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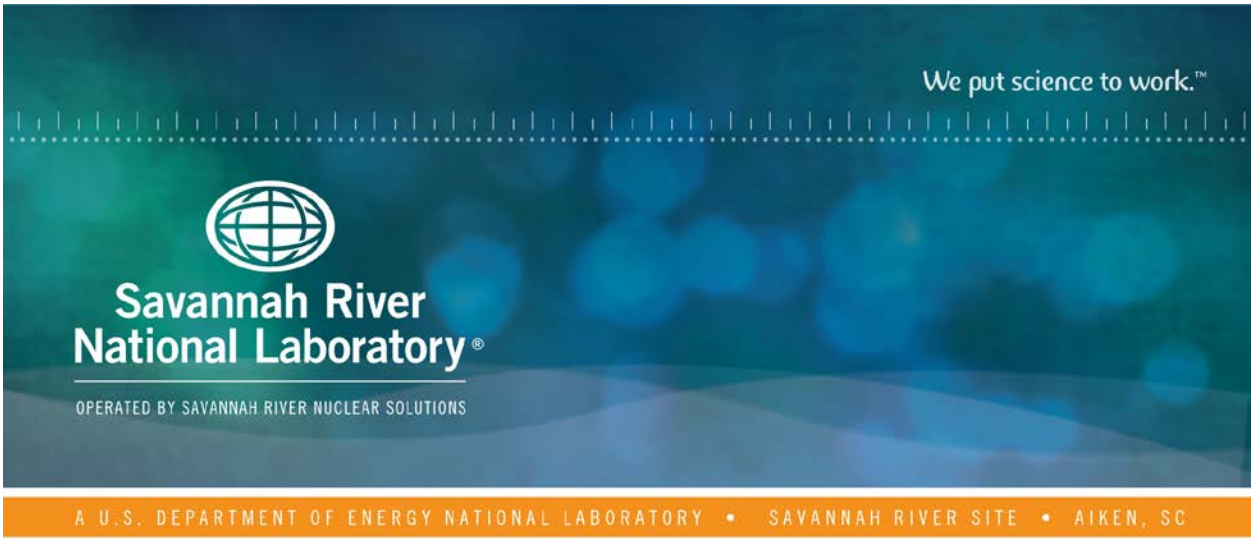

Results of Second Set of Analyses of the Salt Waste Processing Facility (SWPF) Batch 2 Tank 21H Qualification Samples

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EXECUTIVE SUMMARY

Savannah River National Laboratory (SRNL) analyzed samples from Tank 21H in support of qualification of Salt Waste Processing Facility (SWPF) Batch 2 for processing. This document reports the second set of results of the analyses of the Tank 21H qualification sample. Analysis of the Tank 21H SWPF Batch 2 sample indicates that the material contains measured analytes in typical concentrations. This memo along with the previous results memo [i] satisfies Deliverable 3 of the Technical Task Request (TTR).[ii]

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LIST OF ABBREVIATIONS

MCU	Modular Caustic-Side Solvent Extraction Unit
%RSD	Percent Relative Standard Deviation
SRNL	Savannah River National Laboratory
SRR	Savannah River Remediation
SWPF	Salt Waste Processing Facility
TTR	Technical Task Request
TTQAP	Task Technical and Quality Assurance Plan
WAC	Waste Acceptance Criteria

1.0 Introduction

This report provides the second set of analytical laboratory results of SWPF Batch 2 samples from Tank 21H. These results will be used by Savannah River Remediation (SRR) for information and planning purposes. This work was specified by a TTR [ii] and Task Technical and Quality Assurance Plan (TTQAP).[iii] Details for the work are contained in controlled laboratory notebooks.[iv]

This document provides the longer turnaround results (analytes and analytical methods are described in Table 4-2 of the TTQAP).

2.0 Experimental Procedure

A 3L sample (HTF-21-19-86) was pulled and delivered to SRNL on September 10th, 2019.
The 3L sample was a variable depth sample obtained at pump suction depth (approximately 62" from the bottom of the tank). Tank 21H was mixed for approximately 8.3 hours with two pumps on August 30th, 2019 before the sample was pulled; the sample was pulled 11 days after pump shutdown. The sample was visually a clear solution with no apparent solids.

For the mercury measurements, approximately 1.5 mL of unfiltered sample was diluted into 39 mL of ultrapure water in a glass vial with a Teflon cap with almost no headspace and refrigerated until analysis. Per AD guidance, immediate acidification as a part of dilution in the Shielded Cells was avoided as the two methods (total mercury and methyl mercury) require different sample preparations and long term sample storage was not anticipated.[v]

For the filtered samples, filtration was provided by using a 0.45 μm syringe filter and the filtrate was submitted for analysis without dilution.

2.1 Quality Assurance

Requirements for performing reviews of technical reports and the extent of review are established in Manual E7, Procedure 2.60. This is Safety Class work. SRNL documents the extent and type of review for Safety Class work using the SRNL Technical Report Design Checklist (design verification) contained in WSRC-IM-2002-00011, Rev. 2. The work performed, all analyses, and the review process for this report complies with those requirements. Results from this report are not subject to RW-0333P enhanced quality assurance requirements as per the TTR.

3.0 Results and Discussion

The results of the various long-term analyses are listed in Table 1. These results represent values for filtered samples except for the methyl mercury (Me-Hg), which was unfiltered. The values in the parentheses are the %RSD.

Table 1. Long-Term Analyses Results

Analyte	Result (pCi/mL)
^{99}Tc	4.19E+04 (11%)
^{129}I	<4.42E+01
^{144}Ce	<6.32E+01
^{241}Am	4.93E+00 (11%)
^{244}Cm	1.76E+01 (2.0%)
^{245}Cm	<1.66E+01
^{241}Pu	1.85E+04 (1.9%)
^{3}H	3.80E+03 (1.7%)
^{14}C	9.78E+02 (58%)
^{60}Co	<1.91E+01
^{125}Sb	6.28E+02 (2.1%)
^{126}Sn	5.26E+02 (1.8%)
^{154}Eu	<6.32E+00
^{155}Eu	<3.64E+01
^{232}Th	<1.10E-04
^{237}Np	6.66E+00 (1.2%)
Me-Hg	29.7 (3.5%) mg/L

The Me-Hg, ^{232}Th, and ^{237}Np 1-sigma analytical uncertainty is 20%. The 1-sigma analytical uncertainly is 6.1-6.3% (sample specific) for the ^{99}Tc results, 26-28% (sample specific) for the ^{241}Am, 16% for the ^{241}Pu results, 11% for the ^{3}H results, 23-56% (sample specific) for the ^{14}C results, 5% for the ^{125}Sb results, and 7% for the ^{126}Sn results.

The radiochemical results are typical of previous salt batches.

4.0 Conclusions

Analysis of the Tank 21H SWPF Batch 2 sample indicates that the material contains measured analytes in typical concentrations. This memo along with the previous results memo [i] satisfies Deliverable 3 of the TTR.

5.0 References

[i] T. B. Peters, "Results of Initial Analyses of the Salt Waste Processing Facility (SWPF) Batch 2 Tank 21H Qualification Samples", SRNL-STI-2019-00621, Rev. 0, October 2019.

[ii] A. Samadi-Dezfouli, "Salt Batch Qualification for Feed to Salt Waste Processing Facility", X TTR-H-00090, Rev. 0, August 27, 2019.

[iii] T. B. Peters, "Task Technical and Quality Assurance Plan for SWPF Feed Batch Qualification Testing", SRNL-RP-2019-00582, Rev. 0, September 2019.

[iv] T. B. Peters, "SWPF 2 Batch Qualification", ELN, A4571-00084-43.

[v] W. R. Wilmarth, "Best Handling Practices for Elemental Mercury, Organo-Mercury, and Inorganic Mercury Compounds", SRNL-TR-2019-00243, Rev.0, August 29, 2019.

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