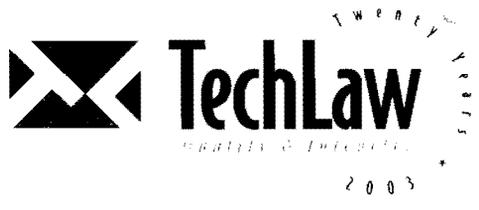


TA73



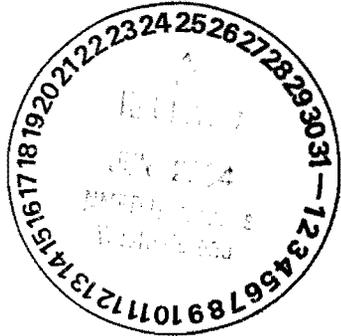
ENTERED



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June 22, 2004

Mr. David Cobrain
State of New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303



Reference: Work Assignment No. 06110.150.0001; State of New Mexico Environment Department, Santa Fe, New Mexico; General Permit Support Contract; Technical Review of Phase II Work Plan For Los Alamos Site Office TA-73 Airport Landfill, Final Revision 0; Los Alamos National Laboratory, Los Alamos, New Mexico; Draft Deliverable

Dear Mr. Cobrain:

Enclosed please find the deliverable for the above-referenced work assignment. The deliverable consists of a technical review of the "Phase II Work Plan for Los Alamos National Laboratories Site office TA-73 Airport Landfill Final Revision", dated April 2004.

In general, there are several technical and engineering deficiencies associated with the Work Plan, which have been addressed in the deliverable as either general comments or specific comments.

One issue which NMED should be aware of deals with General Comments #1 and #9. It was not clear to TechLaw if a specific soil design cover of 18 inches had been "approved" by NMED as is inferred in the document or that NMED had only approved the concept of a soil cover, pending the submittal of specific design information by Los Alamos National Laboratories (LANL). Therefore, the wording in General Comments #1 and #9 should be evaluated closely by NMED to ensure that they convey previously agreed upon discussion by NMED and LANL. NMED may wish to modify these comments accordingly.

The document is formatted in WordPerfect. The deliverable was emailed to Mr. David Cobrain on June 22, 2004 at David_Cobrain@nmenv.state.nm.us. A formalized hard (paper) copy of this deliverable will be sent vial mail in a few days.





Please feel free to contact me at (303) 763-7188, or Mr. Mohamed Nur, the reviewer, at (703) 818-3244, if you have any questions.

Sincerely,

A handwritten signature in black ink that reads 'June K. Dreith'. The signature is written in a cursive style with a large, looping initial 'J'.

June K. Dreith
Project Manager

enclosures

cc. D. Goering, NMED
M. Nur, TechLaw
J. Raines, TechLaw
Denver Files

**Los Alamos National Laboratories
Los Alamos, New Mexico**

**Technical Review of
Phase II Work Plan
For Los Alamos Site Office TA-73 Airport Landfill
Final Revision 0, dated April 2004**

Submitted to:

**Mr. David Cobrain and
Ms. Darlene Goering
State of New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1, Santa Fe, New Mexico 87505**

Submitted by:

**Ms. June Dreith
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**Work Assignment No.
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Darlene Goering
(505) 428-2500
June Dreith
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June 22, 2004

**Technical Review of
Phase II Work Plan
For Los Alamos Site Office TA-73 Airport Landfill
Final Revision 0, dated April 2004
Los Alamos National Laboratory (LANL), New Mexico**

GENERAL COMMENTS

1. As stated in the *Construction Quality Control Plan* (CQCP) (Appendix C) and the New Mexico Environment Department (NMED) conditional approval letter of the Voluntary Corrective Measure (VCM) Plan, NMED approved the use of an engineered alternative earthen cover (cap) or RCRA Subtitle C equivalent cover that will meet or exceed RCRA Subtitle C requirements. In order to demonstrate that the alternative cover meets or exceeds the Subtitle C required performance criteria, modeling (such as the Hydrologic Evaluation of Landfill Performance [HELP] Model) will need to be conducted. The modeling could be conducted with data obtained from testing the materials to be used in the cover, literature data and assumed values for parameters like hydraulic conductivities.

As proposed the landfill cover does not appear to be equivalent in performance to a Subtitle C final cover. A Subtitle C final cover includes a composite soil and geosynthetic impermeable liner, a gas collection layer, a biotic barrier, a surface water collection layer and a vegetation cover. Please revise the design documents to show equivalency in surface water flux through the cover, collection of landfill gas, protection against biotic intrusion and surface water control of the proposed cover to the Subtitle C prescriptive final cover. Equivalency must be shown in both numeric similarity (i.e., zero water flux through the cover) and in reliability of the cover.

The EPA *Technical Guidance Document, Quality Assurance and Quality Control for Waste Containment Facilities* (EPA/600/R-93/182) recommends construction of a test pad to demonstrate adequate performance (hydraulic conductivity) of the design that will be used for the full-scale landfill cover. *The Phase II Work Plan for Los Alamos Site Office TA-73 Airport Landfill, Final Revision 0* (Work Plan) presents neither modeling results nor test pad results to demonstrate that the proposed cover meets the RCRA Subtitle C landfill regulations for design of the landfill cover, closure and post-closure regulations in 20 NMAC 4.1.500 (and 600), incorporating 40 CFR 264 (and 265) Subparts G and N, and related guidance issued by the US EPA.

After a modeling exercise is completed, a test pad is needed to verify the assumed and modeled hydraulic conductivity of the proposed cover, using the materials, equipment and procedures indicated in Appendix A (Construction Specifications). The materials and procedures used in constructing the test pad, with any modifications necessary to confirm the required performance (hydraulic conductivity), should then be used for

construction of the cover. The Work Plan should be revised to include modeling and test pad construction and evaluation, and provide for revision of the construction specifications, if needed, based on the data obtained from the test pad.

2. The engineering drawings presented in Appendix A (e.g., Drawing No. 2005) indicate that the landfill cover will have three layers (a 6-inch top soil, 18-inch infiltration layer, and 6-inch existing cover). Based on the information provided in the Post-closure Care and Monitoring (Appendix D), the infiltration layer is also identified as an "infiltration barrier layer." The design as presented does not incorporate a drainage layer and any potential leachate generation is not addressed in the Work Plan. In addition, since the waste will be relocated from the eastern and northern edges, it is not clear how this relocation affects the cover configuration depicted on Drawing No. 2005. According to Drawing No. 2001 (Excavation Tick Plan), waste will be relocated from the eastern and northern edges and distributed over the remaining landfill area essentially covering all of the existing cover material. Drawing No. 2006 indicates that the relocated waste will be placed on the "existing ground surface" and then covered by the "existing/relocated interim cover material." Revise the Work Plan to clarify if the existing cover will be removed before placing the relocated waste on top of the existing waste or if the relocated waste will be directly placed on the existing cover. In either case, the cover configuration would not look like what is depicted in the drawings. In addition, explain how the existing and the relocated interim cover material will be reconstituted as a single 6-inch layer just above the waste/relocated waste.
3. The Work Plan, in various places, mentions the use of sediment basins and the engineering drawings show nondescript rectangular shapes showing locations of these basins, which are proposed as part of a storm water control system. However, the designs of these basins are not provided in the engineering drawings. Revise the Work Plan to provide detailed designs on the drawings.
4. In addition to periodic landfill inspections, please inspect the landfill after the next significant rainfall following the installation of the final cover and also at the end of the spring thaw. In the event that sever erosion is detected in the final cover slopes, please revise the landfill inspections to cover any significant rainfall event.
5. The Work Plan (see Section 4, page 14, last sentence) implies that structures may be built on or near the landfill cover and if that occurs vapor monitoring systems will be required in the structures to assure that methane concentrations do not exceed 25 percent of the lower explosive limit. Revise the Work Plan to clearly state the cover will not be disturbed and its integrity impaired during the 30-year post-closure period and a transferable deed restriction will be place on the landfill to assure that all post closure uses of the landfill are compatible with the presence of waste.
6. The Construction Plan (Appendix B) addresses the construction sequence, procedures and schedule for both the Main Landfill and the Debris Disposal Area (DDA). Although the Work Plan provides very limited information for the DDA, detailed design and

calculations (e.g., hydraulic calculations) presented for the main landfill are not provided for the DDA. Revise the Work Plan to clarify whether this work plan is meant to address the design and construction of the Main Landfill only or provide detailed design information including engineering calculations for the DDA cover.

7. None of the engineering drawings provided clearly indicate the current limits of waste and the extent of the cover over the existing and the relocated waste. For example, the legend for Drawing No. 2002 indicates a symbol for limit of "armored soil cap." However, the heavy dashed lines are not distinct on the drawing and it is not clear if the legend description applies only to eastern portion of the cap (where armoring will be used) or the entire landfill. If applied to the entire landfill, it is not clear which dashed line is considered the final extent of the waste (after waste consolidation). Revise the Work Plan to provide drawings that clearly show the extent of the waste and the cap.
8. The erosion and sedimentation control plan as presented in the engineering drawings (e.g., Drawing No. 2013) and the engineering calculations (e.g., hydraulic calculations, Drawing No. 2002B) do not clearly address the top of the landfill and side slope on the north (largest portion of the landfill area), which mostly drain to the north and northeast. Revise the Work Plan to verify that it has addressed runoff from this area.
9. A 6-inch topsoil and 18-inch compacted infiltration barrier layer are proposed as components of the landfill cover. It is not clear how the thickness of the barrier layer was determined. Such determination should be supported by data from field test on the predicted annual infiltration through the cover by measuring flux through different thicknesses of the layer to find the optimal thickness. The HELP Model can be used for such simulations. Revise the Work Plan to discuss why 18-inch infiltration layer was selected for the cover.
10. In the Post-closure Care and Monitoring Plan (Appendix D) inspection for breach of the cover by animal burrows is discussed. If burrowing animals have been identified at the site, the Work Plan does not discuss what other measures (other than inspection and repair if damaged) could be considered or used to prevent burrowing animals from damaging the cover. Revise the Work Plan to discuss this issue in detail.
11. Open burning of waste, the practice at this landfill for more than 20 years, can produce polychlorinated dibenzo dioxins and furans (dioxins/furans). Please provide procedures for characterization and proper handling of any ash that is uncovered during waste relocation activities. The characterization must include analysis for dioxins/furans and total metals (including mercury). In the event that elevated levels of dioxins/furans or metals are detected in samples of ash collected at the landfill, much more rigorous dust control procedures will be required and all work will have to be conducted by workers properly protected from the hazards.
12. DOE expects that it will be moving waste disposed of during the period 1965-1973. Waste handling practices and record keeping procedures during this time period were

imprecise. DOE may expect to uncover hazardous and radioactive waste during waste excavation operations. Please provide procedures to be used by site personnel to segregate hazardous waste from municipal solid waste. All containers still capable of containing liquids must be removed from the waste stream and handled separately (they can not be moved to the top of the landfill but must be disposed of off-site in a Subtitle C landfill). All waste excavated from the landfill must be screened with radiation monitors and any waste with activities significantly above background must be segregated and handled separately.

13. The proposed procedures for dewatering waste are deficient. Any saturated material excavated from the landfill should be assumed to be hazardous waste unless characterization results indicate otherwise. Even if the wastes are shown to be non-hazardous, allowing saturated wastes to dewater by spreading them on the ground and discing them is unacceptable unless it can be shown that the liquids are free from significant contamination. Please revise the document to incorporate a waste handling plan that includes segregation of saturated wastes within a lined area, collection of any liquids that come off the waste, characterization of the liquids, and proper management of any residuals.
14. The Construction Plan and Project Specifications do not appear to contain procedures that address daily cover. Please revise the Construction Plan and Specifications to indicate that a minimum of 6 inches of clean material will be placed over all waste surfaces at the end of every working day. This requirement is particularly applicable to the cover mining plan in which landfill cover material will be stripped from the top of the landfill. At the end of every working day, a minimum of 6 inches of clean material must be present between the surface and all waste. In the event that DOE operates for more than a standard working day, no waste may be exposed to the environment for more than 12 hours.

SPECIFIC COMMENTS

1. **Section 5.0 Demonstration of Cover Performance, page 14:** This section was supposed to respond to the requirement of the NMED Conditional Approval of Voluntary Corrective Measures (VCM) Plan (Conditional Approval Letter) that the Phase II Work Plan contain demonstration of cover performance for the life of the cover. This section simply references Appendix D (Post-closure Care and Monitoring Plan), but the referenced plan does not provide the information requested by the Conditional Approval Letter. As indicated above in General Comment No. 1, the Work Plan should be revised to satisfy this requirement.
2. **Appendix A, Drawing Nos. 2006, 2007 and 2008, page 5-3:** These drawings show an approximate location of the 1962 ground surface and the general notes on these drawings indicate that the 1962 surfaces depicted on this drawing should be considered "for information only." It is not clear what information the 1962 ground surface provides,

since waste was accepted at the Main Landfill before that date. Please revise these drawings to either explain the pertinent information that these surface lines provide or remove them from the drawings.

3. **Appendix A, Hydraulic Calculations, sheet 1 of 25:** Paragraph 4 states that each bench was designed as a 10-ft wide triangular channel with bed slope of 4%, and side slopes of 2.75% and 10% bench slope. Please clarify if the slopes indicated are the ratio of horizontal (H) to vertical (V) change and not percent slope. Drawing No. 2005 indicates that the side slope of each bench is 2.75 (i.e. 2.75H:1V). Please correct all references to H:V ratio as percent slope throughout the Work Plan.
4. **Appendix A, Hydraulic Calculations, Drainage Structures Hydraulic Design, sheet 1 of 25:** Paragraph 6 indicates that, at a minimum, a R-6 rip rap is required for the trapezoidal downchute based on the shear stress level, resulting from the steep slope. However in the supporting documentation provided in Tables 6 and 9, and Figures 3 and 21, a R-5 rip rap is selected for the downchute. Please reconcile this discrepancy and revise the text, table, and figures accordingly.
5. **Appendix A, Hydraulic Calculations, Drainage Structures Hydraulic Design, sheet 3 of 25:** For Channel 1 runoff calculations a Manning Roughness Coefficient (n) of 0.03 is used for sheet flow on grass-lined channel. The Technical Release 55 (TR-55) documentation which is cited in the hydraulic calculations discussions puts (see Table 3-1 of TR-55 manual) the value used (0.03) between smooth surface (0.011) and Fallow (0.05). The Manning Roughness Coefficients, depending on types of grass, are provided as 0.15 (short grass prairie), 0.24 (dense grasses), and 0.41 (Bermuda grass). Revise these calculations as appropriate using the correct coefficients.
6. **Appendix A, Hydraulic Calculations, Drainage Structures Hydraulic Design, sheet 7 of 25:** For the inlet/outlet control check a design discharge of 5.2 cubic feet per second (cfs) is used. However, the hydraulic calculations conducted for pipe segments 1 and 2 resulted in a maximum discharge of 5.5 cfs in pipe segment 1. Please clarify why this discharge was not used as the design discharge for the inlet/outlet control check computations.
7. **Appendix A, Hydraulic Calculations, Landfill Top Erosion Forces Estimate, sheet 1 of 8:** It is indicated that to determine velocities and shear forces generated by the sheet flow atop of the landfill sheet flow was examined for a 300-ft length of a 3% slope. Using the top of cap grading plan elevations and the scale provided on Drawing No. 2002, the slope atop the landfill appears to be in the range of 6% to 8%. Clarify this issue.
8. **Appendix A, Settlement Evaluations, Differential Settlement Evaluation, sheet 1 of 8:** The first paragraph states, "Settlement due to dewatering will also be neglected as no dewatering of the waste mass has been proposed. Furthermore, there is no evidence of a perched water table or leachate mound within the landfill." Revise the Work Plan to

provide data to backup this contention or provide a reference for this determinations.

9. **Appendix A, Settlement Evaluations, Differential Settlement Evaluation, sheet 4 of 8:** In Table 1, at the bottom of this sheet, the interim cover thickness is given as 1 foot. The engineering drawings (e.g., Drawing No. 2005) indicate the interim cover thickness as minimum 6 inches. Please clarify if the thickness used in the settlement calculations is the maximum expected or the average thickness of the interim cover.

10. **Appendix A, Settlement Evaluations, Differential Settlement Evaluation, sheet 5 of 8:** It is indicated on this page that with respect to grid point B5, the existing ground surface elevation is 7132 feet and Figure 1 is referenced for this information. However, the closest elevation point that can be used to approximate the elevation at point B5 is given as 7143 feet on the figure. None of the Drawings and figures provided clearly depict labeled contour elevations of the existing grade. Revise the Work Plan to provide a drawing or a figure that clearly provides the existing ground surface.

Under "Conclusions," it is stated that "due to the anticipated rate of settlement of the landfill and consolidation of the relocated waste due to compaction by construction equipment, it is likely that the final grades shown on the project drawing will not be achieved." Please revise the Work Plan to provide acceptance criteria for what grades will be acceptable and procedures to follow in the event final grades shown on the drawings are not achieved, or provide, in the final work plan submittal, an achievable grading plan. Clear instructions on compaction requirements and permeability specifications of the infiltration barrier layer should be provided to the construction contractor.

11. **Appendix A, Slope Stability, Global Slope Stability, sheet 5 of 5:** The last sentence on this page states, "stability of slopes during construction was addressed in a separate memo." Please clarify if the content of this memo is incorporated in this Work Plan (in one of the Plans), if so, provide a reference for its location.

12. **Appendix A, Landfill Gas Assumptions, Section 3.2, Factors Affecting LFG Generation, page 2:** In the equation used to estimate total tonnage of waste, the total waste is estimated as 429,400 cubic yards (cy) or 214,700 tons. However, in Section 2.0 (page 1), the estimated in-place tonnage of the waste is given as 268,400 tons. The maximum LFG calculated using this tonnage would be 102 scfm as compared to 82 scfm that is presented as the maximum LFG generation rate. The smaller waste tonnage (214,700 tons) was used throughout to determine LFG generation rates. Please reconcile these discrepancies and revise the discussions and conclusions presented as necessary. In addition, since gas venting is not incorporated in the cover design, revise the Work Plan to evaluate the effect of the impervious layer of the cover on the LFG generated during the 30-year post-closure period, and if perimeter monitoring will be required.

13. **Appendix B, Construction Plan, Section 5.7.3, Install Topsoil, page 15:** This section states, "in most cases, topsoil delivery will involve the belly dump trucks driving on the

previous cover soil and not the top soil." It is not clear how this would be possible when the infiltration layer has already been installed. Please clarify this statement and revise this section accordingly.

14. **Appendix B, Construction Plan, Section 5.9.1, DDA, page 16:** This section states that work areas within the DDA will be constructed as shown on design drawings. Please revise this section to identify these drawings.
15. **Appendix B, Construction Plan, Section 9.6, Dust Control, Page 19:**The dust control procedures are deficient. Please revise the documents to indicate that no work will be conducted when dust obscures visibility by 25%. Revise the specifications to indicate that dust will be continuously monitored (visually). Indicate that all dust-creating operations will be stopped when visibility is obscured by 25% and that operations will not recommence until at least two hours have passed in which visibility has not been obscured by 25%. As is mentioned above, in the event that ash to be moved at the landfill is determined to contain hazardous levels of dioxins/furans or metals, enhanced dust control procedures will be required. Please propose contingency dust control procedures for the case that contaminated ash must be relocated during this project.
16. **Appendix B, Construction Plan, Section 9.10, Housekeeping, Page 21:**The litter control procedures presented in the plan are not present and therefore deficient. Litter screens at least 20 feet high must be installed down wind of any waste excavation or placement operations. The entire site must be inspected at the end of every work shift, and as needed, and any litter present on site must be collected for proper disposal. Please revise the design to incorporate litter screens to control the spread of litter at the site and site inspections to control litter. Please propose a sustained wind velocity above which no operations involving exposed waste will take place.
17. **Appendix C, Construction Quality Control Plan, Table 5.3.1-1, As-Delivered Testing Requirements for Infiltration Layer Material, Page 11:** Please add testing requirements for Atterberg Limits. Please require that the soil have a liquid limit in excess of at least 25 and a Plasticity Index of at least 10. In addition, tests should be conducted at any significant visual change in the material.
18. **Appendix C, Construction Quality Control Plan, Table 5.4.1-1, As-Delivered Testing Requirements for Topsoil, Page 12:** Kjeldahl nitrogen is unavailable to plants. Please consider testing for nitrate and ammonia instead.

MISCELLANEOUS/MINOR COMMENTS

1. The Work Plan refers to the DDA as SWMU 73-001(d), however, the NMED Conditional Approval Letter refers to it as SWMU 73-001(b). Please reconcile this discrepancy.