

Department of Energy

Washington, DC 20585

October 25, 1999

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DNF SAFETY BOARD

The Honorable John T. Conway
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, N.W.
Suite 700
Washington, D.C. 20004

Dear Mr. Chairman:

Enclosed are the compliance evaluation and the disposal authorization for the Hanford 200 East Area burial grounds, 200 West Area burial grounds, and the Immobilized Low-Activity Tank Waste disposal facility. The Low-Level Waste Disposal Facility Federal Review Group (LFRG) conducted their review of the performance assessments and the composite analysis and recommended that the Department authorize the continued operations of the DOE Hanford Site 200 East Area burial grounds and 200 West Area burial grounds subject to the conditions in the disposal authorization statement. The LFRG also recommended that the Department authorize continued development of the Immobilized Low-Activity Tank Waste disposal facility, subject to the conditions in the disposal authorization statement. The Department accepted the LFRG recommendation and signed the disposal authorization statement for the Hanford Site low-level waste disposal facilities.

The Department has completed the following actions related to commitments VII.B.5.b.1., 2., and 3. in the Defense Nuclear Facilities Safety Board Recommendation 94-2 Implementation Plan: "Complete Headquarters' Review of Hanford Site Performance Assessments," "Complete Headquarters' Review of Hanford Site Composite Analysis" and "Issue Disposal Authorization Statement for Hanford Low-Level Waste Disposal Facilities." The Department proposes closure of these commitments. If you have any questions concerning this information, please contact me at (202) 586-7710 or Mark Frei at (202) 586-0370.

Sincerely,

Carolyn L. Huntoon
Assistant Secretary for
Environmental Management

Enclosures

cc:
M. Whitaker, Jr., S-3.1



SEPARATION

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**Compliance Evaluation of the Performance Assessments and the Composite Analysis
for the Disposal of Low-Level Waste in the Hanford Low-Level Waste Disposal
Facilities**

The Low Level Waste Disposal Facility Federal Review Group (LFRG) concludes from its review of the performance assessment for the Immobilized Low-Activity Tank Waste disposal facility and the Hanford site 200 area plateau composite analysis and the review team reports that the performance assessment and the composite analysis were found generally acceptable and it was determined that continued waste management operations be approved with specific conditions as delineated in the disposal authorization statement.

On August 16, 1999, the performance assessment for the Immobilized Low-Activity Tank Waste disposal facility was conditionally approved and the 200 area plateau composite analysis was accepted with conditions. The primary conditions for approval are the development and incorporation of additional information and analysis into the performance assessment and composite analysis by issuance of an addendum for each document.

The performance assessments for the 200 East and West area burial grounds were conditionally accepted on June 30, 1997 and June 27, 1996, respectively. The performance assessments were judged to provide a reasonable expectation that the DOE Order 5820.2A and DOE Order 435.1 performance objectives will not be exceeded. The LFRG concluded that the composite analysis provided sufficient information to determine that the Hanford low-level waste disposal facilities' operations would not contribute significantly to any composite effects. Therefore, if any adverse exposure concerns resulted, management alternatives should be directed at other sites or sources of radioactive contamination.

The base case analysis results in the following calculated doses relative to the performance measures:

Performance Assessment for the Immobilized Low-Activity Tank Waste Disposal Facility

PA Component	Measure	Immobilized Low-Activity Tank Waste Disposal Facility Projected Maximum Dose or flux*
All pathways	≤ 25 mrem/yr	6.4 mrem/yr
Air pathway	≤ 10 mrem/yr	$<10^{-8}$ mrem/yr
Radon flux	an average flux of ≤ 20 pCi/m ² /s <i>or</i> an air concentration of ≤ 0.5 pCi/L unless constrained by applicable laws and regulations, or agreements	<0.001 pCi/m ² /s
Hypothetical inadvertent intruder	100 mrem/yr from chronic exposure 500 mrem/yr from a single event	27.5 mrem/yr from chronic exposure ** 5.5 mrem/yr from a single event **
Water resource protection	Established consistent with laws, agreements or groundwater protection management program Hanford adopted the following performance measures for groundwater protection: Beta/photon emitters: 4 mrem/yr Alpha emitters: 15 pCi/L Radon: 3 pCi/L	2.0 mrem/yr 1.7 pCi/L < 0.001 pCi/L

* Because the Immobilized Low-Activity Tank Waste must meet the incidental waste requirements in DOE 435.1, the performance assessment used 10,000 years for the period of analysis.

** The performance assessment used 1,000 years for the period of analysis.

Sensitivity/uncertainty analyses were conducted by identifying the modeling parameters to which the results were most sensitive, then evaluating the impacts by using higher and lower input values than those used for the base case. The results of the sensitivity/uncertainty analysis show that performance objectives could be exceeded if the long-term release rate

from the glass waste form is significantly larger than the rate used in the base case, if the infiltration rate is high and the disposal facility/closure design does not incorporate a sand-gravel diverter, or if the inventory of key radionuclides (i.e., selenium, technetium, or uranium) were significantly larger. These results are judged to be consistent with a reasonable expectation that the performance target for protecting groundwater will be met.

Performance Assessment for the 200 East Area Burial Grounds

PA Component	Measure	200 East Area Burial Grounds Projected Maximum Dose or flux*
All pathways	≤ 25 mrem/yr	0.02 mrem/yr
Air pathway	≤ 10 mrem/yr	< 0.0002 mrem/yr
Radon flux	an average flux of ≤ 20 pCi/m ² /s <i>or</i> an air concentration of ≤ 0.5 pCi/L unless constrained by applicable laws and regulations, or agreements	0.0002 pCi/m ² /s
Hypothetical inadvertent intruder	100 mrem/yr from chronic exposure 500 mrem/yr from a single event	0.02 mrem/yr from chronic exposure < chronic exposure
Water resource protection	Established consistent with laws, agreements or groundwater protection management program Hanford established a performance measure of 4 mrem/year	0.02 mrem/yr

* Maximum doses during the 1000 year compliance period are not reported, therefore, the reported peak doses which occur beyond 1000 years are used to evaluate compliance.

Sensitivity/uncertainty analyses show that the values of parameters used in the base case, and the results of the base case are in the conservative portions of their respective ranges. This supports the premise that the analyses are conservative and that the performance objectives can reasonably be expected to be met.

Performance Assessment for the 200 West Area Burial Grounds

PA Component	Measure	200 West Area Burial Grounds Projected Maximum Dose or flux*
All pathways	≤ 25 mrem/yr	0.47 mrem/yr
Air pathway	≤ 10 mrem/yr	0.012 mrem/yr
Radon flux	an average flux of ≤ 20 pCi/m ² /s <i>or</i> an air concentration of ≤ 0.5 pCi/L unless constrained by applicable laws and regulations, or agreements	0.15 pCi/m ² /s
Hypothetical inadvertent intruder	100 mrem/yr from chronic exposure 500 mrem/yr from a single event	44 mrem/yr from chronic exposure < chronic exposure
Water resource protection	Established consistent with laws, agreements or groundwater protection management program Hanford established a performance measure of 4 mrem/year	0.35 mrem/yr

* Maximum doses during the 1000 year compliance period are not reported, therefore, the reported peak doses which occur beyond 1000 years are used to evaluate compliance.

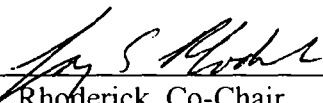
Sensitivity/uncertainty analyses show that the values of parameters used in the base case, and the results of the base case are in the conservative portions of their respective ranges. This supports the premise that the analyses are conservative and that the performance objectives can reasonably be expected to be met.

Composite Analysis, Hanford 200 Area Plateau

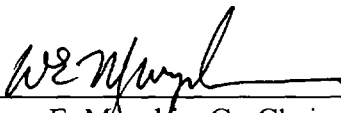
Composite Analysis Component	Measure	Hanford 200 Area Plateau Projected Maximum Dose
All pathways	Composite Analysis dose constraint of 30 mrem/yr	<6 mrem/yr

Sensitivity analysis show that the values of parameters used in the base case and the results of the base case are in the conservative portions of their respective ranges. This supports the premise that the performance measure can reasonably be expected to be met.

LFRG Co-Chairs:



Jay E. Rhoderick, Co-Chair



William E. Murphy, Co-Chair

Date:

SEPARATION

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**Disposal Authorization Statement
for the
Department of Energy Hanford Site
Low-Level Radioactive Waste Disposal Facilities**

Revision No.: 0

Effective Date: October 25, 1999

Background:

The DOE Radioactive Waste Management Order requires that a disposal authorization statement be obtained prior to construction of a new low-level waste disposal facility. Field Elements with existing low-level waste disposal facilities shall obtain a disposal authorization statement in accordance with the schedule in the Complex-Wide Low-Level Waste Management Program Plan. The disposal authorization statement shall be issued based on a review of the facility's performance assessment and composite analysis or appropriate CERCLA documentation. The disposal authorization statement shall specify the limits and conditions on construction, design, operations, and closure of the low-level waste facility based on these reviews. A disposal authorization statement is a part of the required radioactive waste management basis for a disposal facility. Failure to obtain a disposal authorization statement or Record of Decision shall result in shutdown of an operational disposal facility or disapproval to initiate construction of a new facility.

Disposal Authorization Statement:

In fulfillment of the requirements of DOE Radioactive Waste Management Order, this Disposal Authorization Statement is hereby issued authorizing the Hanford Site to transfer, receive, possess, and dispose of low-level radioactive waste at the 200 East Area burial grounds, the 200 West Area burial grounds, and the Immobilized Low-Activity Tank Waste disposal facility.

The Hanford Site shall conduct its low-level waste disposal program in accordance with the requirements contained in the following documents.

200 East Area burial grounds

Performance Assessment for the Disposal of Low-Level Waste in the 200 East Area Burial Grounds, WHC-EP-0645, November, 1995, M.I. Wood, et al.

Letter from M.W. Frei to Charles Hansen, Conditional Acceptance of the Hanford 200 East Area Burial Ground Performance Assessment, 6/30/97.

Addendum to the Performance Assessment Analysis for Low-Level Waste Disposal in the 200 East Area Active Burial Grounds, HNF-2005, Rev. 0, M.I. Wood, 12/21/98.

200 West Area burial grounds

Performance Assessment for the Disposal of Low-Level Waste in the 200 West Area Burial Grounds, WHC-EP-0645, November, 1995, M.I. Wood, et al.

Letter from S.P. Cowan to Charles Hansen, Conditional Acceptance of the Hanford 200 West Area Burial Ground Performance Assessment, 6/30/96.

Addendum to the Performance Assessment Analysis for Low-Level Waste Disposal in the 200 West Area Active Burial Grounds, HNF-SD-WM-TI-798, Rev. 0, M.I. Wood, 12/20/96.

Immobilized Low-Activity Tank Waste Disposal Facility

Hanford Immobilized Low-Activity Tank Waste Performance Assessment, DOE/RL-97-69, March 1998, F.M. Mann, et al.

Letter from J. Fiore and M. Frei to Manager for Hanford Office of River Protection and Manager for Richland Operations Office dated September 1999, Subject: Conditional Acceptance of the Immobilized Low-Activity Tank Waste Disposal Facility Performance Assessment and Hanford Site 200 Plateau Composite Analysis.

Hanford Site

Composite Analysis for Low-Level Waste Disposal in the 200 Area Plateau of the Hanford Site, PNNL-11800, March 1998, C.T. Kincaid, et al.

Letter from J. Fiore and M. Frei to Manager for Hanford Office of River Protection and Manager for Richland Operations Office dated September 1999, Subject: Conditional Acceptance of the Immobilized Low-Activity Tank Waste Disposal Facility Performance Assessment and Hanford Site 200 Plateau Composite Analysis.

This Disposal Authorization Statement is subject to all applicable rules and Orders now or hereafter in effect and to all conditions specified below. Also, this authorization is applicable to any subsequent revisions and additions to the performance assessments and the composite analysis provided such revisions and additions are in accordance with the performance assessment and composite analysis maintenance program. Applicable permits and reports that comprise the Radioactive Waste Management Basis shall be approved and continue to be maintained current according to the applicable DOE Orders and regulations.

Facility Construction and Design

The 200 East Area burial grounds consists of three types of earthen trenches described in the performance assessment: Category 1 trenches, Category 3 trenches, and trenches for Naval reactor components. The design features of each disposal unit constructed in the field shall conform to the conceptual model used in the performance assessment or special analysis. Any changes in disposal

technology, disposal unit, or waste form must be analyzed and authorized according to the performance assessment and composite analysis maintenance program and approved by DOE. The 200 West Area burial grounds consists of two types of earthen trenches described in the performance assessment: Category 1 trenches and Category 3 trenches. The design features of each disposal unit constructed in the field shall conform to the conceptual model used in the performance assessment or special analysis. Any changes in disposal technology, disposal unit, or waste form must be analyzed and authorized according to the performance assessment and composite analysis maintenance program and approved by DOE.

The Immobilized Low-Activity Tank Waste disposal facility consists of concrete vaults containing glass waste forms from the vitrification of low-activity waste from treatment of Hanford tank waste. This combination of disposal unit and waste form has been analyzed in the Hanford Immobilized Low-Activity Tank Waste performance assessment. The design features of each disposal unit constructed in the field shall conform to the design limits derived from the conceptual models used in the performance assessment or special analysis. Any changes in disposal technology, disposal unit or waste form must be analyzed according to the performance assessment and composite analysis maintenance program and approved by DOE.

Radionuclide Limits, Waste Form, and Packaging

Each disposal unit within the 200 East Area burial grounds, the 200 West Area burial grounds, and the Immobilized Low-Activity Tank Waste disposal facility shall have waste acceptance criteria which provide specific radionuclide disposal limits, waste form restrictions, and descriptions of acceptable waste packages. The waste acceptance criteria shall be based on facility performance assessments, special analyses, and composite analyses as well as safety documentation and criticality considerations. Waste acceptance procedures shall be in place that describe requirements for waste characterization, waste certification and record keeping, as well as the process for authorizing deviations from the requirements. All waste received for disposal at these facilities must conform to the waste acceptance procedures. The waste acceptance criteria shall be reviewed and approved through the facility Radioactive Waste Management Basis.

Closure

Closure plans for the 200 East Area burial grounds, the 200 West Area burial grounds, and the Immobilized Low-Activity Tank Waste disposal facility shall be prepared within one year of the issuance of this disposal authorization statement and submitted to the Richland Operations Office and Office of River Protection for review and approval. These closure plans must address any outstanding closure commitments from the review of the 200 East Area Burial Grounds, the 200 West Area Burial Grounds, and the Immobilized Low-Activity Tank Waste Disposal Facility performance assessments and the composite analysis. Any deviations in the closure plan from the closure concept analyzed in the performance assessments must be analyzed and approved per the performance assessment and composite analysis maintenance program.

Monitoring

Monitoring plans for the 200 East Area burial grounds and the 200 West Area burial grounds shall be written, and approved by the Richland Operations Office. The monitoring plan for the Immobilized Low-Activity Tank Waste disposal facility shall be written, and approved by the Office of River Protection. The monitoring plans shall be implemented within one year of the issuance of this disposal authorization statement. These plans shall be updated at least every five years to reflect

changing facility conditions. The plans shall include monitoring frequencies and protocols for all the data collection required to assess the continued performance of the disposal facilities. These plans shall also include a requirement for comparison with the performance assessment results and development of any corrective action necessary.

Performance Assessment and Composite Analysis Maintenance

Maintenance plans shall be written and approved by the Richland Operations Office for the 200 East Area burial grounds, and the 200 West Area burial grounds, and by Office of River Protection for the Immobilized Low-Activity Tank Waste disposal facility performance assessments and the composite analysis by March 31, 1999. Changes in the disposal facility operation (e.g., waste form, disposal unit design, radionuclide quantity) or in site policy (e.g., land use plan) or strategy (e.g., closure plans, remedial actions) and consequent changes in disposal facility controls shall be managed per the performance assessment and composite analysis maintenance program.

Copies of the annual review of the adequacy of the performance assessments and the composite analysis shall be provided to the Low-Level Waste Disposal Facility Federal Review Group (LFRG).

200 East Area Burial Grounds Performance Assessment Conditions

Provide to the LFRG, within eight months of the date of issuance of this disposal authorization statement, a response to the open condition of acceptance of the performance assessment. The Richland Operations Office shall complete and document a review of the adequacy of waste characterization relative to the data needs of the 200 East Area burial grounds performance assessment. The reliability and accuracy of waste characterization data was an item of concern raised during the review of the performance assessment. The review shall be expanded to include the data needs of the 200 West Area Burial Grounds performance assessment.

Also, provide to the LFRG, within eight months of the date of issuance of this disposal authorization statement, a statement confirming that the status of the disposal facility has not changed since approval of the performance assessment.

200 West Area Burial Grounds Performance Assessment Condition

Provide to the LFRG, within eight months of the date of issuance of this disposal authorization statement, the review of the adequacy of waste characterization relative to the data needs of the 200 East Area and 200 West Area performance assessments.

Also, provide to the LFRG, within eight months of the date of issuance of this disposal authorization statement, a statement confirming that the status of the disposal facility has not changed since approval of the performance assessment.

Environmental Restoration Disposal Facility Condition

The operation of the Environmental Restoration Disposal Facility is authorized by an existing CERCLA Record of Decision. Defense Nuclear Facilities Safety Board Recommendation 94-2 Implementation Plan mentioned that a composite analysis for Environmental Restoration Disposal Facility would "be approved by Headquarters." The review by LFRG completes the approval of the composite analysis for Environmental Restoration Disposal Facility. To ensure consistency between the Record of Decision and the DOE Order 435.1 requirements, the Richland Operations Office is

requested to provide to the DOE Office of Environmental Restoration, within eight months of the date of issuance of this disposal authorization statement, a crosswalk demonstrating that the substantive requirements of DOE Order 435.1 have been fulfilled. An acceptable crosswalk will complete the administrative record process and sustain the applicability of the composite analysis standards to the Environmental Restoration Disposal Facility. The disposal authorization statement for the Environmental Restoration Disposal Facility will be considered satisfied by the issuance of the Record of Decision and DOE acceptance of the crosswalk, which will complete the administrative record process.

Immobilized Low-Activity Tank Waste Disposal Facility Performance Assessment Conditions

Provide to the LFRG, per the schedule committed to in the supplemental information provided the Hanford Review Team, documentation of the near-term glass activities to provide confidence that the glass performance assumed in the performance assessment can actually be achieved. The activities and schedule are:

Issue to the LFRG, by December 31, 1999, a status report, including a data package, on the testing of the LAWABPI glass, the screening tests of approximately 50 glasses by Office of Science and Technology, and additional testing on a selected subset (approximately 5) of the Office of Science and Technology glasses. The status report shall include the results from the short-term product consistency test and vapor hydration test experiments on all glasses. Data from the LAWABPI glass and the selected subset of the Office of Science and Technology glasses shall also include results of pressurized unsaturated flow test experiments, single pass flow through tests and mid-term pressurized unsaturated flow tests.

The secondary issues identified in the Hanford review team report shall be addressed as the performance assessment is maintained.

Hanford Site Composite Analysis Conditions

Provide to the LFRG, by September 30, 2001, an addendum to the composite analysis that addresses the following:

Bounding sensitivity analyses of the impact on the composite analysis results of the PUREX tunnels, the chemical separations plants and the CERCLA sites in the 200 Area.

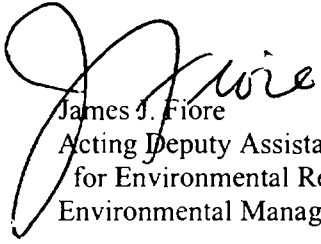
Commit either to remediate the Gable Mountain Pond to ensure acceptable dose levels by the planned time of public release or to include it within the 200 Area buffer zone and exclusive waste management area. If the latter is selected, the inclusion of Gable Mountain Pond within the 200 Area buffer zone and exclusive waste management area shall be integrated with Hanford's land use planning documentation.

The secondary issues identified in the Hanford review team report shall be addressed as the composite analysis is maintained. Also, the following secondary issue, identified during the August 16-17, 1999 LFRG meeting shall be addressed as the composite analysis is maintained:

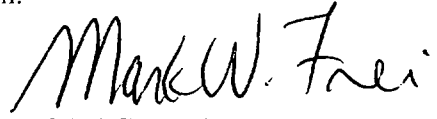
Provide justification for the assumption that the basalt aquifers and interbeds do not contain significant contaminants.

Violations of Operational Requirements

Performance assessment and composite analysis commitments that are not met will result in the review of the applicability of continued disposal authorization.



James J. Fiore
Acting Deputy Assistant Secretary
for Environmental Restoration
Environmental Management



Mark W. Frei
Acting Deputy Assistant Secretary
for Waste Management
Environmental Management

Date: