

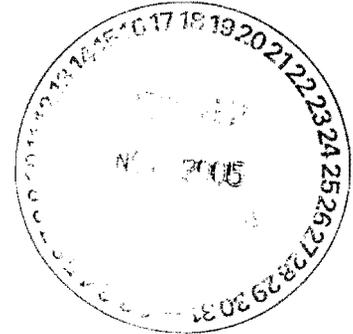


TA-73

ENTERED
560 Golden Ridge Road, Suite 130
Golden, CO 80401
(303) 763-7188
(303) 763-8889 FAX
www.techlawinc.com

November 14, 2005

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. 06110.270.0003; State of New Mexico Environment Department, Santa Fe, New Mexico; General Permit Support Contract; Technical Memorandum on the Selection of Subtitle D Landfill Cover For The Los Alamos Site Office TA-73 Airport Landfill; Los Alamos National Laboratory, Los Alamos, New Mexico; Draft Deliverable

Dear Mr. Cobrain:

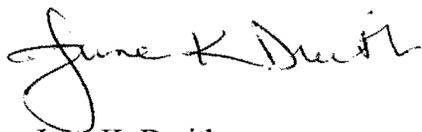
This "Technical Memorandum" is prepared in response to the request from Ms. Darlene Goering to address the viability and appropriateness of a Subtitle D Landfill Cover for the Los Alamos Site Office TA-73 Airport Landfill, instead of the New Mexico Environment Department (NMED) prescribed Subtitle C or equivalent landfill cover. The Subtitle C or equivalent landfill cover for the TA-73 Airport Landfill was prescribed by the NMED April 1, 2003 Conditional Approval Letter of the Voluntary Corrective Measure (VCM) Plan. In preparing this memorandum, TechLaw reviewed the RCRA Facility Investigation (RFI) Report (LANL, 1998), various correspondences between NMED and the Department of Energy (DOE), RCRA Subtitle C and D regulations, relevant U.S. EPA guidance, and other literature. A summary of findings and conclusions are provided in the memorandum attached.

The document is formatted in Microsoft Word. The deliverable was emailed to Mr. David Cobrain on November 14, 2005 at David_Cobrain@nmenv.state.nm.us. A formal hard (paper) copy of this deliverable will be sent vial U.S. mail.

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



Sincerely,

A handwritten signature in black ink, appearing to read "June K. Dreith". The signature is fluid and cursive, with the first name "June" being the most prominent.

June K. Dreith
Project Manager

Enclosures

Cc. D. Goering, NMED
M. Nur, TechLaw
G. Starkebaum, TechLaw
Denver Files

Technical Memorandum

To: Mr. David Corbain
NMED

From: June Dreith and Mohamed Nur
TechLaw, Inc.

Subject: TA-73 Landfill Cover Design

Date: November 14, 2005

Background

The Voluntary Corrective Measures (VCM) Plan (LANL 2003) proposed a single cap conceptual design option comprising of 12-inch soil layer over a 6-inch gravel layer and three grading plan options for the TA-73 Landfill. The NMED conditionally approved the VCM Plan on April 1, 2003 and required the final cover for the TA-73 Landfill be equivalent to a RCRA Subtitle C cover. Upon review of the Phase II Work Plan for TA-73 Landfill, the NMED commented on the RCRA Subtitle D cover prescribed in the Work Plan instead of the RCRA Subtitle C prescribed by the April 1, 2003 conditional approval letter. The conditional approval letter of April 1, 2003 stated that “the VCM proposes the use of an engineered alternative earthen final cover,” and “NMED approves the use of engineered alternative earthen cover (cap) or RCRA Subtitle C equivalent cover, as long as the cover constructed will perform equivalent to or better than a standard RCRA Subtitle C prescriptive cover outlined in 40 CFR 265 subpart N, incorporated by 20.4.1.600 NMAC.” NMED requested the basis for the change in design. In response to this request, LANL indicated that on December 15, 2003, Mr. Robert Enz of DOE-LASO met with Mr. Edward Hansen and Ms. Darlene Goering of NMED to discuss the TA-73 Landfill closure during which Mr. Hansen stated his preference that TA-73 closure be modeled after LANL TA-54 Area J closure, with 18 inches of engineered fill with a hydraulic conductivity of 1×10^{-5} cm/sec overlain by 6 inches of soil for native plant growth. This being the conceptual design for a RCRA Subtitle D landfill cover as prescribed in 40 CFR 258.60(a)1-3) and in NMAC 20.9.1.500.B(1).

LANL conducted equivalency determination of the single cap design with respect to a Subtitle D cover performance. The cap containing a gravel layer failed the equivalency test and based on the results, the VCM Plan alternative cover conceptual design was abandoned and the Subtitle D prescribed cover was selected. To satisfy the NMED conditional approval that “the final remedy for the Airport Landfill be equivalent to applicable RCRA Subtitle C requirements,” LANL conducted comparison of RCRA Subtitle C cover requirement to that of the proposed Subtitle D features and modeled hydrologic performance. According to a summary provided by LANL of this comparison, the proposed Subtitle D cover meets all the requirements outlined below (see Regulator Review).

In a letter dated September 2, 2004, NMED issue a Notice of Approval with modifications of

Phase II Work Plan for the TA-73 Airport Landfill. In this letter, while NMED acknowledges the Work Plan proposal for a RCRA Subtitle D municipal landfill cover as described by NMAC 20.9.1.306 regulations, the following specific requirements, with regard to the cover design, were requested to be added as modifications to Work Plan:

- Layer 1 shall consist of 12 inches of top soil Texture No. 8;
- Layer 2 shall consist of 24 inches of soil with a permeability of 1×10^{-6} to 5×10^{-6} cm/sec; and
- All other components of the landfill cover shall remain as originally proposed in the Work Plan.

In addition, NMED requested, among other design clarifications, for landfill monitoring gas results and any engineering calculations to substantiate LANL contention that landfill gas concentrations will not exceed 25 percent of the LEL for methane.

LANL's response to the NMED September 2, 2004 letter questioned the basis for the request saturated hydraulic conductivities and increased thickness of the layers, and indicated that this would add significant cost and would also affect the landfill gas migration. The response also indicated that the soil texture specification for Layer 1 is unnecessarily prescriptive since the proposed cover is a Subtitle D cover and not an Evapotranspiration (ET) cover.

This memorandum addresses the issue of whether the RCRA Subtitle D cover or equivalent is appropriate for the closure of the TA-73 Airport Landfill to protect human health and the environment.

Regulatory Review

The RCRA Subtitle D landfill closure requirements apply to municipal solid waste landfills (MSWL) to be closed using engineered covers that are designed with the intent to meet the following performance standards:

- Cover permeability less than or equal to the permeability of the bottom liner/natural subsoil or no greater than 1×10^{-5} cm/sec;
- Minimize infiltration using no less than 18 inches of soil; and
- Minimize erosion using no less than 6 inches of top soil for sustained native plant growth.

Subtitle D of RCRA addresses non-hazardous solid wastes, including certain hazardous wastes, which are exempted from the Subtitle C regulations such as: hazardous wastes from households and from conditionally exempt small quantity generators. Subtitle D also includes garbage, non-recycled household appliances, residue from incinerated automobile tires, refuse such as metal scrap, wall board and empty containers, and sludge from industrial and municipal waste water and water treatment plants and from pollution control facilities.

The RCRA Subtitle C landfill closure requirements apply to hazardous and mixed waste landfills to be closed using engineered covers that are designed with the intent of meeting these requirements:

- Permeability less than or equal to permeability of any bottom liner or natural soils,
- Long-term minimization of migration of liquids,
- Function with minimum maintenance,
- Promote drainage and minimize erosion or abrasion of the cover, and
- Accommodate settling and subsidence.

Typical EPA recommended Subtitle C final cover design consists of, from bottom layer to the top layer:

- A composite barrier layer consisting of a minimum 24-inch thick layer of compacted natural or amended soil with a maximum saturated hydraulic conductivity of 1×10^{-7} cm/sec overlain by a minimum 40-mil geomembrane.
- A drainage layer consisting of a minimum 12-inch thick sand layer having a minimum saturated hydraulic conductivity of 1×10^{-2} cm/sec, or a layer of geosynthetic material having the same characteristics.
- A top vegetation/soil layer consisting of a minimum 24-inch of soil graded at as slope between 3 and 5 percent with vegetation or an armored top surface.

The above configurations for engineered landfill covers are not rigidly applied and can of course vary from site to site. In addition, the Director of an approved State may approve an alternative final cover that meets the performance standards.

TA-73 Airport Landfill

The TA-73 has served as an airport facility continually since the late 1940s and current plans for the future use of the site are for continued use as an airport. The TA-73 Airport Landfill occupies a small portion of the airport facility and was operational from 1943 until 1973 as a municipal landfill. Solid wastes were collected twice weekly from the laboratory and the townsite and were burned on the edge of the hanging valley located adjacent to the airport runway. The intentional burning of the waste ceased in 1965, when the county assumed operation of the landfill. Heavy equipment was used to push the burned residue and ash into whichever permanent disposal area was being used within the landfill at the time (RFI Report, November 1998).

The landfill is comprised of two areas: the main landfill and the debris disposal area. The main landfill covers a surface area of approximately 12 acres. The debris disposal area landfill covers a surface area of approximately 5 acres. Using approximate depths obtained from geophysical survey, geomorphologic mapping and drilling activities, the main and debris disposal landfill waste volumes are estimated to be 489,500 and 126,000 cubic yards, respectively. The areas encompassing these two landfill areas are currently part of the airport, but are not being used for any specific purposes. Future land use projections indicate that these areas will continue to be included as part of the airport (i.e., industrial use) (RFI Report, November 1998).

Normal and accepted operations of the landfill encouraged disposal of municipal wastes only. However, there are some documented and anecdotal accounts of disposal or releases of

hazardous substances in the landfill. During the RFI, the data collected from the TA-73 Landfill were compared with data collected from over 60 municipal, non-hazardous landfills in California. These comparisons indicated that the nature and level of contaminants detected in soil gas and pore water at the airport landfill were present at levels consistent with those found at other municipal landfills.

Conclusions and Recommendations

Based on the data presented in the RFI Report, it can be concluded that the final remedy for this landfill should be consistent with state and federal municipal landfill regulations. Therefore, the RCRA Subtitle D cover or equivalent is appropriate for the TA-73 Airport Landfill.

The issues of contention with the cover design as communicated by NMED to LANL in the letter dated September 2, 2004, and DOE-LASO responses become irrelevant (at least for the main landfill) when one considers the design concept advanced in the *Remedy Design Work Plan for the Los Alamos Site Office TA-73 Airport Landfill, Revision 1* (June 2005). In this Work Plan, a completely different cover configuration is proposed.

This proposed cover should be evaluated with respect to the Subtitle D requirements and should also be evaluated with respect to the site specific challenges presented (e.g., landfill gas, structures to be built on the cover, settlement, etc.). It should be noted that municipal landfills are notorious for landfill gas generation and any design concept for this landfill should address landfill gas. The RFI Report indicates a maximum methane percentage of 54.3% as compared to a mean value of 19% for California landfills. There was a distinct landfill gas plume that was identified in the RFI Report that needs to be quantified further, since the data in the RFI is dated (approximately a decade old).

References

RFI Report for Potential Releases Sites, LANL, November 20, 1998

Letter from Nick Schiavo, NMED to David Gregory, et. al., LASO/LANL, Re: Notice of approval with modifications of Phase II Work Plan for Los Alamos Site Office TA-73 Airport Landfill SWMU – 73-001(a-d), September 2, 2004

DOE-LASO responses to NMED “Notice of approval with modifications of Phase II Work Plan for Los Alamos Site Office TA-73 Airport Landfill.” Not dated

Code of Federal Regulations, Part 258 – Criteria for Municipal Solid Waste Landfills

Code of Federal Regulations, Part 265 Subpart N – Landfills

Comparison of proposed cover to RCRA Subtitle C Requirements (included within a response to NMED), LANL, not dated.

EPA Corrective Action website: <http://www.epa.gov/correctiveaction/guidance.htm>

Sandia National Laboratory website; www.sandia.gov