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Results of Analyses of the Macrobatches 4 Tank 49H Confirmatory Sample

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EXECUTIVE SUMMARY

Savannah River National Laboratory (SRNL) analyzed samples from Tank 49H in support of qualification of Salt (Macro)Batch 4 for the Integrated Salt Disposition Project (ISDP). This document reports the results of the analyses of the confirmatory sample of Tank 49H. All sample results either agree with expectations based on prior analyses or are considered trivial enough not to warrant concern. No issues with the projected Salt Batch 4 strategy are identified.

LIST OF ABBREVIATIONS

AD - Analytical Development
ARP - Actinide Removal Project
ICPES - inductively coupled plasma emission spectroscopy
ISDP - Integrated Salt Disposition Project
RSD – Relative Standard Deviation
SRNL - Savannah River National Laboratory
TIC-TOC- total inorganic carbon-total organic carbon
TTQAP - Task Technical and Quality Assurance Plan
TTR - Technical Task Request
% RSD - percent relative standard deviation

1.0 Introduction

This report describes the laboratory results of Salt (Macro)Batch 4 confirmatory sample. These results will be used by Tank Farm Engineering for their blend calculations. This work was specified by Technical Task Request (TTR)¹ and by Task Technical and Quality Assurance Plan (TTQAP).²

Details for the work are contained in controlled laboratory notebooks.³

2.0 Experimental Procedure

A Tank49H sample (i.e., dip sample bottle HTF-49-11-108) arrived at SRNL on October 10, 2011. The sample was optically clear, with no visible solids present. The researchers measured the density of the solution (Table 1).

After the density measurements, samples were sent to Analytical Development (AD) for analysis.

3.0 Results and Discussion

Table 1. Density Result from the Tank 49H Sample (25 °C)

Sample	Density Result (g/mL)
HTF-49-11-108	1.271

The analytical uncertainty is typically <1% for density measurements. After the density measurement, samples were sent to AD for analysis.

The tank samples were analyzed by Analytical Development (AD) for cesium content by Inductively Coupled Plasma Emission Spectroscopy (ICPES), for free hydroxide, anion content, for Total Inorganic Carbon-Total Organic Carbon (TIC/TOC).

Table 2 shows the results from the analyses for the Tank 49H sample.

Table 2. Chemical Results for the Tank 49H Analyses

Analyte	Result (%uncertainty)	Expected Value
Al	4110 mg/L (10%)	4104 mg/L
K	381 mg/L (10%)	452 mg/L
Na	151000 mg/L (10%)	157000 mg/L
Si	61.3 mg/L (10%)	73.9 mg/L
Free Hydroxide	2.81 M (10%)	2.65 M
Total Base	3.12 M (10%)	N.A.
Total Inorganic Carbon	3120 mg/L (10%)	2900 mg/L *
Total Organic Carbon	260 mg/L (10%)	N.A.
nitrate	156000 mg/L (10%)	197000 mg/L
nitrite	39000 mg/L (10%)	41300 mg/L
sulfate	4890 mg/L (10%)	6390 mg/L
chloride	118 mg/L (10%)	148 mg/L
phosphate	508 mg/L (10%)	447 mg/L
oxalate	121 mg/L (10%)	192 mg/L
¹³⁷ Cs	5.54E+07 pCi/mL (5.00%)	5.45E+07 pCi/mL

N.A. = analyte concentration was not predicted

* as carbonate

4.0 Conclusions

All sample results either agree with expectations based on prior analyses or are considered trivial enough not to warrant concern. No issues with the projected Salt Batch 4 strategy are identified.

5.0 References

¹ A. R. Shafer, “Qualification of ISDP Salt Batch 4”, HLW-DWPF-TTR-2010-0035, September 14, 2010.

² T. B. Peters and S. D. Fink, “Task Technical and Quality Assurance Plan for ISDP Salt Batch 4 Sample Qualification”, SRNL-RP-2010-01433, Rev.0, November 30, 2010.

³ T. B. Peters, “ISDP4”, SRNL-NB-2011-00027, February 18, 2011.

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