Data Adequacy Summary

Analytical data generated for the Kingston Ash Recovery project underwent a critical Quality Assurance (QA) review as specified in the TVA-KIF-QAPP. The summary below provides:

- A description of the laboratory deliverables reviewed.
- The level of review (verification and validation).
- The quality control (QC) measures included in the review.
- Summary tables representing the overall data quality.

For the Kingston Ash Recovery project, TVA's contracted laboratories submitted three types of deliverables:

- A limited (Level 1) data package containing sample results and batch quality control (QC) sample results.
- A fully-documented (Level 4) data package including raw data for all analyses.
- Electronic data deliverables (EDDs) for storage in TVA's EarthSoft EQuIS® database.

Electronic data were stored and hosted in a Microsoft SQL database using the EQuIS Enterprise SQL server data schema. Security of the data was maintained using SQL server roles and assigning user names and passwords appropriately.

EDDs were subjected to completeness and correctness testing during loading to TVA's EQuIS database; once loaded to the EQuIS database, the data were subjected to verification. As defined in the TVA-KIF-QAPP, data verification involved comparison of the data loaded in the EQuIS database to the results reported in the Level 1 data package and reconciliation of any discrepancies between these two deliverables. In addition, data verification included review of the batch QC summary forms for compliance with the applicable methods and for data usability with respect to the project data quality objectives (DQOs) and the TVA-KIF-QAPP.

Following receipt of the Level 4 data package, data were subjected to validation. As defined in the TVA-KIF-QAPP, data validation included review of raw data and associated QC summary forms for compliance with the applicable methods and for data usability with respect to the appropriate guidance documents. Data validation expands upon the completeness, correctness, and usability assessment performed during verification to include evaluation of instrumental QC analyses, review of sample preparation information, and recalculation of reported results from raw data.

Data validation was performed based on the sample results, summary QC data, and raw data provided by the laboratory. Data validation includes a review of the following QC measures (where applicable):

- Sample condition upon laboratory receipt.
- Initial calibration linearity.
- Blank analysis results greater than the method detection limit (MDL).
- Sample preparation and holding times.
- Inductively coupled plasma (ICP)/mass spectrophometer (MS) tuning.
- Initial calibration verification/continuing calibration verification standard recoveries.
- Inductively coupled plasma interference check standard results (metals only).
- Method detection limits (MDLs) and linear ranges.
- Internal standard area counts and recoveries.

- Percent moisture/solids.
- Matrix spike/matrix spike duplicate (MS/MSD) recoveries and precision.
- Post-digestion spike recoveries (metals only).
- Laboratory and field duplicate precision.
- Quantitation of positive results.
- Laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries and precision.
- Serial dilution results (metals only).
- Analytical sequence.
- Total vs. dissolved analyte results.
- Reporting limit standard recoveries (metals only).
- MDL verification standards (metals only).
- Standard reference material recoveries (metals only).
- Dual analytical column precision (organics only).
- Retention times (organics only).
- DDT/endrin breakdown (organics only).
- Surrogate recoveries (organics only).
- Qualitative identification (organics only).
- Gas chromatograph/mass spectrometer (GC/MS) tuning and system performance (organics only).
- Background checks (radionuclides only).
- Chemical yields (radionuclides only).
- Centroid checks (radionuclides only).
- Efficiency checks (radionuclides only).

The purpose of analytical data validation was to segregate unacceptable data and to qualify data based on data quality limitations identified during validation. In addition to the laboratory QA review, the Level 4 data packages were evaluated and validated for the following:

- Compliance with requested testing requirements.
- Completeness with respect to the QAPP Level 4 data package deliverables requirements.
- Reporting accuracy (including hardcopy to EDD).
- Confirmation of receipt of requested items.
- Traceability, sensitivity, and usability of the data.

In addition to the review items specified above, the data were validated with guidance from:

- *US EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, EPA-540-R-08-01 (June 2008).*
- *National Functional Guidelines for Inorganic Data Review (US EPA, October 2004).*
- *US EPA Region 4 Data Validation Standard Operating Procedures for Contract Laboratory Program Routine Analytical Services (Rev. 2.1; July 1999).*
- *US EPA Region 4 Data Validation Standard Operating Procedure for Organic Analysis* (Revision 3.1, June 2008).
- *US EPA Region 4 Data Validation Standard Operating Procedure*.

It should be noted that these US EPA data validation guidelines are not completely applicable to US EPA and SW-846 analytical methods referenced by the laboratories performing the analyses; consequently, professional judgment was used to evaluate data usability. The following methods were referenced by the contract laboratories for the samples analyzed:

Constituent Class	**Method(s)**
Organics	SW-846 Method 8270C Selective Ion Monitoring (SIM) SW-846 Method 8082 SW-846 Method 8081A
Metals	SW-846 Methods 6010B and 6020A. US EPA Methods 200.7 and 200.8 SW-846 Methods 7470A and 7471A
Metals Species	SW-846 Method 7199 US EPA Method 1632 US EPA Method 1638 US EPA Method 1630 US EPA Method 1631
General Chemistry	Standard Methods (SM) 2540B, C, and D SM 5310B SM 2340B US EPA Method 300.0 US EPA Method 350.1 US EPA 160.3 Walkley-Black Method
Physical Characteristics	ASTM D2974
AVS/SEM	US EPA 821-R-91-100/6010/7470/9034
Radionuclides	HASL 300 US EPA Method 901.1 US EPA Method 904.4/SW-846 Method 9320 Modified US EPA Method 903.1 Modified

Analytical data from the contracted laboratories were qualified with guidance from the National Functional Guidelines and Region 4 Data Validation SOPs previously referenced. The data validation qualifiers listed below were applied to project samples based on the reviews conducted.

Organic Data Validation Qualifiers

U* - This result should be considered “not detected” because it was detected in an associated field or laboratory blank at a similar level.
R - Unreliable positive result; compound may or may not be present in sample.
UR - Unreliable reporting or detection limit; compound may or may not be present in sample.
J - Quantitation is approximate due to limitations identified during data validation.
UJ - This compound was not detected, but the reporting or detection limit should be considered estimated due to a bias identified during data validation.

Inorganic Data Validation Qualifiers

U* - This result should be considered “not detected” because it was detected in an associated field or laboratory blank at a similar level.
R - Unreliable positive result; analyte may or may not be present in sample.
UR - Unreliable reporting or detection limit; analyte may or may not be present in sample.
J - Quantitation is approximate due to limitations identified during data validation.
UJ - This analyte was not detected, but the reporting or detection limit may or may not be higher due to a bias identified during data validation.

As specified in the TVA-KIF-QAPP (Section 22.0), the data produced during the sampling tasks included in the field investigation are compared with the defined QA objectives and criteria for precision, accuracy, representativeness, completeness, and comparability (PARCC) and sensitivity. The primary goal of these procedures is to ensure that the data reported are representative of actual conditions at the Site.

Standard procedures are used so that known and acceptable levels of PARCC are maintained for each data set. Descriptions of these criteria are presented in the following subsections.

Precision

Precision is the degree of agreement between the numerical values of a set of duplicate samples performed in an identical fashion constitutes the precision of the measurement.

Analytical precision is calculated by expressing, as a percentage, the relative percent difference (RPD) between results of analyses of laboratory duplicate samples for a given analyte. Precision is expressed as an RPD when both results are greater than 5-times the reporting limit. When at least one result is less than 5-times the reporting limit, the difference between the results is used to evaluate precision.

Precision is evaluated by analysis of MS/MSD, LCS/LCSD, or laboratory duplicates. In general, acceptable precision was consistently observed for the sample matrices and parameters included in the EE/CA dataset. Individual results qualified as estimated as a result of analytical imprecision were detailed in the data validation reports issued to TVA.

Accuracy

Accuracy is the degree of agreement of a measurement, X, with an accepted reference or true value, T.

Accuracy, which is a measure of the bias in a system, is assessed by means of reference samples and percent recoveries. Error may arise due to personal, instrumental, or method factors.

The two types of analytical check samples used are LCSs and MS samples. Analytical accuracy is expressed as the percent recovery (%R) of an analyte that has been added to the control sample or a standard matrix (*e.g.*, blank, soil) at a known concentration prior to analysis.

Acceptable accuracy was observed for most sample matrices and parameters included in the EE/CA dataset. Very low recoveries were observed for hexavalent chromium in some sediment MS analyses and very low recoveries were observed for semivolatile organic surrogate

compounds in some sediment samples, which resulted in rejection of data as summarized in Table 11 below. Individual results qualified as estimated or rejected as a result of analytical inaccuracy were detailed in the data validation reports issued to TVA.

Completeness

Completeness is a measure of the degree to which the amount of sample data collected meets the needs of the sampling program and is quantified as the relative number of analytical data points that meets the acceptance criteria (including accuracy, precision, and any other criteria required by the specific analytical method used). Completeness is defined as a comparison between actual numbers of usable data points expressed as a percentage of expected number of points.

Difficulties encountered while handling samples in the laboratory, as well as unforeseen complications regarding analytical methods, may affect completeness during sample analysis. As specified in the TVA-KIF-QAPP, the minimum goal for completeness was 90%; the ability to exceed this goal is dependent on the applicability of the analytical methods to the sample matrix analyzed. If data cannot be reported without qualifications, project completion goals may still be met if the qualified data (*i.e.*, data of known quality, even if not perfect) are suitable for specified project goals. Percent completeness was expressed as the ratio of the total number of usable results relative to the total number of analytical results. The total number of usable analytical results was the total number of results minus any results deemed unusable (*e.g.*, rejected) at validation.

Table 1 presents the completeness percentage of each individual task specified in the Engineering Evaluation Cost Analysis (EECA).

Table 1: Summary of Completeness Percentages

Matrix	Analytical Results (Total Count)	Usable – Results that were not Rejected (Total Count)	Percent Usable
Amphibian	5940	5795	98%
Aquatic Vegetation			
Emergent Vegetation	835	835	100%
Shoreline Vegetation	835	835	100%
Periphyton	349	349	100%
Benthic Invertebrate			
Mayflies - Adult	4301	4301	100%
Mayfies - Nymph	2976	2976	100%
Snails	2382	2382	100%
Aqueous	78	75	96%
Bird – Tree Swallows			
Egg	5,719	5,635	99%
Nestling	3,023	3,021	99%

Matrix	Analytical Results (Total Count)	Usable – Results that were not Rejected (Total Count)	Percent Usable
Dud Egg	234	234	100%
Dead Nestling	54	52	96%
Egg Shells	520	520	100%
Bird – All Others	1,917	1,916	99%

Fish – Metals			
Carcass	5,538	5,443	98%
Fillet	19,929	18,488	93%
Whole Body Minus Gut Content	1,848	1,848	100%
Ovary	223	216	97%
Gut and Gut Content	1,652	1,652	100%
Whole Body	5,038	5,016	99%
Fish – Non-Metals Analyses (By Laboratory)			
Carcass – Pace	756	756	100%
Fillet – Pace	1092	1092	100%
Carcass – Frontier	144	144	100%
Fillet – Frontier	632	632	100%
Fillet – GEL	180	180	100%
Groundwater and Pore Water (By Matrix and Laboratory)			
GW – TestAmerica	757	755	99%
Soil – TestAmerica	208	207	99%
Porewater – TestAmerica	409	409	100%
Shur-Mud – TestAmerica	50	50	100%
GW – GEL	360	360	100%
Porewater – GEL	216	216	100%
Raccoon			
Brain	810	796	98%
Blood	810	797	99%
Hair	810	795	98%
Kidney	810	804	99%

Matrix	Analytical Results (Total Count)	Usable – Results that were not Rejected (Total Count)	Percent Usable
Liver	810	804	99%
Ovaries	26	26	100%
Skeletal Muscle	810	803	99%
Gonad	669	662	99%
Subcutaneous Fat	378	375	99%
Exposed Sediment (By Laboratory)			
TestAmerica Burlington	1,514	1,491	98%
TestAmerica Irvine	19	19	100%
TestAmerica Nashville	1,872	1,872	100%
TestAmerica North Canton	38	38	100%
Frontier	247	247	100%
GEL	342	342	100%
Submerged Sediment (By Laboratory)			
TestAmerica Burlington	1,892	1872	99%
TestAmerica Irvine	24	21	87%*
TestAmerica Nashville	2,265	2,265	100%
TestAmerica North Canton	48	48	100%
TestAmerica Pittsburgh	245	245	100%
Frontier	312	312	100%
GEL	432	432	100%
Ash Deposit (By Laboratory)			
R.J. Lee	204	204	100%
Surface Water (By Laboratory)			
TestAmerica Nashville	11,550	11,548	99%
Frontier	500	500	100%
GEL	936	936	100%
Turtle			
Blood	7,242	6,993	97%
Carapace	1,820	1,820	100%

Notes:
* Hexavalent chromium was rejected in several samples due to matrix issues with the sediment samples; resampling and reanalysis most likely would not have resolved the matrix issues. Overall completeness for sediment sample analyses was > 90%..

Representativeness

Representativeness expresses the degree to which sample data are accurate and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a qualitative parameter associated with the proper design of the sampling program. The representativeness criterion can, therefore, be met through the proper selection of sampling locations, the collection of a sufficient number of samples, and the use of US EPA-approved and standardized sampling procedures to describe sampling techniques and the rationale used to select sampling locations to ensure representativeness of the sample data.

Representativeness was also measured by the collection of field duplicates or co-located samples, as appropriate given the sample matrix. Comparison of the analytical results of field duplicates will provide a direct measure of individual sample representativeness. In general, field duplicate analyses demonstrated acceptable sample representativeness for all matrices and parameters included in the EE/CA dataset. Individual results qualified as estimated or rejected as a result of analytical inaccuracy were detailed in the data validation reports issued to TVA.

Comparability

Comparability is a qualitative parameter used to express the confidence with which one data set can be compared with another. The comparability of the data, a relative measure, is influenced by sampling and analytical procedures. By providing specific protocols for obtaining and analyzing samples, data sets should be comparable regardless of who collects the sample or who performs the sample analysis.

The laboratory was responsible providing the following controls to allow assessment of comparability:

- Adherence to current, standard US EPA-approved methodology for sample preservation.
- Chain-of-custody (COC) Records that accompanied samples to the analytical laboratory have very specific method and analyte requests. Each COC contains a "MAG" which is a method and analyte group that indicate to the laboratory which method and grouping of analytes to report. In addition to requiring method and analytes, the MAG, also requires specific units and basis (*e.g.*, wet, dry).
- Compliance with holding times and analysis consistent with TVA-KIF-QAPP.
- Consistent reporting units for each parameter of similar matrices.
- US EPA-traceable or NIST-traceable standards, when applicable.
- For metals analysis, the Kingston Ash Recovery project instituted project method detection limits (MDLs) to which all samples were reported. The project MDLs were set at the higher value between the 40 CFR Part 136 MDLs and an evaluation of the blanks, represented as "3 sigma × the average of the blank results." With each analytical sequence, the laboratory verified that it could "see" and report to the project MDLs by analyzing a series of MDL verification standards spiked at 1×, 2×, and 3× the project MDL.

In general, the analytical laboratories met the requirements above to generate comparable data. Individual sample results qualified as estimated due to exceeded analytical holding times were detailed in the data validation reports issued to TVA. In addition, MDLs for specific results were raised in the project database when MDL verification standard acceptance criteria were not met.

Data Quality

In general, the data met the DQOs defined for these tasks and are acceptable for use. Tables 2 through 13 below summarize the data quality based on the verification and validation that was performed and as compared to the data quality measures identified in the TVA-KIF-QAPP. The tables have been divided into the categories as identified in the EE/CA and individual technical memoranda.

Table 2: Summary of Amphibian Data Quality

Analytical Results (Total)	Acceptable (No Qualification)[a]		Acceptable (Estimated)[b]		Blank Qualified[c]		Rejected[d]	
5940	4221	*71%*	1273	*22%*	301	*5%*	145[e]	*2%*

Notes:
[a]Acceptable, No Qualification – Qualification of data was not warranted based on a review of the applicable QC measures.
[b]Acceptable, Estimated – Quantitation or detection limit is approximate due to limitations or bias identified during a review of the applicable QC measures.
[c]Blank Qualified – Result is considered "not-detected" because it was detected in an associated blank at a similar level.
[d]Rejected – Unreliable result or detection limit; analyte may or may not be present in sample.
[e]Rejected results are percent moisture results qualified as unusable due to limited sample mass and/or extended frozen storage prior to moisture determination.

Table 3: Summary of Vegetation Data Quality

Matrix	Analytical Results (Total) Count)	Acceptable (No Qualification)[a]		Acceptable (Estimated)[b]		Blank Qualified[c]		Rejected[d]	
Emergent Vegetation	835	624	*75%*	211	*25%*	0	*0%*	0	*0%*
Shoreline Vegetation	835	589	*71%*	230	*28%*	16	*2%*	0	*0%*
Periphyton	349	241	*69%*	90	*26%*	18	*5%*	0	*0%*

Notes:
[a]Acceptable, No Qualification – Qualification of data was not warranted based on a review of the applicable QC measures.
[b]Acceptable, Estimated – Quantitation or detection limit is approximate due to limitations or bias identified during a review of the applicable QC measures.
[c]Blank Qualified – Result is considered "not-detected" because it was detected in an associated blank at a similar level.
[d]Rejected – Unreliable result or detection limit; analyte may or may not be present in sample.

Table 4: Summary of Mayfly Data Quality

Matrix	Analytical Results (Total) Count)	Acceptable (No Qualification)[a]		Acceptable (Estimated)[b]		Blank Qualified[c]		Rejected[d]	
Mayflies – Adult	4301	3012	*70%*	1074	*25%*	215	*5%*	0	*0%*
Mayfies – Nymph	2976	1960	*66%*	869	*29%*	147	*5%*	0	*0%*
Snails	2382	1664	*70%*	649	*27%*	69	*3%*	0	*0%*
Aqueous (Blanks)	78	0	*0%*	0	*0%*	75	*96%*	3	*4%*

Notes:

[a]Acceptable, No Qualification – Qualification of data was not warranted based on a review of the applicable QC measures.
[b]Acceptable, Estimated – Quantitation or detection limit is approximate due to limitations or bias identified during a review of the applicable QC measures.
[c]Blank Qualified – Result is considered "not-detected" because it was detected in an associated blank at a similar level.
[d]Rejected – Unreliable result or detection limit; analyte may or may not be present in sample.

Table 5: Summary of Tree Swallow Data Quality

Matrix	Analytical Results (Total)	Acceptable (No Qualification)[a]		Acceptable (Estimated)[b]		Blank Qualified[c]		Rejected[d,e]	
Egg	5,719	4,514	*79%*	956	*17%*	165	*3%*	84	*1%*
Nestling	3,023	2,511	*83%*	418	*14%*	92	*3%*	2	*< 1%*
Dud Egg	234	181	*77%*	52	*22%*	1	*< 1%*	0	*0%*
Dead Nestling	54	36	*66%*	14	*26%*	2	*4%*	2	*4%*
Egg Shells	520	403	*78%*	107	*21%*	10	*1%*	0	*0%*

Notes:

[a]Acceptable, No Qualification – Qualification of data was not warranted based on a review of the applicable QC measures.
[b]Acceptable, Estimated – Quantitation or detection limit is approximate due to limitations or bias identified during a review of the applicable QC measures.
[c]Blank Qualified – Result is considered "not-detected" because it was detected in an associated blank at a similar level.
[d]Rejected – Unreliable result or detection limit; analyte may or may not be present in sample.
[e]Rejected results are percent moisture results qualified as unusable due to limited sample mass and/or extended frozen storage prior to moisture determination.

Table 6: Summary Heron, Osprey Geese Data Quality

Analytical Results (Total)	Acceptable (No Qualification)[a]		Acceptable (Estimated)[b]		Blank Qualified[c]		Rejected[d]	
1,917	1,557	*81%*	316	*16%*	43	*2%*	1	*1%*

Notes:

[a]Acceptable, No Qualification – Qualification of data was not warranted based on a review of the applicable QC measures.
[b]Acceptable, Estimated – Quantitation or detection limit is approximate due to limitations or bias identified during a review of the applicable QC measures.
[c]Blank Qualified – Result is considered "not-detected" because it was detected in an associated blank at a similar level.
[d]Rejected – Unreliable result or detection limit; analyte may or may not be present in sample.

Table 7: Summary of Fish Metals Data Quality

Matrix	Analytical Results (Total) Count)	Acceptable (No Qualification)[a]		Acceptable (Estimated)[b]		Blank Qualified[c]		Rejected[d,e]	
Carcass	5,538	3,730	*67%*	1,479	*27%*	234	*4%*	95	*2%*
Fillet	19,929	13,055	*66%*	4,770	*24%*	663	*3%*	1,441	*7%*
Whole Body Minus Gut Content	1,848	1,376	*74%*	436	*24%*	36	*2%*	0	*0%*
Ovary	223	96	*43%*	88	*39%*	32	*14%*	7	*3%*
Gut and Gut	1,652	1,158	*70%*	413	*25%*	81	*5%*	0	*0%*
Whole Body	5,038	3,077	*61%*	1,675	*33%*	264	*5%*	22	*1%*

Notes:

[a]Acceptable, No Qualification – Qualification of data was not warranted based on a review of the applicable QC measures.
[b]Acceptable, Estimated – Quantitation or detection limit is approximate due to limitations or bias identified during a review of the applicable QC measures.
[c]Blank Qualified – Result is considered "not-detected" because it was detected in an associated blank at a similar level.
[d]Rejected – Unreliable result or detection limit; analyte may or may not be present in sample.
[e]Rejected results are percent moisture results qualified as unusable due to limited sample mass and/or extended frozen storage prior to moisture determination. Additionally, the baseline fish were reanalyzed > 2× after the holding time expired; accordingly, the "not-detected" results have been rejected due to National Functional Guideline criteria.

Table 8: Summary of Fish Non-Metals Data Quality

Matrix	Laboratory	Analytical Results (Total) Count)	Acceptable (No Qualification)[a]		Acceptable (Estimated)[b]		Blank Qualified[c]		Rejected[d]	
Carcass	PACE	756	624	*83%*	132	*17%*	0	*0%*	0	*0%*
	Frontier	144	17	*12%*	108	*75%*	19	*13%*	0	*0%*
	GEL	0	0	*0%*	0	*0%*	0	*0%*	0	*0%*
Fillet	PACE	1092	1017	*93%*	75	*7%*	0	*0%*	0	*0%*
	Frontier	632	128	*20%*	402	*64%*	102	*16%*	0	*0%*
	GEL	180	180	*100%*	0	*0%*	0	*0%*	0	*0%*

Notes:

[a]Acceptable, No Qualification – Qualification of data was not warranted based on a review of the applicable QC measures.

[b]Acceptable, Estimated – Quantitation or detection limit is approximate due to limitations or bias identified during a review of the applicable QC measures.

[c]Blank Qualified – Result is considered “not-detected” because it was detected in an associated blank at a similar level.

[d]Rejected – Unreliable result or detection limit; analyte may or may not be present in sample

Table 9: Summary of Groundwater and Pore Water Data Quality

Laboratory	Matrix	Analytical Results (Total)	Acceptable (No Qualification)[a]		Acceptable (Estimated)[b]		Blank Qualified[c]		Rejected[d]	
Test America Nashville	GW	757	618	*82%*	130	*17%*	7	*1%*	2	*> 1%*
	Soil	208	182	*88%*	24	*12%*	1	*< 1%*	1	*< 1%*
	Porewater	409	351	*86%*	56	*14%*	2	*< 1%*	0	*0%*
	Shur-Mud	50	19	*38%*	31	*62%*	0	*0%*	0	*0%*
GEL	GW	360	355	*99%*	2	*<1%*	3	*1%*	0	*0%*
	Porewater	216	214	*99%*	1	*<1%*	1	*< 1%*	0	*0%*

Notes:

[a]Acceptable, No Qualification – Qualification of data was not warranted based on a review of the applicable QC measures.
[b]Acceptable, Estimated – Quantitation or detection limit is approximate due to limitations or bias identified during a review of the applicable QC measures.
[c]Blank Qualified – Result is considered "not-detected" because it was detected in an associated blank at a similar level.
[d]Rejected – Unreliable result or detection limit; analyte may or may not be present in sample.

Table 10: Summary of Raccoon Data Quality

Matrix	Analytical Results (Total) Count)	Acceptable (No Qualification)[a]		Acceptable (Estimated)[b]		Blank Qualified[c]		Rejected[d,e]	
Brain	810	501	*62%*	223	*27%*	72	*9%*	14	*2%*
Blood	810	613	*76%*	146	*18%*	38	*5%*	13	*1%*
Hair	810	518	*64%*	167	*20%*	110	*14%*	15	*2%*
Kidney	810	558	*69%*	207	*26%*	39	*5%*	6	*< 1%*
Liver	810	567	*70%*	188	*23%*	49	*6%*	6	*< 1%*
Ovaries	26	17	*65%*	7	*27%*	2	*8%*	0	*0%*
Skeletal Muscle	810	610	*75%*	148	*18%*	45	*6%*	7	*< 1%*
Gonad	669	445	*66%*	163	*24%*	54	*8%*	7	*1%*
Subcutaneous Fat	378	285	*75%*	68	*20%*	22	*6%*	3	*< 1%*

Notes:

[a]Acceptable, No Qualification – Qualification of data was not warranted based on a review of the applicable QC measures.
[b]Acceptable, Estimated – Quantitation or detection limit is approximate due to limitations or bias identified during a review of the applicable QC measures.
[c]Blank Qualified – Result is considered “not-detected” because it was detected in an associated blank at a similar level.
[d]Rejected – Unreliable result or detection limit; analyte may or may not be present in sample.
[e]Rejected results are percent moisture results qualified as unusable due to limited sample mass and/or extended frozen storage prior to moisture determination.

Table 11: Summary of Submerged Sediment, Exposed Sediment, and Ash Deposit Data Quality

Submerged Sediment

Laboratory	Analytical Results (Total Count)	Acceptable (No Qualification)[a]		Acceptable (Estimated)[b]		Blank Qualified[c]		Rejected[d]	
TestAmerica Burlington	1892	592	*31%*	1280	*68%*	0	*0%*	20[e]	*1%*
TestAmerica Irvine	24	12	*50%*	9	*38%*	0	*0%*	3[f]	*13%*
TestAmerica Nashville	2265	1528	*67%*	736	*32%*	1	*< 1%*	0	*0%*
TestAmerica North Canton	48	38	*79%*	10	*21%*	0	*0%*	0	*0%*
TestAmerica Pittsburgh	245	168	*69%*	77	*31%*	0	*0%*	0	*0%*
Frontier	312	90	*29%*	210	*67%*	12	*4%*	0	*0%*
GEL	432	344	*80%*	88	*20%*	0	*0%*	0	*0%*

Exposed Sediment

Laboratory	Analytical Results (Total Count)	Acceptable (No Qualification)[a]		Acceptable (Estimated)[b]		Blank Qualified[c]		Rejected[d]	
TestAmerica Burlington	1514	1067	*70%*	424	*28%*	0	*0%*	23[e]	*2%*
TestAmerica Irvine	19	17	*89%*	2	*11%*	0	*0%*	0	*0%*
TestAmerica Nashville	1872	1474	*79%*	398	*21%*	0	*0%*	0	*0%*
TestAmerica North Canton	38	29	*76%*	5	*13%*	4	*10%*	0	*0%*
TestAmerica Pittsburgh	0	0	*0%*	0	*0%*	0	*0%*	0	*0%*
Frontier	247	109	*44%*	132	*53%*	6	*2%*	0	*0%*
GEL	342	339	*99%*	3	*1%*	0	*0%*	0	*0%*

Ash Deposit

Laboratory	Analytical Results (Total Count)	Acceptable (No Qualification)[a]		Acceptable (Estimated)[b]		Blank Qualified[c]		Rejected[d,e]	
R.J. Lee	204	190	*93%*	14	*7%*	0	*0%*	0	*0%*
TVA Field Laboratory	339	-	-	-	-	-	-	-	-

Notes:

[a]Acceptable, No Qualification – Qualification of data was not warranted based on a review of the applicable QC measures.

[b]Acceptable, Estimated – Quantitation or detection limit is approximate due to limitations or bias identified during a review of the applicable QC measures.

[c]Blank Qualified – Result is considered "not-detected" because it was detected in an associated blank at a similar level.

[d]Rejected – Unreliable result or detection limit; analyte may or may not be present in sample.

[e]Rejected PAH/alkylated PAH results were due to very low surrogate compound recoveries.

[f]Rejected hexavalent chromium results were due to very low matrix spike/matrix spike duplicate recoveries.

Table 12: Summary of Surface Water Data Quality

Laboratory	Analytical Results (Total Count)	Acceptable (No Qualification)[a]		Acceptable (Estimated)[b]		Blank Qualified[c]		Rejected[d]	
TestAmerica Nashville	11,661	9,141	78%	2,397	21%	121	1%	2[e]	< 1%[e]
Frontier	500	339	68%	161	32%	0	0%	0	0%
GEL	936	914	98%	0	0%	22	2%	0	0%

Notes:

[a]Acceptable, No Qualification – Qualification of data was not warranted based on a review of the applicable QC measures.

[b]Acceptable, Estimated – Quantitation or detection limit is approximate due to limitations or bias identified during a review of the applicable QC measures.

[c]Blank Qualified – Result is considered "not-detected" because it was detected in an associated blank at a similar level.

[d]Rejected – Unreliable result or detection limit; analyte may or may not be present in sample.

e - Rejected results were due to dissolved metals results that were significantly greater than the associated total metals results; therefore, both results were rejected.

Table 13: Summary of Turtle Data Quality

Matrix	Analytical Results (Total) Count)	Acceptable (No Qualification)[a]		Acceptable (Estimated)[b]		Blank Qualified[c]		Rejected[d]	
Blood	7,242	5,111	*71%*	1,775	*25%*	107	*1%*	249[e]	*3%*
Carapace	1,820	1,577	*87%*	174	*10%*	69	*4%*	0	*0%*

Notes:

[a]Acceptable, No Qualification – Qualification of data was not warranted based on a review of the applicable QC measures.
[b]Acceptable, Estimated – Quantitation or detection limit is approximate due to limitations or bias identified during a review of the applicable QC measures.
[c]Blank Qualified – Result is considered "not-detected" because it was detected in an associated blank at a similar level.
[d]Rejected – Unreliable result or detection limit; analyte may or may not be present in sample.
[e]Rejected results are percent moisture results qualified as unusable due to limited sample mass and/or extended frozen storage prior to moisture determination.