JUN 19 1985

WM64/GNG/85/06/11

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John Themelis, Project Manager
Uranium Mill Tailings Project Office
Albuquerque Operations Office
U.S. Department of Energy
P. O. Box 5400
Albuquerque, New Mexico 87115

Dear Mr. Themelis:

Enclosed are detailed comments on the Lakeview draft RAP and EA, which were discussed during the meeting in the Denver, Colorado NRC office on May 20, 1985.

Overall the quality of the documentation has improved considerably, and I encourage that you continue this trend. For example, the inclusion of trilinear diagrams of major ion chemistry (Draft PSCR Fig. 5.17) shows a definite step in the right direction.

However, as was discussed at the meeting, the preliminary nature of the sampling data (only one sample from each sampling point) makes it difficult to come to a conclusion regarding water quality. Moreover, the key information needed to adequately assess the geology and seismology at the disposal site was inadequate, as can be seen from the detailed comments enclosed.

Although there appeared to be a mutual understanding in the meeting of what had to be done, the preliminary status of the ground-water situation both at the processing site and the disposal site, in conjunction with the significant NRC reservations expressed regarding the erosion protection design, indicates that an additional intermediate NRC review is necessary. I recommend that DOE prepare and submit to NRC a response addressing the enclosed specific comments, as well as incorporating the results of the additional sampling, prior to any DOE request for formal review of the final RAP for concurrence.

Should you have any questions in this matter, please contact Giorgio Gnugnoli of my staff at (FTS) 427-4788.

Sincerely,

Original signed by
Leo B. Higginbotham

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

WM Record File
WM Project 64
Docket No.
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		Concurrence by telecon					
NAME	:GN Gnugnoli	:EF Hawkins	:LB Higginbotham	:	:	:	:
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GROUND-WATER COMMENTS: DRAP

1. P. 21, Paragraph 3: Design Concept; and
   P. 35, Paragraph 2: "Ground-Water Protection"

   Please provide the technical basis by which a 1-foot thick radon barrier and a 2-foot thick compacted soil liner is considered to be sufficient to protect the ground water from contamination due to contaminant leaching through the stabilized pile.

2. The DRAP calls for a 2-foot thick liner in the disposal facility. However, both the draft DSCR and DEA do not indicate that a liner will be used. This discrepancy should be clarified.

3. Page 21 of the DEA states that below-grade excavation of the disposal area will extend to approximately 25 feet below the surface. Page 35 of the DRAP states that depth to water at the Collins Ranch site ranges from 20 feet to 76 feet below the proposed base of the tailings (ground water could therefore be as close as 20 feet beneath base of tailings). Page 15 of the draft DSCR states that ground water at the Collins Ranch site ranges from 35 feet to 127 feet beneath the surface (ground water could therefore be as close as 10 feet beneath the base of the tailings). This discrepancy should be clarified.

GROUND-WATER COMMENTS: DEA

1. Page 66, paragraph 1
   Page 69, paragraph 3

   The Lakeview site pump test summary together with the slug test results from both the Lakeview site and Collins Ranch site were reviewed (see pages 132, 133 and 134 of the draft PSCR and page 28 of the draft DSCR). The hydraulic conductivity values and calculated velocities are inappropriate because they were derived from invalid analysis methods. None of the pump test analysis methods presented in Table 5.4 of the draft PSCR are valid because many of the assumptions inherent to these methods are violated. From the very limited geologic data presented in the review documents, it would appear that the aquifers underlying the Lakeview and Collins Ranch sites are unconfined. It is therefore recommended that the pump test data be re-evaluated, taking into account the apparent unconfined conditions and partially penetrating wells.

2. Following from No. 1 above, the Bower and Rice method presents the most representative values for K and T when analyzing the slug test data from the Lakeview and Collins Ranch sites. Assumptions

inherent to the Skibitzke and Hvorslev methods invalidates their use at these sites. The geologic data presented in the review documents does not support the premise of confined or confined/leaky aquifer systems underlying these two sites.

3. It is apparent from Tables 5.10, 5.11, 5.12, 5.13 and 5.15 (pp. 137-155) of the draft PSCR, that only one sample from each well was used to characterize the ground-water quality. It is recommended that additional samples be analyzed to better delineate temporal and spatial variability and to assist in determining the effects of geothermal activity versus contamination from the pile.

4. Although a very limited amount of ground-water data is presented in the draft DSCR, no ground-water quality evaluation for the Collins Ranch site is presented in the DEA. As provided in Comment No. 4 above, additional ground-water quality data should be collected and evaluated to delineate the character of the alluvial aquifer underlying the Collins Ranch site. The evaluation should take into consideration temporal and spatial variability of the ground water.

GEOLOGY/SEISMOLOGY COMMENTS

DEA/DRAP

In order to adequately assess the Collins Draw site against the EPA longevity requirements, additional information regarding the regional and site specific geology, seismology, and geothermal activity, similar to that provided for the Lakeview site, is required. Specifically, the DEA/DRAP should provide a discussion of the regional and site specific geology, seismology and geothermal activity which includes the following:

- The relationship between the regional tectonics and the site specific structural geology.
- The relationship between the regional seismology and the MCE determined.
- The relationship between the regional geothermal activity and the potential geothermal activity, and
- An assessment of the potential for liquefaction at the Lakeview and Collins Draw sites.

The information required usually can be derived for a review of existing, pertinent geologic literature. The information should be documented by references to all relevant published and unpublished material. The UMTRAP document review process will be expedited if the DOE submittals contain sufficient information for the reviewer to make an independent

assessment of the conclusions regarding the geologic suitability of the Lakeview site and the proposed alternative site.

GEOTECHNICAL/COVER DESIGN COMMENTS: DRAP

1. Page B-17 - The method used for correlating blow count data with shear strength values should be specified. Friction angles of 38 degrees and 41.5 degrees for SM-ML materials appear somewhat high, based on typical values for a silty sand as shown on Table 17.1 of Terzaghi and Peck.

2. Page B-42 - The cover thickness calculation assumes a residual moisture content of 16.0 percent. However, NRC staff calculations using Eqn. 16 of NUREG/CR-3533 (Rogers, 1984) and grain size distribution data from Figures 9.2-9.11 of the Collins Ranch SCR, resulted in a residual moisture content of 11.9 percent. Further, the average long-term moisture content calculated by DOE using the Rogers equation, also was 11.9 percent. Finally, the average in-situ moisture content for three near-surface (2.5 feet) soil samples from Table 9.1 of the Collins Ranch SCR is 12.5 percent. The rationale for the moisture content assumed in the cover thickness calculations should be better documented to allow independent conclusions regarding the validity of the figure.

3. Page B-49 - Table 6.5 of NUREG/CR-2642 indicates that a petrographic examination of rock provides valuable information regarding the overall quality of the rock. Therefore, the evaluation of riprap quality should include a petrographic examination. In addition, several of the tests specified utilize acceptance criteria which are not appropriate. As specified in Table 6.2 of NUREG/CR-2642, the weight loss after 250 freeze-thaw cycles should not exceed 5 percent, while values from the Schmidt impact hammer test should exceed 40. Additionally, provide the basis for the 20 percent increase in rock size to account for durability or lack thereof.

4. Page B-45 - The rock layers on the top and sideslopes should be designed to prevent erosion due to the inevitable concentration of sheet flow which will result from a PMP event. A concentration of flow has not been considered in the design.

SURFACE HYDROLOGY AND EROSION COMMENTS: DRAP AND DEA

1. Based on a review of the conceptual design presented in the RAP, there is a major deficiency in the design of the diversion ditch (East Ditch) that will be constructed upstream of the remediated pile. A qualitative examination of the design indicates that the ditch can become clogged with sediment and debris on a routine basis and will thus need frequent and regular maintenance. Based on the

need for such maintenance, the EPA long-term stability criteria (40 CFR 192) will not be met by such a design. Because the location of the sediment buildup cannot be predicted and because the sediment buildup could be concentrated, we conclude that flows could be blocked at critical areas in the ditch, resulting in flows over the remediated embankment. However, EPA standards could be met by one of the following methods:

a. Move the remediated pile upstream, where little or no drainage area has to be intercepted by a diversion ditch.

b. Design the rock protection on the remediated pile to resist the runoff from the additional contributing upstream drainage area.

c. Design the top slope of the pile such that runoff is directed toward, rather than away from, the diversion ditch.

Alternately, if none of the above methods are used to resolve the problem, additional information and analyses should be provided to document that blockage and sediment accumulation in the ditch will not be a potential problem.

2. Based on an examination of the site and of the information provided in the geomorphic analyses, it appears that significant gullying occurs in the immediate site area. Because of this, there exists a potential for concentration of runoff into the diversion ditches at one or more points (where such gullies would discharge flow to the ditch). It is therefore important to design the erosion protection in the ditch to resist the forces associated with concentrated flows which could enter the ditch perpendicular to the ditch alignment. It is also important that the design is capable of resisting the forces associated with significant energy dissipation directly in the ditch at a location where a potential gully could discharge into the ditch. Accordingly, the ditch design (all ditches) should be revised to account for the above phenomena. Provide the bases for all assumptions and calculations.

   In addition, the geomorphic analyses indicate that head cutting of the existing gullies and channels in the site area could be a potential problem. Additional erosion protection should be provided to prevent the occurrence of head cutting and to provide transitions where the flows from the proposed diversion ditches discharge into existing gullies and channels. Accordingly, the diversion ditches and ditch transitions should be designed to protect the remediated pile from damage due to the erosion of existing channels and gullies. Detailed plans of the transitional ditches should be provided for review.

3. Our review of the site plan indicates that the alignment of the East diversion ditch is not conducive to long-term stability. There are several locations where flows in the diversion ditch are directed toward the stabilized tailings. It appears that either (a) the ditch alignment should be revised such that flows are not directed toward the tailings at channel bends, or (b) additional erosion protection should be provided at those locations where curvature is necessary. Revise the design accordingly, and provide the basis for all assumptions and analyses (EM 1110-2-1601 provides acceptable guidance for determining increases in shear forces at channel bends).

4. For the East diversion ditch, it appears that peak PMF flows may have been underestimated. This is principally due to the fact that critical combinations of drainage areas and times of concentration were not considered. Based on a qualitative examination of the site plan (as presented on Sheet 11 of 20 Calculation No. 346703050313-7B), it can be seen that due to the shape of the drainage basin, there are several locations along the ditch where the drainage area is only slightly less than the total area at the ditch outlet, but the time of concentration (which was computed based on watershed length) is about half the time of concentration at the ditch outlet. This effectively doubles the peak flow in the East ditch, for example, at a point located about 900 feet southeast of Mt. Augur.

   Accordingly, the design calculations should be revised to reflect the most critical combinations of drainage area and time of concentration in all the diversion ditches. Several points along each ditch should be checked, due to the shape of the watersheds draining into the ditches. In addition, changes may need to be made in the riprap design in the ditches to reflect the increased flow rates, as applicable.

5. Our review of the rock protection for the sides of the tailings embankment indicates that the average rock size (D50) needs to be increased. This is principally due to the fact that the rock voids will be filled with soil and that a majority of the runoff will pass over, rather than through, the rock layer. This results in an increase in the flow velocities which must be incorporated into the design.

For flow over a rock layer, the Stephenson method (used for designing the rock on the sides) is considered to be less applicable than the Safety Factors method (which was used for the top). We conclude that the Safety Factors method should be used in lieu of the Stephenson method, since very little flow will pass through the rock layer. The rock should be resized accordingly.

6. The methodology for determining rainfall distribution and intensities, as given in NRC Staff Technical Position Paper WM-8201, has been superceded by that given in the recently published Hydrometeorological Report (HMR) No. 55 (March 1984). The NRC staff no longer endorses the methodology presented in WM-8201. WM-8201 was developed for use at active uranium mill sites, most of which are located in Wyoming, east of the Continental Divide. At the time of the development of WM-8201, reasonable guidance for rainfall distributions in that area was unavailable and/or questionable. WM-8201 was formulated to provide that type of general guidance, based on Corps of Engineers rainfall distributions. The recent publication of HMR No. 55 has indicated that certain areas in Wyoming could be subject to rainfall intensities (especially of short duration) much greater than those given in WM-8210. As a result, the NRC staff intends to make appropriate modifications to WM-8201 to reflect the new data.

   The modifications to WM-8201 will include recommendations to use the rainfall distribution guidance that is developed in the HMR that is appropriate for a given region. These modifications will be applicable to UMTRAP sites in general. For the Lakeview site, in particular, the rainfall distributions developed from HMR No. 43 should be used, since this represents the most current estimates of rainfall potential for this area of the United States. Further, in developing rainfall distributions using HMR No. 43, extrapolation of the data for time intervals less than 15 minutes will be necessary.

RADON ATTENUATION AND RADIATION PROTECTION COMMENTS:

DEA V.I

1. Page 83 - Based on a review of the background radiation for the Lakeview site, it was noted that the background Th-230 concentration was omitted. Thus, the background Th-230 concentration should be provided for the Lakeview site in order to complete the characterization of the site background radiological environment.

2. Page 84 - Based on a review of the Lakeview site gamma exposure rate, it was noted that information describing the distance from the pile that the gamma rate approaches background was omitted. Therefore, a gamma exposure rate isopleth for the Lakeview site should be provided.

3. Page 85 - Based on review of the alternate site background radiation characterization, it was noted that air and soil site-specific radionuclide data was omitted. Thus, the background air and soil

radionuclide concentration for U-nat, Ra-226 and Th-230 should be provided for the Collins Ranch and Flynn Ranch sites.

4. Page 103 - The footnote for Table 4.1 should reference Appendix H, not G.

DEA V.II

1. Page H-7;

   a. The risk factor for excess fatal lung cancer, which in this DEA is 100 X 10^{-6} deaths per person-WLM, is used for the general population and for the remedial action workers. The Evans et al (1981) reference, which gives the primary justification for using this risk factor, states that workers are at a higher risk than the general population for equal exposures to radon daughters. A higher risk factor comparable to those recommended by UNSCEAR and used by the NRC, should be applied to the remedial action workers.

   b. Comparing total organ doses over 50 and 100 years for both workers and the general population would help to clarify the difference when compared to expected background exposures rather than comparing only relative risk.

2. Page H-14 - The MILDOS computer program utilizes area sources and actual meteorological data. Use of MILDOS would provide a realistic dose prediction from which general population health effects estimates could be calculated in order to compare to the upper bound already calculated as the worst case.

RADON ATTENUATION AND RADIATION PROTECTION COMMENTS:

DRAP

1. Page 8, Section 2.5, states that, when working levels are between 0.02 WL and 0.03 WL, the government will have the flexibility to decide if measures should be taken to reduce working levels. This is inconsistent with the EPA standard in 40 CFR 192.12(b)(1). The standard requires that a reasonable effort be made to reduce working levels to below 0.02 WL. A decision to take no action would constitute the application of supplemental standards.

2. Page 19, Section 4.3 - A statement should be added to indicate that more vicinity properties may be identified as remedial action proceeds.

3. Page 31, Section 5.5.4 - Based on review of the cover construction program, it is unclear which radionuclide is referenced. Please clarify that this is a cleanup limit, and not an EPA limit for unrestricted use.

4. Page 41 - Based on review of the dust control program, it appears that dust control will depend exclusively on spraying. The DRAP should recognize the po bility of extreme dust conditions and require more restrictive controls when warranted. Therefore, a specific set of criteria should be established in order to allow reduction or stoppage of work. If such programs are described in a separate document, the DRAP should reference that document.

5. Page 51, Section 6.4.3 - A signed statement by the employee, indicating that training was received, should be required. This statement should specify whether oral or written tests will be given. In addition, the supervisors should be given approximately four times the amount of training the workers receive; for example, 16 and 4 hours, respectively.

6. Page 56 - As part of it's DRAP concurrence review, the NRC will need to review the "Radiological Support Plan" developed by DOE's contractor with the appendix applicable to Lakeview. Without this plan, we cannot evaluate the adequacy of the Environmental, Health and Safety Plan contained in the RAP, Appendix D.

7. Page D-19 - Due to the long biological half lives for both Th-230 and Ra-226, NRC considers these bioassays to not provide representative indications of employee internal exposure. Therefore, U-Nat urinalysis should be used since it would be more sensitive and provide a more reliable indication of employee internal exposure.

8. Page D-21 - Based on a review of the respiratory protection program, it was noted that no provisions for an in-house working level (WL) action level were provided. A WL in-house action level should be defined (e.g., 0.08 WL). Thus, when the action level is exceeded, an investigation to determine cause can be triggered, and proper mitigative actions can be taken.