Removal Action Work Plan Quality Assurance Project Plan and Waste Characterization Quality Assurance Project Plan – Phase I Removal Action

Data Quality Usability Assessment

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East Brunswick, New Jersey

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Summary

This Data Quality Usability Assessment (report) provides a summary of the documentation and evaluation of data quality and usability for data collected during the implementation of the Removal Action Work Plan Quality Assurance Project Plan (RAWP QAPP; Tierra Solutions, Inc. [Tierra] 2011a) and the Waste Characterization Quality Assurance Project Plan (WC QAPP; Tierra 2011b).

1. Data Quality Parameters Overview

To assess whether the analytical data obtained were consistent with the objectives of the RAWP QAPP (Tierra 2011a) and the WC QAPP (Tierra 2011b), four data quality parameters were evaluated, including specific data quality criteria assessed during analytical data verification/validation. In the event that the data verification/validation process identified an instance where any of the data quality parameters did not meet the objectives established in the RAWP QAPP or the WC QAPP, the affected sample results were evaluated in accordance with the data verification/validation protocols specified in Worksheet #36 of the RAWP QAPP and WC QAPP and documented accordingly. A detailed narrative describing the verification/validation assessments and findings can be found within the data verification/validation data reports prepared for each data package. Per Worksheet #27 of the RAWP QAPP and WC QAPP, fully documented laboratory data packages, verification/validation checklists, and verification/validation data reports are located in the project file.

The seven data quality parameters included the following:

- precision

- overall accuracy/bias

- accuracy/bias contamination

- sensitivity

- representativeness

- comparability

- completeness

Each of these data quality parameters, as it relates to the RAWP QAPP and WC QAPP programs, is discussed below.

1.1 Precision

Precision is the measure of variability between individual sample measurements of the same property under similar conditions. During the RAWP QAPP and WC QAPP programs, precision was evaluated through the analysis of laboratory duplicate samples. Laboratory duplicates were analyzed at regular, required intervals throughout the RAWP QAPP and WC QAPP programs.

Laboratory duplicates are two portions of a single homogeneous sample that are analyzed for the same parameter in order to determine the precision of the analytical system. Laboratory duplicates without known analyte spikes added were analyzed to monitor laboratory precision. Laboratory duplicates were analyzed at the frequency specified in the RAWP QAPP and WC QAPP. The relative percent difference (RPD) between results obtained for a given laboratory duplicate pair provides an estimate of analytical precision.

The precision assessment for laboratory duplicate analyses is expressed as the RPD:

$$RPD = \left\{ \frac{(S - D)}{\frac{(S + D)}{2}} \right\} \times 100$$

Where:

S = original sample concentration
D = duplicate sample concentration

Acceptance criteria for laboratory duplicates are provided in Worksheet #12 of the RAWP QAPP and WC QAPP. Conformance to laboratory duplicate frequency requirements, as well as acceptability of the resulting RPD values, were evaluated and considered during data verification/validation.

1.2 Overall Accuracy/Bias

Accuracy is a measure of the bias in a system, and is defined as the agreement between a measurement and an accepted reference or true value. Accuracy was monitored during the RAWP QAPP and WC QAPP programs through the analysis of laboratory control samples (LCSs) (performed at regular, specified intervals).

As outlined in the RAWP QAPP and WC QAPP, the analyses of LCSs provide laboratory results that may be compared to their associated known values to monitor potential bias. Actual versus expected recoveries of known LCSs were evaluated for potential bias.

Acceptance criteria for the quality control (QC) evaluation described above are provided in Worksheet #12 of the RAWP QAPP and WC QAPP. Conformance to field and laboratory QC sample frequency requirements, as well as acceptability of QC results for accuracy, were evaluated and considered during data verification/validation.

1.3 Accuracy/Bias Contamination

Accuracy parameters were also assessed with respect to contamination. Any contamination present in laboratory blanks reflects the potential for contamination in associated samples. Accuracy/bias contamination measurement performance criteria are outlined in Worksheet #12 of the RAWP QAPP and WC QAPP. Acceptability of QC results for accuracy/bias contamination and conformance to field and laboratory QC sample frequency requirements were evaluated and considered during the data verification/validation.

1.4 Sensitivity

All analytical results reported were evaluated to determine if adequate sensitivity was achieved. The results for each analyte were cross-checked against the project quantitation limits (PQLs) and study action levels presented in Worksheet #15 of the RAWP QAPP and WC QAPP. Results for analytes that did not meet PQL/study action level criteria were summarized in the data verification/validation reports.

1.5 Representativeness

Representativeness is the degree to which a dataset accurately represents the characteristics of a population, parameter conditions at a sample point, or an environmental condition. Data are representative when all sampling and analyses are performed in compliance with appropriate procedures. Performing sample analyses within the specified holding times and adhering to sample handling and storage requirements are also critical elements in obtaining representative sample data. These elements were evaluated and considered during data verification/validation. Acceptance criteria for sample handling, storage, and holding times are provided in Worksheet #19 of the RAWP QAPP and WC QAPP.

1.6 Comparability

Comparability expresses the confidence with which one set of data can be compared to another to measure the same property. Data can be compared to the degree that their precision and representativeness are known and documented. Data are comparable if QC measures, such as collection techniques, measurement procedures, analytical methods, and reporting units, are equivalent for the samples within a sample set. Data subject to established quality assurance (QA)/QC measures are deemed more reliable and, therefore, more comparable, than data generated without such measures.

Consistent application of prescribed procedures was monitored throughout the RAWP QAPP and WC QAPP programs. Likewise, specific data verification/validation protocols were consistently applied to all data generated under this program to understand and document precision and representativeness, thereby establishing comparability as defined above.

During data verification/validation activities, analytical data were evaluated using a defined set of guidelines and acceptance criteria. When consistently applied, the data verification/validation process serves to allow data comparability to be established between the RAWP QAPP and WC QAPP data and other verified/validated datasets.

1.7 Completeness

There are two measures of completeness defined for the RAWP QAPP and WC QAPP programs: field completeness and analytical completeness. Field completeness is defined as the ratio of the number of samples received in acceptable condition by the laboratories to the number of samples planned to be collected, as specified in the RAWP QAPP and WC QAPP. Analytical completeness is defined as the ratio of total analytical data results reported to the total number of analytical results requested on samples submitted for analysis. The formulas used to compute field and analytical completeness are presented below.

$$\% \text{ Field Completeness} = \left(\frac{Number\ of\ Samples\ Received\ by\ Laboratories}{Total\ Number\ of\ Samples\ Planned\ to\ be\ Collected} \right) \times 100$$

$$\% \text{ Analytical Completeness} = \left(\frac{Total\ Number\ of\ Analytical\ Results\ Reported}{Number\ of\ Analytical\ Results\ Requested} \right) \times 100$$

The targeted field and analytical completeness goals were 90% for the RAWP QAPP and WC QAPP programs; these goals were met, as summarized below.

RAWP QAPP and WC QAPP	Completeness Goal Established in RAWP QAPP and WC QAPP	Actual Completeness Achieved
Field Completeness	90%	99%
Analytical Completeness	90%	99%

RAWP QAPP and WC QAPP Analytical Completeness by Analysis and Sample Type	Completeness Goal Established in RAWP QAPP and WC QAPP	Actual Completeness Achieved
Chemical/Geotechnical Analyses		
Chlorobenzene (TO-15) – Air	90%	99%
Aroclor PCBs (TO-4A) – Air	90%	99%
Pesticides (TO-4A) – Air	90%	99%
PCDD/PCDFs (TO-9A) – Air	90%	100%
VOCs – Solid	90%	100%
SVOCs – Solid	90%	100%
Aroclor PCBs – Solid	90%	100%

RAWP QAPP and WC QAPP Analytical Completeness by Analysis and Sample Type	Completeness Goal Established in RAWP QAPP and WC QAPP	Actual Completeness Achieved
Pesticides – Solid	90%	100%
Herbicides – Solid	90%	100%
PCDD/PCDFs – Solid	90%	100%
Metals – Solid	90%	100%
Cyanide – Solid	90%	100%
Sulfide – Solid	90%	100%
Ignitability – Solid	90%	100%
Corrosivity – Solid	90%	100%
Paint Filter Test – Solid	90%	100%
pH – Solid	90%	100%
Grain Size	90%	100%
VOCs – Water	90%	100%
SVOCs – Water	90%	100%
Aroclor PCBs – Water	90%	100%
Congener PCBs – Water	90%	100%
Pesticides – Water	90%	100%
Herbicides – Water	90%	100%
PCDD/PCDFs – Water	90%	100%
Metals – Water	90%	100%
Cyanide – Water	90%	100%
COD – Water	90%	100%
TOC – Water	90%	100%
TSS – Water	90%	100%

Notes:
COD = chemical oxygen demand
PCB = polychlorinated biphenyl
PCDD/PCDF = polychlorinated dibenzo-*p*-dioxin/polychlorinated dibenzofuran
SVOC = semivolatile organic compound
TOC = total organic compound
TSS = total suspended solid
VOC = volatile organic compound

2. RAWP QAPP and WC QAPP Data Verification/Validation

2.1 Data Verification/Validation Status

The RAWP QAPP and WC QAPP programs' analytical results were provided by the laboratories both electronically and in hard copy format. Upon receipt from the laboratory, results for specific analytical groups described below were subject to verification/validation by ARCADIS using U.S. Environmental Protection Agency Region 2 Data Validation Standard Operating Procedures (SOPs), Environmental Data Services SOPs, and ARCADIS SOPs applicable to the analytical methods associated with the reported results. The data verification/validation process is detailed in Worksheets #34, 35, and 36 of the RAWP QAPP and WC QAPP.

2.2 Data Quality Issues

Two types of data quality issues are discussed in this section: systematic data quality issues and random data quality issues. Systematic data quality issues are those that are identified as having a consistent impact on the quality of numerous results reported (i.e., data quality of many samples and/or constituent classes are affected by a single data quality issue), due to a common circumstance or procedural application. Systematic data quality issues are described in Section 2.2.1, as well as incorporated into Section 2.2.2. Random data quality issues are those that impact the quality of results on a limited basis [i.e., data quality for a specific sample(s) and/or analyte(s) are affected by the data quality issue]. Random data quality issues are presented in Section 2.2.1, as well as incorporated into Section 2.2.2.

Section 2.2.2 summarizes the data verification/validation findings related to systematic and random data quality issues for each constituent class. These verification/validation findings have been separated into two distinct categories: major data quality issues and minor data quality issues. Major data quality issues are those that demonstrate extreme bias or variability in the analytical system. Minor data quality issues include all other QA/QC issues identified during the data verification/validation process that indicate a level or type of uncertainty associated with the reported result.

2.2.1   Systematic and Random Data Quality Issues

There were no systematic data quality issues identified during the RAWP QAPP and WC QAPP data verification/validation task. Several random data quality issues were identified during the RAWP QAPP and WC QAPP data verification/validation task. These issues are detailed in the data verification/validation data reports prepared for each data package. There were a few major data quality issues that resulted in the rejection of the data. These issues are discussed below.

2.2.2   Data Quality Issues by Constituent Class

Chlorobenzene (TO-15) – Air

The RAWP QAPP and WC QAPP chlorobenzene dataset is comprised of 460 samples with 460 associated results.

No major data quality issues were identified during the verification/validation of the RAWP QAPP chlorobenzene analyses.

Aroclor PCBs (TO-4A) – Air

The RAWP QAPP Aroclor PCB (TO-4A) dataset is comprised of 354 samples with 3,186 associated results.

One major data quality issue was identified during the verification/validation of the RAWP QAPP Aroclor PCBs analyses and is described in the following table.

Major Data Quality Issues				
Aroclor PCBs	**Data Quality Parameter Affected**	**Number of Samples Affected**	**Number of Results Affected**	**% of Aroclor PCBs Results Affected**
Aroclor pattern recognition/ identification: The laboratory added the qualifier "PE" which is defined by the laboratory as: "This Aroclor is being used to report an altered PCB pattern exhibited by the sample. The reported Aroclor was not present in the sample, but is reported to more accurately quantify PCBs present in the sample that have undergone environmental alteration." Since the laboratory identified Aroclor was not actually present in the sample, this result was rejected (R) and the Total PCB result has been adjusted to reflect the rejected sample result.	Representativeness/ Comparability	30	30	0.9

Pesticides (TO-4A) – Air

The RAWP QAPP pesticide (TO-4A) dataset is comprised of 354 samples with 1,062 associated results.

No major data quality issues were identified during the verification/validation of the RAWP QAPP pesticides (TO-4) analyses.

PCDD/PCDFs (TO-9) – Air

The RAWP QAPP PCDD/PCDFs (TO-9) dataset is comprised of 518 samples with 11,214 associated results.

One major data quality issue was identified during the verification/validation of the RAWP QAPP PCDD/PCDFs analyses and is described in the following table.

Major Data Quality Issues				
PCDD/PCDFs	**Data Quality Parameter Affected**	**Number of Samples Affected**	**Number of Results Affected**	**% of PCDD/PCDFs Results Affected**
Labeled standards extraction efficiency (surrogate) low recovery	Accuracy/Bias	1	18	0.2

VOCs – Solid

The RAWP QAPP and WC QAPP VOC dataset is comprised of 14 samples with 469 associated results.

No major data quality issues were identified during the verification/validation of the RAWP QAPP and WC QAPP VOC analyses.

SVOCs – Solid

The RAWP QAPP and WC QAPP SVOC dataset is comprised of 13 samples with 903 associated results.

No major data quality issues were identified during the verification/validation of the RAWP QAPP and WC QAPP SVOC analyses.

Aroclor PCBs – Solid

The RAWP QAPP and WC QAPP Aroclor PCB dataset is comprised of 11 samples with 99 associated results.

No major data quality issues were identified during the verification/validation of the RAWP QAPP and WC QAPP Aroclor PCB analyses.

Pesticides – Solid

The RAWP QAPP and WC QAPP pesticide dataset is comprised of 13 samples with 261 associated results.

No major data quality issues were identified during the verification/validation of the RAWP QAPP and WC QAPP pesticide analyses.

Herbicides – Solid

The RAWP QAPP and WC QAPP herbicide dataset is comprised of 13 samples with 46 associated results.

No major data quality issues were identified during the verification/validation of the RAWP QAPP and WC QAPP herbicide analyses.

PCDD/PCDFs – Solid

The RAWP QAPP PCDD/PCDF dataset is comprised of 24 samples with 600 associated results.

No major data quality issues were identified during the verification/validation of the RAWP QAPP PCDD/PCDF analyses.

Metals – Solid

The RAWP QAPP and WC QAPP metals dataset is comprised of 13 samples with 254 associated results.

One major data quality issue was identified during the verification/validation of the RAWP QAPP and WC QAPP metals analyses and is described in the following table.

Major Data Quality Issues				
Metals	Data Quality Parameter Affected	Number of Samples Affected	Number of Results Affected	% of Metals Results Affected
Low matrix spike recovery	Accuracy/Bias	2	8	3.1

Cyanide – Solid

The RAWP QAPP cyanide dataset is comprised of one sample with one associated result.

No major data quality issues were identified during the verification/validation of the RAWP QAPP cyanide analysis.

Sulfide – Solid

The RAWP QAPP sulfide dataset is comprised of one sample with one associated result.

No major data quality issues were identified during the verification/validation of the RAWP QAPP sulfide analysis.

Ignitability – Solid

The RAWP QAPP ignitability dataset is comprised of one sample with one associated result.

No major data quality issues were identified during the verification/validation of the RAWP QAPP ignitability analysis.

Corrosivity – Solid

The RAWP QAPP corrosivity dataset is comprised of one sample with one associated result.

No major data quality issues were identified during the verification/validation of the RAWP QAPP corrosivity analysis.

Paint Filter Test – Solid

The RAWP QAPP paint filter test dataset is comprised of three samples with three associated results.

No major data quality issues were identified during the verification/validation of the RAWP QAPP paint filter test analyses.

pH – Solid

The RAWP QAPP pH dataset is comprised of 10 samples with 10 associated results.

No major data quality issues were identified during the verification/validation of the RAWP QAPP pH analyses.

Grain Size

The RAWP QAPP sediment grain size dataset is comprised of nine samples with 247 associated results.

No major data quality issues were identified during the verification/validation of the RAWP QAPP grain size analyses.

VOCs – Water

The RAWP QAPP VOC dataset is comprised of 107 samples with 632 associated results.

No major data quality issues were identified during the verification/validation of the RAWP QAPP VOC analyses.

SVOCs – Water

The RAWP QAPP SVOC dataset is comprised of 22 samples with 604 associated results.

One major data quality issue was identified during the verification/validation of the RAWP QAPP SVOC analyses and is described in the following table.

Major Data Quality Issues				
SVOCs	Data Quality Parameter Affected	Number of Samples Affected	Number of Results Affected	% of SVOCs Results Affected
Low surrogate recovery	Accuracy/Bias	1	2	0.3

Aroclor PCBs – Water

The RAWP QAPP Aroclor PCB dataset is comprised of 16 samples with 104 associated results.

No major data quality issues were identified during the verification/validation of the RAWP QAPP Aroclor PCB analyses.

Congener PCBs – Water

The RAWP QAPP congener PCB dataset is comprised of 18 samples with 3,204 associated results.

No major data quality issues were identified during the verification/validation of the RAWP QAPP congener PCB analyses.

Pesticides – Water

The RAWP QAPP pesticide dataset is comprised of 22 samples with 343 associated results.

No major data quality issues were identified during the verification/validation of the RAWP QAPP pesticide analyses.

Herbicides – Water

The RAWP QAPP herbicide dataset is comprised of 25 samples with 213 associated results.

Two major data quality issues were identified during the verification/validation of the RAWP QAPP herbicide analyses and are described in the following table.

Major Data Quality Issues				
Herbicides	**Data Quality Parameter Affected**	**Number of Samples Affected**	**Number of Results Affected**	**% of Herbicides Results Affected**
Low MS/MSD recovery	Accuracy/Bias	1	1	0.5
Low LCS recovery	Accuracy/Bias	1	1	0.5

Notes:
MS/MSD = matrix spike/matrix spike duplicate

PCDD/PCDFs – Water

The RAWP QAPP PCDD/PCDF dataset is comprised of 23 samples with 543 associated results.

No major data quality issues were identified during the verification/validation of the RAWP QAPP PCDD/PCDF analyses.

Metals – Water

The RAWP QAPP metals dataset is comprised of 16 samples with 203 associated results.

No major data quality issues were identified during the verification/validation of the RAWP QAPP metals analyses.

Cyanide – Water

The RAWP QAPP cyanide dataset is comprised of 15 samples with 15 associated results.

No major data quality issues were identified during the verification/validation of the RAWP QAPP cyanide analyses.

COD – Water

The RAWP QAPP COD dataset is comprised of 18 samples with 18 associated results.

No major data quality issues were identified during the verification/validation of the RAWP QAPP COD analyses.

TOC – Water

The RAWP QAPP TOC dataset is comprised of 15 samples with 15 associated results.

No major data quality issues were identified during the verification/validation of the RAWP QAPP TOC analyses.

TSS – Water

The RAWP QAPP TSS dataset is comprised of 105 samples with 105 associated results.

No major data quality issues were identified during the verification/validation of the RAWP QAPP TSS analyses.

3. Data Usability and Limitations Assessment

3.1 Detailed Evaluation of Data Usability/Limitations

Details regarding data quality issues, as outlined in Section 2.2.2, including specific information regarding samples affected, are provided in Section 3.2, including an assessment of the impact of these data quality issues on data usability. There is no limitation on the use of data obtained from this program, with the exception of the specific samples that were rejected and are discussed in Section 3.2 below.

3.2 Overall Conclusions

The design team has considered the data quality issues outlined in this report and based upon the objectives of this program, the level of data verification/validation performed has been affirmed as adequate. Therefore, it is determined that full data validation of this particular dataset is not warranted at this time.

However, though deemed acceptable for use in fulfilling the data quality objectives for this program, alternative data uses may require a higher level of certainty and, therefore, additional data validation may be necessary prior to any alternative use of these data.

As described in Section 2.2.2, 30 Aroclor PCB (TO-4A) samples and 30 results were affected by Aroclor pattern recognition/identification. (The laboratory added the qualifier "PE" which is defined by the laboratory as: "This Aroclor is being used to report an altered PCB pattern exhibited by the sample. The reported aroclor was not present in the sample, but is reported to more accurately quantify PCBs present in the samples that have undergone environmental alteration." Since the laboratory identified the Aroclor was not actually present in the sample, this result was rejected (R) and the Total PCB result has been adjusted to reflect the rejected sample result.), affecting 0.9% of all Aroclor PCB (TO-4A) results reported. The affected samples and Aroclors are listed below:
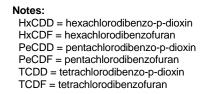
Sample	Aroclor
PRR1AIR01-30-04	Aroclor-1248
PRR1AIR05-30-04	Aroclor-1248
PRR1AIR07-30-04	Aroclor-1248
PRR1AIR01-36-04	Aroclor-1248
PRR1AIR02-36-04	Aroclor-1248
PRR1AIR04-36-04	Aroclor-1248
PRR1AIR05-36-04	Aroclor-1248
PRR1AIR09-36-04	Aroclor-1248
PRR1AIR11-36-04	Aroclor-1248
PRR1AIR04-37-04	Aroclor-1248
PRR1AIR08-37-04	Aroclor-1248
PRR1AIR07-38-04	Aroclor-1248
PRR1AIR08-38-04	Aroclor-1248
PRR1AIR09-38-04	Aroclor-1248

Sample	Aroclor
PRR1AIR11-38-04	Aroclor-1248
PRR1AIR11-39-04	Aroclor-1248
PRR1AIR11-41-04	Aroclor-1248
PRR1AIR11-59-04	Aroclor-1221
PRR1AIR09-67-04	Aroclor-1232
PRR1AIR11-67-04	Aroclor-1232
PRR1AIR09-69-04	Aroclor-1248
PRR1AIR11-69-04	Aroclor-1248
PRR1AIR09-70-04	Aroclor-1248
PRR1AIR11-70-04	Aroclor-1248
PRR1AIR09-71-04	Aroclor-1232
PRR1AIR11-71-04	Aroclor-1232
PRR1AIR09-73-04	Aroclor-1248
PRR1AIR11-73-04	Aroclor-1248
PRR1AIR09-79-04	Aroclor-1248
PRR1AIR11-79-04	Aroclor-1248

Due to the level of uncertainty of the reported results mentioned above, this data quality issue is considered major; therefore, the design team has rejected these results and determined that they are not usable in this program.

As described in Section 2.2.2, one PCDD/PCDF (TO-9) analyses sample and 18 results were affected by a low labeled extraction standard recovery (less than 10%), affecting 0.2% of all PCDD/PCDF (TO-9) results reported. The affected sample and compounds are listed below:

Sample	Compound
PRR1AIR07-44-09	1,2,3,4,7,8-HxCDD
	1,2,3,4,7,8-HxCDF
	1,2,3,6,7,8-HxCDD
	1,2,3,6,7,8-HxCDF
	1,2,3,7,8,9-HxCDD
	1,2,3,7,8,9-HxCDF
	1,2,3,7,8-PeCDD
	1,2,3,7,8-PeCDF
	2,3,4,6,7,8-HxCDF
	2,3,4,7,8-PeCDF
	2,3,7,8-TCDD
	2,3,7,8-TCDF
	Total HxCDD
	Total HxCDF
	Total PeCDD
	Total PeCDF
	Total TCDD
	Total TCDF

Notes:
HxCDD = hexachlorodibenzo-p-dioxin
HxCDF = hexachlorodibenzofuran
PeCDD = pentachlorodibenzo-p-dioxin
PeCDF = pentachlorodibenzofuran
TCDD = tetrachlorodibenzo-p-dioxin
TCDF = tetrachlorodibenzofuran

Due to the low recovery of the labeled extraction standard and potential bias of the reported results mentioned above, this data quality issue is considered major; therefore, the design team has rejected these results and determined that they are not usable in this program.

As described in Section 2.2.2, two metals analyses samples and eight results were affected by a low matrix spike recovery (less than 30%), affecting 3.1% of all metals results reported. The affected samples and analytes are listed below.

Sample	Analyte
PRR1SOLIF-01	Beryllium
	Selenium
	Silver
PRR1SOLIF-02	Arsenic
	Beryllium
	Lead
	Selenium
	Silver

Due to the low matrix spike recovery and the potential bias of the reported results mentioned above, this data quality issue is considered major; therefore, the design team has rejected these results and determined that they are not usable in this program.

As described in Section 2.2.2, one SVOC analyses sample and two results were affected by a low surrogate recovery (less than 10%), affecting 0.3% of all SVOC results reported. The affected sample and compounds are listed below.

Sample	Compound
PRR1WATCME-63	3,3'-Dichlorobenzidine
	Hexachlorocyclopentadiene

Due to the low surrogate recovery and the potential bias of the reported results mentioned above, this data quality issue is considered major; therefore, the design team has rejected these results and determined that they are not usable in this program.

As described in Section 2.2.2, two herbicide analyses samples and two results were affected by low MS/MSD recovery (less than 10%) and low laboratory control sample recovery (less than 10%), affecting 0.9% of all herbicide results reported. The affected samples and compounds are listed below.

Sample	Compound
PRR1WATCME-16	Dinoseb
PRR1WATSME-04	Dinoseb

Due to the low MS/MSD and LCS recoveries and the potential bias of the reported results mentioned above, these data quality issues are considered major; therefore, the design team has rejected these results and determined that they are not usable in this program.

There is no limitation on the use of data obtained from this program, with the exception of the specific samples that were rejected and are discussed in Section 3.2.

4. References

Tierra Solutions, Inc. 2011a. Removal Action Work Plan Quality Assurance Project Plan. Phase I Removal Action, CERCLA Non-Time-Critical Removal Action – Lower Passaic River Study Area. Revision 1. Tierra Solutions, Inc. East Brunswick, New Jersey. December.

Tierra Solutions, Inc. 2011b. Waste Characterization Quality Assurance Project Plan. Phase I Removal Action, Diamond Alkali Superfund Site, Operable Unit 1/CERCLA Non-Time-Critical Removal Action-Lower Passaic River Study Area/Newark Bay Study Area. Revision 1. Tierra Solutions, Inc. East Brunswick, New Jersey. September.