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(Return to WM, 623-53)

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MEMORANDUM FOR: Leo B. Higginbotham, Chief
 Low-Level Waste and Uranium
 Recovery Projects Branch, WM

FROM: John T. Greeves, Chief
 Engineering Branch, WM

SUBJECT: REVIEW OF DOE RESPONSES TO NRC'S COMMENTS ON SHIPROCK
 CONSTRUCTION DOCUMENTS (SPECIFICATIONS)

- REFERENCES: 1. Letter dated May 17, 1985, from L. Higginbotham of NRC to J. G. Themelis of DOE; Subject: Geotechnical Engineering Review of Specifications for Phase II Construction, Shiprock RAP
2. Letter dated March 26, 1985, from R. E. Hopkins of Morrison-Knudsen Company, Inc., to L. Higginbotham of NRC; Subject: Shiprock Site - Shiprock, New Mexico, Phase II Construction Documents

As per your Technical Assistance Request (TAR-WM-85839) of September 17, 1985, we have reviewed DOE's responses to NRC's comments (Reference 1) on construction specifications for proposed remedial action at the Shiprock site (Reference 2). The NRC's comments and the DOE's responses to them pertain to the geotechnical engineering aspects only.

The DOE's responses to comment numbers 1, 4, and 5 regarding disposal of demolished materials, compaction of radon barrier materials, and gradation of select rock material and select bedding material are satisfactory. The responses to comment number 2 (radon barrier material) and comment number 3 (relocation and compaction of slimes) need clarification. Our observations on these two items are in the attachment.

This review was performed by Dr. Banad Jagannath of my staff and he may be contacted at extension 74629.

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PDR WASTE
WM-58

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John T. Greeves, Chief
 Engineering Branch, WM

Attachment:
 As stated

OFC :	WMEG :	WMEG :	WMEG :	WMEG :	WMEG :	:	:
NAME :	BJagannath/cj	MNataraja	MTokar	JTGreeves	:	:	:
DATE :	10/11/85	10/11/85	10/11/85	10/11/85	:	:	:

GEOTECHNICAL ENGINEERING

OBSERVATIONS ON DOE'S RESPONSES TO NRC'S COMMENTS

ON SPECIFICATIONS FOR PHASE II CONSTRUCTION, SHIPROCK RAP

The DOE's responses to comment numbers 1, 4, and 5 are satisfactory; NRC's observations on DOE's responses to comment numbers 2 and 4 are presented below.

1. Comment Number 2 - Radon Barrier Materials

(Section 02200, Earthwork, Part 2 - Products, Section 2.2.B, Page 02200-3)

The NRC's comment was that the specification is not restrictive; a gap-graded material which satisfies the percent fine criteria will be in compliance with the specification. In the specification there is no limit on the maximum size of particles. There is no statement on prohibiting gap-graded material, but there is a statement that mixing may be needed to meet the percent fine criteria. The DOE's response shows that the test samples from designated borrow areas satisfy the specification, and the data from tests on these samples are used in the design of earth cover as radon barrier. But the NRC concerns on lack of maximum size and gradation requirements in the specification are not addressed in the response. Even though the limited laboratory samples do comply with the specifications and provide proper gradation, there is nothing in the specification to assure that similar materials will be used in the field. The specification may be revised to address the above concern.

2. Comment Number 3 - Relocation and Compaction of Slime

(Section 02200, Earthwork, Part 3 - Execution, Section 3.2, Page 0220-7)

The specification, items 3.2.A.7 and 8, states that pockets of slime located in tailings designated to be relocated or otherwise disturbed shall be mixed with sands and placed at the lower part of the tailings embankment. The DOE's response, to NRC's question seeking guidelines for mixing with sand, was that mixing with sand was required only for construction purposes to support the equipment and not for radon attenuation. The response further states that the subcontractor will be allowed the option of drying the slime rather than mixing with sand and compacting it to the specification. The NRC concurs that radon attenuation should not be the intent for mixing slime with sand. The intent was to improve the stability/strength characteristics of the material. The

slime and sand, both compacted to meet specification (compacted to a dry density of 90 percent of maximum dry density as per ASTM D698 method) will have different dry density, strength, and compression characteristics. In the absence of mixing with sand, it is possible to end up with a large pocket of compacted slime (several layers of slime, within a small area, compacted to meet specification) and compacted sand next to each other. This has the potential to result in uneven settlement under the weight of the overburden fill and radon barrier cover. To mitigate this problem, a desirable solution would be to distribute the slime evenly over the embankment area to prevent the possibility of uneven settlement. Another solution is to place the slime and sand in alternate layers so that the slime would readily stabilize aided by the sand layers in dissipating the excess pore pressures in the slime. The possibility of relocating and compacting slime will be at all UMTRAP sites; the specification may be revised to address the above concern.