

Distribution: WM-85356  
WM file: WM-39 ✓  
WMEG r/f  
NMSS r/f  
REBrowning  
MJBell  
JTGreeves  
MSNataraja  
JRPearring  
BJagannath  
SSmykowski  
HJMiller  
JOBunting  
LBHigginbotham  
PDR

WM Record File  
WM Project 39  
MAY 17 1985  
PDR ✓  
LPDR

WM-39/BJ/85/05/15

Distribution: - 1 -  
(Return to WM, 623-SS)

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

FROM: John T. Greeves, Chief  
Engineering Branch  
Division of Waste Management

SUBJECT: REVIEW OF THE DOE UMTRA PROJECT SURVEILLANCE AND  
MAINTENANCE PLAN

In accordance with Technical Assistance Request 85026, WMEG has reviewed the Project Surveillance and Maintenance Plan (PSMP) for the UMTRA project. This is a generic document for UMTRAP and DOE plans to prepare a site specific document for each site. General and specific comments related to the geotechnical engineering aspects of the plan are attached to this letter. We have identified the following comments that are significant to the PSMP.

1. The PSMP has not identified the final condition to which the tailings pile will be restored, should any repair work be needed. We recommend the repair work restore the pile to the original design conditions at the time of closure or to a revised design that meets all safety requirements.
2. Although the PSMP identifies the types of damage to the pile that can result from various modifying processes, it does not specify the extent of damage that would trigger a repair action.
3. The PSMP does not require that the pile be monitored to determine radon flux. Although the EPA regulation for controlling radon flux from these piles is a design criterion, the NRC in its regulatory role will require a demonstration of compliance of a licensing criterion. Therefore, it is recommended that radon flux monitoring be made a part of Phase I inspection.
4. The NRC's role in both review of repair actions and in the new Phase-I inspection plan which will be developed at the end of 10-year period is not clearly defined in this document.
5. Durable monitoring devices should be installed to aid in quantifying some critical aspects of the modifying processes that will be inspected. Quantifying the extent of damage by mere visual inspection may be difficult.

8506110206 850517  
PDR WASTE  
WM-39 PDR

OFC	:	WMEG	:	WMEG	:	WMEG	:	WMEG	:	WMEG:C	:	:
NAME	:	SSmykowski/cj/jc	:	BJagannath	:	MNataraja	:	JPearring	:	JGreeves	:	:
DATE	:	85/05/	:	85/05/17	:	85/05/	:	85/05/	:	85/05/	:	:

MAY 17 1985

WM-39/BJ/85/05/15

- 2 -

6. The PSMP addresses quality assurance for laboratory tests on groundwater samples and aerial photography. QA/QC aspects for other items of work are not addressed. The QA/QC portions of this PSMP needs to be reviewed by a NRC QA/QC specialist.

If there are any questions regarding this review, please contact Steve Smykowski or Banad Jagannath of my staff.

ORIGINAL SIGNED BY

John T. Greeves, Chief  
Engineering Branch  
Division of Waste Management

Attachment:  
As stated

OFC	: WMEG	(SS)	:	WMEG	(SS)	:	WMEG	:	WMEG	(SS)	:	WMEG	:	WMEG	:	WMEG	:	WMEG	:	WMEG	:
NAME	:	Smykowski/cj/jc	:	BJagannath	:	MNataraja	:	JPearring	:	JGreeves	:		:		:		:		:		:
DATE	:	85/05/17	:	85/05/17	:	85/05/17	:	85/05/17	:	85/05/17	:		:		:		:		:		:

Comments on the Geotechnical Engineering Aspects of  
the Project Surveillance and Maintenance Plan  
for UMTRA Sites

General Comments

1. Section 6.1 states that "the decision to conduct maintenance or contingency repair will be based on the results of Phase II or contingency site inspection". The primary objective of the site inspection is to identify potential problems at an early stage prior to the need for extensive repairs. However, no criteria have been specified that would indicate when repair actions would begin based on the extent of the damage. The PSMP should require that the site specific surveillance and monitoring program indentify the level of damage resulting from the modifying processes that would trigger repair action.
2. Phase I inspection relies heavily on visual inspection during site visits to identify any potential problems such as slope movement and encroachment of stream channels or arroyos onto the disposal site. It is prudent that some monitoring devices such as alignment stakes (capped rebars recommended in the PSMP for monitoring headward gully erosion, Section 3.4.2, page 40, ¶2) be installed. These devices would represent reference points or lines that could be useful in monitoring movement during Phase I site inspections, and would aid in early detection of any potential stability problems. Since the site inspections may be performed by a contractor/consultant on behalf of the responsible agency, it is possible that the inspection team may change from one site visit to another. The perception and engineering judgment qualities of individuals from different inspection teams cannot be heavily relied upon. It is recommended that durable monitoring devices be installed to aid in quantifying critical aspects of the inspection.
3. The PSMP has no provision for monitoring the radon flux at the stabilized disposal site to verify compliance with the EPA radon flux criteria. The long-term monitoring program should include monitoring the radon flux at the site. Although the EPA requires the radon flux compliance to be a design criteria (i.e. demonstration of compliance by design calculations only), the NRC in its regulatory role may require verification of compliance of a licensing criterion. Monitoring of the radon flux at the site will be a helpful tool to verify compliance with the regulations. Therefore, it is recommended that radon flux monitoring at the site be considered a part of the Phase I inspection.

4. The PSMP states that repair actions will be taken as needed at the site, however no details of the level of repair action are provided. The PSMP should clearly state whether the repair will restore the site to the original condition or to some other satisfactory condition.

#### Specific Comments

1. Section 1.2, Approach, p. 1, ¶7

This section lists five primary activities of this plan. The PSMP does not explicitly state the requirement for technical analyses and evaluation of the data. It is only implied by the requirement of detailed explanation for items indicated by an asterisk mark in the field inspection checklist. Therefore, it is recommended that technical evaluation of the data be included in the list of the primary activities of this plan.

2. Section 1.2.1, Final Site Conditions, p. 2, ¶5

The list of documents and materials used to characterize final site conditions should include the following information:

- ° Foundation data and geological features including boring logs, geological maps, profiles and cross sections, and reports of foundation treatment.
- ° Properties of embankment and foundation materials including results of laboratory tests, field tests, construction control tests, and assumed design material properties.

3. Section 1.3, Responsibilities, p. 5, 6

The list of responsibilities of the DOE (including the TAC and RAC) or another designated agency should include the technical analyses and evaluation of data collected during the field inspection as a separate item. The list of responsibilities of the NRC should clearly state the scope of the NRC's role when repairs are necessary to restore the integrity of the damaged tailings pile and disposal site to safe conditions.

4. Section 2.3.2, Site Map, p. 9, ¶1

The PSMP states that the scale for the topographic survey and final site map will not be less than 1: 24,000 (1 inch = 2,000 feet). Although this



scale is quoted as a limit, the PSMP should indicate that the scale will be large enough (for example 1: 2,400) so that the topographic site map can easily be used during the field inspection phase.

5. Section 2.6.1, Horizontal and Vertical Control, p. 11

The description and requirements for erosion control markers as identified in Figures 2.3 and 3.3 are not presented in Section 2.6.1. Requirements and description of markers required to monitor the embankment (horizontal and vertical movement) are also not presented in Section 2.6.1. It is recommended that this section be expanded to include this information.

6. Section 2.6.4, Signs, p. 15

Signs that will be placed around the perimeter of the site indicating the presence of uranium mill tailings will be in English and Spanish (where appropriate). In addition, the International symbol indicating the presence of radioactive material should also be displayed.

7. Section 2.7.1, Well Drilling and Coring Procedures, p. 18, ¶3

It is stated that core recovery will be a minimum of 90 percent. Since the nature of the rock is unknown, it is unclear how a minimum of 90 percent recovery can be assured. Complying with 90 percent core recovery may not be possible since core recovery is site and operation specific.

8. Section 3.2.2, Contingency Inspections, p. 27-29, ¶1, 2

The PSMP states that contingency inspections of the site will be ordered by the responsible agency when it receives information about the occurrence of extreme natural events that could threaten the integrity of the site. Occurrence of extreme seismic or meteorological events will trigger the contingency inspection. The PSMP does not specify the triggering level of these events. The seismic or meteorologic event used in the design is usually conservative. It is possible that a less severe seismic or meteorological event could result in significant damage to the tailings pile without resulting in total loss of the integrity of the site. Therefore, the triggering level of these events that will initiate a contingency inspection should be less severe than the design basis event. The PSMP should provide guidance on the triggering level of these events.

9. Section 3.3.1.a, Frequency and Timing of Inspections, p. 29

The PSMP states that at the 10-year point, the responsible agency and the NRC will evaluate all inspection and maintenance reports and records and will specify a new Phase I inspection frequency. This implies that NRC will jointly evaluate the data with the responsible agency and specify a new phase I inspection plan. The NRC, being in a regulatory role, should only concur with the new Phase I inspection plan and not take an active role along with the responsible agency in developing the new plan. The NRC may review the inspection reports and maintenance reports and records as a part of the concurrence process. It is recommended that the last sentence on page 29 be revised to reflect the above concern.

10. Section 3.2.2.b, The Inspection Team, p. 30

This section presents the qualifications of the Chief Inspector of the inspection team. Since the inspections draw on the inspector's perception and engineering judgment, the qualifications should include field experience and familiarity with pre and post construction inspection of earthen structures. The PSMP being a generic document does not identify the technical specialty of the inspection team in detail. The generic PSMP should require each site specific PSMP to clearly state the composition of the inspection team (technical specialties).

11. Section 3.3.2b Field Procedures - Crest, p. 33

The PSMP presents the scope for inspection of the crest of the stabilized tailings pile. The inspection should determine areas of subsidence on top of pile that could become collection areas for rainfall and result in downward infiltration through the tailings pile. The consequences of the water collection should be evaluated to determine if repair action would be necessary.

12. Section 3.3.3a, Ground Photograph-Equipment, p. 37, ¶1

The PSMP requires using color slide film, ASA25 or equivalent. Since this is a long-term monitoring plan, the PSMP should consider the possibility that ASA25 speed film may become obsolete or difficult to find.

13. Section 3.4.2, Phase II Procedures and Objectives, p. 39, 40

Since Phase I monitoring relies only on visual inspection by the inspection team to detect settlement and/or creep problems, it is conceivable that these phenomena may not be readily recognized considering the absence of quantified data collected from monitoring instruments and the time interval between inspections. The DOE may consider requiring the

Phase I inspection to monitor the lateral deformation of the slope using simple devices such as alignment stakes and the settlement of areas suspected to have settlement problems. These simple monitoring devices will aid in early detection of any potential problem.

14. Appendix C, page C-3, Items A-4 and B-2b

Every monument, site marker, sign, and monitor well will be inspected and included on the site atlas overlays. Erosion control markers should also be inspected and included on the site atlas overlays.

15. Appendix C, page C-4, Item 7e

Aerial photographs will be used to identify landslides. By the time the evidence of a slide or debris flow is found, bare tailings may have been exposed and transported by wind and water erosion. The inspection should also determine if contaminated material has been moved from the pile and identify the extent of contamination resulting from wind and water erosion.

16. Appendix C, page C-7, Item 4, Crests

The inspection checklist should include observing evidence of deterioration of riprap or gravel cover. The PSMP should also indicate the level of deterioration that would trigger repair action.

17. Appendix C, Item 5, page C-7

The site inspection checklist requires identifying evidence of gradual downslope movement (creep). Since creep is a slow process, it may be difficult to observe the amount of creep deformation that has occurred between site inspections. Alignment stakes are simple and durable monitoring devices which provide evidence of deformations/creep of slopes. It is recommended that alignment stakes be installed in the critical sections of the slope to help recognize and quantify the amount of creep occurring.