Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, New Mexico 87185-5400

June 16, 1997

Mr. Joseph J. Holonich, Chief
Uranium Recovery Branch
Office of Nuclear Materials Safety and Safeguards
Mail Stop T7J9
U.S. Nuclear Regulatory Commission
11545 Rockville Pike
Rockville, MD 20852-2738

Dear Mr. Holonich:

Enclosed are four copies of the revised Long-Term Surveillance Plan (LTSP) for the Mexican Hat, Utah, Uranium Mill Tailings Remedial Action Project. This document was revised based on comments received from the Navajo Nation, Nuclear Regulatory Commission, and Department Of Energy Grand Junction Office. Also enclosed are responses to these comments. In addition to the changes made to the document based on agency comments, the LTSP was modified to only include information required per 10 CFR 40.27. Therefore, ancillary information not required by 10 CFR 40.27 was deleted.

On June 4, 1997, the DOE transmitted page changes to the Mexican Hat and Monument Valley Completion Report. In this transmittal the Table of Contents page for Volume 6A (Attachment 3) contained a typographical error. Please replace the second page of the Table of Contents in Volume 6A with this new page.

Give me a call at (505) 845-5668 if you have any concerns regarding this information.

Sincerely,

Sharon J. Arp
Site Manager
Uranium Mill Tailings Remedial Action Team
Environmental Restoration Division

3 Enclosures

cc w/o enclosures:
H. Lefevre, NRC
J. McBee, TAC

RESPONSE TO GJO COMMENTS
LONG-TERM SURVEILLANCE PLAN
MEXICAN HAT, UTAH

1. Comment. Page 1-3, Figure 1.1: SM-1, SM-3, and SM-4 are incorrectly located; the fence is incorrectly located in several places; BM-8 is incorrectly located and other Bms should be located at their respective property corners; numbering of settlement plates does not match the roman numerals stamped onto their casings; the west sideslope should be labeled as well as a south slope, which is south of the top slope of the cell. (All of these features are located and designated on Plate 1 of the 1995 prelicensing inspection report.)

   Response/Implementation. Figures in Section 1.0 have been deleted due to reorganization of the document. Plate 1 (Disposal Site Map) has been changed to correct locations for SM-1, SM-3, SM-4, the fence, and boundary monuments. Settlement plate numbering have been corrected and the south slope has been labeled.

2. Comment. Page 2-2, Section 2.2.1, first paragraph: "Salt Lake Meridian" should be changed to Salt Lake Principal Meridian. The disposal site also extends into Sections 18 and 19, Township 42 South, Range 19 East.

   Response/Implementation. The text in Section 2.2, page 2-2, has been changed to incorporate the comment.

3. Comment. Throughout the LTSP text and figures where units of length are given in both English and metric units, the conversion from English to metric units is in millimeters. It is suggested that conversions be given in centimeters to avoid a certain awkwardness in units of hundreds of thousands of millimeters.

   Response/Implementation. The LTSP has been modified to change millimeters to centimeters.

4. Comment. Page 2-2, Section 2.2.1, second paragraph: In the climate discussion, it should be stated that nighttime temperatures below freezing prevail from November through March, and that prevailing winds are from the southwest.

   Response/Implementation. The text in Section 2.2, page 2-2, has been revised.

5. Comment. Page 2-3, Figure 2-1: The correct spelling is Halgaitoh Wash (according to U.S. Geological Survey topographic maps) instead of Halgaito Wash. This misspelling also appears in Figure 5.2 and elsewhere in text. The correct spelling for the geologic unit is Halgaito Shale, however.

Response/Implementation. Figure 2.1 is now 2.2. Figure 5.2 is now 4.2. This correction has been made throughout the document and on Figures 2.2 and 4.2.

6. Comment. Page 2-4, Figure 2.2: The correct name is Goosenecks Overlook, not Great Goosenecks Overlook as shown in the figure. Also, the highway south of Mexican Water should be US 191. The regional map shown in Figure 2.2 should precede the site area map shown in Figure 2.1, and it is suggested that the figures be switched.

   Response/Implementation. Figure 2.1 and text have been revised as suggested.

7. Comment. Page 2-5, top paragraph: "Desend" should be changed to the proper spelling, descend.

   Response/Implementation. The text in Section 2.3.1, page 2-7, has been revised.

8. Comment. Page 2-6, second paragraph: The mean diameter of rock on sideslopes appears in the field to be about 9 inches rather than the 4.4 inches as stated in the text. Also, rock on top of the disposal cell and on the sides slopes is rounded cobbles, not riprap, a term that is properly applied only to angular, broken rock (present in the aprons and ditches).

   Response. The D_{50} that was placed in 4.4 inches and the D_{100} is 9 inches. Frequently, when walking on riprap, the observer sees primarily the larger rock as the smaller sizes are filling void space. Riprap is a term used to describe material (usually rock, but sometimes broken concrete) used for erosion protection. Increased angularity of the material does provide higher shear strength; however the size and density of the material are the primary factors in preventing removal by erosive forces.

   Implementation. None.

9. Comment. Page 2-6, third paragraph: The reader would have an easier time if the diversion ditches referred to here were also labeled in Figure 1.1. GJPO recommends they be labeled.

   Response/Implementation. Figure 1.1 has been renamed Plate 1 and revised to include labels on ditches.

10. Comment. Page 2-8, top paragraph: South Arroyo should be capitalized throughout the report, and this feature should be labeled in Figure 2.1 and in Figure 5.2.

    Response/Implementation. The text and figures have been revised as recommended. figure 2.1 is now Figure 2.2. Figure 5.2 is now 4.2.

11. Comment. Page 3-1, Section 3.1, first bullet: Only one gate, one fence, and no access road are shown in Figure 1.1.

    Page 3-1, Section 3.1, final paragraph: The reference to site inspections in Section 6.7 should be changed to Section 6.5.

    Response/Implementation. The text in Section 3.3 has been revised to reflect one gate and one fence; and no access road. The references to Section 6.7 is no longer applicable due to the reorganization of the document and deletion of Section 6.7 and 6.5. Figure 1.1 was replaced by Plate 1.

12. Comment. Page 3-3, Table 3.1: In "Products to be delivered," a scale of 1 inch=300 ft is a representation fraction of 1:3600, not 1:2400.

    Response/Implementation. This comment is no longer applicable due to the reorganization of the document and deletion of this table.

13. Comment. Page 4.2, Figure 4.1: The "Elevation set above adjacent ground surface" is shown in the figure. As in Figure 4.2, it would be useful to indicate that this elevation varies.

    Response/Implementation. The figure has been deleted due to the reorganization of the document.

14. Comment. Page 4-6, Figure 4.4: In two places in the figure, reference should be made to Figure 4.5, not Figure 4.6. See Attached.

    Response/Implementation. The figure has been deleted due to the reorganization of the document.

15. Comment. Page 4-7, Figure 4.5: The figure does not show what is actually engraved on the site markers. The following changes should be made to the figure: the date of closure is July 20, 1994; delete the "BM" from the upper right corner; and place a comma in 1800 Curies (1,800).

    Response/Implementation. The figure has been deleted due to the reorganization of the document.

16. Comment. Page 4-8, Section 4.5: During the Verification and Orientation inspection of HAT, in June 1995, it was observed that casings around the settlement plates were

diestamped with roman numerals, I, II, III, etc. A small table in Section 4.5 of the LTSP showing which roman numeral matches with which SP number would be very useful. It will clear up confusion that will exist because of the dual numbering system, and it will make clear to a site inspector which figure 4.8 or 4.9 goes with which settlement plate.

Response/Implementation. This comment is no longer applicable due to the reorganization of the document and deletion of this section.

17. Comment. Page 5-1, Section 5.1.1, second paragraph: Does the expression "east-northeast and northeast-southwest" mean east-northeast and northeast? It is not clear.

Response/Implementation. The text in Section 4.1.1 was changed to read "east-west and northeast-southwest".

18. Comment. Page 5-2, Figure 5.1: In the three places in this figure where Honaker Trail is shown, it should be referred to as Honaker Trail Formation." See attached.

Response/Implementation. Figure 5.1 has been renamed 4.1 and changes have been made to the figure.

19. Comment. Page 5-3, last paragraph: North Arroyo should be capitalized consistently in text. In last sentence, intermitting should be "intermittent."

Response/Implementation. The text in Section 4.1.1 has been revised.

20. Comment. Page 5-4, Figure 5.2: Seep 248 is incorrectly located; it should be upstream just below seep 923. The location of monitor well 909 should be moved about 500 feet to the northwest. In the legend, for monitor well, delete the last word (well) from the description. See attached.

Response/Implementation. Figure 5.2 have been renamed 4.2 and has been modified as suggested.

21. Comment. Page 5-5, first paragraph: Seep 249 is actually in the lower part of Gully 2 just above its confluence with North Arroyo.

Response/Implementation. Section 4.1.1. has been revised to state that 249 is near North Arroyo.

22. Comment. Page 5-5, third paragraph: Seep 254 is actually in the lower part of South Arroyo just above its confluence with Gypsum Creek. The sentence would be correct if the author said there were seven seeps in the Gypsum Creek drainage. Also, the order of

listing the seeps seems to be in the progressively downstream direction. If so, seep 248 should fall between seeps 923 and 922.

Response/Implementation. The text in Section 4.1.1. and Figure 4.2 have been revised.

23. Comment. Page 6-1, Section 6.1, second paragraph: Site inspection during summer will be extremely hot and uncomfortable. Plant growth can be seen and evaluated just as well in late spring or early autumn when GJPO is most likely to inspect the site.

Response/Implementation. Text is Section 3.1 no longer specifies in what months inspections should occur.

24. Comment. Page 6-3, Section 6.4.1: Off-site areas described should be 0.25 mi from the "site property boundary" rather than from the center of the disposal site.

Response/Implementation: The comment was incorporated into Section 3.3.

25. Comment. Page 11-2, two bullets at top of page: The latitude should be expressed as 37°8' rather than 37°8".

Response/Implementation. This section was deleted due to reorganization of the document.

26. Comment. Page 13-2, first paragraph, second sentence: Should read "The nearest public telephone is..."

Response/Implementation. This section was deleted due to reorganization of the document.

27. Comment. Page 13-2, second paragraph: The first sentence should state Figure 2.2 instead of Figure 2.1.

Response/Implementation. Section 13 has been deleted due to the reorganization of the document.

28. Comment. Page 13-2, Section 13.2: Delete first paragraph. GJPO operating procedures are covered elsewhere and are not properly part of this LTSP.

Response/Implementation. Section 13 was deleted due to reorganization of the document.

RESPONSE TO NAVAJO NATION COMMENTS
LONG-TERM SURVEILLANCE PLAN
MEXICAN HAT, UTAH

Comment (Cover letter). The Long-Term Surveillance Plan primarily focuses on the inspection and maintenance of the Mexican Hat Disposal site. This plan does not include inspection and maintenance of the Monument Valley site areas, the borrow areas, and other reclaimed areas.

A site inspection was completed recently by the Navajo Nation, Office of Environmental Review, Environmental Protection Agency (Navajo EPA). This office found evidence of wind and water erosion and very little vegetative growth at the borrow areas RB4 and RB7 and adjacent areas. The purpose of the site inspection was for authorization of the Performance Bond release to the MK-Ferguson Company. I recommend that this plan include a monitoring plan for maintenance of the Monument Valley site areas, borrow areas, and adjacent areas.

Since these areas have a desert climate, it would be difficult to assess performance of vegetative growth over the normal 2-3 year monitoring period. Navajo EPA suggested that the monitoring period be moved to a 3-5 year period to allow for vegetative growth. By the end of five years, the level of vegetation should be about 75 percent growth. If the vegetative growth is not met by the end of the five-year monitoring period, there should be a need for revegetation. The revegetation plan should include all basic requirements of revegetation. These basic requirements would include, but not limited to, seed mixture, testing soil conditions and evaluating the effectiveness of a specific type of adhesive agent for soil stabilization and successful revegetation, fencing the area, etc. A site inspection checklist for the Monument Valley site areas, borrow areas, and adjacent areas should be established and included in the LTSP as well. Navajo UMTRA staff should be included on all inspections.

Response. The provisions of the Long Term Surveillance Plan are regulated by 10 CFR 40.27, General License for Custody and Long-Term Care of Residual Radioactive Material Disposal Sites. Areas that have been remediated or reclaimed and borrow areas are not covered under this regulation and have no regulated surveillance requirements because they are not contaminated. The Long-Term Surveillance Plan is strictly a vehicle for evaluating the integrity of the disposal cell during its design life.

On February 26, 1997, the DOE reviewed disturbed areas around the Mexican Hat and Monument Valley processing sites. The DOE agrees that in some areas little vegetative growth has occurred. The DOE agrees to continue monitoring these areas in coordination with the Navajo Nation for the next few years (until 1999 or 2000). If after this time period the vegetative growth in the disturbed areas is not similar to that of the surrounding terrain, the DOE in cooperation with the Navajo Nation will develop and implement a corrective action plan. This commitment was made in our letter to Ms. Bernadine Martin on September 19, 1995.

The Performance Bond discussed in your comment was specifically required to ensure adequate reclamation of the proposed borrow areas, RB4 and RB7. Only borrow area RB7 was used by the UMTRA Project; therefore, only borrow area RB7 required reclamation. If wind and water erosion are occuring at proposed borrow area RB4 it is not the responsibility of

the UMTRA Project to correct. In his memo to Ms. Bernadine Martin dated September 30, 1994, Mr. Boyd Nystedt of the Navajo EPA stated that the restoration appeared adequate and felt that return of the Performance Bond was appropriate. In addition, Mr. Akhtar Zaman of the Navajo Nation Minerals Department stated in his memo to Ms. Bernadine Martin dated May 23, 1995, that the requirements of the sand and gravel permit were satisfactorially met and had no objection to the release of the Performance Bond. MK-Ferguson requested cancelation of the Performance Bond on July 25, 1995. The Bureau of Indian Affairs (BIA) had 45 days from the date of submittal to rebutt the termination of the Performance Bond. No response was received from the BIA. Therefore, the Performance Bond was terminated as of September 29, 1995.

Implementation. None.

General Comment. The plan establishes a permanent program for checking the disposal site and reporting on the status of the site. The program can be improved and a few suggestions for improvement are included below. We feel that some of these functions should be integrated with similar work that will be needed to monitor under the Ground Water program. Also, we believe that local persons, who are aware of changing circumstances, can best do a major part of the work, assuming they are adequately trained. Also, since this program is intended to last for 200 to 1,000 years, it is important that the procedures that are adopted allow for program changes caused by circumstances that we cannot now foresee.

Response. The DOE Grand Junction Office is responsible for administering both the Long-Term Surveillance Program and the Ground Water Program. As appropriate, the programs will be integrated to provide continuity. For instance, it would be expected that personnel working on the Ground Water Program would be involved in the monitoring and analysis of the seeps.

Site inspections are currently performed by subcontractors working for the DOE Grand Junction Office. The DOE can foresee pros and cons related to having a local person perform the inspections. On the positive side, a local person would be aware of changing circumstances. However, on the negative side, continuity may be lost if different inspectors are used to perform inspections for each of the 24 UMTRA sites. To a limited degree the DOE does use local persons to aid in the inspections. For instance, the San Juan County Sheriff's Department has been requested to participate in the surveillance program by notifying DOE in the event of any unusual activities or events that could impact the cell (LTSP Attachment 5). The DOE is open to further discussions of this issue with the Navajo Nation.

The DOE agrees that the procedures outlined in the LTSP should be flexible to allow for changing conditions over the life of the program. You will see in the revised LTSP that specific requirement have been deleted to help allow for this flexibility. In addition, the DOE does not see the LTSP as a stagnant document. If it is felt that changing site conditions require modification to the annual inspections, a proposed modification to the LTSP will be submitted to the NRC for approval and to the Navajo Nation for comment. Inspection requirements outlined in the LTSP cannot be modified without prior written approval by the NRC.

Implementation. None.

Specific Comment 1. Land Contamination Outside Site Boundary. Page 2-1, third paragraph. The text states that 162 acres outside the designated site boundary were contaminated. Presumably this region was cleaned up to the radium standard, but there are potential concerns about the presence of other hazardous residues in the soil which should be addressed by soil sampling. We have noted this situation at other sites as well.

Response. The cleanup requirements for the UMTRA Project are outlined in 40 CFR 192. The Remedial Action Plan (RAP) for the Mexican Hat and Monument Valley sites outlines how the DOE will meet the 40 CFR 192 requirements for surface cleanup. The RAP was reviewed and approved by both the NRC and Navajo Nation. The remedial action performed by the DOE is documented in the Completion Report for the Mexican Hat and Monument Valley sites. No further characterization or remedial action for the surface project is intended for this site.

Implementation. None.

Specific Comment 2. Sewage Lagoons. Page 2-1 and Figure 2.1. The text states that there are three sewage lagoons but Figure 2.1 only shows two ponds.

Response/Implementation. The text in Section 2.1 has been revised to omit reference to how many sewage lagoons are on the property. Figure 2.1 has been renumbered to Figure 2.2.

Specific Comment 3. Scale on aerial photographs. Page 3-3, Table 3.1. The description of the scale should be corrected. If 1 inch = 300 feet, the fraction representation is 1:3600 (1:2400) and the metric equivalent should be 1 mm = 3.6 m (not 1 mm = 360 m).

Response/Implementation. The table has been removed in the reorganization of the document.

Specific Comment 4. Photographing of Seeps. Page 3-4. Missing from the list of features to be photographed are the various seeps near the site. The total number and magnitude of these seeps needs to be documented, so changes in seep activity with time can be evaluated.

Response. The DOE agrees with the comment that seeps should be photographed.

Implementation. This change has been made in Section 3.3.

Specific Comment 5. Perimeter Signs. Page 4-10, Figure 4.7. The perimeter sign shows an international symbol for radioactivity and mentions uranium mill tailings but the sign does not actually say that radioactive materials are buried on the site. Since members of the public may not know the meaning of the symbol and may not know that uranium mill tailings are

radioactive, it would be preferable that the sign actually include something like "WARNING--RADIOACTIVE MATERIALS".

Response During the next prelicensing inspection the entrance sign will be replaced with a sign that states this is a repository for radioactive material. However, it is not appropriate to use the phrase "WARNING -- RADIOACTIVITY" since there is no immediate danger due to exposure. When it is necessary to replace the other signs that are located around the site they will be replaced with signs that indicate this is a repository for radioactive material.

Implementation. This section has been deleted from the LTSP due to the reorganization of the document.

Specific Comment 6. Ground Water Characterization. Page 5-1 to 5-8, Section 5.1. The conceptual model of the site ground water presented here contains the same unsubstantiated or incorrect supporting statements that we have noted in our previous comments about this site. DOE uses this unsubstantiated conceptual model to justify not monitoring the ground water at the site. They need to continue ground water monitoring via wells, at least for several years, to provide sufficient data to substantiate their proposed conceptual model, if that can be done. They opt, at the request of the Navajo Nation, to continue monitoring selected seeps at the site (page 5-8, second full paragraph), although the plan for this monitoring is nowhere documented and is not considered to be a part of the long-term surveillance plan under the Surface Project. Thus, for instance, a marked increase in seep discharge and concentrations would not be noted and brought to the attention of DOE as part of the site inspections prescribed in this document. The seep monitoring, as well as the ground water well monitoring, needs to be at least partially integrated into the long-term surveillance of the site, or else a separate but coordinated monitoring plan needs to be set up under the Ground Water Project.

Response. The hydrogeologic model that is presented in the LTSP is the model that was presented in the Remedial Action Plan (RAP) and was approved by the Nuclear Regulatory Commission (NRC). DOE understands the concerns of the Navajo Nation and is currently re-evaluating the hydrogeologic model. This evaluation is being performed by the DOE Grand Junction Office under the UMTRA Ground Water Project. If this evaluation shows that our current hydrogeologic model is inaccurate, the LTSP will be modified to incorporate the new model. In addition, the cell design will be re-evaluated to determine whether the new model will impact the ground water compliance strategy for the disposal cell. Until a new model is approved by the NRC, the model that is currently presented in the RAP is the model that must be presented in the LTSP.

It has been determined that the seeps will be monitored as part of the LTSP by the DOE Grand Junction Office. This information will be evaluated and utilized in conjunction with the data obtained in the hydrogeologic evaluation described above.

Implementation. Section 5.0 has been renumbered 4.0 due to the reorganization of the document and the following changes made: 1) Section 4.1 has been revised to reflect the response; 2) Section 4.2 has been revised to only discuss why monitoring is not currently

necessary in the Halgaito Shale and Honaker Trail. This section will also provide a statement regarding the further characterization of these two zones by the UMTRA Ground Water Project; and 3) Section 4.3 has been added to state specifically which seeps will be monitored, the monitoring frequency, and constituents of concern to be analyzed, and recommended response to indications of potential cell failure.

Specific Comment 7. Water Monitoring. Page 5-8, Section 5.2. In the first paragraph of this section, it is concluded that ground water monitoring is not warranted because Honaker Trail water is naturally poor in quality and is "unlikely" to be a viable water resource. There is no indication that the usability of the water has been verified by residents.

The DOE's perception of feasible water use in the area is a current one--nobody can predict what the local demand will be for underground water 50 years from now or 250 years from now, and we cannot say how that water might then be treated to make it more useful. Nor can we predict what the land uses will be near the site or at the seeps. Also, it may be found someday that there are unknown flows that contaminate the Gypsum Creek alluvium and hence the San Juan River upstream of the NTUA water intake. As noted in our General Comments, the long-term program must be flexible, in order to accommodate new and unforeseen circumstances.

The language in this section implies that it will never be necessary to monitor ground water in the vicinity of the disposal site and that monitoring of the seeps will fulfill all surveillance obligations under the Ground Water program. The language should be modified to recognize that future circumstances may require more intensive and widespread monitoring of water quality. At least, on page 5-3, first full paragraph, the last sentence should be modified to read "...is limited in aerial extent and yield and has no current potential as a water source..."

Response. A well inventory was performed (RAP-DOE, 1993) and there were no recorded uses of ground water within a 2-mile radius of the site. The water supply for the community of Halchita is from a treatment plant that obtains water from the San Juan River. The community of Mexican Hat derives its water supply from the San Juan River and a converted oil exploration well. Results from water samples show that the quality of water in the San Juan River is unaffected by the Mexican Hat UMTRA site. Well completion details are unavailable for the converted oil exploration well, but it is located across the San Juan River in a geologic formation that is believed to be unaffected by and isolated from site constituents. This conclusion is based on the following: a) site constituents are present only in the uppermost unit at the site, the Halgaito Shale; b) contaminated residual process water within the shale is isolated from deeper units due to an upward hydraulic gradient and low permeability beds; and c) the aerial extent of site contamination is limited by deeply incised arroyos that intercept all flow from the shale. The San Juan River is more deeply incised than the arroyos and is between the site and the converted oil well. It is believed that there are no flow paths between the contaminated water and the converted oil well.

The DOE agrees that with advanced technology the water in Honaker Trail Formation could become a potential resource in the future. Therefore, statements regarding its future use will be deleted from Section 5.2. However, until a revised hydrogeologic model is established the

LTSP will continue to state that the water found in the Halgaito Shale is not a water resource due to its preexisting unsaturated conditions.

Implementation. Section 4.2 has been revised to clarify why monitoring of the Honaker Trail Formation is not necessary.

Specific Comment 8. Inspections. Pages 6-1 and 6-4. The timing of site inspections should be determined each year, taking into consideration rainfall, temperature and other plant growth related factors. To attempt to set a predetermined date or schedule (e.g., every June 15) could result in being too early to find significant growth or too late to observe the smaller types of annual growths that die off during the summer heat. Also, extreme and prolonged heavy rainfall could cause a great deal of damage at the site, which would affect the timing of an inspection.

Response. The DOE concurs with the Navajo Nation's comment. Disposal cell annual inspections will be conducted during the growing season as necessary and the LTSP provides for follow on inspections if unexpected weather patterns cause concern. Because seeps may be monitored independent of annual inspections, teams may be visiting the site more than once a year, increasing the likelihood of observing site conditions.

Implementation: Text in Section 3.1 has been revised to state that inspections should occur during the growing season.

Specific Comment 9. Radioactivity and Radon Gas. Page 6-4, Section 6.4. Site inspections are to be conducted by using a checklist, shown in Attachment 4. The list does not include any provision for the monitoring of radioactivity or of radon gas that may leak from the site into the atmosphere. Such a radon leak might be caused by one of the other hazards that will be checked for, e.g., subsidence that causes a break in the radon barrier. However, unless there is some way to check for radon gas leakage, one can never be sure that the radon barrier has not been breached. Some provision should be made for radon gas monitoring at the site and for the monitoring of radioactivity in general, for example with radiation monitors at the perimeter of the site.

On page 2-6, the second paragraph describes the radon barrier but does not give the hydraulic conductivity of the barrier. Also, the settlement plates shown on page 4-11, Figure 4.8, do not show any specific barriers designed to prevent the leakage of radon gas.

Response. In an open environment, radon gas and radioactivity are not likely to be detected by perimeter monitors. In general, during remedial action, personnel working on the tailings did not register external exposures above background levels on their dosimeters, therefore external monitoring for radiation exposure on the closed cell will not be effective. Internal exposure, i.e. inhaling radon gas or particulate, can not be monitored with dosimeters. Even in the event of a cover breach, the exposure levels will be well within the allowable amount.

The saturated hydraulic conductivity is approximately 1 x 10^{-7} cm/sec. Due to a very low flux rate barriers around the settlement plates were not necessary.

Implementation. This section was deleted due to reorganization of the document.

Specific Comment 10. Off-Site Monitoring. Page 6-6, Section 6.4.1. Here a 0.25 mile radius is drawn from the center of the site to define a region of concern for land-use changes (however, on page A4-4, the area is defined as 0.25 mile from the edge of the site). This area of concern should be expanded to include the North Arroyo and Gypsum Creek areas, where seeps nourish vegetation and attract animal and human usage. The site conceptual model has heretofore not provided a comprehensive picture of actual land, plant and water uses at the seeps. Also, the stated reason for concern should be broadened; monitoring is needed not only to prevent intrusion into the site but also to prevent usage of potentially contaminated (seep) water that originates at the site. Such monitoring, whether included in the Surface or in the Ground Water program, should include the San Juan River intake of the NTUA water treatment plant, downstream from Gypsum Creek. Additionally, as noted below, it would be prudent to broaden the seepage correction (Item 5) in the list of Corrective Actions shown on page 9-1.

Response. The area of concern for off-site monitoring is 0.25 miles from the edge of the disposal cell property boundary. As discussed in the responses (and implementation) to specific comments 4, 6, and 7, the seeps in the North Arroyo and Gypsum Wash are now included as part of the monitoring program. Clarification and the specifics of the monitoring program will be provided in revised Section 5.2 and 5.3.

As stated in response to Specific Comment 6, DOE will monitor the seeps in order to better evaluate the source of the seeps. The LTSP inspection documentation will note significant changes in the usage of the seeps.

Based on the past and existing rates of flow in the seeps, the DOE does not believe it is necessary to monitor the San Juan River intake of the NTUA water treatment plant. Water samples from the San Juan River below Gypsum Wash were evaluated and discussed in the RAP (DOE, 1993) and no evidence of contamination were found. Unless flow rates change dramatically, it is not believed to be necessary to monitor the NTUA intake. Sampling of the San Juan River at the confluence of Gypsum Wash may be added as a precautionary item for evaluation of river conditions if a significant increase in seep flow rates occur.

Implementation. Section 3.3 has been modified to state that "the area within a maximum 0.25 mi (0.4 km) of the site property boundary will be examined for evidence of land-use activities that indicate increased human activity such as land development or new roads and paths . Section 4.3 now states that sampling of the San Juan River could be added to the monitoring program in necessary.

Specific Comment 11. Maintenance. Page 8-1, Section 8.1. The last sentence in this section should read "...a maintenance visit to apply herbicidal spray or to implement mechanical

removal techniques will be scheduled." This will then agree with page 6-5, Section 6.4.4, paragraph 3.

Response/Implementation. DOE agrees with the comment. The text in newly organized Section 5.1 has been revised.

Specific Comment 12. Corrective Action. Page 9-1. The fifth bullet indicates that corrective action would be required if there were seepage originating from the disposal cell or the toe of the cell. Such seepage is already occurring, as we observed during our visit to Mexican Hat. Furthermore, since monitoring of seeps is not officially part of the surveillance plan, there is no guarantee that DOE will know that corrective action needs to be taken. The seep monitoring needs to be integrated with the surveillance monitoring in some way.

The ninth bullet dictates corrections for excursions during ground water monitoring. Its unclear what is meant since no ground water monitoring is included as part of this surveillance plan. We believe, however, that additional ground water monitoring is needed to sustain the presumed site characterization, as noted above in our remarks about Characterization.

In the last paragraph, the time allowed for a corrective action is excessive. Under this outline, more than 20 months could pass prior to beginning corrective action. At a minimum, the time line of 18 months should include assessment of the problem and development of a corrective action plan.

Response. The fifth bullet on page 9-1 was not referring to the seeps that have been found in the North Arroyo. This bullet referred to the expression of tailings pore fluids from the toe of the disposal cell or sideslopes of the disposal cell. This type of seep has not been observed. This bullet has been reworded to avoid confusion and is now in Section 6.0, fifth bullet. As discussed in responses to previous comments, seep monitoring will be part of the surveillance plan and the monitoring details added to the LTSP.

The ninth bullet was confusing and was reworded; it is now in Section 6.0, eighth bullet. This bullet is actually discussing cell performance monitoring as outlined in Section 4.3.

The regulations in 40 CFR 192.04 require an 18 month time limit for a corrective action program if the groundwater concentration limits are found or projected to be exceeded. There is not a requirement for when corrective action would be performed for other cell deficiencies. The DOE will expedite the process of any other corrective action, as necessary, to protect human health and the environment.

Implementation. Bullet 5 and 8 of Section 6.0 have been reworded to avoid confusion between seeps and tailings fluids originating from the cell. Section 6.4.2 has been deleted due to a reorganization of the document.

Specific Comment 13. Reports to Navajo Nation. Page 9-2. In figure 9.1, bullets 1 and 3 in the top box and bullet 4 in the bottom box should show that documents, plans and reports are

sent to the Navajo Nation, as stated in the text. Also, on page 10-3, the first sentence should indicate that the annual report is also sent to the Navajo Nation.

Response/Implementation. The DOE agrees with the comments. The figure has been deleted due to reorganization of the document. The comment has been incorporated in sections 5.2, 6.0, and 7.2.

Specific Comment 14. Radiation Hazards to Personnel. Page 13-1, first paragraph. The text states that since the disposal cell was constructed to control radiation releases, not radiation exposure, tracking via the use of dosimetry badges is not necessary. This statement assumes that the cell now functions as designed and will continue to do so in the future. It is not clear that will be the case, so as an inexpensive personal safety measure, personnel working at the site should use dosimeters.

Response. Health and safety protocol by the Grand Junction Office will define what precautions inspection teams will take.

Implementation: This section has been deleted due to reorganization of the document.

RESPONSE TO NUCLEAR REGULATORY COMMISSION COMMENTS
LONG-TERM SURVEILLANCE PLAN
MEXICAN HAT, UTAH

1. Comment. Staff review indicates that DOE needs to clarify its proposed course of action regarding the seepage monitoring that will be performed at the site. For example, on page 5-8 of the LTSP, DOE indicates that "In keeping with the best management practices and request from the Navajo Nation, selected seeps will be monitored periodically to observe changes in flow rates and water quality." The staff considers that more specific information should be provided in the LTSP to show the extent and frequency of the monitoring and any actions or remedial measures that will be taken if problems are identified. This specific information should indicate the constituents and the specific seep locations that will be monitored, the measurements that will be taken, and the remedial measures that will be instituted if a problem is identified.

   Based on the requests of the Navajo Nation and the commitments made by DOE in the Remedial Action Plan for the Mexican hat site, the staff recommends that a program be developed to: (1) monitor constituents that are indicative of tailings seepage; (2) monitor flow rates and collect samples from all seeps identified in Figure 5.2, when seepage is present; and (3) take actions if a problem is found. Revisions to the LTSP should be made to achieve these minimum goals.

   Response. The DOE agrees with this comment. The program described in new Section 4.3 was developed to monitor several of the seeps in the vicinity of the disposal cell in an effort to potentially assess cell performance. This monitoring will be done as a "best management practice" and is not required under the regulations as part of the ground water protection strategy.

   Implementation. The information discussed above will be included in the new Section 4.3.

COMPLETION REPORT
UMTRA - MEXICAN HAT/MONUMENT VALLEY

DESIGN CALCULATIONS

APPENDIX B

VOLUME 6A

Geotechnical Design

Calculation No.	Title
9-238-01-00	Site Seismicity
9-238-02-00	Evaluation of Earthquake-Induced Liquefaction Potential of the Tailings Pile
9-239-01-01	Materials Evaluation at HAT - Tailings Design Parameters
19-349-03-01	Embankment Design - Slope Stability
19-349-04-00	Embankment Design - Soil Properties at MON
9-420-01-01	Embankment Design - Settlement Analysis
9-420-02-01	Embankment Design - Cover Cracking Analysis

Contaminated Material Excavation & Quantities

Calculation No.	Title
9-226-02-01	Contaminated Material Excavation - Windblown & Waterborne Excavation Quantities
9-415-01-01	Quantities - Demolition & Final Grading at MON
9-419-01-00	Contaminated Material Excavation at HAT Site - Quantities Estimated
19-332-01-00	Site Excavation & Average Contamination at MON
9-423-01-00	Pile Volume & Height Calculation - Volume & Layout
9-423-02-00	Cut/Fill Quantities - West Ditch
9-423-03-00	Earth Quantity - North Ditch
9-423-04-00	Earth Quantity - Cut & Fill Quantities for Gullies
9-423-05-00	Quantity - Common Fill: Cut & Fill
9-423-06-01	Quantities - Erosion Protection
9-423-07-01	Earthwork Quantity - Rock Surface Cleanup
9-423-08-01	Quantities - Materials Balance
9-423-09-01	Quantities - Bid Schedule