



UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON NUCLEAR WASTE AND MATERIALS
WASHINGTON, D.C. 20555-0001

ACNWMR-0269

October 2, 2007

The Honorable Dale E. Klein
Chairman
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Chairman Klein:

SUBJECT: NRC PLANS FOR MONITORING DISPOSAL ACTIONS FOR WASTE
INCIDENTAL TO REPROCESSING AT U.S. DEPARTMENT OF ENERGY
FACILITIES AT THE IDAHO NATIONAL LABORATORY AND SAVANNAH
RIVER SITES

In May 2007, the Advisory Committee on Nuclear Waste (the Committee) received and reviewed draft copies of plans for monitoring actions to dispose of waste incidental to reprocessing (WIR) at the U.S. Department of Energy (DOE) at the Idaho National Laboratory (INL) Nuclear Technology and Engineering Center (INTEC) tank farm facility and the salt waste disposal facility at the Savannah River Site (SRS) (References 1 & 2). During its 181st meeting on July 17-19, 2007, the Committee received a briefing by U.S. Nuclear Regulatory Commission (NRC) staff members from the Office of Federal and State Materials Safety and Environmental Management Programs on these plans. The staff has prepared the monitoring plans for both sites in fulfillment of the NRC responsibilities under Section 3116 of the Ronald Reagan National Defense Authorization Act of 2005 (NDAA)¹.

The staff discussed the NRC's responsibilities under the NDAA, their general monitoring approach (that includes technical reviews and onsite observations), coordination with the DOE and the concerned states (Idaho and South Carolina), and specifics of the monitoring plans. The staff reported that they had completed technical evaluation reports (TERs) for both facilities, and that the monitoring plans address the key monitoring areas identified in these reports. The staff also discussed the criteria for compliance with the performance objectives for waste determinations provided in both the legislation and the TERs. They also indicated that they will prepare periodic compliance monitoring reports that will assess and document whether there is reasonable assurance that the DOE complies, and will continue to comply, with the performance objectives of 10 CFR 61.40 through 61.44.

The monitoring plans for disposal actions for WIR at the SRS salt waste disposal facility and INTEC tank farm are high quality, risk-informed, performance-based, and largely responsive to previous Committee recommendations. The Committee commends the staff for developing these plans in a complex technical and institutional environment.

¹ Ronald Reagan National Defense Authorization Act for Fiscal year 2005, Public Law 108-375, 118 Stat 2162, October 28, 2004

RECOMMENDATIONS

When preparing periodic compliance monitoring reports, the NRC staff should evaluate the adequacy of information produced by environmental monitoring programs performed by DOE and the host States.

The Committee recommends that future versions of these and other plans for monitoring WIR disposal actions seek environmental monitoring information from points beneath, beside, or within the WIR disposal site to provide early warning of potential radionuclide release.

The Committee recommends that future versions of these and other plans seek performance assessment results based on best-estimate and central tendency models and input parameters, preferably including a probabilistic uncertainty analysis.

Monitoring plans should focus on the extent to which the residual radionuclide inventory in WIR has been reduced considering other factors (e.g., cost, worker risk) involved in achieving this reduction, and not on evaluating whether separation efficiency goals are met.

OBSERVATIONS

The monitoring activities are focused on the performance objectives in 10 CFR 61.40 through 61.44, and the uncertainty in the DOE's evaluation of whether the performance objectives will continue to be met. Implementation of the plans uses the (1) results of monitoring activities performed by DOE and the host States, (2) modeling activities performed by the DOE, and (3) onsite observation of the DOE's experimental activities and waste disposal actions. The NRC staff reported that the plans have been favorably received by the DOE, the host States, and other stakeholder groups. The NRC staff expects these plans to be 'living documents' that evolve as the DOE's waste disposal actions progress and lessons are learned. The Committee believes that the monitoring plans embody many of the Committee's previous recommendations on related subjects, such as performance assessment, review of the DOE's draft waste determinations, and iterative monitoring and modeling of closed waste disposal sites (References 3 & 4).

The NRC staff reported that existing environmental monitoring efforts performed by the DOE and the host States will provide an adequate basis for the NRC's independent assessment of whether there is reasonable assurance the DOE will continue to comply with the performance objectives. The Committee accepts this judgment at present but notes that the validity of the staff's conclusion could be affected by information obtained from future environmental monitoring and the DOE's research programs concerning contaminant migration and the performance of engineered barriers, as well as potential changes in the DOE's approaches to the disposing of WIR.

The Committee has previously recommended that monitoring be performed near the source to provide early warning before releases occur (Reference 4). The Committee notes that existing DOE/State environmental monitoring points are at least several meters from the waste.²

The Committee has previously recommended that performance assessments be based on best estimates instead of conservative assumptions and models because the latter can obscure risk-significant features, events, and processes (References 3, 5-7). In their briefing, the NRC staff noted that comparison of the DOE's conservative performance assessment results is not consistent with environmental modeling.

The monitoring plan for the salt waste disposal facility at the SRS states:

“Predicted removal efficiencies of highly radioactive radionuclides by each of the planned salt waste treatment processes are a key factor in determining the radiological inventory disposed of in saltstone.”

As previously observed by the Committee (Reference 3), removal efficiency is not a meaningful measure of risk from radionuclides disposed of onsite. While removal efficiency may be useful in evaluating the effectiveness of competing radionuclide separation technologies, it does not provide insights into risks from material sent to a disposal facility unless it is combined with information concerning the initial inventory of radionuclides being sent through the separation process. The Committee reiterates its belief that the parameters relevant to risk are the inventory and spatial distribution of radionuclides in wastes that will be disposed of or stabilized onsite (e.g., saltstone) after radionuclide removal to the maximum extent practical, not the fraction or amount of radionuclides removed.

In conclusion, the Committee appreciates the forthright and responsive discussions concerning the NRC's draft monitoring plans for WIR disposal actions. We look forward to future discussions on implementation of the monitoring plans regarding evaluation of whether there is reasonable assurance that the DOE's WIR disposal actions will continue to meet the performance objectives in 10 CFR 61.40 through 61.44, and generic technical topics related to managing WIR.

Sincerely,

/RA/

Michael T. Ryan
Chairman

² The terms of the settlement of a recent lawsuit brought by the National Resources Defense Council against the DOE call for monitoring beneath the SRS salt waste disposal vaults.

References

1. U.S. Nuclear Regulatory Commission Plan for Monitoring Disposal Actions Taken by the U.S. Department of Energy at the Idaho National Laboratory Idaho Nuclear Technology and Engineering Center Tank Farm Facility in Accordance with the National Defense Authorization Act for Fiscal Year 2005, dated April 13, 2007. (Adams Accession No. ML070650222)
2. U.S. Nuclear Regulatory Commission Plan for Monitoring the U.S. Department of Energy Salt Waste Disposal at the Savannah River Site in Accordance with the National Defense Authorization Act for Fiscal Year 2005, dated May 3, 2007. (Adams Accession No. ML070730363)
3. Letter dated December 1, 2006, from Michael T. Ryan, Chairman, Advisory Committee on Nuclear Waste, to Dale E. Klein, Chairman, Nuclear Regulatory Commission, "Standard Review Plan for Activities Related to U.S. Department of Energy Waste Determination." (Adams Accession No. ML063380158)
4. Letter dated December 27, 2006, from Michael T. Ryan, Chairman, Advisory Committee on Nuclear Waste, to Dale E. Klein, Chairman, Nuclear Regulatory Commission, "Working Group Meeting on Using Monitoring to Build Model Confidence." (Adams Accession No. ML063620174)
5. Letter dated August 2, 2000, from B. John Garrick, Chairman, Advisory Committee on Nuclear Waste, to Richard A. Meserve, Chairman, Nuclear Regulatory, "Branch Technical Position on a Performance Assessment Methodology for Low-Level Radioactive Waste Disposal Facilities." (Adams Accession No. ML003737348)
6. Letter dated January 17, 2002, from George M. Hornberger, Chairman, Advisory Committee on Nuclear Waste, to Richard A. Meserve, Chairman, Nuclear Regulatory Commission, "Total System Performance Assessment and Conservatism." (Adams Accession No. 020240467)
7. Letter dated September 18, 2001, from George M. Hornberger, Chairman, Advisory Committee on Nuclear Waste, to Richard A. Meserve, Chairman, Nuclear Regulatory Commission, "Total System Performance Assessment-Site Recommendation (TSPA-SR)." (Adams Accession No. ML 012690661)

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Sincerely,

/RA/

Michael T. Ryan
Chairman

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