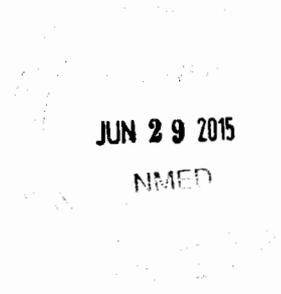




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June 23, 2015

DCN: NMED-2015-12

Mr. David Cobrain
New Mexico Environment Department (NMED)
Hazardous Waste Bureau
2905 Rodeo Park Dr. East
Building One
Santa Fe, NM 87505

RE: Evaluation of the Work Plan and Supporting Documents for the Los Alamos (LA) County
Airport Landfill Cover Replacement, April 2015

Dear Mr. Cobrain:

Attached please find draft technical review comments on the above-referenced document. These comments were drafted by our subcontractor, TRM Environmental Consultants, LLC (TRM).

This assessment includes and expands on our prior completion comments (provided informally to Ms. Neelam Dhawan) which initially focused on significant omissions from or concerns identified in the documents provided by NMED to support a preliminary meeting with Department of Energy on June 10, 2015. Significant concerns exist over the lack of landfill gas design documentation and the lack of detail and consistency within the soil components of the Evapotranspiration (ET) Cover. Although the design approach supporting the ET Cover is adequate, the entire design package is lacking to such an extent that concerns exist that the final constructed final product might not meet the design intent further complicating concerns at the LA Airport.

If you or any of your staff have questions, please contact me at (801) 451-2864 or via email at paigewalton@msn.com.

Thank you,

Paige Walton
AQS Senior Scientist and Program Manager

cc: Neelam Dhawan, NMED (electronic)
Joel Workman, AQS (electronic)
Cathy Dare, TRM (electronic)

Enclosure



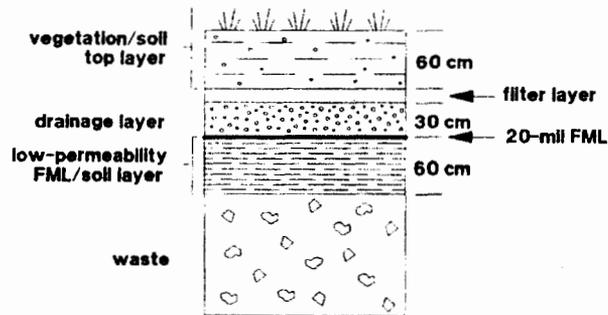


Figure 1. EPA-recommended cover design.

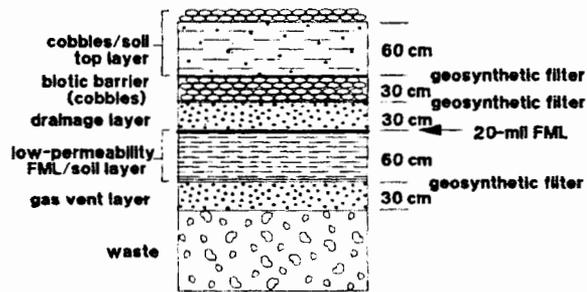


Figure 2. EPA-recommended cover design with optional layers.

RCRA Subtitle C regulations also allow alternative designs that consider site-specific conditions including climate and the nature of the waste as long as the alternative design also meets the intent of the regulations, to protect human health and the environment (see 40 CFR § 264.301(b)). The Design Report should be revised to include a more detailed discussion of the regulatory requirements as they pertain to the Los Alamos County Airport Landfill Cover Replacement, which clearly indicate that use of the 40 CFR § 264.310 design criteria is considered an alternative design standard which requires substantiation and regulatory approval.

4. The Design Report relies 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 Technical Regulatory Council (ITRC) guidance has a broad range of authors, but still includes Dr. Dwyer. Use of independent references in addition to the ITRC guidance is preferred to ensure that design documents do not appear to be self-substantiating. Please provide additional references where available whose primary author is not Dr. Dwyer which substantiate the design and use of ET Covers.
5. NMED provided a comment that stated, "The Permittees must provide an evaluation of gas emissions from the landfill and their impact on the ET Cover and vegetation." The response provided in Section 11.0 of the Work Plan is not adequate to address this concern. The

rationale provided for incorporating only a passive landfill gas control measures is that NMED approved of such a design, with stipulations, in September 2004. Without documentation that the overall moisture content of the landfill is similar to what it was in 2004, this rationale is unsupported. Given the description of the current landfill cover which currently directs surface water into the landfilled waste, the above average amount of precipitation the landfill received over the last several years, and the high levels of methane readings recorded at the landfill, further substantiation for only incorporating a passive landfill gas collection system is needed. Please revise the Work Plan to document the landfill gas collection design rationale in a manner consistent with EPA's landfill gas guidance document entitled, "Guidance for Evaluating Landfill Gas Emissions From Closed Or Abandoned Facilities", EPA-600/R-05/123a, September 2005.

6. Section 5.2 of the Work Plan discusses in the third bullet under this section that, "a vertical barrier composed of a 40 mil polyethylene liner will be placed between the hangar expansion area and the landfill to the bottom of waste to mitigate the potential for lateral subsurface methane migration from the landfill toward the proposed hangar facility." No additional design related information could be located for this design feature other than its incorporation in the drawing files and its inclusion in the Construction Implementation Plan, April 2015 (CI Plan) as Item No. 8, in Section 5.1, Landfill Cover Replacement Tasks and Associated Work. Documentation of how this feature will be safely installed, how it was designed to meet the stated objectives or how it will successfully remain intact over the 30-year design life by resisting friction, shear, and tensile forces could not be located within the Design Report or the specifications. Please clarify where the supporting design information is for this feature demonstrating it will serve its intended purpose, 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 and migrating to the hangar expansion area. Of specific concern is the lack of permeable media placed along the vertical barrier to allow for successful venting of landfill gas without which migration of landfill gas around the vertical barrier could result. Also of concern is the lack of computations to support the fastening approach at the surface for the vertical barrier which could fail due to friction, shear, or tensile forces. Design computations for each of these concerns need to be incorporated into one or more of the various design documents.
7. Information related to assessment of the future potential for differential settlement of the landfill after consolidation of wastes and placement of the ET Cover could not be located in either the Work Plan or Design Report. The Work Plan proposes to excavate landfilled wastes beneath the to-be-constructed-hanger concrete pad so as to limit differential settlement impacts to this concrete pad. This excavated material is to be incorporated into the existing landfill. No assessment of future potential differential settlement as a result of consolidating or constructing the ET Cover over the landfilled wastes could be located in the Work Plan or Design Report. Given the documented two feet of settlement which has already occurred, an assessment of the future potential settlement of the landfill after consolidation of wastes, use of one foot daily cover over the replaced wastes and placement of the ET Cover should be included in the Design Report.

Without substantiation that differential settlement will not be a concern, it is unclear how the design and installation of concrete culverts and concrete diversion channels is appropriate. Concrete structures are susceptible to cracking should differential settlement occur. Any such cracking will allow surface water intended to be diverted to “leak” and percolate into the landfill in a manner similar to what is occurring with the MATCON cover design. Design of features which are not susceptible to failure should differential settlement occur would appear to be more conservative and appropriate. Please revise the Work Plan and supporting design documents to address the potential for additional differential settlement and how the current design will be able to accommodate future settlement.

Additionally, the Drawings do not provide top of surface elevations for each ET Cover layer. Given that waste is to be placed with 1-foot daily cover requirements, it would appear necessary to provide control grades to ensure the design slope criteria is met. Without specific construction sequencing requirements and no material management guidelines to follow, there appear to be no controlling criteria to ensure that unnecessary cover soil is not used which is both costly and could unnecessarily increase the overall landfill footprint. Please revise the overall ET Cover design to include top of surface elevation criteria for each ET Cover layer from compacted subgrade to cover topsoil surface. Please also ensure that as-built grades are collected and presented as part of the Construction Quality Assurance (CQA) Plan.

8. The level of detail provided in the cost estimate provided in Section 4.0 of the CI Plan is not adequate. The Attachment to the CI Plan, referenced in Section 4.0, indicates in the header that the cost estimate is within +/- 20%, but no reference for how the costs were derived is provided. The Attachment detail appears to be from a costing analysis program which was performed by DOE to arrive at the costs, but no reference to the actual costing program used is provided. Please revise the CI Plan to include supporting documentation for the cost estimate presented including how it was derived, what costing program was used to arrive at the values presented, and how the accuracy range was determined.

Further, the level of detail provided does not demonstrate a complete understanding of the complexities of the proposed construction activities. Costing for remedies is to include ***all activities necessary*** to complete the action as indicated in the RCRA CAP (Corrective Action Plan), Corrective Measures Study (CMS) Section II.E.5.e, including costs for: engineering, site preparation, construction, materials, labor, sampling/analysis, waste management/disposal, permitting, health and safety measures, training, operation and maintenance, etc. Please revise Section 4.0 of the CI Plan to incorporate all of the costs associated with installation of the cap and the monitoring and maintenance for the required 30 year monitoring period.

9. The Health and Safety Plan, dated April 2015, does not discuss potential exposures from the compounds detected in the landfill gas samples (please refer to the data package file entitled Test America volatile organic compound (VOC) Report Comment: As part of the review of the active soil gas data provided in “Test America VOC Report”, a comparison to the EPA Vapor Intrusion Screening Levels (VISLs) was conducted in accordance with the NMED Soil Screening Guidance (SSG). Several samples resulted in elevated risk and/or hazard

above acceptable target levels (1E-05 for carcinogens and 1.0 for noncarcinogens). For example, the soil boring 19 (SB19) had individual and total risk and hazard well above the acceptable target levels. As the future use of this landfill includes industrial use as an airport with hangers, buildup of vapors, especially in hangers is a concern to potential site workers and casual flyers. Per the NMED SSG additional analyses of this pathway using site-specific modeling may be warranted to better evaluate site risks. Discuss how the vapor intrusion pathway has been evaluated in selection of and design of the proposed landfill cap and discuss how the cap will mitigate potential risks via the vapor intrusion pathway.

Also, please ensure that the Health and Safety Plan (HASP), Work Plan and design documents discuss the potential for exposure to compounds detected in the landfill gas, and what measures will be taken such as perimeter monitoring to ensure the public is not exposure to the compounds in the landfill gas during intrusive construction activities such as MATCON removal, waste excavation and placement, or passive gas vent installation and removal.

10. The Case Narrative of the Test America VOC Report indicates in the second paragraph on Page 3 of 55 under the Volatile Organic Compounds by gas chromatography /mass spectrometry (GC/MS) heading that, "Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with batch 152963. A laboratory control spike and duplicate (LCS/LCSD) was performed to demonstrate accuracy and precision." EPA's Guidance for Quality Assurance Project Plans, EPA QA/G-5, EPA/240/R-02/009, December 2002, specifies in Table 3, Data Quality Indicators, that bias should be assessed through the use of reference samples or spike matrix samples, also referred to as MS/MSD samples. Extra sample volume needs to be provided by the sampler to allow the lab to spike the sample with a known concentration of compounds, and then analyze the sample to verify the known concentration is detected. Please address how the lack of bias analysis via MS/MSD affects data quality. Please also ensure any future sampling events include collection of extra sample volume to allow for MS/MSD analysis.
11. The Work Plan, Design Report, and CI Plan all discuss waste removal/relocation. Excavation into any landfill generates odors which need to be managed. No discussion of odor management is provided in any of the documents. Please revise the Work Plan or Design Report or CI Plan and Specifications as necessary to address odor management associated with the waste removal/relocation operations.
12. The Work Plan indicates in Section 11.0 that the ET Cover will not concentrate the gas via a specific collection system, but will allow it to vertically migrate up through the soil profile extrapolated 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 any 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 stand of grass to support the ET Cover design.

The Design Report indicates in Section 7.0 that all soil cover systems naturally regulate methane through both physical barrier and methane oxidation processes, but documentation of this is not provided with in the Design Report either.

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 MSW 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 had developed an automated estimation tool for calculating landfill gas emissions which is referred to as the Landfill Gas Emissions Model (LandGEM). Please revise the supporting design documentation for managing the landfill gas to includes use of a landfill gas calculation or model to document that the proposed landfill gas management approach is adequate.

13. The proposed cover design does not include features to address burrowing animals. NMED considers the top five feet of soil covers to be subject to burrowing. The proposed cover will not be more than three feet in thickness and does include a rock layer or other designed feature to prevent animals from burrowing into wastes and bringing contaminants to the surface or generating preferential pathways for surface water infiltration. Please revise the proposed design to address the need for protection against burrowing animals given its proximity to protected lands for animals.
14. 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 to-be-placed waste which is being relocated from the to-be-constructed-hanger. This lack of consistency significantly impacts the design and could result in a poor final constructed ET Cover. For example, Drawing 3002, refers to a compacted soil clay mixture, but none of the other documents refer to any 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. Further, various documents reference 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 density, and placement of 18-inches of material in two equal (i.e., 9-inch) lifts. The CQA Plan only specifies a 90% compaction criteria with tolerances which allow for less than 90% compaction. Given that the soils used to construct the ET Cover are each critical design elements, please revise the Work Plan, Design Report, Specifications, CQA Plan, Borrow Report, and Drawings to call out 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 specifications include material gradations and material properties.

Additionally, each material type should have its own unique specification (i.e., daily cover, topsoil with gravel admixture, cover soil, compacted waste, compacted subgrade). Each should be referred to by name consistently, with compaction, gradation, and material properties indicated. Please revise the design to provide a specific specification for each material type to be placed.

15. Drawing 2001 specifies in Note 4 that the relocated waste is to be placed to 95% maximum dry density. This material will be very heterogeneous, requiring potentially numerous compaction standards. Further, specifying compaction criteria requires performance of dry bulk density and standard proctor testing which is not typically performed on a waste. Please provide written documentation that a reputable soils lab is willing to perform the required testing to support these requirements. Also ensure provisions are made for this material to be very heterogeneous with specific corrective actions which will be taken to address this during construction.
16. The Borrow Report provides no assessment of the materials tested. Information from the Borrow Report should be tied to the Specifications in the Design Report highlighting how the soils tested 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 tie all this information together in a manner which demonstrates that adequate soil volumes of appropriate gradation are available for all the various soil needs of the project.
17. Section 4.0 of the Design Report presents the cover profile. In subsection 4.1.7, Soil Properties of the various ET Cover soil layers is presented. The third paragraph states that the upper 6-inches of the cover profile will have rock mixed into it at a volumetric ratio of 25% rock to 75% soil (with a rock size of D50 of 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. The mathematical model geometry was presented prior to this section, so it is not clear if the soil properties modeled were just topsoil, or the altered topsoil properties as determined by the equation. Please revise this section of the Design Report to clarify why the equation was used to alter the material properties in lieu of actual testing, and which soil properties were actually modeled.
18. The approach used for the design of the ET Cover and supporting components lacks clarity. Specifically, in the Attachment to the Design Report, the Waste Volume calculations state to assume 3-feet of waste was spread over a length of 700 feet. The Cover Soil Volume Required (approximate) calculation indicates that the cover soil area is 770 feet by 300 feet, but it is unclear from where these values were taken. Similarly, the compacted volume was apparently derived from 231,000 square feet times the determined depth of 2.875 feet, but that was not readily presented either. It is also noted that this does not appear to include the surficial top six inches, but is listed as the cover soil required volume but the resulting volume does not really not the total volume of all soil required since the thickness omits the top six inch layer. These are just some of the inconsistencies throughout the design documentation and supporting calculations which could be improved upon by providing a step by step design process in a manner similar to a solutions manual. Please revise the design documentation to present a more detailed set of calculations to allow for concurrence in the design approach and assumptions made.
19. The Design Report does not indicate what the controlling design criteria was used for ensuring the soil cover components can adequately resist erosion. The Attachment to the Design Report lists design 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, which specifies use of a Tc for existing conditions which is not less than 10 minutes but not more than 60 minutes. This requirement does not appear to be consistent with Section 5.1.1 of the Design Report which indicates that use of a Tc of 60 minutes is considered to be conservative. Please revise the Design Report to substantiate the use of a Tc of 60 minutes based on the Los Alamos County design criteria.

Further, Section 4.12.1.C of the Los Alamos County design manual specifies the use of a 100-year frequency, 24-hour duration storm which was also not included in table in the Design Report Attachment. Please revise the design documentation to ensure consistency with the Los Alamos Design and Construction Standards.

20. Specification 01400, Quality Control does not include preparation of Construction Completion documentation. Please revise this section or another section of the design documentation deemed appropriate to indicate that preparation of Construction Completion documentation is required.
21. The Post-Closure Care Monitoring Plan (PCCM) Plan presents monitoring requirements in Table 1 of Section 2.0. NMED is not authorized for the National Pollution Discharge Elimination System (NPDES) regulations. As such, this project is subject to the USPEA Region 6 National Pollutant Discharge Elimination System General Construction Permit for Discharges from Construction Activities. The current NPDES General Construction Permit requires under Section 4, Site Inspections, in Section 4.1.4.2, for Arid, Semi-Arid and Drought Stricken Areas, that at a minimum you inspect within 24 hours of an occurrence of a storm event of 0.25 inches or greater. Please revise Table 1 to incorporate this requirement.

Additionally, 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 deep, areas of ponding water, animal intrusion burrows in excess of 4 inches in diameter, or contiguous areas lacking vegetation in excess of 200 square feet should be specified to ensure corrective actions 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.

22. The Work Plan refers to a VCM Plan in Section 6.0, Applicable Regulations. VCM is not defined. Please clarify what is meant by a VCM Plan.
23. Section 7.0, Cover System Design of the Work Plan, indicates that the cover surface will be a "desert pavement." Although references are provided for use of this term, it is not a widely accepted industry standard. Please do not use the term desert pavement, but refer to the material by its material composition, such as a topsoil and gravel mixed soil.