, or if it represents a soil profile consisting exclusively of the blended soil. Please provide additional information on the soil profile represented

by Figure 10, both in the text and in the figure caption clarifying the composition of the soil profile. If Figure 10 does not represent the complete soil profile (as shown in Figure 5), provide computer simulation results for the complete soil profile.

20. ET Cover Design Report: 5.1.4 Incipient Particle Size (p. 28)

Correct units for total average shear stress from “pcf” to “psf” (pounds per square foot).

21. Work Plan: Cover System Design 7.0 (p.35)

The Permittees state that all soil cover systems naturally regulate methane through both physical barrier and methane oxidation processes; however, documentation of this is not provided within the Design Report. Section 5.3 of USEPA’s Technical Guidance for RCRA/CERCLA Final Covers, EPA 540-R-04-007, dated April 2004 states that gas emission rates for municipal solid waste landfills can be difficult to predict and vary over time. EPA recommends the use of a first order decomposition rate equation to estimate annual emissions over a user-specified time period. EPA has developed an automated estimation tool for calculating landfill gas emissions which is referred to as the Landfill Gas Emissions Model (LandGEM). Revise the supporting design documentation for managing the landfill gas to either include calculations of landfill gas emissions or other supporting documentation that the proposed landfill gas management approach is adequate.

22. ET Cover Design Report: Attachment 1 (p.40)

- a. The Attachment to the Design Report lists storm intensity criteria in a table on the first page of the attachment, but it does not include criteria from the County of Los Alamos, Public Works Design and Construction Standards, Revised September 2008. This document specifies use of a Tc (time of concentration) for existing conditions which is not less than 10 minutes and not more than 60 minutes. The Design Report must be revised to include the Los Alamos County design criteria, and select the most conservative storm intensity criteria.
- b. There appears to be a discrepancy between rainfall intensity and the time of concentration values used in the runoff prediction in Section 5.1.2 and those being used in Hydrology Calculation in Attachment 1. Please explain or correct the discrepancy, and if necessary, redesign the drainage channels.

23. Post-Closure Care and Monitoring Plan: General Comment

- a. The proposed PCCMP does not include landfill gas monitoring. As discussed during a meeting on June 10, 2015, the DOE shall propose to install three landfill gas monitoring wells: one well on the west side of the vertical liner separating the waste from the backfill; a well near the current monitoring location PS-02; and another well near the current monitoring location PS-05. The DOE must submit for NMED approval the exact locations and

construction details for the monitoring wells at least 15 calendar days prior to the scheduled installation. The new monitoring wells must be sampled quarterly for the first year, using a methodology approved by NMED for the existing landfill monitoring wells. The monitoring frequency for subsequent years will be determined by NMED based on the collected monitoring data. Please revise the Work Plan to include the above-referenced landfill gas monitoring requirements.

- b. The proposed PCCMP does not include plans to monitor the performance of the ET cover, and its ability to minimize water infiltration into the waste. Soil moisture probes can be used to measure vertical gradients in soil moisture within the ET cover, and can indicate whether the cover system is approaching its storage capacity. The DOE shall install two or more nests or strings of soil moisture probes capable of measuring vertical distribution of soil moisture, in the center of the ET Cover and near the edge. The DOE must also submit a plan for NMED approval that includes the exact locations and construction details for the soil moisture monitoring equipment at least 15 calendar days prior to the scheduled installation. For the first year DOE must measure soil moisture quarterly and between 5 to 10 calendar days after each major precipitation event that exceeds 50% of the design rainfall. The monitoring frequency for subsequent years will be determined by NMED based on the collected monitoring data. Revise the Work Plan to include the above-referenced soil moisture monitoring of the ET Cover.

24. Post-Closure Care and Monitoring Plan: Attachment 1

- a. In the Section titled 'Permanent Erosion & Sedimentation Control Measures', the checklist focuses exclusively on geotextile fabric. However, in many instances, the fabric is going to be completely covered by rocks. Please review the checklist in the 'Permanent Erosion & Sedimentation Control Measures' and in all other sections of Attachment 1 to ensure that the checklist items reflect the actual construction of the structures being inspected. Revise the Work Plan where appropriate.
- b. Inspection tolerances which would trigger corrective action could not be located in the PCCM Plan. For example, inspections should ensure that settlement of the cover surface in excess of 6 inches, erosion of the cover soil in excess of 6 inches below the cover surface, areas of ponding water, animal intrusion burrows in excess of 3 inches in diameter, or contiguous areas lacking vegetation in excess of 200 square feet would trigger corrective actions that are taken in a timely manner to prevent excessive deterioration of the cover system. Please revise the PCCM Plan to specify inspection tolerance criteria for damage which would trigger corrective action.

25. Technical Specifications 01400

Specification 01400, Quality Control does not include preparation of Construction Completion documentation. Revise this section or another appropriate section of

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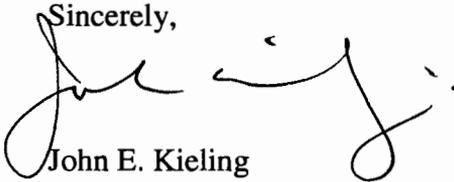
the design documentation to indicate that preparation and submittal of Construction Completion documentation is required.

DOE must address the above comments in the revised Work Plan for the replacement cover design. DOE must receive an approval of the Work Plan from NMED prior to commencing construction on the cover.

DOE must submit two hard copies and one electronic copy of the revised Work Plan to NMED by **August 17 2015**. In addition, the revised Work Plan must be accompanied by a response to NMED's comments that cross-references NMED's numbered comments and provide an electronic redline-strikeout version of the Work Plan that shows where all revisions to the Work Plan have been made. .

If you have any questions regarding this letter, please contact Siona Briley or Jerzy Kulis of my staff at (505) 476-6049, and (505) 476 6039 respectively.

Sincerely,



John E. Kieling
Chief
Hazardous Waste Bureau

cc: S. Briley, NMED HWB
J. Kulis, NMED HWB
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File: 2015 Reading and LANL, TA-73, Airport Landfill, Work Plan