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WM Project 39

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

FROM: Mark Haisfield
Low-Level Waste and Uranium
Recovery Projects Branch
Division of Waste Management

SUBJECT: TRIP REPORT TO UMRAP SITES - AMBROSIA LAKE, TUBA CITY,
MONUMENT VALLEY, MEXICAN HAT, AND SHIPROCK.

DATES: May 6-10, 1985

Participants: NRC

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DOE/TAC/RAC*

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Parker, TAC
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Mulford, TAC
Mason, TAC
Knight, TAC
Darr, TAC
Stepp, TAC
Hobbs, TAC
Smith, TAC
Oldham, RAC
Wathen, RAC

*DOE, TAC, and RAC personnel at Albuquerque meeting, and/or site visits. Not all personnel participated at each site.

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Discussion: On May 6, a general overview of the sites was presented. The material which includes history, maps, general information, and aerial photographs is attached. The following portion of this report is organized by site and discipline. In addition, more generalized geology comments and concerns are contained within a separate Geology-Geophysics Section trip report.

Surface water The purpose of this site visit was to assess the hydrologic and erosion conditions which could affect the conceptual design of the remedial action plan. Accompanied by personnel from Jacobs Engineering Group, DOE, and M-K, we first observed the immediate tailings pile area. We walked on the top area of pile, which offered a good view of the surrounding drainage areas. It was noted that the existing pile partially blocks the drainage path for runoff from a drainage area of 3.8 square miles (DOE's estimate). This runoff will probably have to be diverted around the remediated pile in a rock-protected diversion channel and may present design problems if the slope of the channels are steep. Examination of topographic maps of the site area indicates that the ground slope is approximately 1% in the immediate site area.

We then observed portions of the upstream drainage area. These areas were sparsely vegetated, and portions of the upper drainage areas were very steep. The existence of deep gullies and arroyos were noted, indicating the potential for heavy runoff during a major storm event.

Ground water The Ambrosia Lake tailings pile is located in the Grants Mineral Belt area approximately 80 miles west of Albuquerque. Of technical interest at the site was the ponded water on top of the pile as well as a subsidence area near the pile. Previous underground mining has left a large network of tunnels in the area. The UMTRAP pile is dwarfed by the Kerr-McGee "active" pile located 1½ miles to the west.

For additional information on ground water at Ambrosia Lake, see Mike Weber's May 5-8, 1985 trip report.

Geology The site is located in the Ambrosia Lake Valley approximately 20 miles north of Grants, New Mexico. The valley is bordered on the north by San Mateo Mesa (7,100 ft elevation) and on the southwest by Mesa Montanosa (7,300 ft elevation). The site lies on the pediment/bajada that slopes southwestward

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The presence of numerous mine vent holes in the area and allegedly under the pile, presence of extensive underground mine workings, evidence of surface subsidence adjacent to the existing pile, reported occurrence of recent seismicity that had some impact on underground openings, and reports of closely-spaced faults in mines in the vicinity of the site, all appear to be appropriate concerns for focusing site characterization plans and activities at the Ambrosia Lake site.

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- o There is local ponding on top of the tailings pile and the rain water does not drain through the pile. This indicates the presence of low permeability and possibly low strength tailings in that vicinity.
- o There were numerous erosion gullies on the side slopes on the pile, and the perimeter dike was breached at two locations.
- o The TAC is planning to commence site characterization activities during the month of May 1985.
- o There are other tailing piles (larger in size) in the general vicinity which are not scheduled for stabilization. The mining activity is still going on in this area, and the effect of these should be considered in developing the remedial action plan.
- o The borrow source, tentatively identified for the radon barrier cover, is about $\frac{1}{2}$ mile northeast of the site. The borrow material is expected to be sandy silt to silty sand.
- o Mining operations west of the tailings pile has resulted in surface subsidence - approximately 200 feet in diameter and 6 feet in depth. This subsidence is approximately 200 to 300 feet beyond the site boundary; but, may require relocating portions of the tailings away from this zone.

Surface water The purpose of this site visit was to assess the hydrologic and erosion conditions which could affect the conceptual design of the remedial action plan. Accompanied by personnel from Jacobs Engineering Group, DOE, and M-K, we first observed the immediate tailings pile area. We walked on the top area of the pile, which offered a good view of the surrounding drainage areas. It was noted that the existing pile partially blocks the drainage for runoff from a presently undefined drainage area and is also located such that runoff from upslope drainage areas will probably have to be diverted around the remediated pile in a rock-protected diversion channel. The runoff may present design problems if the slope of the diversion channels are steep. We then observed portions of the upstream drainage area. These areas were sparsely vegetated, and portions of the upper drainage areas were very steep.

We then drove to Greasewood Lake, a potential source of borrow material for the pile. No unusual surface water hydrology features were noted.

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Engineering The tailings appear to be coarse grained in that there was no ponding on the surface of the pile. The potential borrow site (Greasewood Lake) for radon barrier earth cover material, is reddish brown, fine silty sand. The borrow source for the rock cover material has not yet been identified. The team drove around the site and also drove down to the valley, south of the site, to witness the contact horizons of rock formations underlying the site.

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Paul Darr, DOE TAC geologist, accompanied the NRC geologic staff around the site and adjacent regions. A source area of Honaker Trail limestone for potential rip-rap use was visited. Given that the exposed limestone joint-blocks were fissile parallel to bedding, the suitability of these rocks for rip-rap was not apparent. The abandoned open pit uranium mines west of the site were also visited. It was suggested that these mined areas might provide a suitable site for relocating the tailings. Geomorphic stability problems at the current site include those resulting from the fact that the pile is directly in the path of a channel originating on the western side of the valley.

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Engineering The old tailings area contains the residue of the original heap leach process tailings. The new tailings pile is composed mostly of coarse-grained sand and small pebbles that were never processed. The piles appeared to be dry which can be expected since the site is located in a very dry area. Contaminated windblown material to the northeast of the new pile and to the west of the old pile may be difficult to clean up since it is dispersed in rocky terrain. A thin layer of contaminated material covers an area of the road to the north of the site. The level of this contamination should be assessed to determine if remedial action is required. Presently, the radon barrier material and the rock cover material have not been identified. The DOE may have some difficulty locating sufficient quantities of these materials in the area.

Mexican Hat, Utah: - May 8, 1985

Surface water The purpose of the site visit was to assess the hydrologic and erosion conditions which could affect the conceptual design of the remedial action plan. Accompanied by personnel from Jacobs Engineering Group, DOE, and M-K, we first observed the immediate tailings pile area. We walked on the top area of the pile, and viewed the surrounding drainage areas. It was noted that the existing pile partially blocks the drainage path for surface runoff in a steep gullied arroyo having a currently undefined drainage area. This runoff will probably have to be diverted around the remediated pile in a rock protected diversion channel and may present design problems if the slope of the channels are steep.

In the immediate site area, the presence of numerous gullies and arroyos were noted. It appeared that these gullies have the potential to migrate upstream and possibly affect the pile and that head cutting will need to be considered in the erosion protection design at this site.

We then observed portions of the upstream drainage area. These areas were sparsely vegetated, and portions of the upper drainage areas were very steep. The existence of deep gullies and arroyos were noted, indicating the potential for heavy runoff during a major storm event.

Ground Water The Mexican Hat tailings pile is located in an arroyo which does not contain a perennial stream. According to the TAC, groundwater is first encountered at a depth greater than 150 feet in an artesian aquifer. In drilling these wells, the TAC encountered hydrogen sulfide gas and oil. A small zone of saturated material was reported by the TAC as occurring directly beneath the pile. The alluvium in the arroyo is very thin and the bedrock (mostly fire-gained sedimentary rocks) is notably fractured.

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The Shiprock site visit was of a different nature than the pre-RAP visits to the other four sites. Conditional NRC concurrence in the Shiprock RAP has been issued, and initial site preparation activities have begun. On May 9, 1985, we toured the site to briefly view the work that has been done and to discuss surface water hydrology and geotechnical engineering concerns with DOE and M-K personnel. Fences have been constructed, borrow areas have been cleared, and the waste water retention basin has been nearly completed. When questioned about the retention basin's liner, M-K personnel indicated that the clay liner has not yet been placed. We observed the rock cover borrow area and the eroded arroyos adjacent to the pile that are to be filled in as part of the design.

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May 10, 1985 Steve Smykowski and Banad Jagannath met with Bill Mason (JEC), Kathy Carlson (DOE) and John Smith (Weston) to discuss the methodology the DOE is using to determine the radon flux from the UMTRA site piles. The meeting was conducted by John Smith who presented slides from a paper that he had presented at the most recent Symposium on Uranium Mill Tailings Management at CSU. Items that were discussed included the EPA criteria for limiting radon flux from inactive tailings piles and the radiological input parameters that are used in the RAECOM model. The meeting was predominantly an informative session for the staff rather than one to discuss specific issues.

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(Please see previous concurrences)

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