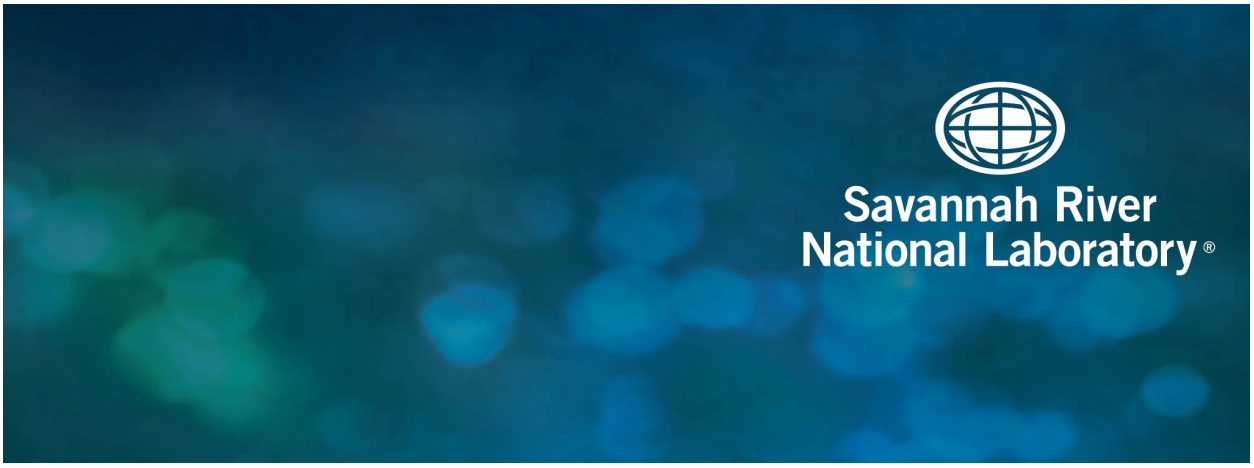
Contract No:

This document was prepared in conjunction with work accomplished under Contract No. 89303321CEM000080 with the U.S. Department of Energy (DOE) Office of Environmental Management (EM).

Disclaimer:



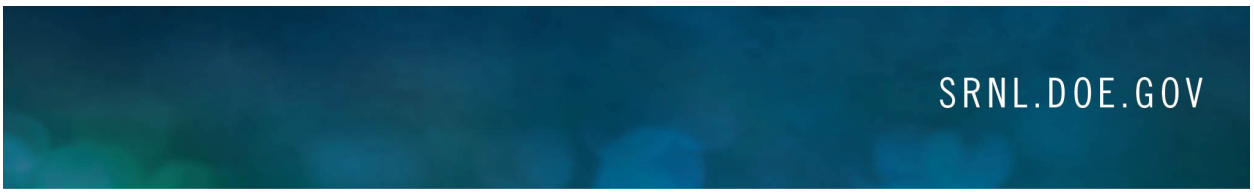
A U.S. DEPARTMENT OF ENERGY NATIONAL LAB • SAVANNAH RIVER SITE • AIKEN, SC • USA

Organomercury Measurements from Sludge Batch 10 Simulant Studies

W. H. Woodham

April 2022

SRNL-STI-2022-00079, Revision 0



DISCLAIMER

Printed in the United States of America

Prepared for
U.S. Department of Energy

SRNL-STI-2022-00079
Revision 0

Keywords: *Mercury, Sludge, DWPF*

Retention: *Permanent*

Organomercury Measurements from Sludge Batch 10 Simulant Studies

W. H. Woodham

April 2022

Savannah River National Laboratory is operated by Battelle Savannah River Alliance for the U.S. Department of Energy under Contract No. 89303321CEM000080.

REVIEWS AND APPROVALS

AUTHORS:

_____
W. H. Woodham, Chemical Flowsheet Development

TECHNICAL REVIEW:

_____
S. C. Hunter, Chemical Flowsheet Development, Design Verification per E7 2.60

APPROVAL:

_____
G. A. Morgan, Jr., Manager
Chemical Flowsheet Development

_____
F. M. Pennebaker, Manager
Chemical Processing

_____
R. T. McNew, Manager
Flowsheet Development and Facility Integration

_____
R. M. Hoeppel, Manager
DWPF/Saltstone Facility Engineering

EXECUTIVE SUMMARY

Researchers at the Savannah River National Laboratory have recently performed testing to evaluate the Sludge Batch 10 flowsheet using simulated sludge waste. In the course of this testing several samples were taken to determine the concentration of organomercury species resulting from sludge batch processing. These samples were submitted to the Savannah River National Laboratory Sensing and Metrology department quantitation using a mercury analyzer. The signal amplifier used to perform organomercury quantitation in the mercury analyzer experienced a malfunction in the course of analysis, leading to uncertainty of organomercury concentrations observed. Seventy-three organomercury samples from six project submissions to the Savannah River National Laboratory Sensing and Metrology department have been critically reviewed.

Project Number	Measurement Type	# of Samples	Sample Description
210119-1	MeHg	6	Supernatant and Condensate Measurements from Tk40-1/-2 Tests
210225-1	MeHg	5	Condensate Measurements from Tk40-7 and Tk51-4 Tests
210408-1	MeHg	30	Supernatant and Condensate Measurements from Tk40 and Tk51 Tests
210506-1	MeHg	26	Coupled Operations Condensates from Tk40 Tests
210616-1	EtHg	2	Scoping Ethylmercury Measurements from Tk40-8
210712-5	MeHg	4	Supernatant and Condensate Measurements from Tk51-3
Total		**73**	**Samples Potentially Impacted**

Of these six projects, five are able to be reported with varying degrees of quality control:

- Project 210119-1 was reported in SRNL-STI-2021-00349, Rev. 0 and was unimpacted by the instrument malfunction (for production support use)
- Project 210225-1 was found to be unimpacted by the instrument malfunction (for production support use)
- Project 210408-1 was found to be partially impacted by the instrument malfunction
    - Twelve samples were unimpacted (for production support use)
    - Eighteen samples were impacted (for illustrative/academic use only)
- Project 210506-1 was fully impacted by the instrument malfunction and is unable to be reported
- Project 210616-1 was found to be unimpacted by the instrument malfunction (for production support use)
- Project 210712-5 was found to be unimpacted by the instrument malfunction (for production support use)

The following conclusions are offered as a result of this work:

- A single measurement of ethylmercury (0.12 mg L^{-1}) was observed in Sludge Batch 10 testing. While this measurement was confirmed to be unaffected by the instrument failure, it is uncertain if this observation is representative of real waste behavior given that no ethyl groups were deliberately added to Sludge Batch 10 simulant testing.
- The majority of methylmercury measurements made during Sludge Batch 10 testing were shown to be unimpacted by the instrument failure and may be used with the same standard of quality assurance as data reported in the Sludge Batch 10 simulant report.
- Methylmercury measurements suggest patterns of behavior during Chemical Process Cell processing:
    - Methylmercury is likely formed throughout the Chemical Process Cell (Sludge Receipt and Adjustment Tank and Slurry Mix Evaporator cycles)

- Methylmercury is likely generated in the Sludge Receipt and Adjustment Tank and Slurry Mix Evaporator kettles (i.e., not exclusively formed in condensate or off-gas)
- Methylmercury is likely either consumed or is volatile enough to vaporize during Chemical Process Cell processing and enter the condensate/off-gas streams
- Methylmercury formation is likely dominant at the beginning of the Sludge Receipt and Adjustment Tank cycle when mercury metal is present at the highest concentrations

The following recommendations are made as a result of this work:

- The results reported here should be compared to results obtained from radioactive waste experiments with Sludge Batch 10 sludge to determine similarities in organomercury behavior.
- Future experiments designed to investigate methylmercury formation should focus efforts on the first parts of the Sludge Receipt and Adjustment Tank cycle, as these parts of the run seem most likely to yield the highest concentrations of organomercury.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ABBREVIATIONS

CPC	Chemical Process Cell
EtHg	Ethylmercury
MeHg	Methylmercury
SaM	Sensing and Metrology
SB	Sludge Batch
SME	Slurry Mix Evaporator
SRAT	Sludge Receipt and Adjustment Tank
SRNL	Savannah River National Laboratory
TTR	Technical Task Request

1.0 Introduction

Researchers at the Savannah River National Laboratory (SRNL) have recently performed testing to evaluate the Sludge Batch (SB) 10 flowsheet using simulated sludge waste.[1] In the course of this testing, several samples were taken to determine the concentration of organomercury species resulting from SB processing. These samples were submitted to the SRNL Sensing and Metrology (SaM) department for quantitation using a mercury analyzer. Unfortunately, the signal amplifier used in the mercury analyzer exhibited a malfunction in the course of sample analysis between the dates of February 11, 2021 and August 26, 2021. This malfunction created uncertainty regarding the reported values for the majority of SB 10 simulant samples. The projects potentially impacted by this malfunction are given in Table 1-1.

Table 1-1. List of Organomercury Sample Projects Potentially Impacted by Instrument Malfunction.

Project Number	Measurement Type	# of Samples	Sample Description
210119-1	MeHg	6	Supernatant and Condensate Measurements from Tk40-1/-2 Tests
210225-1	MeHg	5	Condensate Measurements from Tk40-7 and Tk51-4 Tests
210408-1	MeHg	30	Supernatant and Condensate Measurements from Tk40 and Tk51 Tests
210506-1	MeHg	26	Coupled Operations Condensates from Tk40 Tests
210616-1	EtHg	2	Scoping Ethylmercury Measurements from Tk40-8
210712-5	MeHg	4	Supernatant and Condensate Measurements from Tk51-3
Total		**73**	**Samples Potentially Impacted**

SaM personnel performed an extensive review of the samples within these six projects to determine a.) if a given sample was impacted by the instrument malfunction, and b.) a post-corrected concentration for some impacted samples.[2-3] SaM personnel were able to determine the following:

- Projects 210119-1, 210225-1, 210616-1, and 210712-5 were completely unimpacted by the instrument malfunction.
- Project 210408-1 was partially impacted by the instrument malfunction. Associated impacted samples were able to be post-corrected.
- Project 210506-1 was fully impacted by the instrument malfunction. Associated samples were unable to be post-corrected.

This report serves as a formal communication of the unimpacted samples, an identification of the impacted samples, an interpretation of use of the resulting data, and an assessment of the organomercury behavior indicated by concentration measurement.

2.0 Data Compilation

2.1 Data Selection and Evaluation

All of the samples described in this report were originally reported by SaM personnel to SRNL researchers. Upon discovery of the instrument malfunction, all six of the projects described herein were recalled. Data from project 210119-1 was independently evaluated by SaM personnel and has since been reported in SRNL-STI-2021-00349, Rev. 0. The remaining five projects (210225-1, 210408-1, 210506-1, 210616-1, and 210712-5) were subjected to additional review by SaM personnel to detect signs of impact from the instrument malfunction.

The nature of the instrument malfunction was a failure of a signal amplifier. In general, problems with quantitation were identified where organomercury calibration points were inconsistently amplified with respect to the sample measurement. Table 2-1 identifies the methodology used to determine instrumental impact on data.

Table 2-1. Identification Matrix for Organomercury Sample Status.

	Sample Measurement with Amplification	**Sample Measurement with No Amplification**
Calibration Measurement with Amplification	Consistent Amplification – Not Impacted	Inconsistent Amplification leading to deflated sample measurements – Impacted, Not Correctable
Calibration Measurement with No Amplification	Inconsistent Amplification leading to inflated sample measurements – Impacted, Correctable	Consistent Amplification – Not Impacted

The SaM review concluded the following:

- Projects 210225-1, 210616-1, and 210712-5 were performed with consistent amplification and were therefore unimpacted by the instrument malfunction.
- Project 210408-1 was performed with inconsistent amplification such that the calibrations were not amplified, and a portion of the samples were amplified. Therefore, the data associated with this project were partially impacted and able to be post-corrected using alternative methods.
- Project 210506-1 was performed with inconsistent amplification such that the calibrations were amplified, and all samples were not amplified. Therefore, the data associated with this project universally yielded less than detectable values and were unable to be corrected.

The status of the organomercury analyzer and the corrective measures were formally communicated by SaM personnel in SRNL-RP-2021-05291, Rev. 0. The status of the SaM review of SB 10-related samples as well as post-corrected estimates for some impacted values were communicated by SaM via email (see Appendix A).

2.2 Quality Assurance

The SB 10 simulant report was a deliverable requested by Technical Task Request (TTR) X-TTR-S-00076, Rev. 2.[4] Organomercury measurements are not listed in relation to the functional classification of Safety Class, and are therefore managed as Production Support. Organomercury samples that have been determined to have been unimpacted by the instrument malfunction fall within the scope of SRNL procedures and are applicable to Production Support use. Data that has been post-corrected are approximations based on calibrations outside of SRNL procedures and should therefore not be used for Production Support applications. These data are recommended to be used only for illustrative or academic purposes.

Requirements for performing reviews of technical reports and the extent of review are established in manual E7 2.60.[5] The contents of this report have been subjected to a Design Verification to ensure compliance with this procedure. SRNL documents the extent and type of review using the SRNL Technical Report Design Checklist contained in WSRC-IM-2002-00011, Rev. 2.[6]

3.0 Results and Discussion

Organomercury measurements that were determined to be unimpacted by the mercury analyzer malfunction are given in Table 3-1.

Table 3-1. Organomercury Data Not Impacted by Instrument Malfunction.

Project	Sample ID	Analyte	Concentration (mg L^{-1})
210119-1	Tk40-1-STP-5	MeHg	<1
	Tk40-1-STD-3	MeHg	6.71
	Tk40-1-AS-8	MeHg	4.69
	Tk40-2-STP-5	MeHg	<1
	Tk40-2-STD-3	MeHg	25
	Tk40-2-AS-8	MeHg	6.42
210225-1	Tk51-4-STD-2H	MeHg	0.917
	Tk51-4-AS-1H	MeHg	1.83
	Tk51-4-SMD-2H	MeHg	0.0177
	Tk40-7-STD-2H	MeHg	1.63
	Tk40-7-AS-7H	MeHg	0.609
210408-1	Tk51-4-STP-2H	MeHg	0.586
	Tk51-4-SMP-2H	MeHg	0.386
	Tk40-3-STD-2H	MeHg	8.51
	Tk40-3-AS-7H	MeHg	0.999
	Tk40-3-STP-2H	MeHg	0.9
	Tk40-4-STP-2H	MeHg	3.35
	Tk40-6-STP-2H	MeHg	2.55
	Tk40-8-STP-2H	MeHg	1.96
	Tk40-8-SMP-2H	MeHg	0.97
	Tk40-9-SMP-2H	MeHg	1.21
	Tk40-10-STP-2H	MeHg	1.41
	Tk40-10-SMP-2H	MeHg	1.44
210616-1	Tk40-8-STP-F-Et	EtHg	<0.1
	Tk40-8-STD-Et	EtHg	0.12
210712-5	Tk51-3-STD-H	MeHg	15.8
	Tk51-3-STP-H	MeHg	0.288
	Tk51-3-SMD-H	MeHg	0.538
	Tk51-3-SMP-H	MeHg	0.0918

Samples from project 210119-1 were previously reported in the SB 10 simulant report. All results from projects 210225-1, 210616-1, and 210712-5 were found to be unimpacted by the instrument outage and may be used with the same level of quality assurance as those reported in the SB 10 simulant report.[1] Several samples from 210408-1 were also shown to be unimpacted by the instrument outage, and are therefore held to the same quality assurance standards as previous data. Note that the two measurements reported in project 210616-1 are ethylmercury measurements for Tk40-8 Sludge Receipt and Adjustment Tank (SRAT) Product filtrate (STP-F-Et) and SRAT dewater (STD-Et), one of which yielded a value above the detection limit of 0.1 mg L^{-1}. At this time, the source of the ethyl group observed in this species is uncertain (no ethyl groups were deliberately added as a part of testing). It is therefore uncertain if this result should be considered representative of real waste behavior.

The balance of samples from project 210408-1 were shown to have been impacted by the instrument outage. These samples were able to be corrected after-the-fact using calibration curves that had been measured around the same time as the samples in question. This post-correction allows for an estimation of the concentrations of methylmercury present in each sample. However, because of the discrepancy with calibration curve timing, it is recommended that these post-corrected samples be used only for illustrative or academic purposes. These samples, their original measurements, and the post-corrected values are given in Table 3-2. Total Hg concentrations for each sample are also reported for convenience.

Table 3-2. Methylmercury Measurements Impacted by Instrument Malfunction.

Sample ID	Total Mercury (mg L^{-1})	Initial Measurement (mg L^{-1})	Corrected Measurement (mg L^{-1})
Tk40-4-STD-2H	466	1420	16.6
Tk40-4-AS-7H	45.3	287	3.25
Tk40-5-STD-2H	537.3	1270	14.8
Tk40-5-AS-7H	16.9	123	1.32
Tk40-5-STP-2H	10.5	30.2	0.226
Tk40-6-STD-2H	617	720	8.36
Tk40-6-AS-7H	56.1	630	7.31
Tk40-7-STP-2H	10.7	75	0.755
Tk40-8-STD-2H	488	605	7
Tk40-8-AS-7H	56	342	3.9
Tk40-8-CDD-1H	1.745	8.14	<1
Tk40-9-STD-2H	658	1310	15.3
Tk40-9-STP-2H	1.15	3.22	<0.1
Tk40-9-AS-7H	68	508	5.86
Tk40-9-CDD-1H	3.55	30.3	0.227
Tk40-10-STD-2H	502	406	4.66
Tk40-10-AS-7H	70	434	4.99
Tk40-10-CDD-1H	2.82	19.7	0.103

Generally, the post-corrected measured are ~100x lower than those previously reported. This is consistent with the nature of the instrument malfunction (i.e., detector amplification failure).[2] The corrected measurements fall below the reported total Hg values, and are therefore more consistent with expectations.

All of the methylmercury results reported in Table 3-1 and Table 3-2 are tabulated in Table 3-3 for ease of comparison. Values reported in red are those that should be used only for illustrative or academic purposes.

Table 3-3. Final Methylmercury Measurements for SB 10 Testing (in mg L^{-1}).

Test ID	Acid Stoichiometry‡	SRAT Cycle			SME Cycle	
		Dewater	Product	Scrubber	Dewater	Product
Tk40-1	107.9	6.71	<1	4.69	N/A	N/A
Tk40-2	127.1	25	<1	6.42	N/A	N/A
Tk40-3	107.9	8.51	0.9	0.999	N/A	N/A
Tk40-4	128.6	16.6†	3.35	3.25†	N/A	N/A
Tk40-5	118.3	14.8†	0.226†	1.32†	N/A	N/A
Tk40-6	92.3	8.36†	2.55	7.31†	N/A	N/A
Tk40-7	137.7	1.63	0.755†	0.609	N/A	N/A
Tk40-8	105.7	7†	1.96	3.9†	<1†	0.97
Tk40-9	103.6	15.3†	<0.1†	5.86†	0.227†	1.21
Tk40-10	106.2	4.66†	1.41	4.99†	0.103†	1.44
Tk51-2※	116.6	15.3	1.56	3.57	1.78	<1
Tk51-3	106.1	15.8	0.288	N/A	0.538	0.0918
Tk51-4	107.3	0.917	0.586	1.83	0.0177	0.386

†Values in red are those that should be used only for illustrative or academic purposes.
‡Acid stoichiometry is reported relative to the Koopman Minimum Acid stoichiometry.
※Tk51-2 values were reported previously in project 201102-6, which was outside of the impacted window. These values are repeated here for completion.

The results in Table 3-3 suggest that SRAT dewater contains the highest concentrations of methylmercury expected during Chemical Process Cell (CPC) processing (~1 – 25 mg L^{-1}). These samples correspond to the part of CPC processing that is expected to have the highest mercury concentrations, which suggest that formation may be driven by mercury availability. Samples from the ammonia scrubber also yield methylmercury concentrations higher than those seen elsewhere in the CPC (0.6 – 6.4 mg L^{-1}). SRAT products appear to contain more methylmercury than Slurry Mix Evaporator (SME) products (0.3 – 3.4 mg L^{-1} vs. 0.1 – 1.4 mg L^{-1}). SRAT dewater samples contain significantly more methylmercury than SME dewater samples (0.02 – 1.8 mg L^{-1}). No clear conclusion can be made regarding the impact of acid stoichiometry on methylmercury formation.

These observations indicate the methylmercury demonstrate the following behaviors (*evidence of behavior is given in parentheses*):

- Methylmercury seems to be formed during both the SRAT and SME cycles (*the sums of SME product concentrations and SME dewater concentrations often exceed the concentrations of methylmercury observed in the SRAT products*). Methylmercury formation seems to occur more rapidly near the beginning of the SRAT cycle (i.e., before SRAT dewater) compared to the remainder of CPC processing (*largest methylmercury concentrations are observed in SRAT dewater*). This is consistent with the gradual removal of mercury from CPC sludge.
- Methylmercury is generated in the SRAT kettle (*methylmercury is observed in Tank 40 SRAT products, which employed coupled operations rather than condensate reflux periods*). Note: this does not mean that additional formation does not occur downstream.
- Methylmercury seems to disappear from the kettle during CPC operations, suggesting volatilization or degradation (*SME product concentrations are lower than SRAT product concentrations*).

4.0 Conclusions

The following conclusions are made as a result of this work:

- A single measurement of ethylmercury (0.12 mg L^{-1}) was observed in SB 10 testing. While this measurement was confirmed to be unaffected by the instrument failure, it is uncertain if this observation is representative of real waste behavior given that no ethyl groups were deliberately added to SB 10 simulant testing.
- The majority of methylmercury measurements made during SB 10 testing were shown to be unimpacted by the instrument failure and may be used with the same standard of quality assurance as data reported in the SB 10 simulant report.
- Methylmercury measurements suggest patterns of behavior during CPC processing:
    - Methylmercury is likely formed throughout the CPC (SRAT and SME cycles)
    - Methylmercury is likely generated in the SRAT and SME kettles (i.e., not exclusively formed in condensate or off-gas)
    - Methylmercury is likely either consumed or is volatile enough to vaporize during CPC processing and enter the condensate/off-gas streams
    - Methylmercury formation is likely dominant (i.e., most quickly formed) at the beginning of the SRAT cycle when mercury metal is present at the highest concentrations

5.0 Recommendations

The following recommendations are made as a result of this work:

- The results reported here should be compared to results obtained from radioactive waste experiments with SB 10 sludge to determine similarities in organomercury behavior.

- Future experiments designed to investigate methylmercury formation should focus efforts on the first parts of the SRAT cycle, as these parts of the run seem most likely to yield the highest concentrations of organomercury.

6.0 References

1. Woodham, W. H.; Howe, A. M.; Siegfried, M. J. "Sludge Batch 10 Flowsheet Testing with Non-radioactive Simulants"; SRNL-STI-2021-00349, Rev. 0; Savannah River National Laboratory: **2021**.

2. Boggess, A. J.; White, T. L. "System Malfunction Leading to Incorrect Mercury Speciation Data Being Released to LIMS System"; SRNL-RP-2021-04720, Rev. 0; Savannah River National Laboratory: **2021**.

3. Boggess, A. J.; White, T. L. "Recalibration and Validation of Mercury Speciation Methods"; SRNL-RP-2021-05291, Rev. 0; Savannah River National Laboratory: **2021**.

4. Russell, K. J. "Sludge Batch 10 Simulant Testing"; X-TTR-S-00076, Rev. 2; Savannah River Remediation: **2021**.

5. Procedure "Technical Reports"; Manual E7, Procedure 3.60, Rev. 9; **2021**.

6. "Savannah River National Laboratory Technical Report Design Check Guidelines"; WSRC-IM-2002-00011, Rev. 2; Westinghouse Savannah River Company: **2004**.

Appendix A. Email Communication from SRNL Sensing and Metrology

From: Andrew Boggess
To: Wesley Woodham
Cc: Mary Whitehead; Thomas02 White
Subject: Release of remaining mercury speciation data
Date: Friday, October 22, 2021 11:37:36 AM

Wes,

I am reporting on your final two submitted travel copies that were affected by the instrument malfunction in our Mercury Speciation Lab. Previously, we released the data for the following travel copies for use "as-is": LW-AD-PROJ-210119-1, LW-AD-PROJ-210225-1, LW-AD-PROJ-210712-5, LW-AD-PROJ-210616-1. The travel copy LW-AD-PROJ-210506-1 unfortunately returned only "less than detect" values and therefore cannot be mathematically corrected. This e-mail reports on the methylmercury data for the travel copy LW-AD-PROJ-210408-1 and the efforts to obtain useable data through mathematical correction and "spot-check" samples. A memo will be released shortly outlining all of the re-analyzed, rejected, and corrected methylmercury data with a document number for your reference. We believe that the resubmitted samples provide high confidence in our "corrected" values, but please see the underlined portion in the document below that this corrected data should only be used for illustrative or academic purposes- as the reported data was not technically obtained with a calibration curve run on the same day as the samples.

This appears to be the last of your affected samples. Please let me know if your records show any remaining samples left unaccounted for. Please feel free to reach out to me with any questions.
AJ

Prioritized data was examined to determine if batches of samples could be identified in which no evidence of detector malfunction could be found. This led to the approval and immediate release of several batches of high priority methylmercury samples. Specifically, four of your six travel copies submitted during this timeframe have been released for use "as-is" with no caveat on data accuracy. Of the remaining two, LW-AD-PROJ-210408-1 and LW-AD-PROJ-210506-1, only LW-AD-PROJ- 210408-1 contained enough useable data that mathematical correction for the signal amplification could performed. As such, the raw data obtained from these 27 methylmercury samples was re- calculated using a correctly amplified calibration curve obtained from a similar timeframe as the original raw data. Selected methylmercury samples from this travel copy were re-submitted by the customer (while stored in archive, these re-analyzed samples were approximately 4-6 months older than the originally analyzed samples) and 8 "spot-check" comparisons were obtained to assess the accuracy of the mathematical correction. Outside of the 8 re-submitted methylmercury samples, these mathematically corrected values should be reported with a caveat indicating that the reported data was obtained using a correction factor following a detector malfunction and should only be used for illustrative or academic purposes.

In total, we are reporting 27 previously submitted methylmercury values and 8 re-submitted spot-check methylmercury values. Of these original 27, 6 are kept unchanged and 21 were "corrected" by

re-calculating the raw signal area using a calibration curve obtained from a similar time period with the correct amplification. See the attached Table 1 and Figures 1- 4 for which data were issued corrections. In Table 1, the "Reported" column indicates the originally submitted data, while "Corrected" indicates the mathematically corrected values. Table 2 lists the re-analyzed "spot check" samples with the corresponding DMA Total Mercury values.

Table 1: Reported and Corrected Values for Submitted SRAT Dewater, SRAT Product, Ammonia Scrubber, and CDD Samples. Bolded ratio values indicate those that fall within customer expected values

SRAT Dewater							
Sample	Peak Area	Reported (mg/L)	Corrected (mg/L)	Total Hg (mg/L)	Reported Ratio	Corrected Ratio	Reject
20728	7214085	1.63	-	169	**0.00965**	**-**	NO
21401	406068	8.51	-	384	**0.0222**	**-**	NO
21404	67528909	1420	16.6	466	3.05	**0.0356**	YES
21407	60384228	1270	14.8	537	2.36	**0.0276**	YES
21410	34344371	720	8.36	617	1.17	**0.0135**	YES
21414	28862887	605	7.00	488	1.24	**0.0143**	YES
21419	62426134	1310	15.3	658	1.99	**0.0233**	YES
21424	19373967	406	4.66	502	0.809	**0.00928**	YES

SRAT Product							
Sample	Peak Area	Reported (mg/L)	Corrected (mg/L)	Total Hg (mg/L)	Reported Ratio	Corrected Ratio	Reject
21403	42935	0.9	-	8.6	**0.105**	**-**	NO
21406	159777	3.35	-	6	**0.558**	**-**	NO
21409	1439932	30.2	0.226	10.5	2.88	**0.0215**	YES
21412	121665	2.55	-	<1	-	-	NO
21413	3580577	75	0.755	10.7	7.01	**0.0706**	YES
21415	93508	1.96	-	<1	-	-	NO
21420	153722	3.08	<0.1	1.1	2.80	**-**	YES
21425	67093	1.4	-	<1	-	-	NO

Ammonia Scrubber							
Sample	Peak Area	Reported (mg/L)	Corrected (mg/L)	Total Hg (mg/L)	Reported Ratio	Corrected Ratio	Reject
21402	47658	0.999	-	27.2	**0.0367**	**-**	NO
21405	13679229	287	3.25	45.3	6.34	**0.0717**	YES
21408	5885010	123	1.32	16.9	7.28	**0.0781**	YES
21411	30084697	630	7.31	56.1	11.2	**0.130**	YES
20734	2690390	0.609	-	94.4	**0.00645**	**-**	NO
21416	16299468	342	3.90	56.0	6.11	**0.0696**	YES
21421	24247018	508	5.86	68.0	7.47	**0.0862**	YES
21426	20718911	434	4.99	70.0	6.20	**0.0713**	YES

CDD Samples							
Sample	Peak Area	Reported (mg/L)	Corrected (mg/L)	Total Hg (mg/L)	Reported Ratio	Corrected Ratio	Reject
21417	388210	8.14	<1	1.75	4.65	-	YES
21422	1444610	30.3	0.227	3.55	8.54	**0.06394**	YES
21427	941189	19.7	0.103	2.82	6.99	**0.03652**	YES

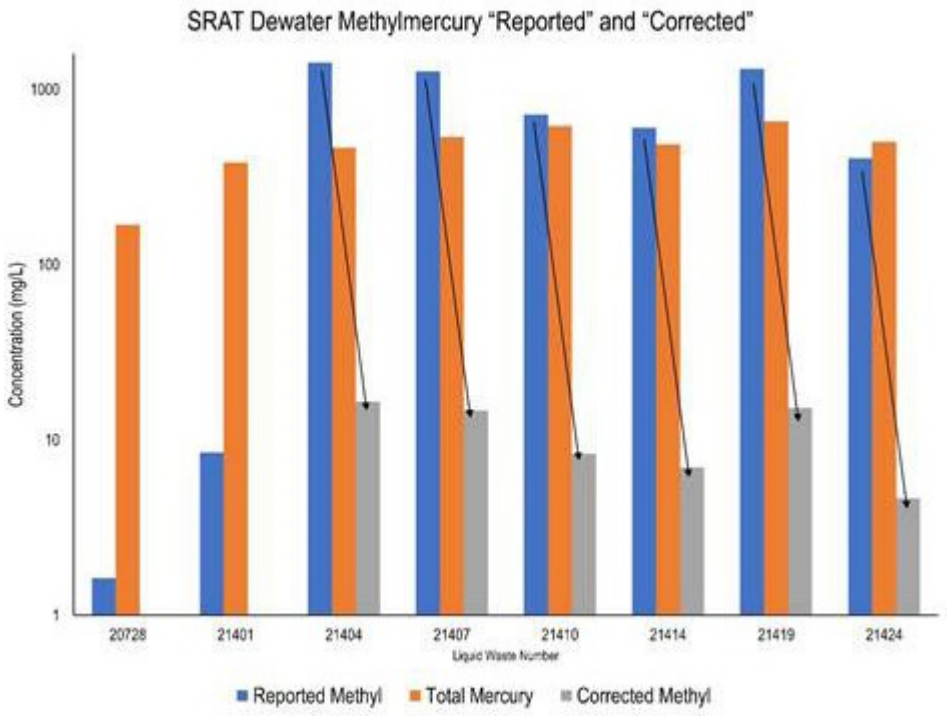


Figure 1: Transformation of reported methylmercury values meeting rejection criteria into corrected methylmercury values for SRAT Dewater samples

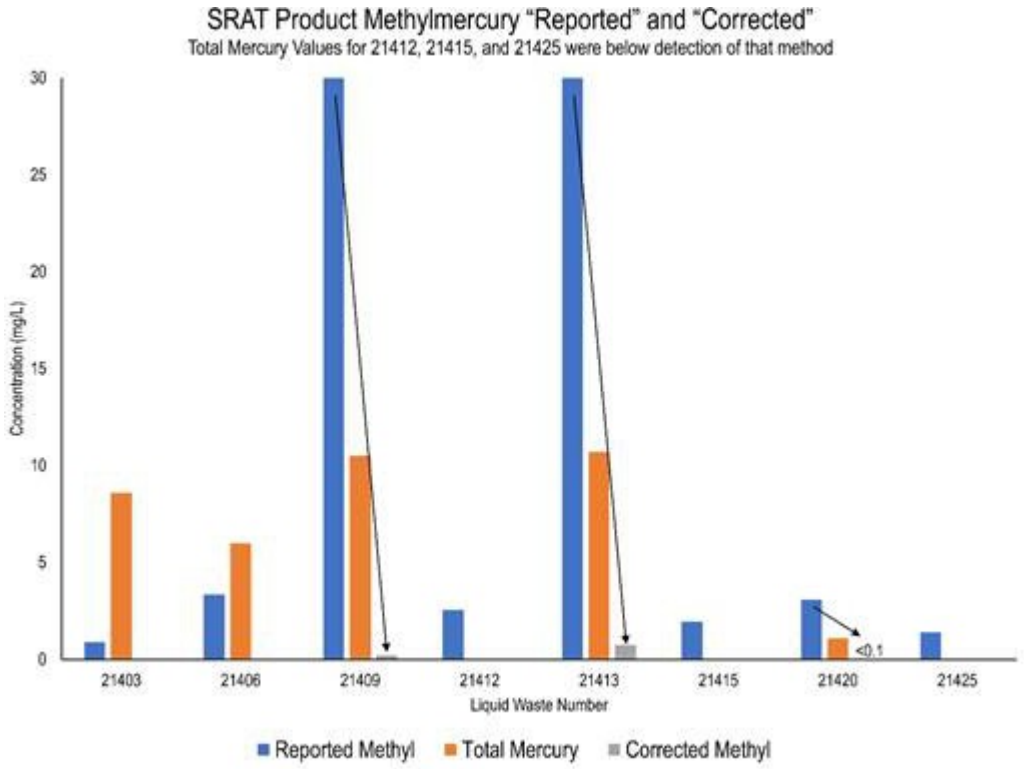


Figure 2: Transformation of reported methylmercury values meeting rejection criteria into corrected methylmercury values for SRAT Product samples

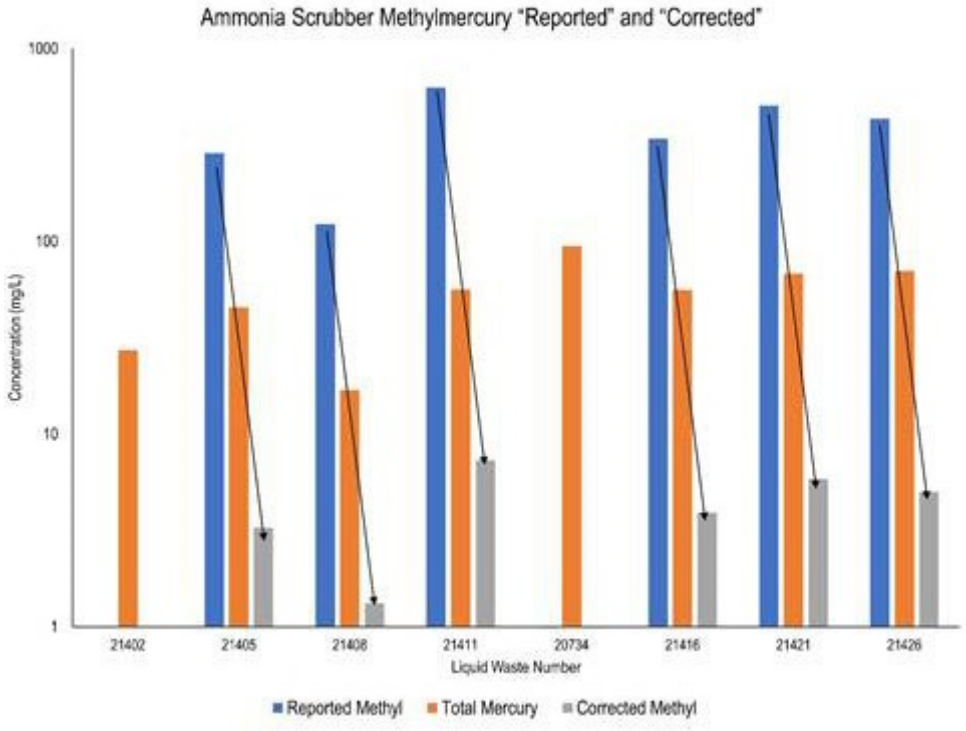


Figure 3: Transformation of reported methylmercury values meeting rejection criteria into corrected methylmercury values for Ammonia Scrubber samples

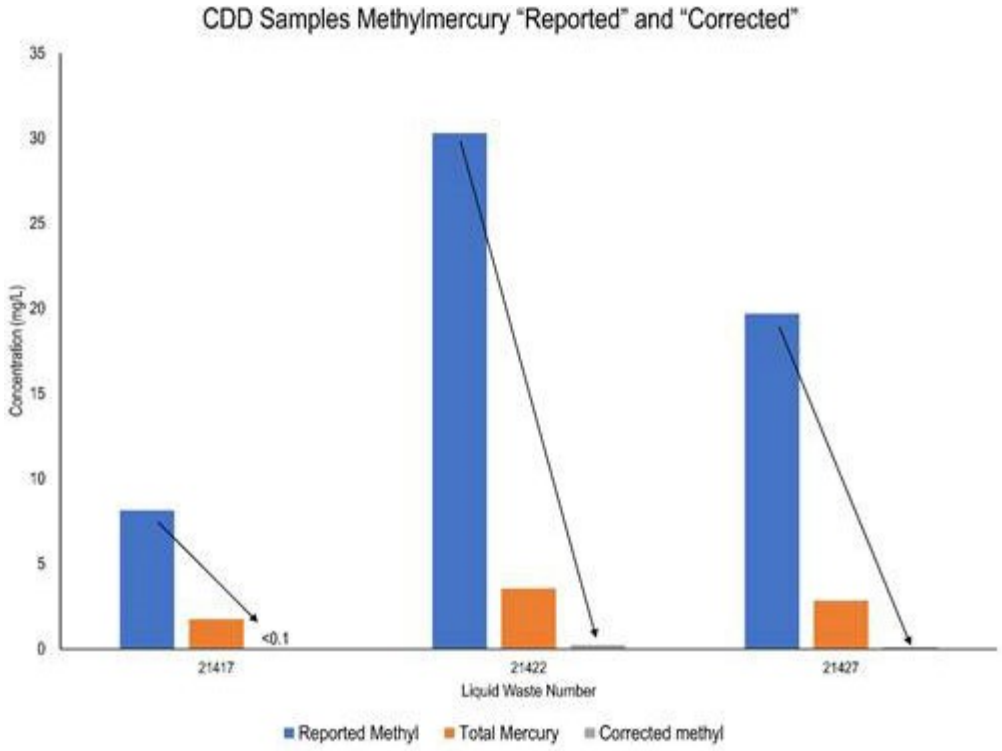


Figure 4: Transformation of reported methylmercury values meeting rejection criteria into corrected methylmercury values for CDD samples

Table 2: Reported concentration values for "spot-check" resubmission samples for DMA Total Mercury and Methylmercury analysis

Sample	Peak Area	Reported (mg/L)	DMA Total Mercury (mg/L)	Ratio
23812	33860713	10.5	42.7	0.246
23813	42642102	13.2	92.9	0.142
23814	29114931	8.99	64.8	0.139
23815	21459789	6.63	127	0.0522
23816	39430747	12.2	41.4	0.295
23817	19812670	6.12	22.4	0.273
23818	85745940	26.5	36.9	0.718
23819	14111054	4.36	132	0.0330

Andrew Boggess
Senior Scientist A | SRNL - Analytical Development
Savannah River National Laboratory | Savannah River Site | Aiken | SC | 29808
Office 803.725.9150| Cell 803.646.4840

Distribution:

cj.bannochie@srnl.doe.gov
William.bates@srnl.doe.gov
marion.cofer@srnl.doe.gov
alex.cozzi@srnl.doe.gov
connie.herman@srnl.doe.gov
brady.lee@srnl.doe.gov
Joseph.Manna@srnl.doe.gov
Gregg.Morgan@srnl.doe.gov
frank.pennebaker@srnl.doe.gov
William.Ramsey@SRNL.DOE.gov
Marissa.Reigel@srnl.doe.gov
eric.skidmore@srnl.doe.gov
michael.stone@srnl.doe.gov
william.swift@srnl.doe.gov
Boyd.Wiedenman@srnl.doe.gov
Records Administration (EDWS)
bill.clark@srs.gov
jeffrey.crenshaw@srs.gov
james.folk@srs.gov
Curtis.Gardner@srs.gov
Pauline.hang@srs.gov
Anna.Murphy@srs.gov
tony.polk@srs.gov
Anthony.Robinson@srs.gov
mark-a.smith@srs.gov
patricia.suggs@srs.gov
thomas.temple@srs.gov
Richard.Edwards@srs.gov
terri.fellinger@srs.gov
Joseph.fields@srs.gov
barbara.hamm@srs.gov
robert.hoeppel@srs.gov
Thomas.Huff@srs.gov
bill.holtzscheiter@srs.gov
Vijay.Jain@srs.gov
Fabienne.Johnson@srnl.doe.gov
Jeremiah.Ledbetter@srs.gov
chris.martino@srnl.doe.gov
jeff.ray@srs.gov
Azadeh.Samadi-Dezfouli@srs.gov
hasmukh.shah@srs.gov
aaron.staub@srs.gov
Kevin.Brotherton@srs.gov
thomas.colleran@srs.gov
Spencer.Isom@srs.gov
MARIA.RIOS-ARMSTRONG@SRS.GOV
Seth.Hunter@srnl.doe.gov
Wesley.Woodham@srnl.doe.gov
Aubrey.Silker@srs.gov
helen.boyd@srs.gov