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TECHLAW, INC.

REQUEST FOR SUPPLEMENTARY INFORMATION: ENGINEERING DESIGN ISSUES TRIASSIC PARK WASTE DISPOSAL FACILITY TATUM, NEW MEXICO

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This request for supplemental information (RSI) addresses responses to comments on the first Notice of Deficiency (NOD) dated February 1997, which were partially adequate or inadequate, and provides new comments which were generated from a review of technical information in the November 1998 application provided by Gandy Marley, Inc. The comments are listed in the order of subjects in the RCRA Part B Checklist, primarily Section D, Process Information and Section I, Closure Plans, Post Closure Plans and Financial Requirements.

General Comment

The application organization/format does not lend itself to convenient grouping of unit-specific design, construction and operating plans into stand alone segments, as will be required for inclusion into a facility permit. The entire review and permit drafting process would be facilitated if the application were to be conceptually reworked to allow for typical RCRA permit segmentation. This is not a requirement, simply a suggestion that may help all parties work more efficiently.

D. PROCESS INFORMATION

As noted in the following comments, the hazardous waste unit design and operation information in the application is still incomplete in many respects as discussed in more detail in the following paragraphs. In addition, notes on the design drawings and specifications state that the plans provided are "not for construction." Other statements indicate that details or modifications to the plans will be submitted to the NMED before construction begins. Many responses to the previous NOD state that detailed design drawings and other information "will be submitted," but much of the promised information is not provided in the application. The application does not provide an explanation of the degree of finality of the current design drawings, so the impression conveyed is that the applicants may expand and/or modify the plans extensively, both before and after a final permit is issued. A final operations plan is expected to provide many of the necessary details of operation and maintenance of the facility, but that plan has apparently not been written (see Section 2.5.3.2 of the application), and the application does not indicate when that plan may be prepared and submitted for review.

This approach is not in accord with the hazardous waste regulations, which require that complete design and operating plans must be provided in the permit application. Only after the plans have been determined to be complete and adequate by the Secretary may a draft permit be issued. Proposed modifications to the facility plans received after the draft permit is issued, which would require public notice and comment periods pursuant to 20 NMAC 4.1.900 (incorporating 40 CFR 270.42, e.g., Class 2 and 3 modifications in Appendix I), will not be included in the final permit.

Such modifications would be required to go through the procedures specified in 40 CFR 270.42, after the final permit is issued. Less substantive (Class 1) modifications proposed after a draft permit is issued may or may not be included in a final permit, at the discretion of the Secretary. Class 1 modifications included in the final permit are subject to the public notice requirements and potential denial provisions of 40 CFR 270.42(a). Accordingly, in order to be in conformance with governing statutes, the application must be revised to provide complete design and operating plans as specified in the following comments.

D-1 <u>Containers</u>: 270.15, 264.170 through 264.178

The roll-off storage area described in Section 2.2.2 of the application (Page 2-4) is proposed to consist of two portions. The stabilized waste storage portion of the area is proposed to be operated as a (less than) 90-day storage area. However, the regulation which governs less than 90-day storage areas, 40 CFR §262.34, applies only to generators of hazardous waste. The term "generator" is defined in 40 CFR §260.10, and the applicability of the exemption from permitting requirements is explained in Notes 1 and 2 to 40 CFR §262.10. As such, ". . . any person whose act first causes a hazardous waste to become subject to regulation," would be considered the generator of the waste. The Gandy Marley facility will not be the generator of wastes placed in this storage area, and the wastes will be disposed on-site. In order for the stabilization process to be considered a generator, the waste would have to change treatability groups (e.g.., a wastewater would become a non-wastewater.) Additionally, mixing two or more wastes does not generate a new waste [EPA RCRA Permitting Policy Compendium, Document 9453.1989(01)]. Therefore, the stabilized waste roll-off area must be included in, and designed and operated as part of the permitted roll-off container storage unit. Consequently, both the Part A and Part B applications must be revised to include the stabilized waste roll-off storage area.

D-1a(3) <u>Secondary Containment System Design and Operation</u>: 270.15(a)(1), 264.175(a), 264.175(d)

Drawing No. 39, Sheet 2 of 2, shows the conceptual design drawing for the Drum Handling Facility. This drawing indicates that the concrete floor will be underlain by a single geomembrane, with no drainage geonet. The floor drain trench is designed with a secondary liner and geonet, but there is no supporting structure (e.g., concrete) under the drainage trench and sump. This design may be unstable and lead to significant movement of the foundation soil, resulting in damage to the geomembrane(s), collapse of the trench walls, and/or cracking of the floors. Releases of liquid wastes to the uncoated floor could accumulate within and below the concrete. The design must be revised to provide a stable, sufficiently impervious base for storage of containers.

Response No. 28 indicates that the Engineering Report will include engineering calculations which will identify the minimum requirements for the foundation soils and concrete floor coatings. There are no calculations provided for the container storage area that document the foundation stability. Please revise the Engineering Report to include the promised information and to also address the concerns regarding differential settlement or swelling/upheaval.

Response No. 28 also states that the final design will include a sand layer that will allow the liquids to migrate below the floor to the sump areas. It is assumed that the select subgrade material included on Drawing No. 39 is sand(?), but the specifications do not include a "select subgrade." Please revise the application to explain what the select subgrade material is intended to be, and if it is intended to function as a drainage layer. Please also provide material and construction specifications for this material.

Please revise Section 2.2.1 to explain how incompatible waste will be managed or provide design drawings for the roll-off container storage area that indicate where and how incompatible wastes will be stored.

Appendix E-32, the Truck Roll-Off LCRS Pumping Capacity calculations, provides a sketch of the sump on page 1 of 4. The phreatic surface line is shown as daylighting roughly three feet from the top of the pipe, between the pipe centerline and the gravel surface. The information provided is insufficient to be able to reproduce this estimated distance. Please revise Appendix E-32 to include a description of the approach used to approximate this distance. Additionally, the length of the perforated pipe is stated as being seven feet in the sketch. Drawing No. 43 shows this dimension as five feet. Either revise the calculations or provide the reasoning for not using the design length in the calculations.

The Truck Roll-Off LCRS Pumping Capacity calculations on page 2 of 4 state that the area of the liner is 59,858 square feet, while referring the reader to page 4 of 4 of the calculations. The figure on page 4 of 4 does not have dimensions and is not to scale. Please revise the calculations to either provide the dimensions of the liner area, or refer to a scalable drawing (e.g.., Drawing No. 41).

D-1a(3)(a) <u>Requirement for the Base or Liner to Contain Liquids</u>: 264.175(b)(1)

Demonstrate the capability of the base of the roll-off container storage area to contain liquids, including:

- Demonstrate or verify that the lower portion of the composite base (geomembrane) will remain free of cracks or gaps (breaches) during use;
- Demonstrate the imperviousness and compatibility of the lower portion of the composite base (geomembrane) with regard to the wastes and precipitation;
- Demonstrate the compatibility of the upper portion of the composite base with wastes (i.e., provide a discussion on the compatibility of the surface soil material with the wastes to be stored at the roll-off container storage area; and
- Demonstrate the theoretical structural integrity of the lower portion of the composite base (geomembrane) under anticipated routine and extreme loading conditions. Ensure that calculations are provided documenting that the soils will be capable of carrying the maximum anticipated load under saturated conditions, without compromising the integrity of the geomembrane.

The application should also include a discussion on how the surface will be maintained to the original design specifications (including placement, compaction, and compaction verification testing) during routine operation and maintenance.

Provide a discussion of how the surface of the roll-off storage area will be maintained to prevent cross-contamination or releases of waste via wheel tracking or wind dispersion. The discussion should demonstrate that the road base surface proposed for the roll-off container storage area will provide a working surface equivalent to the epoxy coated concrete surface proposed for the container storage area.

There are no engineering calculations in Section 5 to demonstrate that the geomembrane will not deform under the maximum anticipated loading, or that the soils (road base material) will not shear or deform under saturated conditions and subsequently over stress the underlying geomembrane. The application does not demonstrate the long-term durability of the soils (road base material) as a working surface. Please revise the discussion of the composite base/liner system to address the durability of each of the composite base components individually and as a whole. The base design selected should be equivalent to the recommended concrete secondary containment system discussed in the preamble to the container storage regulations.

D-1a(3)(c) <u>Containment System Capacity and Control of Run-on</u>: 270.15(a)(3) and (4), 264.175(b)(3) and (4)

Please provide calculations in or referenced in Section 2.2.2.1 to demonstrate that the roll-off storage area containment system will have sufficient capacity to contain 10% of the volume of the containers or the volume of the largest container, whichever is greater. This demonstration must discuss the volume of the largest container, total volume of containers, containment structure capacity, and volume displaced by containers and other structures in the containment system.

As run-on into the containment system is not prevented, the collection system must have sufficient excess capacity, in addition to that required to contain potential waste releases, to contain any run-on that might enter the system. Calculations for only the run-on volume have been provided so far. Please revise the application to provide calculations demonstrating that the containment system has sufficient capacity to contain run-on in addition to the volume required above.

D-1a(3)(e) <u>Removal of Liquids from Containment System</u>: 270.15(a)(5), 264.175(b)(5)

There is no discussion provided in Section 5 on how frequently the fluid level will be visually observed in the sump system. Please revise this section to include a discussion on inspection frequency and the time frame for removal of any liquids detected.

There is no discussion provided in Section 7 on how frequently the fluid level will be visually observed in the leachate collection and removal sump or the leak detection and removal sump. Please revise this section to include a discussion on inspection frequency and the time frame for removal of any liquids detected.

D-1b <u>Containers Without Free Liquids:</u> 270.15(b)

As previously stated, the Part A must be revised to include the stabilized waste roll-off storage area.

D-1b(1) <u>Test for Free Liquids</u>: 270.15(b)(1)

Provide a discussion of the test procedures or other documentation/information that will be used to determine that the stabilized wastes to be stored in the stabilized roll-off container storage area will not contain free liquids.

D-1b(2) <u>Description of Containers</u>: 264.171, 264.172

Please provide the following information about the roll-offs used to treat/store hazardous waste:
- approximate number of each type of container,
- dimensions and usable volumes,
- DOT specifications or other manufacturer specifications,
- liner specifications (if applicable),
- container condition (new, used, reconditioned),
- markings and labels.

D-1b(3) <u>Container Management Practices</u>: 264.173

Please describe the management practices to be used to ensure that the roll-offs/hazardous waste containers are always kept closed during storage, except when adding or removing waste, and are not opened, handled, or stored in a manner that may cause them to rupture or to leak.

D-1b(4) <u>Container Storage Area Drainage</u>: 270.15(b)(2), 264.175(c)

Please describe how the storage area is designed or operated to drain and remove liquids unless containers are otherwise kept from contact with standing liquids.

The response to the original comment states that the stabilized waste roll-off bin portion of the Roll-Off Storage Area will control precipitation within the unit. No design discussion on this portion of the unit or on how it will be operated so as to prevent a release is provided in the application or the engineering report. Please revise both the Part B Permit Application and the Engineering Report to address drainage in both portions of the Roll-Off Container Storage Area.

D-2 <u>Tank Systems:</u> 270.16, 264.19 through 264.194, 262.10

Section 3.01 in Appendix C (page 13205-3) states that "Polyethylene tanks shall be installed as indicated on the Construction Drawing." However, no Construction drawings are submitted with the permit application. Drawing No. 40, the only sketch provided for the tank system, does not provide the details of the construction of the polyethylene tanks and the drawing is labeled "not for construction." Please revise the application to provide construction drawings that show the details of the construction, specific to each tank system, including the base that will be supporting these tanks. Construction drawings must be certified by a professional engineer.

Response No. 32 a & c state that the leachate generated at the landfill, and the wastewater and sludge that will be generated at the truck wash, are considered to be generated on site and therefore will be managed in non-permitted, less-than-90-day storage units. NMED has determined that the landfill leachate can be considered to be a newly generated waste, and is therefore eligible for the exemption from permitting requirements. The truck wash is in a different category. The response refers to the definition provided in 40 CFR 260.10: "Generator means any person, by site, whose act or process produces hazardous waste identified or listed in part 261 of this chapter or whose act first causes a hazardous to become subject to regulation." However, the response does not address the full definition and the notes to 262.10, which were referenced in the original NOD, or the definition of "empty" containers in 261.7. The truck wash sump and tank will contain rinsate or wash water from truck beds, tires, undercarriages and heavy equipment tracks, etc. which will be traceable to or derived from any or all types of wastes to be received at the facility. These wastes will include many listed and acutely hazardous waste codes, as specified in the facility Part A. Wastes from containers which were not empty before washing, all P-listed waste residues (including those from "empty" containers), and all types of listed wastes contained in environmental media, such as soil washed from truck tires and dozer tracks, are still hazardous wastes. None of these wastes will be "generated" at the truck wash, although they may be mixed together there. The original waste codes for each detectable listed hazardous constituent will apply to the mixed wastewater and sludge collected at the truck wash. Note 1 to 40 CFR 262.10 states that "The provisions of §262.34 are applicable to the on-site accumulation of hazardous wastes by generators. Therefore, the provisions of §262.34 only apply to owners or operators who are shipping hazardous waste which they generated at the facility." The facility cannot use the less-than-90-day storage area exemption for the accumulation of the wastewater and sludge from the truck wash unit. The truck wash will be storing these wastes on site, but not "generating" any new hazardous wastes, and thus these storage units must be permitted. Therefore, please revise the application to include the truck wash tank and sump.

D-2a <u>Tank Systems Description:</u> 270.14(b)(1), 264.194(a)

Section 6.1.2 (Stabilization Unit Layout) states that "the control room is positioned centrally along the west wall of the stabilization building. ... Reagent storage tanks and silos are also located on the west side of the building which permits operations personnel to view reagent delivery activities." Assuming the convention that north = up, Drawing 33 indicates that the control room, reagent tanks and silos are all located on the east side of the building. Please revise the

application to reconcile this discrepancy between the text and the drawing, and provide a direction arrow for the layout portion of the drawing.

D-2a(1) **<u>Dimensions and Capacity of Each Tank:</u> 270.16 (b)**

The application does not discuss the dimensions and capacities of the tank(s) that will be used for wash water storage and settling at the truck wash. Please revise the application to provide detailed construction drawings, including tank locations, dimensions and capacities.

No discussion of the process design capacity for stabilization bins is provided in the text of the application, except in Part A permit application, where it is indicated that the process design capacity (total) will be 150,000 gallons/day. Revise the application to discuss the capacities of each tank to be permitted.

Nominal dimensions and volumetric capacities of the stabilization bins are discussed in the response No. 34. However, this information is not included in the text of the revised application. Revise the application to include this information and show the final design dimensions on construction drawings certified by an independent professional engineer registered in the State of New Mexico.

D-2a(2) **<u>Description of Feed Systems, Safety Cutoff, Bypass Systems and Pressure Controls:</u> 270.16(c), 264.194(b)**

Section 2.3.3 (Volume I) of the permit application discusses spill and overfill prevention in general terms without committing to any specific measures that will be used for the tank system. For example, it is stated that "spill prevention is primarily maintained by hard-plumbed piping. When transfer lines are not hard plumbed or when open-ended lines are used, one or more of the following spill prevention controls or an equivalent device will be used." The application goes on to list several types overfill prevention, including automatic feed cutoff, high-level alarm and bypass, none of which are discussed or indicated on the design Drawing No. 40 in the engineering report. Drawing No. 40 shows low- and high-level cutoff switches which are not discussed in detail in the text of the application. Revise the application to provide descriptions and drawings of the specific feed systems, spill prevention controls, safety cutoff, bypass systems, and pressure controls that will be used with each tank. The discussion provided in the text of Section 8.1.3 (Volume III) of the application is not adequate, and no construction drawings are provided to show, for example, the location of the vent systems and their construction.

Section 2.3.4 (Volume I) of the permit application states that pump transfer or gravity drain will be used as feed mechanisms for tank systems, or an equivalent transfer mechanism will be used. It is further stated that "liquids will be pumped into or out of the tank through permanent or temporary transfer lines; or liquids will be allowed to drain by gravity through permanent or temporary transfer lines." Revise the application to discuss and show (on drawings) where these different mechanisms will be utilized in the system. Discuss the procedures that will be used to switch from one system to the other. The application must be specific in the description of the design features of the system. Simply stating this or that or equivalent mechanism will be used is

not sufficient for permit application approval. Two or more designs for the same function may be included, but each design must be complete.

Section 2.4.3 (Spill and Overfill Prevention) of the permit application states that "additionally, the delivery system will be computerized and will be designed to ensure that the mixture used for stabilization prevents overfilling." However, Section 2.4.4 (Feed Mechanism, Pressure Controls, and Temperature Controls) states that the "reagents will either be pumped from reagent tanks or manually fed." The engineering report in Volume III describes a computerized system for injecting reagents into the system, however, it does not mention any manual feeding of the reagents. In addition, Drawing No. 34 does not show any manual feeding mechanism. Revise the application to address these discrepancies and to discuss the feed systems in detail.

D-2a(3) **<u>Diagram of Piping, Instrumentation and Process Flow:</u> 270.16(d)**

The application does not provide details of piping, instrumentation and process flow for the tank system and ancillary equipment. Only one drawing, Drawing No. 40, which is labeled "not for construction," is provided as a design drawing for the tank system. This drawing does not contain adequately detailed information on piping, instrumentation and process flow for the tank system and ancillary equipment. Section 2.3 (Volume I) of the permit application states that "waste will be transferred from the tanks to the stabilization unit either by pumping into transfer tankers or by direct piping." However, these two transfer systems are not discussed in detail or shown on P&ID or process flow diagrams (PFDs). For example, Section 8.1.2 (Volume III) of the permit application states that "discharge pipes to the stabilization building will be elevated double walled pipes." However, no drawings indicating these pipes and their process flow are provided in the application. Revise the application to discuss these transfer processes in detail and provide P&ID and PFDs for the tank systems and all the ancillary equipment associated with the process.

D-2a(4) **<u>Ignitable, Reactive and Incompatible Wastes:</u> 270.16(j), 264.17(b), 264.198, 264.199**

Section 2.4 (Stabilization) states that "when the waste is sufficiently mixed, it will be tested in accordance with the Waste Analysis Plan (see Section 4.0). It will then be placed in a roll-off container and transferred to the roll-off storage area to cure." Also see Section 6.1.4, Volume III, first paragraph on page 6-3 which states that "the truck will either proceed to the landfill for disposal or will stage the roll-off container in the truck roll-off area (if TCLP test results are required)." Drawing No. 34 also indicates that after the waste is stabilized it would either go to the roll-off area or the landfill. Discuss in what situations the waste will be directly transferred to the landfill without interim storage at the roll-off storage area. Discuss the procedures and criteria that will be used to determine whether a TCLP analysis will be required on a stabilized waste.

Section 2.4.8 (Tank Assessment) states that "The engineering report presented with the preliminary tank design drawing in Volume III includes a discussion of wastes to be excluded from storage or treatment in [stabilization units] due to their excessive corrosive effects." However, the engineering report does not present or discuss this information. Revise the

application to provide this information or provide a reference in Section 2.4.8 indicating where this information is located.

D-2c(1) **<u>Assessment of New Tank System's Integrity:</u> 270.16, 264.192**

Section 2.3 of the application (Volume I) states that "the tanks will be double-walled and constructed of high density polyethylene materials that are compatible with the wastes to be placed in the tanks." However, except for stating that "these compatibilities are assessed in the design specification and engineering report (Volume III)," no tests or evaluation of these compatibilities were conducted and no results substantiating the statements in the application are provided.

The Part A permit application indicates that all of the wastes listed in Section XIV will be stored in the polyethylene tanks. Some of the wastes listed in Section XIV of Part A may be corrosive and incompatible with the tank construction material (e.g., carbon tetrachloride, benzenes, carbon disulfide, hydrogen peroxide) when present at high concentrations. In addition, as a general guidance, strong nitric (50% or higher) and sulfuric (25% or higher) acids should not be stored in the tanks (Reference: Table 23-2 of Perry's Chemical Engineer's Handbook, 6th Edition, Perry & Green, 1984).

Please revise the application to either provide results of compatibility tests conducted or literatures (e.g., manufacturer's compatibility tables) indicating and certifying that the hazardous wastes and/or hazardous waste constituents listed in Part A do not have a detrimental effect on the structural integrity of the polyethylene tanks. In addition, provide literature data (including manufacturer's) or calculations to show that the secondary containment is of sufficient strength to withstand all of the forces acting on it, especially in the event of failure of the primary containment.

Section 8.2.1 states that "the tank manufacturer will provide recommended tank tie down details for review and approval by a registered New Mexico professional engineer prior to tank installation." Revise the application to provide this information.

The application does not provide calculations and/or data to show that the concrete base for the polyethylene tank system is capable of supporting the system, providing resistance to pressure gradients below the system, and preventing failure due to settlement, compression, or uplift. The application merely states that the tank system is designed as such, and does not provide supporting design calculations and engineering drawings in the engineering report (Volume III). Revise the application to provide a detailed demonstration of the structural integrity of the base for the tank system.

The discussion, designs and supporting calculations presented in Volume I and Volume III of the permit application for the Stabilization Unit are preliminary and lack the details required in final design of a unit. Following are some of the deficiencies noted:

- The drawings are either labeled "not for construction" or do not show a seal of a professional engineer. The text does not include an explanation of the meaning of the "not for construction" designation, so they drawings are assumed to be preliminary, not final design information.

- The design section references Calculation No. E-33, Appendix E, Volume VI and states that it describes the steel plate, reinforcing members, and energy absorbing devices intended for the stabilization bin system. However, the assessment and supporting calculations presented in Calculation E-33 regarding the tanks' structural integrity are inconclusive, and neither the calculations nor the results are fully legible. For example, the inner liner with a thickness (1") would fail by the impact of total and instantaneous hydraulic failure from a height of 15 feet. However, no other iterations are presented to provide the thickness that would withstand such an impact, except stating that "it does not appear cost effective to design the inner liner for this possibility."

- Except for stating that "all ancillary equipment will be supported and protected against physical damage and excessive stress due to settlement, vibration, expansion, or contraction," the application does not discuss or show how this will be accomplished, or identify which ancillary equipment requires such support and protection.

The application states (in Section 2.4.8) that "a written assessment attesting that the tank system has sufficient structural integrity and is acceptable for the storing and treating of hazardous waste will be provided by an independent, qualified, New Mexico registered professional engineer based on the final tank design drawings and prior to tank construction." In addition, 6.1.1 states that "it should be noted that certain components of the stabilization building, process control and delivery systems, ventilation systems and steel bins will be completed under future design/build contracts." The applicants must note that components of hazardous waste management units which are to be designed in the future are subject to the permit modification requirements of the hazardous waste regulations. For the units which are proposed to be constructed under the original permit, the application must include the final design and operating plans.

Revise the application to provide final design drawings which are certified by a professional engineer. In addition, provide calculations supporting the design in a final format and discuss the final designs of the process control, delivery and ventilation systems, and the final designs of the steel bins.

D-2d(1) **<u>Plans and Description of the Design, Construction, and Operation of the Secondary Containment System:</u>**

The application does not provide any calculation and/or data to show that the outer tank of the double walled polyethylene tank system will provide secondary containment of sufficient strength and thickness to prevent failure due to pressure gradients, physical contact with waste, climatic conditions, or the stress of daily operations. The application, except for stating that the

containment system is designed as such, does not provide supporting design calculations or engineering drawings in the engineering report (Volume III). Revise the application to provide a detailed discussion of the secondary containment for the tank system.

The application states that the concrete pad for the tank system is not considered a secondary containment and therefore does not have to meet secondary containment standards. However, the containment is provided as an additional measure to prevent the spread of fluid should leaks or spills occur at discharge piping connections and pumps located within the pad. This containment requirement should be discussed further. In addition, Section 2.3.1 (Volume I) of the permit application states that "each tank will be surrounded by a concrete area which will be sloped to provide drainage to a sump." However, these elements of the pad are not discussed in the engineering report (Volume III). For example, no discussion or drawing shows the percent slope that will be used; no discussion or drawing shows the design of the sump. Revise the application to provide a detailed discussion and engineering drawings of the pad, sump and berms for the tank system.

Section 2.3.1 (Volume I) of the permit application states that "all ancillary equipment will be provided with secondary containment except above ground piping (exclusive of flanges, joints, valves, and other connections), welded flanges, welded joints, and welded connections that are visually inspected for leaks each operating day." Furthermore, it is stated in Section 2.3.12 (Volume I) of the permit application that "impervious concrete coatings will be applied to the liquid waste storage tank containment area and the evaporation pond discharge station. Hose and pipe connections will be inside the concrete containment area boundaries." Revise the permit to identify and discuss the ancillary equipment that will require secondary containment and provide the details on the designs of these containment areas. Engineering drawings identifying the equipment and the appropriate containments must accompany the discussion.

A distinction should be made between the "primary and secondary steel liners" and the "double walls" of the stabilization bins. If they are one and the same, the application should state so in the text of the application and reconcile the information with the design drawings provided. For example, the cross-section A-A' on Drawing No. 34 should be discussed further in the text, since it indicates a Leak Detection and Leachate Collection and Removal System (LD/LCRS) within the vault while it also indicates that there is a "primary LD/LCRS" within the liners or the double walls. If there is a LD/LCRS in the vault as indicated in this figure, this implies that the vault serves as a secondary or tertiary containment. What is depicted in this figure is contrary to the statement that "the vault will not be used as secondary containment; therefore, it does not have to be lined or meet other requirements for secondary containment."

However, Drawing No. 34 supports the statement in Section 6.1.2 of Volume III that "the bin and vault arrangement provides three levels of waste containment with the inner bin liner serving as primary containment, the outer bin as secondary containment, and the vault as final or tertiary containment." See also, paragraph 2 of Section 6.1.3 (Volume III), page 6-2. This paragraph explicitly proposes the vault as a containment and indicates that there will be a concrete epoxy coating requirement. Although preliminary structural assessment indicates that impact from loads and the bucket will be mostly absorbed by the wire rope isolators situated between the liners, it is

not shown how the vault will be designed to withstand any residual forces or vibrations, and none of the drawings show how the bins will be tied down to the floor of the vault.

Revise the application to address these discrepancies and provide detailed design drawings for the construction of the vaults. Discuss how releases into the vault will be pumped out of the LCRS (i.e., by stationary pumps or portable pumps).

D-4 Surface Impoundments

Since most of the design elements of the surface impoundments are similar to that of the landfill, only comments specific to the surface impoundments are addressed under this section. If the landfill comments are adequately addressed in a revised application, much of the revised information will also be applicable to the impoundment. For example, shallow soil characterization, and material and construction specifications for the liner system, leak detection system, foundation, and run-on/run-off control designs are similar.

Comments relating to the truck wash sump are placed under this section, because most of the design components of the truck wash sump are also similar to those of a surface impoundment. The permit application assumes that the truck wash is not subject to permitting requirements, but NMED has determined that the truck wash is not eligible for the generator exemption as explained previously in Comment D-2.

The application does not provide adequate information on the run-on/run-off control system for the Evaporation Pond. Section 2.6.1.4 (Run-On/Run-Off Control) states: "Section 2.5.1.5 contains information on run-on/run-off control for the landfill, which is also pertinent to the evaporation pond." The correct section is 2.5.1.6 (not 2.5.1.5), which mentions that a lined collection basin located at the toe of the inter phase cut slope, as shown of Drawings 10 and 13 in Volume III, will be used to collect runoff from the landfill side slopes. However, it is not clear whether this basin will also receive runoff from the Evaporation Pond Areas. In addition, since the basin is lined, it is unclear how the water accumulated in the basin will be managed to prevent overflow. No details of this basin (e.g., capacity, material of construction) are presented in the application. If the purpose of the basin is for only the initial phase of the landfill operation, describe how runoff from the landfill/evaporation pond and run on to the landfill/evaporation pond will be managed after the construction phases are completed.

The last paragraph of Section 2.5.1.6 also states that "run-off from the Facility, but not from the active portion of the landfill (including run-on/run-off from the landfill perimeter drainage ditch), will be directed to the stormwater retention basin." It is not clear from the design drawings whether this information is true for the evaporation pond as well. Section 2.6.2.1 (Site Preparation) states that "existing site drainage will be modified to route any run-on away from the evaporation pond area. Access roads and a truck discharge station will be constructed. These engineering controls and components are shown on Drawings 4, 5, and 31 in Volume III."

Unfortunately, these drawings do not show the level of details needed for these engineering controls as they pertain to the Evaporation Pond. In fact, the initial site grading plan shown in

Figure 5 does not take into account that a pond exists or will be built on the northwest corner of the landfill. Thus, reference to Figure 5 is irrelevant and does not depict the engineering controls as they pertain to the Evaporation Pond.

In addition, the last paragraph in Section 4.1.4 (Evaporation Pond Discharge Pad Arrangement) states that "Drawing No. 4 (Volume III) depicts the surface grades around the perimeter of the evaporation pond area. Surface water run off from these areas will flow to the roadway ditch system and ultimately to the stormwater detention basin." The referenced Figure No. 4 neither shows surface grades around the perimeter of the ponds nor how the run-on to the ponds will be diverted to the stormwater detention basin. Revise the application to provide detailed discussion and drawings showing the run-on and run-off control system for the evaporation pond.

Section 2.6.2.3 (Structural Fill Areas) states that "areas of the evaporation pond requiring structural fill will be constructed according to the specifications presented in Volume IV." Revise the application to indicate the specific location for this information within the text of Volume IV.

Section 4.1.2 (Evaporation Pond Layout and Phasing) states that "Pond units 1A, 1B, 2A, and 2B are 132-ft wide by 285-ft long by 12 feet deep and each will provide approximately 1.63 million gallons *[total of 6.52 million gallons for all four ponds]* of useable storage capacity (excluding 2-foot freeboard volumes)." Section 4.2.9 of Volume III also states that "the resulting pond volume available for liquid storage and evaporation (not including 2 ft freeboard) is approximately 6.5 million gallons." However, Section 2.6.1 (Volume I) and the Part A form indicate that the capacity of the surface impoundment (total volumetric capacity of all four ponds) is to be 4.6 million gallons (it is not indicated whether or not the 2-ft freeboard is accounted for in this volume).

The application does not show how these volumes were determined. Using the geometric information provided in Section 4.1.2, we could not duplicate any of the volumes provided. Similarly, calculations utilizing the scales provided on Figure 4 also did not yield results that matched the text. According to Figure 4 (based on the scale provided on the figure) the longest side of each pond is approximately 300 feet. Our calculations were based on a trapezoidal cross section and a side slope of the longest side of 2H:1V.

In other calculations, for example, Calculation E-15: Anchor Trench Pullout Capacity, evaporation pond slope length is given as 60 ft, which, using the 12 ft depth, would translate to a slope of 5H:1V. This slope does not correspond with the slopes shown on the drawings and discussed in the text of the application.

Revise the application to address the above discrepancies and present a sample calculation of how the useable capacity of the ponds was determined, including the geometric shapes used as a basis for the calculations.

D-4e(2) **<u>Soil Liners:</u> 270.17(b)(1), 264.221(a), and 264.221(c)(1)**

Section 3.02.A of Specification Section 02221 (Clay Liner) states that "the clay liner shall be constructed to the elevations, grades, and thicknesses shown the Construction Drawings." However, no construction drawings were submitted with the permit application to show the elevations, grades and thicknesses to which the clay liner will be constructed. This deficiency applies to most of the construction specifications where reference is made to construction drawings that do not exist. Revise the application to provide final design drawings for units where such drawings are required.

The previous NOD noted that the Upper Dockum material does not appear to provide the low permeability required by 40 CFR 264.221(c)(1)(i)(b). Response No. 44 states that "additional laboratory tests will be conducted on processed siltstone and mudstone samples to confirm their permeability characteristics." However, no further laboratory tests or results are presented in the revised application. The application must be revised to provide permeability test data representative of the proposed clay liner material which demonstrates that it can be used to construct impoundment liners with the necessary low permeability.

The preferred method for obtaining this information, in addition to laboratory testing of enough samples to demonstrate that the data adequately represents the proposed liner material, is to construct a test fill and perform a large-scale field permeability test on the test fill. Large-scale hydraulic conductivity testing on "test pads" is strongly recommended by EPA and by Koerner and Daniel in **Waste Containment Facilities: Guidance for Construction, Quality Assurance and Quality Control of Liner and Cover Systems** (ASCE, 1995) (see Comment D-4g(3)). The application must also identify the location of the borrow material proposed for the soil liner including a plan drawing showing the location of the borrow area, or a cross section showing the depth that the liner material will be taken from.

D-4e(2)(a) **<u>Material Testing Data:</u> 270.17(b)(1), and 264.221(c)**

The previous NOD comment stated: "Some limited soil test data is included in Appendices E and F, but the application does not indicate whether these data are representative of the proposed soil liner materials. Many of the test data in Appendices E and F are not accompanied by sample depth information, which makes the usefulness of the data questionable. Provide data from index tests, laboratory and/or in situ hydraulic conductivity (permeability) tests, strength tests, consolidation tests, and shrink-swell testing of the soil liner material. If detailed sample locations and depths for all of the data in Appendix E and F can be provided, additional testing needs may be minimal. (However, the shallow Quaternary soils have not been adequately sampled or characterized - see landfill comments). Provide copies of the test procedures, or reference standard test methods used to produce the data. Include complete soil test results and sample identification information, including depths as well as horizontal reference points. Discuss the potential for dispersion and piping of the soil due to flow of wastes into or through the soil liner layer."

Response No. 45 indicates that a table previously submitted will be revised to indicate standard test methods used in the analyses for the soil liner material and the depth of sample location. The response also states that "dispersion and piping of the soil will be discussed in the engineering report for the landfill." However, none of this information was presented in the revised application. In addition, the response does not address the concern as to whether the data presented in Appendices E and F of the original application are representative of the proposed soil liner materials. Revise the application to provide the information requested in the previous comment.

D-4e(2)(b) <u>Soil Liner Compatibility Data:</u> 270.17(b)(1), 264.221(a)(1)

The previous NOD comment requested information as follows: "The application does not address soil liner compatibility with liquids which may be placed in the impoundment. Section 2.6.1.1 simply restates the requirement in 264.221(a)(1). The application should provide the results of hydraulic conductivity tests of the soil liner material using wastes or surrogate solutions representative of the liquid that may be placed in the surface impoundment. Discuss the effects or predicted effects, if any, of the wastes on the soil hydraulic conductivity. Provide a copy of the test procedures, or reference appropriate standard methods, along with a description of how the liquid samples were prepared or obtained, a demonstration that the liquid sample is representative of wastes which may be placed in the impoundment, and the complete test results. Alternatively, provide research reporting compatibility testing of similar soils and similar liquids, or provide typical liquid waste analyses and site specific soil chemical and mineral characteristics, and use this information to predict the results (changes in hydraulic conductivity) of interaction of the soil with wastes from the impoundment."

Response No. 45 states that the evaporation pond soil liner compatibility testing will be discussed in the engineering report, and promises to provide most of the information requested. However, none of this information is presented in the engineering report. Revise the application to provide the information requested in the previous comment.

D-4f(1) <u>System Operation and Design</u>: 270.17(b)(1), 264.221(c)(2) and (3)

The previous NOD requested the final design and operation details for the leak detection system, as required by 264.221(c)(2) and (3). The revised application does not provide this information, although response No. 47 promised to provide the final design and operations plan. Section 4 of the Engineering Report (Evaporation Pond) and the specifications do not mention pump controls, leakage volume measurement devices, or the proposed management of liquids removed from the leak detection and vadose zone sumps if the leakage rate is less than the Action Leakage Rate, or if the (3) adjacent ponds cannot accept the additional liquids. Section 4.1.2 of the Engineering Report refers to the ALR discussion in Appendix G (Volume VI), but the ALR discussion (actually, the Response Actions in Section 7.0 of Appendix G) only provides for pumping the entire contents of a pond into an adjacent pond, <u>after</u> the ALR has been exceeded- it does not mention pumping from a leak detection sump into another pond. The application must be revised to provide complete details of the leak detection system design, including the proposed methods

for controlling the pumps, measuring and recording the liquids present in the sump and removed, and plans for handling the removed liquids.

D-4g <u>Liner System, Construction and Maintenance</u>

D-4g(1)(c) <u>Leak Detection System:</u> 270.7(b)(1), and 264.221(a)

The application must provide detailed final material specifications of piping to be used in the leachate detection systems.

No distinction is made between the truck wash liquid collection sump and the LDRS sump in the text of the application. The discussion in the text of the application and details provided on Drawing 44 do not clearly present the details of the main sump. It appears most of what is presented in Drawing 44 pertains to the LDRS system. Also, it is not clear where the physical locations of these sumps are in relation to each other. Drawing 44 shows only one liner running underneath the whole floor area of the truck wash bays, but does not indicate the presence of a secondary liner that is associated with the Leak Detection System. No discussion of the capacity of the main sump and no cross-section of the main sump is provided in the drawing. No calculations of the pump or sump capacity are presented.

Section 9.1.3 states that "because this sump is close to the surface and any fluids in the sump can be observed by looking down the LDRS riser pipe, fluid level instrumentation is not required." The cross-section of the truck wash leak detection sump depicted on Drawing No. 44 indicates that the bottom of this sump is six feet below the pad surface (i.e., distance from the pad surface, excluding the height of the riser above the pad). Liquid released into the sump may not be visible to the naked eye until the level rises above the sump trough, which would defeat the proposed purpose of this sump as a "leak detection" device. It appears that the sump is a leachate collection system rather than a leak detection system. Revise the application to provide detailed descriptions and design drawings of the sumps.

D-4g(3) <u>Construction Quality Assurance Program</u>: 270.17(b)(1), 270.17(b)(4), 270.30(k)(2), 264.19, and 264.229 (a)

The application does not provide evidence demonstrating that the clay material available on-site will provide the low permeability required for a soil liner. In fact, the laboratory hydraulic conductivity test data for Upper Dockum material (Appendix E in the original application) which showed test results consistently higher than the maximum acceptable value, and the original plans for use of a bentonite-soil mixture for the pond liner, have been removed from the revised application.

Although the previous NOD specifically pointed out the inadequacy of the available data, and the necessity for careful control of the construction of the soil liner, the revised application largely ignores these concerns, without explanation or justification. For example, although the previous NOD comment specifically recommended the use of a large-scale infiltrometer test to determine the permeability of the test fill, in agreement with both the EPA **Technical Guidance Document**

and the Koerner and Daniel guidance cited in response No. 53 (**Waste Containment Facilities: Guidance for Construction, Quality Assurance and Quality Control of Liner and Cover Systems**, page 55), the revised application and CQA Plan (Appendix A, Test Fill Plan) includes only laboratory permeability testing.

As noted in the Koerner and Daniel guidance (page 55), "...laboratory hydraulic conductivity tests can under predict the large-scale hydraulic conductivity by a factor of up to 100,000." The suggested approach of using on-site material for the soil liner and inadequate testing to demonstrate adequate performance is thus highly questionable. The application must be revised to provide representative hydraulic conductivity test data for the materials proposed for use in constructing the soil liner. The Test Fill Plan must be revised in accordance with standard industry practice as recommended by EPA, and Koerner and Daniel, to include a large-scale infiltrometer test to determine the large-scale hydraulic conductivity of the test fill.

Response No. 53i states that "the CQA plan will be revised to distinguish CQC and CQA responsibilities including evaluation of earthwork and geosynthetic installer CQC plans." However, in the CQA plan presented in Appendix B of the revised permit application, no distinction is made between CQA and CQC when discussing the activities the CQA engineer conducts on a daily basis, including activities that would fall under CQC of earth materials as well geosynthetics and other non-soil components of the evaporation pond and the truck wash unit. In addition, Section 2.2 (Use of the Terms in This Plan) of Appendix B, states that "in the case of geosynthetic and other non-soil components, CQC is provided by the Manufacturers and installers of the various geosynthetics." This statement directly contradicts response No. 53i. Revise the CQA Plan and related sections of the application to present CQA and CQC activities in a distinct manner, as suggested in the EPA **Technical Guidance Document: Quality Assurance and Quality Control for Waste Containment Facilities**, EPA/600/R-93/182, and in **Waste Containment Facilities: Guidance for Construction, Quality Assurance and Quality Control of Liner and Cover Systems**, page 22, and identify who will be conducting the activities.

Response 53j states that "The testing frequencies for both pre-construction and post-construction will be reviewed. Recommendations in "same ref. as previous comments..." will be used as basis for testing frequencies." This statement is false. Table II-3 of the CQA Plan and the testing frequency recommendations in Daniel and Koerner, **Waste Containment Facilities** (WCF), Tables 3.8 and 3.10, are compared side by side below.

	TP CQA Table II-3	WCF
Compaction curve	Not mentioned	4,000 m^3 (5,263 yd^3)
Sieve analysis	3,000 yd^3	800 m^3 (1,053 yd^3)
Atterberg limits	3,000 yd^3	800 m^3 (1,053 yd^3)
In-situ moisture	300 ccy	5/ac/lift (161 ccy)
In-situ density	300 ccy	5/ac/lift (161 ccy)
Calibration density	1 per day	1 per 20 nuclear densities
Moisture by oven	1 per day	1 per 10 nuclear moistures
Shelby tube permeability	1,000 yd^3	1/ac/lift (538 yd^3)

As shown above, the proposed soil liner testing frequencies are only one-third to one-half of the frequencies recommended by Koerner and Daniel. The application CQA Plan must be revised to provide for soil testing at least as frequently as recommended by Koerner and Daniel. In addition, the application must be revised to include moisture-density curves every 5,000 yd^3 (at minimum) and at every visible change in soil type (color or texture).

Response 53k promises that a statement that "no waste shall be accepted at the site until NMED has reviewed the certification report." The revised application does not contain such a statement, or the actual (different) requirement for submittal of the certification report, in 264.19(d). Revise the application to include (in the CQA Plan) a statement that no waste will be received in a unit until a signed CQA certification report for that unit has been submitted to the NMED Secretary.

D-4i <u>Leakage Response Action Plan</u>: 270.17(b)(5), 264.223(b) and (c)

The application Response Action Plan in Appendix G includes all of the requirements of 40 CFR 264.223 and 264.304 (for both the evaporation pond and the landfill) on the first page of Section 7.0. Then a separate section is provided for the evaporation pond, beginning at the bottom of the page. This second section includes all of the preceding responses, except for the requirement to "determine whether waste receipt should cease or be curtailed..." etc., in 264.223(b)(4). The separate plan for the impoundment also includes an additional commitment (not found in the regulations) to "immediately remove the surface impoundment from service and remove any fluids contained in the surface impoundment to an adjacent approved pond or other approved facility..." There appears to be no need for the separate (and incomplete) set of responses for the evaporation pond. Revise the application to clarify the applicability of the responses on the first page of Section 7.0 to both the landfill and the impoundment (add a reference to 264.223), and remove the following separate section concerning the impoundment only.

D-4j(3) <u>Prevention of Overtopping:</u> 270.17 (b)(2), and 264.221(g)

According to Section 4.1.2 (Evaporation Pond Layout and Phasing) of Volume III, "Pond overtopping will be controlled manually through the use of liquid elevation indicators placed in the pond." If this is the only overtopping control and this requires Facility personnel checking the fluid level in the pond to prevent overtopping, then the proposed weekly inspection is not

sufficient. What does inspection of "improper operation of overtopping control systems" mean in this context? Revise the application to fully describe the design and/or operating procedures that will provide adequate protection against impoundment overtopping/overflow.

In response No. 58, a brief discussion of the availability of sufficient volume for a 100-year, 24-hour storm is provided. However, no such discussion is provided in the text of the application. The details of the pond capacity and freeboard calculations are not provided in the application, although the response states that this information "will be presented in the pond detailed design drawings." In addition, the overtopping prevention measure proposed does not address the concerns specified in the previous NOD comment. Revise the application to provide the information source references and calculations supporting the statement that the impoundment has at least the capacity to accept run-off from the 100-year storm.

D-6 <u>Landfills</u>: 270.14(a), 270.21 and 264.300 through 264.317

As noted in the following comments, the landfill design and operation portion of the application is still incomplete in many respects. The application must be revised to provide complete design and operating plans.

D-6c(3) <u>Loads on Liner System</u>: 270.21(b)(1), 264.301(a)(1)(I)

The laboratory test report and stability calculations in Appendix E-2 include assumptions that are not carried through to the engineering report and construction specifications. The calculations assume that the largest equipment on a slope will be a D6 dozer (maximum ground pressure 9.8 psi), and that the protective cover soil will never be saturated; resulting in a factor of safety of 1.8. The specifications (Appendix C, page 02232-3) allow equipment with up to 20 psi ground pressure on 24-inches of soil (the cover soil thickness). The consequences of saturation or near-saturation of the cover soil are not addressed under static or dynamic conditions, although soil saturation was specifically requested to be considered in the previous NOD comment.

The laboratory testing (Appendix D) used only slightly moistened, well-compacted cover soil (only the GCL was saturated). The specifications (page 02232-4) only limit cover soil placement <u>during</u> precipitation, leaving open the possibility that a dozer much larger than a D6 may be operated on wet, nearly-saturated cover soil layers during the hours and days after rain storms. Although these conditions may not result in catastrophic slope failures, the application does not demonstrate that such circumstances have factors of safety greater than 1.

In addition to these concerns, the application does not provide calculations of the predicted stresses in the synthetic liner system materials or anchor trenches due to down-drag loading on the slopes. Loading due to wet protective cover soil on the 300 feet slopes may exceed anchor trench capacity, and therefore require that cover soil placement be limited to only a portion of the slope above the toe. If sacrificial geomembranes are proposed (see Comment D-6c(5)), consideration of an additional loading scenario may be necessary. The application must be revised to demonstrate

that the landfill liner system will be constructed to prevent failure due to climatic conditions, the stress of installation, and the stress of daily operation.

D-6c(4) <u>Liner System Coverage</u>: 270.21(b)(1), 264.301(a)(1)(iii)

Two significant deficiencies were identified in the revised liner coverage information. 1) The landfill liner is intended to eventually cover the floor and sidewalls of the entire (Phase I, II and III) landfill, but none of the drawings actually shows the full extent of the planned liner. For example, Drawing 8 shows the anchor trench for the Phase 1 liner, but no drawings are provided to show the anchor trenches and/or liner coverage for Phase II and Phase III. Similarly, the text of the application only suggests (Volume III, Section 3.1.4, page 3-7) that the plans for Phase II and Phase III liner installation, access ramps and waste fill sequencing "...will be determined in the future." 2) The liner anchor trench is located in the center of each of the two Phase IA access ramps (Drawings 8, 13 and 14). This leaves the outer half of each access ramp outside the limits of the liner system. The entire surface of the access ramps will be routinely contaminated with wastes tracked from the active fill face by waste hauling and water trucks, and waste placement and compaction equipment, contrary to the statement in Section 2.5.1.2 (page 2-14) in the application. (Both ramps apparently may be used for both entry to, and exit from, the landfill.) The application must be revised to demonstrate that the liner system will be installed to cover all surrounding earth likely to be in contact with waste or leachate during Phases I, II and III.

D-6c(5) <u>Liner System Exposure Prevention</u>: 270.21(b)(1), 264.301(a)(1)

The application does not explain whether the entire installed liner system will be immediately covered with soil, or why "...a sacrificial geosynthetic will [or may] be deployed..." instead (as stated in the response to the previous NOD). The revised application (text Section 2.5), engineering report and specifications do not mention possible use of sacrificial geosynthetics. (See comment 68.) The application must be revised to demonstrate that the liner system will be constructed to prevent failure due to climatic conditions, the stress of installation, and the stress of daily operation.

D-6d <u>Liner System Foundation</u>: 270.21(b)(1), 264.301(a)(1)(ii)

The response promises to provide bearing capacity and stability evaluations for load bearing embankments, but the revised application text (Section 2.5) and engineering report (Volume II, Section 3) do not include such evaluations, or even mention the load bearing embankments that are shown on the west and south sides of the landfill on Drawing 6 (Volume III, Appendix A). The outward slopes of these embankments appear to be about 3:1, but the slope is not specified. The embankments will apparently be built directly on top of the existing, highly variable Quaternary sediments, as indicated on Drawing 7 (Cross-Section A-A'). The embankment on the west side of the Phase III sub-cell is more than 20 feet above natural grade, about twice as high as proposed in the original application. Slope failure or severe settlement of the constructed embankments could result in damage to the liner and cover systems, increased erosion, and release of wastes to the environment. The application must be revised to demonstrate that the

liner system will be placed on a foundation capable of providing support to the liner system adequate to prevent failure due to settlement, compression or uplift.

The interim Phase II cut slope to the south of the initial Phase I fill is proposed to be left at 2:1 grade until Phase II excavation begins. The stability of this slope was not evaluated in the application. A failure of this slope may disrupt operations, fill in the proposed "clean" runoff collection basin, and possibly damage the completed liner on the floor of Phase I, where contaminated landfill runoff is proposed to be collected. The stability analysis in Appendix E-1 suggests that 3:1 slopes will have only minimal factors of safety (1.4 for static and 1.2 under seismic loading), assuming unsaturated conditions and Upper Dockum strength properties for the Quaternary sediments. The top forty feet or so of the slope actually will have less strength, and the exposed slope will be repeatedly wetted and eroded by precipitation. The bare slope may be left exposed with no maintenance for perhaps 10 years or more, if the landfill business is slow. Finally, the slope stability evaluation for the 3:1 slopes does not include static or dynamic loading due to construction equipment. Therefore the proposed 2:1 cut slope is apparently likely to fail. A sudden slope failure could threaten the lives of workers.

The bare 3:1 cut slopes above the access ramps on the east and west sides of the proposed Phase I fill will be exposed to precipitation infiltration and erosion from the time of excavation until the decision is made to complete the liner system on these slopes. The application provides no indication of how long this time period might be. The slope stability calculations in Appendix E-1 assume that "due to the temporary nature of the cut slope, a [factor of] safety less than [the typical minimum of] 1.5 was accepted." (Page 2) The parameters in the calculation are claimed to be "very conservative," but in fact the climatic exposure conditions (infiltration of precipitation over an extended time period) and routine heavy loading due to construction on the slopes (e.g., 40-ton truck and 80-ton scraper traffic) have not been accounted for. The exposure of these bare slopes will be extended, for at least several years, cannot be considered "temporary." Although a calculation concerning Ramp Stability is provided in Appendix E-6, this addresses only scraper loads on the "subbase and road base," not the stability of the slopes on which the access ramps are located. The slope stability evaluation must be revised to fully account for actual slopes in the landfill (both 2:1 and 3:1); actual soil strengths; exposure effects due to weathering, precipitation infiltration and erosion; and construction stresses on the slopes due to dynamic loads from trucks, dozers and scrapers.

D-6d(4)(b) <u>Bearing Capacity</u>: 270.21(b)(1), 264.301(a)(1)(ii)

The response discusses interface shear testing and slope stability analyses, but the comment requested a foundation bearing capacity analysis. Bearing capacity is particularly important in the areas around the boundary of the landfill where embankments (structural fills above natural grade) are proposed to be constructed on top of relatively weak sandy sediments. Revise the application to provide an analysis of the bearing capacity of the liner system foundation, with emphasis on the structural fills on the west and south sides of the landfill.

D-6e(1)(a) **<u>Synthetic Liner Compatibility Data</u>: 270.21(b)(1), 264.301(a)(1)**

The application (Section 3.2.3.5) does not provide information necessary to demonstrate that the liner system materials will be compatible with the wastes and leachate that will be in contact with those materials, as required by 264.301(a)(1)(i). Liner compatibility data from testing with synthetic and real leachates is available from liner manufacturers and other sources. Revise the application to include summary information and references to the data relevant to the proposed geomembrane and other liner system components.

D-6e(1)(c) **<u>Synthetic Liner Bedding</u>: 270.21(b)(1), 264.301(a)(1)(ii)**

The proposed specifications (02119) and CQA requirements (Section II.3) for prepared subgrade materials allow any type of soil found on site to be used, and do not correspond with previously approved criteria. The CQA Plan provides no method for enforcing the limited subgrade criteria mentioned in the response (Response No. 81 states that prepared subgrade "...materials will be free of particles larger than 1 inch in diameter or sharp objects which may puncture the liner"). The proposed specifications and CQA Plan do not include any prohibition or mention of sharp objects. No grain size analyses are required for prepared subgrade, and no gradation range is specified for this material. This means that any of the soils excavated anywhere on site (sand, gravel, caliche, silt or clay) can be used for prepared subgrade, so long as cobbles, large roots and branches are not visible. Proctors are required only once every 6 acres (CQA Plan, Table II-2), equal to 4,629 cubic yards of material, i.e., one test for about 231 dump truck loads of material (at 20 yards each). This approach is not consistent with the Alternative Liner System HELP Analysis, in Appendix E-28 of the application. This document provided the basis for the preliminary 1996 NMED approval of the proposed alternative (non-MTR) design for the Triassic Park landfill liner and cover systems. For example, the Prepared Subgrade description in Section 4.2.8 of this document states:

> "The prepared subgrade material considered is essentially the same material considered for the clay barrier material described above. ... this material is the same material proposed for the clay barrier... For the prepared subgrade layer, the same soil texture number and defaults were input as the clay layer described above including the conductivity."

Since the characteristics of this component of the alternative liner design are proposed to be modified in a non-conservative manner in the current application, the applicability and adequacy of the 1996 HELP analysis is called into question. Revise the application to specify clay liner material for Prepared Subgrade, or revise and expand the Alternative Liner System HELP Analysis report to demonstrate that the proposed open or empty specification (any type of soil) as a substitute for the clay material will provide equivalent physical support, and equivalent hydraulic performance, of the liner system.

D-6e(2)(b) **Soil Liner Compatibility Data: 270.21(b)(1), 264.301(a)(1)(i), 264.301(c)(1)(ii)**

Limited GCL testing to determine saturated shear strength was performed (Appendix D), but no waste nor leachate compatibility data are provided. The application must be revised to provide an evaluation of the chemical compatibility of the bentonite and synthetic materials with leachate which may be generated in the landfill. Manufacturer's test data, scientific or engineering literature, or testing with synthetic leachate may be acceptable if the character of the leachate is demonstrated to be similar to leachate which may be generated in the landfill.

D-6f(1) **System Operation and Design: 270.21(b)(1), 264.301(a)(2), 264.301(c)(2), 264.301(c)(3)**

The application presents only a partial design and incomplete specifications for the leachate collection and leak detection systems. Phase II and III plans "will be determined in the future" (Section 3.1.4, page 3-7), and the design details and specifications for flow meters and fluid level transducers or equivalent devices, and data recorders, are not provided in the application. The design will apparently include a trench across the center of the floor of each of the three separate sections or phases of the landfill, to accommodate the 8-inch diameter pipes in the leak detection and leachate collection systems. However, the application provides no description nor drawing to demonstrate how the trenches will be designed or how the pipes will be installed. Another example is the absence of plans for connecting the future (Phase IB, II and III) portions of the liner system to the previously constructed liners and drainage nets. Apparently the anchor trenches may be excavated, or the old liners will be cut at the top of the anchor trenches so that the new liners and drainage nets can be attached.

Plans for operation of the leachate collection and leak detection systems do not include pump operating levels, or procedures and equipment for draining leachate collection tanks. Management of the leachate collection tanks is important because at leachate and leak flow rates well below the proposed Action Leakage Rate (900 gpad), the small leachate collection tanks must be emptied several times per day (i.e., through the night, weekends, and holidays). The prompt emptying of leachate collection tanks (required to minimize the buildup of head on the liners) must be included as part of the landfill leachate collection and leak detection system operation plans. The application must be revised to provide complete leachate and leak detection system design and operation plans.

D-6f(2) **Drainage Material: 270.21(b)(1), 264.301(a)(2), 264.301(c)(3)(ii)**

The design calculations for the Action Leakage Rated (Appendix G-2) recommends (sheet 3 of 40) that the proposed geocomposite drainage material be tested to confirm that the assumed factors of safety are adequate. The discussion of leak detection system design parameters in Section 5.2.2 of Appendix G states that transmissivity test results, under conditions similar to those anticipated in the field, "are required in the specifications and CQA Plan." However, the CQA Plan (Appendix B, Section VII-1.4, Conformance Testing) indicates only that testing shall be done according to the specification. The specification (Appendix C, Section 02710-2.01)

refers to Table 02710-1, which explains the required transmissivity test setup in Note 5 at the bottom of the table. Note 5 requires that "the geocomposite shall be sandwiched between a layer of protective soil... and a 60-mil thick HDPE geomembrane."

This test setup is appropriate for the geocomposite above the primary liner (the LCRS), but it is not similar to the conditions that the leak detection geocomposite will be exposed to. In addition, the compressive stress of 10,000 psf specified for the test (also in Note 5) may be substantially less than the actual load on the floor of the landfill at most locations, when filling is complete. The maximum depth of waste fill and cover appears to be approximately 140 to 150 feet, which would result in loading of 14,000 to 15,000 psf, assuming average waste density of only 100 pounds per cubic foot (which may be an underestimate). Revise the application to require testing of the geocomposite under conditions similar to those which will exist in the landfill, e.g., compacted soil, GCL and textured 60-mil HDPE membrane below the geocomposite, with textured 60-mil HDPE membrane and lightly compacted above the geocomposite, under compressive stress representative of the actual loading on the floor of the landfill. (Note: Testing with only soil above the geocomposite is also necessary to demonstrate that the LCRS will function as designed.)

D-6f(3) **Grading and Drainage: 270.21(b)(1), 264.301(a)(2), 264.301(c)(2), 264.301(c)(3)**

In addition to the absence of plans for the Phase II and Phase III systems, discrepancies exist between the text of the Engineering Report (Volume III of the application) and the Specifications in Volume IV, Appendix C. The pumps indicated in the LCRS and LDRS descriptions (Section 3.1.3, page 3-5, Table 2 and Section 3.2.8, page 3-17) appear to be identical. However, the pump specifications in Section 11210 of Appendix C state that the Vadose Sump and Secondary Leachate Collection System pumps will be identical, but the LCRS pump will have a much larger capacity. Grundfos pump performance curves for the "25S19-9" pumps specified in Appendix C suggest a flow rate of about 35 gpm at 100 to 110 feet of head, not 20 gpm as indicated in Table 2. The application must be revised to correct these discrepancies.

Grundfos performance curves (not included in the application) for the two pumps specified in Appendix C indicate (in notes at the bottom of the charts) that the minimum submergence (liquid above the pump) is 2 feet for the smaller pump and 5 feet for the larger. Revise the application to provide additional details of the actual pumps to be installed and the operating parameters (submergence, on/off operating limits, and resulting depth of leachate on the liners) that are proposed to be included in the facility permit. Plans and procedures must be provided to minimize the head on the liners, and to maintain less than one foot of leachate head on the liners outside the limits of the sumps.

The application does not provide a means for measuring or recording volumes of leachate removed from the LCRS or the LDRS. Although flow meters apparently may be installed on pipelines from the landfill sumps ("FM" items on Drawing 19, Sheet 1), flow meters are not discussed in the Engineering Report or included in the Specifications. In addition, the application

provides no methods to measure the volume of leachate in the LDRS sumps, although a small 3-inch pipe ("pressure transducer conduit") is included next to each Riser Pipe in Drawing 19. Revise the application to provide the method(s) to measure and record the volumes of leachate removed from each LCRS and LDRS, and the volume of leachate present in each LDRS sump.

D-6f(4) Maximum Leachate Head: 270.21(b)(1), 264.301(a)(2), 264.301(c)(2)

Although the application provides calculations of the drainage capacities of the Phase I geocomposite (leachate collection and leak detection layers) and LCRS sump in Appendixes E-31 and G-1, Phase II and Phase III are not included. Results from testing the geocomposite under design conditions are not available, but are to be provided at some later date. The application does not address the details necessary to demonstrate that the leachate collection and removal system will be operated in such a manner as to prevent the buildup of more than one foot of head on the top liner. For example, the pump operating control systems, fluid pressure transducers or other monitoring devices, flow meters and data recording devices are not included in the application text, the Engineering Report, drawings or specifications.

In addition, the application does not provide plans for performing maintenance and monitoring, as necessary to demonstrate that high leachate flow rates will be managed to prevent buildup of more than one foot of head on the top liner (outside the sump area). The proposed collection of contaminated runoff inside the active waste disposal area (in a "pond" at the toe of the waste fill, as shown on Drawing 10) will allow collected water to drain into the leachate collection system at a rapid rate. (The protective soil cover above the drainage geocomposite may consist of lightly compacted sand, gravel or any other type of soil found on site.) High rates of inflow to the LCRS sump will result in the requirement to frequently empty the small leachate collection tank.

Additionally, rainstorms may produce very large volumes of leachate. For example, 3.3 inches of rainfall on the Phase IA area of about 16.5 acres may produce as much as 1,500,000 gallons of leachate which must be pumped out of the leachate collection sump. In this case, the 9,000 gallon tank may have to be drained as fast as it is filled by the continuously operating 50 gpm leachate pump, i.e., every 3 hours for 21 days, including nights, weekends and holidays. This design may not prevent the accumulation of more than 1 foot of head on the liners, even with the sump pump operating continuously.

The application must be revised to provide complete design plans for the landfill (Phases I, II and III) leachate collection and leak detection and removal systems (including pump controls, flow meters, pressure transducers, data recorders, etc.) and plans for operating and maintaining these systems. The plans must demonstrate that the leachate head on the primary liner will not exceed 1 foot during the active life and post-closure care period of the landfill, using the 25-year, 24-hour storm as the minimum design basis.

D-6f(5) **Systems Compatibility: 270.21(b)(1), 264.301(a)(2)(I)(A), 264.301(c)(3)(iii)**

The application does not provide waste and leachate compatibility information for the liner system construction materials. The application must be revised to demonstrate that all components of the leachate collection and leak detection systems are chemically resistant to the wastes to be managed in the landfill and the leachate that will be generated from them.

D-6f(7) **Prevention of Clogging: 270.21(b)(1), 264.301(a)(2)(ii), 264.301(c)(3)(iv)**

The application provides a design specification for the geotextile to be used to filter soil particles out of the leachate drainage layer (Appendix E-21), but does not suggest any other measures to prevent or respond to clogging of the leachate collection and leak detection systems. One potential cause of clogging of the leachate collection geonet and/or sump is excessive runoff infiltration, which may result from the proposed ponding of runoff on the protective soil cover at the toe of the waste fill. The filtration geotextile should not be expected to completely exclude clay-sized particles, especially when large volumes of infiltrating runoff are expected to pass through the protective soil cover, over a period of several years. The proposed geocomposite testing (Appendix G-1, sheet 8 of 40), although intended to simulate LDRS design conditions, should include testing of the actual LCRS conditions as well (including infiltration of large volumes of water through typical sand and other surficial soils from the site. Revise the application to evaluate the potential for clogging of the leachate collection system by infiltrating soil particles, and redesign the runoff collection pond if necessary to prevent clogging.

D-6g **Liner System Construction and Maintenance: 270.21(b)(1), 264.301(a)(1)**

The application does not provide complete (e.g., Phase II and Phase III) material specifications for the liner system, or test fill results for the clay liner in the Phase I sump. The application must be revised to include the entire landfill and all components of the liner system, including clay liner compaction and placement requirements based on or confirmed by test fill results.

D-6g(1)(b) **Soil Liners: 270.21(b)(1), 264.301(a)(1)**

The application includes clay liner material specifications (Section 02221), but no information to demonstrate that this material can or will be compacted as necessary to achieve the required low permeability. No data is provided to demonstrate that the clay material available on site will meet the permeability specification, or that the clay will be chemically resistant to the wastes and leachate to be managed in the landfill. Obtaining these data will probably require performance of the EPA 9090 test procedure and construction of a test fill. Revise the application to provide compaction, permeability and waste compatibility test results.

The application does not provide plans for Phases II and III of the landfill. The design report does not clearly indicate whether the leachate collection and leak design systems are expected to be identical to Phase I. The sump designs for Phases II and III are not provided, although they will clearly have different dimensions and floor slopes than the Phase I sump. Revise the application

to provide complete design information for the entire landfill (see Comments D-6f(1) and D-6f(3)).

D-6g(2) Construction Specifications: 270.14(a), 270.21(b)(1), 264.301(a)(1)

The construction specifications (Appendix C) are not certified, stamped or signed by a New Mexico professional engineer. Revise the application to provide the necessary certification.

D-6g(2)(b) Soil Liner: 270.21(b)(1), 264.301(a)(1), 264.303(c)(2)

The application does not include design details for Phase II and Phase III of the landfill. Revise the application to include design details for the entire landfill.

D-6g(2)(d) Leachate Collection and Leak Detection Systems: 270.21(b)(1), 264.301(a) and (c)

The application does not include specifications for several components of the leachate collection and leak detection and removal systems. The proposed method of connecting new segments of the liner, leachate collection and leak detection systems is also not addressed, as noted in the previous NOD. Revise the application to include design details, specifications and CQA requirements for leachate level sensors, pump control systems and flow meters; and the proposed methods for connecting new sections of the liner system during expansion beyond the Phase IA limits.

D-6g(3) Construction Quality Assurance Program: 270.21(b)(1), 270.30(k)(2), 264.19, 264.303(a)

The Construction Quality Assurance (CQA) Plan has the name of a professional engineer printed on the cover page, but a seal, signature or certification is not included. Revise the application to include certification.

The CQA Plan does not address pumps, controls and instrumentation, although these are integral components of the leachate collection and leak detection systems. Revise the application to include CQA requirements for pumps and controls, liquid level sensors, flow meters and data recorders.

The response to the previous NOD (response No. 105b) stated that the CQA Plan would be revised to incorporate the most recent EPA guidance (**Technical Guidance Document: Quality Assurance and Quality Control for Waste Containment Facilities**, EPA/600/R-93/182). The revised CQA Plan conflicts with several basic recommendations in the EPA guidance. For example, the definitions of Construction Quality Assurance and Construction Quality Control (CQC) in the CQA Plan are radically different from the definitions in the EPA guidance. The proposed Triassic Park definition of Construction Quality Control includes "Manufacturers, Suppliers, Contractors or Owners..." in the group of those who may perform CQC functions, and

carries this approach through the entire CQA Plan. In contrast, the EPA guidance states (page 2) that CQC "...is normally performed by the geosynthetics installer, or for natural soil materials by the earthwork contractor... (CQC) refers to measures taken by the installer or contractor to determine compliance with the requirements..." The application CQA Plan does not include any Manufacturing Quality Assurance or Control (MQA/MQC) as recommended by the EPA guidance (page 2). The proposed CQA approach for the Triassic Park facility (with no CQC) is confusing, and is not in agreement with EPA guidance or typical industry practice. Assignment of CQC functions to Manufacturers, Suppliers or Owners (Section 2.2) is inappropriate, and will not improve the quality or assist in documentation of the quality of the constructed units. Manufacturers, Suppliers and the Owner are not expected to construct any of the permitted units. The application provides no justification or explanation for the proposed changes in the approach recommended by EPA. Revise the application CQA Plan to provide definitions and assigned functions for MQA, MQC, CQA and CQC in accordance with the EPA Technical Guidance Document.

The proposed CQA Plan does not include the NMED as a party to CQA, as requested in the previous NOD comment. This is another example of the failure of the CQA Plan to incorporate the recommendations of the EPA Technical Guidance Document into the Triassic Park plan, and another contradiction between the response (No. 105d, which promised to incorporate the NMED into the CQA Plan and Project Organization Chart) and the actual revised application. Compare Figure I-1 of the proposed CQA Plan with Figure 1.1 of the EPA guidance. The proposed plan and project organization do not illustrate nor account for the flow of work from design through manufacturing, construction, inspection, certification, approval by NMED, and, finally, actual operation of the facility. The application CQA Plan must be revised to include the NMED as a party in the Project Organization, and the structure of the MQA/CQA organization must be revised to account for the flow of work on the facility from start to finish. If the proposed organization does not mirror the recommended structure in the EPA guidance (EPA/600/R-93/182, page 4), the revised application must provide a full explanation of why the EPA guidance is not being followed.

The previous NOD requested acknowledgment of the permit modification requirements of 40 CFR 270.41 and 42, and the response (No. 105e) promised to include "... Agency notification of any design changes which might require permit modification." However, the revised CQA Plan only suggests (Section 1.4, page XVIII-5) that when design or specification changes are required, the owner will notify NMED. The plan does not indicate whether the NMED will be notified before or after such changes are constructed, and does not mention the permit modification requirements of 20 NMAC 4.1.9, incorporating 40 CFR 270.41 and 42. Revise the CQA Plan to specifically acknowledge the permit modification criteria in 40 CFR 270.41 and 42.

The previous NOD requested that the CQA Plan be clarified to provide for separate certification of each phase of landfill liner system construction, including the final cover. The response (No. 105f) promised to provide for submittal of certification reports for each constructed phase. However, the revised CQA Plan does not mention the phased construction plans or the

requirement for multiple certification reports. Revise the CQA Plan to provide for submittal of certification reports for each phase of liner system construction.

Section 2.5.2 of the application text is inconsistent with the EPA CQA guidance. For example, the final bullet on page 2-20 discusses a need for unidentified subcontractors and consultants to have an acceptable CQA program. There should be no need for any additional CQA program outside the one to be included in the facility permit. There should never be any need for a consultant to have an independent CQA program even if they are also a construction contractor. Revise the text of the application to conform to the definitions and practices outlined in the EPA guidance.

D-6g(4) Maintenance Procedures for Leachate Collection & Leak Detection Systems: 270.21(b)(1), 264.301(a) and (c)

Response No. 106 to the previous NOD promised to provide maintenance plans. However, the revised application still does not include maintenance plans. Section 2.5.3.2 of the application states that "The landfill structure will be maintained through a routine preventive maintenance program which will be fully defined in the final site operations plan." As noted in previous comments, the application must include final design and operation plans. Revise the application to include maintenance plans for the landfill leachate collection and leak detection systems.

D-6g(5) Liner Repairs During Operation: 270.21(b)(1), 264.301(a)

Response 107 states that repairs to the landfill liner will be made in accordance with the original specifications and CQA Plan. However, the text of the application does not mention liner repairs. The most appropriate document for such a commitment to be located would apparently be the final site operations plan, which has not been submitted. Revise the application to include the final site operations plan, and ensure that the operations plan contains a clear and explicit commitment to repair the landfill liner.

D-6h Action Leakage Rate: 270.21(b)(1)(v), 264.302

The proposed Action Leakage Rate (ALR) of 900 gallons per acre per day (gpad) is a large rate of flow. The initial Phase IA liner as proposed on Drawing 9 will cover a surface area of about 16.5 acres. Therefore an average flow of 14,850 gallons per day (gpd) or less into the Phase IA LDRS sump would not trigger implementation of the Response Action Plan. The largest ALR will be for the Phase II sump, which will drain about 37 acres. The Phase II ALR would therefore be 33,300 gpd. This rate of flow would require nearly constant operation of the 25 gallons per minute (gpm) secondary leachate collection system pump specified in Appendix C, Section 11210, page 2. In addition, the 9,000 gallon leachate collection tank would have to be emptied four times per day to keep pace with the leachate pump. The application does not provide plans to continue operation of the leachate pumps and transfer of collected leachate around the clock, as will be required to minimize the head on the liner system, if the leakage rate approaches the ALR. Revise the application to provide for continuing operation of the leachate and/or leak detection

system sump pumps, and emptying of the leachate collection tanks if necessary to allow continued operation of the sump pumps, throughout the times when the facility is otherwise non-operational, i.e., overnight, weekends, and holidays.

The proposed ALR is nine times the EPA recommended minimum. The explanation given for the nine-fold increase is the high transmissivity of the geocomposite. However, the transmissivity cited in Section 3.2.9 of the Engineering Report is 2.2×10^{-4} m^2/sec, which is only 7.33 times greater than the minimum of 3×10^{-5} m^2/sec required in 40 CFR 264.301(c)(3)(ii). In addition, the value specified in Section 02710 of the construction specifications (page 02710-9) is 2.0×10^{-4} m^2/sec, only 6.7 times greater than the minimum required value. Revise the application to include an Action Leakage Rate of no larger than 670 gpad, or provide additional information to justify a larger value.

D-6h(2) <u>Monitoring of Leakage</u>: 270.21(b)(1)(v), 264.302(b)

Response 109 to the previous NOD does not address the request to provide the method the facility will use to determine whether the Action Leakage Rate has been exceeded for each sump. The revised application likewise provides no method or calculations of the weekly volume of leachate removed from the leak detection sump which would constitute such exceedance. The Phase I liner system (and presumably the Phase II liner) will have two different areas, during the initial Phase IA operating period and the next (Phase IB?, IIA/IIB?) period. Therefore, the Phase I sump should have two different weekly total volumes calculated to compare with the actual leachate pumped. These calculations and resulting volumes are necessary to demonstrate how the leak detection system will be operated, and when the Response Action Plan will be implemented. Revise the application to include calculations of the total weekly volume for each sump, for each different development or operating period, that will trigger implementation of the Response Action Plan.

D-6i(1) <u>Response Actions</u>: 270.21(b)(1)(v), 264.304

The Response Action Plan for the landfill provides for monitoring the landfill sumps weekly and after significant precipitation. The term "significant" is not defined. The proposal to check sumps only weekly, after the ALR has been exceeded, does not meet the requirements in 20 NMAC 4.1.500 (incorporating 40 CFR 264.301(c)(3)(v) and (4)), i.e., to prevent liquids from backing up into the drainage layer and to minimize the head on the bottom liner. If the sump in the Phase II sector was to be checked and pumped by manual control only weekly (due to failure of the fluid level sensor in the sump, or any other reason) and the leak rate remained at or near the ALR, about 233,000 gallons would have accumulated and would be waiting to be removed from the sump, each week. This approach could result in accumulation of large amounts of leachate in the leak detection system drainage layer, and expose the bottom liners to high pressures and extreme variations in pressure. The RAP must be revised to provide methods (e.g., daily or more frequent inspections) and/or equipment (automated leachate detection, alarm and pump operating systems) as necessary to prevent backup of leachate into the LDRS drainage layer, and to minimize head on the bottom liner.

D-6j <u>Run-on and Run-off Control Systems</u>: 270.21(b)(2), 264.301(g)

The application provides only partial run-on and run-off control system design calculations and drawings. No calculations or designs for managing run-on or run-off beyond the initial Phase IA development are included. Revise the application to include plans for managing run-on and run-off for each and every phase of future development of the landfill.

Section 2.1.3, Facility Traffic Plan, Unimproved Access Roads and Temporary Construction Haul Roads, states that although the construction haul roads are not shown on the drawings, provisions for surface water drainage such as culverts and ditches, as well as erosion control features, will be included. Many of the construction haul roads will be in the landfill excavation or immediately adjacent to it. The run-on and run-off control measures associated with the haul roads may directly impact the waste fill or waste emplacement operations, must be included in the application. Revise the application to include sufficient detail on these features to allow for full review.

Section 2.2, General Facility Design Analyses, Erosion Control, states that a freeboard height of 3.5 inches (0.3 feet) was selected. Provide the rationale for the selection of this value for the channel design.

Section 2.1.3, Facility Traffic Plan, Unimproved Access Roads and Temporary Construction Haul Roads, states that the truck staging area will only be constructed with a gravel surface. Provide information on how any releases from trucks waiting to deposit their contents will be managed. Additionally, this area is to drain to the surface water detention basin. Provide information on whether or not the discharge from this area will be under valve control. In the event that a release does occur, having this area under valve control could prevent the release from impacting the surface water in the detention basin and any areas downstream of the detention basin.

Section 2.0, Hydrogeology, Section 2.3, Return Period/Precipitation, states that three return periods were used to design and evaluate the stormwater control system. This is an oversimplification, as each channel was not evaluated for each of the return periods, and the ramp ditches, site perimeter ditches, and roadside ditches were only evaluated for a 2 year return period. This section needs to be expanded such that the complexity of the design is fully discussed.

Section 2.4, Hydrograph Response Shape, states that a medium hydrograph response was selected for disturbed as well as undisturbed areas. During construction of the landfill, none of the areas will be vegetated, and if vegetation does exist, it will not be very hardy. The worst case conditions will occur during this poor-vegetation state, which would be representative of a fast or high response rate. Either provide the justification for using the medium response rate to predict the runoff response, or revise the response hydrograph used such that it is representative of a non-vegetated/unprotected area.

This Section 3.0, Channel Design, states that channels with peak flow velocities greater than 5 feet per second from an average storm will be lined with gravel or rip rap if required. No

information is provided on how a determination will be made as to whether gravel or rip rap will be placed. Revise this section to include this information.

Section 5.0, Ponds, of the Storm Water Control System Design, does not discuss the design approach shown on Drawing No. 27, Section 24. Surface water will be allowed to pond and percolate into the landfill cover and the soils that will serve as the road subgrade. This could potentially create an unstable condition on top of the liner. Provide a design discussion and calculations that clearly demonstrate that the soil will remain stable, and the cap surface will not be negatively impacted by this proposed water management approach.

Table A-1, Curve Numbers, does not provide a value for the curve number used for the waste area type. Revise this table to include this value.

The Channel Design information presented for Ditch 5, in Attachment 2, Channel Designs and Drawing No. 25, Sheet 2 of 2, states that the side slope used for design of this ditch was 2H:1V. The supporting computer run for Ditch 5 in Attachment 1 shows that this was used only for the 2-year, 24-hour rain event. A value of 3H:1V was used for the 25 year, 24 hour rain event. Either revise the Channel Design Table and Drawing No. 25 such that the correct side slope is referenced, or recalculate the flow for the 25 year, 24 hour rain event using a side slope of 2H:1V, as indicated.

The maximum total depth for Ditch 3, at a slope of 1.1 percent to 2.0 percent, should be 2.4 feet, not 2.3 as indicated on Drawing No. 25 and the Channel Design Table in Attachment 2. Revise both accordingly.

The spillway 25-year, 24-hour flow value presented in the Channel Design Table is actually the 100 year, 24-hour flow value. Revise the table to include a footnote to this effect.

In Appendix F-2, the velocity of the flow in the Channel Design Table for Ditch 1, during the 2 year, 24 hour rain event should be 4.1 feet per second (fps), not 4.3 fps as indicated by the table. Revise the table accordingly. Additionally, revise the table to include a reference for why the velocity calculations were not required for the 2-year storm analysis given the following conditions: the 25-year, 24-hour rain event flow velocity was less than 5 fps, so the 2-year, 24-hour rain event flow velocity would also be less than 5 fps, or because erosion protection had already been specified, so verification that it was needed is unnecessary.

Flow calculations were provided for a Landfill Phase I Run-off Data set, but the results are not discussed in the Surface Water Control System Design. Revise the channel design discussion to explain the data generated by this analysis, and how it is being used.

In Attachment 3, Apron Design, provide a reference for the equation that was used to determine the apron width.

Drawing No. 25, Sheet 1 of 2, does not include any flow directions or elevations. Revise this drawing to include the flow direction of each water conveyance channel and to include surface

contours such that the surrounding surface water flow directions can be determined in relationship to the surface water control system features.

There is no material definition for the perpendicular cross hatching underneath each of the cross-sections in Drawing No. 39. Define the material the perpendicular cross hatching represents.

Detail F, on the right hand side of Drawing No. 39, calls out the prepared subgrade. The direction arrow is pointing to the wrong material. The prepared subgrade is represented by the vertical cross-hatching, not the perpendicular cross hatching. Revise the drawing accordingly.

Detail 2, on Drawing No. 43, Sheet 1 of 2, refers to a clay liner material. No discussion in the engineering report refers to a clay liner material used in the roll-off area. Revise the engineering report to discuss the clay liner material shown in Detail 2.

Drawing No. 43, Sheet 2 of 2, does not provide a slope for the HDPE pipe. Revise the drawing to include the installation slope for the HDPE pipe along the sump wall.

Section S-105, Drawing No. 45, Sheet 5 of 5, does not provide an overlap dimension for the steel reinforcement. Revise Section S-105 such that all steel reinforcement overlaps are specified.

None of the arrow heads are visible in Section S-563 of Drawing No. 45, Sheet 5 of 5. Revise this section such that all dimensions and call outs are clearly discernable.

Section 2.5.1.6, Run-on/Run-off Control, of the Part A Application states that the run-off from the landfill side slopes above the liner system will be channeled away from the waste and managed as clean water. Facility run-on will be diverted via a diversion channel to a natural drainage discharge point, and facility run-off will be managed in detention basins according to Section 2.1.4, Facility Stormwater Control, of the Engineering Report. There is no discussion provided on how clean water will be managed, except that it will be collected in the detention basins, and allowed to evaporate. As the design capacity of the detention basins is for only a 24-hour, 25-year storm event, provided a discussion on how facility run-off will be managed if the detention basins are not dry at the beginning of a 24-hour, 25-year rain event.

The information presented on Drawing 10 is inconsistent with Drawing 13. Drawing 13 shows a surface water diversion berm and associated culvert, but these two features are not shown on Drawing 10. Revise one or both of these two drawings such that these inconsistencies are resolved. Additionally, these features are not discussed in the stormwater management design portion of the permit application. Any surface water management features that control or manage runoff must be discussed in the Engineering Design portion of the application under the surface water management section and all supporting design calculations must be provided. Revise the storm water Engineering Design portion of the application to discuss all storm water management features.

D-6j(3) **Management of Collection and Holding Units: 270.21(b)(4), 264.301(I)**

Although the text of the application (Section 2.5.1.3, page 16) appropriately proposes that the three leachate collection tanks will be managed as less-than-90-day storage units, the basis for the permitting exemption and the generator requirements of 20 NMAC 4.1.300 (incorporating 40 CFR 262.34(a)(1)(ii)) are not mentioned. The tanks are not required to be permitted (in part) because the waste they will store (F039 leachate) will be produced on-site and is listed in 40 CFR 261. Generator requirements include the tank management standards in 40 CFR 265 Subpart J, except 265.197(c) and 265.200. For example, 265.192 requires that the new tanks must be assessed and certified by an independent professional engineer, and 265.193 specifies adequate containment requirements. The generator requirements that must be met if the tanks are to be exempted from permitting requirements should be acknowledged in the application. In addition, the details of plans for emptying the tanks and managing leachate must be included in the application.

D-6j(5) **Maintenance: 270.21(b)(2) and (3), 264.301(g) and (h)**

The drainage control section of the application (2.5.1.6) and response No. 120 to the previous NOD do not mention the requirements for maintenance of the drainage system. Section 2.5.3.2 of the application indicates that an operations and maintenance plan will be prepared at some future date. Revise the application to include maintenance requirements for the run-on/run-off control system.

D-6k **Control of Wind Dispersion: 270.21(b)(5), 264.301(j)**

The application (Section 2.5.1.7) does not address the previous NOD comment, although response No. 120 suggested suspending waste placement operations and/or employing wind screens and fencing as necessary to control or prevent escape of wind-blown wastes. The revised application focuses solely on spraying water to limit dust escape. Since many wastes may not be dust or soil-like, and may consist of materials which could be more easily dispersed by wind, such as paper, cloth or building debris, additional control measures such as those mentioned in response No. 120 should be included in the landfill operating plans. In addition, the plans should account for tracking of wastes out of the active fill face area and the potential for subsequent dispersal. Cleanup of vehicle tires or treads may be advisable before allowing them to exit from the active face. Revise the application to provide effective means to control or prevent dispersal of wastes by wind. Provide a maximum wind speed, above which waste dumping and spreading operations will be halted; and differentiate between disposal operations below the perimeter road and operations above that elevation, where exposure to wind will be greatly increased.

I. CLOSURE PLANS

I-1a <u>Closure Performance Standard</u>: 270.14(b)(13), 264.111

The closure plan in the revised application proposes the same definition of the closure performance standard identified as unacceptable in the previous NOD. Closures of all units are to be followed by sampling of soil to determine if contamination exists. The single criterion to be used in these determinations is that no indicator parameter concentration should be more than three standard deviations above background. Response No. 147b and the revised application do not address the objections raised in the previous NOD, but simply restate the preference for this simple way of demonstrating compliance with clean closure requirements. Background samples are not proposed to be taken before operations begin, indicator parameters are not proposed, and the number and locations of background samples are not suggested. The probable absence of organic hazardous constituents in quantifiable concentrations is not addressed. The need to account for environmental and human health toxicity in the potential contaminants is not mentioned. The closure plan must be revised to address each of the above factors in developing specific and detailed procedures for demonstrating clean closure and adequate decontamination around the landfill. The number, locations and analytical parameters for background samples must be provided, etc.

Response 147d states that it is agreed that any concentrations found in closure confirmation sample analyses that are above the range of regional background values must be addressed in a comprehensive risk assessment. This statement contradicts the explicit language of both the original and the revised closure plans, as well as response NO. 147b. Three standard deviations above the mean of background values will almost always be far above the highest value in a normal population (i.e., a group of representative samples). Since a large difference of opinion clearly exists, it is even more important that the specific details of how the background and closure sampling will be performed. The application must be revised to provide a detailed sampling and analysis plan for determining background concentrations in the soils at and near the facility, prior to the start of operations (unless another means of demonstrating clean closure is provided).

I-1e(2) <u>Disposal or Decontamination of Equipment, Structures and Soils</u>: 264.112(b)(4), 264.114

Response 151 states that the information requested in the NOD comment was provided. However, review of the closure plan in the revised application failed to locate any mention of a commitment that any hazardous constituents left at a unit will not impact any environmental media in excess of Agency-established exposure levels and that direct contact will not pose a threat to human health or the environment (see Preamble 51 FR 16444, May 2, 1986). Revise the closure plan to include the above commitment.

I-1e(3)(b) **Cover Design: 264.310(a)**

The proposed cover design described in the closure plan (Section 8.1.6, Volume I) states the vegetative cover thickness as 2 feet, but the Engineering Report (Section 3.1.5 states that this layer is 2.5 feet thick. Revise the application to resolve this discrepancy.

I-1e(3)(e) **Grading and Drainage: 264.310(a)(3)**

The cover design does not provide any kind of outlet drainage for the geocomposite, at the toe of the cover. Revise the application to address the predicted effects of drainage of infiltrating precipitation off the cover. If increased erosion, root penetration at the outer limit of the cover, or other adverse effects are likely to occur, provide additional design features (e.g., perimeter drain piping) to minimize these effects.