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

FROM: John T. Greeves, Chief  
Engineering Branch  
Division of Waste Management

SUBJECT: REVIEW OF THE RADON BARRIER FOR THE SHIPROCK UMTRAP SITE

This memorandum is in response to Technical Assistance Request #85041 concerning a review of DOE's radon barrier design calculations for the Shiprock UMTRAP site. These calculations, submitted to Banad Jagannath (WMEG) by the TAC during a meeting on May 10, 1985, were performed by IECO (RAC) and constitute the most current information pertinent to this open issue.

The current radon barrier design presented by the RAC has two variations based on the arrangement of the relocated contaminated material in the final embankment configuration. These variations differ from the design that is presented in the RAP. Mr. T. R. Wathen (RAC) indicated during a telephone conversation with Steve Smykowski of my staff that the RAC will attempt to place the highly contaminated material deeper in the pile if construction activities permit. The resultant attenuation benefits from overlying material of lower levels of contamination may reduce the required cover thickness. Mr. Wathen also mentioned that the RAC has accepted the borrow site that the TAC has identified in the RAP.

Based on a review of the calculations, we find that the values of all the input parameters for the RAECOM model are acceptable with the exception of the value selected for the diffusion coefficient (D) of the radon barrier material. Samples obtained from six test pits at the borrow site were tested to estimate values for D. The arithmetic mean of these values was used in the calculations to estimate cover thickness. We find that the results from these limited number of tests do not provide sufficiently conservative estimates of this significant parameter and therefore, additional testing is necessary to better characterize the radon barrier material.

In a telephone conversation between Steve Smykowski of my staff and Mr. John Smith (TAC), Mr. Smykowski was informed that the TAC planned on limiting the amount of testing and sampling of radon barrier material until an actual borrow site was formally accepted by the RAC. Both the TAC and RAC have agreed that insufficient testing was performed on the borrow material and that additional

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testing is necessary to better characterize the diffusion coefficient. Since the RAC has now selected a borrow site, they plan to perform additional tests on the cover material. The testing may continue throughout cover construction. This approach is intended to provide a better basis for the cover thickness design to ensure that the radon flux will meet the EPA standard.

Based on the present limited diffusion coefficient data, WMEG concludes that the cover thickness calculated from this data (i.e. 7.9 feet) does not provide reasonable assurance that the EPA standard will be met. We recommend that this remain an open issue until a revised cover thickness design is provided using either a more reliable D value based upon more detailed testing of the borrow material, or a more conservative D value based upon the existing data. WMEG will provide a final review of this open issue upon receipt of this information. Any questions regarding this review should be directed to Steve Smykowski of my staff.

ORIGINAL SIGNED BY

John T. Greeves, Chief  
Engineering Branch  
Division of Waste Management

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