

# **EXHIBIT D**



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February 11, 1999

David C. Frydenlund  
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SUBJECT: February 4, 1999 Letter to Mr. Don Ostler  
Director - Division of Water Quality  
Utah Department of Environmental Quality

Dear Mr. Frydenlund:

The Utah Department of Environmental Quality, Division of Radiation Control (DRC) has received the subject letter via facsimile on February 4, 1999. As we indicated in our meeting with you on December 11, 1998, the DRC has many concerns related to groundwater protection from potential seepage from the tailings impoundments at the White Mesa Mill. These concerns were further clarified in subsequent letters to International Uranium Corporation (IUC) on January 8, 1999 and January 21, 1999. As requested by you in the subject letter, the DRC's concerns are stated again below.

#### Tailings Impoundment Liner Systems

The DRC is not convinced that the bottom liner systems for tailings impoundment cells 1, 2, and 3 at White Mesa are adequate for minimizing discharge of tailings leachate to groundwater. DRC staff reviews of the November 23, 1998 and December 31, 1998 Knight Piésold modeling reports indicated that a number of assumptions were made in the modeling effort without appropriate supporting documentation. As stated in the January 21, 1999 letter to IUC, these assumptions have critical implications associated with the analytical model inputs and corresponding output liner leakage predictions. Without the supporting documentation, these assumptions and the corresponding model predictions cannot be confirmed. As we indicated in the January 21, 1999 letter, the DRC cannot verify the predictions rendered by the modeling effort without the requested information. In addition, the DRC does not believe that a best-case scenario for liner leakage is valid as assumed in the Knight Piésold modeling effort. A more realistic approach should be employed which considers sensitivity analyses of key model input parameters to provide a range of possible predictions instead of a single best-case scenario.

### **Leak Detection Systems**

Similarly, the DRC does not have confidence in the efficiency of the leak detection systems for tailings impoundment cells 1, 2, and 3 at the White Mesa Mill. The leak detection systems have a high potential for undetected leakage for two primary reasons: First of all, an efficient leak detection system must have a secondary low-permeability barrier below the primary low-permeability liner to accumulate and divert leakage to the leak collection pipe. However, the leak detection systems for these cells consists of a primary 30-mil PVC geomembrane on top of a 6-inch thick layer of reworked sandstone bedrock which is supposed to function as a secondary low-permeability barrier. In the December 31, 1998 Knight Piésold modeling report, the reworked sandstone bedrock material is assigned a saturated hydraulic conductivity of  $1 \times 10^{-6}$  centimeters per second. Because the reworked bedrock layer beneath the PVC geomembrane is the controlling soil layer, there needs to be some quantitative justification for using this value.

Secondly, should a leak occur that is large enough to pool and accumulate on top of the reworked sandstone bedrock material, it would have to travel over a long horizontal distance to reach the collection pipe and be detected at the downslope end of the cell. During this horizontal travel path across the impoundment, vertical seepage losses through the reworked sandstone material will further reduce the effectiveness of the detection system to report small leaks. Consequently, only the largest catastrophic leaks will be detected by the current leak detection systems for these cells. Non-catastrophic seepage from these disposal cells will travel vertically through the vadose zone with the potential for reaching the water table aquifer. Once reaching the water table, leachate contamination will not be detected until reaching the groundwater monitoring wells which could take many years to occur.

### **Fracture Flow Potential**

Accelerated travel times of tailings fluid leakage via secondary permeability from joints and fractures was not addressed in either the November 23, 1998 or the December 31, 1998 Knight Piésold reports. As reported in the February 1993 UMETCO Groundwater Study of the White Mesa Facility (Peel Environmental Services, 1993) fluid travel times to the perched aquifer from pond liner leakage were estimated based on site-specific boring and well test data. These data indicate that it is likely that seepage under positive pressure could be in direct contact with vertical joints at the base of the ponds. In this case, seepage would occur as localized saturated flow through joints within the Dakota Sandstone into the Burro Canyon perched aquifer. Consequently, travel times for tailings pond leakage to the perched aquifer could be as short as a few weeks through joints directly in contact with tailings solutions to approximately 60 years for partially saturated flow conditions (Peel Environmental Services, 1993). This is in sharp contrast to the 1,300 year travel time estimated in the November 23, 1998 Knight Piésold report.

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### Deficient Groundwater Monitoring Program

Another concern the DRC has is the groundwater monitoring program which we find to be inadequate. Presently, the groundwater detection monitoring program employed at the mill analyzes only for the inorganic constituents of chloride, potassium, nickel, and uranium. Based on the constituents that are typically present in 11e.(2) byproduct material from acid leach processing of natural uranium ores, other conservative more mobile "smoking gun" leakage parameters such as ammonia, nitrate, nitrite, molybdenum and sulfate should be included. In addition to inorganics associated with acid leach processing of natural uranium ores, IUC has introduced a number of additional organic constituents from alternate feed materials such as the Ashland 2 FUSRAP material which are not common constituents of 11e.(2) byproduct material from natural ores. The current groundwater detection monitoring program at the mill does not include any organic compounds and is therefore inadequate for detecting releases of these compounds to the perched aquifer. As indicated by analytical results of soil samples in the Remedial Investigation Report, pre-excavation sampling activities, and receipt sampling activities at the mill, there are a wide range of volatile and semi-volatile organic compounds mixed with the Ashland 2 material including chlorinated solvents. Chlorinated solvents have much different chemical characteristics than petroleum hydrocarbons which make them a serious threat to groundwater systems. In particular, the high density and low viscosity of chlorinated solvents enables them to migrate downward through vertical fractures in bedrock systems such as the one beneath the White Mesa tailings impoundment.

I hope this letter has clarified our concerns to IUC regarding Utah DEQ's request for a groundwater discharge permit. The State will notify you prior to taking any formal enforcement action against IUC. If you have any questions about this letter, please call me or Rob Herbert at (801) 536-4250.

Sincerely,



William J. Sinclair, Director  
Division of Radiation Control

cc: Fred Nelson, Utah Attorney Generals Office  
Don Ostler, P.E., Director, -DEQ-DWQ  
Dianne Nielson, Ph.D., Executive Director, UDEQ