



UNITED STATES
NUCLEAR REGULATORY COMMISSION
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September 27, 2023

MEMORANDUM TO:

Stephen Koenick
Low-Level Waste and Projects Branch
Division of Decommissioning, Uranium Recovery,
and Waste Programs
Office of Nuclear Material Safety
and Safeguards

THROUGH:

Christopher McKenney, Chief
Risk and Technical Analysis Branch
Division of Decommissioning, Uranium Recovery,
and Waste Programs
Office of Nuclear Material Safety
and Safeguards

Handwritten signature of Christopher McKenney in black ink.

Signed by McKenney, Christopher
on 09/19/23

FROM:

Cynthia Barr, Senior Risk Analyst
Risk and Technical Analysis Branch
Division of Decommissioning, Uranium Recovery,
and Waste Programs
Office of Nuclear Material Safety
and Safeguards

Handwritten signature of Cynthia Barr in black ink.

Signed by Barr, Cynthia
on 09/27/23

SUBJECT:

TECHNICAL REVIEW OF ENVIRONMENTAL MONITORING
REPORTS FOR F- AND H-TANK FARM FACILITIES AT THE
SAVANNAH RIVER SITE (PROJECT NO. PROJ0734)

Monitoring is performed on the General Separations Area (GSA) of the Savannah River Site in Aiken, SC. The U.S. Nuclear Regulatory Commission (NRC) has performed a technical review of a collection of documents prepared by the U.S. Department of Energy (DOE) that provide information about recent groundwater monitoring and studies to determine the extent of natural attenuation of key radionuclides in the subsurface at the F-Tank Farm (FTF) and H-Tank Farm (HTF) facilities on the GSA. This technical review report is an update to four previous reports on the same topic dated May 14, 2021, December 17, 2019, April 20, 2018, and March 31, 2015 (Agencywide Documents Access and Management System [ADAMS] Accession Nos. [ML21119A312](#), [ML19280A059](#), [ML18051B154](#), and [ML12272A124](#)) with the former reports evaluating the FTF facility and HTF facility monitoring well networks, lysimeter and natural attenuation studies, and general trends in groundwater quality parameters.

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This technical review is associated with Monitoring Factors (MFs) 4.1, "Natural Attenuation of Key Radionuclides," and 4.3, "Environmental Monitoring," listed in the NRC's combined FTF and HTF monitoring plan entitled "U.S. Nuclear Regulatory Commission Plan for Monitoring Disposal Actions Taken by the U.S. Department of Energy at the Savannah River Site (SRS) F-Area and H-Area Tank Farm Facilities in Accordance with the National Defense Authorization Act for Fiscal Year 2005," issued in October 2015 and available using ADAMS Accession No. [ML15238A761](#).

Previous staff conclusions related to review of the environmental monitoring reports remain valid and include the following:

1. DOE has performed environmental monitoring that provides useful information on the hydrogeological systems at FTF and HTF. This information can also be used to better understand contaminant flow and transport at the TFFs and provide support for DOE PA models, particularly the updated 2018 GSA PORFLOW model. Modeling and monitoring should be conducted iteratively as information is collected to help reduce hydrogeological uncertainties.
2. Significant uncertainty in the source of contaminant plumes detected via the FTF and HTF monitoring well networks exists. A better understanding of contaminant flow and transport processes at the TFFs through more extensive data analysis, modeling, and conceptual model development would provide additional confidence in modeling results. For example, geochemical data could be evaluated to develop spatial and temporal correlations, evaluate trends, and identify sources. Additional particle tracking simulations could be conducted to help identify the source of contaminant plumes and validate observed versus modeled travel times.
3. PA modeling and groundwater monitoring at the TFFs could be better integrated. PA modeling could be used to determine key constituents and the types of field monitoring data, which would provide the most useful information to evaluate performance of, and detect early releases from, the TFFs. Data from the monitoring program could be used to evaluate model performance and help develop conceptual models for contaminant flow and transport.
4. The latest GSA groundwater model should be used to establish the monitoring well network, particularly to inform vertical placement of wells when such opportunities for additions or other changes to the monitoring well network exist in the future.

NRC findings with respect to the colloid transport report review include the following:

- The complexity of Pu geochemical behavior and groundwater transport leads to uncertainty in PA modeling predictions. Colloid associations and redox behavior of Pu can be transient and episodic along groundwater transport pathways.
- Evidence of more mobile, oxidized forms of Pu in the subsurface exists and should be further evaluated in PA models and the potential risk assessed.

In this report, there is no significant change to the NRC staff overall conclusions from the NRC Technical Evaluation Report (TER) for the FTF dated October 2011 (ADAMS Accession No. [ML112371751](#)) or the NRC TER for the HTF dated June 2014 (ADAMS Accession No. [ML14094A496](#)) regarding compliance of the DOE disposal actions with the requirements of

the performance objectives in 10 CFR Part 61, Subpart C. NRC staff will continue to monitor DOE activities in this area under MFs 4.1, "Natural Attenuation of Key Radionuclides," and 4.3, "Environmental Monitoring" under NRC staff's Tank Farms Monitoring Plan (ADAMS Accession No. [ML15238A761](#)).

Enclosure:
Technical Review of Environmental
Monitoring Reports for F-Area and H-Area
Tank Farm Facilities

Docket No. PROJ0734

Cc w/ enclosure:
DPickett, SWRI
WIR List Serv

Technical Review of Environmental Monitoring Reports F and H Tank Farm Facilities at Savannah River Site DATE September 27, 2023

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