

Mr. Joel T. Case, Director  
INTEC Waste Programs  
U.S. Department of Energy  
Idaho Operations Office  
850 Energy Drive  
Idaho Falls, ID 83401-1563

SUBJECT: NRC REVIEW OF IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL  
LABORATORY DRAFT WASTE INCIDENTAL TO REPROCESSING  
DETERMINATION FOR SODIUM-BEARING WASTE - CONCLUSIONS AND  
RECOMMENDATIONS

Dear Mr. Case:

The U.S. Nuclear Regulatory Commission (NRC) has completed its review of the waste incidental to reprocessing (WIR) determination for sodium-bearing waste (SBW) removed from waste storage tanks at the Idaho Nuclear Technology and Engineering Center at the Idaho National Engineering and Environmental Laboratory. As established in the Memorandum of Understanding between the U.S. Department of Energy (DOE) and NRC, dated September 7, 2001, NRC's activities related to the review are being carried out in an advisory capacity, and any advice given to DOE's Idaho Operations Office (ID) does not constitute a regulatory approval, authorization, or license for DOE activities.

Your letter, dated February 7, 2001, requested NRC review of two WIR determinations, the first addressing management of SBW as transuranic (TRU) waste. The second determination, regarding tank closure, will be addressed by NRC separately. DOE-ID requested that NRC review the SBW determination to the criteria set forth in DOE Order 435.1, "Radioactive Waste Management." The Order and its associated manual and guidance discuss the WIR evaluation process, stating that incidental waste may be managed as TRU waste if the wastes: "...(1) have been processed, or will be processed, to remove key radionuclides to the maximum extent that is technically and economically practical; and (2) will be incorporated in a solid physical form and meet alternative requirements for waste classification and characteristics, as DOE may authorize; and (3) are managed pursuant to DOE's authority under the Atomic Energy Act of 1954, as amended, in accordance with the provisions of Chapter III of this Manual ["Transuranic Waste Requirements"], as appropriate." NRC's review focused on Criterion 1, assessing whether the waste has been processed, or will be processed, to remove key radionuclides to the maximum extent that is technically and economically practical. NRC's incidental waste guidance does not include a TRU disposal option. Therefore, NRC staff considers it inappropriate to assess whether the TRU disposal option provides safety equivalent to the performance objectives of 10 CFR Part 61, since the Waste Isolation Pilot Plant (WIPP) is regulated by the U.S. Environmental Protection Agency and is outside of NRC's jurisdiction. Although the WIR determination addresses all three criteria in DOE Order 435.1, NRC staff is not providing conclusions and recommendations for the TRU disposal portion of the

Attachment

determination (Criteria 2 and 3). Rather, NRC is only providing comments and observations on the methodology for meeting Criteria 2 and 3, that were identified during the review.

NRC staff's review initially focused on the information submitted by DOE-ID on September 25, 2001 (letter from J.T. Case/DOE-ID to J.T. Greeves/NRC), including the "Idaho Nuclear Technology and Engineering Center Sodium-Bearing Waste -- Waste-Incidental-to-Reprocessing Determination Report, Draft A," and additional documents. NRC also reviewed the responses to the request for additional information (RAI) (letter from J. Case/DOE-ID to C.E. Abrams/NRC, dated January 29, 2002). After DOE-ID decided to revise its approach taken in the SBW WIR determination, NRC staff concentrated its review on the revised SBW WIR determination, submitted on March 8, 2002, which included the following: (1) "Idaho Nuclear Technology and Engineering Center Sodium-Bearing Waste -- Waste-Incidental-to-Reprocessing Determination Report, Draft B"; (2) "Engineering Design File -- Supporting Cost Data for the SBW Waste Incidental to Reprocessing Evaluation"; (3) "Sandia National Laboratories Waste Isolation Pilot Plant -- RH-TRU Impact Assessment with PAVT Baseline (RHVT)"; (4) "Engineering Design File -- Validation of Radionuclide Mass Balance Used in the INTEC SBW WIR Determination Report"; and (5) "Engineering Design File -- Comparison of Candidate Waste Streams to WIPP Waste Acceptance Criteria." NRC staff also reviewed additional information received through informal communications between DOE-ID and NRC. The results of the NRC staff review are included in the technical evaluation report (see Attachment) and are summarized below.

Based on NRC staff's review of the information provided by DOE-ID, NRC staff agrees that it is not technically practical to remove additional key radionuclides from the SBW solids prior to disposal. NRC staff agrees that even though the technology exists to remove additional key radionuclides from SBW liquid, it is not economically practical, since removing additional key radionuclides for disposal at a high-level waste geologic repository would not significantly reduce the radionuclide inventory at WIPP. Therefore, NRC staff agrees that the SBW has been processed to remove key radionuclides to the maximum extent practical. NRC staff, in its role of providing technical assistance to DOE-ID and acting in an advisory capacity and not providing regulatory approval in this action, concludes that Criterion 1 has been met. This conclusion is dependent on DOE-ID addressing the staff recommendations included in the technical evaluation report and summarized below.

Although there have been significant efforts to develop the SBW liquid and solid radionuclide concentrations, limited information is available in some key areas. The residual uncertainty can likely be reduced through the collection of additional information during future activities (e.g., solid and liquid sampling). For the SBW WIR determination, the residual uncertainty is not expected to be significant enough to invalidate DOE-ID's conclusion that SBW is WIR that can be managed as TRU waste. However, as additional information is collected, an impact assessment on the SBW WIR determination should be completed and any significant impacts communicated to NRC. The residual uncertainty regarding the radionuclide inventory is expected to be an area of interest to the NRC staff with respect to its impact on DOE-ID's WIR determination for tank closure. NRC plans to address this issue in a future RAI on the tank closure WIR determination.

NRC's RAI requested DOE-ID to provide a brief analysis describing impacts to workers from the SBW treatment options evaluated. DOE-ID provided adequate information in its response to

the RAI and noted that this discussion would be included in the revised SBW WIR determination. It appears that this information was not included; NRC recommends that DOE-ID provide a brief analysis discussing worker doses in the final SBW WIR determination.

Although the NRC staff review of the SBW WIR determination focused on Criterion 1, the staff also noted the following during its review. NRC staff suggests that, if there are changes to plans to permit WIPP to accept remote-handled (RH) TRU waste, or if the draft waste acceptance criteria (WAC) for RH-TRU waste change, DOE-ID should revisit the WIR determination before final decisions regarding the SBW treatment process and final waste forms are made. NRC staff supports DOE-ID using the most economically efficient technology that will result in waste that meets the WIPP WAC and supports DOE using a risk-informed approach for the WIR determinations.

If you have any questions regarding this letter or the attached technical evaluation report, please contact Kristina Banovac of my staff at (301) 415-5114, or David Esh at (301) 415-6705.

Sincerely,

John T. Greeves, Director  
Division of Waste Management  
Office of Nuclear Material Safety  
and Safeguards

Attachment:

“U.S. Nuclear Regulatory Commission Review of the Idaho National Engineering and Environmental Laboratory Draft Waste Incidental to Reprocessing Determination for Sodium-Bearing Waste”

cc: K. Lockie/DOE-ID  
K. Picha/DOE-EM  
R. Bernero  
J. Contardi/DNFBSB  
B. Gannon/SAIC