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September 25, 2015  
Contract No. NRC-HQ-12-C-02-0089  
Task Order 4  
Project No. 17860.04

Mr. Maurice Heath  
U.S. Nuclear Regulatory Commission  
Office of Nuclear Material Safety and Safeguards  
Division of Decommissioning, Uranium Recovery, and Waste Programs  
Mail Stop: TWFN-8F8  
Washington, DC 20555

**SUBJECT:** Intermediate Milestone 17860.04.001.511, Letter Report—Summary of Technical Assistance (Joint With Subtask 1-2)

Dear Mr. Heath:

This letter documents a portion of Center for Nuclear Waste Regulatory Analyses (CNWRA®) technical assistance activities conducted from September 27, 2014 to September 25, 2015, (corresponding to Southwest Research Institute® fiscal year 2015) under Task Order 4 of Contract No. NRC-HQ-12-C-02-0089. CNWRA assists the U.S. Nuclear Regulatory Commission (NRC) in meeting its statutory responsibilities under the Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 (NDAA). The technical assistance is provided to the Division of Decommissioning, Uranium Recovery, and Waste Programs of the Office of Nuclear Material Safety and Safeguards to support NRC technical reviews of the non-high-level waste (non-HLW) determinations that the U.S. Department of Energy (DOE) prepared for facilities at Savannah River Site (SRS) and Idaho National Laboratory and subsequent monitoring of DOE disposal and closure activities. These reviews evaluate information DOE provides to support its non-HLW determinations, including site characterization data and performance assessments used by DOE to demonstrate compliance with NDAA criteria. As directed by the NRC contracting officer's representative (COR), CNWRA also supports the development of NRC monitoring plans, participates in site visits, and reviews site environmental monitoring reports. As appropriate, CNWRA works with the NRC staff to develop guidance documents to support NRC reviews of future DOE non-HLW determinations. In addition, CNWRA conducts independent, proactive, risk-informed technical investigations that help provide the technical bases for NRC review and monitoring actions.

While the CNWRA assistance is conducted in three task areas under Task Order 4, this letter addresses activities only for Task Area 1, titled "Reactive Support of Non-High-Level Waste Determinations." Subtask 1-1 addresses consultation [Section 3 116(a)] responsibilities under the NDAA, and Subtask 1-2 addresses monitoring [Section 3 116(b)] responsibilities.

Following are summary descriptions of the technical assistance provided by CNWRA during fiscal year 2015 for Task Area 1. Proactive technical work in Task Area 3 is documented in three separate intermediate milestones. At the direction of the COR, an annual summary has not been prepared for Task Area 2.



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*Task Area 1—Reactive Support of Non-High-Level Waste Determinations*

Subtask 1-1: Consultation on Waste Determinations for Savannah River Site

Because technical evaluation reports have been published for F-Area Tank Farm, H-Area Tank Farm, and the Saltstone Disposal Facility, CNWRA was not directed to work on this subtask during fiscal year 2015. NRC NDAA responsibilities are currently focused on monitoring activities.

Subtask 1-2: Monitoring Disposal Actions at Savannah River Site

In supporting NRC's monitoring activities, CNWRA was responsive to needs for technical assistance as they arose at various times during the year. During October 2014, CNWRA participated in a technical exchange between NRC and DOE contractors regarding the F-Area Tanks 5 and 6 grouting operations and provided NRC with a set of detailed meeting notes to support the development of meeting minutes.<sup>1</sup> At NRC's request, several related documents (SRS technical reports, an ASTM specification, and a concrete pump primer testing report) were reviewed. CNWRA also contributed to a related list of technical questions for DOE about their grouting operations. In November and December 2014, contributions were made to and several reviews were provided for finalization of the Technical Review Report on Tanks 5 and 6 grouting operations; this report was published by NRC in December 2014<sup>2</sup> and was lauded for its level of detail and high quality.

During April and May 2015, CNWRA staff assisted NRC's development of an updated SRS tank closure monitoring plan, which added the H-Area Tank Farm to the existing monitoring plan for F-Area Tank Farm closure monitoring. (The updated monitoring plan has not been published.)

In August 2015, CNWRA reviewed a newly available DOE contractor report on grout drop height experimentation. A review also was conducted of a DOE presentation on the grout mounding issues that occurred during grouting of Tank H-16, which led to the DOE decision to fill the remainder of Tank 16 with more flowable clean saltstone.

An assessment was provided of the structural integrity and performance of SRS F-Area tanks after closure in response to site settlement and degradation of concrete material. Documents were reviewed to assess the assumptions, analysis approaches, and data used in a DOE evaluation of the long-term structural integrity of grout-filled HLW tanks and stability of the tank

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<sup>1</sup>U.S. Nuclear Regulatory Commission. Summary of Telephone Conference Call Held on October 29, 2014, Between the U.S. Nuclear Regulatory Commission Staff and Department of Energy Representatives Concerning NRC Staff Questions Regarding Tanks 5 and 6 Grouting Operations. ADAMS Accession No. ML14330A037. December 2014.

<sup>2</sup>U.S. Nuclear Regulatory Commission. Technical Review: U.S. Department of Energy Documentation Related to Tanks 5F and 6F Final Configurations with an Emphasis on Grouting from Recommendations and Testing to Final Specifications and Procedures (Project No. PROJ0734). ADAMS Accession No. ML14342A784. December 2014.

foundations. The structural analysis is risk-significant because cracking (or the formation of separation gaps) could lead to significantly less attenuation and higher release rates of key radionuclides as a result of: (i) limited conditioning of the infiltrating groundwater by the overlying reducing grout due to flow through preferential pathways; (ii) more rapid corrosion of the steel liner than assumed in the performance assessment; and (iii) bypass flow through or around the basemat.

The DOE structural evaluation assumes that a grout-filled tank will behave as a rigid monolith. The CNWRA review<sup>3</sup> determined that several features, events, and processes could invalidate the monolith assumption, including grout shrinkage and material degradation. Additionally, in DOE's long-term structural analyses, the assumption that the grouted tank and vault system is a solid monolith may lead to an underestimation of the detrimental impacts associated with seismically-induced ground motion and settlement, as well as other processes, such as liquefaction and calcareous zone dissolution. As part of this technical assistance, CNWRA participated with NRC in a technical meeting with DOE on site stability, discussing CNWRA and NRC comments and further information and clarifications needed from DOE based on the review. NRC is awaiting DOE responses to the comments and questions.

### *Summary*

During fiscal year 2015, CNWRA continued to be flexible and responsive to NRC needs for technical assistance in the reactive NDAA activities. Frequent communications with the NRC project staff ensured proper programmatic and technical focus, and CNWRA provided high quality review products. A key factor in CNWRA's ability to contribute effectively is our long experience, both as an organization and as individuals, with tank closure-related technical topics. We look forward to continuing our contributions to this important program.

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<sup>3</sup>U.S. Nuclear Regulatory Commission. Comments on Long-Term Structural Assessment for F-Tank Farm Facility T-CLC-F-00421, *Structural Assessment of F-Area Tank Farm After Final Closure*. ADAMS Accession No. ML15244A905. September 2015.

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Additional details on the activities discussed in this letter can be provided at your request. Should you have any questions regarding the information provided in this letter, please contact me at 210.522.5582 or dpickett@swri.org.

Sincerely yours,



David A. Pickett, Ph.D., P.G.  
Senior Program Manager  
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cc:	<u>NRC</u>	<u>CNWRA</u>
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