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Department of Energy
Albuquerque Operation Office
ATTN: Mr. David M. Ball, Project Engineer
Uranium Mill Tailings Project Office
P. O. Box 5400
Albuquerque, New Mexico 87115

Gentlemen:

Enclosed are the initial comments developed by the review team on the Review Draft of the Remedial Action Plan for the Canonsburg, Pennsylvania site. Answers to these comments are required so that a detailed review of the Remedial Action Plan can be initiated.

Sincerely,

W. A. Nixon
Uranium Process Licensing Section
Uranium Fuel Licensing Branch
Division of Fuel Cycle and
Material Safety

Enclosure: as stated

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INITIAL
WMLL COMMENTS ON THE
CANONSBURG RAP

1. The thorium and radium soil activities provided in the draft RAP are based on a small sample. We need to review the additional soil sample results being obtained from the ORNL study for the whole site, the material going into the encapsulation cell, and the material within the disposal area being left out of the cell. Adequate data on the activity levels of the buried waste must be available in order to evaluate post-reclamation radon emission levels.
2. The diffusion coefficient estimate for the pit-run rock appears unjustifiably low. A coefficient on the order of $0.06 \text{ cm}^2/\text{sec}$ or larger is probably more appropriate.
3. Given that the soil cover on the side slopes may erode, we do not consider it appropriate to take full credit for the radon attenuating capabilities of the soil cover or pit run rock.
4. Provide the computer printouts of HEC-2 analyses for the 100-year, 1000-year, and Probable Maximum Floods. Justify the use of the various input parameters to the HEC-2 computer model, such as Mannings "n" values, weir coefficients for flow over roadways, and expansion and contraction losses. Provide the cross-sections used in the analyses. Provide map(s) showing the location and orientation of these cross-sections. Provide the FEMA documents and flood insurance studies which were used as the basis for your HEC-2 analysis and your determination of 100-year and 1000-year discharges in Chartiers Creek.
5. Discuss and provide the results of various HEC-2 analyses which demonstrate the sensitivity of flow velocities and water surface elevations to variations in Manning's "n" values for the channel and overbank areas of Chartiers Creek.
6. Discuss and provide the results of HEC-2 analyses assuming the bridge and/or portions of the railways/roadways have been washed out. Discuss the effects of washouts on water surface profiles and stream velocities.
7. Discuss the susceptibility to erosion of the cover soil in the nonencapsulated areas, and the pit-run rock in the encapsulated areas, in light of the HEC-2 analyses performed for comments 4-6. Discuss the impact of a loss of cover material (if applicable) in these areas. Provide the results of analyses used to quantify the erosion.

8. Provide the bases and rationale for siting the riprap to be buried along the edge of Chartiers Creek. Provide the riprap size and gradation and the results or proposed criteria for durability tests of this rock and the "pit-run" rock. Provide and justify an evaluation of the effective life expectancy of the rock material.
9. Identify any upstream dams whose failure could affect the site. If any are present, provide analyses of the resulting flood for both seismic and flooding-type failures.
10. Provide justification for use of the 10-year flood or 10-year 24-hour precipitation event for sizing the sedimentation basin and the temporary berm. Recognizing that the State of Pennsylvania uses this criteria for construction at sites with no contaminated material, discuss the applicability of such criteria in light of the susceptibility of contaminated material being eroded during the construction period.
11. As discussed in many National Weather Service publications, reduction of 20% in the Probable Maximum Precipitation (PMP) event as a design basis for local site drainage is not acceptable. No reduction should be applied. Provide appropriate evaluations and design revisions based on the full PMP.
12. Justify the use of runoff coefficients of 0.3 for site drainage computations. It should be recognized that the rational formula is a simplistic hydrologic model and that conservative input parameters may be needed for this model to be appropriate for a particular site. In addition, the peak burst of rainfall used in the design should be assumed to occur after the ground has become virtually saturated. Therefore, a runoff coefficient value approaching 1.0 should be used.
13. The 5-minute rainfall should be determined in a manner consistent with the guidance provided in NRC Staff Technical Position WM-8201 (copy enclosed). The rainfall distribution curves that were used (Design of Small Dams) may not be accurate for short rainfall periods. (Riprap sizes for the drainage ditches may need to be adjusted accordingly when the flow and velocities increase as a result of applying the above adjustments to the rainfall intensity and runoff coefficient.)
14. We note that the runoff ditches have a relatively steep slope of 4-5%. Provide sufficient supporting data and analyses to demonstrate that this slope, or a reduced slope, is consistent with the EPA longevity standard.
15. Provide additional details regarding the design of the sedimentation pond and spillway for the pond. Provide an evaluation of the potential for, and impacts of, releasing contaminated material through the spillway if the sediment pond becomes filled. Evaluate the

need for providing a flap gate for the spillway outfall to prevent high creek flows from backing up into the sediment pond. Provide information on the amounts and concentrations of contaminated material that can be expected to be in the sediment pond during construction.

16. Provide basis for the determination of the 1000-year flood event. The methodology contained in the U.S. Water Resources Council publication entitled "Guidelines For Determining Flood Flow Frequency." provides guidance which is acceptable to the NRC staff. In addition, given the relatively short period of record, an estimated 95% confidence interval for the 1000-year flood event should be provided as well as the technical support for the estimate.
17. The assumptions used in predicting erosion on the site are overly optimistic. Prediction of 98-100% grass cover is not reasonable, particularly when mowing is estimated to be once or twice a year. On the side slopes, 10 inches of the 12 inches of cover are predicted to erode in your analysis. If the grass cover is even slightly less, no cover would be left. In addition, your calculation of the LS factor for the 20% slopes used in the Universal Soil Loss Equation, does not appear to take into account the contribution from the top of the impoundment. Since assumptions on radon and infiltration assume that the soil cover stays in place, the cover will need to be made thicker or analyses performed to determine the effects of the soil cover being eroded away.
18. The report states that filter fabric may be used between layers of the encapsulation cell. Since a clean break is needed between the fine and coarse soil layers to minimize infiltration, durable filter fabric should be required between the select soil and pit run rock, and between the liner and capillary break.
19. Provide information on and discuss the effects of freeze-thaw cycles on the bentonite-clay layer. Discuss the impacts on water infiltration and radon emanation.
20. Although test procedures for earthen materials are given, provide criteria for test frequencies and levels of acceptance.
21. Provide information on the assumptions used in the earthquake analysis such as the historic earthquakes and estimated magnitudes and recurrence intervals in the area. The unpublished evaluation of potential earthquake effects should contain the information we need.
22. Provide baseline water quality data, including concentrations of the major and minor ionic constituents for the unconfined and semiconfined aquifers, on and off site.

23. Describe and provide data on the recharge and flow relationships between the two aquifer systems and Chartiers Creek.
24. Describe the predicted downgradient concentrations and impacts from the non-radiological toxic elements such as arsenic, selenium, and molybdenum.
25. Discuss the feasibility of restoring or cleaning up the unconfined aquifer at the site and assess whether the ground water needs to be cleaned up to meet the EPA standard. The impacts on site water quality of dewatering area C, during tailings excavation should also be assessed.
26. Analyze the projected future use or needs of the ground water from the semiconfined aquifer and the potential for contamination of the aquifer at the site and in the surrounding area.
27. Discuss the adequacy of the cover depth and design on the control and prevention of misuse of contaminated material. The analysis should consider if significant quantities of tailings will remain close enough to the surface to be of interest to those seeking a local source of earthen building material.