



**Data Validation Report
SDG 160-18570-1**

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

Revision 0

ALLIANT CORPORATION
320 N CEDAR BLUFF ROAD
KNOXVILLE, TN 37923

Validated by: *Kathy K Okonzak-Lowry*
Kathryn K Okonzak-Lowry

Date: 10/14/2016

SCOPE

This report contains Level 3 data validation results for analytical data for SDG No. 160-18570-1 for nine soil samples collected at the Y-12 Headworks Area (Project ORNL Y-12 Outfall 200 Characterization). The evaluation covers analyses for toxicity characteristic leaching procedure (TCLP) volatile organic compounds (VOCs), TCLP herbicides, TCLP semivolatile organic compounds (SVOCs), TCLP metals, polychlorinated biphenyls (PCBs), and radionuclides (tritium, total beta strontium, and technetium-99).

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 nine soil samples (SDG No. 160-18570-1) were evaluated. Analyses were performed by TestAmerica in Earth City, Missouri (TA-St. Louis). The following lists analytical methods and sample numbers for reported results.

Analysis	Project Sample ID Numbers	Laboratory Sample ID Numbers
TCLP VOCs, TCLP herbicides, TCLP SVOCs, TCLP metals, PCBs, radionuclides (tritium, total beta strontium, and technetium-99)	YMTFA 42 SO 030	160-18570-1
TCLP VOCs, TCLP herbicides, TCLP SVOCs, TCLP metals, PCBs, radionuclides (tritium, total beta strontium, and technetium-99)	YMTFA 42 SO 030D	160-18570-2
TCLP VOCs, TCLP herbicides, TCLP SVOCs, TCLP metals, PCBs, radionuclides (tritium, total beta strontium, and technetium-99)	YMTFA 43 SO 030	160-18570-3
TCLP VOCs, TCLP herbicides, TCLP SVOCs, TCLP metals, PCBs, radionuclides (tritium, total beta strontium, and technetium-99)	YMTFA 43 SO 030D	160-18570-4
TCLP metals, PCBs, and radionuclides (tritium, total beta strontium, and technetium-99)	YMTFA 49 SO 005	160-18570-5

Analysis	Project Sample ID Numbers	Laboratory Sample ID Numbers
TCLP metals, PCBs, and radionuclides (tritium, total beta strontium, and technetium-99)	YMTFA 36 SO 002	160-18570-6
TCLP metals, PCBs, and radionuclides (tritium, total beta strontium, and technetium-99)	YMTFA 35 SO 002	160-18570-7
TCLP metals, PCBs, and radionuclides (tritium, total beta strontium, and technetium-99)	YMTFA 32 SO 002	160-18570-8
TCLP metals, PCBs, and radionuclides (tritium, total beta strontium, and technetium-99)	YMTFA 34 SO 002	160-18570-9

Holding times

The date of sample collection (08/09/16) and dates of sample analyses were evaluated. Based on these, all recommended holding times per the analytical methods were met.

Preservation and Laboratory Sample Receipt

All samples arrived at TAL intact and in good condition under valid chain of custody (COC). The COC was signed indicating the samples were appropriately relinquished by the sampler and accepted by the analytical laboratory. Tamper indicator devices (TIDs) were not present on the coolers which were shipped by Federal Express. The laboratory sample receipt checklist documents that the coolers and samples do not appear to have been compromised or tampered with.

Analytical Methods, Reporting Units, and Detection Limits

All analytical methods specified (or equivalent to those specified) on the COC (COC No.160-4416-2171.2) were utilized for the analyses. All results were reported in appropriate units. The detection limits were appropriate for all methods.

Transcription (COC and Lab Data)

Per the laboratory case narrative, the container label for the following sample did not match the information listed on the COC: YMTFA 32 SO 002. The container labels listed YMTFA 32 SO 010, while the COC lists YMTFA 32 SO 002. The sample was logged in per the COC ID. There were no other transcription errors in sample numbers or other information listed on COCs and in data reports that would impact the results.

Trip Blank

Not Applicable.

Equipment Blanks (EB)

Not applicable.

Field Blank (FB)

Not applicable.

Field Duplicates

Two field duplicate samples were collected and reported. The field duplicate pairs are: Sample YMTFA 42 SO 030 and field duplicate YMTFA 42 SO 030D; and sample YMTFA 43 SO 030 and field duplicate YMTFA 43 SO 030D. Field duplicate analytical results met QC acceptance criteria.

Laboratory Case Narratives

The following issues were noted in the case narratives:

TCLP VOCs:

- 2-Butanone did not meet the minimum RRF limit in the CCV. However, the RRF was above 0.05 and no qualification was required.

TCLP SVOCs:

- Surrogate recovery was above the control limit in a method blank and sample YMTFA 43 SO 30. The affected sample had no target analyte detections and qualification was not required. Qualification was not required due to the method blank since all recoveries in the remaining samples were acceptable.
- Hexachlorobenzene recovery was above the control limit in the LCS and MS. No qualification was required since this compound was not detected in the associated samples.

PCBs:

- Due to presence of multiple PCBs, less than 5 peaks were used for quantitation.
- The IS eluted outside the retention time window on the column for CCV 160-265947/3. The retention time shift was taken into account when reviewing the samples for target compounds. No sample qualification was required. PCBs were not detected in the samples.

TCLP Herbicides:

- The CCV recovery for 2,4-D is above the QC limit on the confirmation column. Since it was acceptable on the primary column, no qualification was required.

TCLP Metals (ICP) and Mercury:

- Mercury was detected in a method blank. Samples YMTFA 43 SO 030 and YMTFA 43 SO 030D: Hg detects <RL at 0.00011 J and 0.00012 J mg/L, respectively, are qualified as ND at the RL (0.0010 U mg/L).
- Per the laboratory case narrative, the TCLP mercury samples were re-digested/re-extracted due to the calibration curve and calibration QC expiring before analysis was performed. The MS/MSD was therefore spiked after preservation. No sample qualification was required.
- ICSA 160-266197/B: Arsenic detect > control criteria at 11.8 ug/L. Arsenic was not detected in the samples; therefore, no sample qualifications were required.

Radionuclides:

- No analytical or quality issues were noted in the laboratory SDG narrative.

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

TCLP Extractions

Nine soil samples were extracted by SW-846 Method 1311 with appropriate batch QC. There were no problems noted during the extraction.

Volatiles by GC/MS

TCLP extracts of four soil samples were analyzed for volatile organic compounds (VOCs) by GC/MS after TCLP extraction. Holding times, initial and continual calibrations, batch QCs (blank, LCS, MS/MSD) and sample specific QCs (internal standards, surrogates) were acceptable. No qualification of data was required.

Semivolatiles by GC/MS

TCLP extracts of four samples were extracted and analyzed for SVOCs by SW-846 Method 8270D. Holding times, initial and continual calibrations, batch QCs (blank, LCS, MS/MSD) and sample specific QCs (internal standards, surrogates) were acceptable. No qualification of data was required.

Herbicides by GC

TCLP extracts of four samples were prepared and analyzed for chlorinated herbicides by SW-846 Method 8151A. Holding times, initial and continual calibrations, batch QCs (blank, LCS, MS/MSD) and sample specific QCs (surrogates) were acceptable. No qualification of data was required.

Metals (ICP) and Mercury

TCLP extracts of nine samples were prepared and analyzed for ICP metals by SW-846 Method 6010C and mercury by SW-846 Method 7470A. Holding times, initial and continual calibrations, batch QC (blank, LCS, MS/MSD) were acceptable except for the following: Mercury was detected in a method blank. Therefore, Hg detects for samples YMTFA 43 SO 030 and YMTFA 43 SO 030D <RL at 0.00011 J and 0.00012 J mg/L, respectively, are qualified as ND at the RL (0.0010 U mg/L). No further qualification of metals data was required.

Polychlorinated Biphenyl by GC

Nine samples were extracted and analyzed for PCBs by SW-846 Method 8082A. Holding times, initial and continual calibrations, batch QCs (blank, LCS, MS/MSD) and sample specific QCs (internal standards, surrogates) were acceptable. No qualification of data was required.

Radionuclides

Nine samples were analyzed for the following radionuclides: tritium, total beta strontium, and technetium-99. Holding times, applicable instrument calibrations, and sample and batch QCs were acceptable for all methods. Traceable standard certificates were acceptable.

Gas Flow Proportional Counter

Total beta strontium analysis was performed by gas flow proportional counter. The Laboratory Control Sample (LCS) and matrix spike (MS) had acceptable percent recoveries. The laboratory duplicate analyses had acceptable relative percent difference (RPD) and duplicate error ratio (DER) results.

Chemical recoveries and yields were within acceptable limits. Method blank results were less than the MDAs. No qualification of data was required.

Liquid Scintillation Counter

Tritium and technetium (Tc-99) were analyzed by liquid Scintillation counter. The Laboratory Control Sample (LCS) and matrix spike (MS) had acceptable percent recoveries. The laboratory duplicate analyses had acceptable relative percent difference (RPD) and duplicate error ratio (DER) results. Chemical recoveries and yields were within acceptable limits. Method blank results were less than the MDAs.

Summary

- Mercury was detected in a method blank. Therefore, Hg detects for samples YMTFA 43 SO 030 and YMTFA 43 SO 030D <RL at 0.00011 J and 0.00012 J mg/L, respectively, are qualified as ND at the RL (0.0010 U mg/L).

Summary of Result Qualifiers

Sample No.	Parameter	Laboratory Result	Qualified Result	Units	Laboratory Qualifier	Validation Qualifier
YMTFA 43 SO 030	Mercury	0.00011 J	0.0010 U	mg/L	J	U
YMTFA 43 SO 030D	Mercury	0.00012 J	0.0010 U	mg/L	J	U

Appendix A
Verification Summary Table

Data Verification SDG 160-18570-1	Y	N	N/A	Comment
Custody of Samples				
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			The container label for sample YMTFA 32 SO 02 did not match the COC. The container listed YMTFA 32 SO 010, while the COC lists YMTFA 32 SO 002. Sample logged in per COC.
Standard Traceability				
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			
Analytical Completeness				
Are all COC samples and associated analytical results reported in the laboratory data package?	x			
Data Summaries				
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			

Data Verification SDG 160-18570-1	Y	N	N/A	Comment
Sample Data				
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			
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		Lab internal review checklists for the sample analyses are not included.

Appendix B
Validation Summary Tables

TCLP Extraction	Y	N	N/A	Qualifier	Comment or Reason Code
Was a ZHE vessel used for VOAs?	x				
Was ZHE checked for leaks after extraction?	x				
Did the lab use proper bottles?			x		No non-compliances were noted in the preparation logs
Was the %solid determined correctly?	x				
If appropriate, did the lab reduce particle size?			x		
Was the correct extraction fluid used?	x				Extraction fluid #1
Was the pH of the extraction fluid correct?	x				
Was the correct weight of extraction fluid used?	x				
For VOAs, was the sample weight 25 grams or less?	x				
Were the TCLP extracts properly preserved?	x				
Is there a TCLP blank with the TCLP fluid for a batch of up to 20 samples?	x				

TCLP Volatile Organic Compounds by GC/MS (SW846 8260C)	Y	N	N/A	Qualifier	Comment or Reason Code
Preservation and Holding Times					
Were samples properly preserved?			x		
Have the samples been analyzed within holding times?	x				
Detection Limits and Preservation					
Are all laboratory RLs <= recommended reporting limits in the SAP?	x				
GC/MS Instrument Performance Tuning					
Was BFB tune performed at the beginning of 12 hour analytical sequence?	x				
Did the BFB tunes meet instrument performance criteria?	x				
Initial Calibration					
Are minimum calibration curve with minimum 5 points analyzed prior to sample analysis?	x				
Are average RRFs greater than 0.05 level?	x				
Are %RSDs within the criteria?	x				
Calibration Verification					
Are calibration verification standard analyzed at the beginning of the analytical sequence immediately after BFB tuning?	x				
RRT within 0.006 of the average RRT of the initial calibration?	x				

TCLP Volatile Organic Compounds by GC/MS (SW846 8260C)	Y	N	N/A	Qualifier	Comment or Reason Code
Are RRFs greater than 0.05?	x			NA	The RRFs for the MEK ICV and CCV are 0.0707 and 0.0736, respectively and are below the 0.100 minimum RRF listed on the Forms VII. Per the lab narrative, a low-level LOQV was analyzed at the reporting limit (5ug/L) and the affected analyte was detected. The MEK sample non-detect results are validated to the reporting limit (RL) of 50 ug/L. No sample qualifications were required.
Are %D(difference or drift) within 20% of the initial calibration RRF appropriate peak resolution within appropriate control criteria?	x				
Method Blank					
Is the Method Blank analyzed for each analytical batch of up to 20 samples?	x				
Is the Method Blank Summary form present?	x				
Is the method blank the same matrix as the samples in the reporting batch?	x				TCLP
Is the blank at similar (low, medium, or trace) concentration level?	x				
Does the blank have any detects above MDL?		x			
Surrogate Recovery					
Are all samples and QCs spiked with surrogate compounds?	x				
Are percent recoveries within the method criteria results?	x				
LCS/LCSD					
Has at least one LCS been prepared for each preparation batch containing up to 20 samples?	x				
Is the LCS the same matrix as the samples in the reporting batch?			x		Aqueous LCS for the TCLP samples.
Is the LCS spiked with all target analytes listed in the SAP?	x				

TCLP Volatile Organic Compounds by GC/MS (SW846 8260C)	Y	N	N/A	Qualifier	Comment or Reason Code
Are the LCS %RECs within the applicable QC criteria?	x				
Are the LCS/LCSD RPDs within the applicable QC criteria?			x		
Matrix Spike/Matrix Spike Duplicate					
Has at least one MS/MSD pair been prepared for a batch with sample counts up to 20 samples?	x				
Are the MS/MSD spiked with all target analytes listed in the SAP?	x				
MS and MSD %RECs within the applicable QC limits?	x				
MS/MSD RPDs within the applicable QC limits?	x				
Internal Standards					
Were internal standards added to all samples and QCs?	x				
Are internal standard retention time within method criteria?	x				
Are internal standard area within method criteria?	x				
Target Analyte Identification					
Do the mass spectra of the positively identified compounds meet the mass criteria?			x		All TCLP sample results are non-detect for the reported VOCs.
Are the RRTs of the positively identified target compounds within ± 0.06 of the same analyte in the associated opening CCV?			x		
Target Analyte Quantitation and Reported Quantitation Limit					
Are the results for all positively identified analytes are calculated correctly?			x		
Are the reporting limits calculated for the non-detects and reported correctly	x				

TCLP Semivolatile Organic Compounds by GC/MS (SW846 8270D)	Y	N	N/A	Qualifier	Comment or Reason Code
Preservation and Holding Times					
Were samples properly preserved?			x		
Have the samples been analyzed within holding times?	x				
Detection Limits and Preservation					
Are all laboratory RLs <= recommended reporting limits in the SAP?	x				
GC/MS Instrument Performance Tuning					
Was DFTPP tune performed at the beginning of 12 hour analytical sequence?	x				
Did the DFTPP tunes meet instrument performance criteria?	x				
Initial Calibration					
Are minimum calibration curve with minimum 5 points analyzed prior to sample analysis?	x				
Are average RRFs greater than 0.05 level?	x				
Are %RSDs within method criteria?	x				
Calibration Verification					
Are calibration verification standard analyzed at the beginning of the analytical sequence immediately after DFTPP tuning?	x				
RRT within 0.006 of the average RRT of the initial calibration?	x				
Are RRFs greater than 0.05?	x				
Are %Ds (difference or drift) within appropriate control criteria?	x				
Method Blank					
Is the Method Blank extracted and analyzed for each analytical batch of up to 20 samples?	x				
Is the Method Blank Summary form present?	x				
Is the method blank the same matrix as the samples in the reporting batch?	x				TCLP
Is the blank at similar (low, medium, or trace) concentration level?	x				
Does the blank have any detects above MDL?		x			

TCLP Semivolatile Organic Compounds by GC/MS (SW846 8270D)	Y	N	N/A	Qualifier	Comment or Reason Code
Surrogate Recovery					
Are all samples and QCs spiked with surrogate compounds?	x				
Are percent recoveries within the method criteria results?		x		NA	Surrogates were recovered high for Sample YMTFA 43 SO 030. All reported compounds for the sample were non-detect at the RL. No sample qualifications were required. A surrogate was high for the method blank analysis. No target analytes were detected above the MDL for the MB. The QC samples are not qualified for surrogate recovery.
LCS/LCSD					
Has at least one LCS been prepared for each preparation batch containing up to 20 samples?	x				
Is the LCS the same matrix as the samples in the reporting batch?			x		Aqueous LCS for the TCLP samples.
Is the LCS spiked with all target analytes listed in the SAP?	x				
Are the LCS %RECs within the applicable QC criteria?		x		NA	Hexachlorobenzene recovered high. The samples are non-detect for this compound. No sample qualifications were required.
Are the LCS/LCSD RPDs within the applicable QC criteria?			x		
Matrix Spike/Matrix Spike Duplicate					
Has at least one MS/MSD pair been prepared for a batch with sample counts up to 20 samples?	x				
Are the MS/MSD spiked with all target analytes listed in the SAP?	x				

TCLP Semivolatile Organic Compounds by GC/MS (SW846 8270D)	Y	N	N/A	Qualifier	Comment or Reason Code
MS and MSD %RECs within the applicable QC limits?			x	NA	The Batch QC was not performed on a sample in this SDG and is not applicable.
MS/MSD RPDs within the applicable QC limits?			x		
Internal Standards					
Were internal standards added to all samples and QCs?	x				
Are internal standard retention time within method criteria?	x				
Are internal standard area within method criteria?	x				
Target Analyte Identification					
Do the mass spectra of the positively identified compound meet the mass criteria?			x		TCLP SVOC target compounds were not detected for the samples in the SDG.
Are the RRTs of the positively identified target analytes within ± 0.06 of the same analyte in the associated opening CCV?			x		
Target Analyte Quantitation and Reported Quantitation Limit					
Are the results for all positively identified analytes are calculated correctly?			x		
Are the reporting limits calculated for the non-detects and reported correctly	x				

TCLP Chlorinated Herbicides (SW846 8151A)	Y	N	N/A	Qualifier	Comment or Reason Code
Preservation and Holding Times					
Were samples properly preserved?			x		
Have the samples been analyzed within holding times?	x				
Detection Limits and Preservation					
Are all laboratory RLs <= recommended SAP RLs?	x				
Initial Calibration					
Are minimum calibration curve with minimum 5 points analyzed prior to sample analysis?	x				
Are %RSDs within method criteria?	x				
Calibration Verification					
Are calibration verification standards analyzed at the appropriate frequency?	x				
RT within RT windows established by initial calibration?	x				

TCLP Chlorinated Herbicides (SW846 8151A)	Y	N	N/A	Qualifier	Comment or Reason Code
Are %Ds (difference or drift) within 20% of the average initial calibration factors?		x			The CCV 160-265408/15 recovery for 2,4-D was outside upper QC limits on the secondary column, but was within acceptance limits on the primary column. There were no sample hits above the RL on the primary column; therefore, sample detect confirmation was not needed on the secondary column. The data results were reported from the primary column. No validation qualifiers were required for the sample non-detected results.
Method Blank					
Is the Method Blank extracted and analyzed for each analytical batch of up to 20 samples?	x				
Is the Method Blank Summary form present?	x				
Is the method blank the same matrix as the samples in the reporting batch?	x				
Is the blank at similar (low, medium, or trace) concentration level?	x				
Does the blank have any detects above MDL?		x			
Surrogate Recovery					
Are all samples and QCs spiked with surrogate compounds?	x				

TCLP Chlorinated Herbicides (SW846 8151A)	Y	N	N/A	Qualifier	Comment or Reason Code
Are percent recoveries within the method criteria results?	x				
LCS/LCSD					
Has at least one LCS been prepared for each preparation batch containing up to 20 samples?	x				
Is the LCS the same matrix as the samples in the reporting batch?			x		Aqueous for TCLP extracts
Is the LCS spiked with all target analytes listed in the SAP?	x				
Are the LCS %RECs within the applicable QC criteria?	x				
Are the LCS/LCSD RPDs within the applicable QC criteria?			x		
Matrix Spike/Matrix Spike Duplicate					
Has at least one MS/MSD pair been prepared for a batch with sample counts up to 20 samples?	x				
Are the MS/MSD spiked with all target analytes specified in the SAP?	x				
MS and MSD %RECs within the applicable QC limits?			x		The Batch QC was not performed on a sample in this SDG.
MS/MSD RPDs within the applicable QC limits?			x		
Target Analyte Identification					
Do the positively identified compounds meet the identification criteria?			x		Target compounds were not detected for the samples in this SDG.
Are the RTs of the positively identified target analytes within RT windows established by initial calibration standards?			x		
Target Analyte Quantitation and Reported Quantitation Limit					
Are the results for all positively identified analytes calculated correctly?			x		
Are the reporting limits calculated for the non-detects and reported correctly	x				

TCLP Metals by ICP (SW6010) TCLP Mercury by CVAA (SW7470A)	Y	N	N/A	Qualifier	Comment or Reason Code
Preservation and Holding Times					
Were samples properly preserved?			x		
Are sample preparation sheets present and account for all extractions and digestions for reported samples?	x				
Have the samples been prepared and analyzed within holding times?	x				
Detection Limits and Target Analytes					
Do all samples show RLs <= the SAP Recommended Reporting Limits?	x				
Are all the SAP target analytes reported?	x				
Initial Calibration					
Was the calibration within acceptance criteria?	x				
Calibration Verification					
Was a second source ICV analyzed after calibration with recoveries within acceptance criteria?	x				
Were CCVs analyzed at the required frequency with recoveries within acceptance criteria? For ICP, CCVs and low level CCVs (CCVL) as applicable.	x				
Are the ICV and CCV/CCVL Summary forms present?	x				
Was the ICP CRQL Check Standard analyzed with recoveries within acceptance criteria?	x				
Method Blank and ICB/CCBs					
Has at least one method blank been prepared For each batch of up to 20 samples?	x				
Is the method blank the same matrix as the samples in the reporting batch?	x				TCLP

TCLP Metals by ICP (SW6010) TCLP Mercury by CVAA (SW7470A)	Y	N	N/A	Qualifier	Comment or Reason Code
Were target analytes detected in the method blank above the MDL?	x			Samples YMTFA 43 SO 030 and YMTFA 43 SO 030D: Hg detects <RL at 0.00011 J and 0.00012 J mg/L, respectively, are qualified as ND at the RL (0.0010 U mg/L)	Hg LB160-266072/1-A: Hg detected at 0.0000935 J mg/L All other MB results were < MDL.
Were the ICB and CCBs analyzed at the required frequency with results within acceptance criteria?	x				
Are the Method Blank and ICB/CCB Summary forms present?	x				
ICP Interference Check Samples					
Were the ICP ICSA/ICSAB interference check standards analyzed as required with results within acceptance criteria?		x		None	ICSA 160-266197/B: Arsenic detect > control criteria at 11.8 ug/L Arsenic was not detected in the samples; therefore, no sample qualifications were required.
LCS/LCSD					
Has at least one LCS been prepared for each preparation batch containing up to 20 samples?	x				
Is the LCS the same matrix as the samples in the reporting batch?			x		Aqueous LCS for the TCLP samples
Is the LCS spiked with all target analytes listed in the SAP?	x				
Are the LCS %RECs within the applicable QC criteria?	x				
Are the LCS/LCSD RPDs within the applicable QC criteria?			x		

TCLP Metals by ICP (SW6010) TCLP Mercury by CVAA (SW7470A)	Y	N	N/A	Qualifier	Comment or Reason Code
Matrix Spike/Matrix Spike Duplicate					
Has at least one MS/MSD pair been prepared for a batch containing up to 20 samples?	x				
Are the MS/MSD spiked with all target analytes listed in the SAP?	x				
Are MS and MSD %RECs within the applicable QC limits?	x				
Are MS/MSD RPDs within the applicable QC limits?	x				
Duplicates					
Has a laboratory duplicate been prepared for a batch containing up to 20 samples? (If an MS/MSD pair has been prepared, the laboratory duplicate is not required.)			x		
If a laboratory duplicate was analyzed, were the RPDs within acceptance criteria?			x		
Was a field duplicate collected?	x				
If a field duplicate was analyzed, were the RPDs within the 50% acceptance criteria?	x				Barium detects were within criteria for the two FD pairs. All other sample results were non-detect for the field duplicate pairs.
Serial Dilution					
Was the Serial Dilution within acceptance limits?	x				
Sample Quantitation and Documentation					
Are reported sample concentrations within the instrument linear range?	x				
Have sample reporting limits and reported concentrations been adjusted for analytical dilutions?	x				
Are instrument runlogs present and account for all reported sample results?	x				

TCLP Metals by ICP (SW6010) TCLP Mercury by CVAA (SW7470A)	Y	N	N/A	Qualifier	Comment or Reason Code
Have all Laboratory Case Narrative comments and findings been addressed in the data validation process?	x			None	Per the laboratory case narrative, the TCLP mercury samples were re-digested/re-extracted due to the calibration curve and calibration QC expiring before analysis was performed. The MS/MSD was therefore spiked after preservation.

Polychlorinated Biphenyl (Method 8082A)	Y	N	N/A	Qualifier	Comment or Reason Code
Preservation and Holding Times					
Were samples properly preserved?			x		
Have the samples been analyzed within holding times?	x				
Detection Limits and Preservation					
Are all laboratory RLs <= recommended RLs in the SAP?	x				
Initial Calibration					
Are minimum calibration curve with minimum 5 points analyzed prior to sample analysis?	x				
Are %RSDs within method criteria?	x				
Calibration Verification					
Are calibration verification standard analyzed at the appropriate frequency?	x				
RT within RT windows established by initial calibration?	x				
Are %D (difference or drift) within 20% of the average initial calibration factors?	x				The ICV and CCV %Ds for each aroclor were within 20% of the ICAL. Several individual peaks for the aroclors were outside 20% D but the average of the peaks for each aroclor was within 20%.
Method Blank					
Is the Method Blank extracted and analyzed for each analytical batch of up to 20 samples?	x				
Is the Method Blank Summary form present?	x				
Is the method blank the same matrix as the samples in the reporting batch?	x				
Is the blank at similar (low, medium, or trace) concentration level?	x				
Does the blank have any detects above MDL?		x			

Polychlorinated Biphenyl (Method 8082A)	Y	N	N/A	Qualifier	Comment or Reason Code
Surrogate Recovery					
Are all samples and QCs spiked with surrogate compounds?	x				
Are percent recoveries within the method criteria results?	x				
LCS/LCSD					
Has at least one LCS been prepared for each preparation batch containing up to 20 samples?	x				
Is the LCS the same matrix as the samples in the reporting batch?	x				
Is the LCS spiked with all target analytes listed in the SAP?			x		The lab QC samples are spiked with aroclor 1016 and 1260
Are the LCS %RECs within the applicable QC criteria?	x				
Are the LCS/LCSD RPDs within the applicable QC criteria?			x		
Matrix Spike/Matrix Spike Duplicate					
Has at least one MS/MSD pair been prepared for a batch with sample counts up to 20 samples?	x				
Are the MS/MSD spiked with target analyte specified in the SAP?			x		The lab QC samples are spiked with aroclor 1016 and 1260
MS and MSD %RECs within the applicable QC limits?	x				
MS/MSD RPDs within the applicable QC limits?	x				
Internal Standards					
Were internal standards added to all samples and QC samples?	x				

Polychlorinated Biphenyl (Method 8082A)	Y	N	N/A	Qualifier	Comment or Reason Code
Are internal standard retention times within method criteria?		x		None	The IS eluted outside the retention time window on the column for CCV 160-265947/3. The retention time shift was taken into account when reviewing the samples for target compounds per the lab case narrative.
Are internal standard areas within method criteria?	x				
Target Analyte Identification					
Do the positively identified compounds meet the identification criteria?			x		The samples are non-detect for all reported aroclors. Per the lab case narrative, less than 5 peaks were used for quantitation for samples YMTFA 35 SO 002 and YMTFA 34 SO 002 due to the presence of matrix interferences. The samples were non-detect.
Are the RTs of the positively identified target analytes within RT windows established by initial calibration standards?			x		

Polychlorinated Biphenyl (Method 8082A)	Y	N	N/A	Qualifier	Comment or Reason Code
Target Analyte Quantitation and Reported Quantitation Limit					
Are the results for all positively identified analytes calculated correctly?			x		Target analytes were not reported for the samples.
Are the reporting limits calculated for the non-detects and reported correctly	x				

Radiological Data Validation Gamma Spectrometry Gas Flow Proportional Counting Liquid Scintillation Counting	Y	N	N/A	Qualifier	Comment or Reason Code
Sample Handling and Preservation					
Were samples preserved correctly?	x				
Holding Times					
Were samples analyzed within holding times?	x				
Standard Traceability					
Were all certificates included for the LCS and MS samples?	x				
Were all standards and reference materials traceable to reliable source material?	x				
Calibration Verification					
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				
LCS					
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 limits?	x				
Laboratory Duplicate					
Has at least one laboratory duplicate been prepared for up to 20 samples?	x				
ARE RPD and DER within QC acceptance limits?	x				
Matrix Spike					
Has at least one MS been prepared for up to 20 samples?	x				
Is MS %D (or %R) within QC acceptance limits?	x				
Method Blank					
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				
Chemical Yield - Tracers and Carriers					
Is yield reported for all samples and QC samples in the reporting batch?	x				

Radiological Data Validation Gamma Spectrometry Gas Flow Proportional Counting Liquid Scintillation Counting	Y	N	N/A	Qualifier	Comment or Reason Code
Are percent recovery criteria satisfied for all yield results?	x				

Analytical Data Review Verification Checklist

Laboratory:	TestAmerica	SOW or Contract No.:	Outfall 200
Verifier Name:	JD Milloway	Date Verified:	9/6/16
SDG No(s).	18570-1; 18570-2		

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				Login-Sample Receipt Checklist comment is wrong for sample #8 discrepancy. Case narrative assumption for sample #8 is correct; the ID supports field sampling ID documentation in the SAP. Logged per COC ID-YMTFA 32 SO 002.
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	X				

Analytical Data Review Verification Checklist

Laboratory:	TestAmerica	SOW or Contract No.:	Outfall 200
Verifier Name:	JD Milloway	Date Verified:	9/6/16
SDG No(s).	18570-1; 18570-2		

Item No.	Criteria	Acceptable?				Comments
		Yes	No	NA	NR	
	days					
	-TCLP Mercury TCLP Extraction to Analysis ≤28 days	X				
	-VOAs to Extraction/Analysis ≤14 days			X		
	-SVOAs to Extraction ≤7 days (liquids), ≤14 days (solids)			X		
	-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				

Analytical Data Review Verification Checklist

Laboratory:	TestAmerica	SOW or Contract No.:	Outfall 200
Verifier Name:	JD Milloway	Date Verified:	9/6/16
SDG No(s).	18570-1; 18570-2		

Item No.	Criteria	Acceptable?				Comments
		Yes	No	NA	NR	
	-TCLP Herbicides Prep Extraction to Analysis ≤40 days	X				
	TOC ≤28 days			X		
	-Hexane Extractable Material, Oil and Grease ≤28 days			X		
	-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				