

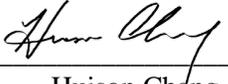


**Data Validation Report  
SDG 160-18504-2**

**Characterization of Structures, Items, Solutions, and Soil at the  
Proposed Outfall 200 Treatment System Sites  
Y-12 National Security Complex**

Revision 0

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Date: 10/14/2016

## SCOPE

This report contains Level 3 data validation results for analytical data for SDG 160-18504-2 for four sediment samples collected at the Proposed Outfall 200 Mercury Treatment Facility located at the Y-12 National Security Complex, Oak Ridge, Tennessee. The evaluation covers analyses for radium-226 by alpha spectrometry. All other analyses are presented in a report for SDG 160-18504-1.

## METHOD

The analytical data were validated using the following guidelines:

- Sampling and Analysis Plan / Quality Assurance Project Plan for Geotechnical and Waste Characterization of the Outfall 200 Mercury Treatment Facility Area at the Y-12 National Security Complex, Oak Ridge, Tennessee (November, 2015)
- *Guidance on Environmental Data Verification and Data Validation - EPA QA/G-8, EP A/240/R-02/004*, United States Environmental Protection Agency, Washington D.C
- National Functional Guidelines for Superfund Organic Methods Data Review (August 2014)
- National Functional Guidelines for Inorganic Superfund Data Review (August 2014)
- Verification and Validation of Radiological Data for Use in Waste Management and Environmental Remediation. ANSI/ANS-41.5-2012. (February, 2012)
- Multi-Agency Radiological Laboratory Analytical Protocols Manual (July, 2004)

## VERIFICATION AND VALIDATION RESULTS

### Completeness

Results for four sediment samples were evaluated. All analyses were performed by TestAmerica in Earth City, Missouri (TA-St. Louis). The following lists analytical methods and sample numbers for reported results.

Project Sample ID	Laboratory Sample ID	Analysis
YMTFA39SE001	160-18504-1	Radium-226
YMTFA40SE001	160-18504-2	Radium-226
YMTFA41SE001	160-18504-3	Radium-226
YMTFA73SE001	160-18504-4	Radium-226

### Holding times

Based on evaluation of the date of sample collection (08/04/16) and date of sample analyses, all recommended holding times per the analytical methods were met.

## Preservation and Laboratory Sample Receipt

All samples arrived at TA-St. Louis intact and in good condition under valid chain of custody (COC). The COC was signed indicating the samples were appropriately relinquished by the field personnel and accepted by the analytical laboratory.

The samples arrived at TA-St. Louis facility at cooler temperature of 0.6 °C.

## Analytical Methods, Reporting Units, and Detection Limits

All analytical methods specified (or equivalent to those specified) on the COC (COC No. 160-4416-2171.1) were utilized for the analyses. All results were reported in appropriate units. The detection limits were appropriate for all methods.

### Trip Blank

Not Applicable.

### Equipment Blanks (EB)

Not applicable.

### Field Blank (FB)

Not applicable.

### Field Duplicates

Not applicable.

## Laboratory Case Narratives

The following issues were noted in the case narratives:

### Radionuclides:

The At-217 tracer recovery for the LCS 160-266021/2-A samples was below the QC limits of 30%. The DOE/DOD Quality Systems Manual for Environmental Laboratories (QSM Rev. 5.0) allows for reporting results as quantitative when tracer recoveries are below 30% if, a) the relative uncertainty associated with the tracer recovery is less than 10% (2 sigma); b) spectral resolution requirements are met and there are no indications of spectral interferences; and c) detection limit requirements are met.

All three of these criteria are met for this sample.

## Verification/Validation Checklists, Data Qualifiers, and Qualifier Definitions

Verification and validation checklists are presented in Appendix A and Appendix B. Applicable validation qualifier codes are defined in the table below.

Qualifier	Definition
U	analyte is not detected at or above the stated reporting limit

Qualifier	Definition
UJ	analyte is not detected but there is uncertainty about the reporting limits.
J	result is estimated
R	result is rejected

### Radionuclides

Four sample was analyzed for the following radionuclides: radium-226 by alpha spectroscopy. Holding times, applicable instrument calibrations, and sample and batch QCs were acceptable. Ra-226 was detected in the method blank at a level greater than 1.65\* CSU. Traceable standard certificates were acceptable.

### Summary

Ra-226 was detected in the method blank at a level greater than 1.65 \* CSU. The sample results less than 10 times the blank results were qualified as estimated (J).

### Summary of Result Qualifiers

Sample No.	Parameter	Laboratory Result	Qualified Result	Units	Laboratory Qualifier	Validation Qualifier
YMTFA39SE001	Radium-226	0.772	0.772	pCi/g		J
YMTFA40SE001	Radium-226	1.21	1.21	pCi/g		J
YMTFA41SE001	Radium-226	0.923	0.923	pCi/g		J
YMTFA73SE001	Radium-226	0.710	0.710	pCi/g		J

**Appendix A**  
**Verification Summary Tables**

<b>Data Verification</b>	<b>Y</b>	<b>N</b>	<b>N/A</b>	<b>Comment</b>
<b>Custody of Samples</b>				
Are samples traceable through inspection of signature records on field and laboratory chains of custody (COCs)?	x			
Has contractual turn-around time been met for all samples?	x			
Have all samples been preserved correctly and pertinent documentation included?	x			
Is the laboratory log in sample receipt checklist present	x			
Are any sample receipt non-conformances noted?	x			
<b>Standard Traceability</b>				
Have certificate(s) been included for the LCS and MS?	x			
Standards have not exceeded the certificate expiration date	x			
Are chemical standards and reference materials traceable to a reliable source? (Reagent traceability summary)	x			
<b>Analytical Completeness</b>				
Are all COC samples and associated analytical results reported in the laboratory data package?	x			
<b>Data Summaries</b>				
The case narrative is present and summarizes the sample receipt and analysis information including any analytical anomalies for all methods reported in the data package.	x			
Other data summary forms are present as applicable (detection, sample results, surrogate, tracer/carrier, QC results and association, prep and analysis chronicle, method and sample summaries)	x			
<b>Sample Data</b>				
Is the Sample Data included for each COC requested analytical method?	x			
Is the calibration data included for each method? (ICAL, ICV, CCAL as required for each method)	x			
Are the QC summary forms included for each method? (MB, ICS/CCB, LCS/LCSD, MS/MSD, surrogates, internal standards, serial dilution as required and applicable for each method)	x			
Are the method run logs and/or bench sheets included for each method?	x			

<b>Data Verification</b>	<b>Y</b>	<b>N</b>	<b>N/A</b>	<b>Comment</b>
Are the method preparation/extraction logs included for each applicable method?	x			
Is the sample and QC raw data included for each method?	x			
Is the internal Laboratory Review documented by checklists and included in the data package?		x		

**Appendix B**  
**Validation Summary Tables**

<b>Radionuclide Analyses: Alpha Spectroscopy</b>	Y	N	N/A	Qualifier	Comment or Reason Code
<b>Preservation and Holding Times</b>					
Were samples preserved correctly?	x				
Were samples analyzed within holding times?	x				
<b>Standard Traceability</b>					
Were all certificates included for the LCS and MS samples?	x				
Were all standards and reference materials traceable to reliable source material?	x				
<b>Calibration Verification</b>					
Are efficiencies within tolerance limits?	x				
Are energies within tolerance limits?	x				
Are background performance check count rates within tolerance limits?	x				
Are appropriate peak resolution within appropriate control criteria?	x				
<b>LCS</b>					
Has at least one LCS been prepared for up to 20 samples?	x				
Is the LCS the same matrix as the samples in the reporting batch?	x				
Are LCS %D (or %R) within QC acceptance limit?	x				
<b>Laboratory Duplicate</b>					
Has at least one laboratory duplicate been prepared for up to 20 samples?	x				
Are RPD and DER/RER within QC acceptance limit?	x				
<b>Matrix Spike</b>					
Has at least one MS been prepared for up to 20 samples?		x			
Is MS %D (or %R) within QC acceptance limit?			x		
<b>Method Blank</b>					
Has at least one method blank been prepared for up to 20 samples?	x				
Is the method blank the same matrix as the samples in the reporting batch?	x				
Are the results less than 1.65 * CSU or within control limits?		x			Sample results less than 10X the result of the method blank were qualified as estimated (J).
<b>Chemical Yield - Tracers and Carriers</b>					
Is yield reported for all samples and QC samples in the reporting batch?	x				

<b>Radionuclide Analyses: Alpha Spectroscopy</b>	Y	N	N/A	Qualifier	Comment or Reason Code
Are percent recovery criteria satisfied for all yield results?		x			At-217 tracer recovery was below the QC limit in an LCS analysis. No qualification was required.

## Analytical Data Review Verification Checklist

Laboratory:	TestAmerica	SOW or Contract No.:	Outfall 200
Verifier Name:	JD Milloway	Date Verified:	9/19/16
SDG No(s).	18504-1; 18504-2		

Item No.	Criteria	Acceptable?				Comments
		Yes	No	NA	NR	
1.	Case Narrative Present	X				
2.	Lab Qualifiers Present	X				
3.	Methods Specified in SAP or Equivalent Methods were Used	X				
4.	Data is Complete for All Requested Analytes with All Samples	X				
5.	Units are as Specified in SOW/Contract or Otherwise are Appropriate	X				
6.	Detection Limits Meet Contract Required Detection Limits or Other Project Defined Limits (e.g., regulatory limits)	X				
7.	Samples IDs and Analytes Agree with those on COCs	X				
8.	Samples IDs Agree Throughout Report	X				
9.	Raw Data Results Agree with Data Reports and Electronic Data	X				
10.	COCs – Samples Traceable	X				
11.	All Samples Preserved Correctly	X				
12.	Samples Arrived Intact	X				
13.	Custody Seals on Samples			X		COC Seals on coolers only
14.	Holding Times Met	X				
	-Metals other than Mercury ≤ 180 days			X		
	-Mercury ≤28 days			X		
	-TCLP Metals other than Mercury to TCLP Extraction ≤180 days	X				
	-TCLP Metals other than Mercury TCLP Extraction to Analysis ≤180 days	X				
	-TCLP Mercury to TCLP Extraction ≤28 days	X				
	-TCLP Mercury TCLP Extraction to Analysis ≤28 days	X				
	-VOAs to Extraction/Analysis ≤14 days			X		
	-SVOAs to Extraction ≤7 days (liquids),			X		

## Analytical Data Review Verification Checklist

Laboratory:	TestAmerica	SOW or Contract No.:	Outfall 200
Verifier Name:	JD Milloway	Date Verified:	9/19/16
SDG No(s).	18504-1; 18504-2		

Item No.	Criteria	Acceptable?				Comments
		Yes	No	NA	NR	
	≤14 days (solids)					
	-SVOAs Extraction to Analysis ≤40 days			X		
	-Pesticides to Extraction ≤7 days (liquids), ≤14 days (solids)			X		
	-Pesticides Extraction to Analysis ≤40 days			X		
	-Herbicides to Extraction ≤7 days (liquids), ≤14 days (solids)			X		
	-Herbicides Extraction to Analysis ≤40 days			X		
	PCBs - none	X				
	-TCLP VOAs to TCLP Extraction ≤14 days	X				
	-TCLP VOAs TCLP Extraction to Analysis ≤14 days	X				
	-TCLP SVOAs to TCLP Extraction ≤14 days	X				
	-TCLP SVOAs TCLP Extraction to Prep Extraction ≤7 days	X				
	-TCLP SVOAs Prep Extraction to Analysis ≤40 days	X				
	-TCLP Pesticides to TCLP Extraction ≤14 days			X		
	-TCLP Pesticides TCLP Extraction to Prep Extraction ≤7 days			X		
	-TCLP Pesticides Prep Extraction to Analysis ≤40 days			X		
	-TCLP Herbicides to TCLP Extraction ≤14 days	X				
	-TCLP Herbicides TCLP Extraction to Prep Extraction ≤7 days	X				
	-TCLP Herbicides Prep Extraction to Analysis ≤40 days	X				
	TOC ≤28 days			X		
	-Hexane Extractable Material, Oil and Grease ≤28 days			X		

## Analytical Data Review Verification Checklist

Laboratory:	TestAmerica	SOW or Contract No.:	Outfall 200
Verifier Name:	JD Milloway	Date Verified:	9/19/16
SDG No(s).	18504-1; 18504-2		

Item No.	Criteria	Acceptable?				Comments
		Yes	No	NA	NR	
	-Chloride, Fluoride, Nitrate, Sulfate ≤28 days			X		
	-Cyanide ≤14 days			X		
	-Sulfide ≤7 days			X		
	-pH – immediately			X		
	-Specific Conductance - immediately			X		
	-Radionuclides 180 days (best practice)	X				