UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
URANIUM RECOVERY FIELD OFFICE
BOX 25325
DENVER, COLORADO 80225

MAY 31 1985

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040WM181102E

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

FROM: Edward F. Hawkins, Chief
Licensing Branch 1
Uranium Recovery Field Office, Region IV

SUBJECT: COMMENTS ON THE UMTRAP DEA AND DRAP FOR PROPOSED DOE REMEDIAL ACTIONS AT THE INACTIVE URANIUM MILL TAILINGS SITE AT LAKEVIEW, OREGON

Attached are URFO's comments on the drafts of the Environmental Assessment and Remedial Action Plan for the Lakeview UMTRAP site located in Lakeview, Oregon. It is our understanding that DOE will incorporate these comments into an addendum to the recently published Environmental Assessment. These comments were discussed informally with DOE and their contractors at a meeting held in our offices on May 20, 1985.

Should you have any questions regarding the comments, please contact myself (FTS 776-2805) or Paul R. Hildenbrand (FTS 776-2812).

Edward F. Hawkins

Edward F. Hawkins, Chief
Licensing Branch 1
Uranium Recovery Field Office, Region IV

Attachment: As stated

Cases Closed: 040WM181101E
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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-feet 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-feet thick liner in the disposal facility. However, both the 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 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. P. 66, Paragraph 1.

   The hydraulic conductivity values and calculated velocities are inappropriate because they were derived from invalid aquifer analysis methods. None of the aquifer analysis methods used by the TAC are valid because many of the assumptions inherent to these methods are violated. It is recommended that the data be re-analyzed, taking into account the apparent unconfined conditions and the partially penetrating wells.

2. The above comment also applies to the slug tests performed at the Lakeview site. Of the three methods used, the Bower and Rice method presents the most representative estimates of K and T. The other two methods should not be used to calculate an average K and T, because they are not appropriate for conditions present at the Lakeview site.

3. Any aquifer test analysis method developed for confined or confined/leaky systems is not appropriate for the Lakeview site.

Discontinuous clay lenses (page 65, paragraph 4 of EA) do not necessarily constitute an aquitard.

4. It is apparent from Tables 5.10, 5.11, 5.12, 5.13 and 5.15 (pp. 137-155) of the 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.

5. P. 69, Paragraph 3.

   The average value of hydraulic conductivity given for the alluvial aquifer underlying the Collins Ranch site should be re-evaluated. Assumptions inherent to the Skibitzke and Hvorslev methods invalidate their use at the Collins Ranch site. This aquifer should also be considered unconfined unless detailed geologic data indicates the presence of continuous confining layers.

6. No ground-water quality evaluation is presented in the EA, although a limited amount of data is presented in the DSCR. Additional data should be collected to allow an adequate characterization of ground-water quality. Data collection 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 doeument review process will be expedited if the DOE submittals contain sufficient information for the reviewer to make an independnet assessment of the conclusions regaridng 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 ragarding the validity of the figure.

3. Page B-49; The evaluation of riprap quality should include a petrographic examination of the rock. 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. Maintain positive backslope for the pile.

   Alternately, if neither of the above methods are used to resolve the problem, additional information and analyses should be provided to document that potential 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 potential 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 designed for.

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 a method such as 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 (HRM) 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 Hydrometeorological Report 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 Hydrometeorological Report 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 Hydrometeorological Report 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

DEA V.I

Page 83; The background Th-230 concentration is needed.

Page 84; The EA should state the distance from the pile that the gamma exposure rate approaches background.

Page 85; The background concentrations for U-nat, Ra-226 and Th-230 are needed for the Collins Ranch and Flynn Ranch sites.

Page 103; The footnote for Table 4.1 should reference Appendix H not G.

DEA V.II

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 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.

Page H-14; MILDOS utilizes area sources and actual meteorological data. Use of MILDOS would minimize the over-prediction discussed in the first paragraph on page H-16, providing the terrain is essentially flat.

Page H-16; MILDOS utilization, in addition to the approach presented in the second paragraph, would provide a realistic prediction for general population health effects estimates with which to compare the upper bound.

RADON ATTENUATION AND RADIATION PROTECTION COMMENTS: DRAP

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.

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

Page 31, Section 5.5.4; The average concentration of which radionuclide? Please explain how this is less than the EPA unrestricted limit. Note that NRC has established unrestricted limits, not EPA. EPA has established clean up standards.

Page 41; It appears that dust control will depend exclusively on spraying. The DRAP should recognize the possibility of extreme dust conditions and require more restrictive controls when warranted. Controls such as reduction or stoppage of work should be considered.

Page 51, Section 6.4.3; A signed statement by the employee, indicating that training was received, should be required. 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.

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.

Page D-19; What is rationale for performing Th-230 bioassay rather than U-Nat. U-Nat may be more sensitive and give quicker indication of employee exposure.

Page D-21; A working level (WL) in-house action level should be defined so that when the action level is exceeded, an investigation to determine cause can be triggered.