Data Validation Report

Project/Site Name:	AMCO
Collection Date:	February 15, 16, 21, 23 and 24 2005
Report Date:	March 9, 2005
Parameters:	General Chemistry: Total Organic Carbon
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05048C

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901038. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (NFG), October 2004, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within temperature control and with the appropriate CoC and custody seals intact.

Holding-time requirements were met.

II. Calibration

All calibration criteria were met.

III. Blanks

A method blank was analyzed as required. No contamination was detected.

IV. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate was performed on sample RMW-07-03US-0105. All acceptance criteria were met.

V. Laboratory Control Sample

All acceptance criteria were met.

VI. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

VII. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), was not within the scope of the data review for this SDG.

VIII. Field Blanks

No field blanks in this SDG.

IX. Field Duplicates

No field duplicates in this SDG.

X. Laboratory Duplicates

No duplicates in this SDG.

XI. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XII. Overall Assessment of Data

- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 15, 16, 17 and 22, 2005
Report Date:	April 18, 2005
Parameters:	General Chemistry: Anions, Hexavalent Chromium and Total Organic Carbon
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05075B

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901038. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (NFG), October 2004 as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within temperature control and with the appropriate CoC forms and custody seals intact.

The sample bottle for total organic carbon (TOC) analysis for sample RMW-06-15-0305 was received at pH 7. The laboratory preserved the sample to pH 2 with HCL.

Sample MW-EB-01-0305 had the incorrect collection date of March 14, 2005 on the CoC. The correct date is March 15, 2005.

Holding-time requirements were met.

II. Calibration

The initial calibration verification standard (ICV) for the TOC analysis was below acceptance criteria. TOC detected results were qualified as estimated and flagged "J".

III. Blanks

Method blanks were analyzed as required for each method. No contamination was detected.

IV. Matrix Spike/Matrix Spike Duplicate

Matrix spike/matrix spike duplicates (MS/MSD) were performed on sample RMW-03-15-0305 for all analyses. The MS/MSD recovery of hexavalent chromium was less than the acceptance criteria. The associated non-detected result was qualified as estimated and flagged "UJ". All other MS/MSD recoveries were within acceptance criteria.

V. Laboratory Control Sample

All acceptance criteria were met.

VI. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

VII. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), was not within the scope of the data review for this SDG.

VIII. Field Blanks

This SDG contained one equipment blank (EB), MW-EB-01-0305, for hexavalent chromium. Hexavalent chromium was not detected in the EB.

IX. Field Duplicates

Samples RMW-10-15-0305 and MW-92-0305 were designated as a field duplicate pair. All acceptance criteria were met.

X. Laboratory Duplicates

Laboratory duplicates analyzed on chloride and sulfate. All acceptance criteria were met.

XI. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XII. Overall Assessment of Data

- A calibration exceedance resulted in qualification of TOC as an estimated concentration.
- MS/MSD exceedances for hexavalent chromium resulted in qualification of the parent sample as an estimated concentration.

- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT	FINAL FLAG	VALIDATION COMMENTS
MW-92-0305	TOTAL ORGANIC CARBON	79	J	ICVS<LCL
RMW-01-17-0305	TOTAL ORGANIC CARBON	15	J	ICVS<LCL
RMW-03-15-0305	TOTAL ORGANIC CARBON	48	J	ICVS<LCL
RMW-06-15-0305	TOTAL ORGANIC CARBON	35	J	ICVS<LCL
RMW-10-15-0305	TOTAL ORGANIC CARBON	81	J	ICVS<LCL
RMW-03-15-0305	HEXAVALENT CHROMIUM	1.0	UJ	MS<LCL

ICVS<LCL = Initial calibration verification standard recovery less than lower control limit
MS<LCL = Matrix spike recovery less than lower limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 23, 2005
Report Date:	April 22, 2005
Parameters:	General Chemistry: Anions and Hexavalent Chromium
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05083A

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901038. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (NFG), October 2004, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within temperature control and with the appropriate CoC and custody seals intact.

Holding-time requirements were exceeded for hexavalent chromium in samples MW-91-0305 and RMW-08-35-0305. Sample MW-91-0305 was exceeded by approximately 1.5 hours. Sample RMW-08-35-0305 was originally analyzed within holding time but required a sample dilution and was analyzed approximately 0.5 hours past the 24-hour holding time. Non-detected sample results were qualified as estimated and flagged “UJ”.

II. Calibration

All acceptance criteria were met.

III. Blanks

Method blanks were analyzed as required for each method. No contamination was detected.

IV. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate (MS/MSD) for hexavalent chromium was performed on sample RMW-08-35-0305. Sample RMW-08-15-0305 was used for the anion MS/MSD. All acceptance criteria were met.

V. Laboratory Control Sample

All acceptance criteria were met.

VI. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

VII. Compound Quantitation and Reported CRQLs

Hexavalent chromium results were reported from a sample dilution for several samples.

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), was not within the scope of the data review for this SDG.

VIII. Field Blanks

There was one equipment blank (EB) for the hexavalent chromium analysis. Hexavalent chromium was not detected in the EB.

IX. Field Duplicates

There was one field duplicate pair, MW-91-0305 and RMW-08-15-0305. All acceptance criteria were met.

X. Laboratory Duplicates

A laboratory duplicate was analyzed for sulfate. All acceptance criteria were met.

XI. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XII. Overall Assessment of Data

- The holding time for the analysis of hexavalent chromium exceeded method control limits. Sample results were qualified as non-detects and “UJ” flagged.
- The completeness objectives were met for all method/analyte combinations.

- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MW-91-0305	HEXAVALENT CHROMIUM	0.2	UJ	HT>UCL
RMW-08-35-0305	HEXAVALENT CHROMIUM	0.4	UJ	HT>UCL

HT>UCL = Holding time exceeded

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	April 21, 2005
Report Date:	May 19, 2005
Parameters:	General Chemistry: Anions
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05112A

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901038. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (NFG), October 2004, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The sample was received at the laboratory with the appropriate CoC forms and custody seals intact.

The cooler temperature exceeded control limits. The sample did not have sufficient time to cool between time collected and time received. Data were not qualified for this reason.

Holding-time requirements were met.

II. Calibration

All calibration criteria were met.

III. Blanks

A method blank was analyzed as required. No contamination was detected.

IV. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate was performed on sample MW-12-0305. All acceptance criteria were met.

V. Laboratory Control Sample

All acceptance criteria were met.

VI. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

VII. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), was not within the scope of the data review for this SDG.

VIII. Field Blanks

No field blanks in this SDG.

IX. Field Duplicates

No field duplicates in this SDG.

X. Laboratory Duplicates

A laboratory duplicate was analyzed for chloride. All acceptance criteria were met.

XI. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XII. Overall Assessment of Data

- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 15 and 22, 2005
Report Date:	April 7, 2005
Parameters:	General Chemistry: Total Dissolved Solids
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05075B

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901038. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (NFG), October 2004, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified for total dissolved solids in this SDG.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The sample was received at the laboratory within temperature control and with the appropriate CoC forms and custody seals intact.

Holding-time requirements were met.

II. Calibration

All acceptance criteria were met.

III. Blanks

A method blank was analyzed as required for the method. No contamination was detected.

IV. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

V. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), was not within the scope of the data review for this SDG.

VI. Field Blanks

No field blanks in this SDG.

VII. Field Duplicates

Sample RMW-10-15-0305 and MW-92-0305 were designated as a field duplicate pair. All acceptance criteria were met.

VIII. Laboratory Duplicates

No laboratory duplicates in this SDG.

IX. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

X. Overall Assessment of Data

- The completeness objectives were met for the method/analyte combination.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 14, 15, 16, 17 and 18, 2005
Report Date:	April 8, 2005
Parameters:	Metals
Laboratory:	Ceimic Corporation
Sample Delivery Group:	MY1RY2

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by EPA Method ILMO5.3 with the additional requirements posed in Modification Tracking Number 1184.0. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), July 2002, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier II data validation. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed contract laboratory program (CLP) data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers. Two samples, MY1RY8 and MY1RZ9, were received by the laboratory with a pH greater than 2. These samples were preserved to a pH of less than 2 with nitric acid.

All technical holding-time requirements were met.

II. Calibration

All calibration verification standards met acceptance criteria.

Aluminum, calcium, iron, magnesium and sodium were detected in the continuing calibration blank (CCB) below the contract required quantitiation limit (CRQL). Aluminum and iron sample results greater than the method detection limit (MDL) but less than the CRQL were reported as non-detects at the CRQL and flagged "U". Calcium, magnesium and sodium sample results were greater than the CRQL; no flags were applied.

III. Method Blank

A method blank (MB) was analyzed as required. Calcium, iron and silicon were detected in the MB below the CRQL. Calcium and silicon sample results were greater than the CRQL; no flags were applied. One iron sample result greater than the MDL but less than the CRQL was reported as non-detect at the CRQL and flagged "U".

IV. Laboratory Control Sample

All laboratory control sample recoveries were within criteria.

V. Matrix Spike/Matrix Spike Duplicate

A matrix spike (MS) was analyzed on sample MY1RZ5.

Aluminum was recovered below criteria in the MS. The analyte was detected in the parent sample and the result was flagged "J". A post-digestion spike was performed and met criteria.

VI. Laboratory Duplicates

A laboratory duplicate was analyzed on sample MY1TF5. All relative percent difference (RPD) criteria were met.

VII. Field Duplicates

Samples MY1S00 and MY1S01 were designated as a field duplicate pair. The iron RPD was 74 percent and "J" flags were applied to the results.

VIII. Field Blanks

There were three equipment blanks (EB) submitted in this SDG. Calcium, magnesium, silicon and sodium were detected in EB MY1S14 with no associated samples in this SDG. Calcium, iron, magnesium, silicon and sodium were detected in EB MY1S15 and calcium, potassium, silicon and sodium were detected in EB MY1S16 less than the CRQL. The sample results were greater than the CRQL, thus the associated blank concentrations had no impact on the data. No flags were applied.

IX. Serial Dilutions

The serial dilution criteria were met.

X. Target Analyte Quantitation

Raw data were not reviewed.

XI. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable. One MS recovery exceedance was observed.
- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- Target analytes were detected in the associated MB, ICB and CCBs. Some of these low-level blank detects resulted in detected data qualified as non-detects.
- A field duplicate exceedance for one analyte resulted in qualifying the data as estimated detects.
- Between the hardcopy and electronic data there were significant figure differences in reported results for some analytes. This appears to be due to rounding differences in the respective reporting programs.
- The silicon data are reported on the hardcopy but not in the electronic data since it was not delivered in a compatible format.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MY1RY3	Aluminum	200	U	CCB<RL
MY1RY3	Iron	100	U	CCB<RL
MY1RY3	Iron	100	U	LB<RL
MY1RZ5	Aluminum	5200	J	MS<LCL
MY1S00	Iron	921	J	FD>RPD
MY1S01	Iron	422	J	FD>RPD

CCB<RL = Continuing calibration blank concentration less than RL
FD>RPD = Field duplicate exceeds RPD criteria
LB<RL = Laboratory blank contamination less than RL
MS<LCL = Matrix spike recovery less than lower limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 22, 23 and 31, 2005
Report Date:	April 15, 2005
Parameters:	Metals
Laboratory:	Ceimic Corporation
Sample Delivery Group:	MY1RY7

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by EPA Method ILMO5.3, with the additional requirements posed in Modification Tracking Number 1184.0. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), July 2002, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier III data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data and to provide verification of calculations and analyte identification. It was not intended to determine contract compliance.

The scope of the data review was included the chain-of-custody (CoC) records, the case narrative, completed contract laboratory program (CLP) data summary forms and raw data.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All technical holding-time requirements were met.

II. Calibration

The initial calibration verification (ICV), continuing calibration verification (CCV), and contract required quantitation limit (CRQL) standards met acceptance criteria. The ICV, CCV and CRQL calculations were verified.

The interference check samples were analyzed as required and were within acceptance criteria.

III. Laboratory Blanks

A method blank (MB) was analyzed as required. Calcium, magnesium and silicon were detected in the method blank below the CRQL, equivalent to reporting limit. The sample results were greater than the CRQL, thus the blank concentrations did not impact the data. No flags were applied.

Aluminum, potassium and sodium were detected in the continuing calibration blanks (CCB) at concentrations greater than the method detection limit (MDL) but less than the CRQL. One aluminum detected result below the CRQL was qualified as non-detect at the CRQL and flagged "U". Potassium and sodium CCB detected results did not impact the data.

IV. Laboratory Control Sample

All laboratory control sample (LCS) recoveries were within criteria. The LCS calculation was verified.

V. Matrix Spike/Matrix Spike Duplicate

A matrix spike (MS) was analyzed on sample MY1RZ4. Aluminum, iron and silicon were spiked; calcium, magnesium, potassium and sodium were not spiked. Silicon was recovered above the criteria. The sample concentration exceeded the spike concentration by a factor of four and therefore, no flag was applied. The MS calculation was verified.

VI. Laboratory Duplicates

A laboratory duplicate was analyzed on sample MY1RZ4. All relative percent difference (RPD) criteria were met with the exception of one analyte.

The RPD for iron was above the criteria and a "J" flag was applied to the detected parent sample result and qualified as estimated. Because the reviewer had insufficient site and sampling documentation, no field test data, and only limited laboratory data, only the parent sample was qualified.

The RPD calculation was verified.

VII. Field Duplicates

Samples MY1RZ2 and MY1RZ3 were designated as a field duplicate pair. All acceptance criteria met.

VIII. Field Blanks

Two equipment blanks, MY1S18 and MY1S19, were analyzed with this SDG. Calcium, potassium, sodium and silicon were detected in both equipment blanks below the CRQL.

One potassium sample result below the CRQL was qualified as non-detect at the CRQL and flagged "U". The other sample results were greater than the CRQL, thus the blank concentrations did not impact the data.

IX. Serial Dilutions

The serial dilution was performed on sample MY1RZ4. All acceptance criteria were met. The serial dilution calculation was verified.

X. Target Analyte Quantitation

Raw data were reviewed and calculations were verified.

XI. Compound Quantitation and Reported CRQLs

Compound quantitation and accuracy were verified.

XII. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable. One laboratory duplicate RPD exceedance was observed.
- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- Target analytes were detected in the associated MB and CCBs. The blank detected results had limited impact on the sample results.
- Between the hardcopy and electronic data there were significant figure differences in reported results for some analytes. This appears to be due to rounding differences in the respective reporting programs.
- The silicon data were reported on the hardcopy but not in the electronic data since it was not delivered in a compatible format.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MY1RZ4	Aluminum	200	U	CCB<RL
MY1RZ4	Iron	666	J	Lab Dup RPD
MY1S02	Potassium	5000	U	EB<RL

CCB<RL = Continuing calibration blank concentration less than RL
Lab Dup RPD = Lab duplicate exceeds RPD criteria
EB<RL = Equipment blank concentration less than RL

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 31, 2005
Report Date:	April 7, 2005
Parameters:	Metals
Laboratory:	Ceimic Corporation
Sample Delivery Group:	MY1S20

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by EPA Method ILMO5.3. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), July 2002, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier II data validation. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed contract laboratory program (CLP) data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers. The CoC had an incorrect turnaround time (TAT) of 21 days. The correct TAT was seven days.

All technical holding-time requirements were met.

II. Calibration

All calibration verification standards met acceptance criteria.

Several target analytes were detected in the initial calibration blank (ICB) and continuing calibration blank (CCB) less than the contract required quantitation limits (CRQL). Beryllium was detected in the samples greater than the method detection limit (MDL) but less than the CRQL. Sample results were reported as non-detects at the CRQL and flagged "U". All other blank detects had no impact on the sample results.

III. Method Blank

A method blank (MB) was analyzed as required. Several analytes were detected in the MB; however, antimony was the only detected result in the MB below the CRQL which had an impact on the sample data. One sample result greater than the MDL but less than the CRQL was reported as a non-detect at the CRQL and flagged "U".

IV. Laboratory Control Sample

All laboratory control sample recoveries were within criteria.

V. Matrix Spike/Matrix Spike Duplicate

A matrix spike (MS) was analyzed on sample MY1S21.

Antimony, silver, and thallium were recovered below criteria in the MS. "J" flags were applied to the detected parent results and "UJ" flags were applied to the non-detected parent results for these analytes. A post-digestion spike was performed for antimony and thallium. The antimony post-digestion spike was within acceptance criteria; however, the thallium post-digestion spike recovery was below criteria. A "UJ" flag was applied to the non-detected thallium result in the parent sample. The SOW ILM05.3 does not require a post-digestion spike for silver.

VI. Laboratory Duplicates

A laboratory duplicate was analyzed on sample MY1S21. All relative percent difference (RPD) criteria were met.

VII. Field Duplicates

There were no field duplicates in this SDG.

VIII. Field Blanks

None associated with the samples in this SDG.

IX. Serial Dilutions

The RPD for copper was above criteria in the serial dilution for sample MY1S21. The detected sample result was flagged "J".

X. Target Analyte Quantitation

Raw data were not reviewed.

XI. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable. One serial dilution, one post-digestion spike and three MS recovery exceedances were observed.
- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- Target analytes were detected in the associated MB, ICB and CCBs. Antimony and beryllium were the only analytes affected by the blank detections.

Data Qualification Summary

Field ID	Analyte	Final Result (mg/Kg)	Final Flag	Validation Comments
MY1S20	Beryllium	1	U	CCB<RL
MY1S20	Beryllium	1	U	ICB<RL
MY1S21	Antimony	6.6	U	LB<RL
MY1S21	Antimony	6.6	U	MS<LCL
MY1S21	Beryllium	1	U	CCB<RL
MY1S21	Beryllium	1	U	ICB<RL
MY1S21	Copper	11.7	J	SerialDilution>UCL
MY1S21	Silver	1.1	UJ	MS<LCL
MY1S21	Thallium	2.8	UJ	MS<LCL
MY1S21	Thallium	2.8	UJ	PostSpike<LCL

CCB<RL = Continuing calibration blank concentration less than RL
ICB<RL = Initial calibration blank concentration less than RL
LB<RL = Laboratory blank contamination less than RL
MS<LCL = Matrix spike recovery less than lower limit
PostSpike<LCL = Post spike exceeds lower control limit
SerialDilution>UCL = Serial Dilution % difference exceeded criteria >10%

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 15, 16, 17 and 18, 2005
Report Date:	April 8, 2005
Parameters:	Metals
Laboratory:	Ceimic Corporation
Sample Delivery Group:	MY1TE9

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by EPA Method ILMO5.3 with the additional requirements posed in Modification Tracking Number 1184.0. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), July 2002, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier II data validation. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed contract laboratory program (CLP) data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers. Two samples, MY1RY8 and MY1RZ9, were received by the laboratory with a pH greater than 2. These samples were preserved to a pH of less than 2 with nitric acid.

All technical holding-time requirements were met.

II. Calibration

All calibration verification standards met acceptance criteria.

Iron was detected in the continuing calibration blank (CCB) below the contract required quantitiation limit (CRQL). Sample results greater than the method detection limit (MDL) but less than the CRQL were qualified as non-detects at the CRQL and flagged "U".

III. Method Blank

A method blank (MB) was analyzed as required. Iron was detected in the MB below the CRQL. Sample results greater than the method detection limit (MDL) but less than the CRQL were qualified as non-detects at the CRQL and flagged "U".

IV. Laboratory Control Sample

All laboratory control sample recoveries were within criteria.

V. Matrix Spike/Matrix Spike Duplicate

The silicon matrix spike (MS) for sample MY1TF5 was recovered greater than the upper control limit. The sample concentration exceeded the spike concentration by a factor of four; therefore, no flag was applied.

VI. Laboratory Duplicates

A laboratory duplicate was analyzed on sample MY1RZ5. All relative percent difference (RPD) criteria were met.

VII. Field Duplicates

Samples MY1TF8 and MY1TF9 were designated as a field duplicate pair. All acceptance criteria were met.

VIII. Field Blanks

None associated with the samples in this SDG.

IX. Serial Dilutions

The RPD for potassium was above criteria in the serial dilution of sample MY1TF5. The detected sample result was flagged "J".

X. Target Analyte Quantitation

Raw data were not reviewed.

XI. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable. One serial dilution RPD exceedance was observed.

- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- Iron was detected in the associated MB and CCBs and resulted in detected data qualified as non-detects.
- Between the hardcopy and electronic data there were significant figure differences in the reported result for some analytes. This appears to be due to rounding differences in the respective reporting programs.
- The silicon data are reported on the hardcopy but not in the electronic data since it was not delivered in a compatible format.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MY1TF0	Iron, Dissolved	100	U	CCB<RL
MY1TF0	Iron, Dissolved	100	U	LB<RL
MY1TF3	Iron, Dissolved	100	U	CCB<RL
MY1TF3	Iron, Dissolved	100	U	LB<RL
MY1TF5	Iron, Dissolved	100	U	CCB<RL
MY1TF5	Iron, Dissolved	100	U	LB<RL
MY1TF5	Potassium, Dissolved	5690	J	SerialDilution>UCL
MY1TF9	Iron, Dissolved	100	U	CCB<RL
MY1TF9	Iron, Dissolved	100	U	LB<RL
MY1TG3	Iron, Dissolved	100	U	CCB<RL
MY1TG3	Iron, Dissolved	100	U	LB<RL

CCB<RL = Continuing calibration blank concentration less than RL
LB<RL = Laboratory blank contamination less than RL
SerialDilution>UCL = Serial Dilution % difference exceeded criteria >10%

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 15, 16, 17 and 18, 2005
Report Date:	April 8, 2005
Parameters:	Metals
Laboratory:	Ceimic Corporation
Sample Delivery Group:	MY1TF0

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by EPA Method ILMO5.3. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), July 2002, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier II data validation. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed contract laboratory program (CLP) data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The sample IDs were assigned after arrival at the laboratory in order to avoid a conflict with the analyses reported under SDG MY1RY2.

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers. Two samples, MY1TF7 and MY1TG2, were received by the laboratory with a pH greater than 2. These samples were preserved to a pH of less than 2 with nitric acid.

All technical holding-time requirements were met.

II. Calibration

Not all continuing calibration verification (CCV) standards met acceptance criteria. Beryllium (111%, 115%, 111%, 114%); chromium (112%); cobalt (113%, 116%, 119%, 113%, 111%, 112%); copper (117%, 120%, 126%, 116%, 136%, 132%); nickel (116%, 118%, 126%, 111%, 116%, 115%, 126%); vanadium (111%); and zinc (113%, 112%, 113%) CCV recoveries were above criteria. Due to the consistent pattern of elevated recoveries for these analytes, "J" flags were applied to all sample detects for these analytes.

Contract required quantitation limit (CRQL) standard recoveries were also above criteria for chromium (140%); copper (131%, 1236%, 332%); vanadium (177%); and zinc (201%, 160%). "J" flags were applied to all sample detects for these analytes because of the consistent pattern of high recoveries.

Internal standards covering the entire target analyte range in sample MY1TG2 were outside acceptance criteria. The sample was reanalyzed at a twofold dilution; all internal standards were still outside acceptance criteria. Target analytes were reported from the undiluted sample analysis. No flags were applied.

The internal standard response of lithium-6 was above criteria in the undiluted sample MY1TF9, but was within criteria in the twofold dilution. Therefore, beryllium with mass less than six was reported from the twofold dilution. No flag was applied.

The internal standard response of bismuth-209 was above criteria in the undiluted sample MY1TF7, but was within criteria in the twofold dilution. Therefore, target analytes with masses greater than 115 were reported from the twofold dilution. No flags were applied.

Antimony and silver were detected in the initial calibration blank (ICB) below the CRQL. Sample concentrations greater than the method detection limit (MDL) but less than the CRQL were qualified as non-detects at the CRQL and flagged "U".

Antimony, cadmium, chromium, copper, nickel, silver, vanadium and zinc were detected in the continuing calibration blanks (CCB) below the CRQL. Nickel and zinc sample detects were greater than the CRQL; therefore, the blank detects had no impact on these analytes. Sample concentrations greater than the MDL but less than the CRQL were qualified as non-detects at the CRQL and flagged "U".

Copper was detected in the final CCB above the CRQL at 13ug/L. Affected samples were MY1TF7 and MY1TG2. Both sample results were greater than the CCB result and were not flagged.

III. Method Blank

A method blank (MB) was analyzed as required. Chromium was detected in the MB below the CRQL. Sample concentrations greater than the MDL but less than the CRQL were qualified as non-detects at the CRQL and flagged "U".

IV. Laboratory Control Sample

All laboratory control sample recoveries were within criteria.

V. Matrix Spike/Matrix Spike Duplicate

A matrix spike was analyzed on sample MY1TF5. All recoveries were within criteria.

VI. Laboratory Duplicates

A laboratory duplicate was analyzed on sample MY1TF5. All relative percent difference (RPD) criteria were met.

VII. Field Duplicates

MY1TF8 and MY1TF9 were designated as a field duplicate pair. All acceptance criteria met.

VIII. Field Blanks

None associated with the samples in this SDG.

IX. Serial Dilutions

The RPD for nickel was above criteria in the serial dilution of sample MY1TF5. The detected sample result was flagged "J".

X. Target Analyte Quantitation

Raw data were not reviewed.

XI. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable. One serial dilution exceedance was observed.
- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- Target analytes were detected in the associated MB, ICB and CCBs. Some of these low-level blank detects resulted in detected data qualified as non-detect.
- Some CCV and CRQL standards were outside acceptance criteria. Affected data were qualified as estimated.
- Between the hardcopy and electronic data there were significant figure differences in the reported result for some analytes. This appears to be due to rounding differences in the respective reporting programs.
- The silicon data are reported on the hardcopy but not in the electronic data since it was not delivered in a compatible format.
- Sample MY1TE9 had result discrepancies between the hardcopy and electronic data. The results were corrected and resubmitted in a table which also did not match the hardcopy or electronic data. The results from the electronic data were corrected to correspond with the hardcopy results.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MY1TE9	ANTIMONY, Dissolved	2	U	CCB<RL
MY1TE9	ANTIMONY, Dissolved	2	U	ICB<RL
MY1TE9	CHROMIUM, Dissolved	3.3	J	CCV>UCL
MY1TE9	CHROMIUM, Dissolved	3.3	J	CRQL>UCL
MY1TE9	COBALT, Dissolved	2.8	J	CCV>UCL
MY1TE9	COPPER, Dissolved	12.2	J	CCV>UCL
MY1TE9	COPPER, Dissolved	12.2	J	CRQL>UCL
MY1TE9	NICKEL, Dissolved	19.7	J	CCV>UCL
MY1TE9	VANADIUM, Dissolved	11.1	J	CCV>UCL
MY1TE9	VANADIUM, Dissolved	11.1	J	CRQL>UCL
MY1TE9	ZINC, Dissolved	22.8	J	CCV>UCL
MY1TE9	ZINC, Dissolved	22.8	J	CRQL>UCL
MY1TF0	ANTIMONY, Dissolved	2	U	CCB<RL
MY1TF0	ANTIMONY, Dissolved	2	U	ICB<RL
MY1TF0	CHROMIUM, Dissolved	2	U	CCB<RL
MY1TF0	CHROMIUM, Dissolved	2	U	CCV>UCL
MY1TF0	CHROMIUM, Dissolved	2	U	CRQL>UCL
MY1TF0	CHROMIUM, Dissolved	2	U	LB<RL
MY1TF0	COBALT, Dissolved	0.59	J	CCV>UCL
MY1TF0	COPPER, Dissolved	4.2	J	CCV>UCL
MY1TF0	COPPER, Dissolved	4.2	J	CRQL>UCL
MY1TF0	NICKEL, Dissolved	7.4	J	CCV>UCL
MY1TF0	VANADIUM, Dissolved	2	J	CCV>UCL
MY1TF0	VANADIUM, Dissolved	2	J	CRQL>UCL
MY1TF0	ZINC, Dissolved	5	J	CCV>UCL
MY1TF0	ZINC, Dissolved	5	J	CRQL>UCL
MY1TF1	ANTIMONY, Dissolved	2	U	CCB<RL
MY1TF1	ANTIMONY, Dissolved	2	U	ICB<RL
MY1TF1	CHROMIUM, Dissolved	2	U	CCB<RL
MY1TF1	CHROMIUM, Dissolved	2	U	CCV>UCL
MY1TF1	CHROMIUM, Dissolved	2	U	CRQL>UCL
MY1TF1	CHROMIUM, Dissolved	2	U	LB<RL
MY1TF1	COBALT, Dissolved	1.3	J	CCV>UCL
MY1TF1	COPPER, Dissolved	10.5	J	CCV>UCL
MY1TF1	COPPER, Dissolved	10.5	J	CRQL>UCL
MY1TF1	NICKEL, Dissolved	32.3	J	CCV>UCL
MY1TF1	VANADIUM, Dissolved	9.6	J	CCV>UCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MY1TF1	VANADIUM, Dissolved	9.6	J	CRQL>UCL
MY1TF1	ZINC, Dissolved	6	J	CCV>UCL
MY1TF1	ZINC, Dissolved	6	J	CRQL>UCL
MY1TF2	CHROMIUM, Dissolved	2.9	J	CCV>UCL
MY1TF2	CHROMIUM, Dissolved	2.9	J	CRQL>UCL
MY1TF2	COBALT, Dissolved	4.2	J	CCV>UCL
MY1TF2	COPPER, Dissolved	2	U	CCB<RL
MY1TF2	COPPER, Dissolved	2	U	CCV>UCL
MY1TF2	COPPER, Dissolved	2	U	CRQL>UCL
MY1TF2	NICKEL, Dissolved	17.9	J	CCV>UCL
MY1TF2	VANADIUM, Dissolved	1.3	J	CCV>UCL
MY1TF2	VANADIUM, Dissolved	1.3	J	CRQL>UCL
MY1TF2	ZINC, Dissolved	4.5	J	CCV>UCL
MY1TF2	ZINC, Dissolved	4.5	J	CRQL>UCL
MY1TF3	CADMIUM, Dissolved	1	U	CCB<RL
MY1TF3	CHROMIUM, Dissolved	2	U	CCB<RL
MY1TF3	CHROMIUM, Dissolved	2	U	CCV>UCL
MY1TF3	CHROMIUM, Dissolved	2	U	CRQL>UCL
MY1TF3	CHROMIUM, Dissolved	2	U	LB<RL
MY1TF3	COBALT, Dissolved	2.3	J	CCV>UCL
MY1TF3	COPPER, Dissolved	3.8	J	CCV>UCL
MY1TF3	COPPER, Dissolved	3.8	J	CRQL>UCL
MY1TF3	NICKEL, Dissolved	13.2	J	CCV>UCL
MY1TF3	SELENIUM, Dissolved	5	U	CCB<RL
MY1TF3	VANADIUM, Dissolved	1.5	J	CCV>UCL
MY1TF3	VANADIUM, Dissolved	1.5	J	CRQL>UCL
MY1TF3	ZINC, Dissolved	8.2	J	CCV>UCL
MY1TF3	ZINC, Dissolved	8.2	J	CRQL>UCL
MY1TF4	ANTIMONY, Dissolved	2	U	CCB<RL
MY1TF4	ANTIMONY, Dissolved	2	U	ICB<RL
MY1TF4	CHROMIUM, Dissolved	2	U	CCB<RL
MY1TF4	CHROMIUM, Dissolved	2	U	CCV>UCL
MY1TF4	CHROMIUM, Dissolved	2	U	CRQL>UCL
MY1TF4	CHROMIUM, Dissolved	2	U	LB<RL
MY1TF4	COBALT, Dissolved	0.09	J	CCV>UCL
MY1TF4	COPPER, Dissolved	11	J	CCV>UCL
MY1TF4	COPPER, Dissolved	11	J	CRQL>UCL
MY1TF4	NICKEL, Dissolved	3.4	J	CCV>UCL
MY1TF4	VANADIUM, Dissolved	11	J	CCV>UCL
MY1TF4	VANADIUM, Dissolved	11	J	CRQL>UCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MY1TF4	ZINC, Dissolved	9	J	CCV>UCL
MY1TF4	ZINC, Dissolved	9	J	CRQL>UCL
MY1TF5	CHROMIUM, Dissolved	2	U	CCB<RL
MY1TF5	CHROMIUM, Dissolved	2	U	CCV>UCL
MY1TF5	CHROMIUM, Dissolved	2	U	CRQL>UCL
MY1TF5	CHROMIUM, Dissolved	2	U	LB<RL
MY1TF5	COBALT, Dissolved	0.59	J	CCV>UCL
MY1TF5	COPPER, Dissolved	3.5	J	CCV>UCL
MY1TF5	COPPER, Dissolved	3.5	J	CRQL>UCL
MY1TF5	NICKEL, Dissolved	7.1	J	CCV>UCL
MY1TF5	NICKEL, Dissolved	7.1	J	SerialDilution>UCL
MY1TF5	SELENIUM, Dissolved	5	U	CCB<RL
MY1TF5	VANADIUM, Dissolved	11.1	J	CCV>UCL
MY1TF5	VANADIUM, Dissolved	11.1	J	CRQL>UCL
MY1TF5	ZINC, Dissolved	4.4	J	CCV>UCL
MY1TF5	ZINC, Dissolved	4.4	J	CRQL>UCL
MY1TF6	ANTIMONY, Dissolved	2	U	CCB<RL
MY1TF6	ANTIMONY, Dissolved	2	U	ICB<RL
MY1TF6	CADMIUM, Dissolved	1	U	CCB<RL
MY1TF6	CHROMIUM, Dissolved	2	U	CCB<RL
MY1TF6	CHROMIUM, Dissolved	2	U	CCV>UCL
MY1TF6	CHROMIUM, Dissolved	2	U	CRQL>UCL
MY1TF6	CHROMIUM, Dissolved	2	U	LB<RL
MY1TF6	COBALT, Dissolved	7.3	J	CCV>UCL
MY1TF6	COPPER, Dissolved	5.4		CCV>UCL
MY1TF6	COPPER, Dissolved	5.4		CRQL>UCL
MY1TF6	NICKEL, Dissolved	38.3	J	CCV>UCL
MY1TF6	VANADIUM, Dissolved	1.7	J	CCV>UCL
MY1TF6	VANADIUM, Dissolved	1.7	J	CRQL>UCL
MY1TF6	ZINC, Dissolved	36.4	J	CCV>UCL
MY1TF6	ZINC, Dissolved	36.4	J	CRQL>UCL
MY1TF7	ANTIMONY, Dissolved	2	U	CCB<RL
MY1TF7	ANTIMONY, Dissolved	2	U	ICB<RL
MY1TF7	CHROMIUM, Dissolved	6.6	J	CCV>UCL
MY1TF7	CHROMIUM, Dissolved	6.6	J	CRQL>UCL
MY1TF7	COBALT, Dissolved	192	J	CCV>UCL
MY1TF7	COPPER, Dissolved	52.4		CCV>UCL
MY1TF7	COPPER, Dissolved	52.4		CRQL>UCL
MY1TF7	NICKEL, Dissolved	365	J	CCV>UCL
MY1TF7	VANADIUM, Dissolved	1.3	J	CCV>UCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MY1TF7	VANADIUM, Dissolved	1.3	J	CRQL>UCL
MY1TF7	ZINC, Dissolved	113	J	CCV>UCL
MY1TF7	ZINC, Dissolved	113	J	CRQL>UCL
MY1TF8	CHROMIUM, Dissolved	2	U	CCB<RL
MY1TF8	CHROMIUM, Dissolved	2	U	CCV>UCL
MY1TF8	CHROMIUM, Dissolved	2	U	CRQL>UCL
MY1TF8	CHROMIUM, Dissolved	2	U	LB<RL
MY1TF8	COBALT, Dissolved	19.7	J	CCV>UCL
MY1TF8	COPPER, Dissolved	15.1	J	CCV>UCL
MY1TF8	COPPER, Dissolved	15.1	J	CRQL>UCL
MY1TF8	NICKEL, Dissolved	167	J	CCV>UCL
MY1TF8	VANADIUM, Dissolved	1.3	J	CCV>UCL
MY1TF8	VANADIUM, Dissolved	1.3	J	CRQL>UCL
MY1TF8	ZINC, Dissolved	2560	J	CCV>UCL
MY1TF8	ZINC, Dissolved	2560	J	CRQL>UCL
MY1TF9	CHROMIUM, Dissolved	2	U	CCB<RL
MY1TF9	CHROMIUM, Dissolved	2	U	CCV>UCL
MY1TF9	CHROMIUM, Dissolved	2	U	CRQL>UCL
MY1TF9	CHROMIUM, Dissolved	2	U	LB<RL
MY1TF9	COBALT, Dissolved	20.1	J	CCV>UCL
MY1TF9	COPPER, Dissolved	15.3	J	CCV>UCL
MY1TF9	COPPER, Dissolved	15.3	J	CRQL>UCL
MY1TF9	NICKEL, Dissolved	173	J	CCV>UCL
MY1TF9	VANADIUM, Dissolved	1.5	J	CCV>UCL
MY1TF9	VANADIUM, Dissolved	1.5	J	CRQL>UCL
MY1TF9	ZINC, Dissolved	2820	J	CCV>UCL
MY1TF9	ZINC, Dissolved	2820	J	CRQL>UCL
MY1TG0	CHROMIUM, Dissolved	2	U	CCB<RL
MY1TG0	CHROMIUM, Dissolved	2	U	CCV>UCL
MY1TG0	CHROMIUM, Dissolved	2	U	CRQL>UCL
MY1TG0	CHROMIUM, Dissolved	2	U	LB<RL
MY1TG0	COBALT, Dissolved	0.54	J	CCV>UCL
MY1TG0	COPPER, Dissolved	24.2	J	CCV>UCL
MY1TG0	COPPER, Dissolved	24.2	J	CRQL>UCL
MY1TG0	NICKEL, Dissolved	6.2	J	CCV>UCL
MY1TG0	VANADIUM, Dissolved	0.33	J	CCV>UCL
MY1TG0	VANADIUM, Dissolved	0.33	J	CRQL>UCL
MY1TG0	ZINC, Dissolved	37.9	J	CCV>UCL
MY1TG0	ZINC, Dissolved	37.9	J	CRQL>UCL
MY1TG1	ANTIMONY, Dissolved	2	U	CCB<RL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MY1TG1	ANTIMONY, Dissolved	2	U	ICB<RL
MY1TG1	CHROMIUM, Dissolved	2	U	CCB<RL
MY1TG1	CHROMIUM, Dissolved	2	U	CCV>UCL
MY1TG1	CHROMIUM, Dissolved	2	U	CRQL>UCL
MY1TG1	CHROMIUM, Dissolved	2	U	LB<RL
MY1TG1	COBALT, Dissolved	6	J	CCV>UCL
MY1TG1	COPPER, Dissolved	8.9	J	CCV>UCL
MY1TG1	COPPER, Dissolved	8.9	J	CRQL>UCL
MY1TG1	NICKEL, Dissolved	13.9	J	CCV>UCL
MY1TG1	ZINC, Dissolved	6.1	J	CCV>UCL
MY1TG1	ZINC, Dissolved	6.1	J	CRQL>UCL
MY1TG2	BERYLLIUM, Dissolved	0.07	J	CCV>UCL
MY1TG2	CHROMIUM, Dissolved	16.5	J	CCV>UCL
MY1TG2	CHROMIUM, Dissolved	16.5	J	CRQL>UCL
MY1TG2	COBALT, Dissolved	3.2	J	CCV>UCL
MY1TG2	COPPER, Dissolved	196	J	CCV>UCL
MY1TG2	COPPER, Dissolved	196	J	CRQL>UCL
MY1TG2	NICKEL, Dissolved	15.5	J	CCV>UCL
MY1TG2	SILVER, Dissolved	1	U	ICB<RL
MY1TG2	VANADIUM, Dissolved	16	J	CCV>UCL
MY1TG2	VANADIUM, Dissolved	16	J	CRQL>UCL
MY1TG2	ZINC, Dissolved	27.9	J	CCV>UCL
MY1TG2	ZINC, Dissolved	27.9	J	CRQL>UCL
MY1TG3	ANTIMONY, Dissolved	2	U	CCB<RL
MY1TG3	ANTIMONY, Dissolved	2	U	ICB<RL
MY1TG3	CHROMIUM, Dissolved	2	U	CCB<RL
MY1TG3	CHROMIUM, Dissolved	2	U	CCV>UCL
MY1TG3	CHROMIUM, Dissolved	2	U	CRQL>UCL
MY1TG3	CHROMIUM, Dissolved	2	U	LB<RL
MY1TG3	COBALT, Dissolved	16.5	J	CCV>UCL
MY1TG3	COPPER, Dissolved	16.3	J	CCV>UCL
MY1TG3	COPPER, Dissolved	16.3	J	CRQL>UCL
MY1TG3	NICKEL, Dissolved	44.7	J	CCV>UCL
MY1TG3	VANADIUM, Dissolved	2.2	J	CCV>UCL
MY1TG3	VANADIUM, Dissolved	2.2	J	CRQL>UCL
MY1TG3	ZINC, Dissolved	142	J	CCV>UCL
MY1TG3	ZINC, Dissolved	142	J	CRQL>UCL

CCB<RL = Continuing calibration blank concentration less than RL
CCV>UCL = Continuing calibration recovery greater than upper control limit

CRQL>UCL = CRQL recovery greater than upper control limit
ICB<RL = Initial calibration blank concentration less than RL
LB<RL = Laboratory blank contamination greater than RL
SerialDilution>UCL = Serial Dilution % difference exceeded criteria >10%

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 22 and 23, 2005
Report Date:	April 15, 2005
Parameters:	Metals
Laboratory:	Ceimic Corporation
Sample Delivery Group:	MY1TG4

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by EPA Method ILMO5.3, with the additional requirements posed in Modification Tracking Number 1184.0. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), July 2002, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier II data validation. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed contract laboratory program (CLP) data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All technical holding-time requirements were met.

II. Calibration

All calibration verification standards met acceptance criteria.

Several target analytes were detected in the initial calibration blank (ICB) and continuing calibration blank (CCB). These blank detects have no impact on the sample results and no flags were applied.

III. Method Blank

A method blank (MB) was analyzed as required. Several analytes were detected in the MB less than the contract required quantitation limits (CRQL). Sample results were greater than the CRQL, thus the blank detects have no impact on the sample data. No flags were applied.

IV. Laboratory Control Sample

All laboratory control sample recoveries were within criteria

V. Matrix Spike/Matrix Spike Duplicate

A matrix spike (MS) was analyzed on sample MY1TG7. Silicon was not recovered. The sample concentration exceeded the spike concentration by a factor of four and therefore, no flags were applied.

VI. Laboratory Duplicate

All acceptance criteria were met.

VII. Field Duplicates

Samples MY1TG6 and MY1TH1 were designated as a field duplicate pair. All acceptance criteria were met.

VIII. Field Blanks

None associated with the samples in this SDG.

IX. Serial Dilutions

All acceptance criteria were met.

X. Target Analyte Quantitation

Raw data were not reviewed.

XI. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable.
- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- Target analytes were detected in the associated MB, ICB and CCBs. These low-level blank detects do not impact the sample data.

- Between the hardcopy and electronic data there were significant figure differences in the reported result for some analytes. This appears to be due to rounding differences in the respective reporting programs.
- The silicon data are reported on the hardcopy but not in the electronic data since it was not delivered in a compatible format.

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 22 and 23, 2005
Report Date:	April 18, 2005
Parameters:	Metals
Laboratory:	Ceimic Corporation
Sample Delivery Group:	MY1TG5

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by EPA Method ILMO5.3. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), July 2002, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier II data validation. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed contract laboratory program (CLP) data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All technical holding-time requirements were met.

II. Calibration

Not all continuing calibration verification (CCV) standards met acceptance criteria. Chromium, cobalt, copper and nickel were above the acceptance criteria in the closing CCV at 112%, 115%, 117% and 116%, respectively. Affected samples were MY1TG8 and MY1TG9. "J" flags were applied to sample detects.

Contract required quantitation limit (CRQL) standard recoveries were also above criteria for copper (132%) and vanadium (147%) in the final CRQL standard. Affected samples were MY1TG8 and MY1TG9. "J" flags were applied to sample detects.

Samples MY1TG7 its dilution had a high response for the lithium-6 internal standard. Sample MY1TG6 had a high response for the lithium-6 and scandium-45 internal standards. Analysis of a twofold dilution of each of these samples showed high response for lithium-6, but the scandium-45 recovery was within acceptance criteria. Therefore, beryllium with a mass less than six was reported from the undiluted analysis for both samples. For sample MY1TG6, analytes with masses between 6 and 89 were reported from the twofold dilution. No flags were applied.

Antimony and silver were detected in the initial calibration blank (ICB) below the CRQL. Antimony, silver, chromium and vanadium were detected in the continuing calibration blanks (CCB) below the CRQL. Silver was not detected in the samples and therefore, the blank contamination had no impact. Sample concentrations for antimony, chromium and vanadium greater than the method detection limit (MDL) but less than the CRQL were qualified as non-detect at the CRQL and flagged "U".

III. Method Blank

A method blank (MB) was analyzed as required. Antimony was detected in the MB below the CRQL. Sample concentrations greater than the MDL but less than the CRQL were qualified as non-detect at the CRQL and flagged "U".

IV. Laboratory Control Sample

All laboratory control sample recoveries were within criteria.

V. Matrix Spike/Matrix Spike Duplicate

A matrix spike (MS) was analyzed on sample MY1TG7. Mercury was recovered below criteria in the MS. The analyte was not detected in the parent sample and the result was flagged "UJ".

VI. Laboratory Duplicates

A laboratory duplicate was analyzed on sample MY1TG7. All relative percent difference (RPD) criteria were met.

VII. Field Duplicates

The field duplicate (FD) pair, MY1TG6 and MY1TH1 had detects of arsenic, manganese, nickel, vanadium and zinc where the RPD was exceeded. Both samples of the FD pair were flagged "J".

VIII. Field Blanks

None associated with the samples in this SDG.

IX. Serial Dilutions

The RPD for cobalt, manganese and nickel were above criteria in the serial dilution of sample MY1TG7. The detected sample results were flagged "J".

X. Target Analyte Quantitation

Raw data were not reviewed.

XI. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable. One MS exceedance, five FD exceedances and three serial dilution exceedances were observed.
- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- Target analytes were detected in the associated MB, ICB and CCBs. Some of these low-level blank detects resulted in detected data being qualified as non-detect.
- Some CCV and CRQL standards were outside acceptance criteria. Affected data were qualified as estimated.
- Sample MY1TG9 had result discrepancies between the hardcopy and electronic data. Results were corrected and resubmitted in a table. The electronic data results were corrected to correspond with the table and hardcopy results.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MY1TG4	ANTIMONY, Dissolved	2	U	CCB<RL
MY1TG4	ANTIMONY, Dissolved	2	U	ICB<RL
MY1TG4	ANTIMONY, Dissolved	2	U	LB<RL
MY1TG4	CHROMIUM, Dissolved	2	U	CCB<RL
MY1TG5	CHROMIUM, Dissolved	2	U	CCB<RL
MY1TG6	ANTIMONY, Dissolved	2	U	CCB<RL
MY1TG6	ANTIMONY, Dissolved	2	U	ICB<RL
MY1TG6	ANTIMONY, Dissolved	2	U	LB<RL
MY1TG6	ARSENIC, Dissolved	198	J	FD>RPD
MY1TG6	MANGANESE, Dissolved	2100	J	FD>RPD
MY1TG6	NICKEL, Dissolved	4.8	J	FD>RPD
MY1TG6	VANADIUM, Dissolved	1.9	J	FD>RPD
MY1TG6	ZINC, Dissolved	4.5	J	FD>RPD
MY1TG7	CHROMIUM, Dissolved	2	U	CCB<RL
MY1TG7	COBALT, Dissolved	8.4	J	SerialDilution>UCL
MY1TG7	MANGANESE, Dissolved	1370	J	SerialDilution>UCL
MY1TG7	MERCURY, Dissolved	0.2	UJ	MS<LCL
MY1TG7	NICKEL, Dissolved	73	J	SerialDilution>UCL
MY1TG7	VANADIUM, Dissolved	1	U	CCB<RL
MY1TG8	ANTIMONY, Dissolved	2	U	CCB<RL
MY1TG8	ANTIMONY, Dissolved	2	U	ICB<RL
MY1TG8	ANTIMONY, Dissolved	2	U	LB<RL
MY1TG8	CHROMIUM, Dissolved	2.5	J	CCV>UCL
MY1TG8	COBALT, Dissolved	5.3	J	CCV>UCL
MY1TG8	COPPER, Dissolved	1.7	J	CCV>UCL
MY1TG8	COPPER, Dissolved	1.7	J	CRQL>UCL
MY1TG8	NICKEL, Dissolved	32.1	J	CCV>UCL
MY1TG8	VANADIUM, Dissolved	2.2	J	CRQL>UCL
MY1TG9	ANTIMONY, Dissolved	2	U	CCB<RL
MY1TG9	ANTIMONY, Dissolved	2	U	ICB<RL
MY1TG9	ANTIMONY, Dissolved	2	U	LB<RL
MY1TG9	CHROMIUM, Dissolved	2.2	J	CCV>UCL
MY1TG9	COBALT, Dissolved	7	J	CCV>UCL
MY1TG9	COPPER, Dissolved	7	J	CCV>UCL
MY1TG9	COPPER, Dissolved	7	J	CRQL>UCL
MY1TG9	NICKEL, Dissolved	270	J	CCV>UCL
MY1TG9	VANADIUM, Dissolved	3.7	J	CRQL>UCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MY1TH0	CHROMIUM, Dissolved	2	U	CCB<RL
MY1TH1	ANTIMONY, Dissolved	2	U	CCB<RL
MY1TH1	ANTIMONY, Dissolved	2	U	ICB<RL
MY1TH1	ANTIMONY, Dissolved	2	U	LB<RL
MY1TH1	ARSENIC, Dissolved	217	J	FD>RPD
MY1TH1	MANGANESE, Dissolved	2090	J	FD>RPD
MY1TH1	NICKEL, Dissolved	5.1	J	FD>RPD
MY1TH1	VANADIUM, Dissolved	2.1	J	FD>RPD
MY1TH1	ZINC, Dissolved	5.2	J	FD>RPD

CCB<RL = Continuing calibration blank concentration less than RL
CCV>UCL = Continuing calibration recovery greater than upper control limit
CRQL>UCL = CRQL recovery greater than upper control limit
FD>RPD = Field duplicate exceeds RPD criteria
ICB<RL = Initial calibration blank concentration less than RL
LB<RL = Laboratory blank contamination less than RL
MS<LCL = Matrix spike recovery less than lower limit
SerialDilution>UCL = Serial dilution % difference exceeded criteria >10%

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 14, 2005
Report Date:	April 8, 2005
Parameters:	ICP Metals, Mercury and Flash Point
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05076A

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901038. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (NFG), October 2004, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The sample was received at the laboratory with appropriate CoC forms and custody seals intact.

The cooler temperature exceeded the recommended control limits; however, the sample was a non-aqueous phase liquid (NAPL) and therefore, no flags were applied.

Holding-time requirements were met.

II. Calibration

Summary forms not provided.

III. Blanks

A method blank was analyzed as required. No contamination detected.

IV. Matrix Spike/Matrix Spike Duplicate

A matrix spike and matrix spike duplicate (MS/MSD) was analyzed for ICP metals on the NAPL sample. Antimony was recovered below criteria in the MS at 20 percent; however, the MSD recovery for antimony was within criteria. In addition, the relative percent difference exceeded criteria. No post-digestion spike was provided. The antimony non-detected result was qualified as estimated and flagged "UJ".

Silver was not recovered in either the MS or MSD. No post-digestion spike was provided. The silver non-detected sample result was unusable and flagged "R".

V. Laboratory Control Sample

No laboratory control sample was specified for the NAPL sample. A reference sample was analyzed. Aluminum was recovered above the acceptance criteria; however, it was not detected in the sample and therefore, no flag was applied. Silver was recovered below the acceptance criteria. Antimony and barium were not recovered in the reference sample. No additional flags were applied because antimony and silver were qualified for MS outliers and the barium recovery was within criteria in the MS.

VI. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

VII. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to the reporting limits (RL), was not within the scope of the data review for this SDG.

VIII. Field Blanks

No field blanks in this SDG.

IX. Field Duplicates

No field duplicates in this SDG.

X. Laboratory Duplicates

A laboratory duplicate was analyzed for mercury and flash point. All acceptance criteria were met.

XI. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XII. Overall Assessment of Data

- No method blank contamination.
- An MS exceedance resulted in the qualification of antimony as estimated. Silver was rejected and unusable for project use due to MS/MSD exceedances.
- The completeness objectives were met for all method/analyte combinations except for silver which was unusable.
- The precision and accuracy of the data overall, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

FIELD ID	ANALYTE	FINALRESULT (MG/KG)	FINAL FLAG	VALIDATION COMMENTS
MW-14LP-0305	SILVER	4.0	R	MS<LCL
MW-14LP-0305	ANTIMONY	40	UJ	MS<LCL

MS<LCL= Matrix spike recovery less than lower limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	April 21, 2005
Report Date:	May 20, 2005
Parameters:	Metals: ICP, ICP/MS and Mercury (Total and Dissolved)
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05112A

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901038. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (NFG), October 2004, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The samples were received at the laboratory with appropriate CoC forms and custody seals intact.

The cooler temperature exceeded the recommended control limits. The samples did not have sufficient time to cool. Data were not qualified.

Holding-time requirements were met.

II. ICP/MS Instrument Performance Check

Summary form not provided.

III. Calibration

Summary forms not provided.

IV. Blanks

Method blanks were analyzed as required. No contamination detected.

V. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate (MS/MSD) was analyzed on sample MW-12-0305. The recoveries of arsenic and molybdenum exceeded the upper control limits. Detected results were qualified as estimated and "J+" flagged.

The recovery of selenium was less than the lower control limits in the MS/MSD. The detected result was qualified as estimated and flagged "J-". Post spike data not provided.

VI. Laboratory Control Sample

All acceptance criteria were met.

VII. Internal Standards

Summary forms not provided.

VIII. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

IX. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to the reporting limits (RL), was not within the scope of the data review for this SDG.

X. Field Blanks

One equipment blank (EB) was analyzed in this SDG. No target analytes were detected in the EB.

XI. Field Duplicates

No field duplicates in this SDG.

XII. Laboratory Duplicates

No laboratory duplicates in this SDG.

XIII. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XIV. Overall Assessment of Data

- Laboratory blank contamination was not an issue during sample analysis.

- MS/MSD exceedances affected a few analytes. Data were qualified as estimated concentrations.
- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data overall, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (UG/L)	FINAL FLAG	VALIDATION COMMENTS
MW-12-0305	ARSENIC	54	J+	MS>UCL, SD>UCL
MW-12-0305	MOLYBDENUM	0.78	J+	MS>UCL, SD>UCL
MW-12-0305	SELENIUM	0.95	J-	MS<LCL, SD<LCL

MS<LCL = Matrix spike recovery less than lower limit
MS>UCL = Matrix spike recovery greater than upper limit
SD<LCL = Matrix spike duplicate recovery criteria less than lower limit
SD>UCL = Matrix spike duplicate recovery criteria greater than upper limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 14, 15, 16, 17 and 18, 2005
Report Date:	April 8, 2005
Parameters:	Metals and Cyanide
Laboratory:	Ceimic Corporation
Sample Delivery Group:	MY1RY5

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by EPA Method ILMO5.3. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), July 2002, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier II data validation. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed contract laboratory program (CLP) data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

Sample MY1S17 was listed on the Traffic Report/CoC for this SDG but was not received. This sample was subsequently cancelled.

Two samples, MY1RY8 and MY1RZ9, were received by the laboratory with a pH greater than 2. The samples were preserved to a pH less than 2 with nitric acid.

All technical holding-time requirements were met.

II. Calibration

The continuing calibration verification (CCV) standards were above the acceptance criteria for beryllium (115%, 169%, 156%, 140%, 134%, 171%, 116%, 111%, 114%); cobalt (115%, 128%); copper (115%, 141%); nickel (114%, 133%); vanadium (115%) and zinc (116%). Sample detects were flagged "J" for this exceedance. Manganese (84%) was below the acceptance criteria in a CCV; sample non-detects were flagged "UJ" and sample detects were flagged "J".

Contract required quantitation limit (CRQL) standard recoveries were also above criteria for beryllium (136%, 153%); chromium (146%); copper (3022%, 140%, 340%); nickel (139%); vanadium (132%, 150%, 188%) and zinc (180%, 169%). Sample detects for these analytes were flagged "J".

Sample MY1S03 exhibited a high response for the scandium-45 internal standard. Reanalysis of the sample at a twofold dilution showed a similar high response and therefore, all analytes were reported form the undiluted sample analysis. No flags were applied.

Antimony, chromium, selenium, silver and vanadium were detected in the initial calibration blank (ICB) and/or the continuing calibration blank (CCB) below CRQL. Sample concentrations greater than the method detection limit (MDL) but less than the CRQL were qualified as non-detect at the CRQL and flagged "U".

Copper was detected above the CRQL in the final CCB. The sample results were greater than the blank concentration and thus have no impact on the data. No flags were applied.

Samples MY1RZ1, MY1RZ1D, MY1RZ0, MY1RZ9 and MY1S01 have analytes reported from dilutions because internal standards did not meet the acceptance criteria in the undiluted sample analysis.

For sample MY1RY8, all five internal standards did not meet acceptance criteria in both the undiluted and twofold sample analyses. All target analyte results were reported from the undiluted analysis. No flags were applied.

III. Method Blank

A method blank (MB) was analyzed as required. Chromium and cobalt were detected in the MB below the CRQL. Sample concentrations greater than the MDL but less than the CRQL were qualified as non-detect at the CRQL and flagged "U".

IV. Laboratory Control Sample

All laboratory control sample recoveries were within criteria.

V. Matrix Spike/Matrix Spike Duplicate

A matrix spike (MS) was analyzed on sample MY1RZ1 for cyanide and ICP-MS metals. A mercury MS was analyzed on sample MY1RZ5. Beryllium was recovered above the acceptance criteria in the MS. The analyte was not detected in the parent sample; no flag was applied.

VI. Laboratory Duplicates

A laboratory duplicate was analyzed on sample MY1RZ1 for cyanide and ICP-MS metals. A mercury laboratory duplicate analysis was performed on sample MY1RZ5. All relative percent difference (RPD) criteria were met.

VII. Field Duplicates

The field duplicate pair, MY1S01 and MY1S00, had several detected analytes. The concentrations between the two samples exceeded the RPD for lead and zinc. The detected results for the field duplicate and associated native sample were flagged "J".

VIII. Field Blanks

There were three equipment blanks (EB) submitted in this SDG. Chromium, lead, nickel and zinc were detected in EB MY1S14 with no associated samples in this SDG. Chromium, lead, nickel and zinc were detected in EB MY1S15 below the CRQL. Chromium, nickel and zinc were detected in EB MY1S16 below the CRQL. Sample concentrations greater than the MDL but less than the CRQL were qualified as non-detect at the CRQL and flagged "U".

IX. Serial Dilutions

The RPD for cobalt, manganese, nickel and zinc were above criteria in the serial dilution of sample MY1RZ1. The detected sample results were flagged "J".

X. Target Analyte Quantitation

Raw data were not reviewed.

XI. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix related accuracy and precision indicators are generally acceptable. One MS exceedance, four serial dilution exceedances and two field duplicate exceedances were observed.
- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- Target analytes were detected in the associated MB, ICB, CCBs and EBs. Some of these low-level blank detects resulted in detected data being qualified as non-detect.
- Some CCV and CRQL standards were outside acceptance criteria. Affected data were qualified as estimated.
- The silicon data are reported on the hardcopy but not in the electronic data since it was not delivered in a compatible format.
- Samples MY1RZ0, MY1RZ6, MY1RZ7 and MY1RZ9 had result discrepancies between the hardcopy and electronic data. Results were corrected and resubmitted in a table. The electronic data results were corrected to correspond with the table and hardcopy results.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MY1RY2	ANTIMONY	2	U	CCB<RL
MY1RY2	ANTIMONY	2	U	ICB<RL
MY1RY2	CHROMIUM	12.5	J	CRQL>UCL
MY1RY2	COPPER	14.7	J	CRQL>UCL
MY1RY2	MANGANESE	261	J	CCV<LCL
MY1RY2	NICKEL	21	J	CRQL>UCL
MY1RY2	SILVER	1	U	CCB<RL
MY1RY2	VANADIUM	22.9	J	CRQL>UCL
MY1RY2	ZINC	35.2	J	CRQL>UCL
MY1RY3	CHROMIUM	2	U	CRQL>UCL
MY1RY3	CHROMIUM	2	U	EB<RL
MY1RY3	CHROMIUM	2	U	LB<RL
MY1RY3	COBALT	1	U	CCB<RL
MY1RY3	COBALT	1	U	LB<RL
MY1RY3	COPPER	12.5	J	CRQL>UCL
MY1RY3	NICKEL	3.1	J	CRQL>UCL
MY1RY3	VANADIUM	10.7	J	CRQL>UCL
MY1RY3	ZINC	10.2	J	CRQL>UCL
MY1RY5	ANTIMONY	2	U	CCB<RL
MY1RY5	ANTIMONY	2	U	ICB<RL
MY1RY5	CHROMIUM	4.3	J	CRQL>UCL
MY1RY5	COBALT	1	U	LB<RL
MY1RY5	COPPER	6.2	J	CRQL>UCL
MY1RY5	NICKEL	8.7	J	CRQL>UCL
MY1RY5	SELENIUM	5	U	CCB<RL
MY1RY5	VANADIUM	4.4	J	CRQL>UCL
MY1RY5	ZINC	9.3	J	CRQL>UCL
MY1RY6	CHROMIUM	3.9	J	CRQL>UCL
MY1RY6	COPPER	12.1	J	CRQL>UCL
MY1RY6	NICKEL	29.7	J	CRQL>UCL
MY1RY6	VANADIUM	9.5	J	CRQL>UCL
MY1RY6	ZINC	11.1	J	CRQL>UCL
MY1RY8	ANTIMONY	2	U	CCB<RL
MY1RY8	ANTIMONY	2	U	ICB<RL
MY1RY8	BERYLLIUM	0.11	J	CCV>UCL
MY1RY8	BERYLLIUM	0.11	J	CRQL>UCL
MY1RY8	CHROMIUM	9.7	J	CRQL>UCL
MY1RY8	COBALT	3	J	CCV>UCL
MY1RY8	COPPER	1650	J	CCV>UCL
MY1RY8	COPPER	1650	J	CRQL>UCL
MY1RY8	LEAD	1	U	EB<RL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MY1RY8	MANGANESE	371	J	CCV<LCL
MY1RY8	NICKEL	13.1	J	CCV>UCL
MY1RY8	NICKEL	13.1	J	CRQL>UCL
MY1RY8	SILVER	1	U	CCB<RL
MY1RY8	VANADIUM	6.5	J	CCV>UCL
MY1RY8	VANADIUM	6.5	J	CRQL>UCL
MY1RY8	ZINC	18.1	J	CCV>UCL
MY1RY8	ZINC	18.1	J	CRQL>UCL
MY1RY9	CHROMIUM	2.4	J	CRQL>UCL
MY1RY9	COPPER	13.8	J	CRQL>UCL
MY1RY9	NICKEL	14.5	J	CRQL>UCL
MY1RY9	VANADIUM	1	U	CCB<RL
MY1RY9	VANADIUM	1	U	CRQL>UCL
MY1RY9	ZINC	11.3	J	CRQL>UCL
MY1RZ0	BERYLLIUM	0.27	J	CCV>UCL
MY1RZ0	BERYLLIUM	0.27	J	CRQL>UCL
MY1RZ0	CHROMIUM	37.9	J	CRQL>UCL
MY1RZ0	COBALT	8.4	J	CCV>UCL
MY1RZ0	COPPER	11.7	J	CCV>UCL
MY1RZ0	COPPER	11.7	J	CRQL>UCL
MY1RZ0	NICKEL	42.4	J	CCV>UCL
MY1RZ0	NICKEL	42.4	J	CRQL>UCL
MY1RZ0	SILVER	1	U	CCB<RL
MY1RZ0	VANADIUM	22.2	J	CRQL>UCL
MY1RZ0	ZINC	28.5	J	CRQL>UCL
MY1RZ1	CHROMIUM	8.1	J	CRQL>UCL
MY1RZ1	COBALT	3.2	J	SerialDilution>UCL
MY1RZ1	COPPER	9.5	J	CRQL>UCL
MY1RZ1	MANGANESE	2380	J	SerialDilution>UCL
MY1RZ1	NICKEL	18.2	J	CRQL>UCL
MY1RZ1	NICKEL	18.2	J	SerialDilution>UCL
MY1RZ1	SELENIUM	5	U	CCB<RL
MY1RZ1	VANADIUM	6	J	CRQL>UCL
MY1RZ1	ZINC	14.7	J	CRQL>UCL
MY1RZ1	ZINC	14.7	J	SerialDilution>UCL
MY1RZ5	BERYLLIUM	0.09	J	CRQL>UCL
MY1RZ5	CHROMIUM	14.9	J	CRQL>UCL
MY1RZ5	COPPER	7.1	J	CRQL>UCL
MY1RZ5	NICKEL	19.7	J	CRQL>UCL
MY1RZ5	SELENIUM	5	U	CCB<RL
MY1RZ5	VANADIUM	16.8	J	CRQL>UCL
MY1RZ5	ZINC	17.6	J	CRQL>UCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MY1RZ6	ANTIMONY	2	U	CCB<RL
MY1RZ6	ANTIMONY	2	U	ICB<RL
MY1RZ6	CHROMIUM	5.2	J	CRQL>UCL
MY1RZ6	COPPER	6.2	J	CRQL>UCL
MY1RZ6	NICKEL	37.7	J	CRQL>UCL
MY1RZ6	VANADIUM	3.6	J	CRQL>UCL
MY1RZ6	ZINC	42	J	CRQL>UCL
MY1RZ7	ANTIMONY	2	U	CCB<RL
MY1RZ7	ANTIMONY	2	U	ICB<RL
MY1RZ7	CHROMIUM	2	U	CCB<RL
MY1RZ7	CHROMIUM	2	U	CRQL>UCL
MY1RZ7	CHROMIUM	2	U	EB<RL
MY1RZ7	CHROMIUM	2	U	LB<RL
MY1RZ7	COPPER	16.6	J	CRQL>UCL
MY1RZ7	NICKEL	40.6	J	CRQL>UCL
MY1RZ7	VANADIUM	2.2	J	CRQL>UCL
MY1RZ7	ZINC	138	J	CRQL>UCL
MY1RZ9	CHROMIUM	13	J	CRQL>UCL
MY1RZ9	COBALT	231	J	CCV>UCL
MY1RZ9	COPPER	73.9	J	CCV>UCL
MY1RZ9	COPPER	73.9	J	CRQL>UCL
MY1RZ9	MANGANESE	24300	J	CCV<LCL
MY1RZ9	NICKEL	429	J	CCV>UCL
MY1RZ9	NICKEL	429	J	CRQL>UCL
MY1RZ9	SILVER	1	U	CCB<RL
MY1RZ9	VANADIUM	4	J	CRQL>UCL
MY1RZ9	ZINC	124	J	CRQL>UCL
MY1S00	CHROMIUM	5.1	J	CRQL>UCL
MY1S00	COPPER	20.1	J	CRQL>UCL
MY1S00	LEAD	7.4	J	FD>RPD
MY1S00	NICKEL	180	J	CRQL>UCL
MY1S00	VANADIUM	2.8	J	CRQL>UCL
MY1S00	ZINC	3250	J	CRQL>UCL
MY1S00	ZINC	3250	J	FD>RPD
MY1S01	CHROMIUM	5.3	J	CRQL>UCL
MY1S01	COBALT	18.7	J	CCV>UCL
MY1S01	COPPER	18.6	J	CCV>UCL
MY1S01	COPPER	18.6	J	CRQL>UCL
MY1S01	LEAD	4.3	J	FD>RPD
MY1S01	NICKEL	159	J	CCV>UCL
MY1S01	NICKEL	159	J	CRQL>UCL
MY1S01	VANADIUM	1.7	J	CRQL>UCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MY1S01	ZINC	2490	J	CRQL>UCL
MY1S01	ZINC	2490	J	FD>RPD
MY1S12	CHROMIUM	2.2	J	CRQL>UCL
MY1S12	COBALT	1	U	LB<RL
MY1S12	COPPER	27.4	J	CRQL>UCL
MY1S12	NICKEL	6.1	J	CRQL>UCL
MY1S12	VANADIUM	1	U	CCB<RL
MY1S12	VANADIUM	1	U	CRQL>UCL
MY1S12	ZINC	44.1	J	CRQL>UCL

CCB<RL = Continuing calibration blank concentration less than RL
CCV<LCL = Continuing calibration recovery less than lower control limit
CCV>UCL = Continuing calibration recovery greater than upper control limit
CRQL>UCL = CRQL recovery greater than upper control limit
EB<RL = Equipment blank concentration less than RL
FD>RPD = Field duplicate exceeds RPD criteria
ICB<RL = Initial calibration blank concentration less than RL
LB<RL = Laboratory blank contamination less than RL
SerialDilution>UCL = Serial dilution % difference exceeded criteria >10%

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 22, 23 and 31, 2005
Report Date:	April 20, 2005
Parameters:	Metals and Cyanide
Laboratory:	Ceimic Corporation
Sample Delivery Group:	MY1RZ2

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by EPA Method ILMO5.3. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), July 2002, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier II data validation. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed contract laboratory program (CLP) data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All technical holding-time requirements were met.

II. Calibration

The final continuing calibration verification (CCV) standard was above acceptance criteria for cobalt (115%), copper (119%) and nickel (118%). Beryllium was below the acceptance criteria in the final CCV at 87%. The detected results were flagged "J" in sample MY1RY7.

Contract required quantitation limit (CRQL) standard recoveries were also above criteria for copper (142%) and vanadium (146%). "J" flags were applied to detected results in sample MY1RY7.

Sample MY1S03 exhibited a high response for the scandium-45 internal standard. Reanalysis of the sample at a twofold dilution showed a similar high response. Therefore, all analytes were reported from the undiluted sample analysis. No flags were applied.

Antimony was detected in the initial calibration blank (ICB) and all the continuing calibration blanks (CCB) below the CRQL. Antimony results greater than the method detection limit (MDL) but less than the CRQL were qualified as non-detect at the CRQL and flagged "U". Cadmium, chromium, manganese, nickel, silver and vanadium were detected in the CCBs below the CRQL. Manganese, nickel and vanadium sample detects were greater than the CRQL and therefore, the blank detects have no impact on these analytes. Sample concentrations greater than the MDL but less than the CRQL for antimony, cadmium, chromium and silver bracketed by the affected CCBs were qualified as non-detect at the CRQL and flagged "U".

III. Method Blank

A method blank (MB) was analyzed as required. Nickel was detected in the MB below the CRQL. Sample detects were greater than the CRQL for nickel and therefore, the blank detects have no impact on the data.

IV. Laboratory Control Sample

All laboratory sample control recoveries were within criteria.

V. Matrix Spike/Matrix Spike Duplicate

A matrix spike (MS) was analyzed on sample MY1RZ4. Mercury was recovered below criteria in the MS. Mercury was not detected in the parent sample and the result was flagged "UJ".

VI. Laboratory Duplicates

A laboratory duplicate was analyzed on sample MY1RZ4. All relative percent difference (RPD) criteria were met.

VII. Field Duplicates

The field duplicate pair was MY1RZ2 and MY1RZ3. All acceptance criteria met.

VIII. Field Blanks

There were two equipment blanks (EB), MY1S18 and MY1S19, submitted in this SDG. Copper, nickel and zinc were detected in EB MY1S19 less than the CRQL. Cadmium, chromium, copper, lead, nickel and zinc were detected in EB MY1S18 less than the CRQL.

Sample concentrations greater than the MDL but less than the CRQL were qualified as non-detect at the CRQL and flagged "U".

IX. Serial Dilutions

The RPD for cobalt, manganese and nickel were above criteria in the serial dilution of sample MY1RZ4. The detected sample results were flagged "J".

X. Target Analyte Quantitation

Raw data were not reviewed.

XI. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable. One MS exceedance and three serial dilution exceedances were observed.
- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- Target analytes were detected in the associated EB, ICB and CCBs. Some of these low-level blank detects resulted in detected data qualified as non-detect.
- Some CCV and CRQL standards were outside acceptance criteria. Affected data were qualified as estimated.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MY1RY7	BERYLLIUM	0.36	J	CCV<LCL
MY1RY7	CADMIUM	0.97	U	CCB<RL
MY1RY7	COBALT	7.6	J	CCV>UCL
MY1RY7	COPPER	51.7	J	CCV>UCL
MY1RY7	COPPER	51.7	J	CRQL>UCL
MY1RY7	NICKEL	39.6	J	CCV>UCL
MY1RY7	SILVER	1	U	CCB<RL
MY1RY7	VANADIUM	70.3	J	CRQL>UCL
MY1RZ2	ANTIMONY	2	U	CCB<RL
MY1RZ2	ANTIMONY	2	U	ICB<RL
MY1RZ2	COPPER	2	U	EB<RL
MY1RZ3	ANTIMONY	2	U	CCB<RL
MY1RZ3	ANTIMONY	2	U	ICB<RL
MY1RZ3	COPPER	2	U	EB<RL
MY1RZ4	COBALT	8.5	J	SerialDilution>UCL
MY1RZ4	MANGANESE	1330	J	SerialDilution>UCL
MY1RZ4	MERCURY	0.2	UJ	MS<LCL
MY1RZ4	NICKEL	74	J	SerialDilution>UCL
MY1S02	CHROMIUM	2	U	CCB<RL
MY1S02	CHROMIUM	2	U	EB<RL
MY1S03	ANTIMONY	2	U	CCB<RL
MY1S03	ANTIMONY	2	U	ICB<RL
MY1S03	CADMIUM	1	U	EB<RL
MY1S04	CHROMIUM	2	U	CCB<RL
MY1S04	COPPER	2	U	EB<RL
MY1S05	ANTIMONY	2	U	CCB<RL
MY1S05	ANTIMONY	2	U	ICB<RL
MY1S06	ANTIMONY	2	U	CCB<RL
MY1S06	ANTIMONY	2	U	ICB<RL
MY1S22	ANTIMONY	2	U	CCB<RL
MY1S22	ANTIMONY	2	U	ICB<RL

CCB<RL = Continuing calibration blank concentration less than RL
CCV<LCL = Continuing calibration recovery less than lower control limit
CCV>UCL = Continuing calibration recovery greater than upper control limit
CRQL>UCL = CRQL recovery greater than upper control limit
EB<RL = Equipment blank concentration less than RL
MS<LCL = Matrix spike recovery less than lower limit
SerialDilution>UCL = Serial dilution % difference exceeded criteria >10%

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 15, 23 and 31, 2005
Report Date:	May 26, 2005
Parameters:	PCDD/PCDF
Laboratory:	Data/Analysis Technologies, Inc.
Sample Delivery Group:	0305 (0505002)

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. The case narrative indicates that the samples in this SDG were analyzed by a modified version of USEPA Method 1613B/Contract Laboratory Program (CLP) Statement of Work DLM01.4 for polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/PCDF). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Chlorinated Dioxin/Furan Data Review, August 2002.

Tier II review was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance. Contract compliance is addressed in the Checklist for Task Order Compliance for Dioxin Data Packages Delivered under DLM01.4 which was completed concurrently with this data review.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may be imprecise.
- R — The sample result is unusable. The analyte may or may not be present in the sample.

I. Holding Times, Storage and Preservation

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact.

All holding-time requirements were met.

II. Performance Evaluation Samples

Not applicable – there were no performance evaluation samples associated with this SDG.

III. Mass Calibration and Mass Spectrometer Resolution

Verification of the mass calibration and mass spectrometer resolution was not within the scope of the Tier II review.

IV. Window Defining Mix

All requirements within the scope of the Tier II review were determined to have been met.

V. Chromatographic Resolution

The GC resolution criteria were met.

VI. Instrument Stability

The relative retention times of the labeled 1,2,3,4,6,7,8-HpCDD standard in the continuing calibration verification standards injected at the beginning, middle, and end of the analytical sequence on 5/24/05 exceeded the upper acceptance limit. The absolute retention times of this labeled standard were fairly consistent in the three injections. Since adequate stability was indicated by all the injections, no data were qualified.

The ion abundance and response criteria were met.

Verification of the instrument sensitivity was not within the scope of the Tier II review.

VII. HRGC/HRMS Initial Calibration

Initial calibration was performed at the required frequency.

There was no information in the data package regarding the standard concentrations used for initial calibration.

The ion abundance and linearity criteria were met.

Verification of the instrument sensitivity, GC resolution and retention times, was not within the scope of the Tier II review.

VIII. HRGC/HRMS Calibration Verification

The absolute retention time of the first eluting internal standard met the criteria. Comparison of the absolute retention times of the rest of the internal standards with those obtained during initial calibration was not within the scope of the Tier II review.

The relative retention times of the labeled 1,2,3,4,6,7,8-HpCDD standard in the continuing calibration verification standards injected at the beginning, middle, and end of the analytical sequence on 5/24/05 exceeded the upper acceptance limit. The absolute retention times of this labeled standard were fairly consistent in the three injections. Since adequate stability was indicated by all the injections, no data were qualified.

The ion abundances and analyte responses met the criteria.

Verification of the instrument sensitivity was not within the scope of the Tier II review.

IX. Identification Criteria

Evaluation of the relative retention times, peak identifications, signal-to-noise ratios, and polychlorinated diphenyl ether interferences was not within the scope of the Tier II review.

X. Method Blank Analysis

No target analytes were detected in the method blanks.

XI. Laboratory Control Sample Analysis

Three aqueous laboratory control samples were analyzed with the samples in this SDG. The recoveries of 1,2,3,7,8,9-HxCDF from all three laboratory control samples were above the upper acceptance limit. 1,2,3,7,8,9-HxCDF was detected in sample MW-14LP-0305, and its result, as well as the total HxCDF result, were flagged "J".

XII. Toxicity Equivalency Factor and Isomer Specificity

Form 1DFAs for samples IDW-S-02-0305 and IDW-W-01-0305 show concentrations of OCDF with "U" qualifiers and numerical values for the Estimated Maximum Possible Concentration (EMPC)/Estimated Detection Limit (EDL). It is not clear from the Form 1DFA if OCDF was detected in the samples. Toxicity Equivalency Factor (TEF)-adjusted concentrations are shown on their respective Form 1DFB.

The TEF calculations were otherwise properly performed.

XIII. Dilution by Addition of Solvent

No verification could be performed since raw data were outside the scope of the Tier II review.

XIV. Dilution by Re-extraction and Reanalysis

No verification could be performed since raw data were outside the scope of the Tier II review.

XV. Second Column Confirmation

No 2,3,7,8-TCDF was detected in any of the samples in this SDG.

XVI. Estimated Detection Limit and Estimated Maximum Possible Concentration

Form 1DFAs for samples IDW-S-02-0305 and IDW-W-01-0305 show concentrations of OCDF with "U" qualifiers and numerical values for the EMPC/EDL. It is not clear from the Form 1DFA if OCDF was detected in the samples. No ion ratio is provided for OCDF in either sample. TEF-adjusted concentrations are shown on their respective Form 1DFB.

There is no concentration or EMPC/EDL reported for 2,3,7,8-TCDF and 1,2,3,6,7,8-HxCDF in sample RMW-02-13-0305.

All other EDLs and EMPCs were properly reported.

Verification of EDL and EMPC calculations was not within the scope of the Tier II review.

XVII. Labeled Compound Recoveries

The recovery of the labeled 1,2,3,7,8-PeCDD standard in sample MW-14LP-0305 was below the lower acceptance limit. The native 1,2,3,7,8-PeCDD and total PeCDD results for the sample were flagged "J".

All labeled standards were recovered below the lower acceptance limits from sample RMW-07-15-0305. The laboratory indicated in the case narrative that there was no sample left for reanalysis. No target analytes were detected in the sample, and the results were flagged "UJ".

The ion abundance ratios of detected analytes and labeled standards met the criteria.

Verification of signal-to-noise ratios was not within the scope of the Tier II review.

XVIII. Field Blanks

There were no field blanks in this SDG.

XIX. Field Duplicates

There were no field duplicates in this SDG.

XX. Overall Assessment of Data

Low-labeled standard recoveries, particularly in sample RMW-07-15-0305 were noted. There were also reporting problems in three samples. Both concentrations and EMPC/EDL, as well as "U" qualifiers, were reported for OCDF in two samples. No ion ratio is reported for OCDF in either sample. In another sample, no concentrations, EMPC/EDL, or qualifiers were reported for two target analytes. The ion ratios for these analytes are provided.

Data Qualification Summary

Field ID	Analyte	Final Result	Final Flag	Validation Comments
MW-14LP-0305	1,2,3,7,8,9-HxCDF Total HxCDF	213 18685	J	LCS>UCL
MW-14LP-0305	1,2,3,7,8-PeCDD Total PeCDD	70.3 472	J	IS<LCL
RMW-07-15-0305	All target analytes	NA	UJ	IS<LCL

LCS>UCL = LCS recovery greater than upper control limit
IS<LCL = Internal standard response less than lower control limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 14, 2005
Report Date:	April 18, 2005
Parameters:	Organochlorine Pesticides and PCBs
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05076A

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901038. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The sample was received at the laboratory with appropriate CoC forms and custody seals intact.

The temperature of the cooler was above the recommended 2-6 degrees Celsius range at 13 degrees Celsius. This sample was a non-aqueous phase liquid (NAPL) and therefore, no flags were applied for the temperature exceedance.

Holding-time requirements were met.

II. Instrument Performance Check

All instrument performance check requirements were met.

III. Calibration

The recovery of aldrin exceeded acceptable QC limits for the continuing calibration verification. The associated sample result was qualified as estimated and "J" flagged.

IV. Blanks

A method blank was analyzed as required. 4,4'-DDD was detected in the method blank above the contract required quantitation limit (CRQL), equivalent to the reporting limit (RL). The sample concentration was greater than five times the blank concentration and therefore, no flag was applied.

V. Field Blanks

No field blanks in this SDG**.**

VI. Surrogates

Surrogate recoveries could not be evaluated because the concentrations were significantly below the quantitation limits. The sample required dilution and therefore, sample results were not qualified.

VII. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate (MS/MSD) was performed on sample MY1S13. The MS/MSD recoveries were not provided because the sample concentrations were significantly higher than the spike concentrations.

VIII. Laboratory Control Sample

All acceptance criteria were met.

IX. Internal Standards

Not applicable.

X. Field Duplicates

No field duplicates in this SDG.

XI. Confirmation

Alpha-BHC, gamma-BHC, alpha-chlordane and methoxychlor exceeded the confirmation relative percent difference (RPD) criteria. Detected results were qualified as estimated and "J" flagged.

XII. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

XIII. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported CRQLs was not within the scope of the data review for this SDG.

XIV. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XV. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XVI. Overall Assessment of Data

- No method blank contamination.
- A calibration exceedance resulted in qualification of aldrin as an estimated concentration.
- The confirmation RPD exceeded the control limit for four analytes. Sample results were qualified as estimated concentrations.
- Neither surrogate nor matrix recoveries were available due to sample matrix.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (UG/KG)	FINAL FLAG	VALIDATION COMMENTS
MW-14LP-0305	ALDRIN	2500	J	CCV>UCL
MW-14LP-0305	ALPHA BHC	1100	J	CF>RPD
MW-14LP-0305	GAMMA BHC (LINDANE)	2000	J	CF>RPD
MW-14LP-0305	ALPHA-CHLORDANE	2900	J	CF>RPD
MW-14LP-0305	METHOXYCHLOR	2300	J	CF>RPD

CF>RPD = Confirmation precision exceeded
CCV>UCL = Continuing calibration recovery greater than upper control limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 31, 2005
Report Date:	April 05, 2005
Parameters:	Organochlorine Pesticides and PCBs
Laboratory:	Data Chem Laboratories, Inc.
Sample Delivery Group:	Y1RY2

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 for pesticides and PCBs. The data review was performed using the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier III data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data and to provide verification of calculations and analyte identification. It was not intended to determine contract compliance.

The scope of the data review included the chain-of-custody (CoC) records, the case narrative, completed CLP data summary forms and raw data.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers. Sample Y1S14 had an incorrect collection date of 03/14/2005. The correct sample date was 03/15/2005.

Samples were analyzed within the required holding time.

II. Instrument Performance Checks

Resolution check and performance evaluation mixtures were analyzed as required by the method and met acceptance criteria. Resolution and breakdown calculations were verified.

III. Calibration

The initial and continuing calibrations were within acceptance criteria. Calibration factor, relative standard deviation (RSD) and percent difference (%D) calculations were verified.

IV. Method Blanks

Alpha-BHC and gamma-BHC were detected in the method blank below the contract required quantitation limit (CRQL), equivalent to reporting limit. Gamma-BHC was detected in the field blank. The detected result was greater than five times the method blank concentration. No flags were applied.

V. Field Blanks

Sample Y1S14 was a field blank. Gamma-BHC, aldrin, dieldrin and endosulfan II were detected in the field blank below the CRQL. Dieldrin was the only detected analyte in the samples. One detected result less than five times the blank concentration was qualified as a non-detect at the CRQL and flagged "U".

VI. Laboratory Control Sample

All acceptance criteria were met. The laboratory control sample calculation was checked.

VII. Surrogate Spikes

All surrogate recoveries were within acceptance criteria. The surrogate recovery calculation was verified.

VIII. Matrix Spike/Matrix Spike Duplicate

A matrix spike and matrix spike duplicate was not performed.

IX. Field Duplicates

There were no field duplicates in this SDG.

X. Internal Standards

Not applicable.

XI. Confirmation

Target compound detected concentrations with a relative percent difference between the primary and secondary column of greater than 25 percent were qualified as estimated concentrations and flagged "J". Results qualified for this condition are presented in the table below.

XII. Target Compound Identification and Quantitation

Raw data were reviewed as part of this scope.

XIII. Overall Assessment of Data

- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable and therefore, the data are both accurate and precise.
- There were very significant percent differences between the primary and confirmation results in some of the samples. These discrepancies could indicate the presence of interferences or even the possibility of false positives.
- Method blank contamination was minimal and did not impact detected sample results.
- One analyte was affected by field blank contamination and qualified as a non-detect.
- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1RY2	4,4'-DDT	0.0053	J	CF>RPD
Y1RY2	alpha-Chlordane	0.0035	J	CF>RPD
Y1RY2	Endosulfan sulfate	0.0012	J	CF>RPD
Y1RY2	Endrin ketone	0.00042	J	CF>RPD
Y1RY2	gamma-Chlordane	0.0063	J	CF>RPD
Y1RY2	Heptachlor	0.0016	J	CF>RPD
Y1RY2	Heptachlor epoxide	0.0018	J	CF>RPD
Y1RZ0	4,4'-DDD	0.0072	J	CF>RPD
Y1RZ0	4,4'-DDE	0.00073	J	CF>RPD
Y1RZ0	4,4'-DDT	0.0015	J	CF>RPD
Y1RZ0	Dieldrin	0.002	J	CF>RPD
Y1RZ0	Endrin	0.0013	J	CF>RPD
Y1RZ0	Heptachlor epoxide	0.00011	J	CF>RPD
Y1RZ1	4,4'-DDE	0.00022	J	CF>RPD
Y1RZ1	Dieldrin	0.02	U	EB<RL
Y1RZ1	Endosulfan sulfate	0.0072	J	CF>RPD

CF>RPD = Confirmation precision exceeded
EB<RL = Equipment blank concentration less than RL

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 22 and 23, 2005
Report Date:	April 4, 2005
Parameters:	Organochlorine Pesticides and PCBs
Laboratory:	Data Chem Laboratories, Inc.
Sample Delivery Group:	Y1RZ2

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 for pesticides and PCBs. The data review was performed using the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier II data validation. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All samples were analyzed within the required holding time.

II. Instrument Performance Checks

Resolution check and performance evaluation mixtures were analyzed as required by the method and met acceptance criteria.

III. Calibration

The initial and continuing calibrations were within acceptance criteria.

IV. Method Blanks

Alpha-BHC was detected in the method blank below the CRQL. The blank detect was less than five times the sample results and thus had no impact on the data. No flags were applied.

V. Field Blanks

There were two equipment blanks associated with the samples in this SDG. Gamma-BHC, aldrin, and 4, 4'-DDT were detected in Y1S18, associated with samples collected on March 22, 2005. 4, 4'-DDT was detected in equipment blank Y1S19 which was associated with samples collected on March 23, 2005. Sample detects less than five times the blank concentrations were qualified as non-detects at the CRQL and flagged "U".

VI. Laboratory Control Sample

The laboratory control sample was within acceptance criteria.

VII. Surrogate Spikes

Tetrachloro-m-xylene (TCX) surrogate recoveries were below criteria in several samples. This surrogate is closely associated with the pesticide compounds. "J" flags were applied to detected results and "UJ" flags were applied to non-detected results. Surrogate recoveries outside acceptance criteria in diluted samples were not flagged.

VIII. Matrix Spike/Matrix Spike Duplicate

A matrix spike and matrix spike duplicate were performed on sample Y1RZ2. The heptachlor relative percent difference (RPD) was above criteria. The parent sample was non-detect and no flag was applied.

IX. Field Duplicates

Samples Y1RZ2 and Y1RZ3 were designated as a field duplicate pair. All acceptance criteria were met.

X. Internal Standards

Not applicable.

XI. Confirmation

Target compound detected concentrations with a RPD between the primary and secondary column of greater than 25 percent are qualified as estimated concentrations and flagged "J". Results qualified for this condition are presented in the table below.

XII. Target Compound Identification and Quantitation

Raw data were not reviewed as part of this scope.

Several samples required dilution due to high analyte concentration.

XIII. Overall Assessment of Data

- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable and therefore, the data are both accurate and precise.
- There were very significant percent differences between the primary and confirmation results in some of the samples. These discrepancies could indicate the presence of interferences or even the possibility of false positives.
- There was no method blank contamination.
- Sample results were qualified as non-detect due to field blank contamination.
- Surrogate exceedances required sample results to be qualified as estimated concentrations in four samples.
- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1RZ2	4,4'-DDD	0.021	J	Sur<LCL
Y1RZ2	4,4'-DDE	0.012	J	CF>RPD
Y1RZ2	4,4'-DDE	0.012	J	Sur<LCL
Y1RZ2	4,4'-DDT	0.02	U	CF>RPD
Y1RZ2	4,4'-DDT	0.02	U	EB<RL
Y1RZ2	4,4'-DDT	0.02	U	Sur<LCL
Y1RZ2	Aldrin	0.01	UJ	Sur<LCL
Y1RZ2	alpha-BHC	0.01	UJ	Sur<LCL
Y1RZ2	alpha-Chlordane	0.01	UJ	Sur<LCL
Y1RZ2	beta-BHC	0.01	UJ	Sur<LCL
Y1RZ2	delta-BHC	0.01	UJ	Sur<LCL
Y1RZ2	Dieldrin	0.0014	J	CF>RPD
Y1RZ2	Dieldrin	0.0014	J	Sur<LCL
Y1RZ2	Endosulfan I	0.01	UJ	Sur<LCL
Y1RZ2	Endosulfan II	0.02	UJ	Sur<LCL
Y1RZ2	Endosulfan sulfate	0.02	UJ	Sur<LCL
Y1RZ2	Endrin	0.02	UJ	Sur<LCL
Y1RZ2	Endrin aldehyde	0.02	UJ	Sur<LCL
Y1RZ2	Endrin ketone	0.02	UJ	Sur<LCL
Y1RZ2	gamma-BHC (Lindane)	0.01	UJ	Sur<LCL
Y1RZ2	gamma-Chlordane	0.01	UJ	Sur<LCL
Y1RZ2	Heptachlor	0.01	UJ	Sur<LCL
Y1RZ2	Heptachlor epoxide	0.01	UJ	Sur<LCL
Y1RZ2	Methoxychlor	0.1	UJ	Sur<LCL
Y1RZ2	Toxaphene	1	UJ	Sur<LCL
Y1RZ3	4,4'-DDD	0.022	J	Sur<LCL
Y1RZ3	4,4'-DDE	0.014	J	Sur<LCL
Y1RZ3	4,4'-DDT	0.02	U	CF>RPD
Y1RZ3	4,4'-DDT	0.02	U	EB<RL
Y1RZ3	4,4'-DDT	0.02	U	Sur<LCL
Y1RZ3	Aldrin	0.01	UJ	Sur<LCL
Y1RZ3	alpha-BHC	0.0049	J	CF>RPD
Y1RZ3	alpha-BHC	0.0049	J	Sur<LCL
Y1RZ3	alpha-Chlordane	0.01	UJ	Sur<LCL
Y1RZ3	beta-BHC	0.0075	J	Sur<LCL
Y1RZ3	delta-BHC	0.01	UJ	Sur<LCL
Y1RZ3	Dieldrin	0.0014	J	CF>RPD

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1RZ3	Dieldrin	0.0014	J	Sur<LCL
Y1RZ3	Endosulfan I	0.01	UJ	Sur<LCL
Y1RZ3	Endosulfan II	0.02	UJ	Sur<LCL
Y1RZ3	Endosulfan sulfate	0.02	UJ	Sur<LCL
Y1RZ3	Endrin	0.02	UJ	Sur<LCL
Y1RZ3	Endrin aldehyde	0.02	UJ	Sur<LCL
Y1RZ3	Endrin ketone	0.02	UJ	Sur<LCL
Y1RZ3	gamma-BHC (Lindane)	0.0064	J	Sur<LCL
Y1RZ3	gamma-Chlordane	0.01	UJ	Sur<LCL
Y1RZ3	Heptachlor	0.01	UJ	Sur<LCL
Y1RZ3	Heptachlor epoxide	0.01	UJ	Sur<LCL
Y1RZ3	Methoxychlor	0.1	UJ	Sur<LCL
Y1RZ3	Toxaphene	1	UJ	Sur<LCL
Y1RZ4	4,4'-DDT	0.0098	J	CF>RPD
Y1RZ4	Aldrin	0.0025	J	CF>RPD
Y1RZ4	alpha-Chlordane	0.0064	J	CF>RPD
Y1RZ4	Dieldrin	0.0085	J	CF>RPD
Y1RZ4	Endrin aldehyde	0.003	J	CF>RPD
Y1RZ4	gamma-BHC (Lindane)	0.0022	J	CF>RPD
Y1S02	4,4'-DDD	0.0031	J	CF>RPD
Y1S02	Aldrin	0.01	U	CF>RPD
Y1S02	Aldrin	0.01	U	EB<RL
Y1S02	Dieldrin	0.013	J	CF>RPD
Y1S02	Endrin aldehyde	0.0011	J	CF>RPD
Y1S02	Heptachlor	0.00028	J	CF>RPD
Y1S03	4,4'-DDE	0.096	J	CF>RPD
Y1S03	4,4'-DDE	0.096	J	Sur<LCL
Y1S03	4,4'-DDT	0.02	U	CF>RPD
Y1S03	4,4'-DDT	0.02	U	EB<RL
Y1S03	4,4'-DDT	0.02	U	Sur<LCL
Y1S03	Aldrin	0.029	J	CF>RPD
Y1S03	Aldrin	0.029	J	Sur<LCL
Y1S03	alpha-BHC	0.013	J	Sur<LCL
Y1S03	alpha-Chlordane	0.01	J	Sur<LCL
Y1S03	beta-BHC	0.01	UJ	Sur<LCL
Y1S03	delta-BHC	0.01	UJ	Sur<LCL
Y1S03	Dieldrin	0.24	J	Sur<LCL
Y1S03	Endosulfan I	0.01	UJ	Sur<LCL
Y1S03	Endosulfan II	0.02	UJ	Sur<LCL
Y1S03	Endosulfan sulfate	0.0011	J	CF>RPD

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1S03	Endosulfan sulfate	0.0011	J	Sur<LCL
Y1S03	Endrin	0.02	UJ	Sur<LCL
Y1S03	Endrin aldehyde	0.0037	J	Sur<LCL
Y1S03	Endrin ketone	0.00085	J	Sur<LCL
Y1S03	gamma-BHC (Lindane)	0.01	UJ	Sur<LCL
Y1S03	gamma-Chlordane	0.0013	J	CF>RPD
Y1S03	gamma-Chlordane	0.0013	J	Sur<LCL
Y1S03	Heptachlor	0.01	UJ	Sur<LCL
Y1S03	Heptachlor epoxide	0.01	UJ	Sur<LCL
Y1S03	Methoxychlor	0.1	UJ	Sur<LCL
Y1S03	Toxaphene	1	UJ	Sur<LCL
Y1S05	4,4'-DDD	0.0085	J	CF>RPD
Y1S05	4,4'-DDD	0.0085	J	Sur<LCL
Y1S05	4,4'-DDE	0.0052	J	CF>RPD
Y1S05	4,4'-DDE	0.0052	J	Sur<LCL
Y1S05	4,4'-DDT	0.02	UJ	Sur<LCL
Y1S05	Aldrin	0.0086	J	CF>RPD
Y1S05	Aldrin	0.0086	J	Sur<LCL
Y1S05	alpha-BHC	0.0047	J	CF>RPD
Y1S05	alpha-BHC	0.0047	J	Sur<LCL
Y1S05	alpha-Chlordane	0.01	UJ	Sur<LCL
Y1S05	beta-BHC	0.013	J	Sur<LCL
Y1S05	delta-BHC	0.01	UJ	Sur<LCL
Y1S05	Dieldrin	0.1	J	Sur<LCL
Y1S05	Endosulfan I	0.01	UJ	Sur<LCL
Y1S05	Endosulfan II	0.02	UJ	Sur<LCL
Y1S05	Endosulfan sulfate	0.019	J	CF>RPD
Y1S05	Endosulfan sulfate	0.019	J	Sur<LCL
Y1S05	Endrin	0.02	UJ	Sur<LCL
Y1S05	Endrin aldehyde	0.0053	J	CF>RPD
Y1S05	Endrin aldehyde	0.0053	J	Sur<LCL
Y1S05	Endrin ketone	0.02	UJ	Sur<LCL
Y1S05	gamma-BHC (Lindane)	0.01	UJ	Sur<LCL
Y1S05	gamma-Chlordane	0.01	UJ	Sur<LCL
Y1S05	Heptachlor	0.004	J	CF>RPD
Y1S05	Heptachlor	0.004	J	Sur<LCL
Y1S05	Heptachlor epoxide	0.01	UJ	Sur<LCL
Y1S05	Methoxychlor	0.1	UJ	Sur<LCL
Y1S05	Toxaphene	1	UJ	Sur<LCL
Y1S06	4,4'-DDT	0.18	J	CF>RPD

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1S06	alpha-Chlordane	0.0088	J	CF>RPD
Y1S06	Aroclor-1260	4.3	J	CF>RPD
Y1S06	beta-BHC	0.021	J	CF>RPD
Y1S06	Endosulfan I	0.022	J	CF>RPD
Y1S06	Endosulfan sulfate	0.077	J	CF>RPD
Y1S06	Endrin aldehyde	0.14	J	CF>RPD

CF>RPD = Confirmation precision exceeded
EB<RL = Equipment blank concentration less than RL
Sur<LCL = Surrogate recovery less than lower limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 31, 2005
Report Date:	April 18, 2005
Parameters:	Organochlorine Pesticides and PCBs
Laboratory:	Envirosystems, Inc.
Sample Delivery Group:	Y1S20

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 for pesticides and PCBs. The data review was performed using the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier II data validation. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The pesticide fraction was shipped from another laboratory and received by Envirosystems on 04/06/05.

All technical holding-time requirements were met.

II. Instrument Performance Checks

Resolution check and performance evaluation mixtures were analyzed as required by the method and met acceptance criteria.

III. Calibration

The initial calibration was within acceptance criteria. Continuing calibration verification recoveries for alpha-BHC and 4,4'-DDD on the confirmation column were above criteria. There were no sample detects for these analytes, thus, no flags were applied.

IV. Method Blanks

A method blank was analyzed as required. There were no detected results in the method blank.

V. Field Blanks

There were no field blanks in this SDG.

VI. Laboratory Control Sample

No laboratory control sample was analyzed with this SDG.

VII. Surrogate Spikes

The decachlorobiphenyl (DCB) surrogate recovery was above criteria in sample Y1S20. This surrogate is closely associated with the PCB compounds in the analysis. PCB non-detected results were not flagged.

VIII. Matrix Spike/Matrix Spike Duplicate

A matrix spike and matrix spike duplicate was performed on sample Y1S21. All acceptance criteria were met.

IX. Field Duplicates

There was no field duplicate in this SDG.

X. Internal Standards

Not applicable.

XI. Confirmation

Target compound detected concentrations with a relative percent difference between the primary and secondary column of greater than 25 percent were qualified as estimated concentrations and flagged "J". Results qualified for this condition are presented in the table below.

XII. Target Compound Identification and Quantitation

Raw data were not reviewed as part of this scope.

XIII. Overall Assessment of Data

- Instrument calibration was acceptable.

- There was no method blank contamination.
- There were some significant percent differences between the primary and confirmation results in one of the samples. These discrepancies could indicate the presence of interferences or even the possibility of false positives.
- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/Kg)	Final Flag	Validation Comments
Y1S20	4,4'-DDT	3.8	J	CF>RPD
Y1S20	Endosulfan II	0.5	J	CF>RPD
Y1S20	Endrin	5.7	J	CF>RPD
Y1S20	Endrin ketone	7	J	CF>RPD

CF>RPD = Confirmation precision exceeded

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 31, 2005
Report Date:	April 19, 2005
Parameters:	Organochlorine Pesticides and PCBs
Laboratory:	Data Chem Laboratories, Inc.
Sample Delivery Group:	Y1S22

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 for pesticides and PCBs. The data review was performed using the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier II data validation. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody records, the case narrative and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The sample was received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

The sample was analyzed within the required holding time.

II. Instrument Performance Checks

Resolution check and performance evaluation mixtures were analyzed as required by the method and met acceptance criteria.

III. Calibration

The initial and continuing calibrations were within acceptance criteria.

IV. Method Blanks

Alpha -BHC was detected in the method blank below the CRQL. The blank detect was less than five times the sample result and thus had no impact on the data. No flags were applied.

V. Field Blanks

There were no field blanks in this SDG.

VI. Laboratory Control Sample

Endosulfan sulfate was recovered above criteria on the primary column. The detected sample result was flagged "J".

VII. Surrogate Spikes

The decachlorobiphenyl (DCB) surrogate recoveries were below criteria on both columns. This surrogate is closely associated with the PCB compounds in the analysis. PCB non-detected results were flagged "UJ".

VIII. Matrix Spike/Matrix Spike Duplicate

A matrix spike and matrix spike duplicate was performed on sample Y1S22. All acceptance criteria were met.

IX. Field Duplicates

There were no field duplicates in this SDG.

X. Internal Standards

Not applicable.

XI. Confirmation

Target compound detected concentrations with a relative percent difference between the primary and secondary column of greater than 25 percent are qualified as estimated concentrations and flagged "J". Results qualified for this condition are presented in the table below.

XII. Target Compound Identification and Quantitation

Raw data were not reviewed as part of this scope.

XIII. Overall Assessment of Data

- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable and therefore, the data are both accurate and precise.

- There were very significant percent differences between the primary and confirmation results in some of the samples. These discrepancies could indicate the presence of interferences or even the possibility of false positives.
- There was no method blank contamination.
- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1S22	4,4'-DDD	0.022	J	CF>RPD
Y1S22	4,4'-DDE	0.0019	J	CF>RPD
Y1S22	4,4'-DDT	0.0038	J	CF>RPD
Y1S22	Aroclor-1016	0.2	UJ	Sur<LCL
Y1S22	Aroclor-1221	0.4	UJ	Sur<LCL
Y1S22	Aroclor-1232	0.2	UJ	Sur<LCL
Y1S22	Aroclor-1242	0.2	UJ	Sur<LCL
Y1S22	Aroclor-1248	0.2	UJ	Sur<LCL
Y1S22	Aroclor-1254	0.2	UJ	Sur<LCL
Y1S22	Aroclor-1260	0.2	UJ	Sur<LCL
Y1S22	Dieldrin	0.025	J	CF>RPD
Y1S22	Endosulfan sulfate	0.0087	J	CF>RPD
Y1S22	Endosulfan sulfate	0.0087	J	LCS>UCL
Y1S22	Endrin aldehyde	0.0016	J	CF>RPD

CF>RPD = Confirmation precision exceeded
LCS>UCL = LCS recovery greater than upper control limit
Sur<LCL = Surrogate recovery less than lower limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	April 12, 2005
Report Date:	June 24, 2005
Parameters:	Organochlorine Pesticides and PCBs
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05112A

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901038. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The sample was received at the laboratory with appropriate CoC forms and custody seals intact.

Temperature requirements exceeded control limits. Samples did not have sufficient time to cool. Data were not qualified.

Holding-time requirements were met.

II. Instrument Performance Check

All instrument performance check requirements were met.

III. Calibration

The closing calibration verification standard on the second column did not meet criteria. The detected results from the second column confirmation were affected. Since results were reported from the primary column, data were not qualified.

IV. Blanks

A method blank was analyzed as required. There were no detected results in the method blank.

V. Field Blanks

This SDG contained one equipment blank. There were no detected results in the equipment blank.

VI. Surrogates

The decachlorobiphenyl surrogate recovery was below the lower control limit. This surrogate is most closely associated with the polychlorinated biphenyls (PCB). Non-detected results were qualified as estimated and flagged "UJ".

VII. Matrix Spike/Matrix Spike Duplicate

No matrix spike/matrix spike duplicate in this SDG.

VIII. Laboratory Control Sample

All acceptance criteria were met.

IX. Internal Standards

Not applicable.

X. Field Duplicates

No field duplicates in this SDG.

XI. Confirmation

Gamma-BHC and aldrin exceeded the confirmation relative percent difference (RPD) criteria. Detected results were qualified as estimated and "J" flagged.

XII. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

XIII. Compound Quantitation and Reported CRQLs

Initial analysis of the sample indicated the presence of contamination. The pesticide fraction had an alumina column cleanup and the PCB fraction was cleaned with sulfuric acid to reduce this contamination.

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), was not within the scope of the data review for this SDG.

XIV. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XV. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XVI. Overall Assessment of Data

- No method blank contamination.
- The confirmation RPD exceeded the control limit for two analytes. Sample results were qualified as estimated concentrations.
- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (UG/L)	FINAL FLAG	VALIDATION COMMENTS
MW-12-0305	Aldrin	0.086	J	CF>RPD
MW-12-0305	Gamma-BHC	0.037	J	CF>RPD
MW-12-0305	Aroclor 1016	1.00	UJ	Sur<LCL
MW-12-0305	Aroclor 1221	2.00	UJ	Sur<LCL
MW-12-0305	Aroclor 1232	1.00	UJ	Sur<LCL
MW-12-0305	Aroclor 1242	1.00	UJ	Sur<LCL
MW-12-0305	Aroclor 1248	1.00	UJ	Sur<LCL
MW-12-0305	Aroclor 1254	1.00	UJ	Sur<LCL
MW-12-0305	Aroclor 1260	1.00	UJ	Sur<LCL

CF>RPD = Confirmation precision exceeded
Sur<LCL = Surrogate recovery less than lower limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 16, 17, 18 and 22, 2005
Report Date:	April 15, 2005
Parameters:	RSK-175
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05075B

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901038. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The samples were received at the laboratory within temperature control and with appropriate CoC forms and custody seals intact.

Samples RMW-06-15-0305 and BMW-08-0305 were not properly preserved in the field. Detected results were qualified as estimated and flagged “J”. Non-detected results were flagged “UJ” and qualified as estimated.

Holding-time requirements were met for all samples except for methane in sample BMW-08-0305. Because the sample was not properly preserved, the holding time is seven days instead of 14 days. Due to the concentration of methane, a reanalysis was required which

was performed outside seven days. The detected methane result was qualified as estimated and flagged "J".

II. Calibration

In the continuing calibration verification (CCV) performed on March 22, 2005, methane exceeded the upper control range. Only sample RMW-06-15-0305 was associated with this CCV. The detected result was qualified as estimated and flagged "J".

III. Blanks

Method blanks were analyzed as required by the method and did not contain detectable levels of target analytes.

IV. Surrogates

Surrogate recoveries for samples RMW-05-15-0305 (for all analytes) and RMW-10-35-0305 (for ethane and ethane) were below recovery limits. Detected results were qualified as estimated and flagged "J" and non-detected results were flagged "UJ" and qualified as estimated.

Surrogate recoveries for methane for samples BMW-08-0305 and RMW-01-17-0305 were above acceptance criteria. Detected sample results were qualified as estimated and flagged "J".

V. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate was performed on sample RMW-09-35-0305. All acceptance criteria were met.

VI. Laboratory Control Sample

All acceptance criteria were met.

VII. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

VIII. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), was not within the scope of the data review for this SDG.

IX. Field Blanks

No field blanks in this SDG.

X. Field Duplicates

Samples MW-92-0305 and RMW-10-15-0305 were designated as a field duplicate (FD) pair. All acceptance criteria met except for methane. The FD pair had a relative percent difference of 45 percent. The detected results were qualified as estimated and flagged "J".

XI. Laboratory Duplicates

No laboratory duplicates in this SDG.

XII. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XIII. Overall Assessment of Data

- Samples RMW-06-15-0305 and BMW-08-0305 were not properly preserved in the field and therefore, the data were qualified as estimated.
- Methane in sample BMW-08-0305 was qualified as estimated for exceeding hold time.
- Calibration, surrogate and FD exceedances resulted in data qualified as estimated concentrations.
- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data overall, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (UG/L)	FINAL FLAG	VALIDATION COMMENTS
BMW-08-0305	ETHENE	1.0	UJ	NotPres
BMW-08-0305	ETHANE	1.1	UJ	NotPres
BMW-08-0305	METHANE	790	J	Sur>UCL, NotPres, HT>UCL
RMW-01-17-0305	METHANE	670	J	Sur>UCL
RMW-05-15-0305	ETHENE	1.0	UJ	Sur<LCL
RMW-05-15-0305	ETHANE	1.1	UJ	Sur<LCL
RMW-05-15-0305	METHANE	25	J	Sur<LCL
RMW-06-15-0305	ETHENE	0.8	J	NotPres
RMW-06-15-0305	ETHANE	0.7	J	NotPres
RMW-06-15-0305	METHANE	40	J	CCV>UCL, NotPres
RMW-10-35-0305	ETHENE	0.9	J	Sur<LCL
RMW-10-35-0305	ETHANE	1.1	UJ	Sur<LCL
RMW-10-15-0305	METHANE	50	J	FD>RPD
MW-92-0305	METHANE	79	J	FD>RPD

CCV>UCL = Continuing calibration recovery greater than upper control limit
FD>RPD = Field duplicate exceeds RPD criteria
HT>UCL = Holding time exceeded
NotPres = Sample not properly preserved in the field
Sur<LCL = Surrogate recovery less than lower limit
Sur>UCL = Surrogate recovery greater than upper limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 23, 2005
Report Date:	April 15, 2005
Parameters:	RSK-175
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05083A

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901038. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier III data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the analytical raw data and to provide verification of calculations and analyte identification. It was not intended to determine contract compliance.

The scope of the data validation included review of the chain-of-custody (CoC) records, the case narrative, completed data summary forms and raw data.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within temperature control and with appropriate CoC forms and with custody seals intact.

Sample BPZ-01-0305 was not properly preserved in the field. Methane and ethane detected results were qualified as estimated and flagged “J”. The non-detected result for ethene was qualified as estimated and flagged “UJ”.

Holding-time requirements were met.

II. Calibration

The method used for the gas analysis is a variation of method RSK-175 and it is not clearly identified as a modification of method RSK-175 in the data package. The RSK-175 method uses Henry's Law (using partial pressure of the gas, Henry's law constant, temperature of the sample, volume of the sample bottle, and atomic weight of the gas) to calculate the concentrations of analytes in the aqueous phase from the concentration of analytes in the headspace. The method used by the laboratory was modified to perform a direct comparison at a constant equilibrium temperature of standards and samples by using the exact volume of water and the exact ratio of water to headspace for all standards, samples and associated QC samples. It is unknown if a comparison study was conducted to verify results for the modified method.

The volumes of standards to samples and the ratio of headspace of standards and of samples were not clearly documented in the data package. The preparation log provided only the initial and final volumes of the samples.

The initial calibration verification standard (ICV) recovery for methane exceeded the laboratory upper control limit. Methane detected results were qualified as estimated and flagged "J".

Calculations for the initial calibration factor (CF) and relative standard deviation (RSD) were verified. The continuing CF and percent difference (%D) calculations were also verified.

III. Blanks

In method blanks, B5D0010-BLK1 and B5D0010-BLK2, methane was detected below the contract required quantitation limit (CRQL), equivalent to the reporting limit (RL). The detected methane result in sample RMW-02-50-0305 was greater than the CRQL but less than five times the blank result and therefore, the sample result was qualified as non-detect at the detected concentration and flagged "U".

Method blank B5D0027-BLK1 contained methane at the CRQL. All associated methane results were greater than five times the blank concentration and therefore, no flags were applied.

IV. Surrogates

The acetylene surrogate recovery associated with the methane analysis for sample BPZ-01-0305 exceeded the laboratory control limit. The methane detected result was qualified as estimated and flagged "J". The surrogate recovery calculation was verified.

V. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate (MS/MSD) was performed on sample RMW-02-50-0305. All acceptance criteria were met. The MS/MSD recoveries and relative percent difference (RPD) calculations were verified.

VI. Laboratory Control Sample

All acceptance criteria were met and the laboratory control sample calculation was validated.

VII. Target Compound Identification

Compound identification was verified by raw data review.

VIII. Compound Quantitation and Reported CRQLs

Several samples required a dilution due to the concentration of methane.

Quantitation and accuracy of reported CRQLs were verified by raw data review on a percentage of the detected sample results.

IX. Field Blanks

No field blanks in this SDG.

X. Field Duplicates

Samples MW-91-0305 and RMW-08-15-0305 were designated as a field duplicate pair. All acceptance criteria were met.

XI. Laboratory Duplicates

No laboratory duplicates in this SDG.

XII. System Performance

The system performance was evaluated by reviewing the chromatographic data for this SDG.

XIII. Overall Assessment of Data

- The ICV for methane exceeded the QC limit and associated methane results were qualified as estimated.
- One sample was not properly preserved and the sample results were qualified as estimated.
- The completeness objectives were met for all method/analyte combinations.
- The method used for analysis is a modification of method RSK-175. The method is modified to perform a direct comparison between analysis of standards, QC samples and field samples. The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (UG/L)	FINAL FLAG	VALIDATION COMMENTS
BPZ-01-0305	ETHENE	1.0	UJ	NotPres
BPZ-01-0305	ETHANE	1.4	J	NotPres
BPZ-01-0305	METHANE	4400	J	Sur>UCL, ICVS>UCL, NotPres
MW-91-0305	METHANE	240	J	ICVS>UCL
RMW-02-13-0305	METHANE	18000	J	ICVS>UCL
RMW-02-32-0305	METHANE	17000	J	ICVS>UCL
RMW-02-50-0305	METHANE	1.5	U	LB<RL, ICVS>UCL
RMW-08-15-0305	METHANE	260	J	ICVS>UCL

ICVS>UCL = Initial calibration verification standard recovery greater than upper control limit
LB<RL = Laboratory blank contamination less than the RL
NotPres = Sample not properly preserved in the field
Sur>UCL = Surrogate recovery greater than upper limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	April 21, 2005
Report Date:	May 18, 2005
Parameters:	RSK-175
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05112A

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901038. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The sample was received at the laboratory with the appropriate CoC forms and custody seals intact.

The cooler temperature exceeded the recommended control limits. The sample did not have sufficient time to cool between time collected and time received. Data were not qualified for this reason.

Holding-time requirements were met.

II. Calibration

All calibration criteria were met.

III. Blanks

A method blank was analyzed as required. No contamination was detected.

IV. Surrogates

All acceptance criteria were met.

V. Matrix Spike/Matrix Spike Duplicate

No matrix spike or matrix spike duplicates in this SDG.

VI. Laboratory Control Sample

All acceptance criteria were met.

VII. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

VIII. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to the reporting limits (RL), was not within the scope of the data review for this SDG.

IX. Field Blanks

No field blanks in this SDG.

X. Field Duplicates

No field duplicates in this SDG.

XI. Laboratory Duplicates

No laboratory duplicates in this SDG.

XII. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XIII. Overall Assessment of Data

- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 15, 16, 17 and 18, 2005
Report Date:	April 14, 2005
Parameters:	GC/MS Semivolatile SIM for Selected Compounds
Laboratory:	Envirosystems, Inc.
Sample Delivery Group:	Y1RY5

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by EPA Method OLM04.3 for a subset of semivolatile organic compounds (SVOC) compounds using project-approved modifications described in Modification Reference Number 1183.0. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Organic Data Review (NFG), October 1999, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier II data validation. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed contract laboratory program (CLP) data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

The collection date of sample Y1S14 was incorrectly listed on the CoC as March 14, 2005. The correct date was March 15, 2005.

All technical holding-time requirements were met.

II. Calibration

The laboratory did not meet the following selected ion monitoring (SIM) contract required quantitation limits (CRQL): bis(2-chloroethoxy)methane at 0.01ug/L, nitrobenzene at 0.01ug/L and pentachlorophenol at 0.50ug/L. The laboratory achieved CRQLs of 0.1ug/L, 0.1ug/L and 1.0ug/L, respectively.

Pentachlorophenol did not meet the initial calibration (ICAL) requirement of five standards as stated in Modification Reference Number 1183.0. Only four standards were used; no flags were applied.

All tune criteria were met.

No ICAL criteria were stated in Modification Reference Number 1183.0; however, the following analytes exceeded the NFG relative standard deviation (RSD) criteria of 30 percent: pentachlorophenol (82%), 2,4,6-trichlorophenol (32%), 3,3'-dichlorobenzidine (44%), benzo(a)anthracene (81%) and benzo(g,h,i)perylene (35%). The minimum response factor of 0.01 was met. No flags were applied.

Pentachlorophenol did not meet the maximum percent difference (%D) criteria for the continuing calibration as stated in Modification Reference Number 1183.0. Pentachlorophenol was biased low in the continuing calibration verification standards at 71%D and 63%D. Associated sample detects were flagged "J" and non-detects were flagged "UJ".

III. Method Blank

Method blanks (MB) were analyzed as required. MBs SBLK64 and SBLK70 contained detections of bis(2-chloroethyl)ether and bis(2-ethylhexyl)phthalate above the CRQL. Benzo(a)anthracene was detected above the CRQL in MB SBLK70. The detected sample results greater than the CRQL but less than five times the blank concentrations were flagged "U" at the sample concentration. The detected sample results less than the CRQL and less than 5 times (10 times for common lab contaminants) the blank concentrations were flagged "U" at the respective CRQL.

IV. Laboratory Control Sample

No laboratory control sample data; assumed to be performed under full scan.

V. Matrix Spike/Matrix Spike Duplicate

Matrix spike/matrix spike duplicates were not required as per Modification Reference Number 1183.0.

VI. Surrogate Recovery

Surrogate recoveries were within acceptance criteria.

VII. Internal Standard Recovery

Internal standard recoveries were within criteria except for acenaphthene-d10 in sample Y1RZ9. The internal standard recovery was biased high and an associated sample detect was flagged "J".

VIII. Field Duplicates

Samples Y1S00 and Y1S01 were designated as a field duplicate pair. All acceptance criteria were met.

IX. Field Blanks

This SDG contained two equipment blanks (EB), Y1S14 and Y1S15. Bis(2-chloroethyl)ether, bis(2-ethylhexyl)phthalate and benzo(a) anthracene were detected above the CRQL in each of the EBs. The detected sample results greater than the CRQL but less than five times the blank concentrations were flagged "U" at the sample concentration. The detected sample results less than the CRQL and less than 5 times (10 times for common lab contaminants) the blank concentrations were flagged "U" at the respective CRQL.

X. Target Analyte Quantitation

Several samples required a dilution due to the concentration of target analytes above the calibration range.

Raw data were not reviewed.

XI. Overall Assessment of Data

- No ICAL criteria were stated in Modification Reference Number 1183.0.
- Pentachlorophenol was biased low in continuing calibration verification standards at 71%D and 63%D and resulted in qualification of sample results as estimated concentrations.
- The laboratory did not meet the following CRQLs: bis(2-chloroethoxy)methane at 0.01ug/L, nitrobenzene at 0.01ug/L and pentachlorophenol at 0.50ug/L. The laboratory achieved CRQLs of 0.1ug/L, 0.1ug/L and 1.0ug/L, respectively.
- Three target analytes were detected in the associated MB and EBs and resulted in detected data qualified as non-detects.
- An internal standard recovery was biased high in a sample and an associated sample detect was flagged as an estimated concentration.
- Pentachlorophenol did not meet the ICAL requirement of five standards as stated in Modification Reference Number 1183.0. Only four standards were used.
- There were rounding differences in the reported result between the hardcopy and electronic data.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1RY2	Benzo(a)anthracene	0.04	U	LB>RL
Y1RY2	bis(2-Chloroethyl)ether	0.1	U	LB>RL
Y1RY2	bis(2-Ethylhexyl) phthalate	4.8	U	LB>RL
Y1RY2	Pentachlorophenol	1	UJ	CCV<LCL
Y1RY3	Benzo(a)anthracene	0.04	U	LB>RL
Y1RY3	bis(2-Chloroethyl)ether	0.1	U	LB>RL
Y1RY3	bis(2-Ethylhexyl) phthalate	4.8	U	LB>RL
Y1RY3	Pentachlorophenol	1	UJ	CCV<LCL
Y1RY5	Benzo(a)anthracene	0.04	U	EB>RL
Y1RY5	Benzo(a)anthracene	0.04	U	LB>RL
Y1RY5	bis(2-Chloroethyl)ether	0.1	U	EB>RL
Y1RY5	bis(2-Chloroethyl)ether	0.1	U	LB>RL
Y1RY5	bis(2-Ethylhexyl) phthalate	4.8	U	EB>RL
Y1RY5	bis(2-Ethylhexyl) phthalate	4.8	U	LB>RL
Y1RY5	Pentachlorophenol	0.5	J	CCV<LCL
Y1RY6	Benzo(a)anthracene	0.04	U	EB>RL
Y1RY6	Benzo(a)anthracene	0.04	U	LB>RL
Y1RY6	bis(2-Chloroethyl)ether	0.1	U	EB>RL
Y1RY6	bis(2-Chloroethyl)ether	0.1	U	LB>RL
Y1RY6	bis(2-Ethylhexyl) phthalate	4.8	U	EB>RL
Y1RY6	bis(2-Ethylhexyl) phthalate	4.8	U	LB>RL
Y1RY6	Pentachlorophenol	1	UJ	CCV<LCL
Y1RY8	bis(2-Chloroethyl)ether	0.08	U	LB>RL
Y1RY8	bis(2-Ethylhexyl) phthalate	4.8	U	LB>RL
Y1RY8	Pentachlorophenol	1	UJ	CCV<LCL
Y1RY9	bis(2-Chloroethyl)ether	0.08	U	LB>RL
Y1RY9	bis(2-Ethylhexyl) phthalate	4.8	U	LB>RL
Y1RY9	Pentachlorophenol	1	UJ	CCV<LCL
Y1RZ0	Benzo(a)anthracene	0.04	U	LB>RL
Y1RZ0	bis(2-Chloroethyl)ether	0.1	U	LB>RL
Y1RZ0	bis(2-Ethylhexyl) phthalate	4.8	U	LB>RL
Y1RZ0	Pentachlorophenol	1	UJ	CCV<LCL
Y1RZ1	Benzo(a)anthracene	0.04	U	LB>RL
Y1RZ1	bis(2-Chloroethyl)ether	0.1	U	LB>RL
Y1RZ1	bis(2-Ethylhexyl) phthalate	4.8	U	LB>RL
Y1RZ1	Pentachlorophenol	1	UJ	CCV<LCL
Y1RZ5	Benzo(a)anthracene	0.04	U	EB>RL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1RZ5	Benzo(a)anthracene	0.04	U	LB>RL
Y1RZ5	bis(2-Chloroethyl)ether	0.09	U	EB>RL
Y1RZ5	bis(2-Chloroethyl)ether	0.09	U	LB>RL
Y1RZ5	bis(2-Ethylhexyl) phthalate	4.8	U	EB>RL
Y1RZ5	bis(2-Ethylhexyl) phthalate	4.8	U	LB>RL
Y1RZ5	Pentachlorophenol	1	UJ	CCV<LCL
Y1RZ6	bis(2-Chloroethyl)ether	0.1	U	EB>RL
Y1RZ6	bis(2-Chloroethyl)ether	0.1	U	LB>RL
Y1RZ6	bis(2-Ethylhexyl) phthalate	4.8	U	EB>RL
Y1RZ6	bis(2-Ethylhexyl) phthalate	4.8	U	LB>RL
Y1RZ6	Pentachlorophenol	1	UJ	CCV<LCL
Y1RZ7	bis(2-Chloroethyl)ether	0.09	U	LB>RL
Y1RZ7	Pentachlorophenol	1	UJ	CCV<LCL
Y1RZ9	2,4,6-Trichlorophenol	0.4	J	IS>UCL
Y1RZ9	Benzo(a)anthracene	0.04	U	EB>RL
Y1RZ9	Benzo(a)anthracene	0.04	U	LB>RL
Y1RZ9	bis(2-Chloroethyl)ether	0.3	U	EB>RL
Y1RZ9	bis(2-Chloroethyl)ether	0.3	U	LB>RL
Y1RZ9	bis(2-Ethylhexyl) phthalate	4.8	U	EB>RL
Y1RZ9	bis(2-Ethylhexyl) phthalate	4.8	U	LB>RL
Y1RZ9	Pentachlorophenol	1	UJ	CCV<LCL
Y1S00	bis(2-Chloroethyl)ether	0.1	U	EB>RL
Y1S00	bis(2-Chloroethyl)ether	0.1	U	LB>RL
Y1S00	bis(2-Ethylhexyl) phthalate	4.8	U	EB>RL
Y1S00	bis(2-Ethylhexyl) phthalate	4.8	U	LB>RL
Y1S00	Pentachlorophenol	1	UJ	CCV<LCL
Y1S01	bis(2-Chloroethyl)ether	0.1	U	EB>RL
Y1S01	bis(2-Chloroethyl)ether	0.1	U	LB>RL
Y1S01	bis(2-Ethylhexyl) phthalate	4.8	U	EB>RL
Y1S01	bis(2-Ethylhexyl) phthalate	4.8	U	LB>RL
Y1S01	Pentachlorophenol	1	UJ	CCV<LCL
Y1S12	Benzo(a)anthracene	0.04	U	LB>RL
Y1S12	bis(2-Chloroethyl)ether	0.1	U	LB>RL
Y1S12	bis(2-Ethylhexyl) phthalate	4.8	U	LB>RL
Y1S12	Pentachlorophenol	1	UJ	CCV<LCL

CCV<LCL = Continuing calibration recovery less than lower control limit
EB>RL = Equipment blank concentration greater than the RL
IS>UCL = Internal standard response greater than upper control limit
LB>RL = Laboratory blank contamination greater than the RL

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 17, 18, 22 and 23, 2005
Report Date:	April 15, 2005
Parameters:	GC/MS Semivolatile SIM for Selected Compounds
Laboratory:	Envirosystems, Inc.
Sample Delivery Group:	Y1S17

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by EPA Method OLM04.3 for a subset of semivolatile organic compounds (SVOC) using project-approved modifications described in Modification Reference Number 1183.0. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Organic Data Review (NFG), October 1999, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier II data validation. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed contract laboratory program (CLP) data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All technical holding-time requirements were met.

II. Calibration

The laboratory did not meet the following selected ion monitoring (SIM) contract required quantitation limits (CRQL): bis(2-chloroethoxy)methane at 0.01ug/L, nitrobenzene at 0.01ug/L and pentachlorophenol at 0.50ug/L. The laboratory achieved CRQLs of 0.1ug/L, 0.1ug/L and 1.0ug/L, respectively.

Pentachlorophenol did not meet the initial calibration (ICAL) requirement of five standards as stated in Modification Reference Number 1183.0. Only four standards were used; no flags were applied.

All tune criteria were met.

No ICAL criteria were stated in Modification Reference Number 1183.0; however, the following analytes exceeded the NFG relative standard deviation (RSD) criteria of 30 percent: pentachlorophenol (82%), 2,4,6-trichlorophenol (32%), 3,3'-dichlorobenzidine (44%), benzo(a)anthracene (81%) and benzo(g,h,i)perylene (35%). The minimum response factor of 0.01 was met. No flags were applied.

Pentachlorophenol did not meet the maximum percent difference (%D) criteria for the continuing calibration as stated in Modification Reference Number 1183.0. Pentachlorophenol was biased low in a continuing calibration verification standard at 71%D. Associated sample detects were flagged "J" and non-detects were flagged "UJ".

III. Method Blank

Method blanks (MB) were analyzed as required. MBs SBLK71 and SBLK84 contained bis(2-chloroethyl)ether and bis(2-ethylhexyl)phthalate. The detected sample results greater than the CRQL but less than five times the blank concentrations were flagged "U" at the sample concentration. The detected sample results less than the CRQL and less than 5 times (10 times for common lab contaminants) the blank concentrations were flagged "U" at the respective CRQL.

IV. Laboratory Control Sample

No laboratory control sample data; assumed to be performed under full scan.

V. Matrix Spike/Matrix Spike Duplicate

Matrix spike/matrix spike duplicates were not required as per Modification Reference Number 1183.0.

VI. Surrogate Recovery

A surrogate recovery was below criteria in sample Y1RY7. Detected sample results were flagged "J" and non-detected results were flagged "UJ".

VII. Internal Standard Recovery

Internal standard recoveries were within criteria.

VIII. Field Duplicates

Samples Y1RZ2 and Y1RZ3 were designated as a field duplicate. All acceptance criteria were met.

IX. Field Blanks

This SDG contained four equipment blanks (EB). Bis(2-chloroethyl)ether and bis(2-ethylhexyl)phthalate were detected in all of the field blanks. Field blanks Y1S16, Y1S17 and Y1S18 contained nitrobenzene below the CRQL and field blanks Y1S18 and Y1S19 contained 1,4-dioxane above the CRQL. The detected sample results greater than the CRQL but less than five times the blank concentrations were flagged "U" at the sample concentration. The detected sample results less than the CRQL and less than 5 times (10 times for common lab contaminants) the blank concentrations were flagged "U" at the respective CRQL.

X. Target Analyte Quantitation

Several samples required a dilution due to the concentration of target analytes above the calibration range.

Raw data were not reviewed.

XI. Overall Assessment of Data

- No ICAL criteria were stated in Modification Reference Number 1183.0.
- Pentachlorophenol was biased low in a continuing calibration verification standard at 71%D and resulted in qualification of sample results as estimated concentrations.
- Four target analytes were detected in the associated MB and/or EBs and resulted in detected data qualified as non-detects.
- A surrogate was recovered below criteria in sample Y1RY7. Sample results were qualified as estimated concentrations.
- The laboratory did not meet the following CRQLs: bis(2-chloroethoxy)methane at 0.01ug/L, nitrobenzene at 0.01ug/L and pentachlorophenol at 0.50ug/L. The laboratory achieved CRQLs of 0.1ug/L, 0.1ug/L and 1.0ug/L, respectively.
- Pentachlorophenol did not meet the ICAL requirement of five standards as stated in Modification Reference Number 1183.0. Only four standards were used.
- There were rounding differences in the reported result between the hardcopy and electronic data.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1RY7	2,4,6-Trichlorophenol	0.1	UJ	Sur<LCL
Y1RY7	2-Nitroaniline	0.1	UJ	Sur<LCL
Y1RY7	3,3'-Dichlorobenzidine	0.1	UJ	Sur<LCL
Y1RY7	Atrazine	0.1	UJ	Sur<LCL
Y1RY7	Benzo(a)anthracene	0.01	UJ	Sur<LCL
Y1RY7	Benzo(a)pyrene	0.01	J	Sur<LCL
Y1RY7	Benzo(b)fluoranthene	0.02	J	Sur<LCL
Y1RY7	Benzo(g,h,i)perylene	0.02	J	Sur<LCL
Y1RY7	Benzo(k)fluoranthene	0.01	UJ	Sur<LCL
Y1RY7	bis(2-Chloroethoxy)methane	0.2	J	Sur<LCL
Y1RY7	bis(2-Chloroethyl)ether	0.1	U	EB>RL
Y1RY7	bis(2-Chloroethyl)ether	0.1	U	LB>RL
Y1RY7	bis(2-Chloroethyl)ether	0.1	U	Sur<LCL
Y1RY7	bis(2-Ethylhexyl)phthalate	4.8	U	EB>RL
Y1RY7	bis(2-Ethylhexyl)phthalate	4.8	U	LB>RL
Y1RY7	bis(2-Ethylhexyl)phthalate	4.8	U	Sur<LCL
Y1RY7	Carbazole	0.1	UJ	Sur<LCL
Y1RY7	Dibenz(a,h)anthracene	0.01	UJ	Sur<LCL
Y1RY7	Hexachlorobenzene	0.1	UJ	Sur<LCL
Y1RY7	Hexachlorobutadiene	0.1	UJ	Sur<LCL
Y1RY7	Hexachloroethane	0.1	UJ	Sur<LCL
Y1RY7	Indeno(1,2,3-cd)pyrene	0.01	J	Sur<LCL
Y1RY7	Nitrobenzene	2	J	Sur<LCL
Y1RY7	N-Nitroso-di-n propylamine	0.01	UJ	Sur<LCL
Y1RY7	Pentachlorophenol	1	UJ	CCV<LCL
Y1RY7	Pentachlorophenol	1	UJ	Sur<LCL
Y1RZ2	1,4-Dioxane	5	U	EB>RL
Y1RZ2	bis(2-Chloroethyl)ether	0.1	U	EB>RL
Y1RZ2	bis(2-Chloroethyl)ether	0.1	U	LB>RL
Y1RZ2	bis(2-Ethylhexyl)phthalate	4.8	U	EB>RL
Y1RZ2	bis(2-Ethylhexyl)phthalate	4.8	U	LB>RL
Y1RZ2	Pentachlorophenol	1	UJ	CCV<LCL
Y1RZ3	1,4-Dioxane	5	U	EB>RL
Y1RZ3	bis(2-Chloroethyl)ether	0.1	U	EB>RL
Y1RZ3	bis(2-Chloroethyl)ether	0.1	U	LB>RL
Y1RZ3	bis(2-Ethylhexyl)phthalate	4.8	U	EB>RL
Y1RZ3	bis(2-Ethylhexyl)phthalate	4.8	U	LB>RL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1RZ3	Pentachlorophenol	1	UJ	CCV<LCL
Y1RZ4	bis(2-Chloroethyl)ether	0.1	U	EB>RL
Y1RZ4	bis(2-Chloroethyl)ether	0.1	U	LB>RL
Y1RZ4	bis(2-Ethylhexyl)phthalate	4.8	U	EB>RL
Y1RZ4	bis(2-Ethylhexyl)phthalate	4.8	U	LB>RL
Y1RZ4	Pentachlorophenol	0.3	J	CCV<LCL
Y1S02	bis(2-Chloroethyl)ether	0.1	U	EB>RL
Y1S02	bis(2-Chloroethyl)ether	0.1	U	LB>RL
Y1S02	bis(2-Ethylhexyl)phthalate	4.8	U	EB>RL
Y1S02	bis(2-Ethylhexyl)phthalate	4.8	U	LB>RL
Y1S02	Pentachlorophenol	2	J	CCV<LCL
Y1S03	1,4-Dioxane	5	U	EB>RL
Y1S03	bis(2-Chloroethyl)ether	0.1	U	EB>RL
Y1S03	bis(2-Chloroethyl)ether	0.1	U	LB>RL
Y1S03	bis(2-Ethylhexyl)phthalate	4.8	U	EB>RL
Y1S03	bis(2-Ethylhexyl)phthalate	4.8	U	LB>RL
Y1S03	Pentachlorophenol	0.2	J	CCV<LCL
Y1S04	1,4-Dioxane	5	U	EB>RL
Y1S04	bis(2-Chloroethyl)ether	0.1	U	EB>RL
Y1S04	bis(2-Chloroethyl)ether	0.1	U	LB>RL
Y1S04	bis(2-Ethylhexyl)phthalate	4.8	U	EB>RL
Y1S04	bis(2-Ethylhexyl)phthalate	4.8	U	LB>RL
Y1S04	Pentachlorophenol	1	UJ	CCV<LCL
Y1S05	bis(2-Ethylhexyl)phthalate	4.8	U	EB>RL
Y1S05	bis(2-Ethylhexyl)phthalate	4.8	U	LB>RL
Y1S05	Pentachlorophenol	0.5	J	CCV<LCL
Y1S06	bis(2-Chloroethyl)ether	3	U	LB>RL
Y1S06	bis(2-Ethylhexyl)phthalate	4.8	U	EB>RL
Y1S06	bis(2-Ethylhexyl)phthalate	4.8	U	LB>RL
Y1S06DL	Pentachlorophenol	85	J	CCV<LCL

CCV<LCL = Continuing calibration recovery less than lower control limit
EB>RL = Equipment blank concentration greater than RL
LB>RL = Laboratory blank contamination greater than RL
Sur<LCL = Surrogate recovery less than lower limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 31, 2005
Report Date:	April 19, 2005
Parameters:	GC/MS Semivolatile SIM for Selected Compounds
Laboratory:	Envirosystems, Inc.
Sample Delivery Group:	Y1S24

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by EPA Method OLM04.3 for a subset of semivolatile organic compounds (SVOC) using project-approved modifications described in Modification Reference Number 1183.0. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Organic Data Review (NFG), October 1999, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier II data validation. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed contract laboratory program (CLP) data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The sample was received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All technical holding-time requirements were met.

II. Calibration

The laboratory did not meet the following selected ion monitoring (SIM) contract required quantitation limits (CRQL): bis(2-chloroethoxy)methane at 0.01ug/L, nitrobenzene at 0.01ug/L and pentachlorophenol at 0.50ug/L. The laboratory achieved CRQLs of 0.1ug/L, 0.1ug/L and 1.0ug/L, respectively.

Pentachlorophenol did not meet the initial calibration (ICAL) requirement of five standards as stated in Modification Reference Number 1183.0. Only four standards were used; no flags were applied.

All tune criteria were met.

No ICAL criteria were stated in Modification Reference Number 1183.0; however, the following analytes exceeded the NFG relative standard deviation (RSD) criteria of 30 percent: pentachlorophenol (82%), 2,4,6-trichlorophenol (32%), 3,3'-dichlorobenzidine (44%), benzo(a)anthracene (81%) and benzo(g,h,i)perylene (35%). The minimum response factor of 0.01 was met. No flags were applied.

Pentachlorophenol did not meet the maximum percent difference (%D) criteria for the continuing calibration as stated in Modification Reference Number 1183.0. Pentachlorophenol was biased low in a continuing calibration verification standard at 71%D. The associated sample detect was flagged "J".

III. Method Blank

Method blanks (MB) were analyzed as required. MB SBLK91 contained detections of bis(2-chloroethyl)ether and bis(2-ethylhexyl)phthalate below the CRQL. The detected sample result for bis(2-chloroethyl)ether was greater than the CRQL but less than five times the blank concentration and flagged "U" at the sample concentration. The detected sample result for bis(2-ethylhexyl)phthalate was less than the CRQL and less than 10 times (common lab contaminant) the blank concentration and flagged "U" at the respective CRQL.

IV. Laboratory Control Sample

No laboratory control sample data provided; assumed to be performed under full scan.

V. Matrix Spike/Matrix Spike Duplicate

Matrix spike/matrix spike duplicates were not required as per Modification Reference Number 1183.0.

VI. Surrogate Recovery

Surrogate recoveries were within acceptance criteria.

VII. Internal Standard Recovery

Internal standard recoveries were within acceptance criteria.

VIII. Field Duplicates

There were no field duplicates in this SDG.

IX. Field Blanks

There were no field blanks in this SDG.

X. Target Analyte Quantitation

The sample required a dilution due to the concentration of target analytes above the calibration range.

Raw data were not reviewed.

XI. Overall Assessment of Data

- No ICAL criteria were stated in Modification Reference Number 1183.0.
- Pentachlorophenol was biased low in a continuing calibration verification standard at 71%D and resulted in qualification of the sample result s as estimated concentrations.
- The laboratory did not meet the following CRQLs: bis(2-chloroethoxy)methane at 0.01ug/L, nitrobenzene at 0.01ug/L, and pentachlorophenol at 0.50ug/L. The laboratory achieved CRQLs of 0.1ug/L, 0.1ug/L and 1.0ug/L, respectively.
- Two target analytes were detected in the associated MB and resulted in detected data qualified as non-detects.
- Pentachlorophenol did not meet the initial calibration requirement of five standards as stated in Modification Reference Number 1183.0. Only four standards were used.
- There were rounding differences in the reported result between the hardcopy and electronic data.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1S22	Pentachlorophenol	18	J	CCV>UCL
Y1S22	Bis(2-ethylhexyl)phthalate	4.8	U	LB<RL
Y1S22	Bis(2-chloroethyl)ether	0.1	U	LB<RL

CCV>UCL = Continuing calibration recovery greater than upper control limit
LB<RL = Laboratory blank contamination less than the RL

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 15, 16, 17 and 18, 2005
Report Date:	April 09, 2005
Parameters:	Semivolatile Organic Compounds
Laboratory:	Envirosystems, Inc.
Sample Delivery Group:	Y1RY2

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLM04.3 and project-approved modifications described in Modification Reference Number 1183.0 for semi-volatile organic compounds (SVOC). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier II data validation. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative, and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The sample was received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

Sample Y1S14 had a collection date of 3/14/05 when it was actually collected on 3/15/05.

Samples Y1RZ0MS and Y1RZ0MSD were extracted outside of the contract required holding time. No flags were applied.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Initial Calibration

The relative standard deviation (RSD) of the relative response factors for 3-nitroaniline and 3, 3'-dichlorobenzidine in the initial calibration exceeded 30 percent. The associated non-detected results were flagged "UJ".

IV. Continuing Calibration

2,4-Dinitrophenol, 4-nitrophenol, 4,6-dinitro-2-methylphenol, pentachlorophenol, benzo(k)fluoranthene and indeno(1,2,3-cd)pyrene were recovered below criteria in continuing calibration verification (CCV) SSTD050GL. Associated non-detected results were flagged "UJ".

3-Nitroaniline, 4-nitroaniline, butylbenzylphthalate, 3,3'-dichlorobenzidine, bis(2-ethylhexyl)phthalate and di-n-octylphthalate were recovered above criteria in CCV SSTD050GL. All associated results were non-detect and thus, no flags were applied.

Hexachlorocyclopentadiene, 3-nitroaniline, 2,4-dintrophenol, 4,6-dinitro-2-methylphenol and 3,3'-dichlorobenzidine were recovered below criteria in CCV SSTD050GW. Associated non-detected results were flagged "UJ".

Hexachlorobutadiene, pyrene, butylbenzylphthalate, bis(2-ethylhexyl)phthalate, di-n-octylphthalate and benzo(b)fluoranthene were recovered above criteria in CCV SSTD050GW. Associated detected results were flagged "J".

N-Nitroso-di-n-propylamine, 3-nitroaniline, 2,4-dinitrophenol, 4,6-dinitro-2-methylphenol and 3,3'-dichlorobenzidine were recovered below criteria in CCV SSTD050GX. Associated non-detected results were flagged "UJ".

N-Nitrosodiphenylamine, butylbenzylphthalate, di-n-octylphthalate and benzo(b)fluoranthene were recovered above criteria in CCV SSTD050GX. There were no detected results and therefore, no flags were applied.

CCV SSTD050GY had analyte recoveries outside criteria. However, this CCV was only associated with the MS and MSD and therefore, no flags were applied.

The response factor for 2,4-dinitrophenol was below criteria in CCV SSTD050GY. This was only associated with the MS and MSD and therefore, no flags were applied.

V. Blanks

A method blank was analyzed as required. Acetophenone was detected in method blanks SBLK64 and SBLK90 below the contract required quantitation limit (CRQL). Acetophenone was not detected in the associated samples and therefore, no flags were applied.

VI. Surrogates

2-Fluorobiphenyl was recovered below criteria in samples Y1RZ9, Y1S01, Y1RY8, Y1RY9, Y1RZ7 and Y1S00. Associated detected results were flagged "J" and non-detected results were flagged "UJ".

VII. Matrix Spike/Matrix Spike Duplicate

A matrix spike and matrix spike duplicate (MS/MSD) were analyzed on sample Y1RZ0. 4-Nitrophenol was recovered below criteria in the MS. A "UJ" flag was applied to the non-detected result in the parent sample. Pentachlorophenol was recovered above criteria in the MS and MSD. This analyte was not detected in the parent sample and thus, no flag was applied.

VIII. Laboratory Control Sample

The applicable Statement of Work does not require analysis of a laboratory control sample (LCS) and therefore, no LCS was analyzed.

IX. Internal Standards

All internal standard areas and retention times were within the acceptance limits.

X. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

XI. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported CRQLs was not within the scope of the data review for this SDG.

XII. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XIII. Field Blanks

There were two field blanks in this SDG. 4-Chloro-3-methylphenol was detected below the CRQL in field blanks Y1S14 and Y1S15. The analyte was not detected in the associated samples and thus, no flags were applied.

XIV. Field Duplicates

Samples Y1S00 and Y1S01 were designated as a field duplicate pair. All acceptance criteria were met.

XV. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XVI. Overall Assessment of Data

- Limited laboratory contamination was evident for this SDG.
- The responses of a several target analytes in the continuing calibration verifications were diminished by more than 25 percent. However, these shifts were not likely to have had a significant impact on the sample results.
- Surrogate and MS exceedances resulted in qualification of data.
- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1RY2	2,4-DINITROPHENOL	25	UJ	CCV<LCL
Y1RY2	3,3'-DICHLOROBENZIDINE	10	UJ	IC%RSD
Y1RY2	3-NITROANILINE	25	UJ	IC%RSD
Y1RY2	4,6-DINITRO-2-METHYLPHENOL	25	UJ	CCV<LCL
Y1RY2	4-NITROPHENOL	25	UJ	CCV<LCL
Y1RY2	BENZO(K)FLUORANTHENE	10	UJ	CCV<LCL
Y1RY2	INDENO(1,2,3-CD)-PYRENE	10	UJ	CCV<LCL
Y1RY2	PENTACHLOROPHENOL	25	UJ	CCV<LCL
Y1RY3	2,4-DINITROPHENOL	25	UJ	CCV<LCL
Y1RY3	3,3'-DICHLOROBENZIDINE	10	UJ	CCV<LCL
Y1RY3	3,3'-DICHLOROBENZIDINE	10	UJ	IC%RSD
Y1RY3	3-NITROANILINE	25	UJ	CCV<LCL
Y1RY3	3-NITROANILINE	25	UJ	IC%RSD
Y1RY3	4,6-DINITRO-2-METHYLPHENOL	25	UJ	CCV<LCL
Y1RY3	HEXACHLOROCYCLOPENTADIENE	10	UJ	CCV<LCL
Y1RY5	2,4-DINITROPHENOL	25	UJ	CCV<LCL
Y1RY5	3,3'-DICHLOROBENZIDINE	10	UJ	IC%RSD
Y1RY5	3-NITROANILINE	25	UJ	IC%RSD
Y1RY5	4,6-DINITRO-2-METHYLPHENOL	25	UJ	CCV<LCL
Y1RY5	4-NITROPHENOL	25	UJ	CCV<LCL
Y1RY5	BENZO(K)FLUORANTHENE	10	UJ	CCV<LCL
Y1RY5	INDENO(1,2,3-CD)-PYRENE	10	UJ	CCV<LCL
Y1RY5	PENTACHLOROPHENOL	25	UJ	CCV<LCL
Y1RY6	2,4-DINITROPHENOL	25	UJ	CCV<LCL
Y1RY6	3,3'-DICHLOROBENZIDINE	10	UJ	IC%RSD
Y1RY6	3-NITROANILINE	25	UJ	IC%RSD
Y1RY6	4,6-DINITRO-2-METHYLPHENOL	25	UJ	CCV<LCL
Y1RY6	4-NITROPHENOL	25	UJ	CCV<LCL
Y1RY6	BENZO(K)FLUORANTHENE	10	UJ	CCV<LCL
Y1RY6	INDENO(1,2,3-CD)-PYRENE	10	UJ	CCV<LCL
Y1RY6	PENTACHLOROPHENOL	25	UJ	CCV<LCL
Y1RY8	1,1'-BIPHENYL	10	UJ	Sur<LCL
Y1RY8	2,2'-OXYBIS(1-CHLOROPROPANE)	10	UJ	Sur<LCL
Y1RY8	2,4,5-TRICHLOROPHENOL	25	UJ	Sur<LCL
Y1RY8	2,4,6-TRICHLOROPHENOL	10	UJ	Sur<LCL
Y1RY8	2,4-DICHLOROPHENOL	10	UJ	Sur<LCL
Y1RY8	2,4-DIMETHYLPHENOL	10	UJ	Sur<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1RY8	2,4-DINITROPHENOL	25	UJ	CCV<LCL
Y1RY8	2,4-DINITROPHENOL	25	UJ	Sur<LCL
Y1RY8	2,4-DINITROTOLUENE	10	UJ	Sur<LCL
Y1RY8	2,6-DINITROTOLUENE	10	UJ	Sur<LCL
Y1RY8	2-CHLORONAPHTHALENE	10	UJ	Sur<LCL
Y1RY8	2-CHLOROPHENOL	10	UJ	Sur<LCL
Y1RY8	2-METHYLNAPHTHALENE	10	UJ	Sur<LCL
Y1RY8	2-METHYLPHENOL	10	UJ	Sur<LCL
Y1RY8	2-NITROANILINE	25	UJ	Sur<LCL
Y1RY8	2-NITROPHENOL	10	UJ	Sur<LCL
Y1RY8	3,3'-DICHLOROBENZIDINE	10	UJ	CCV<LCL
Y1RY8	3,3'-DICHLOROBENZIDINE	10	UJ	IC%RSD
Y1RY8	3,3'-DICHLOROBENZIDINE	10	UJ	Sur<LCL
Y1RY8	3-NITROANILINE	25	UJ	CCV<LCL
Y1RY8	3-NITROANILINE	25	UJ	IC%RSD
Y1RY8	3-NITROANILINE	25	UJ	Sur<LCL
Y1RY8	4,6-DINITRO-2-METHYLPHENOL	25	UJ	CCV<LCL
Y1RY8	4,6-DINITRO-2-METHYLPHENOL	25	UJ	Sur<LCL
Y1RY8	4-BROMOPHENYL-PHENYLETHER	10	UJ	Sur<LCL
Y1RY8	4-CHLORO-3-METHYLPHENOL	10	UJ	Sur<LCL
Y1RY8	4-CHLOROANILINE	10	UJ	Sur<LCL
Y1RY8	4-CHLOROPHENYL-PHENYL ETHER	10	UJ	Sur<LCL
Y1RY8	4-METHYLPHENOL	10	UJ	Sur<LCL
Y1RY8	4-NITROANILINE	25	UJ	Sur<LCL
Y1RY8	4-NITROPHENOL	25	UJ	Sur<LCL
Y1RY8	ACENAPHTHENE	10	UJ	Sur<LCL
Y1RY8	ACENAPHTHYLENE	10	UJ	Sur<LCL
Y1RY8	ACETOPHENONE	10	UJ	Sur<LCL
Y1RY8	ANTHRACENE	10	UJ	Sur<LCL
Y1RY8	ATRAZINE	10	UJ	Sur<LCL
Y1RY8	BENZALDEHYDE	10	UJ	Sur<LCL
Y1RY8	BENZO(A)ANTHRACENE	10	UJ	Sur<LCL
Y1RY8	BENZO(A)PYRENE	10	UJ	Sur<LCL
Y1RY8	BENZO(B)FLUORANTHENE	10	UJ	Sur<LCL
Y1RY8	BENZO(G,H,I)PERYLENE	10	UJ	Sur<LCL
Y1RY8	BENZO(K)FLUORANTHENE	10	UJ	Sur<LCL
Y1RY8	BIS(2-CHLOROETHOXY)METHANE	10	UJ	Sur<LCL
Y1RY8	BIS-(2-CHLOROETHYL)ETHER	10	UJ	Sur<LCL
Y1RY8	BIS(2-ETHYLHEXYL)PHTHALATE	1	J	Sur<LCL
Y1RY8	BUTYLBENZYLPHTHALATE	10	UJ	Sur<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1RY8	CAPROLACTAM	10	UJ	Sur<LCL
Y1RY8	CARBAZOLE	10	UJ	Sur<LCL
Y1RY8	CHRYSENE	10	UJ	Sur<LCL
Y1RY8	DIBENZO(A,H)-ANTHRACENE	10	UJ	Sur<LCL
Y1RY8	DIBENZOFURAN	10	UJ	Sur<LCL
Y1RY8	DIETHYLPHTHALATE	10	UJ	Sur<LCL
Y1RY8	DIMETHYLPHTHALATE	10	UJ	Sur<LCL
Y1RY8	DI-N-BUTYLPHTHALATE	10	UJ	Sur<LCL
Y1RY8	DI-N-OCTYLPHTHALATE	10	UJ	Sur<LCL
Y1RY8	FLUORANTHENE	10	UJ	Sur<LCL
Y1RY8	FLUORENE	10	UJ	Sur<LCL
Y1RY8	HEXACHLOROBENZENE	10	UJ	Sur<LCL
Y1RY8	HEXACHLOROBUTADIENE	10	UJ	Sur<LCL
Y1RY8	HEXACHLOROCYCLOPENTADIENE	10	UJ	Sur<LCL
Y1RY8	HEXACHLOROETHANE	10	UJ	Sur<LCL
Y1RY8	INDENO(1,2,3-CD)-PYRENE	10	UJ	Sur<LCL
Y1RY8	ISOPHORONE	10	UJ	Sur<LCL
Y1RY8	NAPHTHALENE	10	UJ	Sur<LCL
Y1RY8	NITROBENZENE	10	UJ	Sur<LCL
Y1RY8	N-NITROSO DIPHENYLAMINE	10	UJ	Sur<LCL
Y1RY8	N-NITROSO-DI-N PROPYLAMINE	10	UJ	CCV<LCL
Y1RY8	N-NITROSO-DI-N PROPYLAMINE	10	UJ	Sur<LCL
Y1RY8	PENTACHLOROPHENOL	25	UJ	Sur<LCL
Y1RY8	PHENANTHRENE	10	UJ	Sur<LCL
Y1RY8	PHENOL	10	UJ	Sur<LCL
Y1RY8	PYRENE	10	UJ	Sur<LCL
Y1RY9	1,1'-BIPHENYL	10	UJ	Sur<LCL
Y1RY9	2,2'-OXYBIS(1-CHLOROPROPANE)	10	UJ	Sur<LCL
Y1RY9	2,4,5-TRICHLOROPHENOL	25	UJ	Sur<LCL
Y1RY9	2,4,6-TRICHLOROPHENOL	10	UJ	Sur<LCL
Y1RY9	2,4-DICHLOROPHENOL	10	UJ	Sur<LCL
Y1RY9	2,4-DIMETHYLPHENOL	10	UJ	Sur<LCL
Y1RY9	2,4-DINITROPHENOL	25	UJ	CCV<LCL
Y1RY9	2,4-DINITROPHENOL	25	UJ	Sur<LCL
Y1RY9	2,4-DINITROTOLUENE	10	UJ	Sur<LCL
Y1RY9	2,6-DINITROTOLUENE	10	UJ	Sur<LCL
Y1RY9	2-CHLORONAPHTHALENE	10	UJ	Sur<LCL
Y1RY9	2-CHLOROPHENOL	10	UJ	Sur<LCL
Y1RY9	2-METHYLNAPHTHALENE	10	UJ	Sur<LCL
Y1RY9	2-METHYLPHENOL	10	UJ	Sur<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1RY9	2-NITROANILINE	25	UJ	Sur<LCL
Y1RY9	2-NITROPHENOL	10	UJ	Sur<LCL
Y1RY9	3,3'-DICHLOROBENZIDINE	10	UJ	CCV<LCL
Y1RY9	3,3'-DICHLOROBENZIDINE	10	UJ	IC%RSD
Y1RY9	3,3'-DICHLOROBENZIDINE	10	UJ	Sur<LCL
Y1RY9	3-NITROANILINE	25	UJ	CCV<LCL
Y1RY9	3-NITROANILINE	25	UJ	IC%RSD
Y1RY9	3-NITROANILINE	25	UJ	Sur<LCL
Y1RY9	4,6-DINITRO-2-METHYLPHENOL	25	UJ	CCV<LCL
Y1RY9	4,6-DINITRO-2-METHYLPHENOL	25	UJ	Sur<LCL
Y1RY9	4-BROMOPHENYL-PHENYLETHER	10	UJ	Sur<LCL
Y1RY9	4-CHLORO-3-METHYLPHENOL	10	UJ	Sur<LCL
Y1RY9	4-CHLOROANILINE	10	UJ	Sur<LCL
Y1RY9	4-CHLOROPHENYL-PHENYL ETHER	10	UJ	Sur<LCL
Y1RY9	4-METHYLPHENOL	10	UJ	Sur<LCL
Y1RY9	4-NITROANILINE	25	UJ	Sur<LCL
Y1RY9	4-NITROPHENOL	25	UJ	Sur<LCL
Y1RY9	ACENAPHTHENE	10	UJ	Sur<LCL
Y1RY9	ACENAPHTHYLENE	10	UJ	Sur<LCL
Y1RY9	ACETOPHENONE	10	UJ	Sur<LCL
Y1RY9	ANTHRACENE	10	UJ	Sur<LCL
Y1RY9	ATRAZINE	10	UJ	Sur<LCL
Y1RY9	BENZALDEHYDE	10	UJ	Sur<LCL
Y1RY9	BENZO(A)ANTHRACENE	10	UJ	Sur<LCL
Y1RY9	BENZO(A)PYRENE	10	UJ	Sur<LCL
Y1RY9	BENZO(B)FLUORANTHENE	10	UJ	Sur<LCL
Y1RY9	BENZO(G,H,I)PERYLENE	10	UJ	Sur<LCL
Y1RY9	BENZO(K)FLUORANTHENE	10	UJ	Sur<LCL
Y1RY9	BIS(2-CHLOROETHOXY)METHANE	10	UJ	Sur<LCL
Y1RY9	BIS-(2-CHLOROETHYL)ETHER	10	UJ	Sur<LCL
Y1RY9	BIS(2-ETHYLHEXYL)PHTHALATE	10	UJ	Sur<LCL
Y1RY9	BUTYLBENZYLPHTHALATE	10	UJ	Sur<LCL
Y1RY9	CAPROLACTAM	10	UJ	Sur<LCL
Y1RY9	CARBAZOLE	10	UJ	Sur<LCL
Y1RY9	CHRYSENE	10	UJ	Sur<LCL
Y1RY9	DIBENZO(A,H)-ANTHRACENE	10	UJ	Sur<LCL
Y1RY9	DIBENZOFURAN	10	UJ	Sur<LCL
Y1RY9	DIETHYLPHTHALATE	10	UJ	Sur<LCL
Y1RY9	DIMETHYLPHTHALATE	10	UJ	Sur<LCL
Y1RY9	DI-N-BUTYLPHTHALATE	10	UJ	Sur<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1RY9	DI-N-OCTYLPHTHALATE	10	UJ	Sur<LCL
Y1RY9	FLUORANTHENE	10	UJ	Sur<LCL
Y1RY9	FLUORENE	10	UJ	Sur<LCL
Y1RY9	HEXACHLOROBENZENE	10	UJ	Sur<LCL
Y1RY9	HEXACHLOROBUTADIENE	10	UJ	Sur<LCL
Y1RY9	HEXACHLOROCYCLOPENTADIENE	10	UJ	Sur<LCL
Y1RY9	HEXACHLOROETHANE	10	UJ	Sur<LCL
Y1RY9	INDENO(1,2,3-CD)-PYRENE	10	UJ	Sur<LCL
Y1RY9	ISOPHORONE	10	UJ	Sur<LCL
Y1RY9	NAPHTHALENE	10	UJ	Sur<LCL
Y1RY9	NITROBENZENE	10	UJ	Sur<LCL
Y1RY9	N-NITROSO DIPHENYLAMINE	10	UJ	Sur<LCL
Y1RY9	N-NITROSO-DI-N PROPYLAMINE	10	UJ	CCV<LCL
Y1RY9	N-NITROSO-DI-N PROPYLAMINE	10	UJ	Sur<LCL
Y1RY9	PENTACHLOROPHENOL	25	UJ	Sur<LCL
Y1RY9	PHENANTHRENE	10	UJ	Sur<LCL
Y1RY9	PHENOL	10	UJ	Sur<LCL
Y1RY9	PYRENE	10	UJ	Sur<LCL
Y1RZ0	2,4-DINITROPHENOL	25	UJ	CCV<LCL
Y1RZ0	3,3'-DICHLOROBENZIDINE	10	UJ	IC%RSD
Y1RZ0	3-NITROANILINE	25	UJ	IC%RSD
Y1RZ0	4,6-DINITRO-2-METHYLPHENOL	25	UJ	CCV<LCL
Y1RZ0	4-NITROPHENOL	25	UJ	CCV<LCL
Y1RZ0	4-NITROPHENOL	25	UJ	MS<LCL
Y1RZ0	BENZO(K)FLUORANTHENE	10	UJ	CCV<LCL
Y1RZ0	INDENO(1,2,3-CD)-PYRENE	10	UJ	CCV<LCL
Y1RZ0	PENTACHLOROPHENOL	25	UJ	CCV<LCL
Y1RZ1	2,4-DINITROPHENOL	25	UJ	CCV<LCL
Y1RZ1	3,3'-DICHLOROBENZIDINE	10	UJ	IC%RSD
Y1RZ1	3-NITROANILINE	25	UJ	IC%RSD
Y1RZ1	4,6-DINITRO-2-METHYLPHENOL	25	UJ	CCV<LCL
Y1RZ1	4-NITROPHENOL	25	UJ	CCV<LCL
Y1RZ1	BENZO(K)FLUORANTHENE	10	UJ	CCV<LCL
Y1RZ1	INDENO(1,2,3-CD)-PYRENE	10	UJ	CCV<LCL
Y1RZ1	PENTACHLOROPHENOL	25	UJ	CCV<LCL
Y1RZ5	2,4-DINITROPHENOL	25	UJ	CCV<LCL
Y1RZ5	3,3'-DICHLOROBENZIDINE	10	UJ	CCV<LCL
Y1RZ5	3,3'-DICHLOROBENZIDINE	10	UJ	IC%RSD
Y1RZ5	3-NITROANILINE	25	UJ	CCV<LCL
Y1RZ5	3-NITROANILINE	25	UJ	IC%RSD

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1RZ5	4,6-DINITRO-2-METHYLPHENOL	25	UJ	CCV<LCL
Y1RZ5	HEXACHLOROCYCLOPENTADIENE	10	UJ	CCV<LCL
Y1RZ6	2,4-DINITROPHENOL	25	UJ	CCV<LCL
Y1RZ6	3,3'-DICHLOROBENZIDINE	10	UJ	CCV<LCL
Y1RZ6	3,3'-DICHLOROBENZIDINE	10	UJ	IC%RSD
Y1RZ6	3-NITROANILINE	25	UJ	CCV<LCL
Y1RZ6	3-NITROANILINE	25	UJ	IC%RSD
Y1RZ6	4,6-DINITRO-2-METHYLPHENOL	25	UJ	CCV<LCL
Y1RZ6	HEXACHLOROCYCLOPENTADIENE	10	UJ	CCV<LCL
Y1RZ7	1,1'-BIPHENYL	10	UJ	Sur<LCL
Y1RZ7	2,2'-OXYBIS(1-CHLOROPROPANE)	10	UJ	Sur<LCL
Y1RZ7	2,4,5-TRICHLOROPHENOL	25	UJ	Sur<LCL
Y1RZ7	2,4,6-TRICHLOROPHENOL	10	UJ	Sur<LCL
Y1RZ7	2,4-DICHLOROPHENOL	10	UJ	Sur<LCL
Y1RZ7	2,4-DIMETHYLPHENOL	10	UJ	Sur<LCL
Y1RZ7	2,4-DINITROPHENOL	25	UJ	CCV<LCL
Y1RZ7	2,4-DINITROPHENOL	25	UJ	Sur<LCL
Y1RZ7	2,4-DINITROTOLUENE	10	UJ	Sur<LCL
Y1RZ7	2,6-DINITROTOLUENE	10	UJ	Sur<LCL
Y1RZ7	2-CHLORONAPHTHALENE	10	UJ	Sur<LCL
Y1RZ7	2-CHLOROPHENOL	10	UJ	Sur<LCL
Y1RZ7	2-METHYLNAPHTHALENE	10	UJ	Sur<LCL
Y1RZ7	2-METHYLPHENOL	10	UJ	Sur<LCL
Y1RZ7	2-NITROANILINE	25	UJ	Sur<LCL
Y1RZ7	2-NITROPHENOL	10	UJ	Sur<LCL
Y1RZ7	3,3'-DICHLOROBENZIDINE	10	UJ	CCV<LCL
Y1RZ7	3,3'-DICHLOROBENZIDINE	10	UJ	IC%RSD
Y1RZ7	3,3'-DICHLOROBENZIDINE	10	UJ	Sur<LCL
Y1RZ7	3-NITROANILINE	25	UJ	CCV<LCL
Y1RZ7	3-NITROANILINE	25	UJ	IC%RSD
Y1RZ7	3-NITROANILINE	25	UJ	Sur<LCL
Y1RZ7	4,6-DINITRO-2-METHYLPHENOL	25	UJ	CCV<LCL
Y1RZ7	4,6-DINITRO-2-METHYLPHENOL	25	UJ	Sur<LCL
Y1RZ7	4-BROMOPHENYL-PHENYLETHER	10	UJ	Sur<LCL
Y1RZ7	4-CHLORO-3-METHYLPHENOL	10	UJ	Sur<LCL
Y1RZ7	4-CHLOROANILINE	10	UJ	Sur<LCL
Y1RZ7	4-CHLOROPHENYL-PHENYL ETHER	10	UJ	Sur<LCL
Y1RZ7	4-METHYLPHENOL	10	UJ	Sur<LCL
Y1RZ7	4-NITROANILINE	25	UJ	Sur<LCL
Y1RZ7	4-NITROPHENOL	25	UJ	Sur<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1RZ7	ACENAPHTHENE	10	UJ	Sur<LCL
Y1RZ7	ACENAPHTHYLENE	10	UJ	Sur<LCL
Y1RZ7	ACETOPHENONE	10	UJ	Sur<LCL
Y1RZ7	ANTHRACENE	10	UJ	Sur<LCL
Y1RZ7	ATRAZINE	10	UJ	Sur<LCL
Y1RZ7	BENZALDEHYDE	10	UJ	Sur<LCL
Y1RZ7	BENZO(A)ANTHRACENE	10	UJ	Sur<LCL
Y1RZ7	BENZO(A)PYRENE	10	UJ	Sur<LCL
Y1RZ7	BENZO(B)FLUORANTHENE	10	UJ	Sur<LCL
Y1RZ7	BENZO(G,H,I)PERYLENE	10	UJ	Sur<LCL
Y1RZ7	BENZO(K)FLUORANTHENE	10	UJ	Sur<LCL
Y1RZ7	BIS(2-CHLOROETHOXY)METHANE	10	UJ	Sur<LCL
Y1RZ7	BIS-(2-CHLOROETHYL)ETHER	10	UJ	Sur<LCL
Y1RZ7	BIS(2-ETHYLHEXYL)PHTHALATE	2	J	Sur<LCL
Y1RZ7	BUTYLBENZYLPHTHALATE	10	UJ	Sur<LCL
Y1RZ7	CAPROLACTAM	10	UJ	Sur<LCL
Y1RZ7	CARBAZOLE	10	UJ	Sur<LCL
Y1RZ7	CHRYSENE	10	UJ	Sur<LCL
Y1RZ7	DIBENZO(A,H)-ANTHRACENE	10	UJ	Sur<LCL
Y1RZ7	DIBENZOFURAN	10	UJ	Sur<LCL
Y1RZ7	DIETHYLPHTHALATE	10	UJ	Sur<LCL
Y1RZ7	DIMETHYLPHTHALATE	10	UJ	Sur<LCL
Y1RZ7	DI-N-BUTYLPHTHALATE	10	UJ	Sur<LCL
Y1RZ7	DI-N-OCTYLPHTHALATE	10	UJ	Sur<LCL
Y1RZ7	FLUORANTHENE	10	UJ	Sur<LCL
Y1RZ7	FLUORENE	10	UJ	Sur<LCL
Y1RZ7	HEXACHLOROBENZENE	10	UJ	Sur<LCL
Y1RZ7	HEXACHLOROBUTADIENE	10	UJ	Sur<LCL
Y1RZ7	HEXACHLOROCYCLOPENTADIENE	10	UJ	Sur<LCL
Y1RZ7	HEXACHLOROETHANE	10	UJ	Sur<LCL
Y1RZ7	INDENO(1,2,3-CD)-PYRENE	10	UJ	Sur<LCL
Y1RZ7	ISOPHORONE	10	UJ	Sur<LCL
Y1RZ7	NAPHTHALENE	10	UJ	Sur<LCL
Y1RZ7	NITROBENZENE	10	UJ	Sur<LCL
Y1RZ7	N-NITROSO DIPHENYLAMINE	10	UJ	Sur<LCL
Y1RZ7	N-NITROSO-DI-N PROPYLAMINE	10	UJ	CCV<LCL
Y1RZ7	N-NITROSO-DI-N PROPYLAMINE	10	UJ	Sur<LCL
Y1RZ7	PENTACHLOROPHENOL	25	UJ	Sur<LCL
Y1RZ7	PHENANTHRENE	10	UJ	Sur<LCL
Y1RZ7	PHENOL	10	UJ	Sur<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1RZ7	PYRENE	10	UJ	Sur<LCL
Y1RZ9	1,1'-BIPHENYL	10	UJ	Sur<LCL
Y1RZ9	2,2'-OXYBIS(1-CHLOROPROPANE)	10	UJ	Sur<LCL
Y1RZ9	2,4,5-TRICHLOROPHENOL	25	UJ	Sur<LCL
Y1RZ9	2,4,6-TRICHLOROPHENOL	10	UJ	Sur<LCL
Y1RZ9	2,4-DICHLOROPHENOL	10	UJ	Sur<LCL
Y1RZ9	2,4-DIMETHYLPHENOL	10	UJ	Sur<LCL
Y1RZ9	2,4-DINITROPHENOL	25	UJ	CCV<LCL
Y1RZ9	2,4-DINITROPHENOL	25	UJ	Sur<LCL
Y1RZ9	2,4-DINITROTOLUENE	10	UJ	Sur<LCL
Y1RZ9	2,6-DINITROTOLUENE	10	UJ	Sur<LCL
Y1RZ9	2-CHLORONAPHTHALENE	10	UJ	Sur<LCL
Y1RZ9	2-CHLOROPHENOL	10	UJ	Sur<LCL
Y1RZ9	2-METHYLNAPHTHALENE	10	UJ	Sur<LCL
Y1RZ9	2-METHYLPHENOL	10	UJ	Sur<LCL
Y1RZ9	2-NITROANILINE	25	UJ	Sur<LCL
Y1RZ9	2-NITROPHENOL	10	UJ	Sur<LCL
Y1RZ9	3,3'-DICHLOROBENZIDINE	10	UJ	CCV<LCL
Y1RZ9	3,3'-DICHLOROBENZIDINE	10	UJ	IC%RSD
Y1RZ9	3,3'-DICHLOROBENZIDINE	10	UJ	Sur<LCL
Y1RZ9	3-NITROANILINE	25	UJ	CCV<LCL
Y1RZ9	3-NITROANILINE	25	UJ	IC%RSD
Y1RZ9	3-NITROANILINE	25	UJ	Sur<LCL
Y1RZ9	4,6-DINITRO-2-METHYLPHENOL	25	UJ	CCV<LCL
Y1RZ9	4,6-DINITRO-2-METHYLPHENOL	25	UJ	Sur<LCL
Y1RZ9	4-BROMOPHENYL-PHENYLETHER	10	UJ	Sur<LCL
Y1RZ9	4-CHLORO-3-METHYLPHENOL	10	UJ	Sur<LCL
Y1RZ9	4-CHLOROANILINE	10	UJ	Sur<LCL
Y1RZ9	4-CHLOROPHENYL-PHENYL ETHER	10	UJ	Sur<LCL
Y1RZ9	4-METHYLPHENOL	10	UJ	Sur<LCL
Y1RZ9	4-NITROANILINE	25	UJ	Sur<LCL
Y1RZ9	4-NITROPHENOL	25	UJ	Sur<LCL
Y1RZ9	ACENAPHTHENE	10	UJ	Sur<LCL
Y1RZ9	ACENAPHTHYLENE	10	UJ	Sur<LCL
Y1RZ9	ACETOPHENONE	10	UJ	Sur<LCL
Y1RZ9	ANTHRACENE	10	UJ	Sur<LCL
Y1RZ9	ATRAZINE	10	UJ	Sur<LCL
Y1RZ9	BENZALDEHYDE	10	UJ	Sur<LCL
Y1RZ9	BENZO(A)ANTHRACENE	10	UJ	Sur<LCL
Y1RZ9	BENZO(A)PYRENE	10	UJ	Sur<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1RZ9	BENZO(B)FLUORANTHENE	10	UJ	Sur<LCL
Y1RZ9	BENZO(G,H,I)PERYLENE	10	UJ	Sur<LCL
Y1RZ9	BENZO(K)FLUORANTHENE	10	UJ	Sur<LCL
Y1RZ9	BIS(2-CHLOROETHOXY)METHANE	10	UJ	Sur<LCL
Y1RZ9	BIS-(2-CHLOROETHYL)ETHER	10	UJ	Sur<LCL
Y1RZ9	BIS(2-ETHYLHEXYL)PHTHALATE	1	J	CCV>UCL
Y1RZ9	BIS(2-ETHYLHEXYL)PHTHALATE	1	J	Sur<LCL
Y1RZ9	BUTYLBENZYLPHTHALATE	10	UJ	Sur<LCL
Y1RZ9	CAPROLACTAM	10	UJ	Sur<LCL
Y1RZ9	CARBAZOLE	10	UJ	Sur<LCL
Y1RZ9	CHRYSENE	10	UJ	Sur<LCL
Y1RZ9	DIBENZO(A,H)-ANTHRACENE	10	UJ	Sur<LCL
Y1RZ9	DIBENZOFURAN	10	UJ	Sur<LCL
Y1RZ9	DIETHYLPHTHALATE	10	UJ	Sur<LCL
Y1RZ9	DIMETHYLPHTHALATE	10	UJ	Sur<LCL
Y1RZ9	DI-N-BUTYLPHTHALATE	10	UJ	Sur<LCL
Y1RZ9	DI-N-OCTYLPHTHALATE	10	UJ	Sur<LCL
Y1RZ9	FLUORANTHENE	10	UJ	Sur<LCL
Y1RZ9	FLUORENE	10	UJ	Sur<LCL
Y1RZ9	HEXACHLOROBENZENE	10	UJ	Sur<LCL
Y1RZ9	HEXACHLOROBUTADIENE	10	UJ	Sur<LCL
Y1RZ9	HEXACHLOROCYCLOPENTADIENE	10	UJ	CCV<LCL
Y1RZ9	HEXACHLOROCYCLOPENTADIENE	10	UJ	Sur<LCL
Y1RZ9	HEXACHLOROETHANE	10	UJ	Sur<LCL
Y1RZ9	INDENO(1,2,3-CD)-PYRENE	10	UJ	Sur<LCL
Y1RZ9	ISOPHORONE	10	UJ	Sur<LCL
Y1RZ9	NAPHTHALENE	10	UJ	Sur<LCL
Y1RZ9	NITROBENZENE	10	UJ	Sur<LCL
Y1RZ9	N-NITROSO DIPHENYLAMINE	10	UJ	Sur<LCL
Y1RZ9	N-NITROSO-DI-N PROPYLAMINE	10	UJ	Sur<LCL
Y1RZ9	PENTACHLOROPHENOL	25	UJ	Sur<LCL
Y1RZ9	PHENANTHRENE	10	UJ	Sur<LCL
Y1RZ9	PHENOL	10	UJ	Sur<LCL
Y1RZ9	PYRENE	10	UJ	Sur<LCL
Y1S00	1,1'-BIPHENYL	10	UJ	Sur<LCL
Y1S00	2,2'-OXYBIS(1-CHLOROPROPANE)	10	UJ	Sur<LCL
Y1S00	2,4,5-TRICHLOROPHENOL	25	UJ	Sur<LCL
Y1S00	2,4,6-TRICHLOROPHENOL	10	UJ	Sur<LCL
Y1S00	2,4-DICHLOROPHENOL	10	UJ	Sur<LCL
Y1S00	2,4-DIMETHYLPHENOL	10	UJ	Sur<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1S00	2,4-DINITROPHENOL	25	UJ	CCV<LCL
Y1S00	2,4-DINITROPHENOL	25	UJ	Sur<LCL
Y1S00	2,4-DINITROTOLUENE	10	UJ	Sur<LCL
Y1S00	2,6-DINITROTOLUENE	10	UJ	Sur<LCL
Y1S00	2-CHLORONAPHTHALENE	10	UJ	Sur<LCL
Y1S00	2-CHLOROPHENOL	10	UJ	Sur<LCL
Y1S00	2-METHYLNAPHTHALENE	10	UJ	Sur<LCL
Y1S00	2-METHYLPHENOL	10	UJ	Sur<LCL
Y1S00	2-NITROANILINE	25	UJ	Sur<LCL
Y1S00	2-NITROPHENOL	10	UJ	Sur<LCL
Y1S00	3,3'-DICHLOROBENZIDINE	10	UJ	CCV<LCL
Y1S00	3,3'-DICHLOROBENZIDINE	10	UJ	IC%RSD
Y1S00	3,3'-DICHLOROBENZIDINE	10	UJ	Sur<LCL
Y1S00	3-NITROANILINE	25	UJ	CCV<LCL
Y1S00	3-NITROANILINE	25	UJ	IC%RSD
Y1S00	3-NITROANILINE	25	UJ	Sur<LCL
Y1S00	4,6-DINITRO-2-METHYLPHENOL	25	UJ	CCV<LCL
Y1S00	4,6-DINITRO-2-METHYLPHENOL	25	UJ	Sur<LCL
Y1S00	4-BROMOPHENYL-PHENYLETHER	10	UJ	Sur<LCL
Y1S00	4-CHLORO-3-METHYLPHENOL	10	UJ	Sur<LCL
Y1S00	4-CHLOROANILINE	10	UJ	Sur<LCL
Y1S00	4-CHLOROPHENYL-PHENYL ETHER	10	UJ	Sur<LCL
Y1S00	4-METHYLPHENOL	10	UJ	Sur<LCL
Y1S00	4-NITROANILINE	25	UJ	Sur<LCL
Y1S00	4-NITROPHENOL	25	UJ	Sur<LCL
Y1S00	ACENAPHTHENE	10	UJ	Sur<LCL
Y1S00	ACENAPHTHYLENE	10	UJ	Sur<LCL
Y1S00	ACETOPHENONE	10	UJ	Sur<LCL
Y1S00	ANTHRACENE	10	UJ	Sur<LCL
Y1S00	ATRAZINE	10	UJ	Sur<LCL
Y1S00	BENZALDEHYDE	10	UJ	Sur<LCL
Y1S00	BENZO(A)ANTHRACENE	10	UJ	Sur<LCL
Y1S00	BENZO(A)PYRENE	10	UJ	Sur<LCL
Y1S00	BENZO(B)FLUORANTHENE	10	UJ	Sur<LCL
Y1S00	BENZO(G,H,I)PERYLENE	10	UJ	Sur<LCL
Y1S00	BENZO(K)FLUORANTHENE	10	UJ	Sur<LCL
Y1S00	BIS(2-CHLOROETHOXY)METHANE	10	UJ	Sur<LCL
Y1S00	BIS-(2-CHLOROETHYL)ETHER	10	UJ	Sur<LCL
Y1S00	BIS(2-ETHYLHEXYL)PHTHALATE	10	UJ	Sur<LCL
Y1S00	BUTYLBENZYLPHTHALATE	10	UJ	Sur<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1S00	CAPROLACTAM	10	UJ	Sur<LCL
Y1S00	CARBAZOLE	10	UJ	Sur<LCL
Y1S00	CHRYSENE	10	UJ	Sur<LCL
Y1S00	DIBENZO(A,H)-ANTHRACENE	10	UJ	Sur<LCL
Y1S00	DIBENZOFURAN	10	UJ	Sur<LCL
Y1S00	DIETHYLPHTHALATE	10	UJ	Sur<LCL
Y1S00	DIMETHYLPHTHALATE	10	UJ	Sur<LCL
Y1S00	DI-N-BUTYLPHTHALATE	10	UJ	Sur<LCL
Y1S00	DI-N-OCTYLPHTHALATE	10	UJ	Sur<LCL
Y1S00	FLUORANTHENE	10	UJ	Sur<LCL
Y1S00	FLUORENE	10	UJ	Sur<LCL
Y1S00	HEXACHLOROBENZENE	10	UJ	Sur<LCL
Y1S00	HEXACHLOROBUTADIENE	10	UJ	Sur<LCL
Y1S00	HEXACHLOROCYCLOPENTADIENE	10	UJ	Sur<LCL
Y1S00	HEXACHLOROETHANE	10	UJ	Sur<LCL
Y1S00	INDENO(1,2,3-CD)-PYRENE	10	UJ	Sur<LCL
Y1S00	ISOPHORONE	10	UJ	Sur<LCL
Y1S00	NAPHTHALENE	10	UJ	Sur<LCL
Y1S00	NITROBENZENE	10	UJ	Sur<LCL
Y1S00	N-NITROSO DIPHENYLAMINE	10	UJ	Sur<LCL
Y1S00	N-NITROSO-DI-N PROPYLAMINE	10	UJ	CCV<LCL
Y1S00	N-NITROSO-DI-N PROPYLAMINE	10	UJ	Sur<LCL
Y1S00	PENTACHLOROPHENOL	25	UJ	Sur<LCL
Y1S00	PHENANTHRENE	10	UJ	Sur<LCL
Y1S00	PHENOL	10	UJ	Sur<LCL
Y1S00	PYRENE	10	UJ	Sur<LCL
Y1S01	1,1'-BIPHENYL	10	UJ	Sur<LCL
Y1S01	2,2'-OXYBIS(1-CHLOROPROPANE)	10	UJ	Sur<LCL
Y1S01	2,4,5-TRICHLOROPHENOL	25	UJ	Sur<LCL
Y1S01	2,4,6-TRICHLOROPHENOL	10	UJ	Sur<LCL
Y1S01	2,4-DICHLOROPHENOL	10	UJ	Sur<LCL
Y1S01	2,4-DIMETHYLPHENOL	10	UJ	Sur<LCL
Y1S01	2,4-DINITROPHENOL	25	UJ	CCV<LCL
Y1S01	2,4-DINITROPHENOL	25	UJ	Sur<LCL
Y1S01	2,4-DINITROTOLUENE	10	UJ	Sur<LCL
Y1S01	2,6-DINITROTOLUENE	10	UJ	Sur<LCL
Y1S01	2-CHLORONAPHTHALENE	10	UJ	Sur<LCL
Y1S01	2-CHLOROPHENOL	10	UJ	Sur<LCL
Y1S01	2-METHYLNAPHTHALENE	10	UJ	Sur<LCL
Y1S01	2-METHYLPHENOL	10	UJ	Sur<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1S01	2-NITROANILINE	25	UJ	Sur<LCL
Y1S01	2-NITROPHENOL	10	UJ	Sur<LCL
Y1S01	3,3'-DICHLOROBENZIDINE	10	UJ	CCV<LCL
Y1S01	3,3'-DICHLOROBENZIDINE	10	UJ	IC%RSD
Y1S01	3,3'-DICHLOROBENZIDINE	10	UJ	Sur<LCL
Y1S01	3-NITROANILINE	25	UJ	CCV<LCL
Y1S01	3-NITROANILINE	25	UJ	IC%RSD
Y1S01	3-NITROANILINE	25	UJ	Sur<LCL
Y1S01	4,6-DINITRO-2-METHYLPHENOL	25	UJ	CCV<LCL
Y1S01	4,6-DINITRO-2-METHYLPHENOL	25	UJ	Sur<LCL
Y1S01	4-BROMOPHENYL-PHENYLETHER	10	UJ	Sur<LCL
Y1S01	4-CHLORO-3-METHYLPHENOL	10	UJ	Sur<LCL
Y1S01	4-CHLOROANILINE	10	UJ	Sur<LCL
Y1S01	4-CHLOROPHENYL-PHENYL ETHER	10	UJ	Sur<LCL
Y1S01	4-METHYLPHENOL	10	UJ	Sur<LCL
Y1S01	4-NITROANILINE	25	UJ	Sur<LCL
Y1S01	4-NITROPHENOL	25	UJ	Sur<LCL
Y1S01	ACENAPHTHENE	10	UJ	Sur<LCL
Y1S01	ACENAPHTHYLENE	10	UJ	Sur<LCL
Y1S01	ACETOPHENONE	10	UJ	Sur<LCL
Y1S01	ANTHRACENE	10	UJ	Sur<LCL
Y1S01	ATRAZINE	10	UJ	Sur<LCL
Y1S01	BENZALDEHYDE	10	UJ	Sur<LCL
Y1S01	BENZO(A)ANTHRACENE	10	UJ	Sur<LCL
Y1S01	BENZO(A)PYRENE	10	UJ	Sur<LCL
Y1S01	BENZO(B)FLUORANTHENE	10	UJ	Sur<LCL
Y1S01	BENZO(G,H,I)PERYLENE	10	UJ	Sur<LCL
Y1S01	BENZO(K)FLUORANTHENE	10	UJ	Sur<LCL
Y1S01	BIS(2-CHLOROETHOXY)METHANE	10	UJ	Sur<LCL
Y1S01	BIS-(2-CHLOROETHYL)ETHER	10	UJ	Sur<LCL
Y1S01	BIS(2-ETHYLHEXYL)PHTHALATE	10	UJ	Sur<LCL
Y1S01	BUTYLBENZYLPHTHALATE	10	UJ	Sur<LCL
Y1S01	CAPROLACTAM	10	UJ	Sur<LCL
Y1S01	CARBAZOLE	10	UJ	Sur<LCL
Y1S01	CHRYSENE	10	UJ	Sur<LCL
Y1S01	DIBENZO(A,H)-ANTHRACENE	10	UJ	Sur<LCL
Y1S01	DIBENZOFURAN	10	UJ	Sur<LCL
Y1S01	DIETHYLPHTHALATE	10	UJ	Sur<LCL
Y1S01	DIMETHYLPHTHALATE	10	UJ	Sur<LCL
Y1S01	DI-N-BUTYLPHTHALATE	10	UJ	Sur<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1S01	DI-N-OCTYLPHTHALATE	10	UJ	Sur<LCL
Y1S01	FLUORANTHENE	10	UJ	Sur<LCL
Y1S01	FLUORENE	10	UJ	Sur<LCL
Y1S01	HEXACHLOROBENZENE	10	UJ	Sur<LCL
Y1S01	HEXACHLOROBUTADIENE	10	UJ	Sur<LCL
Y1S01	HEXACHLOROCYCLOPENTADIENE	10	UJ	CCV<LCL
Y1S01	HEXACHLOROCYCLOPENTADIENE	10	UJ	Sur<LCL
Y1S01	HEXACHLOROETHANE	10	UJ	Sur<LCL
Y1S01	INDENO(1,2,3-CD)-PYRENE	10	UJ	Sur<LCL
Y1S01	ISOPHORONE	10	UJ	Sur<LCL
Y1S01	NAPHTHALENE	10	UJ	Sur<LCL
Y1S01	NITROBENZENE	10	UJ	Sur<LCL
Y1S01	N-NITROSO DIPHENYLAMINE	10	UJ	Sur<LCL
Y1S01	N-NITROSO-DI-N PROPYLAMINE	10	UJ	Sur<LCL
Y1S01	PENTACHLOROPHENOL	25	UJ	Sur<LCL
Y1S01	PHENANTHRENE	10	UJ	Sur<LCL
Y1S01	PHENOL	10	UJ	Sur<LCL
Y1S01	PYRENE	10	UJ	Sur<LCL
Y1S12	2,4-DINITROPHENOL	25	UJ	CCV<LCL
Y1S12	3,3'-DICHLOROBENZIDINE	10	UJ	CCV<LCL
Y1S12	3,3'-DICHLOROBENZIDINE	10	UJ	IC%RSD
Y1S12	3-NITROANILINE	25	UJ	CCV<LCL
Y1S12	3-NITROANILINE	25	UJ	IC%RSD
Y1S12	4,6-DINITRO-2-METHYLPHENOL	25	UJ	CCV<LCL
Y1S12	HEXACHLOROCYCLOPENTADIENE	10	UJ	CCV<LCL

CCV<LCL = Continuing calibration recovery less than lower control limit
CCV>UCL = Continuing calibration recovery greater than upper control limit
IC%RSD = Initial calibration RSD exceeded
MS<LCL = Matrix spike recovery less than lower limit
Sur<LCL = Surrogate recovery less than lower limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 17, 18, 22 and 23, 2005
Report Date:	April 14, 2005
Parameters:	Semivolatile Organic Compounds
Laboratory:	Envirosystems, Inc.
Sample Delivery Group:	Y1S16

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLM04.3 and project-approved modifications described in Modification Reference Number 1183.0 for semi-volatile organic compounds (SVOC). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier III data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier II data validation. The intended objective of the data review process was to provide a technical review of the data and to provide verification of calculations and analyte identification. It was not intended to determine contract compliance.

The scope of the data review included the chain-of-custody (CoC) records, the case narrative completed CLP data summary forms and raw data.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The sample was received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

The CoC listed five bottles each for samples Y1S16 and Y1S17. The laboratory received 10 bottles identified as Y1S16. The laboratory was instructed to divide the bottles evenly and identify them as samples Y1S16 and Y1S17. These samples were equipment blanks (EB).

The holding-time requirements were met for the samples.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met. Ion abundance calculations were verified for several masses.

III. Initial Calibration

In the initial calibration (ICAL), the relative standard deviation (RSD) of the relative response factors (RRF) for 3-nitroaniline and 3,3′-dichlorobenzidine exceeded 30 percent. All associated results were not detected and flagged "UJ".

Calculations for the ICAL RRF and RSD criteria were verified.

IV. Continuing Calibration

N-Nitroso-di-n-propylamine, 3-nitroaniline, 2,4-dinitrophenol, 4,6-dinitro-2-methylphenol and 3,3′-dichlorobenzidine were recovered below the percent difference (%D) criteria in the continuing calibration verification (CCV) SSTD050GX. All associated results were not detected and flagged "UJ".

N-Nitrosodiphenylamine, butylbenzylphthalate, benzo(b)fluoranthene and di-n-octylphthlate were recovered above the %D criteria in the CCV SSTD050GX. All associated results were not detected and thus no flags were applied.

Hexachlorocyclopentadiene and hexachlorobenzene were recovered below criteria in CCV SSTD050GA. All associated results were not detected and flagged "UJ".

4-Chloroaniline, caprolactam, 3-nitroaniline, 4-nitrophenol, 4-nitroaniline, carbazole and 3,3′-dichlorobenzidine were recovered above criteria in CCV SSTD050GA. Associated detected results were flagged "J".

In CCV SSTD050GB, 2,2′-oxybis(1-chloropropane), n-nitroso-di-n-propylamine, hexachloroethane, hexachlorocyclopentadiene, 2,4-dinitrophenol, 4,6-dinitro-2-methylphenol and pentachlorophenol were recovered below criteria. All associated results were not detected and flagged "UJ".

In CCV SSTD050GB, 4-chloroaniline, 3-nitroaniline, 4-nitroaniline, carbazole and 3,3′-dichlorobenzidine were recovered above criteria. All associated results were not detected and thus no flags were applied.

The RRF for 2,4-dinitrophenol in CCVs SSTD050GX and SSTD050GB was below the minimum criteria of 0.05. Associated non-detected results were qualified as not useable and flagged "R".

The CCV RRF and %D calculations were verified.

V. Blanks

A method blank was analyzed as required. Acetophenone was detected in the method blank below the contract required quantitiation limit (CRQL), equivalent to reporting limit. All acetophenone results were not detected and thus, flags were not applied.

VI. Surrogates

2-Fluorobiphenyl was recovered below criteria in samples Y1S03, Y1S04 and Y1S05. Associated detected results were flagged "J" and non-detected results were flagged "UJ".

2-Chlorophenyl-d4 was recovered above criteria in sample Y1S05. Associated detected results were flagged "J".

Surrogates recoveries were not available for several diluted samples.

The surrogate recovery calculation was verified.

VII. Matrix Spike/Matrix Spike Duplicate

A matrix spike and matrix spike duplicate (MS/MSD) were analyzed on sample Y1S16 (equipment blank). 4-Nitrophenol was recovered above criteria. This analyte was not detected in the parent sample and thus, no flag was applied.

The MS/MSD recoveries and relative percent difference (RPD) calculations were verified.

VIII. Laboratory Control Sample

The applicable Statement of Work does not require analysis of a laboratory control sample (LCS); therefore, no LCS was analyzed.

IX. Internal Standards

All internal standard areas and retention times were within the acceptance limits.

X. Target Compound Identification

Compound identification was verified by raw data review on a percentage of the sample detected results.

XI. Compound Quantitation and Reported CRQLs

Several samples required dilution because target analytes were detected above the linear calibration range.

Compound quantitation and accuracy were verified.

XII. Tentatively Identified Compounds

Tentatively identified compounds in the samples were reviewed.

XIII. Field Blanks

There were four EBs in this SDG: Y1S16, Y1S17, Y1S18 and Y1S19. 4-Chloro-3-methylphenol was detected below the CRQL in EBs Y1S16, Y1S17 and Y1S18. Associated results were

either non-detected or greater than five times the blank concentrations and therefore, no flags were applied.

XIV. Field Duplicates

Samples Y1RZ2 and Y1RZ3 were designated as a field duplicate pair. All acceptance criteria were met.

XV. System Performance

Sample Y1RY7 was analyzed at a twofold dilution due to suspected contamination.

The system performance was evaluated by reviewing the chromatographic data. Overall, the system was in control.

XVI. Overall Assessment of Data

- Limited laboratory and/or field contamination was evident for this SDG. No impact on the data.
- A few surrogate exceedances were observed and affected analytes were flagged as estimated concentrations.
- Two analytes exceeded criteria in the initial calibration and sample results were qualified as estimated concentrations.
- The responses of several target analytes in the CCVs were diminished by more than 25 percent. However, these shifts were not likely to have had a significant impact on the sample results since the analytes were not detected in the samples.
- 2,4-Dinitrophenol in two CCVs had RRFs below criteria. Associated 2,4-dinitrophenol results were not useable and the completeness goal was not met for this compound.
- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- The completeness objectives were met for all method/analyte combinations except for 2,4-dinitrophenol.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1RY7	2,2′-OXYBIS(1- CHLOROPROPANE)	20	UJ	CCV<LCL
Y1RY7	2,4-DINITROPHENOL	50	R	CCV<LCL
Y1RY7	2,4-DINITROPHENOL	50	R	CCV RRF
Y1RY7	3,3′-DICHLOROBENZIDINE	20	UJ	IC%RSD
Y1RY7	3-NITROANILINE	50	UJ	IC%RSD
Y1RY7	4,6-DINITRO-2-METHYLPHENOL	50	UJ	CCV<LCL
Y1RY7	HEXACHLOROCYCLO-PENTADIENE	20	UJ	CCV<LCL
Y1RY7	HEXACHLOROETHANE	20	UJ	CCV<LCL
Y1RY7	N-NITROSO-DI-N PROPYLAMINE	20	UJ	CCV<LCL
Y1RY7	PENTACHLOROPHENOL	50	UJ	CCV<LCL
Y1RZ2	3,3′-DICHLOROBENZIDINE	10	UJ	IC%RSD
Y1RZ2	3-NITROANILINE	25	UJ	IC%RSD
Y1RZ2	HEXACHLOROBENZENE	10	UJ	CCV<LCL
Y1RZ2	HEXACHLOROCYCLO-PENTADIENE	10	UJ	CCV<LCL
Y1RZ3	3,3′-DICHLOROBENZIDINE	10	UJ	IC%RSD
Y1RZ3	3-NITROANILINE	25	UJ	IC%RSD
Y1RZ3	HEXACHLOROBENZENE	10	UJ	CCV<LCL
Y1RZ3	HEXACHLOROCYCLO-PENTADIENE	10	UJ	CCV<LCL
Y1RZ4	3,3′-DICHLOROBENZIDINE	10	UJ	IC%RSD
Y1RZ4	3-NITROANILINE	25	UJ	IC%RSD
Y1RZ4	HEXACHLOROBENZENE	10	UJ	CCV<LCL
Y1RZ4	HEXACHLOROCYCLO-PENTADIENE	10	UJ	CCV<LCL
Y1S02	3,3′-DICHLOROBENZIDINE	10	UJ	IC%RSD
Y1S02	3-NITROANILINE	25	UJ	IC%RSD
Y1S02	HEXACHLOROBENZENE	10	UJ	CCV<LCL
Y1S02	HEXACHLOROCYCLO-PENTADIENE	10	UJ	CCV<LCL
Y1S03	1,1′-BIPHENYL	10	UJ	Sur<LCL
Y1S03	2,2′-OXYBIS(1- CHLOROPROPANE)	10	UJ	Sur<LCL
Y1S03	2,4,5-TRICHLOROPHENOL	25	UJ	Sur<LCL
Y1S03	2,4,6-TRICHLOROPHENOL	10	UJ	Sur<LCL
Y1S03	2,4-DICHLOROPHENOL	10	UJ	Sur<LCL
Y1S03	2,4-DIMETHYLPHENOL	10	UJ	Sur<LCL
Y1S03	2,4-DINITROPHENOL	25	R	CCV<LCL
Y1S03	2,4-DINITROPHENOL	25	R	Sur<LCL
Y1S03	2,4-DINITROPHENOL	25	R	CCV RRF
Y1S03	2,4-DINITROTOLUENE	10	UJ	Sur<LCL
Y1S03	2,6-DINITROTOLUENE	10	UJ	Sur<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1S03	2-CHLORONAPHTHALENE	10	UJ	Sur<LCL
Y1S03	2-CHLOROPHENOL	3	J	Sur<LCL
Y1S03	2-METHYLPHENOL	10	UJ	Sur<LCL
Y1S03	2-NITROANILINE	25	UJ	Sur<LCL
Y1S03	2-NITROPHENOL	10	UJ	Sur<LCL
Y1S03	3,3'-DICHLOROBENZIDINE	10	UJ	CCV<LCL
Y1S03	3,3'-DICHLOROBENZIDINE	10	UJ	IC%RSD
Y1S03	3,3'-DICHLOROBENZIDINE	10	UJ	Sur<LCL
Y1S03	3-NITROANILINE	25	UJ	CCV<LCL
Y1S03	3-NITROANILINE	25	UJ	IC%RSD
Y1S03	3-NITROANILINE	25	UJ	Sur<LCL
Y1S03	4,6-DINITRO-2-METHYLPHENOL	25	UJ	CCV<LCL
Y1S03	4,6-DINITRO-2-METHYLPHENOL	25	UJ	Sur<LCL
Y1S03	4-BROMOPHENYL-PHENYLETHER	10	UJ	Sur<LCL
Y1S03	4-CHLORO-3-METHYLPHENOL	10	UJ	Sur<LCL
Y1S03	4-CHLOROANILINE	10	UJ	Sur<LCL
Y1S03	4-CHLOROPHENYL-PHENYL ETHER	10	UJ	Sur<LCL
Y1S03	4-METHYLPHENOL	10	UJ	Sur<LCL
Y1S03	4-NITROANILINE	25	UJ	Sur<LCL
Y1S03	4-NITROPHENOL	25	UJ	Sur<LCL
Y1S03	ACENAPHTHENE	2	J	Sur<LCL
Y1S03	ACENAPHTHYLENE	10	UJ	Sur<LCL
Y1S03	ACETOPHENONE	10	UJ	Sur<LCL
Y1S03	ANTHRACENE	10	UJ	Sur<LCL
Y1S03	ATRAZINE	10	UJ	Sur<LCL
Y1S03	BENZALDEHYDE	10	UJ	Sur<LCL
Y1S03	BENZO(A)ANTHRACENE	10	UJ	Sur<LCL
Y1S03	BENZO(A)PYRENE	10	UJ	Sur<LCL
Y1S03	BENZO(B)FLUORANTHENE	10	UJ	Sur<LCL
Y1S03	BENZO(G,H,I)PERYLENE	10	UJ	Sur<LCL
Y1S03	BENZO(K)FLUORANTHENE	10	UJ	Sur<LCL
Y1S03	BIS(2-CHLOROETHOXY)METHANE	10	UJ	Sur<LCL
Y1S03	BIS-(2-CHLOROETHYL)ETHER	10	UJ	Sur<LCL
Y1S03	BIS(2-ETHYLHEXYL)PHTHALATE	10	UJ	Sur<LCL
Y1S03	BUTYLBENZYLPHTHALATE	10	UJ	Sur<LCL
Y1S03	CAPROLACTAM	10	UJ	Sur<LCL
Y1S03	CARBAZOLE	10	UJ	Sur<LCL
Y1S03	CHRYSENE	10	UJ	Sur<LCL
Y1S03	DIBENZO(A,H)-ANTHRACENE	10	UJ	Sur<LCL
Y1S03	DIBENZOFURAN	10	UJ	Sur<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1S03	DIETHYLPHTHALATE	10	UJ	Sur<LCL
Y1S03	DIMETHYLPHTHALATE	10	UJ	Sur<LCL
Y1S03	DI-N-BUTYLPHTHALATE	10	UJ	Sur<LCL
Y1S03	DI-N-OCTYLPHTHALATE	10	UJ	Sur<LCL
Y1S03	FLUORANTHENE	10	UJ	Sur<LCL
Y1S03	FLUORENE	1	J	Sur<LCL
Y1S03	HEXACHLOROBENZENE	10	UJ	Sur<LCL
Y1S03	HEXACHLOROBUTADIENE	10	UJ	Sur<LCL
Y1S03	HEXACHLOROCYCLO-PENTADIENE	10	UJ	Sur<LCL
Y1S03	HEXACHLOROETHANE	10	UJ	Sur<LCL
Y1S03	INDENO(1,2,3-CD)-PYRENE	10	UJ	Sur<LCL
Y1S03	ISOPHORONE	10	UJ	Sur<LCL
Y1S03	NAPHTHALENE	18	J	Sur<LCL
Y1S03	NITROBENZENE	10	UJ	Sur<LCL
Y1S03	N-NITROSO DIPHENYLAMINE	10	UJ	Sur<LCL
Y1S03	N-NITROSO-DI-N PROPYLAMINE	10	UJ	CCV<LCL
Y1S03	N-NITROSO-DI-N PROPYLAMINE	10	UJ	Sur<LCL
Y1S03	PENTACHLOROPHENOL	25	UJ	Sur<LCL
Y1S03	PHENANTHRENE	2	J	Sur<LCL
Y1S03	PHENOL	10	UJ	Sur<LCL
Y1S03	PYRENE	10	UJ	Sur<LCL
Y1S04	1,1'-BIPHENYL	10	UJ	Sur<LCL
Y1S04	2,2'-OXYBIS(1- CHLOROPROPANE)	10	UJ	Sur<LCL
Y1S04	2,4,5-TRICHLOROPHENOL	25	UJ	Sur<LCL
Y1S04	2,4,6-TRICHLOROPHENOL	10	UJ	Sur<LCL
Y1S04	2,4-DICHLOROPHENOL	10	UJ	Sur<LCL
Y1S04	2,4-DIMETHYLPHENOL	10	UJ	Sur<LCL
Y1S04	2,4-DINITROPHENOL	25	R	CCV<LCL
Y1S04	2,4-DINITROPHENOL	25	R	Sur<LCL
Y1S04	2,4-DINITROPHENOL	25	R	CCV RRF
Y1S04	2,4-DINITROTOLUENE	10	UJ	Sur<LCL
Y1S04	2,6-DINITROTOLUENE	10	UJ	Sur<LCL
Y1S04	2-CHLORONAPHTHALENE	10	UJ	Sur<LCL
Y1S04	2-CHLOROPHENOL	10	UJ	Sur<LCL
Y1S04	2-METHYLNAPHTHALENE	1	J	Sur<LCL
Y1S04	2-METHYLPHENOL	10	UJ	Sur<LCL
Y1S04	2-NITROANILINE	25	UJ	Sur<LCL
Y1S04	2-NITROPHENOL	10	UJ	Sur<LCL
Y1S04	3,3'-DICHLOROBENZIDINE	10	UJ	CCV<LCL
Y1S04	3,3'-DICHLOROBENZIDINE	10	UJ	IC%RSD

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1S04	3,3'-DICHLOROBENZIDINE	10	UJ	Sur<LCL
Y1S04	3-NITROANILINE	25	UJ	CCV<LCL
Y1S04	3-NITROANILINE	25	UJ	IC%RSD
Y1S04	3-NITROANILINE	25	UJ	Sur<LCL
Y1S04	4,6-DINITRO-2-METHYLPHENOL	25	UJ	CCV<LCL
Y1S04	4,6-DINITRO-2-METHYLPHENOL	25	UJ	Sur<LCL
Y1S04	4-BROMOPHENYL-PHENYLETHER	10	UJ	Sur<LCL
Y1S04	4-CHLORO-3-METHYLPHENOL	10	UJ	Sur<LCL
Y1S04	4-CHLOROANILINE	10	UJ	Sur<LCL
Y1S04	4-CHLOROPHENYL-PHENYL ETHER	10	UJ	Sur<LCL
Y1S04	4-METHYLPHENOL	10	UJ	Sur<LCL
Y1S04	4-NITROANILINE	25	UJ	Sur<LCL
Y1S04	4-NITROPHENOL	25	UJ	Sur<LCL
Y1S04	ACENAPHTHENE	10	UJ	Sur<LCL
Y1S04	ACENAPHTHYLENE	10	UJ	Sur<LCL
Y1S04	ACETOPHENONE	10	UJ	Sur<LCL
Y1S04	ANTHRACENE	10	UJ	Sur<LCL
Y1S04	ATRAZINE	10	UJ	Sur<LCL
Y1S04	BENZALDEHYDE	10	UJ	Sur<LCL
Y1S04	BENZO(A)ANTHRACENE	10	UJ	Sur<LCL
Y1S04	BENZO(A)PYRENE	10	UJ	Sur<LCL
Y1S04	BENZO(B)FLUORANTHENE	10	UJ	CCV>UCL
Y1S04	BENZO(B)FLUORANTHENE	10	UJ	Sur<LCL
Y1S04	BENZO(G,H,I)PERYLENE	10	UJ	Sur<LCL
Y1S04	BENZO(K)FLUORANTHENE	10	UJ	Sur<LCL
Y1S04	BIS(2-CHLOROETHOXY)METHANE	10	UJ	Sur<LCL
Y1S04	BIS-(2-CHLOROETHYL)ETHER	10	UJ	Sur<LCL
Y1S04	BIS(2-ETHYLHEXYL)PHTHALATE	10	UJ	Sur<LCL
Y1S04	BUTYLBENZYLPHTHALATE	10	UJ	CCV>UCL
Y1S04	BUTYLBENZYLPHTHALATE	10	UJ	Sur<LCL
Y1S04	CAPROLACTAM	10	UJ	Sur<LCL
Y1S04	CARBAZOLE	10	UJ	Sur<LCL
Y1S04	CHRYSENE	10	UJ	Sur<LCL
Y1S04	DIBENZO(A,H)-ANTHRACENE	10	UJ	Sur<LCL
Y1S04	DIBENZOFURAN	10	UJ	Sur<LCL
Y1S04	DIETHYLPHTHALATE	10	UJ	Sur<LCL
Y1S04	DIMETHYLPHTHALATE	10	UJ	Sur<LCL
Y1S04	DI-N-BUTYLPHTHALATE	10	UJ	Sur<LCL
Y1S04	DI-N-OCTYLPHTHALATE	10	UJ	CCV>UCL
Y1S04	DI-N-OCTYLPHTHALATE	10	UJ	Sur<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1S04	FLUORANTHENE	10	UJ	Sur<LCL
Y1S04	FLUORENE	10	UJ	Sur<LCL
Y1S04	HEXACHLOROBENZENE	10	UJ	Sur<LCL
Y1S04	HEXACHLOROBUTADIENE	10	UJ	Sur<LCL
Y1S04	HEXACHLOROCYCLO-PENTADIENE	10	UJ	Sur<LCL
Y1S04	HEXACHLOROETHANE	10	UJ	Sur<LCL
Y1S04	INDENO(1,2,3-CD)-PYRENE	10	UJ	Sur<LCL
Y1S04	ISOPHORONE	10	UJ	Sur<LCL
Y1S04	NAPHTHALENE	10	UJ	Sur<LCL
Y1S04	NITROBENZENE	10	UJ	Sur<LCL
Y1S04	N-NITROSO DIPHENYLAMINE	10	UJ	CCV>UCL
Y1S04	N-NITROSO DIPHENYLAMINE	10	UJ	Sur<LCL
Y1S04	N-NITROSO-DI-N PROPYLAMINE	10	UJ	CCV<LCL
Y1S04	N-NITROSO-DI-N PROPYLAMINE	10	UJ	Sur<LCL
Y1S04	PENTACHLOROPHENOL	25	UJ	Sur<LCL
Y1S04	PHENANTHRENE	10	UJ	Sur<LCL
Y1S04	PHENOL	10	UJ	Sur<LCL
Y1S04	PYRENE	10	UJ	Sur<LCL
Y1S05	1,1'-BIPHENYL	10	UJ	Sur<LCL
Y1S05	2,2'-OXYBIS(1- CHLOROPROPANE)	10	UJ	Sur<LCL
Y1S05	2,4,5-TRICHLOROPHENOL	25	UJ	Sur<LCL
Y1S05	2,4,6-TRICHLOROPHENOL	10	UJ	Sur<LCL
Y1S05	2,4-DICHLOROPHENOL	10	UJ	Sur<LCL
Y1S05	2,4-DIMETHYLPHENOL	10	UJ	Sur<LCL
Y1S05	2,4-DINITROPHENOL	25	R	CCV<LCL
Y1S05	2,4-DINITROPHENOL	25	R	Sur<LCL
Y1S05	2,4-DINITROPHENOL	25	R	CCV RRF
Y1S05	2,4-DINITROTOLUENE	10	UJ	Sur<LCL
Y1S05	2,6-DINITROTOLUENE	10	UJ	Sur<LCL
Y1S05	2-CHLORONAPHTHALENE	10	UJ	Sur<LCL
Y1S05	2-CHLOROPHENOL	10	UJ	Sur<LCL
Y1S05	2-NITROANILINE	25	UJ	Sur<LCL
Y1S05	2-NITROPHENOL	10	UJ	Sur<LCL
Y1S05	3,3′-DICHLOROBENZIDINE	10	UJ	CCV<LCL
Y1S05	3,3′-DICHLOROBENZIDINE	10	UJ	IC%RSD
Y1S05	3,3′-DICHLOROBENZIDINE	10	UJ	Sur<LCL
Y1S05	3-NITROANILINE	25	UJ	CCV<LCL
Y1S05	3-NITROANILINE	25	UJ	IC%RSD
Y1S05	3-NITROANILINE	25	UJ	Sur<LCL
Y1S05	4,6-DINITRO-2-METHYLPHENOL	25	UJ	CCV<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1S05	4,6-DINITRO-2-METHYLPHENOL	25	UJ	Sur<LCL
Y1S05	4-BROMOPHENYL-PHENYLETHER	10	UJ	Sur<LCL
Y1S05	4-CHLORO-3-METHYLPHENOL	10	UJ	Sur<LCL
Y1S05	4-CHLOROANILINE	10	UJ	Sur<LCL
Y1S05	4-CHLOROPHENYL-PHENYL ETHER	10	UJ	Sur<LCL
Y1S05	4-NITROANILINE	25	UJ	Sur<LCL
Y1S05	4-NITROPHENOL	25	UJ	Sur<LCL
Y1S05	ACENAPHTHENE	10	UJ	Sur<LCL
Y1S05	ACENAPHTHYLENE	10	UJ	Sur<LCL
Y1S05	ACETOPHENONE	10	UJ	Sur<LCL
Y1S05	ANTHRACENE	10	UJ	Sur<LCL
Y1S05	ATRAZINE	10	UJ	Sur<LCL
Y1S05	BENZALDEHYDE	10	UJ	Sur<LCL
Y1S05	BENZO(A)ANTHRACENE	10	UJ	Sur<LCL
Y1S05	BENZO(A)PYRENE	10	UJ	Sur<LCL
Y1S05	BENZO(B)FLUORANTHENE	10	UJ	CCV>UCL
Y1S05	BENZO(B)FLUORANTHENE	10	UJ	Sur<LCL
Y1S05	BENZO(G,H,I)PERYLENE	10	UJ	Sur<LCL
Y1S05	BENZO(K)FLUORANTHENE	10	UJ	Sur<LCL
Y1S05	BIS(2-CHLOROETHOXY)METHANE	10	UJ	Sur<LCL
Y1S05	BIS-(2-CHLOROETHYL)ETHER	10	UJ	Sur<LCL
Y1S05	BIS(2-ETHYLHEXYL)PHTHALATE	10	UJ	Sur<LCL
Y1S05	BUTYLBENZYLPHTHALATE	10	UJ	CCV>UCL
Y1S05	BUTYLBENZYLPHTHALATE	10	UJ	Sur<LCL
Y1S05	CAPROLACTAM	10	UJ	Sur<LCL
Y1S05	CARBAZOLE	10	UJ	Sur<LCL
Y1S05	CHRYSENE	10	UJ	Sur<LCL
Y1S05	DIBENZO(A,H)-ANTHRACENE	10	UJ	Sur<LCL
Y1S05	DIBENZOFURAN	10	UJ	Sur<LCL
Y1S05	DIETHYLPHTHALATE	10	UJ	Sur<LCL
Y1S05	DIMETHYLPHTHALATE	10	UJ	Sur<LCL
Y1S05	DI-N-BUTYLPHTHALATE	10	UJ	Sur<LCL
Y1S05	DI-N-OCTYLPHTHALATE	10	UJ	CCV>UCL
Y1S05	DI-N-OCTYLPHTHALATE	10	UJ	Sur<LCL
Y1S05	FLUORANTHENE	10	UJ	Sur<LCL
Y1S05	FLUORENE	10	UJ	Sur<LCL
Y1S05	HEXACHLOROBENZENE	10	UJ	Sur<LCL
Y1S05	HEXACHLOROBUTADIENE	10	UJ	Sur<LCL
Y1S05	HEXACHLOROCYCLO-PENTADIENE	10	UJ	Sur<LCL
Y1S05	HEXACHLOROETHANE	10	UJ	Sur<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1S05	INDENO(1,2,3-CD)-PYRENE	10	UJ	Sur<LCL
Y1S05	ISOPHORONE	10	UJ	Sur<LCL
Y1S05	NITROBENZENE	10	UJ	Sur<LCL
Y1S05	N-NITROSO DIPHENYLAMINE	10	UJ	CCV>UCL
Y1S05	N-NITROSO DIPHENYLAMINE	10	UJ	Sur<LCL
Y1S05	N-NITROSO-DI-N PROPYLAMINE	10	UJ	CCV<LCL
Y1S05	N-NITROSO-DI-N PROPYLAMINE	10	UJ	Sur<LCL
Y1S05	PENTACHLOROPHENOL	25	UJ	Sur<LCL
Y1S05	PHENANTHRENE	10	UJ	Sur<LCL
Y1S05	PHENOL	10	UJ	Sur<LCL
Y1S05	PYRENE	10	UJ	Sur<LCL
Y1S06	2,4-DINITROPHENOL	250	R	CCV<LCL
Y1S06	2,4-DINITROPHENOL	250	R	CCV RRF
Y1S06	3,3'-DICHLOROBENZIDINE	100	UJ	CCV<LCL
Y1S06	3,3'-DICHLOROBENZIDINE	100	UJ	IC%RSD
Y1S06	3-NITROANILINE	250	UJ	CCV<LCL
Y1S06	3-NITROANILINE	250	UJ	IC%RSD
Y1S06	4,6-DINITRO-2-METHYLPHENOL	250	UJ	CCV<LCL
Y1S06	BENZO(B)FLUORANTHENE	100	UJ	CCV>UCL
Y1S06	BUTYLBENZYLPHTHALATE	100	UJ	CCV>UCL
Y1S06	DI-N-OCTYLPHTHALATE	100	UJ	CCV>UCL
Y1S06	N-NITROSO DIPHENYLAMINE	100	UJ	CCV>UCL
Y1S06	N-NITROSO-DI-N PROPYLAMINE	100	UJ	CCV<LCL

CCV RRF = Continuing calibration relative response factor below LCL
CCV<LCL = Continuing calibration recovery less than lower control limit
CCV>UCL = Continuing calibration recovery greater than upper control limit
IC%RSD = Initial calibration RSD exceeded
Sur<LCL = Surrogate recovery less than lower limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 31, 2005
Report Date:	April 18, 2005
Parameters:	Semivolatile Organic Compounds
Laboratory:	Envirosystems, Inc.
Sample Delivery Group:	Y1S20

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLM04.3 and project-approved modifications described in Modification Reference Number 1183.0 for semi-volatile organic compounds (SVOC). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier II data validation. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative, and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The sample was received at the laboratory within control temperatures and with appropriate CoC forms; however, the custody seal on the cooler was not intact. Individual sample bottles did not contain sample tag ID numbers.

Only two of five bottles listed on the CoC for samples Y1S20 and Y1S21 were received.

Turnaround time (TAT) was incorrectly listed as 21 days on the CoC when a 7 day TAT was scheduled.

All technical holding-time requirements were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Initial Calibration

The relative standard deviation (RSD) of the relative response factors for 3-nitroaniline and 3,3′-dichlorobenzidine in the initial calibration exceeded 30 percent. The associated non-detected results were flagged "UJ".

IV. Continuing Calibration

Hexachlorocyclopentadiene and hexachlorobenzene were recovered below criteria in the continuing calibration verification (CCV) standard. Non-detected sample results were flagged "UJ".

4-Chloroaniline, caprolactam, 3-nitroaniline, 4-nitrophenol, 4-nitroaniline, carbazole, and 3,3′-dichlorobenzidine were recovered above criteria in the CCV. The sample results were non-detect and no flags were applied.

V. Blanks

A method blank was analyzed as required. There were no detected results in the method blank.

VI. Surrogates

Surrogate recoveries were within acceptance criteria.

VII. Matrix Spike/Matrix Spike Duplicate

A matrix spike and matrix spike duplicate were analyzed on sample S1Y21. The acenaphthene relative percent difference (RPD) exceeded laboratory control criteria. The non-detected result in the parent sample was not flagged.

VIII. Laboratory Control Sample

The applicable Statement of Work does not require analysis of a laboratory control sample (LCS); therefore, no LCS was analyzed.

IX. Internal Standards

All internal standard areas and retention times were within the acceptance limits.

X. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

XI. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL) was not within the scope of the data review for this SDG.

XII. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XIII. Field Blanks

There were no field blanks in this SDG.

XIV. Field Duplicates

There were no field duplicates in this SDG.

XV. System Performance

Sample Y1S20 was analyzed at a tenfold dilution due to the oily matrix.

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XVI. Overall Assessment of Data

- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- Instrument calibration was generally acceptable. The responses of a few target analytes in the CCVs were diminished by more than 25 percent. However, these shifts were not likely to have had a significant impact on the sample results since the analytes were not detected in the samples.
- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/Kg)	Final Flag	Validation Comments
Y1S20	3,3'-Dichlorobenzidine	3700	UJ	IC%RSD
Y1S20	3-Nitroaniline	9200	UJ	IC%RSD
Y1S20	Hexachlorobenzene	3700	UJ	CCV<LCL
Y1S20	Hexachlorocyclopentadiene	3700	UJ	CCV<LCL
Y1S21	3,3'-Dichlorobenzidine	410	UJ	IC%RSD
Y1S21	3-Nitroaniline	1000	UJ	IC%RSD
Y1S21	Hexachlorobenzene	410	UJ	CCV<LCL
Y1S21	Hexachlorocyclopentadiene	410	UJ	CCV<LCL

CCV<LCL = Continuing calibration recovery less than lower control limit
IC%RSD = Initial calibration RSD exceeded

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 31, 2005
Report Date:	April 19, 2005
Parameters:	Semivolatile Organic Compounds
Laboratory:	Envirosystems, Inc.
Sample Delivery Group:	Y1S22

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLM04.3 and project-approved modifications described in Modification Reference Number 1183.0 for semi-volatile organic compounds (SVOC). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier II data validation. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative, and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The sample was received at the laboratory within control temperatures and with appropriate CoC forms; however, the custody seal on the cooler was not intact. Individual sample bottles did not contain sample tag ID numbers.

The holding-time requirement was met for the sample.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Initial Calibration

The relative standard deviation (RSD) of the relative response factors for 3-nitroaniline and 3, 3′-dichlorobenzidine in the initial calibration exceeded 30 percent. The associated non-detected results were flagged "UJ".

IV. Continuing Calibration

2, 2′-Oxybis(1-chloropropane), n-nitroso-di-n-propylamine, hexachloroethane, hexachlorocyclopentadiene, 2,4-dinitrophenol, 4,6-dinitro-2-methylphenol and pentachlorophenol were recovered below criteria in the continuing calibration verification (CCV) standard. Non-detected sample results were flagged "UJ".

4-Chloroaniline, 3-nitroaniline, 4-nitroaniline, carbazole and 3,3′-dichlorobenzidine were recovered above criteria in the CCV. The sample results were non-detect and no flags were applied.

V. Blanks

A method blank was analyzed as required. There were no detected results in the method blank.

VI. Surrogates

Surrogate recoveries were within acceptance criteria.

VII. Matrix Spike/Matrix Spike Duplicate

Matrix spike/matrix spike duplicates were not analyzed.

VIII. Laboratory Control Sample

The applicable Statement of Work does not require analysis of a laboratory control sample (LCS); therefore, no LCS was analyzed.

IX. Internal Standards

All internal standard areas and retention times were within the acceptance limits.

X. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

XI. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL) was not within the scope of the data review for this SDG.

XII. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XIII. Field Blanks

There were no field blanks in this SDG.

XIV. Field Duplicates

There were no field duplicates in this SDG.

XV. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XVI. Overall Assessment of Data

- Instrument calibration was generally acceptable. The responses of a few target analytes in the CCVs were diminished by more than 25 percent. However, these shifts were not likely to have had a significant impact on the sample results since the analytes were not detected in the samples.
- Samples were collected and analyzed based on approved methods/procedures and the results are reported using industry-standardized units.
- All of the results are useable for project objectives and therefore, the completeness objectives wee met for all method/analyte combinations.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1S22	2,2'-oxybis(1-Chloropropane)	10	UJ	CCV<LCL
Y1S22	2,4- Dinitrophenol	25	UJ	CCV<LCL
Y1S22	3,3'- Dichlorobenzidine	10	UJ	IC%RSD
Y1S22	3- Nitroaniline	25	UJ	IC%RSD
Y1S22	4,6-Dinitro-2-methylphenol	25	UJ	CCV<LCL
Y1S22	Hexachlorocyclopentadiene	10	UJ	CCV<LCL
Y1S22	Hexachloroethane	10	UJ	CCV<LCL
Y1S22	n-Nitroso-di-n-propylamine	10	UJ	CCV<LCL
Y1S22	Pentachlorophenol	25	UJ	CCV<LCL

CCV<LCL = Continuing calibration recovery less than lower control limit
IC%RSD = Initial calibration RSD exceeded

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 14, 2005
Report Date:	April 18, 2005
Parameters:	Semivolatile Organic Compounds
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05076A

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901038. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The sample was received at the laboratory with appropriate CoC forms and custody seals intact.

The cooler temperature exceeded the recommended control limit of 2.6 degrees Celsius at 13 degrees Celsius. However, because this is a non-aqueous phase liquid (NAPL) sample, no flags were applied.

Holding-time requirements were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Calibration

The initial calibration verification (ICV) percent difference (%D) for 4-chloroaniline was below acceptance criteria. The non-detected result was qualified as estimated and flagged "UJ".

The continuing calibration verification (CCV) %Ds for benzyl alcohol and di-n-octyl phthalate were below acceptance criteria. Both non-detected results were qualified as estimated and flagged "UJ".

IV. Blanks

A method blank was analyzed as required. No contamination detected.

V. Surrogates

Surrogate recoveries met acceptance criteria.

VI. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate (MS/MSD) was analyzed on sample MW-14LP-0305. Several analyte recoveries exceeded acceptance criteria. Detected results were qualified as estimated and "J" flagged. Non-detected results were not qualified due to the potential for high bias.

Several MS and/or MSDs were listed as not reported. Since the cause is unknown, the detected and non-detected sample results were qualified as estimated and flagged "J" and "UJ", respectively.

VII. Laboratory Control Sample

1,4-Dioxane exceeded the upper control limit in the laboratory control sample (LCS). The detected result was qualified as estimated and flagged "J".

VIII. Internal Standards

Summary forms not provided.

IX. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

X. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), was not within the scope of the data review for this SDG.

XI. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XII. Field Blanks

No field blanks in this SDG.

XIII. Field Duplicates

No field duplicates in this SDG.

XIV. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XV. Overall Assessment of Data

- No method blank contamination.
- Calibration, LCS and MS exceedances resulted in qualification of data as estimated concentrations.
- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data overall, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (UG/KG)	FINAL FLAG	VALIDATION COMMENTS
MW-14LP-0305	ACENAPHTHENE	350000	J	MS>UCL, SD>UCL
MW-14LP-0305	BUTYL BENZYL PHTHALATE	57000	J	MS<LCL, SD>UCL
MW-14LP-0305	BENZYL ALCOHOL	1700	UJ	CCV<LCL
MW-14LP-0305	BIS(2-CHLOROETHYL) ETHER	330	UJ	SD<LCL
MW-14LP-0305	2-CHLOROPHENOL	1700	UJ	SD<LCL
MW-14LP-0305	4-CHLOROANILINE	1700	UJ	ICVS<LCL
MW-14LP-0305	1,4-DICHLOROBENZENE	20000	J	MS<LCL, SD<LCL
MW-14LP-0305	1,4-DIOXANE	53000	J	LCS>UCL
MW-14LP-0305	DI-n-OCTYL PHTHALATE	330	UJ	CCV<LCL
MW-14LP-0305	HEXACHLOROETHANE	330	UJ	MS<LCL, SD<LCL
MW-14LP-0305	ISOPHORONE	330	UJ	MS<LCL
MW-14LP-0305	N-NITROSODIPROPYLAMINE	330	UJ	SD<LCL
MW-14LP-0305	PENTACHLOROPHENOL	63000	J	MS>UCL,SD>UCL
MW-14LP-0305	PHENANTHRENE	470000	J	MS>UCL,SD>UCL
MW-14LP-0305	PHENOL	1700	UJ	SD<LCL
MW-14LP-0305	PYRENE	160000	J	MS>UCL,SD>UCL

CCV<LCL = Continuing calibration recovery less than lower control limit
ICVS<LCL = Initial calibration verification standard recovery less than lower control limit
LCS>UCL = LCS recovery greater than upper control limit
MS<LCL = Matrix spike recovery less than lower limit
MS>UCL = Matrix spike recovery greater than upper limit
SD<LCL = Matrix spike duplicate recovery criteria less than lower limit
SD>UCL = Matrix spike duplicate recovery criteria greater than upper limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	April 21, 2005
Report Date:	June 6, 2005
Parameters:	Semivolatile Organic Compounds
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05112A

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901038. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory with appropriate CoC forms and custody seals intact.

The cooler temperature exceeded the recommended control limit. Samples did not have sufficient time to cool. Data were not qualified.

Holding-time requirements were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Calibration

Benzyl alcohol was not detected in the initial calibration standards or in the continuing calibration verification (CCV), and therefore, no results were reported for this analyte.

The initial calibration verification (ICV) percent difference (%D) for 4-chloroaniline was below acceptance criteria. The non-detected result was qualified as estimated and flagged "UJ".

The CCV recoveries for hexachlorocyclopentadiene, 2,4-dinitrophenol, 4,6-dinitro-2-methylphenol and pentachlorophenol was less than the control limits. Detected and non-detected results were qualified as estimated and "J" and "UJ" flagged, respectively.

IV. Blanks

The method blank contained bis(2-chloroethy)ether greater than the contract required quantitation limit (CRQL), equivalent to the reporting limit (RL). Data were not qualified because the sample result was non-detected for this analyte.

V. Surrogates

The surrogate, 2-fluorophenol, exceeded the lower control limit in the sample. The non-detected result for 2-chlorophenol was qualified as estimated and flagged "UJ".

VI. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate (MS/MSD) was analyzed on sample MW-12-0305. Several analyte recoveries exceeded the upper control limits of the MS and/or MSD. Detected results were qualified as estimated and "J" flagged.

Several MS/MSD analyte recoveries were less than the lower control limits. Detected and non-detected sample results were qualified as estimated and flagged "J" and "UJ", respectively.

The relative percent difference between the MS and MSD was exceeded for three analytes. The detected result for pentachlorophenol was qualified as estimated and flagged "J" and the non-detected results were not qualified.

4-Chloroaniline and 3,3-dichlorobenzidine were not recovered in either the MS or MSD. Non-detected sample results were unusable and flagged "R".

Hexachloroethane, 2-methylphenol and 3&4-methylphenol in the MS and/or MSD were listed as not reported. Since the cause is unknown, the detected and non-detected sample results were qualified as estimated and flagged "J" and "UJ", respectively.

VII. Laboratory Control Sample

2,4-Dinitrotoluene and dimethyl phthalate recovered less than the lower control limits in the laboratory control sample (LCS). Non-detected results were qualified as estimated and flagged "UJ".

VIII. Internal Standards

Summary forms were not provided.

IX. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

X. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported CRQLs, was not within the scope of the data review for this SDG.

XI. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XII. Field Blanks

The equipment blank contained 4-chloro-3-methyl phenol greater than the CRQL. Data were not qualified because the sample concentration was greater than five times the blank concentration.

XIII. Field Duplicates

No field duplicates in this SDG.

XIV. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XV. Overall Assessment of Data

- The equipment blank contained a detectable level of 4-chloro-3-methyl phenol. No impact on data quality.
- Calibration and surrogate exceedances resulted in qualification of data as estimated concentrations.
- LCS and MS exceedances resulted in qualification of data as estimated concentrations. Two analytes however, 4-Chloroaniline and 3,3-dichlorobenzidine, were rejected and determined unusable.
- The completeness objectives were met for all method/analyte combinations except for 4-chloroaniline and 3,3-dichlorobenzidine which were unusable.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (UG/L)	FINAL FLAG	VALIDATION COMMENTS
MW-12-0305	ACENAPHTHENE	1.0	UJ	SD<LCL
MW-12-0305	2-CHLOROPHENOL	5.0	UJ	SUR<LCL
MW-12-0305	2-METHYLPHENOL	540	J	SD<LCL
MW-12-0305	3&4-METHYLPHENOL	840	J	MS<LCL, SD<LCL
MW-12-0305	4-CHLORO-3-METHYLPHENOL	58	J	MS<LCL, SD<LCL
MW-12-0305	4-CHLOROANILINE	5.0	R	ICVS<LCL, MS<LCL, SD<LCL
MW-12-0305	3,3'-DICHLOROBENZIDINE	5.0	R	MS<LCL, SD<LCL
MW-12-0305	1,4-DIOXANE	30	J	MS>UCL
MW-12-0305	DIMETHYL PHTHALATE	1.0	UJ	LCS<LCL
MW-12-0305	4,6-DINITRO-2-METHYLPHENOL	5.0	UJ	CCV<LCL
MW-12-0305	2,4-DINITROPHENOL	5.0	UJ	CCV<LCL
MW-12-0305	2,4-DINITROTOLUENE	1.0	UJ	LCS<LCL, SD<LCL
MW-12-0305	3-NITROANILINE	5.0	UJ	SD<LCL
MW-12-0305	HEXACHLOROCYCLOPENTADIENE	0.5	UJ	CCV<LCL
MW-12-0305	HEXACHLOROETHANE	1.0	UJ	MS<LCL
MW-12-0305	4-NITROPHENOL	5.0	UJ	SD<LCL, MS<LCL
MW-12-0305	PENTACHLOROPHENOL	11	J	CCV<LCL, MSRPD, SD>UCL
MW-12-0305	PHENOL	190	J	MS<LCL, SD<LCL

CCV<LCL = Continuing calibration recovery less than lower control limit
ICVS<LCL = Initial calibration verification standard recovery less than lower control limit
LCS<LCL = LCS recovery less than lower control limit
MS<LCL = Matrix spike recovery less than lower limit
MS>UCL = Matrix spike recovery greater than upper limit
MSRPD = Matrix spike RPD criteria exceedance
SD<LCL = Matrix spike duplicate recovery criteria less than lower limit
SD>UCL = Matrix spike duplicate recovery criteria greater than upper limit
SUR<LCL = Surrogate recovery less than lower limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 15, 16, 17 and 18, 2005
Report Date:	April 09, 2005
Parameters:	Volatile Organic Compounds
Laboratory:	Envirosystems, Inc.
Sample Delivery Group:	Y1RY2

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLM04.3 and project-approved modifications described in Modification Reference Number 1183.0 for volatile organic compounds (VOC). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier II data validation. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals in tact. Individual sample bottles did not contain sample tag ID numbers.

Sample Y1S14 had a collection date of 3/14/05 when it was actually collected on 3/15/05.

All technical holding times were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Initial Calibration

The relative standard deviation (RSD) of the relative response factors of 2-butanone, methyl acetate, methylene chloride, 2-hexanone and 1,2-dibromo-3-chloropropane in the initial calibration exceeded 30 percent. The associated non-detected results were flagged "UJ" and detected results were flagged "J". All other initial calibration results met the requirements.

IV. Continuing Calibration

In continuing calibration verification (CCV), VSTD010BQ, bromomethane, methyl acetate, 2-butanone, 4-methyl-2-pentanone, 2-hexanone and 1, 2-dibromo-3-chloropropane were below criteria. All associated results were non-detect and flagged "UJ".

Isopropylbenzene in CCV VSTD010BQ was above criteria. There were no detected results associated with this CCV, thus no flags were applied.

In CCVs VSTD010BM and VSTD010BN, methyl acetate and 2-hexanone were below criteria. All associated results were non-detect and flagged "UJ". Acetone was above criteria in both CCVs and carbon disulfide was above criteria in CCV VSTD010BN. Associated detected results were flagged "J".

In all CCVs, the response factor (RF) for tert-butyl alcohol was less than 0.01 as specified in Modification Reference Number 1183.0. Non-detected sample results were flagged "R".

V. Blanks

The method blanks were analyzed as required. Methylene chloride was detected in method blanks VBLKBM and VBLKBQ above the contract required quantitation limit (CRQL). Associated sample detects less than 10 times the blank concentrations were flagged "U".

VI. System Monitoring Compounds

Toluene-d8 and 1,2-Dichloroethane-d4 surrogate recoveries were above the acceptance criteria in sample Y1S01. Detected results were qualified as estimated and flagged "J".

VII. Matrix Spike/Matrix Spike Duplicate

A matrix spike and matrix spike duplicate (MS/MSD) were analyzed on sample Y1RZ5. Trichloroethene and benzene recoveries in the MSD were above acceptance criteria. Parent sample detects were flagged "J".

VIII. Laboratory Control Sample

The applicable Statement of Work does not require analysis of a laboratory control sample (LCS); therefore, no LCS was analyzed.

IX. Internal Standards

All internal standard recoveries were within acceptance criteria with the exception of bromochloromethane in sample Y1S01. The recovery was biased low. Associated detected results in this sample were flagged "J" and non-detected results were flagged "UJ".

X. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

XI. Compound Quantitation and Reported CRQLs

Several samples were initially analyzed at dilutions due to high concentrations of target compounds. In addition, many of the samples foamed during purging.

Verification of quantitation and accuracy of reported CRQLs was not within the scope of the data review for this SDG.

XII. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XIII. Field Blanks

There were three trip blanks and two equipment blanks associated with this SDG. Trip blanks Y1S07 and Y1S08 had detects above the CRQL for carbon disulfide. There were no associated sample detects. Trip blank Y1S10 had detects for 1,1-dichloroethane and cis-1,2-dichloroethene above the CRQL. There were no associated sample detects. There were no detects in either of the two equipment blanks.

XIV. Field Duplicates

Samples Y1S00 and Y1S01 were designated as a field duplicate pair. Sample Y1S00 was analyzed undiluted and at a 25-fold dilution. Sample Y1S01 was analyzed at 5 and 25-fold dilutions. Therefore, reporting limits for non-detected analytes were not comparable; no flags were applied. Trichloroethene detected results exceeded RPD criteria. "J" flags were applied to the parent and field duplicate results. Acetone was detected in the fivefold dilution of Y1S01, but was not detected in the undiluted analysis of Y1S00. "J" and "UJ" flags were applied respectively.

XV. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XVI. Overall Assessment of Data

- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- Instrument calibration was generally acceptable. Several compound RSDs exceeded calibration criteria and the responses of a few target analytes in the CCVs were diminished by more than 25 percent. However, these shifts were not likely to have had a significant impact on the sample results.
- Tert-butyl-alcohol CCVs were below the minimum RF criteria. Data was not useable for this analyte. The completeness goal was not met for this analyte. All other results are useable for project objectives.

- One target analyte was detected in the associated method blank and resulted in detected data qualified as non-detects.
- Surrogate, field duplicate, MSD and internal standard exceedances resulted in data qualified as estimated concentrations.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1RY2	1,2-DIBROMO-3-CHLOROPROPANE	0.5	UJ	IC%RSD
Y1RY2	2-BUTANONE	10	UJ	IC%RSD
Y1RY2	2-HEXANONE	10	UJ	CCV<LCL
Y1RY2	2-HEXANONE	10	UJ	IC%RSD
Y1RY2	METHYL ACETATE	0.5	UJ	CCV<LCL
Y1RY2	METHYL ACETATE	0.5	UJ	IC%RSD
Y1RY2	METHYLENE CHLORIDE	0.5	UJ	IC%RSD
Y1RY2	TERT-BUTYL ALCOHOL	50	R	CCV<RFMod
Y1RY3	1,2-DIBROMO-3-CHLOROPROPANE	0.5	UJ	IC%RSD
Y1RY3	2-BUTANONE	10	UJ	IC%RSD
Y1RY3	2-HEXANONE	10	UJ	CCV<LCL
Y1RY3	2-HEXANONE	10	UJ	IC%RSD
Y1RY3	METHYL ACETATE	0.5	UJ	CCV<LCL
Y1RY3	METHYL ACETATE	0.5	UJ	IC%RSD
Y1RY3	METHYLENE CHLORIDE	0.7	U	IC%RSD
Y1RY3	METHYLENE CHLORIDE	0.7	U	LB>RL
Y1RY3	TERT-BUTYL ALCOHOL	50	R	CCV<RFMod
Y1RY5	1,2-DIBROMO-3-CHLOROPROPANE	0.5	UJ	IC%RSD
Y1RY5	2-BUTANONE	10	UJ	IC%RSD
Y1RY5	2-HEXANONE	10	UJ	CCV<LCL
Y1RY5	2-HEXANONE	10	UJ	IC%RSD
Y1RY5	METHYL ACETATE	0.5	UJ	CCV<LCL
Y1RY5	METHYL ACETATE	0.5	UJ	IC%RSD
Y1RY5	METHYLENE CHLORIDE	1	U	IC%RSD
Y1RY5	METHYLENE CHLORIDE	1	U	LB>RL
Y1RY5	Tertiary Butyl Alcohol	50	R	CCV<RFMod
Y1RY6	1,2-DIBROMO-3-CHLOROPROPANE	0.5	UJ	IC%RSD
Y1RY6	2-BUTANONE	10	UJ	IC%RSD
Y1RY6	2-HEXANONE	10	UJ	CCV<LCL
Y1RY6	2-HEXANONE	10	UJ	IC%RSD
Y1RY6	METHYL ACETATE	0.5	UJ	CCV<LCL
Y1RY6	METHYL ACETATE	0.5	UJ	IC%RSD
Y1RY6	METHYLENE CHLORIDE	0.6	U	IC%RSD
Y1RY6	METHYLENE CHLORIDE	0.6	U	LB>RL
Y1RY6	TERT-BUTYL ALCOHOL	50	R	CCV<RFMod
Y1RY8	1,2-DIBROMO-3-CHLOROPROPANE	0.5	UJ	IC%RSD

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1RY8	2-BUTANONE	10	UJ	IC%RSD
Y1RY8	2-HEXANONE	10	UJ	CCV<LCL
Y1RY8	2-HEXANONE	10	UJ	IC%RSD
Y1RY8	METHYL ACETATE	0.5	UJ	CCV<LCL
Y1RY8	METHYL ACETATE	0.5	UJ	IC%RSD
Y1RY8	METHYLENE CHLORIDE	0.5	UJ	IC%RSD
Y1RY8	TERT-BUTYL ALCOHOL	50	R	CCV<RFMod
Y1RY9	1,2-DIBROMO-3-CHLOROPROPANE	0.5	UJ	IC%RSD
Y1RY9	2-BUTANONE	10	UJ	IC%RSD
Y1RY9	2-HEXANONE	10	UJ	CCV<LCL
Y1RY9	2-HEXANONE	10	UJ	IC%RSD
Y1RY9	METHYL ACETATE	0.5	UJ	CCV<LCL
Y1RY9	METHYL ACETATE	0.5	UJ	IC%RSD
Y1RY9	METHYLENE CHLORIDE	0.5	UJ	IC%RSD
Y1RY9	TERT-BUTYL ALCOHOL	50	R	CCV<RFMod
Y1RZ0	1,2-DIBROMO-3-CHLOROPROPANE	0.5	UJ	IC%RSD
Y1RZ0	2-BUTANONE	10	UJ	IC%RSD
Y1RZ0	2-HEXANONE	10	UJ	CCV<LCL
Y1RZ0	2-HEXANONE	10	UJ	IC%RSD
Y1RZ0	METHYL ACETATE	0.5	UJ	CCV<LCL
Y1RZ0	METHYL ACETATE	0.5	UJ	IC%RSD
Y1RZ0	METHYLENE CHLORIDE	0.8	U	IC%RSD
Y1RZ0	METHYLENE CHLORIDE	0.8	U	LB>RL
Y1RZ0	TERT-BUTYL ALCOHOL	50	R	CCV<RFMod
Y1RZ1	1,2-DIBROMO-3-CHLOROPROPANE	0.5	UJ	IC%RSD
Y1RZ1	2-BUTANONE	10	UJ	IC%RSD
Y1RZ1	2-HEXANONE	10	UJ	CCV<LCL
Y1RZ1	2-HEXANONE	10	UJ	IC%RSD
Y1RZ1	METHYL ACETATE	0.5	UJ	CCV<LCL
Y1RZ1	METHYL ACETATE	0.5	UJ	IC%RSD
Y1RZ1	METHYLENE CHLORIDE	0.5	U	IC%RSD
Y1RZ1	METHYLENE CHLORIDE	0.5	U	LB>RL
Y1RZ1	TERT-BUTYL ALCOHOL	50	R	CCV<RFMod
Y1RZ5	1,2-DIBROMO-3-CHLOROPROPANE	0.5	UJ	IC%RSD
Y1RZ5	2-BUTANONE	10	UJ	IC%RSD
Y1RZ5	2-HEXANONE	10	UJ	CCV<LCL
Y1RZ5	2-HEXANONE	10	UJ	IC%RSD
Y1RZ5	BENZENE	2	J	SD>UCL
Y1RZ5	METHYL ACETATE	0.5	UJ	CCV<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1RZ5	METHYL ACETATE	0.5	UJ	IC%RSD
Y1RZ5	METHYLENE CHLORIDE	0.5	UJ	IC%RSD
Y1RZ5	TERT-BUTYL ALCOHOL	50	R	CCV<RFMod
Y1RZ5	TRICHLOROETHENE	7	J	SD>UCL
Y1RZ6	1,2-DIBROMO-3-CHLOROPROPANE	0.5	UJ	IC%RSD
Y1RZ6	2-BUTANONE	10	UJ	IC%RSD
Y1RZ6	2-HEXANONE	10	UJ	CCV<LCL
Y1RZ6	2-HEXANONE	10	UJ	IC%RSD
Y1RZ6	ACETONE	4	J	CCV>UCL
Y1RZ6	METHYL ACETATE	0.5	UJ	CCV<LCL
Y1RZ6	METHYL ACETATE	0.5	UJ	IC%RSD
Y1RZ6	METHYLENE CHLORIDE	0.8	J	IC%RSD
Y1RZ6	TERT-BUTYL ALCOHOL	50	R	CCV<RFMod
Y1RZ7	1,2-DIBROMO-3-CHLOROPROPANE	0.5	UJ	CCV<LCL
Y1RZ7	1,2-DIBROMO-3-CHLOROPROPANE	0.5	UJ	IC%RSD
Y1RZ7	2-BUTANONE	10	UJ	CCV<LCL
Y1RZ7	2-BUTANONE	10	UJ	IC%RSD
Y1RZ7	2-HEXANONE	10	UJ	CCV<LCL
Y1RZ7	2-HEXANONE	10	UJ	IC%RSD
Y1RZ7	4-METHYL-2-PENTANONE	10	UJ	CCV<LCL
Y1RZ7	BROMOMETHANE	0.5	UJ	CCV<LCL
Y1RZ7	METHYL ACETATE	0.5	UJ	CCV<LCL
Y1RZ7	METHYL ACETATE	0.5	UJ	IC%RSD
Y1RZ7	METHYLENE CHLORIDE	0.5	UJ	IC%RSD
Y1RZ7	TERT-BUTYL ALCOHOL	50	R	CCV<RFMod
Y1RZ9	1,2-DIBROMO-3-CHLOROPROPANE	0.5	UJ	IC%RSD
Y1RZ9	2-BUTANONE	10	UJ	IC%RSD
Y1RZ9	2-HEXANONE	10	UJ	CCV<LCL
Y1RZ9	2-HEXANONE	10	UJ	IC%RSD
Y1RZ9	METHYL ACETATE	0.5	UJ	CCV<LCL
Y1RZ9	METHYL ACETATE	0.5	UJ	IC%RSD
Y1RZ9	METHYLENE CHLORIDE	7	J	IC%RSD
Y1RZ9	TERT-BUTYL ALCOHOL	1800	R	CCV<RFMod
Y1S00	1,2-DIBROMO-3-CHLOROPROPANE	0.5	UJ	IC%RSD
Y1S00	2-BUTANONE	10	UJ	IC%RSD
Y1S00	2-HEXANONE	10	UJ	CCV<LCL
Y1S00	2-HEXANONE	10	UJ	IC%RSD
Y1S00	ACETONE	10	UJ	FD>RPD
Y1S00	METHYL ACETATE	0.5	UJ	CCV<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1S00	METHYL ACETATE	0.5	UJ	IC%RSD
Y1S00	METHYLENE CHLORIDE	1	J	IC%RSD
Y1S00	TERT-BUTYL ALCOHOL	50	R	CCV<RFMod
Y1S00	TRICHLOROETHENE	5	J	FD>RPD
Y1S01	1,1,1-TRICHLOROETHANE	0.5	UJ	IS<LCL
Y1S01	1,1,2,2-TETRACHLOROETHANE	0.5	UJ	IS<LCL
Y1S01	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	0.5	UJ	IS<LCL
Y1S01	1,1,2-TRICHLOROETHANE	0.5	UJ	IS<LCL
Y1S01	1,1-DICHLOROETHANE	0.5	UJ	IS<LCL
Y1S01	1,1-DICHLOROETHENE	0.5	UJ	IS<LCL
Y1S01	1,2,4-TRICHLOROBENZENE	0.5	UJ	IS<LCL
Y1S01	1,2-DIBROMO-3-CHLOROPROPANE	0.5	UJ	IC%RSD
Y1S01	1,2-DIBROMO-3-CHLOROPROPANE	0.5	UJ	IS<LCL
Y1S01	1,2-DIBROMOETHANE	0.5	UJ	IS<LCL
Y1S01	1,2-DICHLOROBENZENE	0.5	UJ	IS<LCL
Y1S01	1,2-DICHLOROETHANE	0.5	UJ	IS<LCL
Y1S01	1,2-DICHLOROPROPANE	0.5	UJ	IS<LCL
Y1S01	1,3-DICHLOROBENZENE	0.5	UJ	IS<LCL
Y1S01	1,4-DICHLOROBENZENE	0.5	UJ	IS<LCL
Y1S01	2-BUTANONE	10	UJ	IC%RSD
Y1S01	2-BUTANONE	10	UJ	IS<LCL
Y1S01	2-HEXANONE	10	UJ	CCV<LCL
Y1S01	2-HEXANONE	10	UJ	IC%RSD
Y1S01	2-HEXANONE	10	UJ	IS<LCL
Y1S01	4-METHYL-2-PENTANONE	10	UJ	IS<LCL
Y1S01	ACETONE	25	J	CCV>UCL
Y1S01	ACETONE	25	J	FD>RPD
Y1S01	ACETONE	25	J	IS<LCL
Y1S01	ACETONE	25	J	Sur>UCL
Y1S01	BENZENE	0.5	UJ	IS<LCL
Y1S01	BROMODICHLOROMETHANE	0.5	UJ	IS<LCL
Y1S01	BROMOFORM	0.5	UJ	IS<LCL
Y1S01	BROMOMETHANE	0.5	UJ	IS<LCL
Y1S01	CARBON DISULFIDE	0.5	UJ	IS<LCL
Y1S01	CARBON TETRACHLORIDE	0.5	UJ	IS<LCL
Y1S01	CHLOROBENZENE	0.5	UJ	IS<LCL
Y1S01	CHLOROETHANE	0.5	UJ	IS<LCL
Y1S01	CHLOROFORM	0.5	UJ	IS<LCL
Y1S01	CHLOROMETHANE	0.5	UJ	IS<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1S01	CIS-1,3-DICHLOROPROPENE	0.5	UJ	IS<LCL
Y1S01	CYCLOHEXANE	0.5	UJ	IS<LCL
Y1S01	DIBROMOCHLOROMETHANE	0.5	UJ	IS<LCL
Y1S01	DICHLORODIFLUOROMETHANE	0.5	UJ	IS<LCL
Y1S01	ETHYL TERT-BUTYL ALCOHOL	50	UJ	IS<LCL
Y1S01	ETHYLBENZENE	0.5	UJ	IS<LCL
Y1S01	ISOPROPYLBENZENE	0.5	UJ	IS<LCL
Y1S01	METHYL ACETATE	0.5	UJ	CCV<LCL
Y1S01	METHYL ACETATE	0.5	UJ	IC%RSD
Y1S01	METHYL ACETATE	0.5	UJ	IS<LCL
Y1S01	METHYL TERT-BUTYL ETHER	0.5	UJ	IS<LCL
Y1S01	METHYLCYCLOHEXANE	0.5	UJ	IS<LCL
Y1S01	METHYLENE CHLORIDE	0.5	UJ	IC%RSD
Y1S01	METHYLENE CHLORIDE	0.5	UJ	IS<LCL
Y1S01	STYRENE	0.5	UJ	IS<LCL
Y1S01	TERT-AMYL METHYL ETHER	50	UJ	IS<LCL
Y1S01	TERT-BUTYL ALCOHOL	250	R	CCV<RFMod
Y1S01	TERT-BUTYL ALCOHOL	250	R	IS<LCL
Y1S01	TETRACHLOROETHENE	0.5	UJ	IS<LCL
Y1S01	TOLUENE	0.5	UJ	IS<LCL
Y1S01	TRANS-1,2-DICHLOROETHENE	0.5	UJ	IS<LCL
Y1S01	TRANS-1,3-DICHLOROPROPENE	0.5	UJ	IS<LCL
Y1S01	TRICHLOROETHENE	34	J	FD>RPD
Y1S01	TRICHLOROETHENE	34	J	IS<LCL
Y1S01	TRICHLOROETHENE	34	J	Sur>UCL
Y1S01	TRICHLOROFLUOROMETHANE	0.5	UJ	IS<LCL
Y1S01	VINYL CHLORIDE	0.5	UJ	IS<LCL
Y1S01	XYLENES (TOTAL)	0.5	UJ	IS<LCL
Y1S12	1,2-DIBROMO-3-CHLOROPROPANE	0.5	UJ	IC%RSD
Y1S12	2-BUTANONE	10	UJ	IC%RSD
Y1S12	2-HEXANONE	10	UJ	CCV<LCL
Y1S12	2-HEXANONE	10	UJ	IC%RSD
Y1S12	METHYL ACETATE	0.5	UJ	CCV<LCL
Y1S12	METHYL ACETATE	0.5	UJ	IC%RSD
Y1S12	METHYLENE CHLORIDE	0.9	J	IC%RSD
Y1S12	TERT-BUTYL ALCOHOL	50	R	CCV<RFMod

CCV<LCL = Continuing calibration recovery less than lower control limit
CCV<RFMod = Analyte exceeds RF < 0.01 criteria

CCV>UCL = Continuing calibration recovery greater than upper control limit
FD>RPD = Field duplicate exceeds RPD criteria
IC%RSD = Initial calibration RSD exceeded
IS<LCL = Internal standard response less than lower control limit
LB>RL = Laboratory blank contamination greater than RL
SD>UCL = Matrix spike duplicate recovery criteria greater than upper limit
Sur>UCL = Surrogate recovery greater than upper limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 15, 17, 18, 22 and 23, 2005
Report Date:	April 14, 2005
Parameters:	Volatile Organic Compounds
Laboratory:	Envirosystems, Inc.
Sample Delivery Group:	Y1S16

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLM04.3 and project-approved modifications described in Modification Reference Number 1183.0 for volatile organic compounds (VOC). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier III data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier II data validation. The intended objective of the data review process was to provide a technical review of the data and to provide verification of calculations and analyte identification. It was not intended to determine contract compliance.

The scope of the data review included the chain-of-custody (CoC) records, the case narrative, completed CLP data summary forms and raw data.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

The CoC listed five bottles each for samples Y1S16 and Y1S17. The laboratory received 10 bottles identified as Y1S16. The laboratory was instructed to divide the bottles evenly and identify them as samples Y1S16 and Y1S17. These samples were equipment blanks (EB).

Sample Y1S03 was analyzed one day past the 14-day holding time because of matrix issues (the sample foamed). The sample was qualified as estimated. Detected sample results were flagged "J" and non-detected results were flagged "UJ".

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met. Ion abundance calculations were verified for several masses.

III. Initial Calibration

In the initial calibration (ICAL), the relative standard deviation (RSD) of the relative response factors (RRF) for 1,2-dibromo-3-chloropropane, 2-butanone, 2-hexanone, methyl acetate and methylene chloride exceeded 30 percent. The associated non-detected results were flagged "UJ" and detected results were flagged "J".

The RRF for 1,2-dibromo-3-chloropropane was below the minimum RRF criteria of 0.05. 1,2-Dibromo-3-chloropropane non-detected results were unuseable and flagged "R".

Tert-butyl alcohol exceeded the 30 percent RSD criteria and had a RRF below 0.05. However, this was an additional compound requested in Modification Reference Number 1183.0 with criteria of 50 percent RSD and a 0.01 RRF. These modified criteria were met in the ICAL.

Calculations for the ICAL RRF and RSD criteria were verified. All other initial calibration results met the requirements.

IV. Continuing Calibration

In the continuing calibration verification (CCV) VSTD010BQ, bromomethane, methyl acetate, 2-butanone, 4-methyl-2-pentanone, 2-hexanone and 1, 2-dibromo-3-chloropropane were below acceptance criteria. Associated non-detected results were flagged "UJ" and detected results were flagged "J".

Isopropylbenzene in CCV VSTD010BQ was above acceptance criteria. There were no detected results associated with this CCV, thus no flags were applied.

In CCV VSTD010BY, bromomethane, methyl tert-butyl ether, 2-butanone and tert-butyl alcohol were below acceptance criteria. Associated non-detected sample results were flagged "UJ" and detected results were flagged "J". Ethyl tert-butyl ether and tert-amyl methyl ether percent differences (%D) were below 25 percent. However, these were additional compounds requested in Modification Reference Number 1183.0 with broader criteria. These additional criteria were met and therefore, no data were qualified.

Chloromethane and isopropylbenzene in CCV VSTD010BY were above acceptance criteria. One isopropylbenzene detected result was affected and flagged "J".

The RRF for tert-butyl alcohol was below the minimum RRF of 0.01 in both CCVs as stated in the Modification Reference Number 1183.0. All associated non-detected results were flagged "R".

The RRF for 1, 2-dibromo-3-chloropropane was below the mimimum RRF criteria of 0.05 in both CCVs and therefore, the non-detected results were qualified as unuseable and flagged "R".

The CCV RRF and %D calculations were verified.

V. Blanks

The method blanks and storage blanks were analyzed as required. Raw data were reviewed. There were no detected results in the blanks.

VI. System Monitoring Compounds

All surrogate recoveries were within acceptance criteria. The surrogate recovery calculation was verified.

VII. Matrix Spike/Matrix Spike Duplicate

A matrix spike and matrix spike duplicate (MS/MSD) were analyzed on sample Y1S04. All acceptance criteria were met. The MS/MSD recoveries and relative percent difference (RPD) calculations were verified.

VIII. Laboratory Control Sample

The applicable Statement of Work does not require analysis of a laboratory control sample (LCS); therefore, no LCS was analyzed.

IX. Internal Standards

All internal standard recoveries were within acceptance criteria with the exception of 1,4-difluorobenzene in sample Y1RZ3. The recovery was biased low. Associated detected results in this sample were flagged "J" and non-detected results were flagged "UJ".

X. Target Compound Identification

Compound identification was verified by raw data review on a percentage of the sample detected results.

XI. Compound Quantitation and Reported CRQLs

Several samples were initially analyzed at dilutions due to high concentrations of target compounds. The dilutions were based on results of unreported analyses. In addition, many of the samples foamed during purging.

Manual integration was performed on acetone and tert-butyl alcohol in several of the standards. Documentation was provided; however, only the reintegration was provided.

Compound quantitation and accuracy were verified.

XII. Tentatively Identified Compounds

Tentatively identified compounds in the samples were reviewed.

XIII. Field Blanks

There were four EBs Y1S16, Y1S17, Y1S18, and Y1S19 and one trip blank (TB), Y1S11, received with the samples in this SDG. Only EBs Y1S18 and Y1S19 had sample collection dates the same as the samples. Carbon disulfide was detected above the contract required quantitation limit (CRQL), equivalent to reporting limit, in the TB. One associated detected result less than five

times the blank concentration was flagged "U". One EB, Y1S18, had detected results above the CRQL for chlorobenzene, 1,4-dichlorobenzene and 1,2-dichlorobenzene. Associated detected results were either non-detect or greater than five times the blank concentrations and therefore, no flags were applied.

XIV. Field Duplicates

Samples Y1RZ2 and Y1RZ3 were designated as a field duplicate pair. Vinyl chloride, trans-1,2-dichloroethene, methyl tert-butyl ether and chlorobenzene detected results exceeded RPD criteria. "J" flags were applied to the parent sample and field duplicate results.

XV. System Performance

The system performance was evaluated by reviewing the chromatographic data. Overall, the system was in control.

XVI. Overall Assessment of Data

- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- Instrument calibration was generally acceptable. Several RSDs exceeded calibration criteria and the responses of a few analytes in the CCVs were diminished by more than 25 percent. However, these shifts were not likely to have had a significant impact on the sample results since the analytes were not detected in the samples.
- 1, 2-Dibromo-3-chloropropane in both the ICAL and CCVs and tert-butyl alcohol in the CCVs were below the minimum criteria. Data were not useable for these analytes. The completeness goal was not met for these analytes.
- Laboratory contamination was not an issue during sample analysis.
- One sample was analyzed past holding time by one day. However, the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations except for tert-butyl alcohol and 1, 2-dibromo-3-chloropropane.
- Trip blank contamination affected one analyte which was flagged as a non-detect.
- An internal standard exceedance affected one sample. Sample results were qualified as estimated detects and non-detects.
- Field duplicate RPD exceedances were observed and three pairs were flagged as estimated detects.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1RY7	1,2-DIBROMO-3-CHLOROPROPANE	0.5	R	CCV<LCL
Y1RY7	1,2-DIBROMO-3-CHLOROPROPANE	0.5	R	IC%RSD
Y1RY7	1,2-DIBROMO-3-CHLOROPROPANE	0.5	R	IC RRF
Y1RY7	1,2-DIBROMO-3-CHLOROPROPANE	0.5	R	CCV RRF
Y1RY7	2-BUTANONE	4	UJ	CCV<LCL
Y1RY7	2-BUTANONE	4	UJ	IC%RSD
Y1RY7	2-HEXANONE	4	UJ	CCV<LCL
Y1RY7	2-HEXANONE	4	UJ	IC%RSD
Y1RY7	4-METHYL-2-PENTANONE	4	UJ	CCV<LCL
Y1RY7	BROMOMETHANE	0.5	UJ	CCV<LCL
Y1RY7	CARBON DISULFIDE	0.6	U	TB>RL
Y1RY7	METHYL ACETATE	0.5	UJ	CCV<LCL
Y1RY7	METHYL ACETATE	0.5	UJ	IC%RSD
Y1RY7	METHYLENE CHLORIDE	0.5	UJ	IC%RSD
Y1RY7	TERT-BUTYL ALCOHOL	50	R	CCV RRF
Y1RZ2	1,2-DIBROMO-3-CHLOROPROPANE	0.5	R	CCV<LCL
Y1RZ2	1,2-DIBROMO-3-CHLOROPROPANE	0.5	R	CCV RRF
Y1RZ2	1,2-DIBROMO-3-CHLOROPROPANE	0.5	R	IC%RSD
Y1RZ2	1,2-DIBROMO-3-CHLOROPROPANE	0.5	R	IC RRF
Y1RZ2	2-BUTANONE	4	UJ	CCV<LCL
Y1RZ2	2-BUTANONE	4	UJ	IC%RSD
Y1RZ2	2-HEXANONE	4	UJ	CCV<LCL
Y1RZ2	2-HEXANONE	4	UJ	IC%RSD
Y1RZ2	4-METHYL-2-PENTANONE	4	UJ	CCV<LCL
Y1RZ2	BROMOMETHANE	0.5	UJ	CCV<LCL
Y1RZ2	CHLOROBENZENE	37	J	FD>RPD
Y1RZ2	METHYL ACETATE	0.5	UJ	CCV<LCL
Y1RZ2	METHYL ACETATE	0.5	UJ	IC%RSD
Y1RZ2	METHYL TERT-BUTYL ETHER	4	J	FD>RPD
Y1RZ2	METHYLENE CHLORIDE	0.5	UJ	IC%RSD
Y1RZ2	TERT-BUTYL ALCOHOL	50	R	CCV RRF
Y1RZ2	TRANS-1,2-DICHLOROETHENE	3	J	FD>RPD
Y1RZ2	VINYL CHLORIDE	10	J	FD>RPD
Y1RZ3	1,1,1-TRICHLOROETHANE	0.5	UJ	IS<LCL
Y1RZ3	1,1,2,2-TETRACHLOROETHANE	0.5	UJ	IS<LCL
Y1RZ3	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	0.5	UJ	IS<LCL
Y1RZ3	1,1,2-TRICHLOROETHANE	0.5	UJ	IS<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1RZ3	1,1-DICHLOROETHANE	0.5	UJ	IS<LCL
Y1RZ3	1,1-DICHLOROETHENE	0.5	UJ	IS<LCL
Y1RZ3	1,2,4-TRICHLOROBENZENE	0.5	UJ	IS<LCL
Y1RZ3	1,2-DIBROMO-3-CHLOROPROPANE	0.5	R	CCV<LCL
Y1RZ3	1,2-DIBROMO-3-CHLOROPROPANE	0.5	R	CCV RRF
Y1RZ3	1,2-DIBROMO-3-CHLOROPROPANE	0.5	R	IC%RSD
Y1RZ3	1,2-DIBROMO-3-CHLOROPROPANE	0.5	R	IC RRF
Y1RZ3	1,2-DIBROMO-3-CHLOROPROPANE	0.5	R	IS<LCL
Y1RZ3	1,2-DIBROMOETHANE	0.5	UJ	IS<LCL
Y1RZ3	1,2-DICHLOROETHANE	0.5	UJ	IS<LCL
Y1RZ3	1,2-DICHLOROPROPANE	0.5	UJ	IS<LCL
Y1RZ3	1,3-DICHLOROBENZENE	0.5	UJ	IS<LCL
Y1RZ3	1,4-DICHLOROBENZENE	2	J	IS<LCL
Y1RZ3	2-BUTANONE	4	UJ	CCV<LCL
Y1RZ3	2-BUTANONE	4	UJ	IC%RSD
Y1RZ3	2-BUTANONE	4	UJ	IS<LCL
Y1RZ3	2-HEXANONE	4	UJ	CCV<LCL
Y1RZ3	2-HEXANONE	4	UJ	IC%RSD
Y1RZ3	2-HEXANONE	4	UJ	IS<LCL
Y1RZ3	4-METHYL-2-PENTANONE	4	UJ	CCV<LCL
Y1RZ3	4-METHYL-2-PENTANONE	4	UJ	IS<LCL
Y1RZ3	ACETONE	4	UJ	IS<LCL
Y1RZ3	BENZENE	1	J	IS<LCL
Y1RZ3	BROMODICHLOROMETHANE	0.5	UJ	IS<LCL
Y1RZ3	BROMOFORM	0.5	UJ	IS<LCL
Y1RZ3	BROMOMETHANE	0.5	UJ	CCV<LCL
Y1RZ3	BROMOMETHANE	0.5	UJ	IS<LCL
Y1RZ3	CARBON DISULFIDE	0.5	UJ	IS<LCL
Y1RZ3	CARBON TETRACHLORIDE	0.5	UJ	IS<LCL
Y1RZ3DL	CHLOROBENZENE	53	J	FD>RPD
Y1RZ3	CHLOROETHANE	0.5	UJ	IS<LCL
Y1RZ3	CHLOROFORM	0.5	UJ	IS<LCL
Y1RZ3	CHLOROMETHANE	0.5	UJ	IS<LCL
Y1RZ3	CIS-1,2-DICHLOROETHENE	6	J	IS<LCL
Y1RZ3	CIS-1,3-DICHLOROPROPENE	0.5	UJ	IS<LCL
Y1RZ3	CYCLOHEXANE	0.5	UJ	IS<LCL
Y1RZ3	DIBROMOCHLOROMETHANE	0.5	UJ	IS<LCL
Y1RZ3	DICHLORODIFLUOROMETHANE	0.5	UJ	IS<LCL
Y1RZ3	ETHYL TERT-BUTYL ETHER	0.5	UJ	IS<LCL
Y1RZ3	ETHYLBENZENE	0.5	UJ	IS<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1RZ3	ISOPROPYLBENZENE	0.5	UJ	IS<LCL
Y1RZ3	METHYL ACETATE	0.5	UJ	CCV<LCL
Y1RZ3	METHYL ACETATE	0.5	UJ	IC%RSD
Y1RZ3	METHYL ACETATE	0.5	UJ	IS<LCL
Y1RZ3	METHYL TERT-BUTYL ETHER	0.9	J	FD>RPD
Y1RZ3	METHYL TERT-BUTYL ETHER	0.9	J	IS<LCL
Y1RZ3	METHYLCYCLOHEXANE	0.5	UJ	IS<LCL
Y1RZ3	METHYLENE CHLORIDE	0.5	UJ	IC%RSD
Y1RZ3	METHYLENE CHLORIDE	0.5	UJ	IS<LCL
Y1RZ3	STYRENE	0.5	UJ	IS<LCL
Y1RZ3	TERT-AMYL METHYL ETHER	0.5	UJ	IS<LCL
Y1RZ3	TERT-BUTYL ALCOHOL	50	R	CCV RRF
Y1RZ3	TERT-BUTYL ALCOHOL	50	R	IS<LCL
Y1RZ3	TETRACHLOROETHENE	0.5	UJ	IS<LCL
Y1RZ3	TOLUENE	0.5	UJ	IS<LCL
Y1RZ3	TRANS-1,2-DICHLOROETHENE	1	J	FD>RPD
Y1RZ3	TRANS-1,2-DICHLOROETHENE	1	J	IS<LCL
Y1RZ3	TRANS-1,3-DICHLOROPROPENE	0.5	UJ	IS<LCL
Y1RZ3	TRICHLOROETHENE	1	J	IS<LCL
Y1RZ3	TRICHLOROFLUOROMETHANE	0.5	UJ	IS<LCL
Y1RZ3	VINYL CHLORIDE	6	J	FD>RPD
Y1RZ3	VINYL CHLORIDE	6	J	IS<LCL
Y1RZ3	XYLENES (TOTAL)	0.5	UJ	IS<LCL
Y1RZ4	1,2-DIBROMO-3-CHLOROPROPANE	0.5	R	CCV<LCL
Y1RZ4	1,2-DIBROMO-3-CHLOROPROPANE	0.5	R	CCV RRF
Y1RZ4	1,2-DIBROMO-3-CHLOROPROPANE	0.5	R	IC%RSD
Y1RZ4	1,2-DIBROMO-3-CHLOROPROPANE	0.5	R	IC RRF
Y1RZ4	2-BUTANONE	4	UJ	CCV<LCL
Y1RZ4	2-BUTANONE	4	UJ	IC%RSD
Y1RZ4	2-HEXANONE	4	UJ	CCV<LCL
Y1RZ4	2-HEXANONE	4	UJ	IC%RSD
Y1RZ4	4-METHYL-2-PENTANONE	4	UJ	CCV<LCL
Y1RZ4	BROMOMETHANE	0.5	UJ	CCV<LCL
Y1RZ4	METHYL ACETATE	0.5	UJ	CCV<LCL
Y1RZ4	METHYL ACETATE	0.5	UJ	IC%RSD
Y1RZ4	METHYLENE CHLORIDE	0.5	UJ	IC%RSD
Y1RZ4	TERT-BUTYL ALCOHOL	50	R	CCV RRF
Y1S02	1,2-DIBROMO-3-CHLOROPROPANE	5	R	CCV RRF
Y1S02	1,2-DIBROMO-3-CHLOROPROPANE	5	R	IC RRF
Y1S02	1,2-DIBROMO-3-CHLOROPROPANE	5	R	IC%RSD

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1S02	2-BUTANONE	40	UJ	CCV<LCL
Y1S02	2-BUTANONE	40	UJ	IC%RSD
Y1S02	2-HEXANONE	40	UJ	IC%RSD
Y1S02	BROMOMETHANE	5	UJ	CCV<LCL
Y1S02	METHYL ACETATE	5	UJ	IC%RSD
Y1S02	METHYL TERT-BUTYL ETHER	17	J	CCV<LCL
Y1S02	METHYLENE CHLORIDE	6	J	IC%RSD
Y1S02	TERT-BUTYL ALCOHOL	500	R	CCV<LCL
Y1S02	TERT-BUTYL ALCOHOL	500	R	CCV RRF
Y1S03	1,1,1-TRICHLOROETHANE	10	UJ	HT>UCL
Y1S03	1,1,2,2-TETRACHLOROETHANE	10	UJ	HT>UCL
Y1S03	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	10	UJ	HT>UCL
Y1S03	1,1,2-TRICHLOROETHANE	10	UJ	HT>UCL
Y1S03	1,1-DICHLOROETHANE	10	UJ	HT>UCL
Y1S03	1,1-DICHLOROETHENE	10	UJ	HT>UCL
Y1S03	1,2,4-TRICHLOROBENZENE	10	UJ	HT>UCL
Y1S03	1,2-DIBROMO-3-CHLOROPROPANE	10	R	CCV RRF
Y1S03	1,2-DIBROMO-3-CHLOROPROPANE	10	R	HT>UCL
Y1S03	1,2-DIBROMO-3-CHLOROPROPANE	10	R	IC RRF
Y1S03	1,2-DIBROMO-3-CHLOROPROPANE	10	R	IC%RSD
Y1S03	1,2-DIBROMOETHANE	10	UJ	HT>UCL
Y1S03	1,2-DICHLOROBENZENE	38	J	HT>UCL
Y1S03	1,2-DICHLOROETHANE	10	UJ	HT>UCL
Y1S03	1,2-DICHLOROPROPANE	10	UJ	HT>UCL
Y1S03	1,3-DICHLOROBENZENE	10	UJ	HT>UCL
Y1S03	1,4-DICHLOROBENZENE	10	UJ	HT>UCL
Y1S03	2-BUTANONE	80	UJ	CCV<LCL
Y1S03	2-BUTANONE	80	UJ	HT>UCL
Y1S03	2-BUTANONE	80	UJ	IC%RSD
Y1S03	2-HEXANONE	80	UJ	HT>UCL
Y1S03	2-HEXANONE	80	UJ	IC%RSD
Y1S03	4-METHYL-2-PENTANONE	80	UJ	HT>UCL
Y1S03	ACETONE	80	UJ	HT>UCL
Y1S03	BENZENE	10	UJ	HT>UCL
Y1S03	BROMODICHLOROMETHANE	10	UJ	HT>UCL
Y1S03	BROMOFORM	10	UJ	HT>UCL
Y1S03	BROMOMETHANE	10	UJ	CCV<LCL
Y1S03	BROMOMETHANE	10	UJ	HT>UCL
Y1S03	CARBON DISULFIDE	10	UJ	HT>UCL
Y1S03	CARBON TETRACHLORIDE	10	UJ	HT>UCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1S03	CHLOROBENZENE	530	J	HT>UCL
Y1S03	CHLOROETHANE	10	UJ	HT>UCL
Y1S03	CHLOROFORM	10	UJ	HT>UCL
Y1S03	CHLOROMETHANE	10	UJ	HT>UCL
Y1S03	CIS-1,2-DICHLOROETHENE	10	UJ	HT>UCL
Y1S03	CIS-1,3-DICHLOROPROPENE	10	UJ	HT>UCL
Y1S03	CYCLOHEXANE	10	UJ	HT>UCL
Y1S03	DIBROMOCHLOROMETHANE	10	UJ	HT>UCL
Y1S03	DICHLORODIFLUOROMETHANE	10	UJ	HT>UCL
Y1S03	ETHYL TERT-BUTYL ETHER	10	UJ	HT>UCL
Y1S03	ETHYLBENZENE	38	J	HT>UCL
Y1S03	ISOPROPYLBENZENE	14	J	CCV>UCL
Y1S03	ISOPROPYLBENZENE	14	J	HT>UCL
Y1S03	METHYL ACETATE	10	UJ	HT>UCL
Y1S03	METHYL ACETATE	10	UJ	IC%RSD
Y1S03	METHYL TERT-BUTYL ETHER	10	UJ	CCV<LCL
Y1S03	METHYL TERT-BUTYL ETHER	10	UJ	HT>UCL
Y1S03	METHYLCYCLOHEXANE	10	UJ	HT>UCL
Y1S03	METHYLENE CHLORIDE	10	UJ	HT>UCL
Y1S03	METHYLENE CHLORIDE	10	UJ	IC%RSD
Y1S03	STYRENE	10	UJ	HT>UCL
Y1S03	TERT-AMYL METHYL ETHER	10	UJ	HT>UCL
Y1S03	TERT-BUTYL ALCOHOL	1000	R	CCV<LCL
Y1S03	TERT-BUTYL ALCOHOL	1000	R	CCV RRF
Y1S03	TERT-BUTYL ALCOHOL	1000	R	HT>UCL
Y1S03	TETRACHLOROETHENE	10	UJ	HT>UCL
Y1S03	TOLUENE	10	UJ	HT>UCL
Y1S03	TRANS-1,2-DICHLOROETHENE	10	UJ	HT>UCL
Y1S03	TRANS-1,3-DICHLOROPROPENE	10	UJ	HT>UCL
Y1S03	TRICHLOROETHENE	10	UJ	HT>UCL
Y1S03	TRICHLOROFLUOROMETHANE	10	UJ	HT>UCL
Y1S03	VINYL CHLORIDE	10	UJ	HT>UCL
Y1S03	XYLENES (TOTAL)	35	J	HT>UCL
Y1S04	1,2-DIBROMO-3-CHLOROPROPANE	0.5	R	CCV RRF
Y1S04	1,2-DIBROMO-3-CHLOROPROPANE	0.5	R	IC RRF
Y1S04	1,2-DIBROMO-3-CHLOROPROPANE	0.5	R	IC%RSD
Y1S04	2-BUTANONE	4	UJ	CCV<LCL
Y1S04	2-BUTANONE	4	UJ	IC%RSD
Y1S04	2-HEXANONE	4	UJ	IC%RSD
Y1S04	BROMOMETHANE	0.5	UJ	CCV<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1S04	METHYL ACETATE	0.5	UJ	IC%RSD
Y1S04	METHYL TERT-BUTYL ETHER	0.5	UJ	CCV<LCL
Y1S04	METHYLENE CHLORIDE	0.5	UJ	IC%RSD
Y1S04	TERT-BUTYL ALCOHOL	50	R	CCV<LCL
Y1S04	TERT-BUTYL ALCOHOL	50	R	CCV RRF
Y1S05	1,2-DIBROMO-3-CHLOROPROPANE	100	R	CCV RRF
Y1S05	1,2-DIBROMO-3-CHLOROPROPANE	100	R	IC RRF
Y1S05	1,2-DIBROMO-3-CHLOROPROPANE	100	R	IC%RSD
Y1S05	2-BUTANONE	1800	J	CCV<LCL
Y1S05	2-BUTANONE	1800	J	IC%RSD
Y1S05	2-HEXANONE	800	UJ	IC%RSD
Y1S05DL	4-METHYL-2-PENTANONE	14000	J	CCV<LCL
Y1S05	BROMOMETHANE	100	UJ	CCV<LCL
Y1S05	METHYL ACETATE	100	UJ	IC%RSD
Y1S05	METHYL TERT-BUTYL ETHER	100	UJ	CCV<LCL
Y1S05	METHYLENE CHLORIDE	180	J	IC%RSD
Y1S05	TERT-BUTYL ALCOHOL	10000	R	CCV<LCL
Y1S05	TERT-BUTYL ALCOHOL	10000	R	CCV RRF
Y1S06	1,2-DIBROMO-3-CHLOROPROPANE	100	R	CCV RRF
Y1S06	1,2-DIBROMO-3-CHLOROPROPANE	100	R	IC RRF
Y1S06	1,2-DIBROMO-3-CHLOROPROPANE	100	R	IC%RSD
Y1S06	2-BUTANONE	2900	J	CCV<LCL
Y1S06	2-BUTANONE	2900	J	IC%RSD
Y1S06	2-HEXANONE	800	UJ	IC%RSD
Y1S06	BROMOMETHANE	100	UJ	CCV<LCL
Y1S06	METHYL ACETATE	100	UJ	IC%RSD
Y1S06	METHYL TERT-BUTYL ETHER	100	UJ	CCV<LCL
Y1S06	METHYLENE CHLORIDE	110	J	IC%RSD
Y1S06	TERT-BUTYL ALCOHOL	10000	R	CCV<LCL
Y1S06	TERT-BUTYL ALCOHOL	10000	R	CCV RRF

CCV RRF = Continuing calibration relative response factor below LCL
CCV<LCL = Continuing calibration recovery less than lower control limit
CCV>UCL = Continuing calibration recovery greater than upper control limit
FD>RPD = Field duplicate exceeds RPD criteria
HT>UCL = Holding time exceeded
IC RRF = Initial calibration relative response factor below LCL
IC%RSD = Initial calibration RSD exceeded
IS<LCL = Internal standard response less than lower control limit
TB>RL = Trip blank concentration greater than RL

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 31, 2005
Report Date:	April 18, 2005
Parameters:	Volatile Organic Compounds
Laboratory:	Envirosystems, Inc.
Sample Delivery Group:	Y1S20

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLM04.3 and project-approved modifications described in Modification Reference Number 1183.0 for volatile organic compounds (VOC). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier II data validation. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms; however, the custody seal on the cooler was not intact. Individual sample bottles did not contain sample tag ID numbers.

Only two of five bottles listed on the CoC for samples Y1S20 and Y1S21 were received.

Turnaround time (TAT) was incorrectly listed as 21 days on the CoC when a 7 day TAT was scheduled.

All technical holding-time requirements were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Initial Calibration

Initial calibration was within acceptance criteria.

IV. Continuing Calibration

The continuing calibration verification was within acceptance criteria.

V. Blanks

The method blank was analyzed as required. There were no detected results in the method blank.

VI. System Monitoring Compounds

Bromofluorobenzene surrogate recoveries were below criteria in the matrix spike/matrix spike duplicate (MS/MSD) of Y1S20. The MS/MSD results were not flagged.

VII. Matrix Spike/Matrix Spike Duplicate

An MS/MSD was analyzed on sample Y1S20. All acceptance criteria were met.

VIII. Laboratory Control Sample

The applicable Statement of Work does not require analysis of a laboratory control sample (LCS); therefore, no LCS was analyzed.

IX. Internal Standards

Internal standard recoveries were below criteria in the MS/MSD for 1,4-difluorobenzene and chlorobenzene-d5. No flags were applied.

X. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

XI. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL) was not within the scope of the data review for this SDG.

XII. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XIII. Field Blanks

There were no field blanks in this SDG.

XIV. Field Duplicates

There were no field duplicates in this SDG.

XV. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XVI. Overall Assessment of Data

- Instrument calibration was acceptable.
- Laboratory contamination was not an issue during sample analysis.
- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 31, 2005
Report Date:	April 19, 2005
Parameters:	Volatile Organic Compounds
Laboratory:	Envirosystems, Inc.
Sample Delivery Group:	Y1S22

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLM04.3 and project-approved modifications described in Modification Reference Number 1183.0 for volatile organic compounds (VOC). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier II data validation. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms; however, the custody seal on the cooler was not intact. Individual sample bottles did not contain sample tag ID numbers.

All technical holding-time requirements were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Initial Calibration

The relative standard deviation (RSD) of the relative response factors of 2-butanone, methylene chloride, methyl acetate, 2-hexanone and 1, 2-dibromo-3-chloropropane in the initial calibration exceeded 30 percent and tert-butyl alcohol exceeded 50 percent. The associated non-detected results were flagged "UJ".

All other initial calibration results met the requirements.

IV. Continuing Calibration

Acetone and 2-hexanone were recovered above criteria in continuing calibration verification (CCV) standards. The acetone detected result was flagged "J" and the 2-hexanone non-detected result was not flagged.

V. Blanks

The method blank was analyzed as required. There were no detected results in the method blank.

VI. System Monitoring Compounds

All surrogate recoveries were within acceptance criteria.

VII. Matrix Spike/Matrix Spike Duplicate

Matrix spike/matrix spike duplicates were not analyzed with this SDG.

VIII. Laboratory Control Sample

The applicable Statement of Work does not require analysis of a laboratory control sample (LCS); therefore, no LCS was analyzed.

IX. Internal Standards

All internal standard recoveries were within acceptance criteria.

X. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

XI. Compound Quantitation and Reported CRQLs

Sample Y1S22 was analyzed at a fivefold dilution due to sample foaming.

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL) was not within the scope of the data review for this SDG.

XII. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XIII. Field Blanks

Sample Y1S23 was a trip blank. The trip blank had no detected results.

XIV. Field Duplicates

There were no field duplicates in this SDG.

XV. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XVI. Overall Assessment of Data

- Instrument calibration was generally acceptable.
- Laboratory contamination was not an issue during sample analysis.
- A few sample results were qualified for calibration exceedances.
- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1S22	1,2-Dibromo-3-chloropropane	0.5	UJ	IC%RSD
Y1S22	2-Butanone	10	UJ	IC%RSD
Y1S22	2-Hexanone	10	UJ	IC%RSD
Y1S22	Acetone	130	J	CCV>UCL
Y1S22	Methyl acetate	0.5	UJ	IC%RSD
Y1S22	Methylene chloride	0.5	UJ	IC%RSD
Y1S22	Tertiary Butyl Alcohol	50	UJ	IC%RSD

CCV>UCL = Continuing calibration recovery greater than upper control limit
IC%RSD = Initial calibration RSD exceeded

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	March 14, 2005
Report Date:	May 11, 2005
Parameters:	Volatile Organic Compounds
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05076A

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901038. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The sample was received at the laboratory with appropriate CoC forms and custody seals intact.

The sample was a non-aqueous phase liquid (NAPL) and was received above the recommended temperature range at 13 degrees Celsius. Detected results were qualified as estimated and flagged “J” and non-detected results were qualified as estimated and flagged “UJ”.

The sample was analyzed one day past the recommended holding time. Detected and non-detected results were qualified as estimates and flagged “J” and “UJ”, respectively.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Calibration

All acceptance criteria were met.

IV. Blanks

Method blanks were analyzed as required. Bromomethane was detected below the contract required quantitation limit (CRQL), equivalent to the reporting limit (RL). Bromomethane was not detected in the sample and therefore, no flag was applied.

V. Surrogates

Surrogate recoveries could not be evaluated because the concentrations were significantly below the quantitation limits. The sample required dilution and therefore, sample results were not qualified.

VI. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate was not evaluated since sample concentrations of analytes were significantly greater than the spiking concentration.

VII. Laboratory Control Sample

All acceptance criteria met.

VIII. Internal Standards

Summary forms not provided.

IX. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

X. Compound Quantitation and Reported CRQLs

Cis-1,2-dichloroethane, trichloroethane and toluene were reported above the calibration range of the instrument. The sample results were qualified as estimated and "J" flagged.

Verification of quantitation and accuracy of reported CRQLs was not within the scope of the data review for this SDG.

XI. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XII. Field Blanks

No field blanks in this SDG.

XIII. Field Duplicates

No field duplicates in this SDG.

XIV. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XV. Overall Assessment of Data

- No method blank contamination.
- Temperature and holding-time limits were exceeded. Sample results were qualified as estimated concentrations.
- The completeness objectives were met for all method/analyte combinations.
- Neither surrogate nor matrix recoveries were available due to sample matrix.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (UG/KG)	FINAL FLAG	VALIDATION COMMENTS
MW-14LP-0305	ACETONE	910000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	BROMODICHLOROMETHANE	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	BROMOMETHANE	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	BENZENE	200000	J	Temp>6C,HT>UCL
MW-14LP-0305	TOLUENE	36000000	J	>ICLinearRange,Temp>6C,HT>UCL
MW-14LP-0305	CARBON DISULFIDE	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	CHLOROBENZENE	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	CHLOROETHANE	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	CHLOROMETHANE	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	CARBON TETRACHLORIDE	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	CHLORODIBROMOMETHANE	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	1,2-DIBROMO-3-CHLOROPROPANE	910000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	1,1-DICHLOROETHANE	1300000	J	Temp>6C,HT>UCL
MW-14LP-0305	1,2-DICHLOROETHANE	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	1,2-DICHLOROBENZENE	300000	J	Temp>6C,HT>UCL
MW-14LP-0305	1,3-DICHLOROBENZENE	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	1,4-DICHLOROBENZENE	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	1,1-DICHLOROETHENE	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	cis-1,2-DICHLOROETHENE	25000000	J	>ICLinearRange,Temp>6C,HT>UCL
MW-14LP-0305	trans-1,2-DICHLOROETHENE	150000	J	Temp>6C,HT>UCL
MW-14LP-0305	1,1-DICHLOROPROPENE	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	cis-1,3-DICHLOROPROPENE	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	trans-1,3-DICHLOROPROPENE	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	1,2-DICHLOROPROPANE	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	1,3-DICHLOROPROPANE	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	ETHYLBENZENE	3400000	J	Temp>6C,HT>UCL
MW-14LP-0305	1,2-DIBROMOETHANE (EDB)	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	ETHYL TERT-BUTYL ETHER	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	TRICHLOROFLUOROMETHANE	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	DICHLORODIFLUOROMETHANE	91000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	2-HEXANONE	910000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	tert-AMYL METHYL ETHER	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	2-BUTANONE (MEK)	910000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	4-METHYL-2-PENTANONE (MIBK)	910000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	DICHLOROMETHANE	820000	J	Temp>6C,HT>UCL
MW-14LP-0305	1,1,2,2-TETRACHLOROETHANE	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	TETRACHLOROETHENE (PCE)	1900000	J	Temp>6C,HT>UCL
MW-14LP-0305	STYRENE	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	BROMOFORM	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	tert-BUTYL METHYL ETHER	180000	UJ	Temp>6C,HT>UCL

FIELD ID	ANALYTE	FINAL RESULT (UG/KG)	FINAL FLAG	VALIDATION COMMENTS
MW-14LP-0305	1,1,1-TRICHLOROETHANE	2400000	J	Temp>6C,HT>UCL
MW-14LP-0305	1,1,2-TRICHLOROETHANE	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	TRICHLOROETHENE (TCE)	76000000	J	>ICLinearRange,Temp>6C,HT>UCL
MW-14LP-0305	CHLOROFORM	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	1,2,3-TRICHLOROPROPANE	180000	UJ	Temp>6C,HT>UCL
MW-14LP-0305	M,P-XYLENE	17000000	J	Temp>6C,HT>UCL
MW-14LP-0305	O-XYLENE	6200000	J	Temp>6C,HT>UCL
MW-14LP-0305	VINYL CHLORIDE	180000	UJ	Temp>6C,HT>UCL

>ICLinearRange = Result greater than linear calibration range
HT>UCL = Holding time exceeded
Temp>6C = Temperature criteria exceeded 6 degrees C

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	April 21, 2005
Report Date:	May 31, 2005
Parameters:	Volatile Organic Compounds
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05112A

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901038. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory with appropriate CoC forms and custody seals intact.

The cooler temperature exceeded the recommended control limits. The samples did not have sufficient time to cool between time collected and time received. Data were not qualified for this reason.

All holding-time requirements were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Calibration

The continuing calibration verification standard percent difference was biased high for acetone. The detected result was qualified as estimated and flagged "J".

IV. Blanks

Method blanks were analyzed as required. There were no detected results in the method blanks.

V. Surrogates

All acceptance criteria were met.

VI. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate was not analyzed with this SDG.

VII. Laboratory Control Sample

All acceptance criteria met.

VIII. Internal Standards

Summary forms were not provided.

IX. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

X. Compound Quantitation and Reported CRQLs

The sample required additional analyses at dilutions due to the concentration of target analytes.

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), was not within the scope of the data review for this SDG.

XI. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XII. Field Blanks

This SDG contained one trip blank (TB) and one equipment blank (EB). Acetone was detected in both the TB and EB below the CRQL. Acetone was greater than the CRQL and greater than 10 times the blank concentrations and therefore, data were not qualified.

XIII. Field Duplicates

No field duplicates in this SDG.

XIV. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XV. Overall Assessment of Data

- No method blank contamination.
- Calibration criteria were met except for acetone which was qualified as estimated.
- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (UG/L)	FINAL FLAG	VALIDATION COMMENTS
MW-12-0305	ACETONE	720	J	CCV>UCL

CCV>UCL = Continuing calibration recovery greater than upper control limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	June 20, 21, 22, and 23, 2005
Report Date:	August 03, 2005
Parameters:	General Chemistry: Anions
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05172A

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901063. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (NFG), October 2004, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory with the appropriate CoC forms and custody seals intact.

Cooler temperatures exceeded control limits for several sets of samples. The samples did not have sufficient time to cool between sample collection and sample receipt. Data were not qualified.

All holding-time requirements were met.

II. Calibration

All acceptance criteria were met.

III. Blanks

Method blanks were analyzed as required. No contamination was detected.

IV. Matrix Spike/Matrix Spike Duplicate

Matrix spike/matrix spike duplicates (MS/MSD) were performed on samples RMW-07-15-0605, RMW-10-15-0605, RMW-09-35-0605, and RMW-08-15-0605. All acceptance criteria were met.

V. Laboratory Control Sample

All acceptance criteria were met.

VI. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

VII. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), was not within the scope of the data review for this SDG.

VIII. Field Blanks

There was no field blank in this SDG.

IX. Field Duplicates

There were two sets of field duplicates in this SDG: Samples RMW-10-35-0605 and MW-90-0605 and samples RMW-08-15-0605 and MW-92-0605. All acceptance criteria were met.

X. Laboratory Duplicates

Laboratory duplicates were analyzed on samples RMW-07-15-0605, RMW-10-15-0605, RMW-09-35-0605, and RMW-08-15-0605. All acceptance criteria were met.

XI. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XII. Overall Assessment of Data

- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	June 29, 2005
Report Date:	August 04, 2005
Parameters:	General Chemistry: Anions
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05181A

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901063. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (NFG), October 2004, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory with the appropriate CoC forms and custody seals intact.

The cooler temperature exceeded control limits. The samples did not have sufficient time to cool between time collected and time received. Data were not qualified.

All holding-time requirements were met.

II. Calibration

All acceptance criteria were met.

III. Blanks

A method blank was analyzed as required. No contamination was detected.

IV. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate (MS/MSD) for nitrate, nitrite and sulfate were performed on sample MW-12-0605. All acceptance criteria were met.

V. Laboratory Control Sample

All acceptance criteria were met.

VI. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

VII. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), was not within the scope of the data review for this SDG.

VIII. Field Blanks

There was no field blank in this SDG.

IX. Field Duplicates

There was no field duplicate in this SDG.

X. Laboratory Duplicates

A laboratory duplicate was analyzed for chloride on sample MW-12-0605. All acceptance criteria were met.

XI. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XII. Overall Assessment of Data

- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Validation Report

(Revised September 11, 2006)

Project/Site Name:	AMCO
Collection Date:	June 20, 21, 22 and 23, 2005
Report Date:	October 11, 2005
Parameters:	Organochlorine Pesticides and PCBs
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y1Y18

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed for pesticides and polychlorinated biphenyls (PCB) by USEPA Contract Laboratory Program (CLP) Statement of Work OLM04.3. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan (SAP), AMCO Chemical Superfund Site, August 2004.

Tier III data validation was performed by CH2M HILL chemists. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review included the chain of custody (CoC) records, case narrative, completed CLP data summary forms, raw data and calculation verification for selected detected results.

The laboratory was requested to re-evaluate surrogate manual integrations. Resubmitted data were reviewed and data qualifiers were revised as needed. Revisions are noted under the surrogate recovery section and summarized in the overall data assessment.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The samples were received at the laboratory within temperature control criteria and with appropriate CoC forms. Individual sample bottles did not contain sample tag ID numbers.

All technical holding times were met.

II. Instrument Performance Checks

Resolution check and performance evaluation mixtures were analyzed as required by the method and met acceptance criteria.

III. Calibration

An initial calibration was analyzed at the correct concentrations. Calibration factor and relative standard deviation calculations were verified.

The continuing calibration standards were analyzed at the method frequency and concentration. The percent difference calculation was verified for all analytes except 4,4′-DDD, 4,4′-DDT and 4,4′-DDE. Although the percent difference was verified in the raw data for these three analytes and the standards met criteria, the calibration summary sheets did not match the raw data. Calculated results and percent differences on the summary sheets could not be recreated.

IV. Method Blanks

A method blank was analyzed as required. There were no detected results in the method blank.

V. Field Blanks

There were no detected results in the equipment blanks (Y1Y42 and Y1Y44).

VI. Laboratory Control Sample

The laboratory control sample (LCS) analyzed with this SDG met the specified criteria.

VII. Surrogate Spikes

A Tier II review of the surrogate recovery summary sheet showed acceptable surrogate recoveries for all samples. However, a Tier III review of the associated raw data and chromatograms showed inappropriate manual integrations that resulted in the qualification and rejection of several sample results.

Manual integration was performed on the surrogates in nearly half of the samples. The tetrachloro-m-xylene (TCX) and decachlorobiphenyl (DCB) manual integrations were inconsistent between samples. “Before” and “after” documentation was provided for most manual integrations, although several “before” chromatograms were not provided. Manual integration on a peak shoulder, partial peak, multiple peaks, or on the baseline, although documented, did not appear to be appropriate.

Manual integration of the surrogates were re-evaluated by the laboratory and revised as needed. Sample Y1Y32 had TCX recoveries above acceptance criteria in both columns. No pesticides were detected in this sample and no flags were applied.

Surrogate recovery calculation was verified.

VIII. Matrix Spike/Matrix Spike Duplicate

A matrix spike and matrix spike duplicate (MS/MSD) analysis was performed on sample Y1Y41 as designated on the CoC. The relative percent difference (RPD) exceeded criteria for

all compounds. The percent recovery was less than the lower control limit (LCL) in the MS for gamma-BHC. The percent recovery was greater than the upper control limit (UCL) in the MS and MSD for heptachlor.

Gamma-BHC was qualified "UJ" for the low MS recovery. No further flagging was required since the compounds were not detected in the parent sample.

IX. Field Duplicates

Samples Y1Y31 and Y1Y32 were designated as a field duplicate pair. All acceptance criteria were met.

X. Internal Standards

Not applicable.

XI. Confirmation

When an RPD between the detected results of the primary and secondary columns is greater than 25 percent, results are qualified as estimated concentrations and flagged "J". The results for 4,4'-DDE and 4,4'-DDT for Y1Y20 were qualified for this condition and are presented in the table below.

XII. Target Compound Identification and Quantitation

Raw data were reviewed. Compound quantitation and accuracy were verified.

Sample Y1Y38 was detected for gamma-BHC. The peak was manually integrated such that additional peak area was added at the baseline, resulting in a concentration with a high bias. The sample result was qualified as estimated and flagged "J".

XIII. Overall Assessment of Data

- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable and therefore, the data are both accurate and precise.
- The results of matrix-related accuracy and precision indicators as indicated by the MS/MSD analysis indicated potentially low precision based on the RPD exceeding QC criteria for all compounds. One of the compounds, gamma-BHC, recovered below the MS acceptance limit. The precision exceedances did not negatively impact the data except for the gamma-BHC which was estimated.
- There were significant RPDs between the primary and confirmation results in two of the samples. These discrepancies could indicate the presence of interferences or even the possibility of false positives.
- There was no method blank or equipment blank contamination.
- The manual integration of gamma-BHC in one sample resulted in a concentration with a high bias.
- Samples were collected and analyzed based on approved methods/procedures, and results are reported using industry-standardized units.

- Resubmitted surrogate manual integrations were evaluated and data qualifiers were revised as needed.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1Y20	4,4'-DDE	0.003	J	CF>RPD
Y1Y20	4,4'-DDT	0.005	J	CF>RPD
Y1Y38	gamma-BHC	0.014	J	BiasResult
Y1Y41	gamma-BHC (Lindane)	0.01	UJ	MS<LCL

CF>RPD = Confirmation precision exceeded
MS<LCL = Matrix spike recovery less than lower limit
BiasResult = Sample result incorrectly reported

Data Validation Report

(Revised September 11, 2006)

Project/Site Name:	AMCO
Collection Date:	June 28, 29 and 30, 2005
Report Date:	October 11, 2005
Parameters:	Organochlorine Pesticides and PCBs
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y1Y24

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed for pesticides and polychlorinated biphenyls (PCB) by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review, June 2001, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan (SAP), AMCO Chemical Superfund Site, August 2004.

Tier III data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the analytical raw data and to provide verification of calculations and analyte identification. It was not intended to determine contract compliance.

The scope of the data review included the chain-of-custody (CoC) records, the case narrative, completed CLP data summary forms and raw data.

The laboratory was requested to re-evaluate manual integrations. Resubmitted data were reviewed and data qualifiers were revised as needed.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The samples were received at the laboratory within temperature control criteria and with appropriate CoC forms. Individual sample bottles did not contain sample tag ID numbers.

One of the sample bottles was received broken for sample Y1Y35; however, there was sufficient sample remaining for analysis.

All technical holding times were met.

II. Instrument Performance Checks

Resolution check and performance evaluation mixtures were analyzed as required by the method and met acceptance criteria. Resolution and breakdown calculations were verified.

III. Calibration

The initial and continuing calibrations were within the acceptance criteria. The calibration factor (CF) and relative standard deviation (RSD) calculations for the initial calibration and the percent difference (%D) calculation for the continuing calibration were verified.

IV. Method Blanks

A method blank was analyzed as required. There were no detected results in the method blank.

V. Field Blanks

There were two equipment blanks (EB) in this SDG. Gamma-BHC was detected in EBs Y1Y55 and Y1Y57 above the contract required quantitation limit (CRQL), equivalent to the reporting limit (RL). Gamma-BHC was not detected in the associated samples and therefore, no samples were qualified.

4,4′-DDD was detected in EB Y1Y57 below the RL. The associated 4,4′-DDD detected results were greater than the RL and were not qualified.

VI. Laboratory Control Sample

The laboratory control sample (LCS) was analyzed as required by the method. All acceptance criteria were met. The LCS recovery calculation was checked

VII. Surrogate Spikes

The tetrachloro-m-xylene (TCX) and decachlorobiphenyl (DCB) surrogate recoveries were above criteria in sample Y1Y37 at a 100-fold dilution. The sample was also analyzed at a 1000-fold dilution in which both surrogates were diluted out. All detected results except for aldrin were reported from the 1000-fold dilution. Therefore, the aldrin detected result was qualified as estimated and flagged “J”.

For all other samples, TCX recoveries were reported within the acceptance criteria for both columns on the summary form. However, review of the raw data indicated that manual integration was performed on the TCX peaks for samples Y1Y24, Y1Y25, Y1Y29, Y1Y29DL, Y1Y33, Y1Y34, Y1Y36, Y1Y37, and Y1Y54.”Before” and “after” documentation was provided; however, the manual integrations were inconsistent from sample to sample and the points of integration appear to be arbitrary. For example, in samples Y1Y29 and Y1Y29DL, manual integration was performed at the expected TCX retention time on both columns, even though a distinct peak for TCX was not evident. For samples Y1Y25 and Y1Y34, the manual integration of TCX on the secondary column included a second peak. Manual integration of TCX in sample Y1Y36 on the secondary column appeared to split a peak. Overall, the reintegrated TCX recoveries did not affect data quality. However, for samples Y1Y29 and Y1Y29DL, the TCX recoveries were likely biased high due to matrix

effects. 4,4'-DDD was the only detected result and is associated with the DCB surrogate and therefore, no data were qualified.

Manual integrations of the surrogates were re-evaluated by the laboratory and revised as needed. Sample RMW-02-32-0605 had no TCX recovery on one column and an elevated recovery on the second column. In addition, the DCB recovery was below acceptance criteria on both columns. The inconsistent TCX recoveries and low bias DCB recoveries indicate method performance issues for this sample. The non-detected sample results for both pesticides and PCBs were qualified as estimated and flagged "UJ".

Sample MW-12-0605 had no TCX recovery on one column and a recovery of 4178 percent on the other column. The sample was reanalyzed at a five-fold dilution for 4,4'-DDD with similar TCX surrogate recoveries. The inconsistent surrogate recoveries indicate method performance issues for this sample; therefore, non-detected and detected pesticide results were qualified as estimated and flagged "UJ" and "J", respectively.

The surrogate recovery calculation was verified.

VIII. Matrix Spike/Matrix Spike Duplicate

A matrix spike and matrix spike duplicate (MS/MSD) was performed on the equipment blank, Y1Y57, as selected by the laboratory per the case narrative. The relative percent difference (RPD) for heptachlor on the primary column and the RPD for gamma-BHC on the secondary column exceeded acceptance criteria. No data were qualified since the MS/MSD analysis was performed on a field QC sample.

The MS/MSD recovery and RPD calculations were verified.

IX. Field Duplicates

Samples Y1Y24 and Y1Y54 were designated as a field duplicate pair. All acceptance criteria were met.

X. Internal Standards

Not applicable.

XI. Confirmation

When an RPD between the detected results of the primary and secondary columns is greater than 25 percent, results are qualified as estimated concentrations and flagged "J". The results for 4,4'-DDD for Y1Y24, Y1Y25 and Y1Y34; the result for 4,4'-DDE for Y1Y35 and Y1Y54; and the results for dieldrin for Y1Y34 and Y1Y35 and Y1Y37DL were qualified for this condition and are presented in the table below.

XII. Target Compound Identification and Quantitation

Several samples were reanalyzed at dilutions due to target compound concentrations above the calibration range.

Raw data were reviewed as part of this scope. Manual integration was noted on several target detects. As with the integration performed on the TCX surrogate, there does not appear to be consistent criteria used for the manual integration. It is also not known if the

manual integration performed is consistent with how the standards are integrated. These integration inconsistencies do not appear to affect the data quality.

Manual integration for 4,4′-DDD in sample MW-12-0605 was revised and appears to have been performed in a consistent manner.

XIII. Overall Assessment of Data

- The results of matrix-related accuracy and precision indicators could not be ascertained by the MS/MSD analysis, as it was performed on the equipment blank.
- There were significant RPDs between the primary and confirmation results in some of the samples. These discrepancies could indicate the presence of interferences or even the possibility of false positives.
- There was no method blank or EB contamination.
- Surrogate exceedances resulted in one sample qualified as an estimated concentration.
- Samples were collected and analyzed based on approved methods/procedures, and results are reported using industry-standardized units.
- Resubmitted manual integrations were evaluated and data qualified as needed. Pesticide results for one sample and both pesticide and PCB results for another sample were qualified as estimated due to inconsistent surrogate recoveries.

Data Qualification Summary

Field ID	ANALYTE	FINAL RESULT (ug/L)	FINAL FLAG	VALIDATION COMMENTS
Y1Y24	4,4'-DDD	0.014	J	CF>RPD
Y1Y25	4,4'-DDD	0.2	J	CF>RPD
Y1Y29DL	4,4'-DDD	0.61	J	MethodPerf, ReintegratedResult
Y1Y29	4,4'-DDE	0.02	UJ	MethodPerf
Y1Y29	4,4'-DDT	0.02	UJ	MethodPerf
Y1Y29	Aldrin	0.01	UJ	MethodPerf
Y1Y29	alpha-BHC	0.01	UJ	MethodPerf
Y1Y29	alpha-Chlordane	0.01	UJ	MethodPerf
Y1Y29	beta-BHC	0.01	UJ	MethodPerf
Y1Y29	delta-BHC	0.01	UJ	MethodPerf
Y1Y29	Dieldrin	0.02	UJ	MethodPerf
Y1Y29	Endosulfan I	0.01	UJ	MethodPerf
Y1Y29	Endosulfan II	0.02	UJ	MethodPerf
Y1Y29	Endosulfan sulfate	0.02	UJ	MethodPerf
Y1Y29	Endrin	0.02	UJ	MethodPerf
Y1Y29	Endrin aldehyde	0.02	UJ	MethodPerf
Y1Y29	Endrin ketone	0.02	UJ	MethodPerf
Y1Y29	gamma-BHC	0.01	UJ	MethodPerf
Y1Y29	gamma-Chlordane	0.01	UJ	MethodPerf
Y1Y29	Heptachlor	0.01	UJ	MethodPerf
Y1Y29	Heptachlor epoxide	0.01	UJ	MethodPerf
Y1Y29	Methoxychlor	0.1	UJ	MethodPerf
Y1Y29	Toxaphene	1	UJ	MethodPerf
Y1Y34	Dieldrin	0.16	J	CF>RPD
Y1Y35	4,4'-DDE	0.004	J	CF>RPD
Y1Y35	Dieldrin	0.037	J	CF>RPD
Y1Y36	4,4'-DDD	0.02	UJ	MethodPerf
Y1Y36	4,4'-DDE	0.02	UJ	MethodPerf
Y1Y36	4,4'-DDT	0.02	UJ	MethodPerf
Y1Y36	Aldrin	0.01	UJ	MethodPerf
Y1Y36	alpha-BHC	0.01	UJ	MethodPerf
Y1Y36	alpha-Chlordane	0.01	UJ	MethodPerf
Y1Y36	Aroclor-1016	0.2	UJ	MethodPerf
Y1Y36	Aroclor-1221	0.4	UJ	MethodPerf
Y1Y36	Aroclor-1232	0.2	UJ	MethodPerf
Y1Y36	Aroclor-1242	0.2	UJ	MethodPerf

Field ID	ANALYTE	FINAL RESULT (ug/L)	FINAL FLAG	VALIDATION COMMENTS
Y1Y36	Aroclor-1248	0.2	UJ	MethodPerf
Y1Y36	Aroclor-1254	0.2	UJ	MethodPerf
Y1Y36	Aroclor-1260	0.2	UJ	MethodPerf
Y1Y36	beta-BHC	0.01	UJ	MethodPerf
Y1Y36	delta-BHC	0.01	UJ	MethodPerf
Y1Y36	Dieldrin	0.02	UJ	MethodPerf
Y1Y36	Endosulfan I	0.01	UJ	MethodPerf
Y1Y36	Endosulfan II	0.02	UJ	MethodPerf
Y1Y36	Endosulfan sulfate	0.02	UJ	MethodPerf
Y1Y36	Endrin	0.02	UJ	MethodPerf
Y1Y36	Endrin aldehyde	0.02	UJ	MethodPerf
Y1Y36	Endrin ketone	0.02	UJ	MethodPerf
Y1Y36	gamma-BHC	0.01	UJ	MethodPerf
Y1Y36	gamma-Chlordane	0.01	UJ	MethodPerf
Y1Y36	Heptachlor	0.01	UJ	MethodPerf
Y1Y36	Heptachlor epoxide	0.01	UJ	MethodPerf
Y1Y36	Methoxychlor	0.1	UJ	MethodPerf
Y1Y36	Toxaphene	1	UJ	MethodPerf
Y1Y37	Aldrin	3.6	J	Sur>UCL
Y1Y37	Dieldrin	6.8	J	CF>RPD
Y1Y54	4,4'-DDE	0.019	J	CF>RPD

CF>RPD = Confirmation Precision Exceeded
MethodPerf = Method performance issues
ReintegratedResult = Manual integration revision
Sur>UCL = Surrogate recovery greater than upper limit

Data Validation Report

(Revised September 11, 2006)

Project/Site Name:	AMCO
Collection Date:	June 24, 2005
Report Date:	October 11, 2005
Parameters:	Organochlorine Pesticides and PCBs
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y1Y26

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed for pesticides and polychlorinated biphenyls (PCB) by USEPA Contract Laboratory Program (CLP) Statement of Work OLM04.3. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan (SAP), AMCO Chemical Superfund Site, August 2004.

Tier III data validation was performed by CH2M HILL chemists. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review included the chain of custody (CoC) records, case narrative, completed CLP data summary forms, raw data and calculation verification for selected detected results.

The laboratory was requested to re-evaluate manual integrations. Resubmitted data were reviewed and data qualifiers were revised as needed.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The samples were received at the lab within control for temperature and with appropriate CoC forms. Sample Y1Y52 had one broken bottle.

All technical holding times were met.

II. Instrument Performance Checks

Resolution check and performance evaluation mixtures were analyzed as required by the method and met acceptance criteria.

III. Calibration

An initial calibration was analyzed at the correct concentrations. Calibration factor and relative standard deviation calculations were verified for 4,4′-DDT.

The continuing calibration standards were analyzed at the method frequency and concentration. The percent difference calculation was verified for all analytes except 4,4′-DDD, 4,4′-DDT and 4,4′-DDE. Although the percent difference was verified in the raw data for these three analytes and the standards met criteria, the calibration summary sheets did not match the raw data. Calculated results and percent differences on the summary sheets could not be recreated.

IV. Method Blanks

A method blank was analyzed as required. There were no detected results in the method blank.

V. Field Blanks

There were no detected results in the equipment blank (Y1Y51).

VI. Laboratory Control Sample

The laboratory control sample (LCS) analyzed with this SDG met the specified criteria.

VII. Surrogate Spikes

Manual integration was performed on the surrogates in several samples. The tetrachloro-m-xylene (TCX) manual integrations were inconsistent between samples. “Before” and “after” documentation was provided. Manual integration on a peak shoulder, partial peak, multiple peaks, or on the baseline, although documented, did not appear to be appropriate. Manual integration was not performed for TCX on both columns for any sample and all associated results were not detected. No data were qualified.

Manual integration of the surrogates were re-evaluated by the laboratory and revised as needed. Sample Y1Y26 had no TCX recovery on one column but the TCX recovery on the second column was within acceptance criteria. Decachlorobiphenyl surrogate recoveries were within acceptance criteria on both columns. The sample had non-detected results that did not require second column confirmation. The results could be reported from the column with acceptable surrogate results; therefore, no data were qualified.

Surrogate recovery calculation was verified.

VIII. Matrix Spike/Matrix Spike Duplicate

A matrix spike and matrix spike duplicate (MS/MSD) analysis was performed on sample Y1Y27. The relative percent difference (RPD) exceeded criteria for all compounds. The percent recoveries were greater than the upper control limit (UCL) in the MS and/or MSD for heptachlor and dieldrin.

4,4′-DDT was qualified "J" for precision, since it was detected in the sample. No further flagging was required since the compounds were not detected in the parent sample.

IX. Field Duplicates

There were no field duplicates in this SDG.

X. Internal Standards

Not applicable.

XI. Confirmation

When an RPD between the detected results of the primary and secondary columns was greater than 25 percent, results are qualified as estimated concentrations and flagged "J". The results for 4,4′-DDD and 4,4′-DDT for Y1Y52 were qualified for this condition and are presented in the table below.

XII. Target Compound Identification and Quantitation

Raw data were reviewed. Compound quantitation and accuracy were verified.

XIII. Overall Assessment of Data

- The results of laboratory-related accuracy and precision indicators are generally acceptable and therefore, the data are both accurate and precise.
- The results of matrix-related accuracy and precision indicators as indicated by the MS/MSD analysis indicated potentially low precision based on the RPD exceeding QC criteria for all compounds. 4,4′-DDT was qualified as an estimated concentration because it was detected in the parent sample. The high recoveries for heptachlor and dieldrin did not negatively impact the accuracy of the data, since these target compounds were not detected in the parent sample.
- There were significant RPDs between the primary and confirmation results in one of the samples. These discrepancies could indicate the presence of interferences or even the possibility of false positives.
- There was no method blank or equipment blank contamination.
- The manual integration performed on the surrogates was documented but was in an arbitrary and inconsistent manner. It is recommended that the manual integration procedure be discussed with the laboratory. Manual integration revisions were received and reviewed. No additional data qualifiers were needed.
- Samples were collected and analyzed based on approved methods/procedures, and results are reported using industry-standardized units.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1Y27	4,4'-DDT	0.026	J	MSRPD
Y1Y52	4,4'-DDD	0.004	J	CF>RPD
Y1Y52	4,4'-DDT	0.003	J	CF>RPD

CF>RPD = Confirmation precision exceeded
MSRPD = Matrix spike RPD criteria exceedance

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	June 20, 21, 22, 23, 24, and 28, 2005
Report Date:	August 16, 2005
Parameters:	RSK-175
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05172A

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901063. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory with appropriate CoC forms and custody seals intact.

The cooler temperature exceeded control limits. The samples did not have sufficient time to cool between time collected and time received by the laboratory. Data were not qualified.

Samples RMW-06-15-0605, BMW-06-0605, and BMW-08-0605 were not properly preserved in the field. The holding time for unpreserved samples is seven days. Samples BMW-06-0605 and BMW-08-0605 were analyzed within seven days of sample collection and therefore, no flags were applied. Sample RMW-06-15-0605 was analyzed past the seven-day holding time

and therefore, the methane and ethene detected results were qualified as estimated and flagged "J". The ethane non-detected result was qualified as estimated and flagged "UJ".

II. Calibration

All acceptance criteria were met.

III. Blanks

Method blanks were analyzed as required by the method. There were no detected results in the method blanks.

IV. Surrogates

The surrogate recovery for sample RMW-06-15-0605 exceeded the laboratory control limit. The detected results were qualified as estimated and flagged "J".

V. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate was performed on sample RMW-09-35-0605. All acceptance criteria were met.

VI. Laboratory Control Sample

All acceptance criteria were met.

VII. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

VIII. Compound Quantitation and Reported CRQLs

Several samples required a dilution due to the concentration of methane.

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), was not within the scope of the data review for this SDG.

IX. Field Blanks

No field blanks in this SDG.

X. Field Duplicates

There were two sets of field duplicates in this SDG: Samples RMW-10-35-0605 and MW-90-0605 and samples RMW-08-15-0605 and MW-92-0605. All acceptance criteria were met.

XI. Laboratory Duplicates

No laboratory duplicates in this SDG.

XII. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XIII. Overall Assessment of Data

- Results for one sample were qualified as estimated due to high surrogate recoveries.
- Sample results were qualified for one sample due to lack of preservation which resulted in a holding-time exceedance.
- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (UG/L)	FINAL FLAG	VALIDATION COMMENTS
RMW-06-15-0605	ETHENE	1.5	J	NotPres,HT>UCL, Sur>UCL
RMW-06-15-0605	ETHANE	1.1	UJ	NotPres, HT>UCL
RMW-06-15-0605	METHANE	170	J	NotPres, HT>UCL, Sur>UCL

NotPres = Sample not properly preserved in the field
HT>UCL = Holding time exceeded
Sur>UCL = Surrogate recovery greater than upper limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	June 29, 2005
Report Date:	July 26, 2005
Parameters:	RSK-175
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05181A

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901063. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier III data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the analytical raw data and to provide verification of calculations and analyte identification. It was not intended to determine contract compliance.

The scope of the data validation included review of the chain-of-custody (CoC) records, the case narrative, completed data summary forms and raw data.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory with appropriate CoC forms and custody seals intact.

The cooler temperature exceeded control limits. The samples did not have sufficient time to cool between time collected and time received by the laboratory. Data were not qualified.

Holding-time requirements were met.

II. Calibration

The method used for the gas analysis is a variation of method RSK-175 and it is not clearly identified as a modification of method RSK-175 in the data package. The RSK-175 method uses Henry's Law (using partial pressure of the gas, Henry's law constant, temperature of the sample, volume of the sample bottle, and atomic weight of the gas) to calculate the concentrations of analytes in the aqueous phase from the concentration of analytes in the headspace. The method used by the laboratory was modified to perform a direct comparison at a constant equilibrium temperature of standards and samples by using the exact volume of water and the exact ratio of water to headspace for all standards, samples and associated QC samples. It is unknown if a comparison study was conducted to verify results for the modified method.

The volumes of standards to samples and the ratio of headspace of standards and of samples were not clearly documented in the data package. The preparation log provided only the initial and final volumes of the samples.

Calculations for the initial calibration factor (CF) and relative standard deviation (RSD) were verified. The continuing CF and percent difference (%D) calculations were also verified.

III. Blanks

A method blank was analyzed as required by the method. There were no detected results in the method blank.

IV. Surrogates

Acetylene was used for the surrogate. The surrogate recovery calculation was verified.

The surrogate recovery for sample MW-12-0605 exceeded the laboratory control limit. Also, the surrogate recovery associated with the methane analysis for sample RMW-02-32-0605 exceeded the laboratory control limit. The detected results were qualified as estimated and flagged "J".

V. Matrix Spike/Matrix Spike Duplicate

There was no matrix spike/matrix spike duplicate in this SDG.

VI. Laboratory Control Sample

All acceptance criteria were met and the laboratory control sample calculation was validated.

VII. Target Compound Identification

Compound identification was verified by raw data review.

VIII. Compound Quantitation and Reported CRQLs

Several samples required a dilution due to the concentration of methane.

Quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), were verified by raw data review on a percentage of the detected sample results.

IX. Field Blanks

No field blanks in this SDG.

X. Field Duplicates

No field duplicates in this SDG.

XI. Laboratory Duplicates

No laboratory duplicates in this SDG.

XII. System Performance

The system performance was evaluated by reviewing the chromatographic data for this SDG.

XIII. Overall Assessment of Data

- Several sample results were qualified as estimated due to high surrogate recoveries.
- The completeness objectives were met for all method/analyte combinations.
- The method used for analysis is a modification of method RSK-175. The method is modified to perform a direct comparison between analysis of standards, QC samples and field samples. The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (UG/L)	FINAL FLAG	VALIDATION COMMENTS
MW-12-0605	ETHENE	3900	J	Sur>UCL
MW-12-0605	ETHANE	1100	J	Sur>UCL
MW-12-0605	METHANE	19000	J	Sur>UCL
RMW-02-32-0605	METHANE	26000	J	Sur>UCL

Sur>UCL = Surrogate recovery greater than upper limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	June 29, 2005
Report Date:	August 12, 2005
Parameters:	GC/MS Semivolatile for 1,4-Dioxane
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05181A

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by Technical Direction Form #00901063. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier III data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the analytical raw data and to provide verification of calculations and analyte identification. It was not intended to determine contract compliance.

The scope of the data validation included review of the chain-of-custody (CoC) records, the case narrative, completed data summary forms and raw data.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory with appropriate CoC forms and custody seals intact.

The cooler temperature exceeded control limits. The samples did not have sufficient time to cool between time collected and time received by the laboratory. Data were not qualified.

All technical holding-time requirements were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met. The DFTPP tune criteria used by the laboratory more closely matches the criteria from method SW8270 rather than a CLP method. The tunes meet CLP method criteria as well. Ion abundance calculations were verified for several masses.

III. Calibration

All acceptance criteria were met for 1,4-dioxane. Calculations for the initial calibration relative response factor (RRF) and relative standard deviation (RSD) were verified. The continuing calibration RRF and percent difference (%D) calculations were also verified.

IV. Blanks

A method blank was analyzed as required. 1,4-Dioxane was not detected in the method blank.

V. Surrogates

Surrogate recoveries were within acceptance criteria. The surrogate recovery calculation was verified.

VI. Matrix Spike/Matrix Spike Duplicate

No matrix spike/matrix spike duplicate in this SDG.

VII. Laboratory Control Sample

All acceptance criteria were met and the laboratory control sample calculation was validated.

VIII. Internal Standards

Summary forms were not provided. Raw data were reviewed for internal standard responses. All acceptance criteria were met.

IX. Target Compound Identification

Compound identification was verified by raw data review.

X. Compound Quantitiation and Reported CRQLs

Quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), were verified by raw data review on a percentage of the detected sample results.

XI. Field Blanks

There was one equipment blank in this SDG. 1,4-Dioxane was not detected in the equipment blank.

XII. Field Duplicates

No field duplicates in this SDG.

XIII. System Performance

The system performance was evaluated by reviewing the chromatographic and mass spectral data for this SDG.

XIV. Overall Assessment of Data

- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data overall, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	June 20, 21, 22, 23, 24, and 28, 2005
Report Date:	August 17, 2005
Parameters:	GC/MS Semivolatile for 1,4-Dioxane
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05172A

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901063. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory with appropriate CoC forms and custody seals intact.

The cooler temperatures exceeded the recommended control limits. The samples did not have sufficient time to cool between time collected and time received by the laboratory. Data were not qualified.

Holding-time requirements were met for all samples except for RMW-07-15-0605 and BPZ-01-0605. The samples were extracted and reanalyzed outside of holding time due to low

surrogate recovery. The re-extracted results were reported and therefore, the detected results were qualified as estimated and flagged "J".

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Calibration

All acceptance criteria were met for 1,4-dioxane.

IV. Blanks

Method blanks were analyzed as required. 1,4-Dioxane was not detected in the method blanks.

V. Surrogates

Surrogate recoveries met acceptance criteria.

VI. Matrix Spike/Matrix Spike Duplicate

Matrix spike/matrix spike duplicates (MS/MSD) were performed on samples BMW-06-0605 and RMW-09-35-0605. All acceptance criteria were met.

VII. Laboratory Control Sample

All acceptance criteria were met.

VIII. Internal Standards

Summary forms were not provided.

IX. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

X. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), was not within the scope of the data review for this SDG.

XI. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XII. Field Blanks

There were six equipment blanks in this SDG. 1,4-Dioxane was not detected in the equipment blanks.

XIII. Field Duplicates

There were two sets of field duplicates in this SDG: RMW-10-35-0605 and MW-90-0605 and samples RMW-08-15-0605 and MW-92-0605. All acceptance criteria were met.

XIV. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XV. Overall Assessment of Data

- Two samples were reported from sample extracts performed past the recommended holding time and were qualified as estimated.
- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data overall, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (UG/L)	FINAL FLAG	VALIDATION COMMENTS
RMW-07-15-0605	1,4-Dioxane	0.5	J	HT>UCL
BPZ-01-0605	1,4-Dioxane	200	J	HT>UCL

HT>UCL = Recommended holding time exceeded

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	June 20, 21, 22 and 23, 2005
Report Date:	October 11, 2005
Parameters:	Volatile Organic Compounds
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y1Y18

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLM04.3 and project-approved modifications described in Modification Reference Number 1253.0 for volatile organic compounds (VOC). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, October 1999 as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan (SAP), AMCO Chemical Superfund Site, August 2004.

Tier III data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the analytical raw data and to provide verification of calculations and analyte identification. It was not intended to determine contract compliance.

The scope of the data validation included review of the chain-of-custody (CoC) records, the case narrative, completed data summary forms and raw data.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms. Individual sample bottles did not contain sample tag ID numbers.

Sample Y1Y21 was received at a pH 7 and was analyzed within 14 days but greater than 7 days. There were no aromatic hydrocarbons detected in the sample and therefore, no data were qualified. All other technical holding times were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met. Ion abundance calculations were verified for several masses.

III. Initial Calibration

The relative standard deviation (RSD) of the relative response factors of dichlorodifluoromethane and methylene chloride exceeded criteria. The associated non-detected results were flagged "UJ" and detected results were flagged "J".

All other initial calibration results met the requirements. Calculations for the initial calibration relative response factor (RRF) and RSD were verified.

IV. Continuing Calibration

Methyl acetate, methylene chloride and 1,2-dibromo-3-chloropropane exceeded the continuing calibration criteria for percent difference (%D), all with %Ds less than the lower control limit (LCL).

Methylene chloride was qualified as estimated and flagged "UJ" for Y1Y17 and Y1Y46.

No qualification was needed for methyl acetate or 1,2-dibromo-3-chloropropane, since field samples were not associated to the calibration noted.

The continuing calibration RRF and %D calculations were verified.

V. Blanks

The method blank was analyzed as required. Chloroform, methylene chloride and ethyl tert-butyl alcohol were detected in the associated method blanks. Sample concentrations less than 10 times the blank concentration for methylene chloride and 5 times the blank concentration for ethyl tert-butyl alcohol were qualified "U" for all detected field samples at the respective reporting limits (RL). Chloroform was not qualified because it was not detected in the samples.

VI. System Monitoring Compounds

Samples Y1Y20 and Y1Y41 were reanalyzed due to failed surrogate recoveries below the LCL. The reanalysis for these samples also reported recoveries below the LCL. The results for these samples were qualified as estimated and flagged "UJ" for non-detected results and "J" for detected results.

The surrogate recovery calculation was verified.

VII. Matrix Spike/Matrix Spike Duplicate

There was no CoC assigned matrix spike/matrix spike duplicate (MS/MSD). Sample Y1Y42 was used by the laboratory for the MS/MSD. This sample was an equipment blank. Performance requirements were met for precision and accuracy and the MS/MSD recovery and relative percent difference (RPD) calculations were verified.

VIII. Laboratory Control Sample

The applicable Statement of Work does not require analysis of a laboratory control sample (LCS); therefore, no LCS was analyzed.

IX. Internal Standards

All internal standard recoveries were within acceptance criteria.

X. Target Compound Identification

Compound identification was verified by raw data review.

XI. Compound Quantitation and Reported CRQLs

Results detected below the RL were flagged "J" by the laboratory due to the inherent uncertainty in this region of quantitation. Results not designated as usable due to a reanalysis or dilution were qualified "R" and excluded in order to preserve a discrete data set for each sample. Neither of these conditions is shown in the summary table.

Quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to the RL, were verified by raw data review of a percentage of the detected sample results.

XII. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XIII. Field Blanks

The trip blanks (Y1Y39 and Y1Y43) were analyzed as required. Acetone, methylene chloride, carbon disulfide and ethyl tert-butyl alcohol were detected in the trip blanks. Sample concentrations less than 10 times the blank concentration for methylene chloride and acetone and 5 times the blank concentration for ethyl tert-butyl alcohol were qualified "U" for all detected field samples at the respective RLs. Carbon disulfide was not qualified because it was not detected in the samples.

The equipment blanks (Y1Y38, Y1Y42 and Y1Y44) were analyzed as required. Sample concentrations less than 10 times the blank concentration for methylene chloride and acetone and 5 times the blank concentration for ethyl tert-butyl alcohol were qualified "U" for all detected field samples at the respective RLs. The exception is acetone which was detected greater than the RL in one of the samples and qualified "U" based on the 5 times/10 times rule at the reported concentration.

XIV. Field Duplicates

There were no field duplicates in this SDG.

XV. System Performance

The system performance was evaluated by reviewing the chromatographic and mass spectral data for this SDG.

XVI. Overall Assessment of Data

- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable and therefore, the data are both accurate and precise.
- Low levels of acetone, methylene chloride and ethyl tert-butyl alcohol in the samples appear to be attributed to contamination originating from the collection, storage, transport, or analysis of the samples based on the detections observed in the method blank, trip blank and equipment blank samples.
- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1Y17	Acetone	14	U	TB<RL, EB<RL
Y1Y17	Bromomethane	0.5	UJ	IC%RSD
Y1Y17	Dichlorodifluoromethane	0.5	UJ	IC%RSD
Y1Y17	Ethyl tert-butyl alcohol	50	U	LB<RL, TB<RL, EB<RL
Y1Y17	Methylene chloride	10	UJ	IC%RSD, CCV<LCL, LB<RL, TB<RL, EB<RL
Y1Y18	Acetone	10	U	LB<RL, TB<RL, EB>RL
Y1Y18	Bromomethane	0.5	UJ	IC%RSD
Y1Y18	Dichlorodifluoromethane	0.5	UJ	IC%RSD
Y1Y18	Ethyl tert-butyl alcohol	50	U	LB<RL, TB<RL, EB<RL
Y1Y18	Methylene chloride	10	U	LB<RL, TB<RL, EB<RL, IC%RSD
Y1Y19	Acetone	10	U	TB<RL, EB>RL
Y1Y19	Bromomethane	0.5	UJ	IC%RSD
Y1Y19	Dichlorodifluoromethane	0.5	UJ	IC%RSD
Y1Y19	Ethyl tert-butyl alcohol	50	U	LB<RL, TB<RL, EB<RL
Y1Y19	Methylene chloride	10	U	LB<RL, TB<RL, EB>RL, IC%RSD
Y1Y20	1,1,1-Trichloroethane	0.5	UJ	Sur<LCL
Y1Y20	1,1,2,2- Tetrachloroethane	0.5	UJ	Sur<LCL
Y1Y20	1,1,2-Trichloro-1,2,2-Trifluoroethane	0.5	UJ	Sur<LCL
Y1Y20	1,1,2- Trichloroethane	0.5	UJ	Sur<LCL
Y1Y20	1,1-Dichloroethane	0.7	J	Sur<LCL
Y1Y20	1,1- Dichloroethene	0.5	UJ	Sur<LCL
Y1Y20	1,2,4-Trichlorobenzene	0.5	UJ	Sur<LCL
Y1Y20	1,2-Dibromo-3-Chloropropane	0.5	UJ	Sur<LCL
Y1Y20	1,2-Dibromoethane	0.5	UJ	Sur<LCL
Y1Y20	1,2- Dichlorobenzene	0.5	UJ	Sur<LCL
Y1Y20	1,2- Dichloroethane	0.5	UJ	Sur<LCL
Y1Y20	1,2-Dichloropropane	0.5	UJ	Sur<LCL
Y1Y20	1,3- Dichlorobenzene	0.5	UJ	Sur<LCL
Y1Y20	1,4- Dichlorobenzene	0.5	UJ	Sur<LCL
Y1Y20	2-Butanone	10	UJ	Sur<LCL
Y1Y20	2-Hexanone	10	UJ	Sur<LCL
Y1Y20	4-Methyl-2-Pentanone	10	UJ	Sur<LCL
Y1Y20	Acetone	10	UJ	TB<RL, EB>RL, Sur<LCL
Y1Y20	Benzene	0.5	UJ	Sur<LCL
Y1Y20	Bromodichloromethane	0.5	UJ	Sur<LCL
Y1Y20	Bromoform	0.5	UJ	Sur<LCL
Y1Y20	Bromomethane	0.5	UJ	IC%RSD, Sur<LCL
Y1Y20	Carbon disulfide	0.5	UJ	Sur<LCL
Y1Y20	Carbon tetrachloride	0.5	UJ	Sur<LCL
Y1Y20	Chlorobenzene	0.5	UJ	Sur<LCL
Y1Y20	Chloroethane	0.5	UJ	Sur<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1Y20	Chloroform	0.5	UJ	Sur<LCL
Y1Y20	Chloromethane	0.5	UJ	Sur<LCL
Y1Y20	Cis-1,2-Dichloroethene	0.5	UJ	Sur<LCL
Y1Y20	Cis-1,3-Dichloropropene	0.5	UJ	Sur<LCL
Y1Y20	Cyclohexane	0.5	UJ	Sur<LCL
Y1Y20	Dibromochloromethane	0.5	UJ	Sur<LCL
Y1Y20	Dichlorodifluoromethane	0.5	UJ	IC%RSD, Sur<LCL
Y1Y20	Ethyl tert-butyl alcohol	50	UJ	LB<RL, TB<RL, EB<RL, Sur<LCL
Y1Y20	Ethylbenzene	0.5	UJ	Sur<LCL
Y1Y20	Isopropylbenzene	0.5	UJ	Sur<LCL
Y1Y20	Methyl acetate	0.5	UJ	Sur<LCL
Y1Y20	Methyl tert-butyl ether	0.5	UJ	Sur<LCL
Y1Y20	Methylcyclohexane	0.5	UJ	Sur<LCL
Y1Y20	Methylene chloride	10	UJ	LB<RL, TB<RL, EB<RL, IC%RSD, Sur<LCL
Y1Y20	Styrene	0.5	UJ	Sur<LCL
Y1Y20	Tert-amyl methyl ether	50	UJ	Sur<LCL
Y1Y20	Tert-butyl alcohol	50	UJ	Sur<LCL
Y1Y20	Tetrachloroethene	0.5	UJ	Sur<LCL
Y1Y20	Toluene	0.5	UJ	Sur<LCL
Y1Y20	Trans-1,2-Dichloroethene	0.5	UJ	Sur<LCL
Y1Y20	Trans -1,3-Dichloropropene	0.5	UJ	Sur<LCL
Y1Y20	Trichloroethene	0.5	UJ	Sur<LCL
Y1Y20	Trichlorofluoromethane	0.5	UJ	Sur<LCL
Y1Y20	Vinyl chloride	0.5	UJ	Sur<LCL
Y1Y20	Xylenes (Total)	0.5	UJ	Sur<LCL
Y1Y20	Ethyl tert-butyl alcohol	50	UJ	LB<RL, TB<RL, EB<RL, Sur<LCL
Y1Y21	Acetone	10	U	TB<RL, EB<RL
Y1Y21	Bromomethane	0.5	UJ	IC%RSD
Y1Y21	Dichlorodifluoromethane	0.5	UJ	IC%RSD
Y1Y21	Ethyl tert-butyl alcohol	50	U	LB<RL, TB<RL, EB<RL
Y1Y21	Methylene chloride	10	U	LB<RL, TB<RL, EB<RL, IC%RSD
Y1Y40	Acetone	10	U	TB<RL, EB<RL
Y1Y40	Bromomethane	0.5	UJ	IC%RSD
Y1Y40	Dichlorodifluoromethane	0.5	UJ	IC%RSD
Y1Y40	Ethyl tert-butyl alcohol	50	U	LB<RL, TB<RL, EB<RL
Y1Y40	Methylene chloride	10	U	LB<RL, TB<RL, EB<RL, IC%RSD
Y1Y41	1,1,1- Trichloroethane	0.5	UJ	Sur<LCL
Y1Y41	1,1,2,2- Tetrachloroethane	0.5	UJ	Sur<LCL
Y1Y41	1,1,2-Trichloro-1,2,2-Trifluoroethane	0.5	UJ	Sur<LCL
Y1Y41	1,1,2- Trichloroethane	0.5	UJ	Sur<LCL
Y1Y41	1,1- Dichloroethane	0.5	UJ	Sur<LCL
Y1Y41	1,1- Dichloroethene	0.5	UJ	Sur<LCL
Y1Y41	1,2,4- Trichlorobenzene	0.5	UJ	Sur<LCL
Y1Y41	1,2-Dibromo-3-Chloropropane	0.5	UJ	Sur<LCL
Y1Y41	1,2- Dibromoethane	0.5	UJ	Sur<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1Y41	1,2- Dichlorobenzene	0.5	UJ	Sur<LCL
Y1Y41	1,2- Dichloroethane	0.5	UJ	Sur<LCL
Y1Y41	1,2- Dichloropropane	0.5	UJ	Sur<LCL
Y1Y41	1,3- Dichlorobenzene	0.5	UJ	Sur<LCL
Y1Y41	1,4- Dichlorobenzene	0.5	UJ	Sur<LCL
Y1Y41	2- Butanone	10	UJ	Sur<LCL
Y1Y41	2- Hexanone	10	UJ	Sur<LCL
Y1Y41	4-Methyl-2-Pentanone	10	UJ	Sur<LCL
Y1Y41	Acetone	10	UJ	LB<RL, TB<RL, EB<RL, Sur<LCL
Y1Y41	Benzene	0.5	UJ	Sur<LCL
Y1Y41	Bromodichloromethane	0.5	UJ	Sur<LCL
Y1Y41	Bromoform	0.5	UJ	Sur<LCL
Y1Y41	Bromomethane	0.5	UJ	IC%RSD, Sur<LCL
Y1Y41	Carbon disulfide	0.5	UJ	Sur<LCL
Y1Y41	Carbon tetrachloride	0.5	UJ	Sur<LCL
Y1Y41	Chlorobenzene	0.5	UJ	Sur<LCL
Y1Y41	Chloroethane	0.5	UJ	Sur<LCL
Y1Y41	Chloroform	0.5	UJ	Sur<LCL
Y1Y41	Chloromethane	0.5	UJ	Sur<LCL
Y1Y41	Cis-1,2-Dichloroethene	0.5	UJ	Sur<LCL
Y1Y41	Cis-1,3-Dichloropropene	0.5	UJ	Sur<LCL
Y1Y41	Cyclohexane	0.5	UJ	Sur<LCL
Y1Y41	Dibromochloromethane	0.5	UJ	Sur<LCL
Y1Y41	Dichlorodifluoromethane	0.5	UJ	IC%RSD, Sur<LCL
Y1Y41	Ethyl tert-butyl alcohol	50	UJ	LB<RL, TB<RL, EB<RL, Sur<LCL
Y1Y41	Ethylbenzene	0.5	UJ	Sur<LCL
Y1Y41	Isopropylbenzene	0.5	UJ	Sur<LCL
Y1Y41	Methyl acetate	0.5	UJ	Sur<LCL
Y1Y41	Methyl tert-butyl ether	0.5	UJ	Sur<LCL
Y1Y41	Methylcyclohexane	0.5	UJ	Sur<LCL
Y1Y41	Methylene chloride	10	UJ	IC%RSD, CCV<LCL, LB<RL, TB<RL, EB<RL, Sur<LCL
Y1Y41	Styrene	0.5	UJ	Sur<LCL
Y1Y41	Tert-amyl methyl ether	50	UJ	Sur<LCL
Y1Y41	Tert-butyl alcohol	50	UJ	Sur<LCL
Y1Y41	Tetrachloroethene	0.5	UJ	Sur<LCL
Y1Y41	Toluene	0.5	UJ	Sur<LCL
Y1Y41	Trans-1,2-Dichloroethene	0.5	UJ	Sur<LCL
Y1Y41	Trans-1,3-Dichloropropene	0.5	UJ	Sur<LCL
Y1Y41	Trichloroethene	0.5	UJ	Sur<LCL
Y1Y41	Trichlorofluoromethane	0.5	UJ	Sur<LCL
Y1Y41	Vinyl chloride	0.5	UJ	Sur<LCL
Y1Y41	Xylenes (Total)	0.5	UJ	Sur<LCL

CCV<LCL = Continuing calibration recovery less than lower control limit

EB<RL = Equipment blank concentration less than RL
IC%RSD = Initial calibration RSD exceeded
LB<RL = Laboratory blank contamination less than RL
Sur<LCL = Surrogate recovery less than lower limit
TB<RL = Trip blank concentration less than RL

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	June 22, 23 and 24, 2005
Report Date:	October 11, 2005
Parameters:	Volatile Organic Compounds
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y1Y22

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLM04.3 and project-approved modifications described in Modification Reference Number 1183.0 for volatile organic compounds (VOC). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan (SAP), AMCO Chemical Superfund Site, August 2004.

Tier III data validation was performed by CH2M HILL chemists. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review included the chain of custody (CoC) records, case narrative, completed CLP data summary forms, raw data and calculation verification for selected detected results.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms. Sample Y1Y22 was not preserved and was analyzed past the technical holding time. The results were estimated and qualified “J” for detects and “UJ” for nondetects. Samples Y1Y32 and Y1Y48 were preserved by the lab and were reanalyzed past the technical holding time due to high surrogate recovery.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Initial Calibration

The relative standard deviation (RSD) of the relative response factors of dichlorodifluoromethane, methylene chloride and bromomethane exceeded criteria. All methylene chloride results, the dichlorodifluoromethane results for Y1Y23, Y1Y30, Y1Y31, Y1Y32 and Y1Y48, and the bromomethane results for Y1Y22, Y1Y26, Y1Y27, Y1Y28 and Y1Y52 were flagged "UJ". All other initial calibration (ICAL) results met the requirements.

IV. Continuing Calibration

Methylene chloride, dichlorodifluoromethane, chloromethane, and vinyl chloride exceeded the continuing calibration verification (CCV) criteria for percent difference (%D), all with %Ds less than the LCL.

Methylene chloride was qualified "UJ" for all samples. Dichlorodifluoromethane, chloromethane and vinyl chloride were qualified "UJ" for non-detected results and "J" for detected results for Y1Y31, Y1Y32 and Y1Y48.

V. Blanks

The method blank was analyzed as required. Methylene chloride and ethyl tert-butyl alcohol were detected in the associated method blanks. The associated sample results less than 5 times or 10 times (common lab contaminants) the blank result were flagged "U" for all detected field samples at the respective RLs.

VI. System Monitoring Compounds

Samples Y1Y32, Y1Y48 and Y1Y49, which was an equipment blank, were reanalyzed due to high surrogate recoveries. The reanalyses exceeded the hold time and were excluded. The detected results for the original analyses were qualified "J" and the non-detected results were not qualified.

VII. Matrix Spike/Matrix Spike Duplicate

The matrix spike/matrix spike duplicate (MS/MSD), sample Y1Y22, performance requirements were met for accuracy. The precision as expressed as the relative percent difference (RPD) of the MS/MSD recoveries exceeded the upper control limit (UCL) for 1,1-dichloroethene and benzene. No flagging required since the compounds were not detected.

VIII. Laboratory Control Sample

The applicable Statement of Work does not require analysis of a laboratory control sample (LCS); therefore, no LCS was analyzed.

IX. Internal Standards

All internal standard recoveries were within acceptance criteria.

X. Target Compound Identification

Compound identification was verified by raw data review.

XI. Compound Quantitation and Reported CRQLs

Results quantitated between the method detection limit (MDL) and the reporting limit (RL) were flagged "J" by the laboratory, due to the inherent uncertainty in this region of quantitation. Results not designated as usable due to a reanalysis or dilution were qualified "R" and excluded and in order to preserve a discrete data set for each sample. Neither of these conditions is shown in the summary table.

There were a few target analytes that were quantified above the linear calibration range and flagged "E" by the laboratory. The laboratory reanalyzed the samples at a dilution to bring those target compounds within the linear range of the instrument, but for one compound, the diluted result was reported as not detected at the elevated RL. In this case, the first analysis (E-flagged result) was qualified "J", and the dilution was excluded.

Calculations for the ICAL, CCV and selected detected sample results were verified for one compound associated with each internal standard. Selected detected results for acetone, benzene, and total xylenes were verified.

Manual integrations were documented in the case narrative. However, no "before" manual integration snapshots were provided.

XII. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XIII. Field Blanks

The trip blanks (Y1Y47 and Y1Y50) were analyzed as required. Acetone, methylene chloride, carbon disulfide, and ethyl tert-butyl alcohol were detected in one or more trip blanks. Acetone, methylene chloride, and ethyl tert-butyl alcohol were qualified "U" for Y1Y22, Y1Y23, Y1Y28, Y1Y30 and Y1Y48 at the respective RLs. Methylene chloride and ethyl tert-butyl alcohol were qualified "U" for Y1Y26, Y1Y27, Y1Y31, Y1Y32 and Y1Y52. Carbon disulfide was not qualified, because it was either not detected in the samples or detected at a level greater than five times the associated blank concentration.

The equipment blanks (Y1Y49 and Y1Y51) were analyzed as required. Acetone, methylene chloride, and ethyl tert-butyl alcohol were detected one or more equipment blanks. Acetone and methylene chloride were qualified "U" for Y1Y22, Y1Y23, Y1Y28, Y1Y30 and Y1Y48 at the respective RLs. Methylene chloride and ethyl tert-butyl alcohol were qualified "U" for Y1Y26, Y1Y27, Y1Y32 and Y1Y52. Methylene chloride was qualified "U" for Y1Y31. The exception is acetone which was detected greater than the RL in Y1Y30 and qualified "U" based on the 5 times/10 times rule at the reported concentration.

XIV. Field Duplicates

Y1Y31 and Y1Y32 were designated as a field duplicate pair. The original undiluted sample analyses were within acceptance criteria, including those compounds above the calibration range. Y1Y31 was reanalyzed at an eight-fold dilution and Y1Y32 was reanalyzed at a five-fold dilution. The samples were reanalyzed for 1,1-dichloroethane, cis-1,2-dichloroethene, tert-butyl alcohol and trichloroethene. The diluted results for each of these compounds had an RPD of greater than 30 percent. Detected results were qualified as estimated and flagged "J".

XV. System Performance

The system performance was evaluated by reviewing the chromatographic and mass spectral data. Overall, the system was in control.

XVI. Overall Assessment of Data

- A number of problems were apparent from the QC data for these samples, but the laboratory generally took the corrective actions required. An exception to this is the reporting of data that exceeded the instrument calibration range without performing a dilution for those target compounds.
- There were indicators of potentially low bias based on the results of the continuing calibration standards exceedances, which were all below the LCL.
- Low levels of acetone, methylene chloride, and ethyl tert-butyl alcohol in the samples appear to be attributed to contamination originating from the collection, storage, transport, or analysis of the samples based on the detections observed in the method blanks, trip blank, and equipment blank samples.
- Two samples, Y1Y32 and Y1Y48, reported high surrogate recoveries. The non-detected compounds were not affected, but the detected compounds were estimated. The reanalyses were past hold time, and therefore not used.
- Field duplicate precision for four compounds exceeded criteria and results were qualified as estimated.
- No systemic issues were found. Data quality, as reviewed, was acceptable.
- Samples were collected and analyzed based on approved methods/procedures, and results are reported using industry-standardized units.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1Y22	1,1,1-Trichloroethane	0.50	UJ	HT>UCL
Y1Y22	1,1,2,2-Tetrachloroethane	0.50	UJ	HT>UCL
Y1Y22	1,1,2-Trichloro-1,2,2-Trifluoroethane	0.50	UJ	HT>UCL
Y1Y22	1,1,2-Trichloroethane	0.50	UJ	HT>UCL
Y1Y22	1,1-Dichloroethane	0.50	UJ	HT>UCL
Y1Y22	1,1- Dichloroethene	0.50	UJ	HT>UCL
Y1Y22	1,2,4- Trichlorobenzene	0.50	UJ	HT>UCL
Y1Y22	1,2-Dibromo-3-Chloropropane	0.50	UJ	HT>UCL
Y1Y22	1,2-Dibromoethane	0.50	UJ	HT>UCL
Y1Y22	1,2- Dichlorobenzene	0.50	UJ	HT>UCL
Y1Y22	1,2- Dichloroethane	0.50	UJ	HT>UCL
Y1Y22	1,2-Dichloropropane	0.50	UJ	HT>UCL
Y1Y22	1,3-Dichlorobenzene	0.50	UJ	HT>UCL
Y1Y22	1,4- Dichlorobenzene	0.50	UJ	HT>UCL
Y1Y22	2-Butanone	2	J	HT>UCL
Y1Y22	2-Hexanone	0.50	UJ	HT>UCL
Y1Y22	4-Methyl-2-Pentanone	10	UJ	HT>UCL
Y1Y22	Acetone	10	UJ	HT>UCL, TB<RL, EB<RL
Y1Y22	Benzene	0.50	UJ	HT>UCL
Y1Y22	Bromodichloromethane	0.50	UJ	HT>UCL
Y1Y22	Bromoform	0.50	UJ	HT>UCL
Y1Y22	Bromomethane	0.50	UJ	HT>UCL, IC%RSD
Y1Y22	Carbon disulfide	4	J	HT>UCL
Y1Y22	Carbon tetrachloride	0.50	UJ	HT>UCL
Y1Y22	Chlorobenzene	0.50	UJ	HT>UCL
Y1Y22	Chloroethane	0.50	UJ	HT>UCL
Y1Y22	Chloroform	0.50	UJ	HT>UCL
Y1Y22	Chloromethane	0.50	UJ	HT>UCL
Y1Y22	Cis-1,2-Dichloroethene	0.50	UJ	HT>UCL
Y1Y22	Cis-1,3-Dichloropropene	0.50	UJ	HT>UCL
Y1Y22	Cyclohexane	0.50	UJ	HT>UCL
Y1Y22	Dibromochloromethane	0.50	UJ	HT>UCL
Y1Y22	Dichlorodifluoromethane	0.50	UJ	HT>UCL
Y1Y22	Ethyl tert-butyl alcohol	50	UJ	HT>UCL, LB<RL, TB<RL
Y1Y22	Ethylbenzene	0.50	UJ	HT>UCL
Y1Y22	Isopropylbenzene	0.50	UJ	HT>UCL
Y1Y22	Methyl acetate	0.50	UJ	HT>UCL
Y1Y22	Methyl tert-butyl ether	0.50	UJ	HT>UCL
Y1Y22	Methylcyclohexane	0.50	UJ	HT>UCL
Y1Y22	Methylene chloride	10	UJ	HT>UCL, LB<RL, TB<RL, EB<RL, IC%RSD, CCV<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1Y22	Styrene	0.50	UJ	HT>UCL
Y1Y22	Tert-amyl methyl ether	50	UJ	HT>UCL
Y1Y22	Tert-butyl alcohol	210	J	HT>UCL, >ICLinearRange
Y1Y22	Tetrachloroethene	0.50	UJ	HT>UCL
Y1Y22	Toluene	0.50	UJ	HT>UCL
Y1Y22	Trans-1,2- Dichloroethene	0.50	UJ	HT>UCL
Y1Y22	Trans-1,3-Dichloropropene	0.50	UJ	HT>UCL
Y1Y22	Trichloroethene	0.50	UJ	HT>UCL
Y1Y22	Trichlorofluoromethane	0.50	UJ	HT>UCL
Y1Y22	Vinyl chloride	0.50	UJ	HT>UCL
Y1Y22	Xylenes (total)	0.50	UJ	HT>UCL
Y1Y23	Acetone	10	U	TB<RL, EB<RL
Y1Y23	Dichlorodifluoromethane	0.50	UJ	IC%RSD
Y1Y23	Ethyl tert-butyl alcohol	50	U	LB<RL, TB<RL
Y1Y23	Methylene chloride	10	UJ	LB<RL, TB<RL, EB<RL, IC%RSD, CCV<LCL
Y1Y26	Bromomethane	0.50	UJ	IC%RSD
Y1Y26	Ethyl tert-butyl alcohol	50	U	LB<RL, TB<RL, EB<RL
Y1Y26	Methylene chloride	10	UJ	LB<RL, TB<RL, EB<RL, IC%RSD, CCV<LCL
Y1Y27	Bromomethane	0.50	UJ	IC%RSD
Y1Y27	Ethyl tert-butyl alcohol	50	U	LB<RL, TB<RL, EB<RL
Y1Y27	Methylene chloride	10	UJ	LB<RL, TB<RL, EB<RL, IC%RSD, CCV<LCL
Y1Y28	Acetone	10	U	TB<RL, EB<RL
Y1Y28	Bromomethane	0.50	UJ	IC%RSD
Y1Y28	Ethyl tert-butyl alcohol	50	U	LB<RL, TB<RL
Y1Y28	Methylene chloride	10	UJ	LB<RL, TB<RL, EB<RL, IC%RSD, CCV<LCL
Y1Y30	Acetone	16	U	TB<RL, EB<RL
Y1Y30	Dichlorodifluoromethane	50	UJ	IC%RSD
Y1Y30	Ethyl tert-butyl alcohol	50	U	LB<RL, TB<RL
Y1Y30	Methylene chloride	10	UJ	LB<RL, TB<RL, EB<RL, IC%RSD, CCV<LCL
Y1Y31	Chloromethane	0.50	UJ	CCV<LCL
Y1Y31	Dichlorodifluoromethane	0.50	UJ	IC%RSD, CCV<LCL
Y1Y31	Ethyl tert-butyl alcohol	50	U	LB<RL, TB<RL
Y1Y31	Methylene chloride	10	UJ	LB<RL, TB<RL, EB<RL, IC%RSD, CCV<LCL
Y1Y31DL	1,1-Dichloroethane	82	J	FD>RPD
Y1Y31DL	Cis-1,2-Dichloroethene	220	J	FD>RPD
Y1Y31DL	Tert-butyl alcohol	910	J	>ICLinearRange, FD>RPD
Y1Y31DL	Trichloroethene	150	J	FD>RPD
Y1Y31	Vinyl chloride	25	J	Sur>UCL
Y1Y32	1,1-Dichloroethene	2	J	Sur>UCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1Y32	1,1,2-Trichloroethane	0.5	J	Sur>UCL
Y1Y32	Acetone	52	J	Sur>UCL
Y1Y32	Benzene	1	J	Sur>UCL
Y1Y32	Cis-1,3-Dichloropropene	6	J	Sur>UCL
Y1Y32	Chloromethane	0.7	J	CCV<LCL, Sur>UCL
Y1Y32	Dichlorodifluoromethane	0.5	UJ	IC%RSD, CCV<LCL
Y1Y32	Ethylbenzene	0.9	J	Sur>UCL
Y1Y32	Ethyl tert-butyl alcohol	50	U	LB<RL, TB<RL, EB<RL
Y1Y32	Methylene chloride	10	UJ	LB<RL, TB<RL, EB<RL, IC%RSD, CCV<LCL
Y1Y32DL	1,1-Dichloroethane	54	J	FD>RPD
Y1Y32DL	Cis-1,2-Dichloroethene	130	J	FD>RPD
Y1Y32DL	Tert-butyl alcohol	520	J	>ICLinearRange, FD>RPD
Y1Y32DL	Trichloroethene	110	J	FD>RPD
Y1Y32	Toluene	0.7	J	Sur>UCL
Y1Y32	Trans-1,2-Dichloroethene	2	J	Sur>UCL
Y1Y32	Vinyl chloride	21	J	CCV<LCL, Sur>UCL
Y1Y32	Xylenes (total)	1	J	Sur>UCL
Y1Y48	2-Butanone	8	J	Sur>UCL
Y1Y48	Acetone	10	U	TB<RL, EB<RL
Y1Y48	Bromodichloromethane	2	J	Sur>UCL
Y1Y48	Chloromethane	0.5	UJ	CCV<LCL
Y1Y48	Dichlorodifluoromethane	0.50	UJ	IC%RSD, CCV<LCL
Y1Y48	Ethyl tert-butyl alcohol	50	U	LB<RL, TB<RL
Y1Y48	Methylene chloride	10	UJ	LB<RL, TB<RL, EB<RL, IC%RSD, CCV<LCL
Y1Y48	Vinyl chloride	0.5	UJ	CCV<LCL
Y1Y50	Bromomethane	0.50	UJ	IC%RSD
Y1Y52	Bromomethane	0.50	UJ	IC%RSD
Y1Y52	Ethyl tert-butyl alcohol	50	U	LB<RL, TB<RL, EB<RL
Y1Y52	Methylene chloride	10	UJ	LB<RL, TB<RL, EB<RL, IC%RSD, CCV<LCL

>ICLinearRange = Result greater than linear calibration range
CCV<LCL = Continuing calibration recovery less than lower control limit
EB<RL = Equipment blank concentration less than RL
FD>RPD = Field duplicate exceeds RPD criteria
HT>UCL = Holding time exceeded
IC%RSD = Initial calibration RSD exceeded
LB<RL = Laboratory blank contamination less than RL
MSRPD = Matrix spike RPD criteria exceedance
Sur<LCL = Surrogate recovery less than lower limit
TB<RL = Trip blank concentration less than RL

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	June 28 and 29, 2005
Report Date:	October 11, 2005
Parameters:	Volatile Organic Compounds
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y1Y24

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLM04.3 and project-approved modifications described in Modification Reference Number 1183.0 for volatile organic compounds (VOC). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, October 1999 as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan (SAP), AMCO Chemical Superfund Site, August 2004.

Tier III data validation was performed by CH2M HILL chemists. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review included the chain of custody (CoC) records, case narrative, completed CLP data summary forms, raw data and calculation verification for selected detected results.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms. Individual sample bottles did not contain sample tag ID numbers.

All technical holding times were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Initial Calibration

The relative standard deviation (RSD) of the relative response factors of methylene chloride and bromomethane exceeded 30 percent. All samples were qualified "UJ" for bromomethane and methylene chloride, except Y1Y36, which was qualified "J" for methylene chloride.

All other initial calibration (ICAL) results met the requirements.

IV. Continuing Calibration

Methyl acetate, methylene chloride, tert-butyl alcohol, 4-methyl-2-pentanone, 2-hexanone and 1,2-dibromo-3-chloropropane exceeded the continuing calibration verification (CCV) criteria for percent difference (%D).

Methylene chloride was qualified "UJ" for all samples except Y1Y36, which was qualified "J". In addition, 4-methyl-2-pentanone, 2-hexanone, and 1,2-dibromo-3-chloropropane were qualified "UJ" for Y1Y24, Y1Y34 and Y1Y54. Methyl acetate, tert-butyl alcohol and 1,2-dibromo-3-chloropropane were qualified "UJ" for Y1Y29, Y1Y35, Y1Y36 and Y1Y37; although, tert-butyl alcohol was qualified "J" for Y1Y36.

V. Blanks

The method blank was analyzed as required. Methylene chloride and ethyl tert-butyl alcohol were detected in the method blanks. The associated sample results less than 5 times or 10 times (common lab contaminants) the blank result were flagged "U".

VI. System Monitoring Compounds

All surrogate recoveries were within acceptance criteria.

VII. Matrix Spike/Matrix Spike Duplicate

The matrix spike and matrix spike duplicate (MS/MSD) performance requirements were met for recovery, but the precision expressed as relative percent difference (RPD) exceeded criteria for 1,1-dicloroethene. This compound was qualified "UJ" for Y1Y35.

VIII. Laboratory Control Sample

The applicable Statement of Work does not require analysis of a laboratory control sample (LCS); therefore, no LCS was analyzed.

IX. Internal Standards

All internal standard recoveries were within acceptance criteria.

X. Target Compound Identification

Compound identification was verified by raw data review.

XI. Compound Quantitation and Reported CRQLs

Results quantitated between the method detection limit (MDL) and the reporting limit (RL) were flagged "J" by the laboratory, due to the inherent uncertainty in this region of quantitation. Results not designated as usable due to a second analysis for dilution were

qualified "R" and excluded and in order to preserve a discrete data set for each sample. Neither of these conditions is shown in the summary table.

There were several target analytes that were quantified above the linear calibration range and flagged "E" by the laboratory. The laboratory reanalyzed the samples at a dilution to bring those target compounds within the linear range of the instrument, but for some compounds, the diluted results were reported as not detected at the elevated RL. In these cases, the first analysis (E-flagged result) was qualified "J", and the dilution was excluded.

Calculations for the ICAL, CCV and selected detected sample results were verified for one compound associated with each internal standard. Selected detected results for vinyl chloride, benzene, and 1,4-dichlorobenzene were verified.

Manual integrations were appropriately documented.

Two samples had misidentified detected results. Tert-butyl alcohol in sample Y1Y25 and cis-1,3-dichloropropene in sample Y1Y36 did not have spectral matches. The results were qualified as non-detected at the contract required quantitation limit (CRQL) and flagged "U".

XII. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XIII. Field Blanks

The trip blanks (Y1Y53 and Y1Y56) and the samples were collected on two different days and analyzed as required. Samples were associated to the trip blank based on the date of collection. Acetone, methylene chloride and ethyl tert-butyl alcohol were detected in both trip blanks, and 1,2-dichlorobenzene was detected in one trip blank (Y1Y53). No qualification was applied for 1,2-dichlorobenzene, because this compound was detected at concentrations greater than five times the concentration in the trip blank, or because it was not associated to a sample (e.g. collected on a different day). Concentrations less than 10 times (5 times for ethyl tert-butyl alcohol) the associated blank were qualified "U" for acetone, methylene chloride and ethyl tert-butyl alcohol for all detected field samples except for Y1Y36, which reported high concentrations of acetone and methylene chloride.

The equipment blanks (Y1Y55 and Y1Y57) were analyzed as required. Acetone, methylene chloride and ethyl tert-butyl alcohol were detected in both equipment blanks. These compounds were qualified "U" for all detected field samples except Y1Y36. Ethyl tert-butyl alcohol only was qualified "U" for Y1Y36.

XIV. Field Duplicates

Samples Y1Y24 and Y1Y54 were designated as a field duplicate pair. All acceptance criteria were met.

XV. System Performance

The system performance was evaluated by reviewing the chromatographic and mass spectral data. Overall, the system was in control.

XVI. Overall Assessment of Data

- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable and therefore, the data are both accurate and precise.
- Low levels of acetone, methylene chloride and ethyl tert-butyl alcohol in the samples appear to be attributed to contamination originating from the collection, storage, transport, or analysis of the samples based on the detections observed in the method blanks, trip blanks, and equipment blanks.
- There were indicators of potentially low bias based on the results of the continuing calibration standards exceedances, which were below the lower control limit, as well as the negative %Ds from the initial calibration reported for all or most compounds calibrated.
- Samples were collected and analyzed based on approved methods/procedures, and results are reported using industry-standardized units.
- Two low-level detected results were misidentified and flagged "U" at the CRQL.
- Overall, the data quality, as reviewed, was acceptable.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1Y24	1,2-Dibromo-3-Chloropropane	0.5	UJ	CCV<LCL
Y1Y24	2-Hexanone	10	UJ	CCV<LCL
Y1Y24	4-Methyl-2-Pentanone	10	UJ	CCV<LCL
Y1Y24	Acetone	10	U	TB<RL, EB<RL
Y1Y24	Bromomethane	0.5	UJ	IC%RSD
Y1Y24	Ethyl tert-butyl alcohol	50	U	LB<RL, TB<RL, EB<RL
Y1Y24	Methylene chloride	10	UJ	LB<RL, TB<RL, EB<RL, IC%RSD, CCV<LCL
Y1Y25	Acetone	10	U	TB<RL, EB<RL
Y1Y25	Bromomethane	0.5	UJ	IC%RSD
Y1Y25	Ethyl tert-butyl alcohol	50	U	LB<RL, TB<RL, EB<RL
Y1Y25	Methylene chloride	10	UJ	LB<RL, TB<RL, EB<RL, IC%RSD, CCV<LCL
Y1Y25	Tert-butyl alcohol	50	U	NoSpectralMatch
Y1Y29	1,2-Dibromo-3-Chloropropane	0.5	UJ	CCV<LCL
Y1Y29	Acetone	10	U	TB<RL, EB<RL
Y1Y29	Bromomethane	0.5	UJ	IC%RSD
Y1Y29	Ethyl tert-butyl alcohol	50	U	LB<RL, TB<RL, EB<RL
Y1Y29	Methyl acetate	0.5	UJ	CCV<LCL
Y1Y29	Methylene chloride	10	UJ	LB<RL, TB<RL, EB<RL, IC%RSD, CCV<LCL
Y1Y29	Tert-butyl alcohol	50	UJ	CCV<LCL
Y1Y33	Acetone	10	U	TB<RL, EB<RL
Y1Y33	Bromomethane	0.5	UJ	IC%RSD
Y1Y33	Ethyl tert-butyl alcohol	50	U	LB<RL, TB<RL, EB<RL
Y1Y33	Methylene chloride	10	UJ	LB<RL, TB<RL, EB<RL, IC%RSD, CCV<LCL
Y1Y34	1,2-Dibromo-3-Chloropropane	0.5	UJ	CCV<LCL
Y1Y34	2- Hexanone	10	UJ	CCV<LCL
Y1Y34	4- Methyl-2-Pentanone	10	UJ	CCV<LCL
Y1Y34	Acetone	10	U	TB<RL, EB<RL
Y1Y34	Bromomethane	0.5	UJ	IC%RSD
Y1Y34	Ethyl tert-butyl alcohol	50	U	LB<RL, TB<RL, EB<RL
Y1Y34	Methylene chloride	10	UJ	LB<RL, TB<RL, EB<RL, IC%RSD, CCV<LCL
Y1Y35	1,1-Dichloroethene	0.5	UJ	MSRPD
Y1Y35	1,2-Dibromo-3-Chloropropane	0.5	UJ	CCV<LCL
Y1Y35	Acetone	10	U	TB<RL, EB<RL
Y1Y35	Bromomethane	0.5	UJ	IC%RSD
Y1Y35	Ethyl tert-butyl alcohol	50	U	LB<RL, TB<RL, EB<RL
Y1Y35	Methyl acetate	0.5	UJ	CCV<LCL
Y1Y35	Methylene chloride	10	UJ	LB<RL, TB<RL, EB<RL, IC%RSD, CCV<LCL
Y1Y35	Tert-butyl alcohol	50	UJ	CCV<LCL
Y1Y36	1,2,4-Trichlorobenzene	54	J	>ICLinearRange
Y1Y36	Bromomethane	0.5	UJ	IC%RSD
Y1Y36	Cis-1,2-Dichloroethene	48	J	>ICLinearRange
Y1Y36	Cis-1,3-Dichloropropene	0.5	U	NoSpectralMatch

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
Y1Y36	Ethyl tert-butyl alcohol	50	U	LB<RL, TB<RL, EB<RL
Y1Y36	Methyl acetate	0.5	UJ	CCV<LCL
Y1Y36DL	Methylene chloride	310	J	IC%RSD, CCV<LCL
Y1Y36	Tert-butyl alcohol	77	J	CCV<LCL, >ICLinearRange
Y1Y36	Trans-1,2-Dichloroethene	52	J	>ICLinearRange
Y1Y37	1,2-Dibromo-3-Chloropropane	0.5	UJ	CCV<LCL
Y1Y37	Acetone	10	U	TB<RL, EB<RL
Y1Y37	Bromomethane	0.5	UJ	IC%RSD
Y1Y37	Methyl acetone	0.5	UJ	CCV<LCL
Y1Y37	Methylene chloride	10	UJ	LB<RL, TB<RL, EB<RL, IC%RSD, CCV<LCL
Y1Y37	Tert-butyl alcohol	50	UJ	CCV<LCL
Y1Y54	1,2-Dibromo-3-Chloropropane	0.5	UJ	CCV<LCL
Y1Y54	2-Hexanone	10	UJ	CCV<LCL
Y1Y54	4-Methyl-2-Pentanone	10	UJ	CCV<LCL
Y1Y54	Acetone	10	U	TB<RL, EB<RL
Y1Y54	Bromomethane	0.5	UJ	IC%RSD
Y1Y54	Ethyl tert-butyl alcohol	50	U	LB<RL, TB<RL, EB<RL
Y1Y54	Methylene chloride	10	UJ	LB<RL, TB<RL, EB<RL, IC%RSD, CCV<LCL

>ICLinearRange = Result greater than linear calibration range
CCV<LCL = Continuing calibration recovery less than lower control limit
CF>RPD = Confirmation precision exceeded
EB<RL = Equipment blank concentration less than RL
EB>RL = Equipment blank concentration greater than RL
IC%RSD = Initial calibration RSD exceeded
LB<RL = Laboratory blank contamination less than RL
LCSRPD = LCS RPD criteria exceeded
MS<LCL = Matrix spike recovery less than lower limit
MSRPD = Matrix spike RPD criteria exceedance
NoSpectralMatch = No spectral match
TB<RL = Trip blank concentration less than RL

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	September 28, 29 and 30, 2005
Report Date:	November 2, 2005
Parameters:	General Chemistry: Anions
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05272B

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901100. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (NFG), October 2004, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within temperature control and with the appropriate CoC forms and custody seals intact.

Holding-time requirements were met for all samples except the following: Nitrite and nitrate for samples BMW-03-0905, MW-90-15-0905, and RMW-05-15-0905; nitrite for sample RMW-10-35-0905; and nitrate for sample RMW-10-15-0905 were analyzed past the recommended 48-hour holding time. Detected and non-detected results were qualified as estimated and flagged “J” and “UJ”, respectively.

II. Calibration

All acceptance criteria were met.

III. Blanks

Method blanks were analyzed as required for each method. No contamination was detected.

IV. Matrix Spike/Matrix Spike Duplicate

Matrix spike/matrix spike duplicates for nitrate and nitrite were performed on samples RMW-04-15-0905 and RMW-09-15-0905. All acceptance criteria were met.

V. Laboratory Control Sample

All acceptance criteria were met.

VI. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

VII. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), was not within the scope of the data review for this SDG.

VIII. Field Blanks

No field blanks in this SDG.

IX. Field Duplicates

This SDG contained two field duplicate pairs: samples RMW-10-15-0905 and MW-90-15-0905 and samples MW-09-15-0905 and MW-91-0905. All acceptance criteria were met.

X. Laboratory Duplicates

A laboratory duplicate was analyzed on samples RMW-04-15-0905 and RMW-09-15-0905 for chloride and sulfate. All acceptance criteria were met.

XI. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XII. Overall Assessment of Data

- Nitrate and nitrite holding times were exceeded for several samples. The results were qualified as estimated.
- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (MG/L)	FINAL FLAG	VALIDATION COMMENTS
BMW-03-0905	Nitrate	46	J	HT>UCL
BMW-03-0905	Nitrite	0.50	UJ	HT>UCL
MW-90-15-0905	Nitrate	58	J	HT>UCL
MW-90-15-0905	Nitrite	0.36	J	HT>UCL
RMW-05-15-0905	Nitrate	0.10	UJ	HT>UCL
RMW-05-15-0905	Nitrite	0.50	UJ	HT>UCL
RMW-10-15-0905	Nitrate	67	J	HT>UCL
RMW-10-35-0905	Nitrite	50	UJ	HT>UCL

HT>UCL = Holding time exceeded

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 3, 4, 5 and 6, 2005
Report Date:	November 3, 2005
Parameters:	General Chemistry: Anions
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05277I

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901100. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (NFG), October 2004 as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within temperature control and with the appropriate CoC forms and custody seals intact.

Holding-time requirements were met for all samples except the following: Nitrite for samples RMW-06-15-0905, BMW-07-0905, and RMW-14-50-0905 and nitrite and nitrate for samples BPZ-01-0905 and BMW-08-0905 were analyzed past the recommended 48-hour holding time. Non-detected results were qualified as estimated and “UJ” flagged.

II. Calibration

All acceptance criteria were met.

III. Blanks

Method blanks were analyzed as required for each method. No contamination was detected.

IV. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate for nitrate and nitrite were performed on samples RMW-07-15-0905 and RMW-14-50-0905. All acceptance criteria were met.

V. Laboratory Control Sample

All acceptance criteria were met.

VI. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

VII. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), was not within the scope of the data review for this SDG.

VIII. Field Blanks

No field blanks in this SDG.

IX. Field Duplicates

No field duplicates in this SDG.

X. Laboratory Duplicates

A laboratory duplicate was analyzed on samples RMW-07-15-0905 and RMW-14-50-0905 for chloride and sulfate. All acceptance criteria were met.

XI. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XII. Overall Assessment of Data

- Nitrate and nitrite holding times were exceeded for several samples. The results were qualified as estimated.
- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (MG/L)	FINAL FLAG	VALIDATION COMMENTS
BMW-08-0905	Nitrate	1.0	UJ	HT>UCL
BPZ-01-0905	Nitrate	1.0	UJ	HT>UCL
RMW-06-15-0905	Nitrite	1.0	UJ	HT>UCL
BMW-07-0905	Nitrite	2.5	UJ	HT>UCL
BMW-08-0905	Nitrite	50	UJ	HT>UCL
BPZ-01-0905	Nitrite	20	UJ	HT>UCL
RMW-14-50-0905	Nitrite	20	UJ	HT>UCL

HT>UCL = Holding time exceeded

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 10, 11 and 12, 2005
Report Date:	November 11, 2005
Parameters:	General Chemistry: Anions
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05284A

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901100. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (NFG), October 2004, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within temperature control and with the appropriate CoC forms and custody seals intact.

Holding-time requirements were met for all samples except the following: Nitrite and nitrate for samples MW-88-51-0905 and RMW-12-51-0905 and nitrite for sample RMW-12-32-0905 were analyzed past the recommended 48-hour holding time. Detected and non-detected results were qualified as estimated and flagged “J” and “UJ”, respectively.

II. Calibration

All acceptance criteria were met.

III. Blanks

Method blanks were analyzed as required for each method. No contamination was detected.

IV. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate for nitrate and nitrite was performed on sample RMW-12-51-0905. All acceptance criteria were met.

V. Laboratory Control Sample

All acceptance criteria were met.

VI. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

VII. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), was not within the scope of the data review for this SDG.

VIII. Field Blanks

No field blanks in this SDG.

IX. Field Duplicates

Samples RMW-12-51-0905 and MW-88-51-0905 were designated as a field duplicate pair. All acceptance criteria were met.

X. Laboratory Duplicates

A laboratory duplicate was analyzed on sample RMW-12-51-0905 for chloride and sulfate. All acceptance criteria were met.

XI. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XII. Overall Assessment of Data

- Nitrate and nitrite holding times were exceeded for several samples. The results were qualified as estimated.
- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (MG/L)	FINAL FLAG	VALIDATION COMMENTS
MW-88-51-0905	Nitrate	2.0	J	HT>UCL
MW-88-51-0905	Nitrite	0.50	UJ	HT>UCL
RMW-12-32-0905	Nitrite	1.0	UJ	HT>UCL
RMW-12-51-0905	Nitrate	2.4	J	HT>UCL
RMW-12-51-0905	Nitrite	0.50	UJ	HT>UCL

HT>UCL = Holding time exceeded

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	September 28, 29 and 30, 2005
	October 3 and 4, 2005
Report Date:	October 14, 2005
Parameters:	ICP/MS Metals
Laboratory:	Sentinel, Inc.
Sample Delivery Group:	MY23M1

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Method ILM05.3. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the USEPA National Functional Guidelines for Inorganic Data Review (NFG), October 2004, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier III data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier III data validation. The intended objective of the data review process was to provide a technical review of the raw data and to provide verification of calculations and analyte identification. It was not intended to determine contract compliance.

The scope of the data review included the chain-of-custody (CoC) records, the case narrative, completed contract laboratory program (CLP) data summary forms and raw data.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

Samples were received for both ICP and ICP/MS metals at another laboratory. A portion of each sample was sent to Sentinel, Inc. for ICP/MS metals analysis.

The CoC requested turnaround time (TAT) was 21 days. However, the contract requested TAT of seven days was followed.

All technical holding-time requirements were met.

II. ICP-MS Tune Analysis

The ICP-MS tune was analyzed as required by the method and was within criteria.

III. Calibration

All initial calibrations were within acceptance criteria.

All continuing calibration (CCV) standards were within criteria except the closing CCV on 10/14/2005. Beryllium, chromium, cobalt, copper, nickel and vanadium recoveries in this CCV were between 75-89 percent. Samples RMW-10-15-0905, MW-90-15-0905 and RMW-10-35-0905 were associated with this CCV. Detected sample results were qualified as estimated and flagged "J-". Non-detected sample results were qualified as estimated and flagged "UJ".

The contract required quantitation limit (CRQL), equivalent to reporting limit (RL), check standards (CRI) were within acceptance criteria except for the following: the second CRI analyzed on 10/13/05 had arsenic, copper, manganese and zinc recoveries between 130-180 percent (150-200 percent for zinc). Detected results between the method detection limit (MDL) and twice the CRQL were qualified. Arsenic and copper in sample RMW-07-15-0905 were qualified as estimated and flagged "J+". Manganese in samples MW-EB-02-0905 and MW-EB-04-0905 and zinc in sample MW-EB-03-0905 were not qualified because only the equipment blanks (EB) were affected. All other results for these elements associated with this CRI were either non-detected or greater than two times the CRQL and not qualified. In a CRI on 10/14/05, nickel was recovered below the lower control limit (LCL); however, all associated results exceeded two times the CRQL and no flags were applied.

IV. Laboratory Blanks

The method blank (MB) contained barium, chromium, lead and vanadium at concentrations below the CRQL. Detected sample results between the MDL and CRQL for these elements were qualified as non-detected at the CRQL and flagged "U".

The initial calibration blanks (ICB) contained antimony, beryllium, silver and thallium. Sample results between the MDL and CRQL were flagged "U" and qualified as non-detected at the CRQL.

Arsenic, cadmium, copper, manganese and zinc were detected in the continuing calibration blanks (CCB). Associated sample results between the MDL and CRQL were qualified as non-detected at the CRQL and flagged "U".

V. Field Blanks

There were four equipment blanks (EB) submitted in this SDG. MW-EB-01-0905 had no detected results. Cobalt was detected below the CRQL and manganese and zinc were detected above the CRQL in MW-EB-02-0905. Selenium was detected below the CRQL and manganese and zinc were detected above the CRQL in MW-EB-03-0905 and MW-EB-04-0905. Cobalt and selenium results were qualified as non-detected at the CRQL and flagged "U". Manganese results were greater than 10 times the blank detected results and therefore, no flags were applied. Zinc results less than 10 times the blank results were considered unusable and flagged "R".

VI. Interference Check Sample

The interference check samples were analyzed as required and were within acceptance criteria except for zinc which was recovered above the upper control limit of 120 percent at 123 percent and 125 percent. Detected sample results were flagged "J+" and qualified as estimated.

VII. Laboratory Control Sample

All laboratory control sample recoveries were within criteria except silver at a recovery of 121 percent. There were no detected silver results and therefore, no flags were applied.

VIII. Laboratory Duplicate

A laboratory duplicate was analyzed on sample BMW-01-0905. All relative percent difference (RPD) criteria were met except for vanadium at an RPD of 79 percent. The detected sample result was flagged "J" and qualified as estimated.

IX. Matrix Spike/Matrix Spike Duplicate

A matrix spike was analyzed on sample BMW-01-0905. All recoveries were within acceptance criteria.

X. Serial Dilutions

The serial dilution was performed on sample BMW-01-0905. All acceptance criteria were met.

XI. ICP/MS Internal Standards

Internal standards were analyzed as per the method. Samples RMW-10-15-0905, MW-90-15-0905 and RMW-10-35-0905 had TB159 and BI209 internal standard recoveries above acceptance criteria in both the original and two-fold dilutions. Data were reported from the dilution for each of these samples. Detected results associated with each of these internal standards were qualified as estimated and flagged "J" and non-detected results were qualified as estimated and flagged "UJ".

XII. Field Duplicates

There were two field duplicate (FD) pairs designated in this SDG: samples RMW-10-15-0905 and MW-90-15-0905 and samples RMW-09-15-0905 and MW-91-0905. All acceptance criteria were met. There appeared to be an error in the second FD pair as to the parent sample.

XIII. Target Compound Quantitation

Raw data were reviewed and all calculations were verified.

XIV. Compound Quantitation and Reported CRQLs

Compound quantitation and accuracy were verified.

XV. Overall Assessment of Data

- All of the results are useable for project objectives except for five zinc results due to EB detections greater than the CRQL. Therefore, the completeness objectives were met for all method/analyte combinations except for zinc.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable overall.
- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- Calibration and internal standard exceedances resulted in data qualified as estimated concentrations.
- An interference check sample exceedance resulted in zinc qualified as estimated concentrations.
- A laboratory duplicate exceedance in one sample resulted in vanadium qualified as an estimated concentration.
- Target analytes were detected in the associated EB, MB, ICB and CCBs. Some of these low-level blank detects resulted in detected data qualified as non-detects.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (ug/L)	FINAL FLAG	VALIDATION COMMENTS
BMW-01-0905	CHROMIUM	2	U	LB<RL
BMW-01-0905	VANADIUM	2.6	J	Lab Dup RPD
BMW-01-0905	ZINC	9	J+	ICS>UCL
BMW-03-0905	CADMIUM	1	U	CCB<RL
BMW-03-0905	CHROMIUM	2	U	LB<RL
BMW-03-0905	THALLIUM	1	U	ICB<RL
BMW-03-0905	ZINC	143	J+	ICS>UCL
MW-90-15-0905	ANTIMONY	2.3	J	IS>UCL
MW-90-15-0905	BARIUM	23.5	J	IS>UCL
MW-90-15-0905	BERYLLIUM	2	UJ	CCV<LCL
MW-90-15-0905	CHROMIUM	7.1	J-	CCV<LCL
MW-90-15-0905	COBALT	25.4	J-	CCV<LCL
MW-90-15-0905	COPPER	21.5	J-	CCV<LCL
MW-90-15-0905	LEAD	9.2	J	IS>UCL
MW-90-15-0905	NICKEL	236	J-	CCV<LCL
MW-90-15-0905	THALLIUM	1	UJ	ICB<RL
MW-90-15-0905	VANADIUM	2.2	J-	CCV<LCL
MW-90-15-0905	ZINC	4920	J+	ICS>UCL
MW-91-0905	ANTIMONY	2	U	ICB<RL
MW-91-0905	CADMIUM	1	U	CCB<RL
MW-91-0905	SELENIUM	5	U	EB<RL
MW-91-0905	SILVER	1	U	ICB<RL
MW-91-0905	ZINC	39.7	J+	ICS>UCL
RMW-03-15-0905	SILVER	1	U	ICB<RL
RMW-03-15-0905	ZINC	62.4	J+	ICS>UCL
RMW-04-15-0905	CHROMIUM	4	U	LB<RL
RMW-04-15-0905	SILVER	2	U	ICB<RL
RMW-04-15-0905	THALLIUM	2	U	ICB<RL
RMW-04-15-0905	ZINC	5.8	J+	ICS>UCL
RMW-05-15-0905	CADMIUM	2	U	CCB<RL
RMW-05-15-0905	ZINC	47.9	R	ICS>UCL, EB>RL
RMW-06-15-0905	SELENIUM	5	U	EB<RL
RMW-06-15-0905	SILVER	1	U	ICB<RL
RMW-06-15-0905	THALLIUM	1	U	ICB<RL
RMW-06-15-0905	ZINC	33.8	R	ICS>UCL, EB>RL
RMW-07-15-0905	ARSENIC	1.3	J+	CRI>UCL
RMW-07-15-0905	CHROMIUM	2	U	LB<RL
RMW-07-15-0905	COPPER	2.2	J+	CRI>UCL
RMW-07-15-0905	ZINC	7.5	R	ICS>UCL, EB>RL
RMW-07-35-0905	ZINC	28.1	R	ICS>UCL, EB>RL
RMW-09-15-0905	ANTIMONY	2	U	ICB<RL

FIELD ID	ANALYTE	FINAL RESULT (ug/L)	FINAL FLAG	VALIDATION COMMENTS
RMW-09-15-0905	CADMIUM	1	U	CCB<RL
RMW-09-15-0905	SELENIUM	5	U	EB<RL
RMW-09-15-0905	ZINC	50.3	J+	ICS>UCL
RMW-09-35-0905	SELENIUM	5	U	EB<RL
RMW-09-35-0905	ZINC	7.1	R	ICS>UCL, EB>RL
RMW-10-15-0905	ANTIMONY	2	J	IS>UCL
RMW-10-15-0905	BARIUM	21.8	J	IS>UCL
RMW-10-15-0905	BERYLLIUM	2	UJ	CCV<LCL
RMW-10-15-0905	CHROMIUM	6.4	J-	CCV<LCL
RMW-10-15-0905	COBALT	24.5	J-	CCV<LCL
RMW-10-15-0905	COPPER	21.3	J-	CCV<LCL
RMW-10-15-0905	LEAD	8.7	J	IS>UCL
RMW-10-15-0905	NICKEL	227	J-	CCV<LCL
RMW-10-15-0905	THALLIUM	1	UJ	ICB<RL
RMW-10-15-0905	VANADIUM	1.8	J-	CCV<LCL
RMW-10-15-0905	ZINC	4520	J+	ICS>UCL
RMW-10-35-0905	ANTIMONY	2	UJ	IS>UCL
RMW-10-35-0905	BARIUM	22	J	IS>UCL
RMW-10-35-0905	BERYLLIUM	2	UJ	CCV<LCL
RMW-10-35-0905	CHROMIUM	5	J-	CCV<LCL
RMW-10-35-0905	COBALT	228	J-	CCV<LCL
RMW-10-35-0905	COPPER	20.3	J-	CCV<LCL
RMW-10-35-0905	LEAD	6.6	J	IS>UCL
RMW-10-35-0905	NICKEL	510	J-	CCV<LCL
RMW-10-35-0905	SILVER	2	U	ICB<RL
RMW-10-35-0905	THALLIUM	1	UJ	ICB<RL
RMW-10-35-0905	VANADIUM	2.9	J-	CCV<LCL
RMW-10-35-0905	ZINC	115	J+	ICS>UCL

CCB<RL = Continuing calibration blank concentration less than RL
CCV<LCL = Continuing calibration recovery less than lower control limit
CRI>UCL = CRQL check standard greater than upper control limit
EB<RL = Equipment blank concentration less than the RL
EB>RL = Equipment blank concentration greater than the RL
ICB<RL = Initial calibration blank concentration less than RL
ICS>UCL = Interference check standard recovery greater than upper control limit
IS>UCL = Internal standard response greater than upper control limit
Lab Dup RPD= Duplicate result exceeds upper control limit
LB<RL = Laboratory blank contamination less than the RL

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 5, 6, 10 and 11, 2005
Report Date:	December 23, 2005
Parameters:	ICP/MS Metals and Mercury
Laboratory:	Sentinel, Inc.
Sample Delivery Group:	MY23R4

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work ILMO5.3 with the additional requirements posed in Modification Tracking Number 1184.0. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), October 2004, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II CLP level data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J- — The analyte was positively identified but biased low; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ — The analyte was positively identified but biased high; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples reported in this SDG were sent to the laboratory in three shipments. The cooler containing samples collected on October 4, 5 and 6 except for samples RMW-01-35-0905 and

RMW-01-17-0905 was received at 7.0 degrees Celsius. This slightly elevated temperature still indicates that the samples were shipped under ice and were likely elevated for a limited period of time. All other samples were received by the laboratory within EPA recommended storage temperatures. Sample CoC forms and custody seals were intact and no issues were noted. Individual samples did not contain sample tag ID numbers. Three samples, BPZ-01-0905, BMW-08-0905 and RMW-02-32-0905, were received by the laboratory at a pH > 2, but were preserved at the laboratory using nitric acid to a pH < 2 prior to analysis. No flags were applied as a result of the pH or temperature discrepancies.

All technical holding-time requirements were met.

Only total analyses are reported in this SDG. Dissolved analyses on the accompanying CoCs can be found reported in another SDG.

II. ICP-MS Tune Analysis

The instrument tune was analyzed as required and all acceptance criteria were met.

III. Calibration

All calibration verification standards met acceptance criteria.

A contract required quantitation limit (CRQL), equivalent to reporting limit (RL), check standard (CRI) was run at the required frequency, and all acceptance criteria were met.

IV. Laboratory Blanks

The method blank (MB) associated with all samples in this SDG contained concentrations of arsenic, barium, copper, chromium, manganese and zinc above the MDL, but below the CRQL. Beryllium and cobalt were detected in negative concentrations below the negative MDL and less than the negative CRQL. Associated sample results reported between the MDL and the CRQL were flagged as non-detects. Detected results greater than the CRQL were not qualified.

Antimony, arsenic, chromium, manganese, selenium, silver, thallium, vanadium and zinc were detected in the initial calibration blank (ICB) at concentrations greater than the method detection limit (MDL), but lower than the CRQL. Beryllium, cobalt, selenium and zinc were detected at negative concentrations less than the negative MDL and less than the negative CRQL. Arsenic, chromium, manganese, selenium, silver, thallium, and vanadium were also detected in continuing calibration blanks (CCB) at concentrations exceeding the MDL, but below the CRQL. Additional CCB contamination at negative concentrations below the negative MDL and less than the negative CRQL was also reported for beryllium, cobalt, lead, selenium and zinc. Associated results detected at concentrations below the CRQL were flagged as non-detects. Detected results greater than the CRQL were not qualified.

V. Field Blanks

Samples MW-EB-05-0905, MW-EB-06-0905, MW-EB-07-0905 and MW-EB-08-0905 were submitted as equipment blanks (EB). Detected concentrations of lead, nickel, manganese, chromium, zinc and cadmium resulted in the qualification of low-level detected results as non-detects. Sample detections greater than the CRQL and less than 10 times the EB (if the EB was greater than the CRQL) were qualified as estimated concentrations and flagged “J+”.

VI. Interference Check Sample

The interference check sample was analyzed as required and all acceptance criteria were met.

VII. Laboratory Control Sample

Laboratory control samples were run at the required frequency and all recoveries were within criteria.

VIII. Laboratory Duplicates

A laboratory duplicate was analyzed on sample RMW-11-35-0905. All acceptance criteria were met.

IX. Matrix Spike/Matrix Spike Duplicate

A matrix spike was analyzed on sample RMW-11-35-0905. All acceptance criteria were met.

X. Serial Dilutions

A serial dilution was analyzed on sample RMW-11-35-0905. Copper and vanadium were detected at concentrations greater than 50 times their associated MDLs, and the percent differences between the initial and serial dilution sample results were determined to be greater than 10 percent. All associated results were qualified as estimated. Detected results were qualified "J" and non-detected results were qualified "UJ".

XI. ICP-MS Internal Standards

The appropriate number of internal standards was analyzed all acceptance criteria were met.

VII. Field Duplicates

Samples MW-88-51-0905 and RMW-12-51-0905 were designated as a field duplicate pair. All acceptance criteria were met.

XIII. Target Compound Quantitation

Verification of compound identification was not within the scope of the data review for this SDG.

XIV. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported CRQLs was not within the scope of the data review for this SDG.

XV. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable.

- Low recovery of copper and vanadium in the serial dilution analysis resulted in the qualification of all associated sample results as estimated results.
- Samples analyzed based on approved methods/procedures and results are reported using industry-standard units.
- Target analytes were detected in the associated MB, ICB and CCBs, resulting in the qualification of several low-level detected results as non-detects.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
BMW-06-0905	Cadmium	1	U	EB<RL
BMW-06-0905	Chromium	2.1	U	CCB<RL
BMW-06-0905	Copper	10.9	J	SerialDilution>UCL
BMW-06-0905	Lead	1.6	J+	EB>RL
BMW-06-0905	Nickel	4.3	J+	EB>RL
BMW-06-0905	Selenium	5	U	ICB<RL
BMW-06-0905	Vanadium	11.6	J	SerialDilution>UCL
BMW-06-0905	Zinc	12.5	J+	EB>RL
BMW-07-0905	Cadmium	1	U	EB<RL
BMW-07-0905	Chromium	2	U	CCB<RL
BMW-07-0905	Copper	8.3	J	SerialDilution>UCL
BMW-07-0905	Lead	1.6	J+	EB>RL
BMW-07-0905	Nickel	14.5	J+	EB>RL
BMW-07-0905	Selenium	5	U	ICB<RL
BMW-07-0905	Vanadium	1.4	J	SerialDilution>UCL
BMW-07-0905	Zinc	6.4	J+	EB>RL
BMW-08-0905	Antimony	2	U	ICB<RL
BMW-08-0905	Chromium	17.2	J+	EB>RL
BMW-08-0905	Copper	6.2	J	SerialDilution>UCL
BMW-08-0905	Lead	2.5	J+	EB>RL
BMW-08-0905	Nickel	12.5	J+	EB>RL
BMW-08-0905	Silver	1	U	ICB<RL
BMW-08-0905	Vanadium	13.9	J	SerialDilution>UCL
BMW-08-0905	Zinc	12.2	J+	EB>RL
BPZ-01-0905	Antimony	2	U	ICB<RL
BPZ-01-0905	Cadmium	1	U	EB<RL
BPZ-01-0905	Chromium	24.2	J+	EB>RL
BPZ-01-0905	Copper	7.8	J	SerialDilution>UCL
BPZ-01-0905	Nickel	23	J+	EB>RL
BPZ-01-0905	Selenium	5	U	ICB<RL
BPZ-01-0905	Silver	1	U	ICB<RL
BPZ-01-0905	Vanadium	48.2	J	SerialDilution>UCL
BPZ-01-0905	Zinc	30.6	J+	EB>RL
MW-88-51-0905	Chromium	3.5	J+	EB>RL
MW-88-51-0905	Copper	3.1	J	SerialDilution>UCL
MW-88-51-0905	Lead	1	U	CCBRL
MW-88-51-0905	Vanadium	3	J	SerialDilution>UCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MW-88-51-0905	Zinc	8.4	J+	EB>RL
RMW-01-17-0905	Beryllium	1	U	CCB<RL
RMW-01-17-0905	Cadmium	1	U	EB<RL
RMW-01-17-0905	Copper	71.4	J	SerialDilution>UCL
RMW-01-17-0905	Silver	1	U	ICB<RL
RMW-01-17-0905	Thallium	1	U	ICB<RL
RMW-01-17-0905	Vanadium	24.7	J	SerialDilution>UCL
RMW-01-35-0905	Cadmium	1	U	EB<RL
RMW-01-35-0905	Chromium	2.1	J+	EB>RL
RMW-01-35-0905	Copper	8.1	J	SerialDilution>UCL
RMW-01-35-0905	Lead	1	U	CCB<RL
RMW-01-35-0905	Nickel	40.6	J+	EB>RL
RMW-01-35-0905	Vanadium	2.1	J	SerialDilution>UCL
RMW-01-35-0905	Zinc	16.4	J+	EB>RL
RMW-02-32-0905	Antimony	2	U	ICB<RL
RMW-02-32-0905	Chromium	2.9	J+	EB>RL
RMW-02-32-0905	Copper	4.7	J	SerialDilution>UCL
RMW-02-32-0905	Lead	1	U	CCBRL
RMW-02-32-0905	Selenium	5	U	ICB<RL
RMW-02-32-0905	Vanadium	3.1	J	SerialDilution>UCL
RMW-02-32-0905	Zinc	7.3	J+	EB>RL
RMW-02-50-0905	Chromium	2	U	CCB<RL
RMW-02-50-0905	Copper	5.9	J	SerialDilution>UCL
RMW-02-50-0905	Lead	1	U	CCBRL
RMW-02-50-0905	Vanadium	4.5	J	SerialDilution>UCL
RMW-02-50-0905	Zinc	13.9	J+	EB>RL
RMW-08-15-0905	Chromium	6.4	J+	EB>RL
RMW-08-15-0905	Copper	4.2	J	SerialDilution>UCL
RMW-08-15-0905	Lead	3.2	J+	EB>RL
RMW-08-15-0905	Nickel	10.3	J+	EB>RL
RMW-08-15-0905	Vanadium	2.2	J	SerialDilution>UCL
RMW-08-15-0905	Zinc	6.3	J+	EB>RL
RMW-08-35-0905	Chromium	4.9	J+	EB>RL
RMW-08-35-0905	Copper	6.7	J	SerialDilution>UCL
RMW-08-35-0905	Lead	1.3	J+	EB>RL
RMW-08-35-0905	Nickel	24.5	J+	EB>RL
RMW-08-35-0905	Vanadium	7.3	J	SerialDilution>UCL
RMW-08-35-0905	Zinc	27	J+	EB>RL
RMW-11-35-0905	Chromium	4.6	J+	EB>RL
RMW-11-35-0905	Copper	3.9	J	SerialDilution>UCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
RMW-11-35-0905	Lead	2.2	J+	EB>RL
RMW-11-35-0905	Nickel	5.6	J+	EB>RL
RMW-11-35-0905	Vanadium	2.7	J	SerialDilution>UCL
RMW-11-35-0905	Zinc	16	J+	EB>RL
RMW-12-32-0905	Barium	10	U	LB<RL
RMW-12-32-0905	Chromium	24.4	J+	EB>RL
RMW-12-32-0905	Copper	18	J	SerialDilution>UCL
RMW-12-32-0905	Lead	2.7	J+	EB>RL
RMW-12-32-0905	Manganese	4.7	J+	EB>RL
RMW-12-32-0905	Nickel	29.4	J+	EB>RL
RMW-12-32-0905	Selenium	5	U	ICB<RL
RMW-12-32-0905	Vanadium	112	J	SerialDilution>UCL
RMW-12-32-0905	Zinc	17.2	J+	EB>RL
RMW-12-51-0905	Chromium	3.3	J+	EB>RL
RMW-12-51-0905	Copper	2.6	J	SerialDilution>UCL
RMW-12-51-0905	Lead	1	U	CCBRL
RMW-12-51-0905	Vanadium	1.6	J	SerialDilution>UCL
RMW-12-51-0905	Zinc	8	J+	EB>RL
RMW-13-35-0905	Chromium	12.9	J+	EB>RL
RMW-13-35-0905	Copper	35.3	J	SerialDilution>UCL
RMW-13-35-0905	Lead	3	J+	EB>RL
RMW-13-35-0905	Nickel	24.6	J+	EB>RL
RMW-13-35-0905	Selenium	5	U	ICB<RL
RMW-13-35-0905	Silver	1	U	ICB<RL
RMW-13-35-0905	Vanadium	6.6	J	SerialDilution>UCL
RMW-13-35-0905	Zinc	13.1	J+	EB>RL
RMW-14-50-0905	Chromium	6.7	J+	EB>RL
RMW-14-50-0905	Copper	51.5	J	SerialDilution>UCL
RMW-14-50-0905	Lead	1.7	J+	EB>RL
RMW-14-50-0905	Selenium	5	U	ICB<RL
RMW-14-50-0905	Silver	1	U	ICB<RL
RMW-14-50-0905	Vanadium	4.8	J	SerialDilution>UCL
RMW-14-50-0905	Zinc	38.7	J+	EB>RL

CCB<RL = Continuing calibration blank concentration less than RL
EB<RL = Equipment blank concentration less than the RL
EB>RL = Equipment blank concentration greater than the RL
ICB<RL = Initial calibration blank concentration less than RL
LB<RL = Laboratory blank contamination less than the RL
SerialDilution>UCL = Serial dilution % difference exceeded criteria >10%

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 4, 5, 6, 10 and 11, 2005
Report Date:	December 19, 2005
Parameters:	ICP/MS Metals and Mercury
Laboratory:	Sentinel, Inc.
Sample Delivery Group:	MY23R5

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work ILM05.3 with the additional requirements posed in Modification Tracking Number 1184.0. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), October 2004, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J- — The analyte was positively identified but biased low; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ — The analyte was positively identified but biased high; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples reported in this SDG were sent to the laboratory in three shipments. The cooler containing samples collected on October 4, 5 and 6 except for samples RMW-01-35-0905 and

RMW-01-17-0905 was received at 7.0 degrees Celsius. This slightly elevated temperature still indicates that the samples were shipped under ice and were likely elevated for a limited period of time. All other samples were received by the laboratory within EPA recommended storage temperatures. Sample CoC forms and custody seals were in tact and no issues were noted. Individual samples did not contain sample tag ID numbers. Three samples, BPZ-01-0905, BMW-08-0905 and RMW-02-32-0905, were received by the laboratory at a pH > 2, but were preserved at the laboratory using nitric acid to a pH less than 2 prior to analysis. No flags were applied as a result of the pH or temperature discrepancies.

All technical holding-time requirements were met.

Only dissolved analyses are reported in this SDG. Total analyses on the accompanying CoCs can be found reported in another SDG.

II. ICP-MS Tune Analysis

The instrument tune was analyzed as required and all acceptance criteria were met.

III. Calibration

All calibration verification standards met acceptance criteria.

A contract required quantitation limit (CRQL), equivalent to reporting limit (RL), check standard was run at the required frequency, but the arsenic and vanadium results exceeded control criteria. Associated arsenic results detected between the method detection limit (MDL) and twice the concentration of the CRQL were qualified as estimated concentrations with a high bias and flagged “J+”. Associated vanadium results detected above twice the concentration of the CRQL were qualified as estimated concentrations with a low bias and flagged “J-“. Non-detected vanadium results were estimated and flagged “UJ”.

IV. Laboratory Blanks

The method blank (MB) associated with all samples in this SDG contained concentrations of barium, chromium, copper, lead, manganese and zinc detectable above the MDL, but below the CRQL. Arsenic, beryllium, cobalt, nickel, selenium and vanadium were also detected in negative concentrations below the negative MDL and lower than the negative CRQL. Associated sample results reported between the MDL and the CRQL were qualified as non-detects and flagged “U”. Detected results greater than the CRQL were not qualified.

Silver, thallium, and zinc were detected in the initial calibration blank (ICB) at concentrations greater than the MDL, but lower than the CRQL. Arsenic, beryllium and vanadium were detected at negative concentrations less than the negative MDL, but lower than the negative CRQL. Chromium, manganese, mercury, selenium, silver, thallium, vanadium and zinc were also detected in continuing calibration blanks (CCB) at concentrations exceeding the MDL, but below the CRQL. Arsenic, beryllium, chromium, selenium and vanadium were also reported in CCBs at negative concentrations below the negative MDL and lower than the negative CRQL. Associated results detected at concentrations below the CRQL were qualified as non-detects and flagged “U”. Detected results greater than the CRQL were not qualified.

V. Field Blanks

No field blanks were included in this SDG.

VI. Interference Check Sample

The interference check sample was analyzed as required and all acceptance criteria were met.

VII. Laboratory Control Sample

Laboratory control samples were run at the required frequency and all recoveries were within criteria.

VIII. Laboratory Duplicates

A laboratory duplicate was analyzed on sample RMW-11-35-0905. All acceptance criteria were met.

IX. Matrix Spike/Matrix Spike Duplicate

A matrix spike (MS) was analyzed on sample RMW-11-35-0905. With the exception of manganese, all recoveries were within control limits. A post-digestion spike was run on manganese, but the associated recovery was also above the upper control limit. Per the EPA inorganic validation guidelines, the associated results detected above the MDL were qualified as estimated concentrations with a high bias and flagged "J+".

X. Serial Dilutions

A serial dilution was analyzed on sample RMW-11-35-0905. Barium and manganese were detected at concentrations greater than 50 times their associated MDLs, and the percent differences between the initial and serial dilution sample results were determined to be greater than 10 percent. All associated results were qualified as estimated. Detect results were flagged "J" and non-detect results were flagged "UJ".

XI. ICP-MS Internal Standards

The appropriate number of internal standards was analyzed and all but the percent relative intensity of the Li^6 standard in sample BMW-08-0905 met criteria. The sample was re-analyzed, but results still exceeded criteria. Therefore, all analytes reported in sample BMW-08-0905 were qualified as estimated and flagged "J".

XII. Field Duplicates

Samples MW-88-51-0905 and RMW-12-51-0905 were designated as a field duplicate pair. All acceptance criteria were met.

XIII. Target Compound Quantitation

Verification of compound identification was not within the scope of the data review for this SDG.

XIV. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported CRQLs was not within the scope of the data review for this SDG.

XV. Overall Assessment of Data

- The completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable. One MS recovery and associated post-digestion spike recovery exceeded control limits for manganese. The results were qualified as estimated concentrations and are considered generally acceptable.
- Internal standard and CRQL check standard exceedances resulted in data qualified as estimated concentrations.
- Low recoveries of barium and manganese in the serial dilution analysis resulted in the qualification of all associated sample results as estimated concentrations.
- Target analytes were detected in the associated MB, ICB and CCBs which resulted in qualifying several low-level results as non-detects.
- Samples were analyzed based on approved methods/procedures and results are reported using industry-standard units.
- The precision and accuracy of the data overall, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
BMW-06-0905	Barium	82.1	J	SerialDilution>UCL
BMW-06-0905	Chromium	2	U	CCB<RL
BMW-06-0905	Cobalt	1	U	LB<RL
BMW-06-0905	Lead	1	U	LB<RL
BMW-06-0905	Manganese	9.6	J+	MS>UCL, SerialDilution>UCL
BMW-06-0905	Mercury	0.2	U	CCB<RL
BMW-06-0905	Vanadium	8.9	J-	CRI>UCL
BMW-07-0905	Barium	16.1	J	SerialDilution>UCL
BMW-07-0905	Chromium	2	U	CCB<RL
BMW-07-0905	Lead	1	U	LB<RL
BMW-07-0905	Manganese	1390	J+	MS>UCL, SerialDilution>UCL
BMW-07-0905	Selenium	5	U	CCB<RL
BMW-07-0905	Vanadium	1	UJ	CRI>UCL
BMW-08-0905	Antimony	2	UJ	IS<LCL
BMW-08-0905	Arsenic	39.8	J	IS<LCL
BMW-08-0905	Barium	45.6	J	SerialDilution>UCL, IS<LCL
BMW-08-0905	Beryllium	1	UJ	IS<LCL
BMW-08-0905	Cadmium	1	UJ	IS<LCL
BMW-08-0905	Chromium	16.1	J	IS<LCL
BMW-08-0905	Cobalt	1.8	J	IS<LCL
BMW-08-0905	Copper	2.6	J	IS<LCL
BMW-08-0905	Lead	1	U	LB<LCL
BMW-08-0905	Manganese	386	J+	MS>UCL, SerialDilution>UCL, IS<LCL
BMW-08-0905	Mercury	0.2	U	CCB<LCL
BMW-08-0905	Nickel	12.4	J	IS<LCL
BMW-08-0905	Selenium	3	J	IS<LCL
BMW-08-0905	Silver	1	U	ICB<LCL
BMW-08-0905	Thallium	1	UJ	IS<LCL
BMW-08-0905	Vanadium	1	UJ	CRI>UCL
BMW-08-0905	Zinc	4.1	J	IS<LCL
BPZ-01-0905	Barium	113	J	SerialDilution>UCL
BPZ-01-0905	Copper	2	U	LB<RL
BPZ-01-0905	Lead	1	U	LB<RL
BPZ-01-0905	Manganese	573	J+	MS>UCL, SerialDilution>UCL
BPZ-01-0905	Mercury	0.2	U	CCB<RL
BPZ-01-0905	Selenium	5	U	CCB<RL
BPZ-01-0905	Silver	1	U	ICB<RL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
BPZ-01-0905	Zinc	2	U	ICB<RL
MW-88-51-0905	Barium	31	J	SerialDilution>UCL
MW-88-51-0905	Chromium	2	U	CCB<RL
MW-88-51-0905	Copper	2	U	LB<RL
MW-88-51-0905	Lead	1	U	LB<RL
MW-88-51-0905	Manganese	416	J+	MS>UCL, SerialDilution>UCL
MW-88-51-0905	Mercury	0.2	U	CCB<RL
MW-88-51-0905	Vanadium	1	U	CCBUCL
MW-88-51-0905	Zinc	2	U	ICB<RL
RMW-01-17-0905	Barium	106	J	SerialDilution>UCL
RMW-01-17-0905	Cobalt	1	U	LB<RL
RMW-01-17-0905	Copper	2	U	LB<RL
RMW-01-17-0905	Lead	1	U	LB<RL
RMW-01-17-0905	Manganese	4040	J+	MS>UCL, SerialDilution>UCL
RMW-01-17-0905	Mercury	0.2	U	CCB<RL
RMW-01-17-0905	Vanadium	1.5	J-	CRI>UCL
RMW-01-35-0905	Barium	125	J	SerialDilution>UCL
RMW-01-35-0905	Chromium	2	U	CCB<RL
RMW-01-35-0905	Copper	2	U	LB<RL
RMW-01-35-0905	Lead	1	U	LB<RL
RMW-01-35-0905	Manganese	2420	J+	MS>UCL, SerialDilution>UCL
RMW-01-35-0905	Mercury	0.2	U	CCB<RL
RMW-01-35-0905	Vanadium	1.6	J-	CRI>UCL
RMW-02-32-0905	Barium	183	J	SerialDilution>UCL
RMW-02-32-0905	Copper	2	U	LB<RL
RMW-02-32-0905	Lead	1	U	LB<RL
RMW-02-32-0905	Manganese	444	J+	MS>UCL, SerialDilution>UCL
RMW-02-50-0905	Arsenic	1.2	U	CRI>UCL, ICB<RL
RMW-02-50-0905	Barium	67.2	J	SerialDilution>UCL
RMW-02-50-0905	Chromium	2	U	CCB<RL
RMW-02-50-0905	Lead	1	U	LB<RL
RMW-02-50-0905	Manganese	847	J+	MS>UCL, SerialDilution>UCL
RMW-02-50-0905	Mercury	0.2	U	CCB<RL
RMW-08-15-0905	Barium	44.2	J	SerialDilution>UCL
RMW-08-15-0905	Copper	2	U	LB<RL
RMW-08-15-0905	Manganese	3240	J+	MS>UCL, SerialDilution>UCL
RMW-08-15-0905	Mercury	0.2	U	CCB<RL
RMW-08-15-0905	Vanadium	2	J-	CRI>UCL
RMW-08-35-0905	Barium	139	J	SerialDilution>UCL
RMW-08-35-0905	Chromium	2	U	CCB<RL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
RMW-08-35-0905	Copper	2	U	LB<RL
RMW-08-35-0905	Lead	1	U	LB<RL
RMW-08-35-0905	Manganese	1000	J+	MS>UCL, SerialDilution>UCL
RMW-08-35-0905	Mercury	0.2	U	CCB<RL
RMW-08-35-0905	Selenium	5	U	CCB<RL
RMW-11-35-0905	Barium	97.8	J	SerialDilution>UCL
RMW-11-35-0905	Chromium	2	U	CCB<RL
RMW-11-35-0905	Cobalt	1	U	LB<RL
RMW-11-35-0905	Copper	2	U	LB<RL
RMW-11-35-0905	Lead	1	U	LB<RL
RMW-11-35-0905	Manganese	603	J+	MS>UCL, SerialDilution>UCL
RMW-11-35-0905	Mercury	0.2	U	CCB<RL
RMW-11-35-0905	Vanadium	1	U	CCBUCL
RMW-12-32-0905	Barium	10	U	LBUCL
RMW-12-32-0905	Manganese	1.2	J+	MS>UCL, SerialDilution>UCL
RMW-12-32-0905	Mercury	0.2	U	CCB<RL
RMW-12-32-0905	Selenium	5	U	CCB<RL
RMW-12-51-0905	Barium	31.3	J	SerialDilution>UCL
RMW-12-51-0905	Chromium	2	U	CCB<RL
RMW-12-51-0905	Copper	2	U	LB<RL
RMW-12-51-0905	Lead	1	U	LB<RL
RMW-12-51-0905	Manganese	419	J+	MS>UCL, SerialDilution>UCL
RMW-12-51-0905	Mercury	0.2	U	CCB<RL
RMW-12-51-0905	Vanadium	1	UJ	CRI>UCL
RMW-12-51-0905	Zinc	2	U	ICB<RL
RMW-13-35-0905	Barium	62.9	J	SerialDilution>UCL
RMW-13-35-0905	Copper	2	U	LB<RL
RMW-13-35-0905	Lead	1	U	LB<RL
RMW-13-35-0905	Manganese	2990	J+	MS>UCL, SerialDilution>UCL
RMW-13-35-0905	Mercury	0.2	U	CCB<RL
RMW-13-35-0905	Selenium	5	U	CCB<RL
RMW-13-35-0905	Vanadium	1	UJ	CRI>UCL
RMW-14-50-0905	Barium	45.3	J	SerialDilution>UCL
RMW-14-50-0905	Copper	2	U	LB<RL
RMW-14-50-0905	Lead	1	U	LB<RL
RMW-14-50-0905	Manganese	84400	J+	MS>UCL, SerialDilution>UCL
RMW-14-50-0905	Mercury	0.2	U	CCB<RL
RMW-14-50-0905	Selenium	5	U	CCB<RL
RMW-14-50-0905	Vanadium	1	UJ	CRI>UCL

CCB<RL = Continuing calibration blank concentration less than RL
CRI>UCL= CRQL check standard greater than upper control limit
ICB<RL = Initial calibration blank concentration less than RL
IS<LCL = Internal standard response less than lower control limit
LB<RL = Laboratory blank concentration less than RL
MS>UCL = Matrix spike recovery greater than upper control limit
SerialDilution>UCL = Serial dilution % difference exceeded criteria >10%

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 11 and 12, 2005
Report Date:	December 21, 2005
Parameters:	ICP/MS Metals and Mercury
Laboratory:	Sentinel, Inc.
Sample Delivery Group:	MY23T5

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work ILM05.3 with the additional requirements posed in Modification Tracking Number 1184.0. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), October 2004, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II CLP level data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J- — The analyte was positively identified but biased low; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ — The analyte was positively identified but biased high; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples reported in this SDG were received at the laboratory at 8.5 degrees Celsius. This slightly elevated temperature still indicates that the samples were shipped under ice and

were likely elevated for a limited period of time. Therefore, no flags were applied to the sample results. Samples were accompanied by appropriate CoC forms, custody seals were intact, and all samples were preserved to the proper pH. Individual samples did not contain sample tag ID numbers.

All technical holding-time requirements were met.

Only total analyses are reported in this SDG. Dissolved analyses on the accompanying CoCs can be found reported in SDG MY23T6.

II. ICP-MS Tune Analysis

The instrument tune was analyzed as required and all acceptance criteria were met.

III. Calibration

Calibration verification standards were analyzed at the required frequency, but the continuing calibration verification (CCV) associated with all mercury results reported in this SDG failed to meet acceptance criteria. Detected results were flagged "J-" and all non-detected results were flagged "UJ" indicating the probability that the reported results are estimated low.

A contract required quantitation limit (CRQL), equivalent to reporting limit (RL), check standard (CRI) was run at the required frequency and all acceptance criteria were met with the exception of arsenic. The CRI for arsenic was out of control with a high bias. The detected results for arsenic were qualified in association with blank contamination and therefore, flags for the high biased arsenic condition were not required.

IV. Laboratory Blanks

The method blank (MB) associated with all samples in this SDG contained concentrations of arsenic, barium, chromium, copper, lead, manganese and zinc detected above the method detection limit (MDL) but below the CRQL. Beryllium, cobalt and vanadium also showed negative detected concentrations below the negative MDL and less than the negative CRQL. Associated sample results reported between the MDL and CRQL were flagged as non-detects. Detected results greater than the CRQL were not qualified.

Arsenic, barium, chromium, lead, silver and thallium were detected in the initial calibration blank (ICB) at concentrations greater than the MDL but lower than the CRQL. Selenium and vanadium were detected at negative concentrations less than the negative MDL but less than the negative CRQL. Arsenic, chromium, manganese, mercury, silver and thallium were also detected in continuing calibration blanks (CCB) at concentrations exceeding the MDL but below the CRQL. Additional CCB contamination at negative concentrations below the negative MDL and less than the negative CRQL was also reported for beryllium, cobalt, selenium and vanadium. Associated results detected at concentrations below the CRQL were flagged as non-detects. Detected results greater than the CRQL were not qualified.

V. Field Blanks

Samples MW-EB-09-0905 and MW-EB-10-0905 were submitted as equipment blanks (EB). Target analytes were detected in the analysis of the samples. Most of the detected targets in the EBs were qualified due to detected concentrations below the CRQL in the CCB.

Detections remaining after blank qualification were manganese at 1.8 ug/L and nickel at 0.17 ug/L. Sample concentrations for the two targets were significantly greater than associated blank concentrations and therefore, these concentrations are not expected to impact data usability. Sample results were not qualified.

VI. Interference Check Sample

The interference check sample was analyzed as required and all acceptance criteria were met.

VII. Laboratory Control Sample

Laboratory control samples were run at the required frequency and all recoveries were within criteria.

VIII. Laboratory Duplicates

A laboratory duplicate was analyzed on sample MW-12-0905. All recovery criteria were met.

IX. Matrix Spike/Matrix Spike Duplicates

A matrix spike (MS) was analyzed on sample MW-12-0905. With the exception of selenium, all recoveries were within control limits. A post-digestion spike was run on selenium and acceptance criteria were met. Per the EPA inorganic validation guidelines, the associated results were qualified as estimated.

X. Serial Dilutions

A serial dilution was analyzed on sample MW-12-0905. Manganese and vanadium were detected at concentrations greater than 50 times their associated MDLs, and the percent differences between the initial and serial dilution sample results were determined to be greater than 10 percent. All associated results were qualified as estimated. Detected results were qualified “J” and non-detected results were qualified “UJ”.

XI. Field Duplicates

No field duplicates were included in this SDG.

XII. ICP-MS Internal Standards

The appropriate number of internal standards was analyzed and all percent relative intensities met control criteria.

XIII. Target Compound Quantitation

Raw data were not reviewed.

XIV. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported CRQLs was not within the scope of the data review for this SDG.

XV. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable. One MS recovery for selenium exceeded control limits, but the associated post-digestion spike met acceptance criteria.
- Low recovery of manganese and vanadium in the serial dilution analysis resulted in the qualification of all associated samples as estimated concentrations.
- Samples were analyzed based on approved methods/procedures and results are reported using industry-standard units.
- Target analytes were detected in the associated MB, ICB and CCBs, resulting in low-level detections qualified as non-detects.

This SDG also received a senior-level review of the hardcopy results along with the review of this validation report.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MW-12-0905	Cobalt	1	U	CCB<RL, LB<RL
MW-12-0905	Lead	1	U	ICB<RL, LB<RL
MW-12-0905	Manganese	7910	J	SerialDilution>UCL
MW-12-0905	Mercury	0.05	J-	CCV<LCL
MW-12-0905	Selenium	5	UJ	MS<LCL
MW-12-0905	Vanadium	2.5	J	SerialDilution>UCL
RMW-02-13-0905	Beryllium	1	U	CCB<RL, LB<RL
RMW-02-13-0905	Manganese	9870	J	SerialDilution>UCL
RMW-02-13-0905	Mercury	0.83	J-	CCV<LCL
RMW-02-13-0905	Selenium	5	UJ	MS<LCL
RMW-02-13-0905	Silver	1	U	ICB<RL, CCB<RL
RMW-02-13-0905	Thallium	1	U	ICB<RL, CCB<RL
RMW-02-13-0905	Vanadium	59.3	J	SerialDilution>UCL

CCB<RL = Continuing calibration blank concentration less than RL
CCV<LCL = Continuing calibration recovery less than lower control limit
ICB<RL = Initial calibration blank concentration less than RL
LB<RL = Laboratory blank contamination less than RL
MS<LCL = Matrix spike recovery less than lower limit
SerialDilution>UCL = Serial dilution % difference exceeded criteria >10%

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 11 and 12, 2005
Report Date:	December 21, 2005
Parameters:	ICP/MS Metals and Mercury
Laboratory:	Sentinel, Inc.
Sample Delivery Group:	MY23T6

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work ILM05.3 with the additional requirements posed in Modification Tracking Number 1184.0. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), October 2004, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II CLP level data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J- — The analyte was positively identified but biased low; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ — The analyte was positively identified but biased high; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples reported in this SDG were received at the laboratory at 8.5 degrees Celsius. This slightly elevated temperature still indicates that the samples were shipped under ice and

were likely elevated for a limited period of time. Samples were accompanied by appropriate CoC forms, all custody seals were intact, and all samples were preserved to the proper pH. Individual samples did not contain sample tag ID numbers.

All technical holding-time requirements were met.

Only dissolved analyses are reported in this SDG. Total analyses on the accompanying CoCs can be found reported in SDG MY23T5.

II. ICP-MS Tune Analysis

The instrument tune was analyzed as required and all acceptance criteria were met.

III. Calibration

All calibration verification standards met acceptance criteria.

A contract required quantitation limit (CRQL), equivalent to reporting limit (RL), check standard (CRI) was run at the required frequency, but the manganese and vanadium results exceeded control criteria. Associated results did not require qualification as all were greater than twice the CRQL.

IV. Laboratory Blanks

The method blank (MB) associated with all samples in this SDG contained concentrations of manganese and nickel detected above the method detection limit (MDL) but below the CRQL. All associated results were greater than the CRQL and therefore, were not flagged.

Beryllium, silver, thallium and vanadium were detected in the initial calibration blank (ICB) at concentrations greater than the MDL but lower than the CRQL. Arsenic, mercury, silver, vanadium and zinc were detected in continuing calibration blanks (CCB) at concentrations exceeding the MDL but below the CRQL. Additional CCB contamination at negative concentrations below the negative MDL and below the negative CRQL was also reported for arsenic, manganese, vanadium and zinc. Associated results detected at concentrations below the CRQL were flagged as non-detects. Detected results greater than the CRQL were not qualified.

V. Field Blanks

No field blanks were included in this SDG.

VI. Interference Check Sample

The interference check sample was analyzed as required and all acceptance criteria were met.

VII. Laboratory Control Sample

Laboratory control samples were run at the required frequency and all recoveries were within criteria.

VIII. Laboratory Duplicates

A laboratory duplicate was analyzed on sample MW-12-0905. The results for zinc did not meet precision criteria and associated data were qualified as estimated concentrations.

IX. Matrix Spike/Matrix Spike Duplicate

A matrix spike (MS) was analyzed on sample MW-12-0905. With the exception of silver, all recoveries were within control limits. A post-digestion spike was run on silver and acceptance criteria were met. The non-detected parent result was qualified as estimated and flagged "UJ".

X. Serial Dilutions

A serial dilution was analyzed on sample MW-12-0905. Manganese, vanadium and zinc were detected at concentrations greater than 50 times their associated MDLs, and the percent differences between the initial and serial dilution sample results were determined to be greater than 10 percent. All associated results were qualified as estimated. Detected results were qualified "J" and non-detected results were qualified "UJ".

XI. Field Duplicates

No field duplicates were included in this SDG.

XII. ICP-MS Internal Standards

The appropriate number of internal standards was analyzed and all percent relative intensities met control criteria.

XIII. Target Compound Quantitation

Raw data were not reviewed.

XIV. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported CRQLs was not within the scope of the data review for this SDG.

XV. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable. One MS recovery exceeded control limits, but the associated post-digestion spike met acceptance criteria.
- Low recovery of manganese, vanadium and zinc in the serial dilution analysis resulted in the qualification of all associated sample results as estimated concentrations.
- Samples were and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- Target analytes were detected in the associated MB, ICB and CCBs, and these low-level blank detects resulted in data qualified as non-detects.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MW-12-0905	Beryllium	1	U	ICB<RL
MW-12-0905	Manganese	10900	J	SerialDilution>UCL
MW-12-0905	Silver	1	UJ	MS<LCL
MW-12-0905	Thallium	1	U	ICB<RL
MW-12-0905	Vanadium	2.4	J	SerialDilution>UCL
MW-12-0905	Zinc	8.7	J	Lab Dup RPD, SerialDilution>UCL
RMW-02-13-0905	Manganese	14100	J	SerialDilution>UCL
RMW-02-13-0905	Mercury	0.2	U	CCB<RL
RMW-02-13-0905	Vanadium	4.4	J	SerialDilution>UCL
RMW-02-13-0905	Zinc	52.6	J	Lab Dup RPD, SerialDilution>UCL

CCB<RL = Continuing calibration blank concentration less than RL
ICB<RL = Initial calibration blank concentration less than RL
MS<LCL = Matrix spike recovery less than lower limit
Lab Dup RPD = Lab duplicate exceeds RPD criteria
SerialDilution>UCL = Serial dilution % difference exceeded criteria >10%

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	September 28, 29 and 30 and October 3 and 4, 2005
Report Date:	January 3, 2006
Parameters:	ICP/MS Metals and Mercury
Laboratory:	Sentinel, Inc.
Sample Delivery Group:	MY26K3

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work ILM05.3 with the additional requirements posed in Modification Tracking Number 1184.0. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), October 2004, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II CLP level data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J- — The analyte was positively identified but biased low; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ — The analyte was positively identified but biased high; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

All samples were received by the laboratory within EPA recommended storage temperature and pH requirements. Sample CoC forms and custody seals were intact and no issues were noted. Individual samples did not contain sample tag ID numbers.

Only dissolved analyses are reported in this SDG. Total analyses on the accompanying CoCs can be found reported in another SDG.

All technical holding-time requirements were met.

II. ICP-MS Tune Analysis

The instrument tune was analyzed as required and all acceptance criteria were met

III. Calibration

All calibration verification standards met acceptance criteria.

A contract required quantitation limit (CRQL), equivalent to reporting limit (RL), check standard (CRI) was run at the required frequency, but the arsenic, manganese, copper and zinc results exceeded control criteria with a high bias. Associated detected concentrations above the method detection limit (MDL), but below twice the CRQL were qualified as estimated concentrations and flagged "J+".

IV. Laboratory Blanks

The method blank (MB) associated with all samples in this SDG contained concentrations of lead, nickel and vanadium detected above the MDL, but below the CRQL. Beryllium and zinc were detected in negative concentrations below the negative MDL and less than the negative CRQL. Associated sample results reported between the MDL and the CRQL were flagged as non-detects. Detected results greater than the CRQL were not qualified.

Beryllium, mercury, thallium and vanadium were detected in the initial calibration blank (ICB) at concentrations greater than the MDL, but lower than the CRQL. Arsenic, cadmium, chromium, copper, manganese, mercury, selenium, silver, thallium, vanadium and zinc were also detected in continuing calibration blanks (CCB) at concentrations exceeding the MDL, but below the CRQL. In addition, CCB contamination at negative concentrations below the negative MDL and less than the negative CRQL was also reported for copper and zinc. Associated results detected at concentrations below the CRQL were flagged as non-detects. Detected results greater than the CRQL were not qualified.

V. Field Blanks

No field blanks were reported in this SDG.

VI. Interference Check Sample

The interference check sample was analyzed as required and all acceptance criteria were met.

VII. Laboratory Control Sample

Laboratory control samples were run at the required frequency and all recoveries were within criteria.

VIII. Laboratory Duplicates

A laboratory duplicate was analyzed on sample BMW-01-0905. The recovery of zinc exceeded control criteria resulting in the qualification of all associated results as estimated.

IX. Matrix Spike/Matrix Spike Duplicate

A matrix spike was analyzed on sample BMW-01-0905. The spike recovery of manganese was lower than the control limit, and the post-digestion spike recovery was in control. All associated results were qualified as estimated.

X. Serial Dilutions

A serial dilution was analyzed on sample BMW-01-0905. Zinc was detected at concentrations greater than 50 times the MDL, and the percent difference between the initial and serial dilution sample results was determined to be greater than 10 percent. All associated results were qualified as estimated. Detected results were qualified "J" and non-detected results were qualified "UJ".

XI. ICP-MS Internal Standards

The appropriate number of internal standards was analyzed and all acceptance criteria were met.

VII. Field Duplicates

There were two field duplicate (FD) pairs designated in this SDG: samples RMW-10-15-0905 and MW-90-15-0905 and samples RMW-09-15-0905 and MW-91-0905. All acceptance criteria were met. There appeared to be an error in the second FD pair as to the parent sample.

XIII. Target Compound Quantitation

Raw data were not reviewed.

XIV. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported CRQLs was not within the scope of the data review for this SDG.

XV. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable. Matrix interference resulted in the qualification of manganese results as estimated. Laboratory duplicate precision issues were noted with the analysis of zinc resulting in the qualification of all associated samples as estimated.

- Low recovery of zinc in the serial dilution analysis resulted in the qualification of all associated samples as estimated.
- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standard units.
- Target analytes were detected in the associated MB, ICB and CCBs, resulting in the qualification of several low-level detect results as non-detects.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
BMW-01-0905	Cadmium	2	U	CCB<RL
BMW-01-0905	Chromium	2	U	CCB<RL
BMW-01-0905	Copper	2.7	J+	CRI>UCL
BMW-01-0905	Manganese	1140	J	MS<LCL
BMW-01-0905	Mercury	0.2	U	ICB<RL
BMW-01-0905	Vanadium	1	U	ICB<RL
BMW-01-0905	Zinc	6.8	J	Lab Dup RPD, SerialDilution>UCL
BMW-03-0905	Cadmium	1	U	CCB<RL
BMW-03-0905	Chromium	2	U	CCB<RL
BMW-03-0905	Manganese	8080	J	MS<LCL
BMW-03-0905	Mercury	0.2	U	ICB<RL
BMW-03-0905	Selenium	5	U	CCB<RL
BMW-03-0905	Thallium	1	U	ICB<RL
BMW-03-0905	Zinc	147	J	Lab Dup RPD, SerialDilution>UCL
MW-90-15-0905	Manganese	2990	J	MS<LCL
MW-90-15-0905	Mercury	0.2	U	ICB<RL
MW-90-15-0905	Selenium	5	U	CCB<RL
MW-90-15-0905	Thallium	1	U	ICB<RL
MW-90-15-0905	Zinc	5640	J	Lab Dup RPD, SerialDilution>UCL
MW-91-0905	Cadmium	1	U	CCB<RL
MW-91-0905	Manganese	9300	J	MS<LCL
MW-91-0905	Mercury	0.2	U	ICB<RL
MW-91-0905	Zinc	28.8	J	Lab Dup RPD, SerialDilution>UCL
RMW-03-15-0905	Copper	2	U	CCB<RL, CRI>UCL
RMW-03-15-0905	Lead	1	U	LB<RL
RMW-03-15-0905	Manganese	1170	J	MS<LCL
RMW-03-15-0905	Mercury	0.2	U	ICB<RL
RMW-03-15-0905	Selenium	5	U	CCB<RL
RMW-03-15-0905	Zinc	3.6	J	CRI>UCL, Lab Dup RPD, SerialDilution>UCL
RMW-04-15-0905	Copper	2	U	CCB<RL, CRI>UCL
RMW-04-15-0905	Lead	1	U	LB<RL
RMW-04-15-0905	Manganese	79.7	J	MS<LCL
RMW-04-15-0905	Mercury	0.2	U	ICB<RL
RMW-04-15-0905	Thallium	1	U	ICB<RL
RMW-04-15-0905	Zinc	7.4	J	Lab Dup RPD, SerialDilution>UCL
RMW-05-15-0905	Chromium	2.1	U	CCB<RL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
RMW-05-15-0905	Copper	2	U	CCB<RL, CRI>UCL
RMW-05-15-0905	Lead	1	U	LB<RL
RMW-05-15-0905	Manganese	522	J	MS<LCL
RMW-05-15-0905	Mercury	0.2	U	ICB<RL
RMW-05-15-0905	Selenium	5	U	CCB<RL
RMW-05-15-0905	Thallium	1	U	ICB<RL
RMW-05-15-0905	Zinc	11.6	J	Lab Dup RPD, SerialDilution>UCL
RMW-06-15-0905	Copper	2	U	CCB<RL, CRI>UCL
RMW-06-15-0905	Lead	1	U	LB<RL
RMW-06-15-0905	Manganese	3950	J	MS<LCL
RMW-06-15-0905	Mercury	0.2	U	ICB<RL
RMW-06-15-0905	Zinc	9	J	Lab Dup RPD, SerialDilution>UCL
RMW-07-15-0905	Arsenic	1.3	J+	CCB<RL, CRI>UCL
RMW-07-15-0905	Chromium	2	U	CCB<RL
RMW-07-15-0905	Copper	2	J+	CRI>UCL
RMW-07-15-0905	Manganese	1750	J	MS<LCL
RMW-07-15-0905	Mercury	0.2	U	ICB<RL
RMW-07-15-0905	Selenium	5	U	CCB<RL
RMW-07-15-0905	Zinc	4.2	J	Lab Dup RPD, SerialDilution>UCL
RMW-07-35-0905	Chromium	2	U	CCB<RL
RMW-07-35-0905	Copper	2	U	CCB<RL, CRI>UCL
RMW-07-35-0905	Lead	1	U	LB<RL
RMW-07-35-0905	Manganese	510	J	MS<LCL
RMW-07-35-0905	Mercury	0.2	U	ICB<RL
RMW-07-35-0905	Zinc	17.2	J	Lab Dup RPD, SerialDilution>UCL
RMW-09-15-0905	Cadmium	1	U	CCB<RL
RMW-09-15-0905	Manganese	9490	J	MS<LCL
RMW-09-15-0905	Mercury	0.2	U	ICB<RL
RMW-09-15-0905	Selenium	5	U	CCB<RL
RMW-09-15-0905	Zinc	29.3	J	Lab Dup RPD, SerialDilution>UCL
RMW-09-35-0905	Chromium	2	U	CCB<RL
RMW-09-35-0905	Copper	2.7	J+	CRI>UCL
RMW-09-35-0905	Lead	1	U	LB<RL
RMW-09-35-0905	Manganese	11.6	J	MS<LCL
RMW-09-35-0905	Mercury	0.2	U	ICB<RL
RMW-09-35-0905	Selenium	5	U	CCB<RL
RMW-09-35-0905	Zinc	4.1	J	Lab Dup RPD, SerialDilution>UCL
RMW-10-15-0905	Manganese	2790	J	MS<LCL
RMW-10-15-0905	Mercury	0.2	U	ICB<RL
RMW-10-15-0905	Selenium	5	U	CCB<RL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
RMW-10-15-0905	Thallium	1	U	ICB<RL
RMW-10-15-0905	Zinc	5540	J	Lab Dup RPD, SerialDilution>UCL
RMW-10-35-0905	Cadmium	1	U	CCB<RL
RMW-10-35-0905	Manganese	13900	J	MS<LCL
RMW-10-35-0905	Mercury	0.2	U	ICB<RL
RMW-10-35-0905	Thallium	1	U	ICB<RL
RMW-10-35-0905	Zinc	30.8	J	Lab Dup RPD, SerialDilution>UCL

CCB<RL = Continuing calibration blank concentration less than RL
CRI>UCL= CRQL check standard greater than upper control limit
ICB<RL = Initial calibration blank concentration less than RL
Lab Dup RPD = Lab duplicate exceeds RPD criteria
LB<RL = Laboratory blank contamination less than the RL
MS<LCL = Matrix spike recovery less than lower limit
SerialDilution>UCL = Serial dilution % difference exceeded criteria >10%

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	September 28, 29 and 30, 2005
	October 3 and 4, 2005
Report Date:	October 14, 2005
Parameters:	Mercury
Laboratory:	Sentinel, Inc.
Sample Delivery Group:	MY23M1

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by EPA Method ILM05.3. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), October 2004, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier III data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier III data validation. The intended objective of the data review process was to provide a technical review of the raw data and to provide verification of calculations and analyte identification. It was not intended to determine contract compliance.

The scope of the data review included the chain-of-custody (CoC) records, the case narrative, completed contract laboratory program (CLP) data summary forms and raw data.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

Samples were received for mercury at another laboratory. A portion of each sample was sent to Sentinel, Inc. for the mercury analysis.

The CoC requested turnaround time (TAT) was 21 days. However, the contract requested TAT of seven days was followed.

All technical holding-time requirements were met.

II. Calibration

The initial calibration curve composed of a blank and five standards were analyzed which met method requirements.

The initial calibration verification (ICV) standard, continuing calibration verification (CCV) standards, and contract required quantitation limit (CRQL), equivalent to reporting limit (RL) check standards (CRI) were analyzed in the correct sequence and at the correct concentrations as per the method. ICV, CCV and CRI calculations were verified.

III. Laboratory Blanks

A method blank (MB) was analyzed as required and had a non-detected result.

An initial calibration blank (ICB) and continuing calibration blanks (CCB) were analyzed in the correct sequence and had non-detected results.

IV. Field Blanks

There were four equipment blanks (EB) submitted in this SDG. EB results were all non-detect.

V. Laboratory Control Sample

A laboratory control sample is not required for analysis of water samples.

VI. Laboratory Duplicate

A laboratory duplicate was analyzed on sample RMW-04-15-0905. The relative percent difference (RPD) criteria were met. The RPD calculation was verified.

VII. Matrix Spike/Matrix Spike Duplicate

A matrix spike (MS) was analyzed on sample RMW-04-15-0905. The recovery was within acceptance criteria. The MS calculation was verified.

VIII. Field Duplicates

There were two field duplicate (FD) pairs designated in this SDG: samples RMW-10-15-0905 and MW-90-15-0905 and samples RMW-09-15-0905 and MW-91-0905. All acceptance criteria were met. There appeared to be an error in the second FD pair as to the parent sample.

IX. Target Compound Quantitation

Raw data was reviewed and compared to the reported results on the summary forms. Calculations were verified.

X. Compound Quantitation and Reported CRQLs

Compound quantitation and accuracy were verified.

XI. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of matrix-related accuracy and precision indicators are acceptable.
- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	September 28, 29 and 30, 2005
	October 3 and 4, 2005
Report Date:	October 13, 2005
Parameters:	ICP Metals
Laboratory:	Bonner Analytical Testing Company
Sample Delivery Group:	MY23M1

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Method ILM05.3. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the USEPA National Functional Guidelines for Inorganic Data Review (NFG), October 2004, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier III data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier III data validation. The intended objective of the data review process was to provide a technical review of the raw data and to provide verification of calculations and analyte identification. It was not intended to determine contract compliance.

The scope of the data review included the chain-of-custody (CoC) records, the case narrative, completed contract laboratory program (CLP) data summary forms and raw data.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

Thirteen water samples received in two coolers on 10/01/05 were above the recommended 2-6 degree Celsius (C) temperature range at 14.5 degrees C and 11 degrees C. No flags were applied to the affected samples.

Samples were received for both ICP and ICP/MS metals. A portion of each sample was sent to another laboratory for ICP/MS analysis.

The CoC requested turnaround time (TAT) was 21 days. However, the contract requested TAT of seven days was followed.

All technical holding-time requirements were met.

II. Calibration

All calibration verification (CCV) standards met acceptance criteria except for potassium. The potassium CCV recoveries were above 110 percent but less than 125 percent; therefore, the associated detected results were qualified as estimated and flagged "J".

III. Laboratory Blanks

A method blank (MB) was analyzed as required. Boron, magnesium, silica and potassium were detected in the MB below the contract required quantitation limit (CRQL), equivalent to the reporting limit (RL). Silica sample results were greater than the CRQL; no flags were applied. Sample results greater than the method detection limit (MDL) and below the CRQL for boron, magnesium and potassium were not qualified because only the equipment blanks (EB) were affected.

Initial calibration blanks (ICB) and continuing calibration blanks (CCB) had detected results greater than the MDL and less than the CRQL for aluminum, boron, calcium, iron, magnesium, molybdenum, silica, potassium, and sodium. Detected sample results between the MDL and the CRQL were qualified as non-detected at the CRQL and flagged "U".

However, sample RMW-09-35-0905 had a detected result for magnesium that was between the MDL and the CRQL that was not qualified because it was more than 50 times the CCB detected concentration. In addition, EB sample MW-EB-03-0905 had a calcium detected result less than the CRQL that was more than 25 times the CCB detected concentration and therefore, was not qualified.

IV. Field Blanks

There were four EBs submitted in this SDG. Boron, magnesium and potassium were detected in the EBs. Samples were qualified and flagged for these elements due to MB and ICB/CCB detected results; therefore, no additional flags were applied. Calcium was detected in MW-EB-03-0905 less than the CRQL. All associated results were greater than the CRQL and not qualified.

V. Interference Check Sample

The interference check samples were analyzed as required and were within acceptance criteria.

VI. Laboratory Control Sample

All laboratory control sample recoveries were within criteria.

VII. Laboratory Duplicate

A laboratory duplicate was analyzed on sample BMW-01-0905. All relative percent difference criteria were met.

VIII. Matrix Spike/Matrix Spike Duplicate

A matrix spike was analyzed on sample BMW-01-0905. All recoveries were within acceptance criteria.

IX. Serial Dilution

A serial dilution was performed on sample BMW-01-0905. The serial dilution criteria were met except for potassium. The sample result was flagged "J" as an estimated concentration.

X. Field Duplicates

There were two field duplicate (FD) pairs designated in this SDG: samples RMW-10-15-0905 and MW-90-15-0905 and samples RMW-09-15-0905 and MW-91-0905. All acceptance criteria were met. There appeared to be an error in the second FD pair as to the parent sample.

XI. Target Compound Quantitation

Raw data were reviewed and calculations were verified. The samples contained sodium and potassium at concentrations above the linear range. The samples were reanalyzed at dilutions.

XII. Compound Quantitation and Reported CRQLs

Compound quantitation and accuracy were verified.

XIII. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are acceptable.
- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- Target analytes were detected in the associated MB, ICB and CCBs. Some of these low-level blank detects resulted in detected data qualified as non-detects.
- Calibration and serial dilution exceedances observed for potassium resulted in data qualified as estimated concentrations.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (ug/L)	FINAL FLAG	VALIDATION COMMENTS
BMW-01-0905	ALUMINUM	200	U	CCB<RL
BMW-01-0905	MOLYBDENUM	5	U	ICB<RL
BMW-01-0905	POTASSIUM	33500	J	CCV>UCL, SerialDilution>UCL
BMW-03-0905	MOLYBDENUM	5	U	ICB<RL
BMW-03-0905	POTASSIUM	35500	J	CCV>UCL
MW-90-15-0905	ALUMINUM	200	U	CCB<RL
MW-90-15-0905	POTASSIUM	19800	J	CCV>UCL
MW-91-0905	MOLYBDENUM	5	U	ICB<RL
MW-91-0905	POTASSIUM	55100	J	CCV>UCL
RMW-03-15-0905	MOLYBDENUM	5	U	ICB<RL
RMW-03-15-0905	POTASSIUM	63300	J	CCV>UCL
RMW-04-15-0905	POTASSIUM	3250	J	CCV>UCL
RMW-05-15-0905	ALUMINUM	200	U	CCB<RL
RMW-05-15-0905	MOLYBDENUM	5	U	ICB<RL
RMW-05-15-0905	POTASSIUM	73300	J	CCV>UCL
RMW-06-15-0905	POTASSIUM	12800	J	CCV>UCL
RMW-07-15-0905	ALUMINUM	200	U	CCB<RL
RMW-07-15-0905	POTASSIUM	14600	J	CCV>UCL
RMW-07-35-0905	POTASSIUM	7010	J	CCV>UCL
RMW-09-15-0905	ALUMINUM	200	U	CCB<RL
RMW-09-15-0905	MOLYBDENUM	5	U	ICB<RL
RMW-09-15-0905	POTASSIUM	48700	J	CCV>UCL
RMW-09-35-0905	MOLYBDENUM	5	U	ICB<RL
RMW-09-35-0905	POTASSIUM	2960	J	CCV>UCL
RMW-10-15-0905	ALUMINUM	200	U	CCB<RL
RMW-10-15-0905	MOLYBDENUM	5	U	ICB<RL
RMW-10-15-0905	POTASSIUM	19900	J	CCV>UCL
RMW-10-35-0905	POTASSIUM	834000	J	CCV>UCL

CCB<RL = Continuing calibration blank concentration less than RL
CCV>UCL = Continuing calibration recovery greater than upper control limit
ICB<RL = Initial calibration blank concentration less than RL
LB<RL = Laboratory blank contamination less than RL
SerialDilution>UCL = Serial dilution % difference exceeded criteria >10%

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 4, 5 and 6, 2005
Report Date:	January 3, 2006
Parameters:	ICP Metals
Laboratory:	Bonner Analytical Testing Company
Sample Delivery Group:	MY23P5

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work ILM05.3 with the additional requirements posed in Modification Tracking Number 1184.0. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), October 2004, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II CLP level data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J- — The analyte was positively identified but biased low; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ — The analyte was positively identified but biased high; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The samples reported in this SDG were received at the laboratory within control temperatures. All samples were accompanied by appropriate CoC forms, and all custody seals were intact. Individual samples did not contain sample tag ID numbers.

Samples BPZ-01-0905 and BMW-08-0905 were received at a pH = 6. The pH of these samples was adjusted to below 2 prior to analysis. No flags were applied as a result of the pH discrepancies.

All technical holding-time requirements were met.

II. Calibration

All calibration verification standards met acceptance criteria.

A contract required quantitation limit (CRQL), equivalent to reporting limit (RL), check standard (CRI) was run at the required frequency and all recoveries met acceptance criteria.

III. Laboratory Blanks

The method blank (MB) associated with all samples in this SDG contained concentrations of boron and silica detectable above the method detection limit (MDL), but below the CRQL. Associated results detected at concentrations below the CRQL were flagged as non-detects. Detected results greater than the CRQL were not qualified.

Boron, molybdenum and silica were detected in the initial calibration blank (ICB) at concentrations greater than the MDL, but lower than the CRQL. Aluminum, boron, calcium, iron, magnesium, molybdenum, potassium and sodium were also detected in continuing calibration blanks (CCB) at concentrations exceeding the MDL, but below the CRQL. Associated results detected at concentrations below the CRQL were flagged as non-detects. Detected results greater than the CRQL were not qualified.

IV. Field Blanks

Samples MW-EB-05-0905, MW-EB-06-0905 and MW-EB-07-0905 were noted as equipment blanks (EB) on the CoC. Detected targets in the three samples were qualified due to detected concentrations below the CRQL in the CCB and therefore, no sample results were impacted from the EB detections.

V. Interference Check Sample

The interference check sample was analyzed as required and all acceptance criteria were met.

VI. Laboratory Control Sample

Laboratory control samples were run at the required frequency and all recoveries were within criteria.

VII. Laboratory Duplicates

A laboratory duplicate was analyzed on sample RMW-14-50-0905. The recovery of aluminum exceeded control criteria resulting in the qualification of all associated samples as

estimated results. Detected results were flagged "J" and non-detected results were qualified "UJ".

VIII. Matrix Spike/Matrix Spike Duplicate

A matrix spike was analyzed on sample RMW-14-50-0905. The recovery of aluminum exceeded control criteria. Although the post-digestion spike analysis was performed and the recovery was acceptable, all associated aluminum results reported above the MDL were qualified as estimated.

IX. Serial Dilutions

A serial dilution was analyzed on sample RMW-14-50-0905. Calcium and magnesium were detected at concentrations greater than 50 times the associated MDL, and the percent differences between the initial and serial dilution sample results were determined to be greater than 10 percent. All associated results were qualified as estimated. Detected results were flagged "J" and non-detected results were qualified "UJ".

X. Field Duplicates

No field duplicates were included in this SDG.

XI. Target Compound Quantitation

Raw data were not reviewed.

XII. Compound Quantitation and Reported CRQLs

Verification of compound identification was not within the scope of the data review for this SDG.

XIII. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable. Matrix interference resulted in the qualification of aluminum results as estimated.
- Low recovery of calcium and magnesium in the serial dilution analysis resulted in the qualification of all associated sample results as estimated results.
- Samples were properly preserved (minor issues with pH requirements) and shipped under a COC. Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standard units.
- Target analytes were detected in the associated MB, ICB and CCBs. Some of these low-level blank detects resulted in detected data qualified as non-detects.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
BMW-06-0905	Aluminum	200	U	CCB<RL, MS>UCL
BMW-06-0905	Calcium	63700	J	SerialDilution>UCL
BMW-06-0905	Calcium	59800	J	SerialDilution>UCL
BMW-06-0905	Iron	100	U	CCB<RL
BMW-06-0905	Magnesium	75300	J	SerialDilution>UCL
BMW-06-0905	Magnesium	70400	J	SerialDilution>UCL
BMW-07-0905	Aluminum	200	U	CCB<RL, MS>UCL
BMW-07-0905	Aluminum	200	U	CCB<RL, MS>UCL
BMW-07-0905	Calcium	78600	J	SerialDilution>UCL
BMW-07-0905	Calcium	67600	J	SerialDilution>UCL
BMW-07-0905	Magnesium	93800	J	SerialDilution>UCL
BMW-07-0905	Magnesium	96500	J	SerialDilution>UCL
BMW-08-0905	Aluminum	400	U	CCB<RL, MS>UCL
BMW-08-0905	Aluminum	400	U	CCB<RL, MS>UCL
BMW-08-0905	Calcium	346000	J	SerialDilution>UCL
BMW-08-0905	Calcium	387000	J	SerialDilution>UCL
BMW-08-0905	Magnesium	1320000	J	SerialDilution>UCL
BMW-08-0905	Magnesium	1530000	J	SerialDilution>UCL
BPZ-01-0905	Aluminum	654	J	MS>UCL
BPZ-01-0905	Aluminum	200	U	CCB<RL, MS>UCL
BPZ-01-0905	Calcium	214000	J	SerialDilution>UCL
BPZ-01-0905	Calcium	217000	J	SerialDilution>UCL
BPZ-01-0905	Magnesium	460000	J	SerialDilution>UCL
BPZ-01-0905	Magnesium	465000	J	SerialDilution>UCL
RMW-01-17-0905	Aluminum	13500	J	MS>UCL
RMW-01-17-0905	Calcium	106000	J	SerialDilution>UCL
RMW-01-17-0905	Magnesium	47300	J	SerialDilution>UCL
RMW-01-17-0905	Molybdenum	5	U	ICB<RL, CCB<RL
RMW-01-35-0905	Aluminum	200	U	CCB<RL, MS>UCL
RMW-01-35-0905	Calcium	31400	J	SerialDilution>UCL
RMW-01-35-0905	Calcium	31900	J	SerialDilution>UCL
RMW-01-35-0905	Magnesium	35800	J	SerialDilution>UCL
RMW-01-35-0905	Magnesium	35700	J	SerialDilution>UCL
RMW-01-35-0905	Potassium	5000	U	CCB<RL
RMW-01-35-0905	Potassium	5000	U	CCB<RL
RMW-11-35-0905	Aluminum	200	U	CCB<RL, MS>UCL
RMW-11-35-0905	Aluminum	200	U	CCB<RL, MS>UCL
RMW-11-35-0905	Calcium	66400	J	SerialDilution>UCL
RMW-11-35-0905	Calcium	67300	J	SerialDilution>UCL
RMW-11-35-0905	Magnesium	74000	J	SerialDilution>UCL
RMW-11-35-0905	Magnesium	72000	J	SerialDilution>UCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
RMW-13-35-0905	Aluminum	3500	J	MS>UCL
RMW-13-35-0905	Aluminum	200	U	CCB<RL, MS>UCL
RMW-13-35-0905	Calcium	130000	J	SerialDilution>UCL
RMW-13-35-0905	Calcium	124000	J	SerialDilution>UCL
RMW-13-35-0905	Magnesium	299000	J	SerialDilution>UCL
RMW-13-35-0905	Magnesium	296000	J	SerialDilution>UCL
RMW-13-35-0905	Molybdenum	5	U	ICB<RL, CCB<RL
RMW-13-35-0905	Molybdenum	5	U	ICB<RL, CCB<RL
RMW-14-50-0905	Aluminum	325	J	MS>UCL
RMW-14-50-0905	Aluminum	200	U	CCB<RL, MS>UCL
RMW-14-50-0905	Calcium	301000	J	SerialDilution>UCL
RMW-14-50-0905	Calcium	296000	J	SerialDilution>UCL
RMW-14-50-0905	Magnesium	575000	J	SerialDilution>UCL
RMW-14-50-0905	Magnesium	578000	J	SerialDilution>UCL

CCB<RL = Continuing calibration blank concentration less than RL
ICB<RL = Initial calibration blank concentration less than RL
LB<RL = Laboratory blank concentration less than RL
MS>UCL = Matrix spike recovery greater than upper limit
SerialDilution>UCL = Percent difference between the initial and serial dilution results greater than 10%

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 6, 2005
Report Date:	December 19, 2005
Parameters:	ICP Metals
Laboratory:	Bonner Analytical Testing Company
Sample Delivery Group:	MY23R8

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work ILM05.3 with the additional requirements posed in Modification Tracking Number 1184.0. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), October 2004, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II CLP level data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J- — The analyte was positively identified but biased low; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ — The analyte was positively identified but biased high; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

One sample reported in this SDG was received at the laboratory within control temperatures and was accompanied by appropriate CoC forms; however, the CoC was not

signed by the sampler. Custody seals were intact. Individual sample tag ID numbers were not included.

Only dissolved analyses are reported in this SDG. Total analyses on the accompanying CoCs can be found reported in another SDG.

All technical holding-time requirements were met.

II. Calibration

All calibration verification standards met acceptance criteria.

A contract required quantitation limit (CRQL), equivalent to reporting limit (RL), check standard (CRI) was run at the required frequency and all recoveries met acceptance criteria.

III. Laboratory Blanks

The method blank (MB) associated with all samples in this SDG contained concentrations of boron, potassium and silica detected above the method detection limit (MDL), but below the CRQL. All associated results for these targets were reported at concentrations greater than the CRQL. Results were not qualified.

Boron, molybdenum and silica were detected in the initial calibration blank (ICB), and boron was detected in each of the subsequent associated continuing calibration blanks (CCB). Additional CCB target analyte detections included aluminum, calcium, magnesium, molybdenum, iron and potassium. All ICB and CCB detections were reported above the MDL but below the CRQL. One associated sample result greater than the MDL but less than the CRQL was reported as a non-detected result and flagged "U". All other associated results were either non-detected below the MDL or greater than the CRQL and therefore, no flags were applied.

IV. Field Blanks

No field blanks were included in this SDG.

V. Interference Check Sample

Potassium and sodium were not added to the interference check sample, but were detected above the MDL indicating the possibility of false positives. Boron and silica were not added to the interference check sample, but returned negative results less than the MDL indicating the possibility of false negatives. Associated results for potassium and sodium contained detections greater than the CRQL and therefore, no flags were applied.

VI. Laboratory Control Sample

Laboratory control samples were run at the required frequency and all recoveries were within criteria.

VII. Laboratory Duplicates

A laboratory duplicate was analyzed on sample RMW-01-17-0905. All relative percent difference criteria were met.

VIII. Matrix Spike/Matrix Spike Duplicate

A matrix spike was analyzed on sample RMW-01-17-0905. All recoveries were within control limits.

IX. Serial Dilutions

A serial dilution was analyzed on sample RMW-01-17-0905. Potassium was detected at a concentration greater than 50 times the MDL, and the percent difference between the initial and serial dilution sample results was determined to be greater than 10 percent. The associated detected result was qualified as estimated and flagged "J".

Note that although the raw instrument printouts were not a part of this review, it was noted that the serial dilution results reported on the summary Form 8-IN (page 28) did not match results reported on the instrument summary report (page 93) or the raw instrument printouts (page 211). However, the raw instrument data and the instrument summary data do match one another.

X. Field Duplicates

No field duplicates were included in this SDG.

XI. Target Compound Quantitation

Raw data were not reviewed.

XII. Compound Quantitation and Reported CRQLs

Verification of compound identification was not within the scope of the data review for this SDG.

XIII. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable.
- Low recovery of potassium in the serial dilution analysis resulted in the qualification of the sample result as an estimated concentration.
- The sample was analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- Target analytes were detected in the associated MB, ICB and CCBs. The low-level blank detect for aluminum resulted in the sample qualified as a non-detect.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
RMW-01-17-0905	Aluminum	200	U	CCB<RL
RMW-01-17-0905	Potassium	8620	J	SerialDilution>UCL

CCB<RL = Continuing calibration blank concentration less than RL
SerialDilution>UCL = Serial dilution % difference exceeded criteria >10%

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 10, 11 and 12, 2005
Report Date:	December 14, 2005
Parameters:	ICP Metals
Laboratory:	Bonner Analytical Testing Company
Sample Delivery Group:	MY23S0

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work ILM05.3 with the additional requirements posed in Modification Tracking Number 1184.0. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), October 2004, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II CLP level data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J- — The analyte was positively identified but biased low; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ — The analyte was positively identified but biased high; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples reported in this SDG were received at the laboratory in two shipments. The first of the shipments that included all samples, except for MW-12-0905, MW-EB-09-0905 and

RWM-02-13-0905, was received at 7 degrees Celsius. This slightly elevated temperature still indicates that the samples were shipped under ice and were likely elevated for a limited period of time. The remaining samples reported in this SDG were received within control temperatures and all samples were accompanied by appropriate CoC forms and all custody seals were intact. Individual samples did not contain sample tag ID numbers. Samples RMW-02-32-0905 for total metals and RMW-02-32-0905 for dissolved metals were received by the laboratory at a pH 5 but were preserved at the laboratory using nitric acid to a pH less than 2 prior to analysis. No flags were applied as a result of the pH or temperature discrepancies.

This SDG contained both total and dissolved analyses.

Sample MW-EB-10-0905, an equipment blank (EB), was listed on the CoC but not reported in this SDG. However, two samples collected on the same day, 10/12/05, as the EB in this SDG were associated. MW-EB-10-0905 was reported by Bonner Analytical Testing Company in SDG MY23W2 and by Sentinel, Inc. in SDG MY23T5. In SDG MY23W2, the method blank associated to this sample contained detections similar to those in the EB and therefore, the EB detections were likely due to laboratory contamination.

All technical holding-time requirements were met.

II. Calibration

All calibration verification standards met acceptance criteria.

A contract required quantitation limit (CRQL), equivalent to reporting limit (RL), check standard (CRI) was run at the required frequency and all recoveries met acceptance criteria.

III. Laboratory Blanks

The method blank (MB) associated with all samples in this SDG contained concentrations of magnesium and potassium detectable above the MDL but below the CRQL. Associated results detected above the MDL but below the CRQL were flagged “U”. Results with detections greater than the CRQL were not flagged.

Boron, magnesium, molybdenum and potassium were detected in the initial calibration blank (ICB). Boron, magnesium, aluminum, calcium, iron, sodium, silicon and potassium were also detected in one or more of the continuing calibration blanks (CCB). All ICB and CCB detections were reported above the MDL but below the CRQL. Associated sample results greater than the MDL but less than the CRQL were reported as non-detected results and flagged “U”. Detected results greater than the CRQL were not qualified.

IV. Field Blanks

Samples MW-EB-08-0905 and MW-EB-09-0905 were collected as EBs. All detected results were likely due to laboratory contamination in the ICB, CCB and/or the MB. No results were qualified from the EB detections.

V. Interference Check Sample

Potassium and sodium were not added to the interference check sample but were detected slightly above the MDL indicating the possibility of false positives. Boron and silicon were

not added to the interference check sample but returned negative results slightly less than the MDL indicating the possibility of false negatives. Associated analytical samples did not contain similar quantities of the interferences and therefore, no flags were applied.

VI. Laboratory Control Sample

Laboratory control samples were run at the required frequency and all recoveries were within criteria.

VII. Laboratory Duplicates

A laboratory duplicate was analyzed on sample MW-88-51-0905. All relative percent difference criteria were met.

VIII. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate was analyzed on sample MW-88-51-0905. All recoveries were within control limits.

IX. Serial Dilutions

A serial dilution was analyzed on sample MW-88-51-0905. Potassium was detected at a concentration greater than 50 times the MDL, and the percent difference between the initial and serial dilution sample results was determined to be greater than 10 percent. All associated results were qualified as estimated. Detected results were qualified "J" and non-detected results were qualified "UJ".

X. Field Duplicates

Samples RMW-12-51-0905 and MW-88-51-0905 were designated as a field duplicate (FD) pair. All acceptance criteria were met.

XI. Target Compound Quantitation

Raw data were not reviewed.

XII. Compound Quantitation and Reported CRQLs

Verification of compound identification was not within the scope of the data review for this SDG.

XIII. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable.
- Low recovery of potassium in the serial dilution analysis resulted in the qualification of all associated sample results as estimated concentrations.
- Samples were analyzed based on approved methods/procedures and results are reported using industry-standard units.

- Target analytes were detected in the associated MB, ICB and CCBs. Some of these low-level blank detects resulted in detected data qualified as non-detects.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MW-12-0905	Aluminum	200	U	CCB<RL
MW-12-0905	Potassium	20700	J	SerialDilution>UCL
MW-12-0905	Potassium	19700	J	SerialDilution>UCL
MW-88-51-0905	Potassium	5560	J	SerialDilution>UCL
MW-88-51-0905	Potassium	5430	J	SerialDilution>UCL
RMW-02-13-0905	Aluminum	200	U	CCB<RL
RMW-02-13-0905	Potassium	54200	J	SerialDilution>UCL
RMW-02-13-0905	Potassium	50700	J	SerialDilution>UCL
RMW-02-32-0905	Aluminum	200	U	CCB<RL
RMW-02-32-0905	Potassium	5650	J	SerialDilution>UCL
RMW-02-32-0905	Potassium	5600	J	SerialDilution>UCL
RMW-02-50-0905	Aluminum	200	U	CCB<RL
RMW-02-50-0905	Potassium	6370	J	SerialDilution>UCL
RMW-02-50-0905	Potassium	6270	J	SerialDilution>UCL
RMW-08-15-0905	Potassium	56900	J	SerialDilution>UCL
RMW-08-15-0905	Potassium	56400	J	SerialDilution>UCL
RMW-08-35-0905	Iron	100	U	CCB<RL
RMW-08-35-0905	Potassium	5000	U	ICB<RL, CCB<RL, LB<RL, SerialDilution>UCL
RMW-08-35-0905	Potassium	5000	U	ICB<RL, CCB<RL, LB<RL, SerialDilution>UCL
RMW-12-32-0905	Iron	100	U	CCB<RL
RMW-12-32-0905	Magnesium	5000	U	ICB<RL, CCB<RL, LB<RL
RMW-12-32-0905	Magnesium	5000	U	ICB<RL, CCB<RL, LB<RL
RMW-12-32-0905	Potassium	15600	J	SerialDilution>UCL
RMW-12-32-0905	Potassium	16000	J	SerialDilution>UCL
RMW-12-51-0905	Potassium	5510	J	SerialDilution>UCL
RMW-12-51-0905	Potassium	5430	J	SerialDilution>UCL

CCB<RL = Continuing calibration blank concentration less than RL
ICB<RL = Initial calibration blank concentration less than RL
LB<RL = Laboratory blank contamination less than the RL
SerialDilution>UCL = Serial dilution % difference exceeded criteria >10%

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 10, 11 and 12, 2005
Report Date:	December 23, 2005
Parameters:	ICP Metals
Laboratory:	Bonner Analytical Testing Company
Sample Delivery Group:	MY23W2

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work ILM05.3 with the additional requirements posed in Modification Tracking Number 1184.0. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), October 2004, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II CLP level data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J- The analyte was positively identified but biased low; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified but biased high; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples reported in this SDG were received within control temperatures and correctly preserved. Samples were accompanied by appropriate CoC forms and all custody seals were intact. Individual samples did not contain sample tag ID numbers.

All technical holding-time requirements were met.

Several samples were listed on the CoC but were reported in another SDG. Only one equipment blank (EB) was reported in this SDG.

II. Calibration

All calibration verification standards met acceptance criteria.

A contract required quantitation limit (CRQL), equivalent to reporting limit (RL), check standard (CRI) was run at the required frequency and all recoveries met acceptance criteria.

III. Laboratory Blanks

The method blank (MB) associated with all samples in this SDG contained concentrations of magnesium and potassium detectable above the method detection limit (MDL) but below the CRQL. Sample results were not qualified because the only associated sample was an EB.

Boron, magnesium, molybdenum and potassium were detected in the initial calibration blank (ICB). Boron, magnesium, aluminum, calcium, iron, silicon and potassium were also detected in one or more of the continuing calibration blanks (CCB). All ICB and CCB detections were reported above the MDL but below the CRQL. Sample results were not qualified.

IV. Field Blanks

Sample MW-EB-10-0905 was collected as an EB. The method blank associated to this sample contained detections similar to those in the EB and therefore, the EB detections were likely due to laboratory contamination.

V. Interference Check Sample

Sodium was not added to the interference check sample but was detected slightly above the MDL indicating the possibility of false positives. Boron and silicon were not added to the interference check sample but returned negative results slightly less than the MDL indicating the possibility of false negatives. Associated analytical samples did not contain similar quantities of the interferences and therefore, no flags were applied.

VI. Laboratory Control Sample

Laboratory control samples were run at the required frequency and all recoveries were within criteria.

VII. Laboratory Duplicates

A laboratory duplicate was analyzed on sample MW-EB-10-0905. All relative percent difference criteria were met.

VIII. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate was analyzed on sample MW-EB-10-0905. All recoveries were within control limits.

IX. Serial Dilutions

A serial dilution was analyzed on sample MW-EB-10-0905. All acceptance criteria were met.

X. Field Duplicates

No field duplicates were included in this SDG.

XI. Target Compound Quantitation

Raw data were not reviewed.

XII. Compound Quantitation and Reported CRQLs

Verification of compound identification was not within the scope of the data review for this SDG.

XIII. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are acceptable.
- Samples were and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- Target analytes were detected in the associated MB, ICB and CCBs. Data were not qualified since the only sample in this SDG was an EB.

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	September 28, 29 and 30 and October 3 and 4, 2005
Report Date:	January 3, 2006
Parameters:	ICP Metals
Laboratory:	Bonner Analytical Testing Company
Sample Delivery Group:	MY26K3

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work ILM05.3 with the additional requirements posed in Modification Tracking Number 1184.0. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), October 2004, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II CLP level data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J- — The analyte was positively identified but biased low; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ — The analyte was positively identified but biased high; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The samples reported in this SDG were received at the laboratory in three coolers. The cooler containing samples RMW-10-15-0905, MW-90-15-0905, RMW-10-35-0905, RMW-09-

15-0905, MW-91-0905 and RMW-09-35-0905 was received at 14.5 degrees Celsius (C) and the cooler containing samples BMW-01-0905, RMW-04-15-0905, RMW-05-15-0905 and BMW-03-0905 was received at 11 degrees C. The third cooler was received within control temperatures. These elevated temperatures still indicate that the samples were shipped under ice and were likely elevated for a limited period of time. Samples were accompanied by appropriate CoC forms, and all custody seals were intact. Individual samples did not contain sample tag ID numbers.

Sample RMW-05-15-0905 was received at a pH = 6 and sample MW-91-0905 was received at a pH = 5. The pH of both samples was adjusted to below 2 prior to analysis. No flags were applied as a result of the pH or temperature discrepancies.

Only dissolved analyses are reported in this SDG. Total analyses on the accompanying CoCs can be found reported in another SDG.

All technical holding-time requirements were met.

II. Calibration

All calibration verification standards met acceptance criteria.

A contract required quantitation limit (CRQL), equivalent to reporting limit (RL), check standard (CRI) was run at the required frequency and all recoveries met acceptance criteria.

III. Laboratory Blanks

The method blank (MB) associated with all samples in this SDG contained concentrations of aluminum, iron, magnesium, molybdenum, potassium, silica, and sodium detectable above the method detection limit (MDL), but below the CRQL. Associated results detected at concentrations below the CRQL were flagged as non-detects. Detected results greater than the CRQL were not qualified.

Boron and molybdenum were detected in the initial calibration blank (ICB) at concentrations greater than the MDL, but lower than the CRQL. Sodium was detected at negative concentrations less than the negative MDL and less than the negative CRQL. Aluminum, boron, calcium, iron, magnesium, molybdenum and silica were also detected in continuing calibration blanks (CCB) at concentrations exceeding the MDL, but below the CRQL. Additional CCB contamination at negative concentrations below the negative MDL and less than the negative CRQL was also reported for potassium and sodium. Associated results detected at concentrations below the CRQL were flagged as non-detects. Detected results greater than the CRQL were not qualified.

IV. Field Blanks

No field blanks were included in this SDG.

V. Interference Check Sample

The interference check sample was analyzed as required and all acceptance criteria were met.

VI. Laboratory Control Sample

Laboratory control samples were run at the required frequency and all recoveries were within criteria.

VII. Laboratory Duplicates

A laboratory duplicate was analyzed on sample BMW-01-0905. All relative percent difference criteria were met.

VIII. Matrix Spike/Matrix Spike Duplicate

A matrix spike was analyzed on sample BMW-01-0905. All recoveries were within control limits.

IX. Serial Dilutions

A serial dilution was analyzed on sample BMW-01-0905. Potassium was detected at a concentration greater than 50 times the MDL, and the percent difference between the initial and serial dilution sample results was determined to be greater than 10 percent. All associated results were qualified as estimated. Detected results were flagged "J" and non-detected results were qualified "UJ".

X. Field Duplicates

There were two field duplicate (FD) pairs designated in this SDG: samples RMW-10-15-0905 and MW-90-15-0905 and samples RMW-09-15-0905 and MW-91-0905. All acceptance criteria were met. There appeared to be an error in the second FD pair as to the parent sample.

XI. Target Compound Quantitation

Raw data were not reviewed.

XII. Compound Quantitation and Reported CRQLs

Verification of compound identification was not within the scope of the data review for this SDG.

XIII. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable.
- Low recovery of potassium in the serial dilution analysis resulted in the qualification of all associated sample results as estimated concentrations.
- Samples were analyzed based on approved methods/procedures and results are reported using industry-standard units.
- Target analytes were detected in the associated MB, ICB and CCBs. Some of these low-level blank detects resulted in detected data qualified as non-detects.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
BMW-01-0905	Aluminum	200	U	CCB<RL, LB<RL
BMW-01-0905	Molybdenum	5	U	ICB<RL, CCB<RL
BMW-01-0905	Potassium	28100	J	SerialDilution>UCL
BMW-03-0905	Aluminum	200	U	CCB<RL, LB<RL
BMW-03-0905	Iron	100	U	CCB<RL, LB<RL
BMW-03-0905	Molybdenum	5	U	ICB<RL, CCB<RL
BMW-03-0905	Potassium	38300	J	SerialDilution>UCL
MW-90-15-0905	Aluminum	200	U	CCB<RL, LB<RL
MW-90-15-0905	Iron	100	U	CCB<RL, LB<RL
MW-90-15-0905	Potassium	15800	J	SerialDilution>UCL
MW-91-0905	Aluminum	200	U	CCB<RL, LB<RL
MW-91-0905	Molybdenum	5	U	ICB<RL, CCB<RL
MW-91-0905	Potassium	41700	J	SerialDilution>UCL
RMW-03-15-0905	Aluminum	200	U	CCB<RL, LB<RL
RMW-03-15-0905	Molybdenum	5	U	ICB<RL, CCB<RL
RMW-03-15-0905	Potassium	55400	J	SerialDilution>UCL
RMW-04-15-0905	Aluminum	200	U	CCB<RL, LB<RL
RMW-04-15-0905	Iron	100	U	CCB<RL, LB<RL
RMW-04-15-0905	Magnesium	5000	U	CCB<RL, LB<RL
RMW-04-15-0905	Potassium	5000	U	CCB<RL, LB<RL, SerialDilution>UCL
RMW-05-15-0905	Aluminum	200	U	CCB<RL, LB<RL
RMW-05-15-0905	Molybdenum	5	U	ICB<RL, CCB<RL
RMW-05-15-0905	Potassium	61800	J	SerialDilution>UCL
RMW-06-15-0905	Aluminum	200	U	CCB<RL, LB<RL
RMW-06-15-0905	Potassium	10500	J	SerialDilution>UCL
RMW-07-15-0905	Aluminum	200	U	CCB<RL, LB<RL
RMW-07-15-0905	Iron	100	U	CCB<RL, LB<RL
RMW-07-15-0905	Potassium	11600	J	SerialDilution>UCL
RMW-07-35-0905	Aluminum	200	U	CCB<RL, LB<RL
RMW-07-35-0905	Iron	100	U	CCB<RL, LB<RL
RMW-07-35-0905	Potassium	5300	J	SerialDilution>UCL
RMW-09-15-0905	Aluminum	200	U	CCB<RL, LB<RL
RMW-09-15-0905	Molybdenum	5	U	ICB<RL, CCB<RL
RMW-09-15-0905	Potassium	39800	J	SerialDilution>UCL
RMW-09-35-0905	Iron	100	U	CCB<RL, LB<RL
RMW-09-35-0905	Magnesium	5000	U	CCB<RL, LB<RL
RMW-09-35-0905	Potassium	5000	U	CCB<RL, LB<RL, SerialDilution>UCL
RMW-10-15-0905	Aluminum	200	U	CCB<RL, LB<RL
RMW-10-15-0905	Iron	100	U	CCB<RL, LB<RL
RMW-10-15-0905	Potassium	15300	J	SerialDilution>UCL
RMW-10-35-0905	Aluminum	200	U	CCB<RL, LB<RL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
RMW-10-35-0905	Potassium	686000	J	SerialDilution>UCL

CCB<RL = Continuing calibration blank concentration less than RL
ICB<RL = Initial calibration blank concentration less than RL
LB<RL = Laboratory blank contamination less than the RL
SerialDilution>UCL = Serial dilution % difference exceeded criteria >10%

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	September 28 and 29, 2005
Report Date:	October 21, 2005
Parameters:	Organophosphorous Pesticides
Laboratory:	APPL, Inc.
Sample Delivery Group:	48633

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Method 8141A. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

All technical holding times were met. Sample receipt information not provided.

II. Instrument Performance Checks

Not provided.

III. Calibration

Not provided.

IV. Method Blanks

A method blank was analyzed as required. There were no detected results in the method blank.

V. Field Blanks

There was one equipment blank in this SDG. There were no detected results in the equipment blank.

VI. Surrogate Recovery

Surrogate recoveries met the specified criteria.

VII. Matrix Spike/Matrix Spike Duplicate

No matrix spike/matrix spike duplicates in this SDG.

VIII. Laboratory Control Sample

All acceptance criteria were met.

IX. Field Duplicates

No field duplicates in this SDG.

X. Confirmation

Not applicable.

XI. Target Compound Identification and Quantitation

Raw data were not reviewed as part of this scope.

XII. Overall Assessment of Data

- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	September 29 and 30, 2005
Report Date:	October 21, 2005
Parameters:	Organophosphorous Pesticides
Laboratory:	APPL, Inc.
Sample Delivery Group:	48634

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Method 8141A. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

All technical holding times were met.

II. Instrument Performance Checks

Not provided.

III. Calibration

Not provided.

IV. Method Blanks

A method blank was analyzed as required. There were no detected results in the method blank.

V. Field Blanks

There were two equipment blanks in this SDG. There were no detected results in either equipment blank.

VI. Surrogate Recovery

Surrogate recoveries were not reported for samples MW-91-0905, RMW-09-15-0905, RMW-10-15-0905 and RMW-10-35-0905 due to sample dilution and therefore, data were not qualified.

VII. Matrix Spike/Matrix Spike Duplicate

No matrix spike/matrix spike duplicates in this SDG.

VIII. Laboratory Control Sample

All acceptance criteria were met.

IX. Field Duplicates

There were two field duplicate pairs: samples RMW-10-15-0905 and MW-90-15-0905 and samples RMW-09-15-0905 and MW-91-0905. Sample RMW-10-15-0905 was analyzed at a dilution of 10; whereas its field duplicate, MW-90-15-0905, was analyzed without a dilution. The non-detected results in the field duplicate pair were qualified as estimated and flagged "UJ".

X. Confirmation

Not applicable.

XI. Target Compound Identification and Quantitation

Reporting limits were raised due to matrix interference for samples MW-91-0905, RMW-09-15-0905, RMW-10-15-0905 and RMW-10-35-0905.

Raw data were not reviewed as part of this scope.

XII. Overall Assessment of Data

- Field duplicate precision was exceeded for one pair which resulted in qualification of data as estimated.
- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (ug/L)	FINAL FLAG	VALIDATION COMMENTS
MW-90-15-0905	Azinphosmethyl	1	UJ	FD>RPD
MW-90-15-0905	Bolstar	0.1	UJ	FD>RPD
MW-90-15-0905	Chlorpyrifos (Dursban)	0.05	UJ	FD>RPD
MW-90-15-0905	Coumaphos	0.2	UJ	FD>RPD
MW-90-15-0905	Def	0.1	UJ	FD>RPD
MW-90-15-0905	Demeton (Total)	0.2	UJ	FD>RPD
MW-90-15-0905	Diazinon	0.05	UJ	FD>RPD
MW-90-15-0905	Dichlorvos	0.2	UJ	FD>RPD
MW-90-15-0905	Dimethoate	0.1	UJ	FD>RPD
MW-90-15-0905	Disulfoton	0.1	UJ	FD>RPD
MW-90-15-0905	EPN	0.1	UJ	FD>RPD
MW-90-15-0905	EPTC	0.1	UJ	FD>RPD
MW-90-15-0905	Ethion	0.1	UJ	FD>RPD
MW-90-15-0905	Ethoprop	0.1	UJ	FD>RPD
MW-90-15-0905	Fensulfothion	0.5	UJ	FD>RPD
MW-90-15-0905	Fenthion	0.1	UJ	FD>RPD
MW-90-15-0905	Malathion	0.1	UJ	FD>RPD
MW-90-15-0905	Merphos	0.1	UJ	FD>RPD
MW-90-15-0905	Mevinphos	0.7	UJ	FD>RPD
MW-90-15-0905	Monocrotophos	5	UJ	FD>RPD
MW-90-15-0905	Naled	0.5	UJ	FD>RPD
MW-90-15-0905	Parathion, ethyl	0.1	UJ	FD>RPD
MW-90-15-0905	Parathion, methyl	0.1	UJ	FD>RPD
MW-90-15-0905	Phorate	0.1	UJ	FD>RPD
MW-90-15-0905	Prowl (Pendimethalin)	0.1	UJ	FD>RPD
MW-90-15-0905	Ronnel	0.1	UJ	FD>RPD
MW-90-15-0905	Stirophos	0.1	UJ	FD>RPD
MW-90-15-0905	Sulfotep	0.1	UJ	FD>RPD
MW-90-15-0905	Tepp	15	UJ	FD>RPD
MW-90-15-0905	Tokuthion	0.1	UJ	FD>RPD
MW-90-15-0905	Trichloronate	0.1	UJ	FD>RPD
MW-90-15-0905	Trifluralin	0.1	UJ	FD>RPD
RMW-10-15-0905	Azinphosmethyl	1	UJ	FD>RPD
RMW-10-15-0905	Bolstar	0.25	UJ	FD>RPD
RMW-10-15-0905	Chlorpyrifos (Dursban)	0.25	UJ	FD>RPD
RMW-10-15-0905	Coumaphos	1.25	UJ	FD>RPD
RMW-10-15-0905	Def	0.5	UJ	FD>RPD

FIELD ID	ANALYTE	FINAL RESULT (ug/L)	FINAL FLAG	VALIDATION COMMENTS
RMW-10-15-0905	Demeton (Total)	0.25	UJ	FD>RPD
RMW-10-15-0905	Diazinon	0.25	UJ	FD>RPD
RMW-10-15-0905	Dichlorvos	0.25	UJ	FD>RPD
RMW-10-15-0905	Dimethoate	0.25	UJ	FD>RPD
RMW-10-15-0905	Disulfoton	0.25	UJ	FD>RPD
RMW-10-15-0905	EPN	0.25	UJ	FD>RPD
RMW-10-15-0905	EPTC	0.25	UJ	FD>RPD
RMW-10-15-0905	Ethion	0.25	UJ	FD>RPD
RMW-10-15-0905	Ethoprop	0.25	UJ	FD>RPD
RMW-10-15-0905	Fensulfothion	1.25	UJ	FD>RPD
RMW-10-15-0905	Fenthion	0.25	UJ	FD>RPD
RMW-10-15-0905	Malathion	0.5	UJ	FD>RPD
RMW-10-15-0905	Merphos	0.5	UJ	FD>RPD
RMW-10-15-0905	Mevinphos	0.7	UJ	FD>RPD
RMW-10-15-0905	Monocrotophos	10	UJ	FD>RPD
RMW-10-15-0905	Naled	1	UJ	FD>RPD
RMW-10-15-0905	Parathion, ethyl	0.25	UJ	FD>RPD
RMW-10-15-0905	Parathion, methyl	0.25	UJ	FD>RPD
RMW-10-15-0905	Phorate	0.25	UJ	FD>RPD
RMW-10-15-0905	Prowl (Pendimethalin)	0.25	UJ	FD>RPD
RMW-10-15-0905	Ronnel	0.25	UJ	FD>RPD
RMW-10-15-0905	Stirophos	0.5	UJ	FD>RPD
RMW-10-15-0905	Sulfotep	0.25	UJ	FD>RPD
RMW-10-15-0905	Tepp	10	UJ	FD>RPD
RMW-10-15-0905	Tokuthion	0.25	UJ	FD>RPD
RMW-10-15-0905	Trichloronate	0.5	UJ	FD>RPD
RMW-10-15-0905	Trifluralin	0.25	UJ	FD>RPD

FD>RPD = Field duplicate exceeds RPD criteria

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 3, 2005
Report Date:	October 24, 2005
Parameters:	Organophosphorous Pesticides
Laboratory:	APPL, Inc.
Sample Delivery Group:	48654

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Method 8141A. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

All technical holding times were met. Sample receipt information not provided.

II. Instrument Performance Checks

Not provided.

III. Calibration

Not provided.

IV. Method Blanks

A method blank was analyzed as required. There were no detected results in the method blank.

V. Field Blanks

There was one equipment blank in this SDG. There were no detected results in the equipment blank.

VI. Surrogate Recovery

Surrogate recoveries met the specified criteria.

VII. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate was performed on RMW-07-15-0905. All acceptance criteria were met.

VIII. Laboratory Control Sample

Monocrotophos and trifluralin recoveries exceeded laboratory criteria. The samples did not contain reportable levels of these analytes and were therefore, not qualified.

IX. Field Duplicates

No field duplicates in this SDG.

X. Confirmation

Not applicable.

XI. Target Compound Identification and Quantitation

Raw data were not reviewed as part of this scope.

XII. Overall Assessment of Data

- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 4 and 5, 2005
Report Date:	October 21, 2005
Parameters:	Organophosphorous Pesticides
Laboratory:	APPL, Inc.
Sample Delivery Group:	48673

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Method 8141A. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

All technical holding times were met. Sample receipt information not provided.

II. Instrument Performance Checks

Not provided.

III. Calibration

Not provided.

IV. Method Blanks

A method blank was analyzed as required. There were no detected results in the method blank.

V. Field Blanks

There was one equipment blank in this SDG. There were no detected results in the equipment blank.

VI. Surrogate Recovery

Surrogate recoveries met the specified criteria.

VII. Matrix Spike/Matrix Spike Duplicate

No matrix spike/matrix spike duplicates in this SDG.

VIII. Laboratory Control Sample

Monocrotophos and trifluralin recoveries exceeded laboratory criteria. The samples did not contain reportable levels of these analytes and therefore, were not qualified.

IX. Field Duplicates

No field duplicates in this SDG.

X. Confirmation

Not applicable.

XI. Target Compound Identification and Quantitation

Raw data were not reviewed as part of this scope.

XII. Overall Assessment of Data

- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 5 and 6, 2005
Report Date:	October 21, 2005
Parameters:	Organophosphorous Pesticides
Laboratory:	APPL, Inc.
Sample Delivery Group:	48699

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Method 8141A. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

All technical holding times were met. Sample receipt information not provided.

II. Instrument Performance Checks

Not provided.

III. Calibration

Not provided.

IV. Method Blanks

A method blank was analyzed as required. There were no detected results in the method blank.

V. Field Blanks

There was one equipment blank in this SDG. There were no detected results in the equipment blank.

VI. Surrogate Recovery

Surrogate recoveries met the specified criteria.

VII. Matrix Spike/Matrix Spike Duplicate

No matrix spike/matrix spike duplicates in this SDG.

VIII. Laboratory Control Sample

Monocrotophos and trifluralin recoveries exceeded laboratory criteria. The samples did not contain reportable levels of these analytes and therefore, were not qualified.

IX. Field Duplicates

No field duplicates in this SDG.

X. Confirmation

Not applicable.

XI. Target Compound Identification and Quantitation

Raw data were not reviewed as part of this scope.

XII. Overall Assessment of Data

- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 6, 2005
Report Date:	November 3, 2005
Parameters:	Organophosphorous Pesticides
Laboratory:	APPL, Inc.
Sample Delivery Group:	48717

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Method 8141A. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

All technical holding times were met. Sample receipt information not provided.

II. Instrument Performance Checks

Not provided.

III. Calibration

Not provided.

IV. Method Blanks

A method blank was analyzed as required. There were no detected results in the method blank.

V. Field Blanks

No field blanks in this SDG.

VI. Surrogate Recovery

Surrogate recoveries met the specified criteria.

VII. Matrix Spike/Matrix Spike Duplicate

No matrix spike/matrix spike duplicates in this SDG.

VIII. Laboratory Control Sample

All acceptance criteria were met.

IX. Field Duplicates

No field duplicates in this SDG.

X. Confirmation

Not applicable.

XI. Target Compound Identification and Quantitation

Raw data were not reviewed as part of this scope.

XII. Overall Assessment of Data

- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 10 and 11, 2005
Report Date:	November 3, 2005
Parameters:	Organophosphorous Pesticides
Laboratory:	APPL, Inc.
Sample Delivery Group:	48753

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Method 8141A. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

All technical holding times were met. Sample receipt information not provided.

II. Instrument Performance Checks

Not provided.

III. Calibration

Not provided.

IV. Method Blanks

A method blank was analyzed as required. There were no detected results in the method blank.

V. Field Blanks

There was one equipment blank in this SDG. There were no detected results in the equipment blank.

VI. Surrogate Recovery

Samples RMW-02-32-0905 and RMW-12-32-0905 were analyzed at a dilution. Surrogate recoveries were not available. All other surrogates met the specified criteria.

VII. Matrix Spike/Matrix Spike Duplicate

No matrix spike/matrix spike duplicates in this SDG.

VIII. Laboratory Control Sample

All acceptance criteria were met.

IX. Field Duplicates

Samples RMW-12-51-0905 and MW-88-51-0905 were designated as a field duplicate pair. All acceptance criteria were met.

X. Confirmation

Not applicable.

XI. Target Compound Identification and Quantitation

Reporting limits were raised due to matrix interference for samples RMW-02-32-0905 and RMW-12-32-0905.

Raw data were not reviewed as part of this scope.

XII. Overall Assessment of Data

- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 11 and 12, 2005
Report Date:	November 3, 2005
Parameters:	Organophosphorous Pesticides
Laboratory:	APPL, Inc.
Sample Delivery Group:	48768

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Method 8141A. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

All technical holding times were met. Sample receipt information not provided.

II. Instrument Performance Checks

Not provided.

III. Calibration

Not provided.

IV. Method Blanks

A method blank was analyzed as required. There were no detected results in the method blank.

V. Field Blanks

There were two equipment blanks in this SDG. There were no detected results in either equipment blank.

VI. Surrogate Recovery

The tributylphosphate recovery exceeded laboratory limits in sample GW-GRAB-0905. The sample did not contain reportable levels of associated analytes and therefore, was not qualified.

VII. Matrix Spike/Matrix Spike Duplicate

No matrix spike/matrix spike duplicates in this SDG.

VIII. Laboratory Control Sample

All acceptance criteria were met.

IX. Field Duplicates

No field duplicates in this SDG.

X. Confirmation

Not applicable.

XI. Target Compound Identification and Quantitation

Raw data were not reviewed as part of this scope.

XII. Overall Assessment of Data

- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Validation Report

(Revised September 11, 2006)

Project/Site Name:	AMCO
Collection Date:	September 28, 29 and 30, 2005
Report Date:	October 4, 2005
Parameters:	Organochlorine Pesticides and PCBs
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y23M1

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 for pesticides and polychlorinated biphenyls (PCB). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review, June 2001, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier III data validation was performed by CH2M HILL chemists. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review included the chain of custody (CoC) records, case narrative, completed CLP data summary forms, raw data and calculation verification for selected detected results.

The laboratory was requested to re-evaluate surrogate manual integrations. Resubmitted data were reviewed and data qualifiers were revised as needed. Revisions are noted under the surrogate recovery section and summarized in the overall data assessment.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All technical holding times were met.

II. Instrument Performance Checks

Resolution check and performance evaluation mixtures were analyzed as required by the method and met acceptance criteria.

III. Calibration

The initial calibration (ICAL) and continuing calibration verifications (CCV) were within the acceptance criteria.

The calibration factor (CF) and relative standard deviation (RSD) calculations for the ICAL were verified for gamma-BHC. The percent difference (%D) calculations for the CCVs presented on the Calibration Verification Summary Forms could not be verified for 4,4'-DDT, 4,4'-DDD and 4,4'-DDE. The reported calculated amounts for these compounds do not match the raw data reports. Raw data were reviewed and the %D for these compounds met criteria. Raw data were not provided for CCV "JM/KM".

IV. Method Blanks

A method blank was analyzed as required. There were no detected results in the method blank.

V. Field Blanks

There were three equipment blanks (EB) in this SDG. Gamma-BHC was detected above the CRQL in the EB sample MW-EB-03-0905. Gamma-BHC was not detected in the associated samples and therefore, no flags were applied.

VI. Surrogate Recovery

The surrogate summary form showed acceptable surrogate recoveries for all samples. However, the Tier III review of the raw data showed unacceptable surrogate recoveries. Manual integration was performed on the surrogates in several samples. "Before" and "after" documentation was provided for most of the manual integrations. However, the manual integrations were inconsistent. Manual integrations on a peak shoulder, partial peak, multiple peaks, or on the baseline, although documented, did not appear to be appropriate.

Manual integration of the surrogates were re-evaluated by the laboratory and revised as needed.

Most of the manual integrations were performed on the surrogates. Samples RMW-10-15-0905 and MW-90-15-0905 had no tetrachloro-m-xylene (TCX) recovery on one column. No definitive peak for TCX was evident. Integrations were performed on the baseline at TCX's retention time. However, these samples had a defined peak at the correct retention time for TCX on the second column which met acceptance criteria. These samples had non-detected results which could then be reported from this second column. Therefore, associated analytes were not qualified.

Sample RMW-10-35-0905 had no TCX recovery on one column and a recovery of 266 percent on the other column. The inconsistent surrogate recoveries indicate method performance

issues for this sample; therefore, the non-detected pesticide results were qualified as estimated and flagged "UJ".

VII. Matrix Spike/Matrix Spike Duplicate

A matrix spike and matrix spike duplicate (MS/MSD) analysis was performed on an EB sample MW-EB-02-0905. MS/MSD recoveries were greater than the QC limits for all compounds on both columns. Theses analytes were not detected in the parent sample and therefore, no flags were applied.

VIII. Laboratory Control Sample

All acceptance criteria were met.

IX. Field Duplicates

There were two field duplicate pairs in this SDG: samples RMW-10-15-0905 and MW-90-15-0905 and samples RMW-09-15-0905 and MW-91-0905. All acceptance criteria were met.

X. Confirmation

Confirmation recovery criteria were met.

XI. Target Compound Identification and Quantitation

Compound identification was verified by raw data review. Selected detected results were verified.

Gamma-BHC manual integration for sample MW-EB-03-0905 was biased high. This was an EB and gamma-BHC was not detected in the associated results; therefore, no data were flagged.

XII. Overall Assessment of Data

- The completeness objectives were met for all method/analyte combinations.
- Selected reported results on the CCV summary forms need further review because the results could not be confirmed by raw data review.
- Resubmitted surrogate manual integrations were evaluated and data qualifiers were revised as needed. All pesticide results for one sample were qualified as estimated due to inconsistent surrogate recoveries.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
RMW-10-35-0905	Aldrin	0.01	UJ	MethodPerf
RMW-10-35-0905	alpha-BHC	0.01	UJ	MethodPerf
RMW-10-35-0905	beta-BHC	0.01	UJ	MethodPerf
RMW-10-35-0905	delta-BHC	0.01	UJ	MethodPerf
RMW-10-35-0905	gamma-BHC	0.01	UJ	MethodPerf
RMW-10-35-0905	Heptachlor	0.01	UJ	MethodPerf
RMW-10-35-0905	Heptachlor Epoxide	0.01	UJ	MethodPerf
RMW-10-35-0905	Endosulfan I	0.01	UJ	MethodPerf
RMW-10-35-0905	Dieldrin	0.02	UJ	MethodPerf
RMW-10-35-0905	4,4′-DDE	0.02	UJ	MethodPerf
RMW-10-35-0905	Endrin	0.02	UJ	MethodPerf
RMW-10-35-0905	Endosulfan II	0.02	UJ	MethodPerf
RMW-10-35-0905	4,4′-DDD	0.02	UJ	MethodPerf
RMW-10-35-0905	Endosulfan Sulfate	0.02	UJ	MethodPerf
RMW-10-35-0905	4,4′-DDT	0.02	UJ	MethodPerf
RMW-10-35-0905	Methoxychlor	0.10	UJ	MethodPerf
RMW-10-35-0905	Endrin Ketone	0.02	UJ	MethodPerf
RMW-10-35-0905	Endrin Aldehyde	0.02	UJ	MethodPerf
RMW-10-35-0905	Alpha-Chlordane	0.01	UJ	MethodPerf
RMW-10-35-0905	Gamma-Chlordane	0.01	UJ	MethodPerf
RMW-10-35-0905	Toxaphene	1.0	UJ	MethodPerf

Sur<LCL = Surrogate recovery less than lower limit
MethodPerf = Method performance issues

Data Validation Report

(Revised September 11, 2006)

Project/Site Name:	AMCO
Collection Date:	October 3, 2005 thru October 6, 2005
Report Date:	October 13, 2005
Parameters:	Organochlorine Pesticides and PCBs
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y23N7

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 for pesticides and polychlorinated biphenyls (PCB). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review, June 2001, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier III data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the analytical raw data and to provide verification of calculations and analyte identification. It was not intended to determine contract compliance.

The scope of the data review included the chain-of-custody (CoC) records, the case narrative, completed CLP data summary forms and raw data.

The laboratory was requested to re-evaluate surrogate manual integrations. Resubmitted data were reviewed and data qualifiers were revised as needed. Revisions are noted under the surrogate recovery section and summarized in the overall data assessment.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All technical holding times were met.

II. Instrument Performance Checks

Resolution check and performance evaluation mixtures were analyzed as required by the method and met acceptance criteria.

III. Calibration

An initial calibration (ICAL) was analyzed at the correct concentrations. Calibration factor and relative standard deviation calculations were verified.

The ICAL relative standard deviation for 4, 4′-DDD was above the QC limit on the confirmation column. One detected result from the second column confirmation was qualified as estimated and flagged "J" since all other results were reported from the primary column or were not detected.

The continuing calibration standards were analyzed at the method frequency and concentration. The percent difference (%D) calculation was verified for all analytes except 4,4′-DDD, 4,4′-DDT and 4,4′-DDE. Although the %D was verified in the raw data for these three analytes and the standards met criteria, the calibration summary sheets did not match the raw data. Calculated results and %Ds on the summary sheets could not be recreated.

IV. Method Blanks

A method blank was analyzed as required. There were no detected results in the method blank.

V. Field Blanks

There were four equipment blanks (EB) in this SDG. Gamma-BHC was detected above the contract required quantitation limit (CRQL), equivalent to reporting limit (RL), in EB samples MW-EB-04-0905 and MW-EB-05-0905. Gamma-BHC was detected below the CRQL in EB samples MW-EB-06-0905 and MW-EB-07-0905. Gamma-BHC was not detected in the associated samples and therefore, no flags were applied.

VI. Surrogate Recovery

4,4′-DDD and dieldrin exceeded the linear range in the initial analysis of BPZ-01-0905 and the sample was reanalyzed at a dilution. Both surrogates were diluted out and therefore, no flags were applied.

Manual integration was performed on the surrogates in several samples. The TCX and DCB manual integrations were inconsistent between samples. ."Before" and "after" documentation was provided for most manual integrations; however, several "before" chromatograms were not provided. Manual integration on a peak shoulder, partial peak, multiple peaks, or on the baseline, although documented, did not appear to be appropriate.

Manual integration of the surrogates were re-evaluated by the laboratory and revised as needed.

The 4,4′-DDE result in sample BPZ-01-0905 was qualified as estimated and flagged "J". The associated manual integration of DCB appeared to have a high bias in the reported column. A re-evaluation of the DCB integration would result in a DCB recovery below criteria. This instance was not re-evaluated by the laboratory and a revised manual integration was not provided.

Surrogate recovery calculation was verified.

VII. Matrix Spike/Matrix Spike Duplicate

A matrix spike and matrix spike duplicate (MS/MSD) analysis was performed on sample RMW-07-15-0905. The gamma-BHC recovery on the confirmation column was less than QC limits. All acceptance criteria were met on the primary column and gamma-BHC was not detected in the parent sample and therefore, no flags were applied.

VIII. Laboratory Control Sample

All acceptance criteria were met.

IX. Field Duplicates

There were no field duplicates in this SDG.

X. Confirmation

The confirmation relative percent difference (RPD) for 4,4′-DDD exceeded QC limits in sample RMW-03-15-0905 and for heptachlor in sample RMW-14-50-0905. The confirmation RPD exceeded QC limits for 4,4′-DDE and dieldrin in sample BPZ-01-0905. Sample results were qualified as estimated and flagged "J".

XI. Target Compound Identification and Quantitation

One sample was reanalyzed at a dilution due to target compounds exceeding the linear range.

Raw data were reviewed. Compound quantitation and accuracy were verified.

XII. Overall Assessment of Data

- Confirmation results for 4,4-DDD, 4,4-DDE, dieldrin and heptachlor exceeded QC limits in several samples. The results were qualified as estimated concentrations.
- A calibration exceedance resulted in 4,4′-DDD qualified as an estimated concentration.
- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.
- One detected result was qualified as estimated after evaluation of the associated manually integrated surrogate.
- Resubmitted surrogate manual integrations were evaluated and data qualifiers were revised as needed. A revised manual integration was not provided for the detected 4,4′-DDE result in sample BPZ-01-0905.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (ug/L)	FINAL FLAG	VALIDATION COMMENTS
RMW-03-15-0905	4,4'-DDD	0.01	J	CF>RPD, IC%RSD
RMW-14-50-0905	Heptachlor	0.012	J	CF>RPD
BPZ-01-0905	4,4'-DDE	0.13	J	CF>RPD, Sur<LCL
BPZ-01-0905DL	Dieldrin	0.4	J	CF>RPD

CF>RPD = Confirmation precision exceeded
IC%RSD = Initial calibration RSD exceeded
Sur<LCL = Surrogate recovered below criteria

Data Validation Report

(Revised September 11, 2006)

Project/Site Name:	AMCO
Collection Date:	October 6, 10 and 11, 2005
Report Date:	October 20, 2005
Parameters:	Organochlorine Pesticides and PCBs
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y23R4

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 for pesticides and polychlorinated biphenyls (PCB). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review, June 2001, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier III data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the analytical raw data and to provide verification of calculations and analyte identification. It was not intended to determine contract compliance.

The scope of the data review included the chain-of-custody (CoC) records, the case narrative, completed CLP data summary forms and raw data.

The laboratory was requested to re-evaluate manual integrations. Resubmitted data were reviewed and data qualifiers were revised as needed.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All technical holding times were met.

II. Instrument Performance Checks

Resolution check and performance evaluation mixtures were analyzed as required by the method and met acceptance criteria.

III. Calibration

An initial calibration (ICAL) was analyzed at the correct concentrations. Calibration factor and relative standard deviation (RSD) calculations were verified.

The ICAL and continuing calibration verifications (CCV) were generally within acceptance criteria. The ICAL RSD for 4, 4'-DDD was above the QC limits on the confirmation column. One detected result from the second column confirmation was qualified as estimated and flagged "J" since all other results were reported from the primary column or were not detected.

The CCVs were analyzed at the method frequency and concentration. The percent difference (%D) calculation was verified for all analytes except 4,4'-DDD, 4,4'-DDT and 4,4'-DDE. Although the %D was verified in the raw data for these three analytes and the standards met criteria, the calibration summary sheets did not match the raw data. Calculated results and %Ds on the summary sheets could not be recreated.

IV. Method Blanks

A method blank was analyzed as required. There were no detected results in the method blank.

V. Field Blanks

There was one equipment blank (EB) in this SDG. Gamma-BHC was detected below the contract required quantitation limit (CRQL), equivalent to the reporting limit (RL), in EB sample MW-EB-08-0905. Gamma-BHC was not detected in the associated samples and therefore, no flags were applied.

VI. Surrogate Recovery

Manual integration was performed on the surrogates in several samples. The tetrachloro-m-xylene (TCX) manual integrations were inconsistent between samples. "Before" and "after" documentation was provided for most manual integrations and several "before" chromatograms were not provided. Manual integration on a peak shoulder, partial peak, multiple peaks, or on the baseline, although documented, did not appear to be appropriate. All associated results were not detected and therefore, no flags were applied.

Manual integrations of the surrogates were re-evaluated by the laboratory and revised as needed. Sample RMW-01-17-0905 had a TCX recovery on one column that was above the acceptance criteria. There were no detected results reported from this column; therefore, no data were qualified. Sample RMW-01-35-0905 also had a TCX recovery on one column above the acceptance criteria. The sample did not have any detected results; therefore, no data were qualified. Both TCX recoveries were above the upper control limit (UCL) in sample RMW-02-32-0905. There were no detected results and therefore, no data were qualified.

Surrogate recovery calculation was verified.

VII. Matrix Spike/Matrix Spike Duplicate

A matrix spike and matrix spike duplicate (MS/MSD) analysis was performed on sample MW-88-51-0905. The heptachlor recovery exceeded QC limits on the primary column but was within limits on the confirmation column. The 4,4′-DDT recovery exceeded QC limits on the confirmation column but was within limits on the primary column. Neither of these compounds was detected in the parent sample and therefore, no flags were applied.

VIII. Laboratory Control Sample

All acceptance criteria were met.

IX. Field Duplicates

Samples RMW-12-51-0905 and MW-88-51-0905 were designated as a field duplicate pair. All acceptance criteria were met.

X. Confirmation

The confirmation relative percent difference (RPD) for 4,4′-DDD exceeded criteria in sample RMW-12-32-0905 and in the dilution of sample MW-88-51-0905. The confirmation RPD for dieldrin exceeded criteria in sample RMW-02-50-0905. The detected sample results were qualified as estimated and flagged "J".

XI. Target Compound Identification and Quantitation

Several samples were reanalyzed at dilutions due to target compounds exceeding the linear range.

Raw data were reviewed. Compound quantitation and accuracy were verified.

XII. Overall Assessment of Data

- Calibration and/or confirmation exceedances for 4,4-DDD and dieldrin resulted in samples qualified as estimated concentrations.
- The completeness objectives were met for all method/analyte combinations.
- The manual integration performed on the surrogates was documented but was in an arbitrary and inconsistent manner. It is recommended that the manual integration procedure be discussed with the laboratory. Resubmitted surrogate manual integrations were evaluated. Adjusted surrogate recoveries were above the UCL. There was no impact on the associated non-detected results.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (ug/L)	FINAL FLAG	VALIDATION COMMENTS
MW-88-51-0905DL	4,4'-DDD	0.26	J	CF>RPD
RMW-02-50-0905	Dieldrin	0.026	J	CF>RPD
RMW-12-32-0905	4,4'-DDD	0.062	J	CF>RPD, IC%RSD

IC%RSD = Initial calibration RSD exceeded
CF>RPD = Confirmation precision exceeded

Data Validation Report

(Revised September 11, 2006)

Project/Site Name:	AMCO
Collection Date:	October 11 and 12, 2005
Report Date:	October 22, 2005
Parameters:	Organochlorine Pesticides and PCBs
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y23T5

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 for pesticides and polychlorinated biphenyls (PCB). The data review was performed using the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Low Concentration Organic Data Review (NFG), June 2001, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier III data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier III data validation. The intended objective of the data review process was to provide a technical review of the analytical raw data and to provide verification of calculations and analyte identification. It was not intended to determine contract compliance.

The scope of the data review included the chain-of-custody (CoC) records, the case narrative, completed CLP data summary forms and raw data.

The laboratory was requested to re-evaluate surrogate manual integrations. Resubmitted data were reviewed and data qualifiers were revised as needed. Revisions are noted under the surrogate recovery section and summarized in the overall data assessment.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

The samples were analyzed within the required holding time.

II. Instrument Performance Checks

Resolution check and performance evaluation mixtures were analyzed as required by the method and met acceptance criteria. Resolution and breakdown calculations were verified.

III. Calibration

An initial calibration (ICAL) was analyzed at the correct concentrations. All acceptance criteria were met except for the following: 4,4'-DDD relative standard deviation (RSD) on the second column was greater than 20 percent at 21.7 percent. 4,4'-DDD detected in the samples was reported from this column and therefore, the detected results were qualified as estimated and flagged "J".

Calibration factor (CF) and RSD calculations were verified.

The continuing calibration standards were analyzed at the method frequency and concentration. All acceptance criteria were met.

The percent difference (%D) calculation was verified.

IV. Method Blanks

The method blank and instrument blanks were analyzed as required by the method. There were no target compounds detected in the blanks. All acceptance criteria were met.

V. Field Blanks

There were two equipment blanks (EB) in this SDG. Gamma-BHC was detected below the contract required quantitation limit (CRQL), equivalent to reporting limits (RL), in EB sample MW-EB-09-0905 and above the CRQL in EB sample MW-EB-10-0905. Gamma-BHC was not detected in the field samples and therefore, no flags were applied.

VI. Surrogate Recovery

The method required surrogate compounds were analyzed. Surrogate recoveries were within acceptance criteria except for the tetrachloro-m-xylene (TCX) recovery in the undiluted analysis of sample MW-12-0905. TCX recoveries were reported within the acceptance criteria for both columns on the summary form. However, review of the raw data indicated that manual integration was performed. The original TCX integration on the first column showed integration of a peak within the retention window but with a recovery that was 50 times greater than expected. The second column did not show a peak within the retention time window and did not yield any TCX recovery. Both chromatograms show evidence of matrix interference at or near the TCX retention time. Manual integration was performed on each column at the expected TCX retention time, although a distinct peak for TCX was not evident. "Before" and "after" documentation was provided for the manual integration. The manual integration on a peak shoulder or on the baseline, although

documented, did not appear to be appropriate. There were no detected compounds reported from this undiluted sample and therefore, no results were qualified.

Manual integration of the surrogates were re-evaluated by the laboratory and revised as needed. Sample MW-12-0905 had no TCX recovery on one column and a recovery of 5498 percent on the other column. In addition, the decachlorobiphenyl recovery was below the acceptance criteria on one column. The sample was reanalyzed at a 10-fold dilution for 4,4'-DDD with similar surrogate recoveries. The inconsistent surrogate recoveries indicate method performance issues for this sample; therefore, non-detected and detected pesticide results were qualified as estimated and flagged "UJ" and "J", respectively.

Sample RMW-02-13-0905 had no TCX recovery on one column but the TCX recovery on the second column was within acceptance criteria. 4,4'-DDE was reported from the column with no TCX recovery and was therefore qualified as estimated and flagged "J".

Surrogate recovery calculation was verified.

VII. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate (MS/MSD) was analyzed on sample MW-EB-09-0905, an equipment blank. All recoveries were within acceptance criteria.

MS/MSD recovery and relative percent difference (RPD) calculations were verified.

VIII. Laboratory Control Sample

A laboratory control sample (LCS) was analyzed as required by the method. All acceptance criteria were met.

The LCS recovery calculation was checked.

IX. Compound Quantitation and Reported CRQLs.

Both field samples were reanalyzed at dilutions due to target compound concentrations above the calibration range.

Raw data were reviewed. Compound quantitation and accuracy were verified.

X. Field Duplicates

There were no field duplicates in this SDG.

XI. Confirmation

In sample RMW-02-13-0905, the 4,4'-DDD detected concentration with an RPD between the primary and secondary column of greater than 25 percent was qualified as an estimated concentration and flagged "J".

XII. Overall Assessment of Data

- Instrument calibration was generally acceptable for all target compounds except for an ICAL exceedance for 4,4'-DDD. Data were qualified as estimated concentrations.

- A confirmation exceedance for 4,4-DDD resulted in one sample qualified as an estimated concentration.

- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.
- Resubmitted surrogate manual integrations were evaluated and data were qualified as needed. All pesticide results for one sample were qualified as estimated due to inconsistent surrogate recoveries.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (ug/L)	FINAL FLAG	VALIDATION COMMENTS
MW-12-0905DL	4,4'-DDD	0.32	J	IC%RSD, MethodPerf
MW-12-0905	4,4'-DDE	0.02	UJ	MethodPerf
MW-12-0905	4,4'-DDT	0.02	UJ	MethodPerf
MW-12-0905	Aldrin	0.01	UJ	MethodPerf
MW-12-0905	alpha-BHC	0.01	UJ	MethodPerf
MW-12-0905	alpha-Chlordane	0.01	UJ	MethodPerf
MW-12-0905	beta-BHC	0.01	UJ	MethodPerf
MW-12-0905	delta-BHC	0.01	UJ	MethodPerf
MW-12-0905	Dieldrin	0.02	UJ	MethodPerf
MW-12-0905	Endosulfan I	0.01	UJ	MethodPerf
MW-12-0905	Endosulfan II	0.02	UJ	MethodPerf
MW-12-0905	Endosulfan sulfate	0.02	UJ	MethodPerf
MW-12-0905	Endrin	0.02	UJ	MethodPerf
MW-12-0905	Endrin aldehyde	0.02	UJ	MethodPerf
MW-12-0905	Endrin ketone	0.02	UJ	MethodPerf
MW-12-0905	gamma-BHC	0.01	UJ	MethodPerf
MW-12-0905	gamma-Chlordane	0.01	UJ	MethodPerf
MW-12-0905	Heptachlor	0.01	UJ	MethodPerf
MW-12-0905	Heptachlor epoxide	0.01	UJ	MethodPerf
MW-12-0905	Methoxychlor	0.1	UJ	MethodPerf
MW-12-0905	Toxaphene	1	UJ	MethodPerf
RMW-02-13-0905	4,4'-DDD	17	J	IC%RSD, CF>RPD
RMW-02-13-0905	4,4'-DDE	2	J	Sur<LCL

CF>RPD = Confirmation precision exceeded
IC%RSD = Initial calibration RSD exceeded
MethodPerf = Method performance issues
Sur<LCL = Surrogate recovery less than lower limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	September 28, 29 and 30, 2005
Report Date:	October 26, 2005
Parameters:	RSK-175
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05272B

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901100. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The samples were received at the laboratory within temperature control and with appropriate CoC forms and custody seals intact.

Holding-time requirements were met for all samples.

II. Calibration

All acceptance criteria were met.

III. Laboratory Blanks

Method blanks were analyzed as required by the method. There were no detected results in the method blanks.

IV. Field Blanks

No field blanks in this SDG.

V. Surrogate Recovery

All acceptance criteria were met.

VI. Matrix Spike/Matrix Spike Duplicate

No matrix spike/matrix spike duplicate in this SDG.

VII. Laboratory Control Sample

All acceptance criteria were met.

VIII. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

IX. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), was not within the scope of the data review for this SDG.

X. Field Duplicates

There were two sets of field duplicates: samples RMW-10-15-905 and MW-90-15-0905 and samples RMW-09-15-0905 and MW-91-0905. All acceptance criteria were met.

XI. Laboratory Duplicates

No laboratory duplicates in this SDG.

XII. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XIII. Overall Assessment of Data

- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data overall, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 3, 4, 5 and 6, 2005
Report Date:	October 28, 2005
Parameters:	RSK-175
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05277I

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901100. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The samples were received at the laboratory within temperature control and with appropriate CoC forms and custody seals intact.

Samples RMW-03-15-0905, RMW-06-15-0905, BPZ-01-0905 and RMW-01-17-0905 were not properly preserved in the field. Unpreserved samples have a seven-day holding time instead of a 14-day holding time. The samples were analyzed within this holding time and therefore, no flags were applied.

II. Calibration

All acceptance criteria were met.

III. Laboratory Blanks

Method blanks were analyzed as required by the method. There were no detected results in the method blanks.

IV. Field Blanks

No field blanks in this SDG.

V. Surrogate Recovery

A surrogate recovery for sample RMW-13-35-0905 was below acceptance criteria. The associated detected results were qualified as estimated and flagged "J".

VI. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate was performed on sample RMW-07-15-0905. All acceptance criteria were met.

VII. Laboratory Control Sample

All acceptance criteria were met.

VIII. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

IX. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), was not within the scope of the data review for this SDG.

X. Field Duplicates

No field duplicate in this SDG.

XI. Laboratory Duplicates

No laboratory duplicates in this SDG.

XII. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XIII. Overall Assessment of Data

- A surrogate recovery was below acceptance criteria for one sample and the data were qualified as estimated.
- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data overall, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (UG/L)	FINAL FLAG	VALIDATION COMMENTS
RMW-13-35-0905	ETHENE	0.7	J	Sur<LCL
RMW-13-35-0905	ETHANE	1.9	J	Sur<LCL
RMW-13-35-0905	METHANE	34	J	Sur<LCL

Sur< LCL = Surrogate recovery less than lower control limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 10 and 11, 2005
Report Date:	October 28, 2005
Parameters:	RSK-175
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	05284A

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901100. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The samples were received at the laboratory within temperature control and with appropriate CoC forms and custody seals intact.

Sample RMW-02-13-0905 was not properly preserved in the field. Because the sample was not properly preserved, the holding time is seven days instead of 14 days. Holding-time requirements were met for all samples except sample RMW-02-13-0905. The detected results were qualified as estimated and flagged “J”.

II. Calibration

All acceptance criteria were met.

III. Laboratory Blanks

Method blanks were analyzed as required by the method. There were no detected results in the method blanks.

IV. Field Blanks

No field blanks in this SDG.

V. Surrogate Recovery

All acceptance criteria were met.

VI. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate was performed on sample RMW-02-50-0905. All acceptance criteria were met.

VII. Laboratory Control Sample

All acceptance criteria were met.

VIII. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

IX. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), was not within the scope of the data review for this SDG.

X. Field Duplicates

Samples RMW-12-51-0905 and MW-88-51-0905 were designated as a field duplicate pair. All acceptance criteria were met.

XI. Laboratory Duplicates

No laboratory duplicates in this SDG.

XII. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XIII. Overall Assessment of Data

- Sample RMW-02-13-0905 was not properly preserved in the field which resulted in a holding-time exceedance and therefore, the data were qualified as estimated.
- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data overall, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (UG/L)	FINAL FLAG	VALIDATION COMMENTS
RMW-02-13-0905	ETHENE	850	J	NotPres, HT>UCL
RMW-02-13-0905	ETHANE	41	J	NotPres, HT>UCL
RMW-02-13-0905	METHANE	15000	J	NotPres, HT>UCL

HT>UCL = Holding time exceeded
NotPres = Sample not properly preserved in the field

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	September 28, 29 and 30, 2005
Report Date:	October 8, 2005
Parameters:	GC/MS Semivolatile SIM for Selected Compounds
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y23M2

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 for a subset of semivolatile organic compounds (SVOC) GC/MS selected ion monitoring (SIM) analysis using project-approved modifications described in Modification Reference Number 1291.0. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Low Concentration Organic Data Review (NFG), June 2001, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier III data validation was performed by CH2M HILL chemists.The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review included the chain of custody (CoC) records, case narrative, completed CLP data summary forms, raw data and calculation verification for selected detected results.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All technical holding-time requirements were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Calibration

All calibration criteria were met.

IV. Method Blank

A method blank was analyzed as required. No method blank contamination was detected.

V. Laboratory Control Sample

No laboratory control sample data were provided. These data were assumed to be performed under full scan.

VI. Matrix Spike/Matrix Spike Duplicate

Matrix spike/matrix spike duplicates were not required as per Modified Reference Number 1291.0.

VII. Surrogate Recovery

Surrogate recoveries were not available for sample dilutions and therefore, data were not qualified. All other surrogate recoveries met acceptance criteria.

VIII. Internal Standard Recovery

Internal standard recoveries met acceptance criteria**.**

IX. Field Duplicates

There were two field duplicate pairs in this SDG: samples RMW-10-15-0905 and MW-90-15-0905 and samples RMW-09-15-0905 and MW-91-0905. All acceptance criteria were met.

X. Field Blanks

There were three equipment blanks in this SDG. There were no detected results in the equipment blanks.

XI. Compound Quantitation and Reported CRQLs

Samples RMW-05-15-0905, BMW-03-0905, RMW-10-15-0905, MW-90-15-0905, RMW-10-35-0905, RMW-09-15-0905, MW-91-0905 and RMW-09-35-0905 required a dilution due to the concentration of the target analyte above the calibration range.

Samples were analyzed for 1,4 dioxane by GC/MS SVOC SIM analysis. Calculations were verified for the initial calibration (ICAL), continuing calibration, and selected detected results. ICAL linear range was verified and all raw data were reviewed. No manual integration was performed. All reported sample results agree with the raw data.

XII. Tentatively Identified Compounds

Not applicable.

XIII. Overall Assessment of Data

- The completeness objectives were met for the method/analyte combination.

- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 3, 4, 5 and 6, 2005
Report Date:	October 13, 2005
Parameters:	GC/MS Semivolatile SIM for Selected Compounds
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y23N8

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 for a subset of semivolatile organic compounds (SVOC) GC/MS selected ion monitoring (SIM) analysis using project-approved modifications described in Modification Reference Number 1291.0. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Low Concentration Organic Data Review (NFG), June 2001, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier III data validation was performed by CH2M HILL chemists.The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review included the chain of custody (CoC) records, case narrative, completed CLP data summary forms, raw data and calculation verification for selected detected results.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All technical holding-time requirements were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Calibration

All calibration criteria met.

IV. Method Blank

A method blank was analyzed as required. No method blank contamination was detected.

V. Laboratory Control Sample

No laboratory control sample data were provided. These data were assumed to be performed under full scan.

VI. Matrix Spike/Matrix Spike Duplicate

Matrix spike/matrix spike duplicates were not required as per Modified Reference Number 1291.0.

VII. Surrogate Recovery

Surrogate recoveries were not available for sample dilutions and therefore, data were not qualified. All other surrogate recoveries met acceptance criteria.

VIII. Internal Standard Recovery

Internal standard recoveries met acceptance criteria**.**

IX. Field Duplicates

There were no field duplicates in this SDG.

X. Field Blanks

There were four equipment blanks in this SDG. There were no detected results in any of the equipment blanks.

XI. Compound Quantitation and Reported CRQLs

Samples RMW-03-15-0905, BMW-07-0905 and BPZ-01-0905 required a dilution due to the concentration of the target analyte above the calibration range.

Samples were analyzed for 1,4 dioxane by GC/MS SVOC SIM analysis. Calculations were verified for the initial calibration (ICAL), continuing calibration, and selected detected results. ICAL linear range was verified and all raw data were reviewed. No manual integration was performed. All reported sample results agree with the raw data.

XII. Tentatively Identified Compounds

Not applicable.

XIII. Overall Assessment of Data

- The completeness objectives were met for the method/analyte combination.

- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 6, 10 and 11, 2005
Report Date:	October 18, 2005
Parameters:	GC/MS Semivolatile SIM for Selected Compounds
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y23R7

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 for a subset of semivolatile compounds (SVOC) GC/MS selected ion monitoring (SIM) analysis using project-approved modifications described in Modification Reference Number 1291.0. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Low Concentration Organic Data Review (NFG), June 2001, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier III data validation was performed by CH2M HILL chemists. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review included the chain of custody (CoC) records, case narrative, completed CLP data summary forms, raw data and calculation verification for selected detected results.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All technical holding-time requirements were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Calibration

All calibration criteria met.

IV. Method Blank

A method blank was analyzed as required. No method blank contamination was detected.

V. Laboratory Control Sample

No laboratory control sample data were provided. These data were assumed to be performed under full scan.

VI. Matrix Spike/Matrix Spike Duplicate

Matrix spike/matrix spike duplicates were not required as per Modified Reference Number 1291.0.

VII. Surrogate Recovery

Surrogate recoveries were not available for sample dilutions and therefore, data were not qualified. All other surrogate recoveries met acceptance criteria.

VIII. Internal Standard Recovery

Internal standard recoveries met acceptance criteria**.**

IX. Field Duplicates

Samples RMW-12-51-0905 and MW-88-51-0905 were designated as a field duplicate pair. All acceptance criteria were met.

X. Field Blanks

This SDG contained one equipment blank (EB). The EB contained 1, 4-dioxane greater than the contract required quantitation limit (CRQL), equivalent to the reporting limit (RL). All associated samples except one, RMW-08-35-0905, had detected results greater than the CRQL and greater than the EB. The detected result in sample RMW-08-35-0905 was less than the EB result and was therefore qualified as not detected at the reported concentration and flagged "U".

XI. Compound Quantitation and Reported CRQLs

Samples RMW-01-35-0905, MW-88-51-0905, RMW-12-51-0905, RMW-12-32-0905 and RMW-02-32-0905 required a dilution due to the concentration of the target analyte above the calibration range.

Samples were analyzed for 1,4 dioxane by GC/MS SVOC SIM analysis. Calculations were verified for the initial calibration (ICAL), continuing calibration, and selected detected results. ICAL linear range was verified and all raw data were reviewed. No manual integration was performed. All reported sample results agree with the raw data.

One detected sample result was possibly due to carryover. Sample RMW-08-15-0905 was analyzed immediately after RMW-02-32-0905 which had a concentration of 1500ug/L. The high standard in the ICAL was 8ug/L. There was no record of reanalysis to confirm the detected result of sample RMW-08-15-0905. Therefore, the detected result of 3.6ug/L was qualified as estimated and flagged "J".

XII. Tentatively Identified Compounds

Not applicable.

XIII. Overall Assessment of Data

- 1,4-Dioxane was detected in the EB and one associated sample result was qualified as non-detected.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.
- One detected sample result was qualified as estimated due to possible carryover contamination.
- The completeness objectives were met for the method/analyte combination.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (ug/L)	FINAL FLAG	VALIDATION COMMENTS
RMW-08-35-0905	1,4-Dioxane	1.1	U	EB>RL
RMW-08-15-0905	1,4-Dioxane	3.6	J	Possible carryover

EB>RL = Equipment blank concentration greater than the RL
Possible carryover = Possible carryover contamination of previous sample

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 11 and 12, 2005
Report Date:	October 19, 2005
Parameters:	GC/MS Semivolatile SIM for Selected Compounds
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y23T9

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 for a subset of semivolatile organic compounds (SVOC) using project-approved modifications described in Modification Reference Number 1291.0. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Low Concentration Organic Data Review (NFG), June 2001, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier III data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier III data validation. The intended objective of the data review process was to provide a technical review of the analytical raw data and to provide verification of calculations and analyte identification. It was not intended to determine contract compliance.

The scope of the data review included the chain of custody (CoC) records, the case narrative, completed CLP data summary forms and raw data.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All technical holding-time requirements were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met. Ion abundance calculations were verified for several masses.

III. Calibration

All calibration criteria for the initial calibration standards (ICAL) were met. Calculations for the ICAL relative response factor (RRF) and relative standard deviation (RSD) criteria were verified.

All continuing calibration criteria were met. The continuing calibration RRF and percent difference (%D) calculations were verified.

IV. Method Blank

Method blanks were analyzed as required. The target compound was not detected in the method blanks.

V. Laboratory Control Sample

No laboratory control sample data were provided. These data were assumed to be performed under full scan.

VI. Matrix Spike/Matrix Spike Duplicate

Matrix spike/matrix spike duplicates were not required as per Modification Reference Number 1291.0.

VII. Surrogate Recovery

The method required deuterated monitoring compound (DMC) was analyzed as required and met all acceptance criteria. The DMC calculation was verified.

VIII. Internal Standard Recovery

Internal standard recoveries were within criteria.

IX. Field Duplicates

No field duplicates in this SDG.

X. Field Blanks

This SDG contained two equipment blanks (EB). MW-EB-10-0905 contained 1,4-dioxane below the contract required quantitation limit (CRQL), equivalent to reporting limit (RL), and MW-EB-09-0905 contained 1,4-dioxane at the CRQL. Associated sample detected concentrations were greater than the CRQL and therefore, no flags were applied.

Raw data were reviewed and a sample calculation was checked.

XI. Target Compound Identification

Compound identification was verified for each detected result.

XII. Compound Quantitation and Reported CRQLs

Several samples required a dilution due to the concentration of the target analyte above the calibration range. The CRQL was met for the target compound.

XIII. Tentatively Identified Compounds

These data were assumed to be performed under full scan.

XIV. Overall Assessment of Data

- All the criteria as stated in Modification Reference Number 1291.0 were met.
- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	September 28, 29 and 30, 2005
Report Date:	October 4, 2005
Parameters:	Semivolatile Organic Compounds
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y23M1

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 and project-approved modifications described in Modification Reference Number 1291.0 for semivolatile organic compounds (SVOC). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review, June 2001, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative, and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The sample was received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

Holding-time requirements were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Calibration

The initial calibration met acceptance criteria.

The continuing calibration standard percent difference (%D) analyzed on 10/5/05 for n-nitroso-di-n-propylamine, 2,4-dinitrophenol, butylbenzylphthalate, bis(2-ethylhexyl)phthalate and di-n-octylphthalate exceeded control limits. Samples MW-91-0905 and RMW-09-35-0905 were associated with this continuing calibration standard. Non-detected results were qualified as estimated and flagged "UJ".

IV. Method Blanks

A method blank was analyzed as required. No contamination was detected.

V. Field Blanks

This SDG contained three equipment blanks (EB). 4-Chloro-3-methylphenol was detected below the contract required quantitation limit (CRQL), equivalent to reporting limit (RL), in MW-EB-02-0905. The compound was not detected in the associated samples and therefore, no flags were applied.

EB samples MW-EB-01-0905 and MW-EB-02-0905 each contained bis(2-ethylhexyl)phthalate below the CRQL. Sample results less than five times the blank concentration and below the CRQL were qualified as non-detected at the CRQL and flagged "U". Sample results greater than the CRQL but less than five times the blank concentration were qualified as non-detected at the concentration and flagged "U". Sample results that were above the CRQL and the blank concentration were not qualified.

EB sample MW-EB-03-0905 contained a significant amount of bis(2-ethylhexyl)phthalate at 88ug/L. Sample results less than five times the blank concentration and below the CRQL were qualified as non-detected at the CRQL and flagged "U". Sample results greater than the CRQL but less than five times the blank concentration were qualified as non-detected at the concentration and flagged "U".

VI. Surrogate Recovery

The 4-methylphenol-d8 recovery was below the control limit in sample RMW-10-35-0905. Associated non-detected results were qualified as estimated and flagged "UJ".

The 4-chloroaniline-d4 recovery was below the control limit in sample MW-91-0905. Associated non-detected results were qualified as estimated and flagged "UJ".

4,6-Dinitro-methylphenol-d2 recoveries were below the control limit in samples BMW-01-0905, RMW-04-15-0905, MW-91-0905 and RMW-09-35-0905. Associated non-detected results were qualified as estimated and flagged "UJ".

VII. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate was analyzed on sample MW-EB-01-0905, an equipment blank. The pentachlorophenol recovery exceeded control limits. Pentachlorophenol was not detected in the associated sample and therefore, data were not flagged.

VIII. Laboratory Control Sample

Not applicable.

IX. Internal Standards

All acceptance criteria were met.

X. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

XI. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported CRQLs was not within the scope of the data review for this SDG.

XII. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XIII. Field Duplicates

There were two field duplicate pairs in this SDG: samples RMW-10-15-0905 and MW-90-15-0905 and samples RMW-09-15-0905 and MW-91-0905. All acceptance criteria were met.

XIV. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XV. Overall Assessment of Data

- Calibration and surrogate exceedances resulted in data qualified as estimated concentrations.
- EB contamination resulted in data qualified as non-detected.
- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (ug/L)	FINAL FLAG	VALIDATION COMMENTS
BMW-01-0905	4,6-Dinitro-2-methylphenol	20	UJ	Sur<LCL
BMW-01-0905	bis(2-Ethylhexyl)phthalate	5	U	EB<RL
BMW-03-0905	bis(2-Ethylhexyl)phthalate	5.6	U	EB<RL
MW-90-15-0905	bis(2-Ethylhexyl)phthalate	5	U	EB<RL
MW-91-0905	2,4-Dinitrophenol	20	UJ	CCV>UCL
MW-91-0905	3,3-Dichlorobenzidine	5	UJ	Sur<LCL
MW-91-0905	4-Chloroaniline	5	UJ	Sur<LCL
MW-91-0905	4,6-Dinitro-2-methylphenol	20	UJ	Sur<LCL
MW-91-0905	bis(2-Ethylhexyl)phthalate	5	U	EB>RL
MW-91-0905	Butylbenzylphthalate	5	UJ	CCV>UCL
MW-91-0905	Di-n-octylphthalate	5	UJ	CCV>UCL
MW-91-0905	Hexachlorocyclopentadiene	5	UJ	Sur<LCL
MW-91-0905	N-Nitroso-di-n-propylamine	5	UJ	CCV>UCL
RMW-04-15-0905	4,6-Dinitro-2-methylphenol	20	UJ	Sur<LCL
RMW-09-15-0905	bis(2-Ethylhexyl)phthalate	5.3	U	EB>RL
RMW-09-35-0905	2,4-Dinitrophenol	20	UJ	CCV>UCL
RMW-09-35-0905	4,6-Dinitro-2-methylphenol	20	UJ	Sur<LCL
RMW-09-35-0905	bis(2-Ethylhexyl)phthalate	5	U	EB>RL
RMW-09-35-0905	Butylbenzylphthalate	5	UJ	CCV>UCL
RMW-09-35-0905	Di-n-octylphthalate	5	UJ	CCV>UCL
RMW-09-35-0905	N-Nitroso-di-n-propylamine	5	UJ	CCV>UCL
RMW-10-15-0905	bis(2-Ethylhexyl)phthalate	5	U	EB<RL
RMW-10-35-0905	2,4-Dimethylphenol	5	UJ	Sur<LCL
RMW-10-35-0905	2-Methylphenol	5	UJ	Sur<LCL
RMW-10-35-0905	4-Methylphenol	5	UJ	Sur<LCL
RMW-10-35-0905	bis(2-Ethylhexyl)phthalate	5	U	EB<RL

CCV>UCL = Continuing calibration recovery greater than upper control limit
EB<RL = Equipment blank concentration less than the RL
EB>RL = Equipment blank concentration greater than the RL
Sur<LCL = Surrogate recovery less than lower limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 3, 4, 5 and 6, 2005
Report Date:	October 13, 2005
Parameters:	Semivolatile Organic Compounds
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y23N7

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 and project-approved modifications described in Modification Reference Number 1291.0 for semivolatile organic compounds (SVOC). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review, June 2001, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative, and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

Holding-time requirements were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Calibration

All initial and continuing calibrations met acceptance criteria.

IV. Method Blanks

Method blank SBLK3B contained bis(2-ethylhexyl)phthalate below the contract required quantitation limit (CRQL), equivalent to reporting limit (RL). Associated detected results less than five times the blank concentration were qualified as non-detected at the CRQL and flagged "U".

V. Field Blanks

There were four equipment blanks (EB) in this SDG. EB samples MW-EB-05-0905 and MW-EB-07-0905 contained 4-chloro-3-methylphenol below the CRQL which was not detected in the associated samples and therefore, no flags were applied.

EB sample MW-EB-06-0905 contained bis(2-ethylhexyl)phthalate below the CRQL. A detected result less than five times the blank concentration was qualified as a non-detected at the CRQL and flagged "U".

VI. Surrogate Recovery

Several surrogate recoveries were less than the lower control limits in samples RMW-07-35-0905, RMW-14-50-0905, BMW-06-0905, BPZ-01-0905 and RMW-11-35-0905. Detected and non-detected results were qualified as estimated and flagged "J" and "UJ", respectively.

4-Chloroaniline-d4 was recovered less than 10 percent in samples RMW-07-35-0905 and BPZ-01-0905. No additional analysis runs were performed on the samples and therefore, the associated sample results were unusable and flagged "R".

VII. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate (MS/MSD) was analyzed on sample RMW-07-15-0905. Pentachlorophenol and 4-nitrophenol recoveries exceeded QC limits. These compounds were not detected in the associated samples and therefore, data were not flagged.

VIII. Laboratory Control Sample

Not applicable.

IX. Internal Standards

All acceptance criteria were met.

X. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

XI. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported CRQLs was not within the scope of the data review for this SDG.

XII. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XIII. Field Duplicates

No field duplicates in this SDG.

XIV. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XV. Overall Assessment of Data

- A method blank and EB had limited contamination which resulted in data qualified as non-detected.
- Surrogate recoveries were less than QC limits in several samples. Associated sample results were qualified as estimated concentrations.
- A surrogate was recovered less than 10 percent in samples RMW-07-35-0905 and BPZ-01-0905 which resulted in associated results qualified as rejected.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (ug/L)	FINAL FLAG	VALIDATION COMMENTS
BMW-06-0905	2,4-Dimethylphenol	5	UJ	Sur<LCL
BMW-06-0905	2-Chloronaphthalene	5	UJ	Sur<LCL
BMW-06-0905	2-Methylnaphthalene	5	UJ	Sur<LCL
BMW-06-0905	2-Methylphenol	5	UJ	Sur<LCL
BMW-06-0905	3,3'-Dichlorobenzidine	5	UJ	Sur<LCL
BMW-06-0905	4-Chloroaniline	5	UJ	Sur<LCL
BMW-06-0905	4-Methylphenol	5	UJ	Sur<LCL
BMW-06-0905	Acenaphthene	5	UJ	Sur<LCL
BMW-06-0905	Acenaphthylene	5	UJ	Sur<LCL
BMW-06-0905	bis(2-Ethylhexyl)phthalate	5	U	EB<RL
BMW-06-0905	Hexachlorocyclopentadiene	5	UJ	Sur<LCL
BMW-06-0905	Naphthalene	5	UJ	Sur<LCL
BPZ-01-0905	3,3'-Dichlorobenzidine	5	R	Sur<LCL
BPZ-01-0905	4-Chloroaniline	5	R	Sur<LCL
BPZ-01-0905	Hexachlorocyclopentadiene	5	R	Sur<LCL
RMW-03-15-0905	bis(2-Ethylhexyl)phthalate	5	U	LB<RL
RMW-07-35-0905	3,3'-Dichlorobenzidine	5	R	Sur<LCL
RMW-07-35-0905	4-Chloroaniline	5	R	Sur<LCL
RMW-07-35-0905	bis(2-Ethylhexyl)phthalate	5	U	LB<RL
RMW-07-35-0905	Hexachlorocyclopentadiene	5	R	Sur<LCL
RMW-11-35-0905	2,4-Dimethylphenol	5	UJ	Sur<LCL
RMW-11-35-0905	2-Methylphenol	5	UJ	Sur<LCL
RMW-11-35-0905	4-Methylphenol	5	UJ	Sur<LCL
RMW-11-35-0905	Benzo(a)pyrene	5	UJ	Sur<LCL
RMW-11-35-0905	Benzo(b)fluoranthene	5	UJ	Sur<LCL
RMW-11-35-0905	Benzo(g,h,i)perylene	5	UJ	Sur<LCL
RMW-11-35-0905	Benzo(k)fluoranthene	5	UJ	Sur<LCL
RMW-11-35-0905	Dibenzo(a,h)anthracene	5	UJ	Sur<LCL
RMW-11-35-0905	Indeno(1,2,3-cd)pyrene	5	UJ	Sur<LCL
RMW-14-50-0905	3,3'-Dichlorobenzidine	5	UJ	Sur<LCL
RMW-14-50-0905	4-Chloroaniline	5	UJ	Sur<LCL
RMW-14-50-0905	Hexachlorocyclopentadiene	5	UJ	Sur<LCL

EB<RL = Equipment blank concentration less than the RL
LB<RL = Laboratory blank contamination less than the RL
Sur<LCL = Surrogate recovery less than lower limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 6, 10 and 11, 2005
Report Date:	October 20, 2005
Parameters:	Semivolatile Organic Compounds
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y23R4

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 and project-approved modifications described in Modification Reference Number 1291.0 for semivolatile organic compounds (SVOC). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review, June 2001, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative, and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

Holding-time requirements were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Calibration

The relative standard deviation (RSD) for 2,4-dinitrophenol exceeded criteria in the initial calibration (ICAL) analyzed on 10/18/05. Associated non-detected results were qualified as estimated and flagged "UJ".

All continuing calibration acceptance criteria were met.

IV. Method Blanks

A method blank was analyzed as required. No contamination detected.

V. Field Blanks

This SDG contained one equipment blank. No field blank contamination detected.

VI. Surrogate Recovery

Surrogate recoveries were above QC limits in sample RMW-08-15-0905 and RMW-02-32-0905. There were no associated detected results and therefore, no flags were applied.

Surrogate recoveries were below QC limits in samples RMW-01-17-0905, RMW-12-51-0905, RMW-12-32-0905 and RMW-02-32-0905. Associated detected results and non-detected results were qualified as estimated and flagged "J" and "UJ", respectively.

4-Chloroaniline-d4 was not recovered in sample RMW-12-51-0905. Associated non-detected results were unusable and flagged "R".

4,6-Dinitro-methylphenol-d2 was not recovered in sample RMW-02-50-0905. The associated non-detected result was not useable and flagged "R".

VII. Matrix Spike/Matrix Spike Duplicate

The matrix spike/matrix spike duplicate (MS/MSD) was analyzed on sample RMW-02-32-0905. Recoveries were outside QC limits due to matrix interference. The sample required a dilution which caused the spike concentrations to be diluted out and therefore, data were not qualified.

VIII. Laboratory Control Sample

Not applicable.

IX. Internal Standards

One internal standard was above the QC limit in sample RMW-02-32-0905MSD due to matrix interference. All internal standards were within acceptance criteria in the parent sample. No flags were applied.

X. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

XI. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), was not within the scope of the data review for this SDG.

XII. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XIII. Field Duplicates

Samples RMW-12-51-0905 and MW-88-51-0905 were designated as a field duplicate pair. Phenol and 2-methylnaphthalene results exceeded acceptance criteria. The detected and non-detected results were qualified as estimated and flagged "J" and "UJ", respectively.

XIV. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XV. Overall Assessment of Data

- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.
- Calibration exceedances resulted in data qualified as estimated concentrations.
- Field duplicate precision exceedances resulted in data qualified as estimated concentrations.
- Surrogate exceedances resulted in data qualified as estimated concentrations and data qualified as rejected.
- The completeness objectives were met for all method/analyte combinations except for associated non-detected results in samples RMW-12-51-0905 and RMW-02-50-0905 that were qualified as unusable due to surrogate exceedances.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (ug/L)	FINAL FLAG	VALIDATION COMMENTS
MW-88-51-0905	2-Methylnaphthalene	34	J	FD>RPD
MW-88-51-0905	Phenol	5	UJ	FD>RPD
RMW-01-17-0905	1,1'-Biphenyl	5	UJ	Sur<LCL
RMW-01-17-0905	2-Chloronaphthalene	5	UJ	Sur<LCL
RMW-01-17-0905	2-Methylnaphthalene	2.4	J	Sur<LCL
RMW-01-17-0905	Acenaphthene	1.6	J	Sur<LCL
RMW-01-17-0905	Acenaphthylene	5	UJ	Sur<LCL
RMW-01-17-0905	bis(2-Ethylhexyl)phthalate	5	UJ	Sur<LCL
RMW-01-17-0905	Butylbenzylphthalate	5	UJ	Sur<LCL
RMW-01-17-0905	Caprolactam	5	UJ	Sur<LCL
RMW-01-17-0905	Diethylphthalate	5	UJ	Sur<LCL
RMW-01-17-0905	Dimethylphthalate	5	UJ	Sur<LCL
RMW-01-17-0905	Di-n-butylphthalate	5	UJ	Sur<LCL
RMW-01-17-0905	Di-n-octylphthalate	5	UJ	Sur<LCL
RMW-01-17-0905	Naphthalene	5.9	J	Sur<LCL
RMW-02-32-0905	1,1'-Biphenyl	5	UJ	Sur<LCL
RMW-02-32-0905	2,4-Dinitrophenol	20	UJ	IC%RSD, Sur<LCL
RMW-02-32-0905	2-Chloronaphthalene	5	UJ	Sur<LCL
RMW-02-32-0905	2-Nitroaniline	20	UJ	Sur<LCL
RMW-02-32-0905	3-Nitroaniline	20	UJ	Sur<LCL
RMW-02-32-0905	4-Bromophenyl-phenylether	5	UJ	Sur<LCL
RMW-02-32-0905	4-Chlorophenyl-phenylether	5	UJ	Sur<LCL
RMW-02-32-0905	4-Nitroaniline	20	UJ	Sur<LCL
RMW-02-32-0905	4-Nitrophenol	20	UJ	Sur<LCL
RMW-02-32-0905	Acenaphthene	5	UJ	Sur<LCL
RMW-02-32-0905	Acenaphthylene	5	UJ	Sur<LCL
RMW-02-32-0905	bis(2-Ethylhexyl)phthalate	5	UJ	Sur<LCL
RMW-02-32-0905	Butylbenzylphthalate	5	UJ	Sur<LCL
RMW-02-32-0905	Caprolactam	5	UJ	Sur<LCL
RMW-02-32-0905	Dibenzofuran	5	UJ	Sur<LCL
RMW-02-32-0905	Diethylphthalate	5	UJ	Sur<LCL
RMW-02-32-0905	Dimethylphthalate	5	UJ	Sur<LCL
RMW-02-32-0905	Di-n-butylphthalate	5	UJ	Sur<LCL
RMW-02-32-0905	Di-n-octylphthalate	5	UJ	Sur<LCL
RMW-02-32-0905	Fluorene	5	UJ	Sur<LCL
RMW-02-50-0905	2,4-Dinitrophenol	20	UJ	IC%RSD
RMW-02-50-0905	4,6-Dinitro-2-methylphenol	20	R	Sur<LCL
RMW-08-15-0905	2,4-Dinitrophenol	20	UJ	IC%RSD
RMW-12-32-0905	4,6-Dinitro-2-methylphenol	20	UJ	Sur<LCL
RMW-12-51-0905	1,1'-Biphenyl	5	UJ	Sur<LCL
RMW-12-51-0905	2-Methylnaphthalene	7.1	J	FD>RPD

FIELD ID	ANALYTE	FINAL RESULT (ug/L)	FINAL FLAG	VALIDATION COMMENTS
RMW-12-51-0905	3,3'-Dichlorobenzidine	5	R	Sur<LCL
RMW-12-51-0905	4-Chloroaniline	5	R	Sur<LCL
RMW-12-51-0905	bis(2-Ethylhexyl)phthalate	5	UJ	Sur<LCL
RMW-12-51-0905	Butylbenzylphthalate	5	UJ	Sur<LCL
RMW-12-51-0905	Caprolactam	5	UJ	Sur<LCL
RMW-12-51-0905	Diethylphthalate	5	UJ	Sur<LCL
RMW-12-51-0905	Dimethylphthalate	5	UJ	Sur<LCL
RMW-12-51-0905	Di-n-butylphthalate	5	UJ	Sur<LCL
RMW-12-51-0905	Di-n-octylphthalate	5	UJ	Sur<LCL
RMW-12-51-0905	Hexachlorocyclopentadiene	5	R	Sur<LCL
RMW-12-51-0905	Phenol	14	J	FD>RPD

FD>RPD = Field duplicate exceeds RPD criteria
IC%RSD = Initial calibration RSD exceeded
Sur<LCL = Surrogate recovery less than lower limit
Sur>UCL = Surrogate recovery greater than upper limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 11 and 12, 2005
Report Date:	October 22, 2005
Parameters:	Semivolatile Organic Compounds
Laboratory:	A4 Scientific Inc.
Sample Delivery Group:	Y23T5

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 and project-approved modifications described in Modification Reference Number 1183.0 for semivolatile organic compounds (SVOC). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review (NFG), June 2001, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier III data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier III data validation. The intended objective of the data review process was to provide a technical review of the data and to provide verification of calculations and analyte identification. It was not intended to determine contract compliance.

The scope of the data review included the chain-of-custody (CoC) records, the case narrative, completed CLP data summary forms, and raw data.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The samples were received at the laboratory within control temperatures and with appropriate CoC forms; however, the custody seal on the cooler was not intact. Individual sample bottles did not contain sample tag ID numbers.

Holding-time requirements were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met. Ion abundance calculations were verified for several masses.

III. Calibration

All calibration criteria for the initial calibration standards (ICAL) were met except as noted below.

2,4-Dinitrophenol was above the upper control limit (UCL) of 50.0 percent relative standard deviation (RSD) at 50.4 percent. The sample results were non-detected and therefore, no flags were applied.

Calculations for the ICAL relative response factor (RRF) and RSD were verified.

All continuing calibration criteria were met. The continuing calibration RRF and percent difference (%D) calculations were verified.

IV. Method Blanks

A method blank was analyzed as required. There were no detected results in the method blank.

V. Field Blanks

There were two equipment blanks (EB) associated with this SDG. There were no target analytes detected in the EBs.

VI. Surrogate Recovery

The method required deuterated monitoring compounds (DMC) were analyzed.

Sample RMW-02-13-0905 had bis-(2-chloroethyl)ether-d8 and 4-methylphenol-d8 recoveries above the respective UCLs. Detected results were qualified as estimated and flagged "J". Associated non-detected results were not flagged. 4-Chloroaniline-d4, 4-nitrophenol-d4 and 4,6-dinitro-methylphenol-d2 recoveries were below the respective lower control limits (LCL). Associated non-detected results were qualified as estimated and flagged "UJ".

Sample RMW-02-13-0905 was analyzed at an additional dilution because 4-methyphenol was above the calibration range in the original analysis. The associated DMC was above the UCL but no flag was applied because of the dilution factor.

Sample MW-12-0905 had 2,4-dichlorophenol-d3 and 4-nitrophenol-d4 recoveries below the respective LCLs. Associated non-detected results were qualified as estimated and flagged "UJ". 4-Chloroaniline-d4 and 4,6-dinitro-methylphenol-d2 DMC recoveries were also below LCLs at one percent and three percent recoveries, respectively. Because of the limited recoveries, associated samples were not useable and flagged "R".

The calculation for DMC recovery was verified.

VII. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate (MS/MSD) was analyzed on sample MW-EB-10-0905, an equipment blank. There was no discussion in the SDG case narrative regarding use of a field blank for the QC sample.

MS/MSD percent recoveries and relative percent difference (RPD) calculations were verified.

VIII. Laboratory Control Sample

The applicable Statement of Work does not require analysis of a laboratory control sample (LCS); therefore, no LCS was analyzed.

IX. Internal Standards

All internal standard areas and retention times were within the acceptance limits.

X. Target Compound Identification

Compound identification was verified by raw data review on a percentage of the sample detected results.

XI. Compound Quantitation and Reported CRQLs

Samples MW-12-0905 and RMW-02-13-0905 were each analyzed at a 10-fold dilution instead of undiluted. The sample management officer (SMO) requested reanalysis at a five-fold dilution; however, the instrument column was affected and analyses at that dilution could not be completed.

Compound quantitation and accuracy were verified.

XII. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XIII. Field Duplicates

There were no field duplicates in this SDG.

XIV. System Performance

The system performance was evaluated by reviewing the chromatographic data. Overall, the system was in control.

XV. Overall Assessment of Data

- Instrument calibration was generally acceptable.
- There was no blank contamination.
- DMC exceedances resulted in data qualified as estimated concentrations and data qualified as rejected.

- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (ug/L)	FINAL FLAG	VALIDATION COMMENTS
MW-12-0905	1,2,4,5-Tetrachlorobenzene	50	UJ	Sur<LCL
MW-12-0905	2,4,5-Trichlorophenol	200	UJ	Sur<LCL
MW-12-0905	2,4,6-Trichlorophenol	50	UJ	Sur<LCL
MW-12-0905	2,4-Dichlorophenol	50	UJ	Sur<LCL
MW-12-0905	2,4-Dinitrophenol	200	UJ	Sur<LCL
MW-12-0905	2-Nitroaniline	200	UJ	Sur<LCL
MW-12-0905	2-Nitrophenol	50	UJ	Sur<LCL
MW-12-0905	3,3'-Dichlorobenzidine	50	R	Sur<LCL
MW-12-0905	3-Nitroaniline	200	UJ	Sur<LCL
MW-12-0905	4,6-Dinitro-2-methylphenol	200	R	Sur<LCL
MW-12-0905	4-Chloro-3-methylphenol	180	J	Sur<LCL
MW-12-0905	4-Chloroaniline	50	R	Sur<LCL
MW-12-0905	4-Nitroaniline	200	UJ	Sur<LCL
MW-12-0905	Atrazine	50	UJ	Sur<LCL
MW-12-0905	Hexachlorocyclopentadiene	50	R	Sur<LCL
RMW-02-13-0905	2,4-Dimethylphenol	300	J	Sur>UCL
RMW-02-13-0905	2,4-Dinitrophenol	200	UJ	Sur<LCL
RMW-02-13-0905	2-Methylphenol	380	J	Sur>UCL
RMW-02-13-0905	2-Nitroaniline	200	UJ	Sur<LCL
RMW-02-13-0905	3,3'-Dichlorobenzidine	50	UJ	Sur<LCL
RMW-02-13-0905	3-Nitroaniline	200	UJ	Sur<LCL
RMW-02-13-0905	4-Chloroaniline	50	UJ	Sur<LCL
RMW-02-13-0905	4-Nitroaniline	200	UJ	Sur<LCL
RMW-02-13-0905	4-Nitrophenol	200	UJ	Sur<LCL
RMW-02-13-0905	Hexachlorocyclopentadiene	50	UJ	Sur<LCL

Sur<LCL = Surrogate recovery less than lower limit
Sur>UCL = Surrogate recovery greater than upper limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	September 28, 29 and 30, 2005
Report Date:	October 4, 2005
Parameters:	Volatile Organic Compounds
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y23M1

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 and project-approved modifications described in Modification Reference Number 1291.0 for volatile organic compounds (VOC). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review, June 2001, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier III data validation was performed by CH2M HILL chemists. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review included the chain of custody (CoC) records, case narrative, completed CLP data summary forms, raw data and calculation verification for selected detected results.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All technical holding times were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Calibration

In the initial calibration (ICAL) analyzed on 10/6/05, the relative standard deviation (RSD) for methylene chloride and 1,2,3-trichlorobenzene exceeded criteria.

The carbon tetrachloride percent difference (%D) was below acceptance criteria for one of the continuing calibration verifications (CCV) analyzed on 10/6/05.

The methylcyclohexane, isopropylbenzene and styrene %Ds were above acceptance criteria in one of the CCVs analyzed on 10/7/05.

Associated non-detected and detected results were qualified as estimated and flagged "UJ" and "J", respectively.

IV. Method Blanks

Chloromethane was determined by the laboratory to be a contaminant in the purchased deuterated monitoring compound (DMC) solution.

Methylene chloride, acetone and chloromethane were detected in the associated method blanks. Associated sample results below the contract required quantitation limits (CRQL), equivalent to reporting limits (RL), were qualified as non-detected at the CRQL and flagged "U". Sample results greater than the CRQL were qualified as non-detected at the concentration and flagged "U". Sample results that were greater than the CRQL and the blank concentration were not qualified.

V. Field Blanks

There were three equipment blanks and two trip blanks in this SDG. Acetone, methylene chloride, carbon disulfide, chloromethane and toluene were detected in the blanks. Associated sample results below the CRQL were qualified as non-detected at the CRQL and flagged "U". Sample results greater than the CRQL were qualified as non-detected at the concentration and flagged "U". Sample results that were above the CRQL and the blank concentration were not qualified.

VI. Surrogate Recovery

Surrogate recoveries exceeded acceptable QC limits in samples RMW-09-15-0905 and RMW-04-15-0905. Associated detected results were qualified as estimated and flagged "J".

Samples RMW-05-15-0905, BMW-03-0905, RMW-10-15-0905, MW-90-15-0905, RMW-09-35-0905 and MW-91-0905 contained surrogates below QC limits. Associated detected and non-detected results were qualified as estimated and flagged "J" and "UJ", respectively.

VII. Matrix Spike/Matrix Spike Duplicate

The matrix spike/matrix spike duplicate (MS/MSD) was performed on sample RMW-09-15-0905. The trichloroethene recovery was greater than the upper control limit in the MSD. The relative percent differences for all compounds exceeded acceptable QC limits. Detected results were qualified as estimated and flagged "J".

VIII. Laboratory Control Sample

Not applicable.

IX. Internal Standards

All internal standard recoveries were within acceptance criteria.

X. Target Compound Identification

Compound identification was verified by raw data review.

XI. Compound Quantitation and Reported CRQLs

Several samples were reanalyzed at dilutions due to high concentrations of target compounds.

Calculations for the ICAL, CCV and selected detected sample results were verified for one compound associated with each internal standard. Selected detected results for vinyl chloride, cyclohexane, and 1,2-dibromo-3-chloropropane were verified.

Manual integrations were performed and "before" and "after" documentation was provided.

XII. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XIII. Field Duplicates

There were two field duplicate pairs in this SDG: samples RMW-10-15-0905 and MW-90-15-0905 and samples RMW-09-15-0905 and MW-91-0905. Trans-1,2-dichloroethene and trans-1,3-dichloropropane exceeded criteria between samples RMW-10-15-0905 and MW-90-15-0905. Detected and non-detected results were qualified as estimated and flagged "J" and "UJ", respectively.

Acetone, methylene chloride and tert-butyl alcohol exceeded criteria between samples RMW-09-15-0905 and MW-91-0905. Detected results were qualified as estimated and flagged "J".

XIV. System Performance

The system performance was evaluated by reviewing the chromatographic and mass spectral data. Overall, the system was in control.

XV. Overall Assessment of Data

- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.
- Low levels of target analytes in the method, equipment and trip blanks resulted in data qualified as non-detected concentrations.
- Calibration, matrix and surrogate exceedances resulted in data qualified as estimated concentrations.
- Field duplicate precision exceedances resulted in data qualified as estimated concentrations.
- The completeness objectives were met for all method/analyte combinations.

- No systemic issues were found. Data quality, as reviewed, was acceptable.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (ug/L)	FINAL FLAG	VALIDATION COMMENTS
BMW-01-0905	Acetone	5	U	LB<RL, EB<RL, TB<RL
BMW-01-0905	Carbon Tetrachloride	0.5	UJ	CCV>UCL
BMW-01-0905	Chloromethane	1.8	U	LB<RL
BMW-01-0905	Methylene Chloride	0.5	U	LB<RL
BMW-03-0905	1,1,2,2-Tetrachloroethane	0.5	UJ	Sur<LCL
BMW-03-0905	1,2,3-Trichlorobenzene	0.5	UJ	IC%RSD
BMW-03-0905	1,2-Dibromo-3-chloropropane	0.5	UJ	Sur<LCL
BMW-03-0905	Acetone	5	U	EB<RL, LB<RL, TB<RL
BMW-03-0905	Methylene Chloride	0.5	UJ	IC%RSD
MW-90-15-0905	1,1-Dichloroethene	1.7	J	Sur<LCL
MW-90-15-0905	1,1,1-Trichloroethane	0.5	UJ	Sur<LCL
MW-90-15-0905	1,1,2-Trichloro-1,2,2-trifluoroethane	0.5	UJ	Sur<LCL
MW-90-15-0905	1,2-Dichloroethane	0.5	UJ	Sur<LCL
MW-90-15-0905	1,2-Dichloropropane	0.5	UJ	Sur<LCL
MW-90-15-0905	Bromodichloromethane	0.5	UJ	Sur<LCL
MW-90-15-0905	Carbon Tetrachloride	0.5	UJ	CCV<LCL, Sur<LCL
MW-90-15-0905	Chloromethane	2	U	LB>RL, Sur>UCL
MW-90-15-0905	Cyclohexane	0.21	J	Sur<LCL
MW-90-15-0905	Methyl acetate	0.5	UJ	Sur<LCL
MW-90-15-0905	Methylcyclohexane	0.5	UJ	Sur<LCL
MW-90-15-0905	Methylene Chloride	0.5	U	LB<RL, Sur<LCL
MW-90-15-0905	Methyl tert-butyl ether	0.5	UJ	Sur<LCL
MW-90-15-0905	Toluene	0.5	U	EB<RL
MW-90-15-0905	trans-1,2-Dichloroethene	12	J	FD>RPD, Sur<LCL
MW-90-15-0905	trans-1,3-Dichloropropene	4.1	J	FD>RPD
MW-90-15-0905	Trichlorofluoromethane	0.5	UJ	Sur<LCL
MW-91-0905	1,1,2-Trichloroethane	0.5	UJ	Sur<LCL
MW-91-0905	1,2,3-Trichlorobenzene	0.5	UJ	IC%RSD
MW-91-0905	Acetone	11	J	FD>RPD
MW-91-0905	cis-1,3-Dichloropropene	0.5	UJ	Sur<LCL
MW-91-0905	Isopropylbenzene	0.5	UJ	CCV<LCL
MW-91-0905	Methylcyclohexane	0.5	UJ	CCV<LCL
MW-91-0905	Methylene Chloride	7.2	J	FD>RPD, IC%RSD
MW-91-0905	Styrene	0.5	UJ	CCV<LCL
MW-91-0905	Tert-butyl alcohol	62	J	FD>RPD
MW-91-0905	trans-1,3-Dichloropropene	0.36	J	Sur<LCL
RMW-04-15-0905	1,2,3-Trichlorobenzene	0.5	UJ	IC%RSD
RMW-04-15-0905	Acetone	5	U	EB<RL, LB<RL, TB<RL
RMW-04-15-0905	Methylene Chloride	0.39	J	IC%RSD

FIELD ID	ANALYTE	FINAL RESULT (ug/L)	FINAL FLAG	VALIDATION COMMENTS
RMW-05-15-0905	1,1,2,2-Tetrachloroethane	0.5	UJ	Sur<LCL
RMW-05-15-0905	1,1,2-Trichloroethane	0.5	UJ	Sur<LCL
RMW-05-15-0905	1,2,3-Trichlorobenzene	0.5	UJ	IC%RSD
RMW-05-15-0905	1,2-Dibromo-3-chloropropane	0.5	UJ	Sur<LCL
RMW-05-15-0905	Acetone	5	U	EB<RL, LB<RL, TB<RL
RMW-05-15-0905	cis-1,3-Dichloropropene	0.5	UJ	Sur<LCL
RMW-05-15-0905	Methylene Chloride	0.5	UJ	IC%RSD
RMW-05-15-0905	trans-1,3-Dichloropropene	0.5	UJ	Sur<LCL
RMW-09-15-0905	1,1-Dichloroethene	0.21	J	MSRPD
RMW-09-15-0905	Acetone	17	J	FD>RPD
RMW-09-15-0905	Benzene	0.31	J	MSRPD
RMW-09-15-0905	Chloromethane	1.6	U	LB>RL, Sur>UCL
RMW-09-15-0905	Methylene chloride	21	J	FD>RPD
RMW-09-15-0905	Tert-butyl alcohol	120	J	FD>RPD
RMW-09-15-0905	Trichloroethene	2.6	J	MSRPD, SD>UCL
RMW-09-35-0905	1,1,2,2-Tetrachloroethane	0.5	UJ	Sur<LCL
RMW-09-35-0905	1,2,3-Trichlorobenzene	0.5	UJ	IC%RSD
RMW-09-35-0905	1,2-Dibromo-3-chloropropane	0.5	UJ	Sur<LCL
RMW-09-35-0905	Acetone	1.7	U	EB<RL
RMW-09-35-0905	Isopropylbenzene	0.5	UJ	CCV<LCL
RMW-09-35-0905	Methylcyclohexane	0.5	UJ	CCV<LCL
RMW-09-35-0905	Methylene Chloride	0.77	J	IC%RSD
RMW-09-35-0905	Styrene	0.5	UJ	CCV<LCL
RMW-10-15-0905	1,1,2,2-Tetrachloroethane	0.5	UJ	Sur<LCL
RMW-10-15-0905	1,1,2-Trichloroethane	0.5	UJ	Sur<LCL
RMW-10-15-0905	1,2,3-Trichlorobenzene	0.5	UJ	IC%RSD
RMW-10-15-0905	1,2-Dibromo-3-chloropropane	0.5	UJ	Sur<LCL
RMW-10-15-0905	cis-1,3-Dichloropropene	0.32	J	Sur<LCL
RMW-10-15-0905	Methylene Chloride	0.5	UJ	IC%RSD
RMW-10-15-0905	trans-1,2-Dichloroethene	6.9	J	FD>RPD
RMW-10-15-0905	trans-1,3-Dichloropropene	0.5	UJ	FD>RPD, Sur<LCL
RMW-10-35-0905	1,2,3-Trichlorobenzene	0.5	UJ	IC%RSD
RMW-10-35-0905	Chloromethane	0.5	U	EB>RL, TB>RL
RMW-10-35-0905	Methylene Chloride	0.5	UJ	IC%RSD

CCV<LCL = Continuing calibration recovery less than lower control limit
EB<RL = Equipment blank concentration less than the RL
EB>RL = Equipment blank concentration greater than the RL
FD>RPD = Field duplicate exceeds RPD criteria
IC%RSD = Initial calibration RSD exceeded
LB<RL = Laboratory blank contamination less than the RL
LB>RL = Laboratory blank contamination greater than the RL
MSRPD = Matrix spike RPD criteria exceedance
SD>UCL = Matrix spike duplicate recovery criteria greater than upper limit
Sur<LCL = Surrogate recovery less than lower limit

Sur>UCL = Surrogate recovery greater than upper limit
TB<RL = Trip blank concentration less than RL
TB>RL = Trip blank concentration greater than the RL

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 3, 4, 5 and 6, 2005
Report Date:	October 13, 2005
Parameters:	Volatile Organic Compounds
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y23N7

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 and project-approved modifications described in Modification Reference Number 1291.0 for volatile organic compounds (VOC). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review, June 2001, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier III data validation was performed by CH2M HILL chemists. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review included the chain of custody (CoC) records, case narrative, completed CLP data summary forms, raw data and calculation verification for selected detected results.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All technical holding times were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Calibration

The relative standard deviation (RSD) for methylene chloride and 1, 2, 3-trichlorobenzene exceeded criteria in the initial calibration (ICAL) performed on 10/6/05.

The percent differences (%D) of methylcyclohexane, xylenes (total) and styrene were above criteria for the continuing calibration verification (CCV) performed on 10/7/05. The chloroethane %D was above criteria in the CCV performed on 10/8/05. The carbon tetrachloride and methylcyclohexane %Ds were less than criteria while the chloroethane %D was above criteria in the CCV performed on 10/11/05.

The associated non-detected results were qualified as estimated and flagged "UJ" and detected results were qualified as estimated and flagged "J".

IV. Method Blanks

Chloromethane was determined by the laboratory to be a contaminant in the purchased deuterated monitoring compound (DMC) solution.

Acetone, methylene chloride, chloromethane and ethyl tert-butyl alcohol were detected in the associated method blanks. Associated sample results below the contract required quantitation limits (CRQL), equivalent to reporting limits (RL), were qualified as non-detected at the CRQL and flagged "U". Sample results greater than the CRQL were qualified as non-detected at the concentration and flagged "U". Sample results that were above the CRQL and the blank concentration were not qualified.

V. Field Blanks

Trip blanks (TB) and equipment blanks (EB) were analyzed as required. There were three TBs and four EBs in this SDG. Acetone, methylene chloride, carbon disulfide, chloromethane, ethyl tert-butyl alcohol and toluene were detected in the blanks. Associated sample results below the CRQL were qualified as non-detected at the CRQL and flagged "U". Sample results greater than the CRQL were qualified as non-detected at the concentration and flagged "U". Sample results that were above the CRQL and the blank concentration were not qualified.

VI. Surrogate Recovery

Sample BMW-06-0905 contained surrogates above QC limits. Data were not qualified because sample results were non-detected.

Samples RMW-06-15-0905, RMW-14-50-0905 and BMW-07-0905 contained surrogates above QC limits. Associated detected results were qualified as estimated and flagged "J".

Samples RMW-03-15-0905, RMW-07-15-0905 and RMW-13-35-0905 contained surrogates below QC limits. Associate detected and non-detected results were qualified as estimated and flagged "J" and "UJ", respectively.

VII. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate was performed on sample RMW-07-15-0905. All acceptance criteria were met.

VIII. Laboratory Control Sample

Not applicable.

IX. Internal Standards

All internal standard recoveries were within acceptance criteria.

X. Target Compound Identification

Compound identification was verified by raw data review.

XI. Compound Quantitation and Reported CRQLs

One of samples was reanalyzed at a dilution due to high concentrations of target compounds.

Calculations for the ICAL, CCV and selected detected sample results were verified for one compound associated with each internal standard. Selected detected results for vinyl chloride, benzene, and 1,3-dichlorobenzene were verified.

Manual integrations were documented in the case narrative. However, no "before" manual integration snapshots were provided.

XII. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XIII. Field Duplicates

There were no field duplicates in this SDG.

XIV. System Performance

The system performance was evaluated by reviewing the chromatographic and mass spectral data. Overall, the system was in control.

XV. Overall Assessment of Data

- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.
- Low levels of target analytes in the method, equipment and trip blanks resulted in data qualified as non-detected concentrations.
- Calibration and surrogate exceedances resulted in data qualified as estimated concentrations.
- The completeness objectives were met for all method/analyte combinations.
- No systemic issues were found. Data quality, as reviewed, was acceptable.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (ug/L)	FINAL FLAG	VALIDATION COMMENTS
BMW-06-0905	Acetone	5	U	EB<RL
BMW-06-0905	Chloroethane	0.5	UJ	CCV>UCL
BMW-06-0905	Chloromethane	1.3	U	LB>RL, TB>RL, EB>RL
BMW-06-0905	Methylene Chloride	0.5	U	LB<RL
BMW-07-0905	Acetone	5	U	EB<RL, Sur>UCL
BMW-07-0905	Chloroethane	0.5	UJ	CCV>UCL
BMW-07-0905	Chloromethane	1.2	U	LB>RL, TB>RL, EB>RL
BMW-07-0905	Methylene Chloride	0.5	U	LB<RL
BMW-08-0905	Chloromethane	1	U	LB<RL
BPZ-01-0905	Acetone	5	U	EB<RL
BPZ-01-0905	Chloromethane	1	U	LB>RL, TB>RL, EB>RL
BPZ-01-0905	Methylene Chloride	0.5	U	TB<RL
RMW-03-15-0905	1,1,1-Trichloroethane	0.5	UJ	Sur<LCL
RMW-03-15-0905	1,1,2,2-Tetrachloroethane	0.5	UJ	Sur<LCL
RMW-03-15-0905	1,1,2-Trichloro-1,2,2-trifluoroethane	0.5	UJ	Sur<LCL
RMW-03-15-0905	1,1,2-Trichloroethane	0.5	UJ	Sur<LCL
RMW-03-15-0905	1,1-Dichloroethene	0.5	UJ	Sur<LCL
RMW-03-15-0905	1,2-Dibromo-3-chloropropane	0.5	UJ	Sur<LCL
RMW-03-15-0905	1,2-Dichloroethane	0.5	UJ	Sur<LCL
RMW-03-15-0905	Acetone	5	U	EB<RL
RMW-03-15-0905	Carbon Tetrachloride	0.5	UJ	Sur<LCL
RMW-03-15-0905	cis-1,3-Dichloropropene	0.5	UJ	Sur<LCL
RMW-03-15-0905	Methyl Acetate	0.5	UJ	Sur<LCL
RMW-03-15-0905	Methyl tert-Butyl Ether	0.69	J	Sur<LCL
RMW-03-15-0905	Methylcyclohexane	0.5	UJ	CCV>UCL
RMW-03-15-0905	Methylene Chloride	0.5	U	LB<RL, Sur<LCL
RMW-03-15-0905	Styrene	0.5	UJ	CCV>UCL
RMW-03-15-0905	trans-1,3-Dichloropropene	0.5	UJ	Sur<LCL
RMW-03-15-0905	Trichlorofluoromethane	0.5	UJ	Sur<LCL
RMW-03-15-0905	Xylenes (total)	0.5	UJ	CCV>UCL
RMW-06-15-0905	Acetone	5	U	TB<RL
RMW-06-15-0905	Chloromethane	1.3	U	LB>RL, TB>RL, Sur<LCL
RMW-06-15-0905	Methylene Chloride	0.5	U	EB<RL
RMW-07-15-0905	1,1,2,2-Tetrachloroethane	0.5	UJ	Sur<LCL
RMW-07-15-0905	1,2,3-Trichlorobenzene	0.5	UJ	IC%RSD
RMW-07-15-0905	1,2-Dibromo-3-chloropropane	0.5	UJ	Sur<LCL
RMW-07-15-0905	Acetone	5	U	TB<RL
RMW-07-15-0905	Methylcyclohexane	0.5	UJ	CCV>UCL
RMW-07-15-0905	Methylene Chloride	1.8	J	IC%RSD

FIELD ID	ANALYTE	FINAL RESULT (ug/L)	FINAL FLAG	VALIDATION COMMENTS
RMW-07-15-0905	Styrene	0.5	UJ	CCV>UCL
RMW-07-15-0905	Xylenes (total)	0.5	UJ	CCV>UCL
RMW-07-35-0905	Acetone	5	U	TB>RL, EB>RL
RMW-07-35-0905	Chloroethane	0.5	UJ	CCV>UCL
RMW-07-35-0905	Chloromethane	1.2	U	LB>RL, TB>RL
RMW-07-35-0905	Methylene Chloride	0.5	U	LB<RL
RMW-11-35-0905	Acetone	5	U	EB<RL
RMW-11-35-0905	Carbon Tetrachloride	0.5	UJ	CCV<LCL
RMW-11-35-0905	Chloroethane	0.5	UJ	CCV>UCL
RMW-11-35-0905	Chloromethane	1.2	U	LB>RL, EB>RL
RMW-11-35-0905	Ethyl Tert-Butyl Alcohol	0.5	U	LB<RL, EB<RL
RMW-11-35-0905	Methylcyclohexane	0.5	UJ	CCV<LCL
RMW-11-35-0905	Methylene Chloride	1.8	U	LB<RL
RMW-11-35-0905	Toluene	0.5	U	EB<RL
RMW-13-35-0905	1,1,2-Trichloroethane	0.5	UJ	Sur<LCL
RMW-13-35-0905	Chloromethane	1	U	LB>RL, TB>RL, EB>RL
RMW-13-35-0905	cis-1,3-Dichloropropene	0.5	UJ	Sur<LCL
RMW-13-35-0905	Methylene Chloride	0.5	U	TB<RL
RMW-13-35-0905	trans-1,3-Dichloropropene	0.5	UJ	Sur<LCL
RMW-14-50-0905	Chloromethane	1.4	U	LB>RL, TB>RL, EB>RL, Sur<LCL

CCV<LCL = Continuing calibration recovery less than lower control limit
CCV>UCL = Continuing calibration recovery greater than upper control limit
EB<RL = Equipment blank concentration less than the RL
EB>RL = Equipment blank concentration greater than the RL
IC%RSD = Initial calibration RSD exceeded
LB<RL = Laboratory blank contamination less than the RL
LB>RL = Laboratory blank contamination greater than the RL
Sur<LCL = Surrogate recovery less than lower limit
Sur>UCL = Surrogate recovery greater than upper limit
TB<RL = Trip blank concentration less than RL
TB>RL = Trip blank concentration greater than the RL

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 6, 10 and 11, 2005
Report Date:	October 20, 2005
Parameters:	Volatile Organic Compounds
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y23R4

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 and project-approved modifications described in Modification Reference Number 1291.0 for volatile organic compounds (VOC). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review, June 2001, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier III data validation was performed by CH2M HILL chemists. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review included the chain of custody (CoC) records, case narrative, completed CLP data summary forms, raw data and calculation verification for selected detected results.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All technical holding times were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Calibration

The relative standard deviation (RSD) for methyl acetate, methylene chloride and trans-1,3-dichloropropene exceeded criteria in the initial calibration (ICAL) performed on 10/17/05.

The percent difference (%D) of methyl acetate was above criteria, while the %D of methylene chloride was below criteria for one of the continuing calibration verifications (CCV) performed on 10/17/05. The chloroethane %D was above criteria for one of the CCVs performed on 10/19/05.

The associated non-detected results were qualified as estimated and flagged "UJ" and detected results were qualified as estimated and flagged "J".

IV. Method Blanks

Chloromethane was determined by the laboratory to be a contaminant in the purchased deuterated monitoring compound (DMC) solution.

Methylene chloride, acetone and chloromethane were detected in the associated method blanks. Associated sample results below the contract required quantitation limits (CRQL), equivalent to reporting limits (RL), were qualified as non-detected at the CRQL and flagged "U". Sample results greater than the CRQL were qualified as non-detected at the concentration and flagged "U". Sample results that were greater than the CRQL and the blank concentration were not qualified.

V. Field Blanks

This SDG contained two trip blanks and one equipment blank. Acetone, methylene chloride, carbon disulfide, chloromethane and toluene were detected in the trip and equipment blanks. Associated sample results below the CRQL were qualified as non-detected at the CRQL and flagged "U". Sample results greater than the CRQL were also flagged "U" and qualified as non-detected at the concentration. Sample results that were greater than the CRQL and the blank concentration were not qualified.

VI. Surrogate Recovery

Sample RMW-01-17-0905 contained surrogates which exceeded the upper QC limits. Data were not qualified because associated sample results were non-detected.

Samples RMW-01-35-0905, MW-88-51-0905, RMW-12-32-0905, RMW-08-15-0905, RMW-02-32-0905 and RMW-02-50-0905 contained surrogates above QC limits. Associated detected results were qualified as estimated and flagged "J".

Sample RMW-08-35-0905 contained surrogates below QC limits. The associated non-detected results were qualified as estimated and flagged "UJ" and detected results were qualified as estimated and flagged "J".

VII. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate (MS/MSD) was performed on sample MW-88-51-0905. The chlorobenzene MS recovery and relative percent difference exceeded QC limits. Data were not qualified because the parent sample did not contain reportable levels of chlorobenzene.

VIII. Laboratory Control Sample

Not applicable.

IX. Internal Standards

All internal standard recoveries were within acceptance criteria.

X. Target Compound Identification

Compound identification was verified by raw data review.

XI. Compound Quantitation and Reported CRQLs

Several samples were reanalyzed at dilutions due to high concentrations of target compounds.

Calculations for the ICAL, CCV and selected detected sample results were verified for one compound associated with each internal standard. Selected detected results for chloromethane, benzene, and 1,3-dichlorobenzene were verified.

Manual integrations were documented in the case narrative. However, no “before” manual integration snapshots were provided.

XII. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XIII. Field Duplicates

RMW-12-51-0905 and MW-88-51-0905 were designated as a field duplicate pair. All acceptance criteria were met.

XIV. System Performance

The system performance was evaluated by reviewing the chromatographic and mass spectral data. Overall, the system was in control.

XV. Overall Assessment of Data

- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.
- Low levels of target analytes in the method, equipment and trip blanks resulted in data qualified as non-detected concentrations.
- Calibration and surrogate exceedances resulted in data qualified as estimated concentrations.
- The completeness objectives were met for all method/analyte combinations.
- No systemic issues were found. Data quality, as reviewed, was acceptable.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (ug/L)	FINAL FLAG	VALIDATION COMMENTS
MW-88-51-0905	Acetone	5	U	LB<RL
MW-88-51-0905	Methyl Acetate	0.5	UJ	IC%RSD, CCV>UCL
MW-88-51-0905	Methylene Chloride	2.1	UJ	CCV<LCL, TB>RL, IC%RSD
MW-88-51-0905	trans-1,3-Dichloropropene	0.5	UJ	IC%RSD
RMW-01-17-0905	Acetone	5	U	LB<RL
RMW-01-17-0905	Chloromethane	1.6	U	TB>RL
RMW-01-17-0905	Methyl Acetate	0.5	UJ	IC%RSD, CCV>UCL
RMW-01-17-0905	Methylene Chloride	0.5	UJ	EB<RL, CCV<LCL, IC%RSD
RMW-01-17-0905	trans-1,3-Dichloropropene	0.5	UJ	IC%RSD
RMW-01-35-0905	1,2-Dichloropropane	0.5	UJ	Sur<LCL
RMW-01-35-0905	Bromodichloromethane	0.5	UJ	Sur<LCL
RMW-01-35-0905	Chloromethane	1.6	U	LB>RL, TB>RL, Sur>UCL
RMW-01-35-0905	Cyclohexane	4.8	J	Sur<LCL
RMW-01-35-0905	Methylcyclohexane	2.2	J	Sur<LCL
RMW-02-32-0905DL	Chloroethane	500	UJ	CCV>UCL
RMW-02-50-0905	Chloromethane	1.1	U	LB>RL, Sur>UCL
RMW-08-15-0905	Acetone	5	U	TB<RL
RMW-08-15-0905	Chloromethane	1.1	U	LB>RL, TB>RL, EB>RL, Sur>UCL
RMW-08-35-0905	1,1,1-Trichloroethane	0.5	UJ	Sur<LCL
RMW-08-35-0905	1,1,2-Trichloro-1,2,2-trifluoroethane	0.5	UJ	Sur<LCL
RMW-08-35-0905	1,1,2-Trichloroethane	0.5	UJ	Sur<LCL
RMW-08-35-0905	1,1-Dichloroethene	0.45	J	Sur<LCL
RMW-08-35-0905	1,2-Dichloroethane	0.5	UJ	Sur<LCL
RMW-08-35-0905	Carbon tetrachloride	0.5	UJ	Sur<LCL
RMW-08-35-0905	Chloroethane	0.5	UJ	CCV>UCL
RMW-08-35-0905	Chloromethane	1.1	U	LB>RL, TB>RL, EB>RL
RMW-08-35-0905	cis-1,3-Dichloropropene	0.5	UJ	Sur<LCL
RMW-08-35-0905	Methyl Acetate	0.5	UJ	Sur<LCL
RMW-08-35-0905	Methyl tert-butyl ether	0.28	J	Sur<LCL
RMW-08-35-0905	Methylene Chloride	1.9	J	Sur<LCL
RMW-08-35-0905	trans-1,3-Dichloropropene	0.5	UJ	Sur<LCL
RMW-08-35-0905	Trichlorofluoromethane	0.5	UJ	Sur<LCL
RMW-12-32-0905	Chloromethane	1.6	U	LB>RL, TB>RL
RMW-12-32-0905DL	Chloroethane	12	UJ	CCV>UCL
RMW-12-51-0905	1,1,2-Trichloroethane	0.5	UJ	Sur<LCL
RMW-12-51-0905	Chloromethane	1.4	U	TB>RL
RMW-12-51-0905	cis-1,3-Dichloropropene	0.5	UJ	Sur<LCL
RMW-12-51-0905	Methyl Acetate	0.5	UJ	CCV>UCL, IC%RSD

FIELD ID	ANALYTE	FINAL RESULT (ug/L)	FINAL FLAG	VALIDATION COMMENTS
RMW-12-51-0905	Methylene Chloride	2.9	J	IC%RSD, CCV<LCL
RMW-12-51-0905	trans-1,3-Dichloropropene	0.5	UJ	IC%RSD, Sur<LCL

CCV<LCL = Continuing calibration recovery less than lower control limit
CCV>UCL = Continuing calibration recovery greater than upper control limit
EB<RL = Equipment blank concentration less than the RL
EB>RL = Equipment blank concentration greater than the RL
IC%RSD = Initial calibration RSD exceeded
LB<RL = Laboratory blank contamination less than the RL
LB>RL = Laboratory blank contamination greater than the RL
Sur<LCL = Surrogate recovery less than lower limit
Sur>UCL = Surrogate recovery greater than upper limit
TB<RL = Trip blank concentration less than RL
TB>RL = Trip blank concentration greater than the RL

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	October 11 and 12, 2005
Report Date:	October 22, 2005
Parameters:	Volatile Organic Compounds
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y23T5

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 and project-approved modifications described in Modification Reference Number 1291.0 for volatile organic compounds (VOC). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review (NFG), June 2001, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier III data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier III data validation. The intended objective of the data review process was to provide a technical review of the analytical raw data and to provide verification of calculations and analyte identification. It was not intended to determine contract compliance.

The scope of the data review included the chain-of-custody (CoC) records, the case narrative, completed CLP data summary forms and raw data.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

Sample RMW-02-13-0905 was listed as HCL preserved on the CoC. However, the sample was pH 7 at sample receipt. Halogenated detected and non-detected results were qualified as estimated and flagged “J” and “UJ”, respectively. Non-halogenated detected results were also

qualified as estimated and flagged "J". Non-halogenated non-detected results were qualified as not useable and flagged "R".

All other technical holding-time requirements were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met. Ion abundance calculations were verified for several masses.

III. Calibration

All calibration criteria for the initial calibration standards (ICAL) were met. Calculations for the ICAL relative response factor (RRF) and relative standard deviation (RSD) criteria were verified.

All continuing calibration standard criteria were met. The continuing calibration RRF and percent difference (%D) calculations were verified.

IV. Method Blanks

The method blanks were analyzed as required. Each of the method blanks contained chloromethane above the contract required quantitation limit (CRQL), equivalent to reporting limit (RL), at similar concentrations (approximately 1.5ug/L). This was determined by the laboratory to be a contaminant in the purchased deuterated monitoring compound (DMC) solution. One chloromethane sample concentration similar to those detected in the method blanks was qualified as a non-detected result and flagged "U".

Acetone was also detected in method blank VBLK34 below the CRQL. Acetone detected less than the CRQL in sample MW-EB-09-0905, an equipment blank (EB), was qualified as a non-detected result at the CRQL and flagged "U".

A storage blank was analyzed as required and met all acceptance criteria.

V. Field Blanks

There were two EBs and one trip blank associated with this SDG. As with the method blanks, chloromethane was detected in each of the field blanks. Because this was identified as a contaminant associated with the DMC solution, no additional flags were applied to the samples. The trip blank, MW-TB-09-0905, also had a detected result for acetone below the CRQL and a detected result for methylene chloride above the CRQL. The samples had detected results greater than the method blank for these analytes and therefore, no flags were applied.

VI. Surrogate Recovery

The method required DMCs were analyzed. 2-Butanone-d5 was recovered below the lower control limit (LCL) at a 10 percent recovery in sample MW-12-0905. The associated acetone detected result was qualified as estimated and flagged "J" and the non-detected result for 2-butanone was qualified as not useable and flagged "R".

Toluene-d5 was also recovered below the LCL in sample MW-12-0905. Ethylbenzene and isopropylbenzene detected results were qualified as estimated and flagged "J". The other compounds associated with toluene-d5 were reported from a dilution of sample MW-12-0905.

VII. Matrix Spike/Matrix Spike Duplicate

A matrix spike and matrix spike duplicate (MS/MSD) were analyzed on sample RMW-02-13-0905. The MS/MSD was not analyzed on the same day or under the same 12-hour tune as the parent sample. Benzene and toluene parent concentrations were greater than four times the spike concentration and therefore, no flags were applied. 1,1-Dichlorethene and trichloroethene MS recoveries were below the LCL. The detected parent results were flagged "J". In addition, the MS/MSD relative percent differences (RPD) were outside acceptance criteria for chlorobenzene and trichloroethene. The parent detected results was flagged "J".

MS/MSD recoveries and RPD calculations were verified.

VIII. Laboratory Control Sample

The applicable Statement of Work does not require analysis of a laboratory control sample (LCS); therefore, no LCS was analyzed.

IX. Internal Standards

All internal standard recoveries were within acceptance criteria.

X. Target Compound Identification

Compound identification was verified by raw data review on a percentage of the sample detected results.

XI. Compound Quantitation and Reported CRQLs

Several samples were reanalyzed at dilutions due to high concentrations of target compounds. This resulted in non-detected results in the sample dilution for several compounds above the calibration range in the undiluted sample. Therefore, the original results were considered reportable and qualified as estimated and flagged "J".

Compound quantitation and accuracy were verified.

XII. Tentatively Identified Compounds

Tentatively identified compounds in the samples were reviewed.

XIII. Field Duplicates

There were no field duplicates in this SDG.

XIV. System Performance

The system performance was evaluated by reviewing the chromatographic data. Overall, the system was in control.

XV. Overall Assessment of Data

- Instrument calibration was acceptable for all target compounds.
- The method blanks had limited contamination which resulted in data qualified as non-detected.
- DMCs and MS/MSD exceedances resulted in data qualified as estimated concentrations.

- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

FIELD ID	ANALYTE	FINAL RESULT (ug/L)	FINAL FLAG	VALIDATION COMMENTS
MW-12-0905	1,1,1-Trichloroethane	300	J	>ICLinearRange
MW-12-0905	1,1-Dichloroethene	180	J	>ICLinearRange
MW-12-0905	2-Butanone	5	R	Sur<LCL
MW-12-0905	4-Methyl-2-pentanone	570	J	>ICLinearRange
MW-12-0905	Acetone	400	J	>ICLinearRange, Sur<LCL
MW-12-0905	Benzene	130	J	>ICLinearRange
MW-12-0905	Ethylbenzene	160	J	>ICLinearRange, Sur<LCL
MW-12-0905	Isopropylbenzene	35	J	>ICLinearRange, Sur<LCL
MW-12-0905	Styrene	0.5	UJ	Sur<LCL
MW-12-0905	Tetrachloroethene	2.7	J	Sur<LCL
MW-12-0905	trans-1,3-Dichloropropene	38	J	>ICLinearRange
MW-12-0905	Trichloroethene	16	J	Sur<LCL
RMW-02-13-0905	1,1,1-Trichloroethane	0.5	UJ	NotPres
RMW-02-13-0905	1,1,2,2-Tetrachloroethane	1.9	J	NotPres
RMW-02-13-0905	1,1,2-Trichloro-1,2,2-trifluoroethane	0.5	UJ	NotPres
RMW-02-13-0905	1,1,2-Trichloroethane	0.5	UJ	NotPres
RMW-02-13-0905	1,1-Dichloroethene	13	J	MS<LCL, MSRPD, NotPres
RMW-02-13-0905	1,2,3-Trichlorobenzene	3.9	J	NotPres
RMW-02-13-0905	1,2,4-Trichlorobenzene	14	J	NotPres
RMW-02-13-0905	1,2-Dibromo-3-chloropropane	0.5	UJ	NotPres
RMW-02-13-0905	1,2-Dibromoethane	0.5	UJ	NotPres
RMW-02-13-0905	1,2-Dichlorobenzene	83	J	>ICLinearRange
RMW-02-13-0905	1,2-Dichloroethane	23	J	NotPres
RMW-02-13-0905	1,2-Dichloropropane	1	J	NotPres
RMW-02-13-0905	1,3-Dichlorobenzene	1.9	J	NotPres
RMW-02-13-0905	1,4-Dichlorobenzene	10	J	NotPres
RMW-02-13-0905	2-Hexanone	5	R	NotPres
RMW-02-13-0905	Bromochloromethane	0.5	UJ	NotPres
RMW-02-13-0905	Bromodichloromethane	0.5	UJ	NotPres
RMW-02-13-0905	Bromoform	0.5	UJ	NotPres
RMW-02-13-0905	Bromomethane	0.5	UJ	NotPres
RMW-02-13-0905	Carbon Disulfide	0.5	UJ	NotPres
RMW-02-13-0905	Carbon Tetrachloride	0.5	UJ	NotPres
RMW-02-13-0905	Chlorobenzene	24	J	MSRPD, NotPres
RMW-02-13-0905	Chloroethane	50	J	NotPres, >ICLinearRange
RMW-02-13-0905	Chloroform	0.5	UJ	NotPres
RMW-02-13-0905	Chloromethane	1.7	J	NotPres, LB>RL
RMW-02-13-0905	cis-1,3-Dichloropropene	0.5	UJ	NotPres

FIELD ID	ANALYTE	FINAL RESULT (ug/L)	FINAL FLAG	VALIDATION COMMENTS
RMW-02-13-0905	Cyclohexane	16	J	NotPres
RMW-02-13-0905	Dibromochloromethane	0.5	UJ	NotPres
RMW-02-13-0905	Dichlorodifluoromethane	0.5	UJ	NotPres
RMW-02-13-0905	Ethyl Tertiary Butyl Alcohol	0.5	UJ	NotPres
RMW-02-13-0905	Isopropylbenzene	36	J	>ICLinearRange
RMW-02-13-0905	Methyl Acetate	0.5	UJ	NotPres
RMW-02-13-0905	Methyl tert-Butyl Ether	28	J	>ICLinearRange
RMW-02-13-0905	Methylcyclohexane	43	J	>ICLinearRange, NotPres
RMW-02-13-0905	Methylene Chloride	6.6	J	NotPres
RMW-02-13-0905	Styrene	0.5	R	NotPres
RMW-02-13-0905	Tertiary Amyl Methyl Ether	0.5	UJ	NotPres
RMW-02-13-0905	Tertiary Butyl Alcohol	33	J	NotPres
RMW-02-13-0905	Tetrachloroethene	2.4	J	NotPres
RMW-02-13-0905	trans-1,2-Dichloroethene	68	J	>ICLinearRange
RMW-02-13-0905	trans-1,3-Dichloropropene	0.5	UJ	NotPres
RMW-02-13-0905	Trichloroethene	20	J	MS<LCL, MSRPD, NotPres
RMW-02-13-0905	Trichlorofluoromethane	0.5	UJ	NotPres
RMW-02-13-0905DL	1,1-Dichloroethane	480	J	NotPres
RMW-02-13-0905DL	2-Butanone	1900	J	NotPres
RMW-02-13-0905DL	4-Methyl-2-pentanone	2100	J	NotPres
RMW-02-13-0905DL	Acetone	1500	J	NotPres
RMW-02-13-0905DL	Benzene	200	J	NotPres
RMW-02-13-0905DL	cis-1,2-Dichloroethene	4500	J	NotPres
RMW-02-13-0905DL	Ethylbenzene	490	J	NotPres
RMW-02-13-0905DL	Toluene	8200	J	NotPres
RMW-02-13-0905DL	Vinyl Chloride	1000	J	NotPres
RMW-02-13-0905DL	Xylenes (total)	2600	J	NotPres

>ICLinearRange = Result greater than linear calibration range
LB>RL = Laboratory blank contamination greater than RL
MS<LCL = Matrix spike recovery less than lower limit
MSRPD = Matrix spike RPD criteria exceedance
NotPres = Sample not properly preserved in the field
Sur<LCL = Surrogate recovery less than lower limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	January 10, 11, 12 and 13, 2006
Report Date:	February 7, 2006
Parameters:	General Chemistry: Anions and Total Dissolved Solids
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	06011A

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901113. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (NFG), October 2004, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within temperature control and with the appropriate CoC forms and custody seals intact. The CoCs provided in the hardcopy data package were not associated to the data provided. The correct CoCs can be found in SDG 06017C.

Holding-time requirements were met for all samples.

II. Calibration

Initial calibration curves for the anions were generated using quadratic regressions. Continuing calibration data were not provided in a summary form and was therefore not evaluated.

III. Blanks

Method blanks were analyzed as required for each method. No contamination was detected.

IV. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate (MS/MSD) for the anions were performed on samples RMW-11-35-0106 and BMW-08-0106. Chloride and sulfate were either not recovered or not spiked due to the sample concentrations relative to the spike concentrations. Recoveries for all other analytes met acceptance criteria.

V. Laboratory Control Sample

All acceptance criteria were met.

VI. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

VII. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), was not within the scope of the data review for this SDG.

VIII. Field Blanks

No field blanks in this SDG.

IX. Field Duplicates

No field duplicates in this SDG.

X. Laboratory Duplicates

Laboratory duplicates were analyzed on samples RMW-11-35-0106 and BMW-08-0106 for anions. All acceptance criteria were met.

XI. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XII. Overall Assessment of Data

- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	January 17, 18, 19, 20 and 23, 2006
Report Date:	February 2, 2006
Parameters:	General Chemistry: Anions and Total Dissolved Solids
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	06017C

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901113. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (NFG), October 2004, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within temperature control and with the appropriate CoC forms and custody seals intact. The CoCs provided in the hardcopy data package were not associated to the data provided. The correct CoCs can be found in SDG 06011A.

The total dissolved solid results could not be evaluated due to an incomplete data package.

Holding-time requirements were met for all anion samples.

II. Calibration

Initial calibration curves for the anions were generated using quadratic regressions. Continuing calibration data were not provided in a summary form and was therefore not evaluated.

III. Blanks

Method blanks were analyzed as required for anions. No contamination was detected.

IV. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate (MS/MSD) for the nitrate and nitrate analyses were performed on sample RMW-10-35-0106. An MS/MSD was performed on sample RMW-08-15-0106 for chloride, nitrate and nitrite. All acceptance criteria were met.

V. Laboratory Control Sample

All acceptance criteria were met.

VI. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

VII. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), was not within the scope of the data review for this SDG.

VIII. Field Blanks

No field blanks in this SDG.

IX. Field Duplicates

This SDG contained three field duplicate pairs: RMW-12-51-0106 and MW-88-0106; RMW-10-15-0106 and MW-90-0106; and RMW-08-35-0106 and MW-92-0106. All acceptance criteria were met for anions.

X. Laboratory Duplicates

Laboratory duplicates were analyzed on samples RMW-10-35-0106 for chloride and sulfate and sample RMW-08-15-0106 for sulfate. All acceptance criteria were met.

XI. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XII. Overall Assessment of Data

- The completeness objectives were met for anions.

- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met for anions.
- Total dissolved solid results could not be evaluated due to an incomplete data package.

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	January 23, 2006
Report Date:	February 6, 2006
Parameters:	ICP/MS Metals and Mercury
Laboratory:	Sentinel, Inc.
Sample Delivery Group:	MY2BR7

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Method ILM05.3. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the USEPA National Functional Guidelines for Inorganic Data Review (NFG), October 2004, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier III data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier III data validation. The intended objective of the data review process was to provide a technical review of the raw data and to provide verification of calculations and analyte identification. It was not intended to determine contract compliance.

The scope of the data review included the chain-of-custody (CoC) records, the case narrative, completed contract laboratory program (CLP) data summary forms and raw data.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All technical holding-time requirements were met.

II. ICP-MS Tune Analysis

The ICP-MS tune was analyzed as required by the method and was within criteria.

III. Calibration

The ICP-MS calibration standards were analyzed in the correct sequence. All initial and continuing calibration verification (ICV/CCV) and Contract Required Quantitation Limit (CRQL) check standards were within acceptance criteria.

The mercury calibration curve, ICV and CCVs were within acceptance criteria.

IV. Laboratory Blanks

The method blank (MB) contained zinc at concentrations below the CRQL, equivalent to the reporting limit (RL). Detected sample results were greater than the CRQL and therefore, no data were qualified.

The initial calibration blanks (ICB) contained antimony and beryllium below the CRQL. Antimony sample results between the method detection limit (MDL) and CRQL were flagged "U" and qualified as non-detected at the CRQL. Beryllium non-detected sample results were not qualified.

The blank summary form reported detected results below the calculated MDLs.

V. Field Blanks

There was one equipment blank (EB) submitted in this SDG, MW-EB-09-0106. Barium, chromium, lead, manganese, vanadium and zinc were detected in the EB below the CRQL. Associated sample results were greater than the CRQL and therefore, were not qualified.

VI. Interference Check Sample

The interference check samples were analyzed as required and were within acceptance criteria.

VII. Laboratory Control Sample

All laboratory control sample recoveries were within criteria.

VIII. Laboratory Duplicate

A laboratory duplicate was analyzed on sample RMW-02-13-0106 for ICP-MS. Sample RMW-02-32-0106 was used for the mercury duplicate sample. All acceptance criteria were met.

IX. Matrix Spike/Matrix Spike Duplicate

A matrix spike (MS) was analyzed on sample RMW-02-13-0106 for ICP-MS. Sample RMW-02-32-0106 was used for the mercury MS. All recoveries were within acceptance criteria.

X. Serial Dilutions

The serial dilution was performed on sample RMW-02-13-0106. All acceptance criteria were met.

XI. ICP/MS Internal Standards

Internal standards were analyzed as per the method. Internal standard recoveries were within control limits.

XII. Field Duplicates

There were no field duplicates in this SDG.

XIII. Compound Quantitation and Reported CRQLs

Raw data were reviewed and calculations were verified. Compound quantitation and accuracy were reviewed. RMW-02-13-0106 was used for the ICP-MS QC sample. Normally a 100 ml initial volume is digested to a final volume of 50 ml. However, because of limited volume, sample RMW-02-13-0106, the MS and duplicate were each digested using a 50 ml aliquot and taken to a final volume of 25 ml. In verifying calculations, the reported concentrations for this sample could not be reproduced using the provided equation and the reduced sample volumes. The reported results could only be achieved using the normal sample volumes.

The blank summary form had detected results for several analytes that were below the calculated MDLs. It appeared that updates were not made for the annual MDL study that was conducted in January, 2006, for the ICP-MS.

XIV. Overall Assessment of Data

- The calculated results for sample RMW-02-13-0106 need to be verified with the laboratory because the reported detected concentrations could not be reproduced using the reduced sample volume.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable overall.
- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- Target analytes were detected in the associated EB, MB, ICB and CCBs. Some of these low-level blank detects resulted in detected data qualified as non-detects.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MW-12-0106	Antimony	2	U	ICB<RL
RMW-02-13-0106	Antimony	2	U	ICB<RL
RMW-02-32-0106	Antimony	2	U	ICB<RL

ICB<RL = Initial calibration blank concentration less than RL

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	January 10, 11, 12, 13 and 17, 2006
Report Date:	January 27, 2006
Parameters:	ICP/MS Metals and Mercury
Laboratory:	Sentinel, Inc.
Sample Delivery Group:	MY2BJ4

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work ILM05.3. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), October 2004, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II CLP level data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J- — The analyte was positively identified but biased low; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ — The analyte was positively identified but biased high; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples reported in this SDG were received at the laboratory within control temperatures. Samples were accompanied by appropriate CoC forms, all custody seals were intact. Individual samples did not contain sample tag ID numbers.

Samples BPZ-01-0106 and BMW-08-0106 were received at pH=6. The pH of these samples was adjusted to below 2 prior to analysis. No flags were applied as a result of the pH discrepancies.

All technical holding-time requirements were met.

II. ICP-MS Tune Analysis

The instrument tune was analyzed as required and all acceptance criteria were met.

III. Calibration

All calibration verification standards met acceptance criteria for ICP-MS and mercury analyses.

A contract required quantitation limit (CRQL), equivalent to reporting limit (RL), check standard was analyzed at the required frequency. All acceptance criteria were met.

IV. Laboratory Blanks

Copper, manganese, nickel and zinc were detected in the method blank (MB) at concentrations greater than the method detection limit (MDL) but less than the CRQL. Associated sample results detected at concentrations below the CRQL were qualified as non-detected at the CRQL and flagged "U".

Antimony, nickel, silver and thallium were detected in the initial calibration blank (ICB) at concentrations greater than the MDL but lower than the CRQL. Arsenic, chromium, silver and vanadium were detected in continuing calibration blanks (CCB) at concentrations exceeding the MDL but below the CRQL. Associated sample results detected at concentrations below the CRQL were qualified as non-detected at the CRQL and flagged "U".

The blank summary form reported detected results below the MDL.

V. Field Blanks

Samples MW-EB-01-0106, MW-EB-02-0106, MW-EB-03-0106, MW-EB-04-0106, and MW-EB-05-0106 were noted as equipment blanks (EB) on the CoC. Detected arsenic, chromium, copper, manganese, nickel, thallium, vanadium and zinc in the five EB samples were qualified as non-detected at the CRQL and flagged "U" due to detected concentrations below the CRQL in the ICB, LB and CCB. Therefore, no sample results were impacted from the EB detections. However, lead was detected in two of the EBs below the CRQL. Associated lead results were either greater than the CRQL or non-detected and therefore, no data were qualified.

VI. Interference Check Sample

Copper and lead were outside of the acceptance criteria in the interference check sample. Samples BMW-06-0106, RMW-11-35-0106, RMW-07-15-0106, RMW-07-35-0106, RMW-06-15-0106, RMW-04-15-0106, BMW-01-0106, RMW-13-35-0106, BMW-07-0106, RMW-14-50-0106, BPZ-01-0106, BMW-08-0106, BMW-03-0106, RMW-05-15-0106, and RMW-10-15-0106 had sample detects greater than the MDL. Associated sample results greater than the MDL were qualified as estimated high and flagged "J+".

VII. Laboratory Control Sample

A laboratory control samples were analyzed and all recoveries were within criteria.

VIII. Laboratory Duplicates

A laboratory duplicate was analyzed on sample BMW-06-0106 and all acceptance criteria were met.

IX. Matrix Spike/Matrix Spike Duplicate

A matrix spike (MS) was analyzed on sample BMW-06-0106 and all acceptance criteria were met.

X. Serial Dilutions

A serial dilution was analyzed on sample BMW-06-0106. Cobalt, lead and manganese were detected at concentrations greater than 50 times the associated MDL, and the percent differences (%D) between the initial and serial dilution sample results were determined to be greater than 10 percent. All associated sample results were qualified as estimated and flagged "J".

Nickel was qualified by the laboratory as estimated because the %D criteria were exceeded. However, the parent sample concentration was less than 50 times the MDL and therefore, the data were not qualified.

XI. Field Duplicates

No field duplicate in this SDG.

XII. ICP-MS Internal Standards

The appropriate number of internal standards was analyzed and all percent relative intensities met control criteria.

XIII. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported CRQLs was not within the scope of the data review for this SDG. Raw data were not reviewed.

The samples were analyzed at a two-fold dilution. No reason was provided in the case narrative.

XIV. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable.
- Cobalt, lead and manganese exceeded the %D criteria in the serial dilution. Associated results were qualified as estimated.
- Copper and lead were qualified as estimated for interference check sample exceedances.

- Samples were and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- Target analytes were detected in the associated MB, ICB and CCBs, and these low-level blank detects resulted in data qualified as non-detects.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
BMW-01-0106	Chromium	4	U	CCB<RL
BMW-01-0106	Cobalt	0.5	J	SerialDilution>UCL
BMW-01-0106	Copper	4	U	LB<RL, ICS>UCL
BMW-01-0106	Lead	4	J+	ICS>UCL, SerialDilution>UCL
BMW-01-0106	Manganese	638	J	SerialDilution>UCL
BMW-01-0106	Vanadium	2	U	CCB<RL
BMW-03-0106	Antimony	4	U	ICB<RL
BMW-03-0106	Chromium	4	U	CCB<RL
BMW-03-0106	Cobalt	19.3	J	SerialDilution>UCL
BMW-03-0106	Copper	95.8	J+	ICS>UCL
BMW-03-0106	Lead	4.4	J+	ICS>UCL, SerialDilution>UCL
BMW-03-0106	Manganese	9640	J	SerialDilution>UCL
BMW-06-0106	Chromium	4	U	CCB<RL
BMW-06-0106	Cobalt	1.6	J	SerialDilution>UCL
BMW-06-0106	Copper	6.6	J+	ICS>UCL
BMW-06-0106	Lead	8.7	J+	ICS>UCL, SerialDilution>UCL
BMW-06-0106	Manganese	280	J	SerialDilution>UCL
BMW-07-0106	Chromium	4	U	CCB<RL
BMW-07-0106	Cobalt	6.1	J	SerialDilution>UCL
BMW-07-0106	Copper	84.2	J+	ICS>UCL
BMW-07-0106	Lead	2.8	J+	ICS>UCL, SerialDilution>UCL
BMW-07-0106	Manganese	1220	J	SerialDilution>UCL
BMW-07-0106	Vanadium	2	U	CCB<RL
BMW-08-0106	Antimony	4	U	ICB<RL
BMW-08-0106	Cobalt	2.4	J	SerialDilution>UCL
BMW-08-0106	Copper	54.4	J+	ICS>UCL
BMW-08-0106	Lead	18.1	J+	ICS>UCL, SerialDilution>UCL
BMW-08-0106	Manganese	457	J	SerialDilution>UCL
BMW-08-0106	Silver	2	U	CCB<RL, ICB<RL
BPZ-01-0106	Cobalt	35.7	J	SerialDilution>UCL
BPZ-01-0106	Copper	296	J+	ICS>UCL
BPZ-01-0106	Lead	1050	J+	ICS>UCL, SerialDilution>UCL
BPZ-01-0106	Manganese	1790	J	SerialDilution>UCL
BPZ-01-0106	Silver	2	U	CCB<RL, ICB<RL
BPZ-01-0106	Thallium	2	U	ICB<RL
RMW-04-15-0106	Chromium	4	U	CCB<RL
RMW-04-15-0106	Cobalt	0.53	J	SerialDilution>UCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
RMW-04-15-0106	Copper	5.5	J+	ICS>UCL
RMW-04-15-0106	Lead	1.7	J+	ICS>UCL, SerialDilution>UCL
RMW-04-15-0106	Manganese	123	J	SerialDilution>UCL
RMW-05-15-0106	Chromium	4	U	CCB<RL
RMW-05-15-0106	Cobalt	4	J	SerialDilution>UCL
RMW-05-15-0106	Copper	36.8	J+	ICS>UCL
RMW-05-15-0106	Lead	2.8	J+	ICS>UCL, SerialDilution>UCL
RMW-05-15-0106	Manganese	2070	J	SerialDilution>UCL
RMW-06-15-0106	Cobalt	4.6	J	SerialDilution>UCL
RMW-06-15-0106	Copper	15.8	J+	ICS>UCL
RMW-06-15-0106	Lead	11.4	J+	ICS>UCL, SerialDilution>UCL
RMW-06-15-0106	Manganese	4460	J	SerialDilution>UCL
RMW-07-15-0106	Arsenic	2	U	CCB<RL
RMW-07-15-0106	Chromium	4	U	CCB<RL
RMW-07-15-0106	Cobalt	4.3	J	SerialDilution>UCL
RMW-07-15-0106	Copper	7.5	J+	ICS>UCL
RMW-07-15-0106	Lead	1.8	J+	ICS>UCL, SerialDilution>UCL
RMW-07-15-0106	Manganese	4330	J	SerialDilution>UCL
RMW-07-15-0106	Thallium	2	U	ICB<RL
RMW-07-15-0106	Vanadium	2	U	CCB<RL
RMW-07-35-0106	Chromium	4	U	CCB<RL
RMW-07-35-0106	Cobalt	1.4	J	SerialDilution>UCL
RMW-07-35-0106	Copper	8.9	J+	ICS>UCL
RMW-07-35-0106	Lead	2.9	J+	ICS>UCL, SerialDilution>UCL
RMW-07-35-0106	Manganese	173	J	SerialDilution>UCL
RMW-07-35-0106	Thallium	2	U	ICB<RL
RMW-10-15-0106	Antimony	4	U	ICB<RL
RMW-10-15-0106	Cobalt	34.1	J	SerialDilution>UCL
RMW-10-15-0106	Copper	77	J+	ICS>UCL
RMW-10-15-0106	Lead	3.8	J+	ICS>UCL, SerialDilution>UCL
RMW-10-15-0106	Manganese	3440	J	SerialDilution>UCL
RMW-11-35-0106	Cobalt	1.6	J	SerialDilution>UCL
RMW-11-35-0106	Copper	16	J+	ICS>UCL
RMW-11-35-0106	Lead	3	J+	ICS>UCL, SerialDilution>UCL
RMW-11-35-0106	Manganese	1370	J	SerialDilution>UCL
RMW-11-35-0106	Thallium	2	U	ICB<RL
RMW-13-35-0106	Antimony	4	U	ICB<RL
RMW-13-35-0106	Cobalt	12.5	J	SerialDilution>UCL
RMW-13-35-0106	Copper	135	J+	ICS>UCL
RMW-13-35-0106	Lead	7.1	J+	ICS>UCL, SerialDilution>UCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
RMW-13-35-0106	Manganese	3060	J	SerialDilution>UCL
RMW-13-35-0106	Silver	2	U	ICB<RL
RMW-14-50-0106	Cobalt	45.4	J	SerialDilution>UCL
RMW-14-50-0106	Copper	84.2	J+	ICS>UCL
RMW-14-50-0106	Lead	3.7	J+	ICS>UCL, SerialDilution>UCL
RMW-14-50-0106	Manganese	49500	J	SerialDilution>UCL

CCB<RL = Continuing calibration blank concentration less than RL
ICB<RL = Initial calibration blank concentration less than RL
ICS>UCL = Interference check standard recovery greater than upper control limit
LB<RL = Laboratory blank contamination less than the RL
SerialDilution>UCL = Serial dilution % difference exceeded criteria >10%

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	January 10, 11, 12, 13, 17 and 18, 2006
Report Date:	January 27, 2006
Parameters:	ICP/MS Metals and Mercury
Laboratory:	Sentinel, Inc.
Sample Delivery Group:	MY2BJ5

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work ILM05.3. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), October 2004, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II CLP level data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J- — The analyte was positively identified but biased low; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ — The analyte was positively identified but biased high; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples reported in this SDG were received at the laboratory within control temperatures. All samples were accompanied by appropriate CoC forms, and all custody seals were intact. Individual samples did not contain sample tag ID numbers.

Samples BPZ-01-0106 and BMW-08-0106 were received at pH=6. These samples are for dissolved metals analysis. The data package does not indicate that the samples were filtered; however, the pH of these samples was adjusted to below 2 prior to analysis as noted in the digestion log. No flags were applied as a result of the pH discrepancies.

All technical holding-time requirements were met.

II. ICP-MS Tune Analysis

The instrument tune was analyzed as required and all acceptance criteria were met.

III. Calibration

All calibration verification standards met acceptance criteria for the ICP/MS and mercury analyses.

A contract required quantitation limit (CRQL), equivalent to reporting limit (RL), check standard was analyzed at the required frequency. The manganese result exceeded control criteria for sample RMW-14-50-0106. The associated detected result was greater than twice the CRQL and was not qualified.

IV. Laboratory Blanks

Barium, manganese, nickel and zinc were detected in the method blank (MB) at concentrations greater than the method detection limit (MDL) but less than the CRQL. Associated sample results detected at concentrations below the CRQL were qualified as non-detected at the CRQL and flagged “U”.

Antimony, silver and thallium were detected in the initial calibration blank (ICB) at concentrations greater than the MDL but lower than the CRQL. Silver and vanadium were detected in continuing calibration blanks (CCB) at concentrations greater than the MDL but below the CRQL. Associated sample results detected at concentrations below the CRQL were qualified as non-detected at the CRQL and flagged “U”.

The blank summary form reported detected results below the calculated MDLs.

V. Field Blanks

No field blanks in this SDG.

VI. Interference Check Sample

Selenium was outside of acceptance criteria in the interference check sample. Detected results were qualified as estimated and flagged “J+”.

VII. Laboratory Control Sample

A laboratory control sample was analyzed and all recoveries were within criteria.

VIII. Laboratory Duplicates

A laboratory duplicate was analyzed on sample BMW-06-0106 and all acceptance criteria were met.

IX. Matrix Spike/Matrix Spike Duplicate

A matrix spike (MS) was analyzed on sample BMW-06-0106 and all acceptance criteria were met.

X. Serial Dilutions

A serial dilution was analyzed on sample BMW-06-0106. Lead was detected at a concentration greater than 50 times the associated MDL, and the percent difference (%D) between the initial and serial dilution sample result was determined to be greater than 10 percent. Detected and non-detected results were qualified as estimated and flagged "J" and "UJ", respectively.

XI. Field Duplicates

There was one field duplicate pair: MW-90-0106 and RMW-10-15-0106. All acceptance criteria were met.

XII. ICP-MS Internal Standards

The appropriate number of internal standards was analyzed and all percent relative intensities met control criteria.

XIII. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported CRQLs was not within the scope of the data review for this SDG. Raw data were not reviewed.

All of the samples were analyzed at a two-fold dilution. No reason was provided in the case narrative.

XIV. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable.
- Samples were and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- Lead did not meet the serial dilution criteria which resulted in the qualification of all associated sample results as estimated concentrations.
- Selenium results were qualified as estimated for an interference check sample exceedance.
- Target analytes were detected in the associated MB, ICB and CCBs, and these low-level blank detects resulted in data qualified as non-detects.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
BMW-01-0106	Lead (Dissolved)	1.1	J	SerialDilution>UCL
BMW-01-0106	Vanadium (Dissolved)	2	U	CCB<RL
BMW-03-0106	Antimony (Dissolved)	4	U	ICB<RL
BMW-03-0106	Lead (Dissolved)	2	J	SerialDilution>UCL
BMW-03-0106	Selenium (Dissolved)	4.7	J+	ICS>UCL
BMW-06-0106	Lead (Dissolved)	5.4	J	SerialDilution>UCL
BMW-06-0106	Nickel (Dissolved)	2	U	LB<RL
BMW-07-0106	Barium (Dissolved)	20	U	LB<RL
BMW-07-0106	Lead (Dissolved)	1.5	J	SerialDilution>UCL
BMW-08-0106	Antimony (Dissolved)	4	U	ICB<RL
BMW-08-0106	Lead (Dissolved)	1.3	J	SerialDilution>UCL
BMW-08-0106	Selenium (Dissolved)	5	J+	ICS>UCL
BMW-08-0106	Silver (Dissolved)	2	U	ICB<RL, CCB<RL
BPZ-01-0106	Antimony (Dissolved)	4	U	ICB<RL
BPZ-01-0106	Lead (Dissolved)	2	UJ	SerialDilution>UCL
BPZ-01-0106	Silver (Dissolved)	2	U	ICB<RL, CCB<RL
MW-90-0106	Antimony (Dissolved)	4	U	ICB<RL
MW-90-0106	Lead (Dissolved)	4.6	J	SerialDilution>UCL
MW-90-0106	Vanadium (Dissolved)	2	U	CCB<RL
RMW-04-15-0106	Lead (Dissolved)	0.22	J	SerialDilution>UCL
RMW-05-15-0106	Lead (Dissolved)	0.3	J	SerialDilution>UCL
RMW-06-15-0106	Lead (Dissolved)	4	J	SerialDilution>UCL
RMW-07-15-0106	Lead (Dissolved)	0.8	J	SerialDilution>UCL
RMW-07-15-0106	Vanadium (Dissolved)	2	U	CCB<RL
RMW-07-35-0106	Barium (Dissolved)	20	U	LB<RL
RMW-07-35-0106	Lead (Dissolved)	0.93	J	SerialDilution>UCL
RMW-09-15-0106	Antimony (Dissolved)	4	U	ICB<RL
RMW-09-15-0106	Lead (Dissolved)	6.4	J	SerialDilution>UCL
RMW-09-35-0106	Barium (Dissolved)	20	U	LB<RL
RMW-09-35-0106	Lead (Dissolved)	0.26	J	SerialDilution>UCL
RMW-10-15-0106	Antimony (Dissolved)	4	U	ICB<RL
RMW-10-15-0106	Lead (Dissolved)	4.4	J	SerialDilution>UCL
RMW-10-35-0106	Barium (Dissolved)	20	U	LB<RL
RMW-10-35-0106	Lead (Dissolved)	11.4	J	SerialDilution>UCL
RMW-10-35-0106	Selenium (Dissolved)	30.5	J+	ICS>UCL
RMW-10-35-0106	Thallium (Dissolved)	2	U	ICB<RL
RMW-11-35-0106	Lead (Dissolved)	2	UJ	SerialDilution>UCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
RMW-11-35-0106	Thallium (Dissolved)	2	U	ICB<RL
RMW-11-35-0106	Vanadium (Dissolved)	2	U	CCB<RL
RMW-13-35-0106	Lead (Dissolved)	2.1	J	SerialDilution>UCL
RMW-14-50-0106	Lead (Dissolved)	2	UJ	SerialDilution>UCL
RMW-14-50-0106	Selenium (Dissolved)	3.9	J+	ICS>UCL
RMW-14-50-0106	Vanadium (Dissolved)	2	U	CCB<RL

CCB<RL = Continuing calibration blank concentration less than RL
ICB<RL = Initial calibration blank concentration less than RL
ICS>UCL = Interference check standard recovery greater than upper control limit
LB<RL= Laboratory blank contamination less than the RL
SerialDilution>UCL = Serial dilution % difference exceeded criteria >10%

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	January 17, 18, 19, 20 and 23, 2006
Report Date:	February 6, 2006
Parameters:	ICP/MS Metals and Mercury
Laboratory:	Sentinel, Inc.
Sample Delivery Group:	MY2BN3

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work ILM05.3. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), October 2004, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II CLP level data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J- — The analyte was positively identified but biased low; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ — The analyte was positively identified but biased high; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples reported in this SDG were received at the laboratory within control temperatures. All samples were accompanied by appropriate CoC forms, all custody seals were intact, and

all samples were preserved to the proper pH. Individual samples did not contain sample tag ID numbers.

All technical holding-time requirements were met.

II. ICP-MS Tune Analysis

The instrument tune was analyzed as required and all acceptance criteria were met.

III. Calibration

All calibration verification standards met acceptance criteria for ICP/MS and mercury analyses.

A contract required quantitation limit (CRQL) check standard was analyzed at the required frequency, and all acceptance criteria were met.

IV. Laboratory Blanks

The method blank associated with all samples in this SDG contained no detections above the method detection limit (MDL).

Antimony and silver were detected in the initial calibration blank (ICB) at concentrations greater than the MDL but lower than the CRQL, equivalent to reporting limit (RL). Chromium, cobalt, copper, manganese, nickel, silver and zinc were detected in continuing calibration blanks (CCB) at concentrations greater than the MDL but below the CRQL. Associated sample results detected at concentrations below the CRQL were qualified as non-detected at the CRQL and flagged "U".

The blank summary form reported detected results below the calculated MDLs.

V. Field Blanks

Samples MW-EB-06-0106, MW-EB-07-0106, and MW-EB-08-0106 were noted as equipment blanks (EB) on the CoC. Detected chromium, manganese, nickel and zinc in the three EB samples were qualified as non-detected at the CRQL and flagged "U" due to detected concentrations below the CRQL in the CCBs. Barium, copper, lead and vanadium were detected in the EBs below the CRQL. Associated sample results detected at concentrations below the CRQL were qualified as non-detected at the CRQL and flagged "U". Zinc was detected above the CRQL in EB sample MW-EB-08-0106. Two samples associated with this EB had detects greater than the CRQL but less than 10 times the blank result. These two samples were qualified as estimated high and flagged "J+".

VI. Interference Check Sample

The interference check sample was analyzed as required and all acceptance criteria were met.

VII. Laboratory Control Sample

Laboratory control samples were run at the required frequency and all recoveries were within criteria.

VIII. Laboratory Duplicates

A laboratory duplicate was analyzed on sample RMW-10-35-0106 and all acceptance criteria were met.

IX. Matrix Spike/Matrix Spike Duplicate

A matrix spike (MS) was analyzed on sample RMW-10-35-0106. Selenium recovered above the acceptance criteria. Antimony, barium, lead and silver were recovered below the acceptance criteria. A post-digestion spike was analyzed on antimony, barium, lead, selenium and silver and acceptance criteria were met for all analytes except selenium. The detected result of selenium in the parent sample was qualified as estimated high and flagged "J+". The non-detected parent results of all other analytes were qualified as estimated and flagged "UJ". For detects greater than the MDL, the parent sample results were qualified as estimated and flagged "J". Arsenic was recovered above the acceptance limit; however, the sample concentration was greater than four times the spike concentration and therefore, no data were qualified.

X. Serial Dilutions

A serial dilution was analyzed on sample RMW-10-35-0106. Zinc was detected at a concentration greater than 50 times its associated MDL, and the percent difference between the initial and serial dilution sample results was determined to be greater than 10 percent. All associated results were qualified as estimated. Detected results were qualified "J" and non-detected results were qualified "UJ".

XI. Field Duplicates

There were three field duplicate (FD) pairs: MW-92-0106 and RMW-08-35-0106, MW-88-0106 and RMW-12-51-0106, and MW-90-0106 and RMW-10-15-0106. Zinc exceeded acceptance criteria for FD pair MW-92-0106 and RMW-08-35-0106, and FD pair MW-88-0106 and RMW-12-51-0106. Detected results were flagged "J". The FD parent sample RMW-10-15-0106 was reported in SDG MY2BJ4. The FD pair MW-90-0106 and RMW-10-15-0106 met acceptance criteria.

XII. ICP-MS Internal Standards

The appropriate number of internal standards was analyzed and all percent relative intensities met control criteria.

XIII. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported CRQLs was not within the scope of the data review for this SDG. Raw data were not reviewed.

XIV. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- High recovery of zinc in the serial dilution analysis resulted in the qualification of all associated sample results as estimated concentrations.

- Samples were and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- Target analytes were detected in the associated EBs, CCBs and ICB and these low-level blank detects resulted in data qualified as non-detects.
- FD and MS exceedances resulted in data qualified as estimated concentrations.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MW-88-0106	Chromium	2	U	CCB<RL
MW-88-0106	Zinc	15.1	J+	EB>RL, FD>RPD, SerialDilution>UCL
MW-90-0106	Silver	1	U	CCB<RL, ICB<RL
MW-90-0106	Zinc	6870	J	SerialDilution>UCL
MW-92-0106	Chromium	2	U	CCB<RL
MW-92-0106	Copper	7	J	FD>RPD
MW-92-0106	Lead	1	U	EB<RL
MW-92-0106	Zinc	16.4	J	SerialDilution>UCL, FD>RPD
RMW-01-17-0106	Antimony	2	U	ICB<RL
RMW-01-17-0106	Silver	1	U	CCB<RL, ICB<RL
RMW-01-17-0106	Zinc	82.9	J	SerialDilution>UCL
RMW-01-35-0106	Chromium	2	U	CCB<RL
RMW-01-35-0106	Lead	1	U	EB<RL
RMW-01-35-0106	Zinc	11.8	J	SerialDilution>UCL
RMW-02-50-0106	Antimony	2	U	ICB<RL
RMW-02-50-0106	Zinc	28.2	J	SerialDilution>UCL
RMW-03-15-0106	Antimony	2	U	ICB<RL
RMW-03-15-0106	Silver	1	U	CCB<RL, ICB<RL
RMW-03-15-0106	Zinc	73.7	J	SerialDilution>UCL
RMW-08-15-0106	Antimony	2	U	ICB<RL
RMW-08-15-0106	Lead	1	U	EB<RL
RMW-08-15-0106	Zinc	14.4	J	SerialDilution>UCL
RMW-08-35-0106	Copper	14	J	FD>RPD
RMW-08-35-0106	Zinc	25.7	J	SerialDilution>UCL, FD>RPD
RMW-09-15-0106	Antimony	2	U	ICB<RL
RMW-09-15-0106	Zinc	135	J	SerialDilution>UCL
RMW-09-35-0106	Silver	1	U	CCB<RL, ICB<RL
RMW-09-35-0106	Zinc	27.3	J	SerialDilution>UCL
RMW-10-35-0106	Antimony	2	UJ	ICB<RL, MS<LCL
RMW-10-35-0106	Barium	27.8	J	MS<LCL
RMW-10-35-0106	Lead	21.3	J	MS<LCL
RMW-10-35-0106	Selenium	30.5	J+	MS>UCL
RMW-10-35-0106	Silver	1	UJ	CCB<RL, ICB<RL, MS<LCL
RMW-10-35-0106	Zinc	91.9	J	SerialDilution>UCL
RMW-12-32-0106	Silver	1	U	CCB<RL, ICB<RL
RMW-12-32-0106	Zinc	305	J	SerialDilution>UCL
RMW-12-51-0106	Zinc	21.6	J+	EB>RL, FD>RPD, SerialDilution>UCL

CCB<RL = Continuing calibration blank concentration less than RL
EB<RL = Equipment blank concentration less than the RL
EB>RL = Equipment blank concentration greater than the RL
FD>RPD = Field duplicate exceeds RPD criteria
ICB<RL = Initial calibration blank concentration less than RL
MS<LCL = Matrix spike recovery less than lower limit
MS>UCL = Matrix spike recovery greater than upper limit
SerialDilution>UCL = Serial dilution % difference exceeded criteria >10%

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	January 19, 20 and 23, 2006
Report Date:	February 6, 2006
Parameters:	ICP/MS Metals and Mercury
Laboratory:	Sentinel, Inc.
Sample Delivery Group:	MY2BP4

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work ILM05.3. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), October 2004, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II CLP level data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J- — The analyte was positively identified but biased low; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ — The analyte was positively identified but biased high; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples reported in this SDG were received at the laboratory within control temperatures. Samples were accompanied by appropriate CoC forms, all custody seals were intact. Individual samples did not contain sample tag ID numbers.

Sample RMW-02-32-0106 was received at pH=4. This sample is for dissolved metals analysis. The data package does not indicate that the sample was filtered. The pH of this sample was adjusted to below 2 prior to analysis as noted in the digestion log. No flags were applied as a result of the pH discrepancies.

All technical holding-time requirements were met.

II. ICP-MS Tune Analysis

The instrument tune was analyzed as required and all acceptance criteria were met for the ICP-MS and mercury analyses.

III. Calibration

All calibration verification standards met acceptance criteria.

A contract required quantitation limit (CRQL), equivalent to reporting limit (RL), check standard (CRI) was analyzed at the required frequency, but the manganese result exceeded the upper control criteria. The CRI was reanalyzed for manganese with an acceptable recovery; therefore, no data were qualified.

IV. Laboratory Blanks

Zinc was detected in the method blank (MB) at a concentration greater than the method detection limit (MDL) but less than the CRQL. All associated results were greater than the CRQL and therefore, were not flagged.

Antimony and silver were detected in the initial calibration blank (ICB) at concentrations greater than the MDL but lower than the CRQL. Silver was detected in a continuing calibration blank (CCB) at a concentration greater than the MDL but below the CRQL. Associated sample results detected at concentrations below the CRQL were qualified as non-detected at the CRQL and flagged “U”.

The blank summary form reported detected results below the calculated MDLs.

V. Field Blanks

No field blanks in this SDG.

VI. Interference Check Sample

The interference check sample was analyzed as required and all acceptance criteria were met.

VII. Laboratory Control Sample

A laboratory control sample was analyzed and all recoveries were within criteria.

VIII. Laboratory Duplicates

A laboratory duplicate was analyzed on sample RMW-01-35-0106 and all acceptance criteria were met.

IX. Matrix Spike/Matrix Spike Duplicate

A matrix spike (MS) was analyzed on sample RMW-01-35-0106. Silver was recovered below the control criteria. A post-digestion spike was analyzed on silver and acceptance criteria were met. The non-detected parent result was qualified as estimated and flagged "UJ".

X. Serial Dilutions

A serial dilution was analyzed on sample RMW-01-35-0106. Barium and nickel were detected at concentrations greater than 50 times their associated MDLs, and the percent differences between the initial and serial dilution sample results were determined to be greater than 10 percent. All associated detected results were qualified as estimated and flagged "J".

XI. Field Duplicates

There were two field duplicate pairs: MW-92-0106 and RMW-08-35-0106, MW-88-0106 and RMW-12-51-0106. All acceptance criteria were met.

XII. ICP-MS Internal Standards

The appropriate number of internal standards was analyzed and all percent relative intensities met control criteria.

XIII. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported CRQLs was not within the scope of the data review for this SDG. Raw data were not reviewed.

XIV. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable. One MS recovery exceeded control limits, but the associated post-digestion spike met acceptance criteria.
- Low recovery of barium and nickel in the serial dilution analysis resulted in the qualification of all associated sample results as estimated concentrations.
- Samples were and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- Target analytes were detected in the associated MB, ICB and CCBs, and these low-level blank detects resulted in data qualified as non-detects.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MW-12-0106	Barium (Dissolved)	107	J	SerialDilution>UCL
MW-12-0106	Nickel (Dissolved)	17.4	J	SerialDilution>UCL
MW-88-0106	Barium (Dissolved)	37.4	J	SerialDilution>UCL
MW-88-0106	Nickel (Dissolved)	87	J	SerialDilution>UCL
MW-92-0106	Barium (Dissolved)	57.2	J	SerialDilution>UCL
MW-92-0106	Nickel (Dissolved)	67.5	J	SerialDilution>UCL
RMW-01-17-0106	Barium (Dissolved)	104	J	SerialDilution>UCL
RMW-01-17-0106	Nickel (Dissolved)	4.6	J	SerialDilution>UCL
RMW-01-35-0106	Barium (Dissolved)	82.3	J	SerialDilution>UCL
RMW-01-35-0106	Nickel (Dissolved)	20.5	J	SerialDilution>UCL
RMW-01-35-0106	Silver (Dissolved)	1	UJ	MS<LCL
RMW-02-13-0106	Antimony (Dissolved)	2	U	ICB<RL
RMW-02-13-0106	Barium (Dissolved)	608	J	SerialDilution>UCL
RMW-02-13-0106	Nickel (Dissolved)	42.8	J	SerialDilution>UCL
RMW-02-32-0106	Antimony (Dissolved)	2	U	ICB<RL
RMW-02-32-0106	Barium (Dissolved)	171	J	SerialDilution>UCL
RMW-02-32-0106	Nickel (Dissolved)	308	J	SerialDilution>UCL
RMW-02-50-0106	Barium (Dissolved)	71.9	J	SerialDilution>UCL
RMW-02-50-0106	Nickel (Dissolved)	227	J	SerialDilution>UCL
RMW-03-15-0106	Antimony (Dissolved)	2	U	ICB<RL
RMW-03-15-0106	Barium (Dissolved)	93.5	J	SerialDilution>UCL
RMW-03-15-0106	Nickel (Dissolved)	12.2	J	SerialDilution>UCL
RMW-08-15-0106	Antimony (Dissolved)	2	U	ICB<RL
RMW-08-15-0106	Barium (Dissolved)	42.2	J	SerialDilution>UCL
RMW-08-15-0106	Nickel (Dissolved)	4.9	J	SerialDilution>UCL
RMW-08-35-0106	Barium (Dissolved)	57.8	J	SerialDilution>UCL
RMW-08-35-0106	Nickel (Dissolved)	67.2	J	SerialDilution>UCL
RMW-12-32-0106	Barium (Dissolved)	12.7	J	SerialDilution>UCL
RMW-12-32-0106	Nickel (Dissolved)	84.5	J	SerialDilution>UCL
RMW-12-51-0106	Barium (Dissolved)	38	J	SerialDilution>UCL
RMW-12-51-0106	Nickel (Dissolved)	88.2	J	SerialDilution>UCL

ICB<RL = Initial calibration blank concentration less than RL
MS<LCL = Matrix spike recovery less than lower limit
SerialDilution>UCL = Serial dilution % difference exceeded criteria >10%

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	January 10, 11, 12, 13, 17 and 18, 2006
Report Date:	January 27, 2006
Parameters:	ICP Metals
Laboratory:	Sentinel, Inc.
Sample Delivery Group:	MY2BJ6

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work ILM05.3. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), October 2004, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II CLP level data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J- — The analyte was positively identified but biased low; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ — The analyte was positively identified but biased high; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The samples reported in this SDG were received at the laboratory within control temperatures. All samples were accompanied by appropriate CoC forms, and all custody

seals were intact. Individual samples did not contain sample tag ID numbers. Not all samples on the CoC were identified or analyzed in this SDG.

Samples BPZ-01-0106 and BMW-08-0106 were received at a pH = 6. The pH of these samples was adjusted to below 2 prior to analysis. No flags were applied as a result of the pH discrepancies.

All technical holding-time requirements were met.

II. Calibration

All calibration verification standards met acceptance criteria.

III. Laboratory Blanks

The method blank met all acceptance criteria.

Calcium, magnesium and sodium were detected in the continuing calibration blanks (CCB) at concentrations greater than the method detection limit (MDL), but below the contract required quantitation limit (CRQL), equivalent to the reporting limit (RL). Only equipment blanks (EB) were affected and therefore, no sample data were qualified.

IV. Field Blanks

Samples MW-EB-01-0106, MW-EB-02-0106, MW-EB-03-0106, MW-EB-04-0106, and MW-EB-05-0106 were noted as EB on the CoC. Calcium, magnesium and sodium in the five samples were qualified due to detected concentrations below the CRQL in the CCB and therefore, no sample results were impacted by the EB detections. However, aluminum was detected in all of the EBs and iron was detected in one EB below the CRQL. Associated aluminum and iron results were greater than the CRQL and therefore, no data were qualified. Potassium was detected in all of the EBs below the CRQL. Associated potassium results in samples RMW-07-35-0106 and RMW-04-15-0106 were qualified as non-detected at the CRQL and flagged "U". Detected potassium results in the remaining samples were greater than the CRQL and therefore, no data were qualified.

V. Interference Check Sample

The interference check sample was analyzed as required and all acceptance criteria were met.

VI. Laboratory Control Sample

Laboratory control samples were analyzed at the required frequency and all recoveries were within criteria.

VII. Laboratory Duplicates

A laboratory duplicate was analyzed on sample RMW-11-35-0106. All acceptance criteria were met.

VIII. Matrix Spike/Matrix Spike Duplicate

A matrix spike was analyzed on sample RMW-11-35-0106 for aluminum and iron. All acceptance criteria were met.

IX. Serial Dilutions

A serial dilution was analyzed on sample RMW-11-35-0106. All acceptance criteria were met.

X. Field Duplicates

Field duplicate pair MW-90-0106 and RMW-10-15-0106 were split between two SDGs. MW-90-0106 was reported in SDG MY2BN5. This field duplicate pair met acceptance criteria.

XI. Compound Quantitation and Reported CRQLs

Sodium and magnesium were detected in several samples above the linear range. Samples were reanalyzed at required dilutions. Raw data were not reviewed.

Verification of compound identification was not within the scope of the data review for this SDG.

XII. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable.
- Blank contamination was minimal and had limited impact on reported results.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
RMW-04-15-0106	Potassium	5000	U	EB<RL
RMW-07-35-0106	Potassium	5000	U	EB<RL

EB<RL = Equipment blank concentration less than RL

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	January 10, 11, 12, 13, 17 and 18, 2006
Report Date:	January 26, 2006
Parameters:	ICP Dissolved Metals
Laboratory:	Sentinel, Inc.
Sample Delivery Group:	MY2BJ8

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work ILM05.3. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), October 2004, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II CLP level data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J- — The analyte was positively identified but biased low; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ — The analyte was positively identified but biased high; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The samples reported in this SDG were received at the laboratory within control temperatures. All samples were accompanied by appropriate CoC forms, and all custody seals were intact. Individual samples did not contain sample tag ID numbers.

Samples BPZ-01-0106 and BMW-08-0106 were received at a pH = 6. The pH of these samples was adjusted to below 2 prior to analysis. No flags were applied as a result of the pH discrepancies.

All technical holding-time requirements were met.

II. Calibration

All calibration verification standards met acceptance criteria.

III. Laboratory Blanks

The method blank met all acceptance criteria.

Aluminum, iron, magnesium, potassium and sodium were detected in the continuing calibration blanks (CCB) at concentrations greater than the method detection limit (MDL), but lower than the contract required quantitation limit (CRQL), equivalent to reporting limit (RL). Associated sample results detected at concentrations below the CRQL were qualified as not detected at the CRQL and flagged "U". Detected results greater than the CRQL were not qualified.

IV. Field Blanks

No field blanks in this SDG.

V. Interference Check Sample

The interference check sample was analyzed as required and all acceptance criteria were met.

VI. Laboratory Control Sample

Laboratory control samples were run at the required frequency and all recoveries were within criteria.

VII. Laboratory Duplicates

A laboratory duplicate was analyzed on sample RMW-10-35-0106. All acceptance criteria were met.

VIII. Matrix Spike/Matrix Spike Duplicate

A matrix spike was analyzed on sample RMW-10-35-0106 for aluminum and iron. All acceptance criteria were met.

IX. Serial Dilutions

A serial dilution was analyzed on sample RMW-10-35-0106. Sodium was detected at a concentration greater than 50 times the associated MDL, and the percent difference between the initial and serial dilution sample results were determined to be greater than 10 percent. All associated results were qualified as estimated and flagged "J".

X. Field Duplicates

There was one field duplicate pair MW-90-0106 and RMW-10-15-0106. All acceptance criteria were met.

XI. Compound Quantitation and Reported CRQLs

Sodium was detected in several samples above the linear range. Samples were reanalyzed at the required dilutions. Raw data were not reviewed.

Verification of compound identification was not within the scope of the data review for this SDG.

XII. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable.
- Low recovery of sodium in the serial dilution analysis resulted in the qualification of all associated sample results as estimated.
- Target analytes were detected in the associated CCBs. Some of these low-level blank detects resulted in detected data qualified as non-detects.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
BMW-01-0106	Aluminum (Dissolved)	200	U	CCB<RL
BMW-01-0106	Sodium (Dissolved)	990999	J	SerialDilution>UCL
BMW-03-0106	Iron (Dissolved)	100	U	CCB<RL
BMW-03-0106	Sodium (Dissolved)	405000	J	SerialDilution>UCL
BMW-06-0106	Iron (Dissolved)	100	U	CCB<RL
BMW-06-0106	Sodium (Dissolved)	876000	J	SerialDilution>UCL
BMW-07-0106	Sodium (Dissolved)	1240000	J	SerialDilution>UCL
BMW-08-0106	Sodium (Dissolved)	9430000	J	SerialDilution>UCL
BPZ-01-0106	Sodium (Dissolved)	5290000	J	SerialDilution>UCL
MW-90-0106	Sodium (Dissolved)	150000	J	SerialDilution>UCL
RMW-04-15-0106	Potassium (Dissolved)	5000	U	CCB<RL
RMW-04-15-0106	Sodium (Dissolved)	336000	J	SerialDilution>UCL
RMW-05-15-0106	Sodium (Dissolved)	407001	J	SerialDilution>UCL
RMW-06-15-0106	Sodium (Dissolved)	225999	J	SerialDilution>UCL
RMW-07-15-0106	Iron (Dissolved)	100	U	CCB<RL
RMW-07-15-0106	Sodium (Dissolved)	60200	J	SerialDilution>UCL
RMW-07-35-0106	Iron (Dissolved)	100	U	CCB<RL
RMW-07-35-0106	Potassium (Dissolved)	5000	U	CCB<RL
RMW-07-35-0106	Sodium (Dissolved)	291000	J	SerialDilution>UCL
RMW-09-15-0106	Iron (Dissolved)	100	U	CCB<RL
RMW-09-15-0106	Sodium (Dissolved)	159999	J	SerialDilution>UCL
RMW-09-35-0106	Aluminum (Dissolved)	200	U	CCB<RL
RMW-09-35-0106	Potassium (Dissolved)	5000	U	CCB<RL
RMW-09-35-0106	Sodium (Dissolved)	303000	J	SerialDilution>UCL
RMW-10-15-0106	Sodium (Dissolved)	146001	J	SerialDilution>UCL
RMW-10-35-0106	Sodium (Dissolved)	3640000	J	SerialDilution>UCL
RMW-11-35-0106	Aluminum (Dissolved)	200	U	CCB<RL
RMW-11-35-0106	Sodium (Dissolved)	260001	J	SerialDilution>UCL
RMW-13-35-0106	Aluminum (Dissolved)	200	U	CCB<RL
RMW-13-35-0106	Sodium (Dissolved)	6150000	J	SerialDilution>UCL
RMW-14-50-0106	Sodium (Dissolved)	5520000	J	SerialDilution>UCL

CCB<RL = Continuing calibration blank concentration less than RL
SerialDilution>UCL = Serial dilution % difference exceeded criteria >10%

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	January 17, 18, 19, 20 and 23, 2006
Report Date:	February 6, 2006
Parameters:	ICP Metals
Laboratory:	Sentinel, Inc.
Sample Delivery Group:	MY2BN5

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work ILM05.3. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), October 2004, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II CLP level data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J- — The analyte was positively identified but biased low; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ — The analyte was positively identified but biased high; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The samples reported in this SDG were received at the laboratory within control temperatures. Samples were accompanied by appropriate CoC forms, and all custody seals

were intact. Individual samples did not contain sample tag ID numbers. Not all samples on the CoC were identified or analyzed in this SDG.

All technical holding-time requirements were met.

II. Calibration

All calibration verification standards met acceptance criteria.

III. Laboratory Blanks

The method blank (MB) associated with all samples in this SDG contained concentrations of potassium above the method detection limit (MDL), but below the contract required quantitation limit (CRQL), equivalent to reporting limit (RL). Associated results detected at concentrations below the CRQL were qualified as not detected at the CRQL and flagged "U". Detected results greater than the CRQL were not qualified.

Aluminum, calcium, iron, magnesium and potassium were detected in the continuing calibration blanks (CCB) at concentrations greater than the MDL, but lower than the CRQL. Associated sample and equipment blank (EB) results detected at concentrations below the CRQL were qualified as non-detected at the CRQL and flagged "U". Detected results greater than the CRQL were not qualified.

IV. Field Blanks

Samples MW-EB-06-0106, MW-EB-07-0106 and MW-EB-08-0106 were noted as EBs on the CoC. Detected aluminum, calcium, iron, magnesium and potassium in the three EB samples were qualified due to detected concentrations below the CRQL in the CCB and therefore, no sample results were impacted from the EB detections. However, sodium was detected in all EBs below the CRQL. Associated sodium results were greater than the CRQL and therefore, no data were qualified.

V. Interference Check Sample

The interference check sample was analyzed as required and all acceptance criteria were met.

VI. Laboratory Control Sample

Laboratory control samples were analyzed at the required frequency and all recoveries were within criteria.

VII. Laboratory Duplicates

A laboratory duplicate was analyzed on sample RMW-10-35-0106. All acceptance criteria were met.

VIII. Matrix Spike/Matrix Spike Duplicate

A matrix spike was analyzed on sample RMW-10-35-0106 for aluminum and iron. All acceptance criteria were met.

IX. Serial Dilutions

A serial dilution was analyzed on sample RMW-10-35-0106. Aluminum was detected at concentrations greater than 50 times the associated MDL, and the percent differences between the initial and serial dilution sample results was determined to be greater than 10 percent. All associated detected results were qualified as estimated and flagged "J".

X. Field Duplicates

There were three field duplicate (FD) pairs: RMW-08-35-0106 and MW-92-0106; RMW-10-15-0106 and MW-90-0106; and RMW-12-51-0106 and MW-88-0106. Aluminum and iron exceeded the relative percent difference (RPD) criteria in the FD pair, RMW-08-35-0106 and MW-92-0106, and detected results were flagged "J". FD pair RMW-12-51-0106 and MW-88-0106 met acceptance criteria. Sample RMW-10-15-0106 was reported in SDG MY2BJ6. This sample and its FD, MW-90-0106, met acceptance criteria.

XI. Compound Quantitation and Reported CRQLs

Verification of compound identification was not within the scope of the data review for this SDG. Raw data were not reviewed.

XII. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable.
- High recovery of aluminum in the serial dilution analysis resulted in the qualification of all associated sample results as estimated.
- Blank contamination was minimal and had limited impact on reported results.
- RPD requirements were exceeded for aluminum and iron in one FD pair which resulted in the qualification of associated sample results as estimated

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MW-88-0106	Aluminum	396	J	SerialDilution>UCL
MW-88-0106	Potassium	5000	U	LB<RL
MW-90-0106	Aluminum	400	J	SerialDilution>UCL
MW-92-0106	Aluminum	292	J	FD>RPD, SerialDilution>UCL
MW-92-0106	Iron	992	J	FD>RPD
MW-92-0106	Potassium	5000	U	LB<RL
RMW-01-17-0106	Aluminum	9770	J	SerialDilution>UCL
RMW-01-35-0106	Aluminum	375	J	SerialDilution>UCL
RMW-01-35-0106	Potassium	5000	U	LB<RL
RMW-02-50-0106	Aluminum	644	J	SerialDilution>UCL
RMW-03-15-0106	Aluminum	2720	J	SerialDilution>UCL
RMW-08-15-0106	Aluminum	605	J	SerialDilution>UCL
RMW-08-35-0106	Aluminum	1090	J	FD>RPD, SerialDilution>UCL
RMW-08-35-0106	Iron	2340	J	FD>RPD
RMW-08-35-0106	Potassium	5000	U	LB<RL
RMW-09-15-0106	Aluminum	612	J	SerialDilution>UCL
RMW-09-35-0106	Aluminum	5260	J	SerialDilution>UCL
RMW-09-35-0106	Magnesium	5000	U	CCB<RL
RMW-09-35-0106	Potassium	5000	U	LB<RL
RMW-10-35-0106	Aluminum	3340	J	SerialDilution>UCL
RMW-12-32-0106	Aluminum	7190	J	SerialDilution>UCL
RMW-12-32-0106	Magnesium	5000	U	CCB<RL
RMW-12-51-0106	Aluminum	436	J	SerialDilution>UCL
RMW-12-51-0106	Potassium	5000	U	LB<RL

CCB<RL = Continuing calibration blank concentration less than RL
FD>RPD = Field duplicate exceeds RPD criteria
LB<RL = Laboratory blank concentration less than RL
SerialDilution>UCL = Serial dilution % difference exceeded criteria >10%

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	January 19, 20 and 23, 2006
Report Date:	February 6, 2006
Parameters:	ICP Dissolved Metals
Laboratory:	Sentinel, Inc.
Sample Delivery Group:	MY2BP6

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work ILM05.3. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Inorganic Data Review (NFG), October 2004, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier II CLP level data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J- — The analyte was positively identified but biased low; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ — The analyte was positively identified but biased high; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The samples reported in this SDG were received at the laboratory within control temperatures. All samples were accompanied by appropriate CoC forms, and all custody seals were intact. Individual samples did not contain sample tag ID numbers.

Sample RMW-02-32-0106 was received at pH = 4. The pH of this sample was adjusted to below 2 prior to analysis. No flags were applied as a result of the pH discrepancies.

All technical holding-time requirements were met.

II. Calibration

All calibration verification standards met acceptance criteria.

III. Laboratory Blanks

The method blank (MB) associated with all samples in this SDG contained concentrations of potassium above the method detection limit (MDL), but below the contract required quantitation limit (CRQL), equivalent to reporting limit (RL). Associated results detected at concentrations below the CRQL were qualified as non-detected at the CRQL and flagged "U". Detected results greater than the CRQL were not qualified.

Calcium, iron, magnesium and sodium were detected in the continuing calibration blanks at concentrations greater than the MDL, but lower than the CRQL. Associated sample results detected at concentrations below the CRQL were qualified as non-detected at the CRQL and flagged "U". Detected results greater than the CRQL were not qualified.

IV. Field Blanks

No field blanks in this SDG.

V. Interference Check Sample

The interference check sample was analyzed as required and all acceptance criteria were met.

VI. Laboratory Control Sample

Laboratory control samples were analyzed at the required frequency and all recoveries were within criteria.

VII. Laboratory Duplicates

A laboratory duplicate was analyzed on sample RMW-12-51-0106. All acceptance criteria were met.

VIII. Matrix Spike/Matrix Spike Duplicate

A matrix spike was analyzed on sample RMW-12-51-0106 for aluminum and iron. All acceptance criteria were met.

IX. Serial Dilutions

A serial dilution was analyzed on sample RMW-12-51-0106. Sodium was detected at concentrations greater than 50 times the associated MDL, and the percent differences between the initial and serial dilution sample results were determined to be greater than 10 percent. All associated results were qualified as estimated and flagged "J".

X. Field Duplicates

There were two field duplicate pairs MW-92-0106 and RMW-08-35-0106 along with MW-88-0106 and RMW-12-51-0106. All acceptance criteria were met.

XI. Compound Quantitation and Reported CRQLs

Sodium was detected in one sample above the linear range and was reanalyzed at a dilution. Raw data were not reviewed.

Verification of compound identification was not within the scope of the data review for this SDG.

XII. Overall Assessment of Data

- All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are generally acceptable.
- Low recovery of sodium in the serial dilution analysis resulted in the qualification of all associated sample results as estimated.
- Blank contamination was minimal and had limited impact on reported results.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MW-12-0106	Sodium (Dissolved)	201999	J	SerialDilution>UCL
MW-88-0106	Potassium (Dissolved)	5000	U	LB<RL
MW-88-0106	Sodium (Dissolved)	215001	J	SerialDilution>UCL
MW-92-0106	Potassium (Dissolved)	5000	U	LB<RL
MW-92-0106	Sodium (Dissolved)	261999	J	SerialDilution>UCL
RMW-01-17-0106	Sodium (Dissolved)	97800	J	SerialDilution>UCL
RMW-01-35-0106	Potassium (Dissolved)	5000	U	LB<RL
RMW-01-35-0106	Sodium (Dissolved)	384000	J	SerialDilution>UCL
RMW-02-13-0106	Sodium (Dissolved)	318000	J	SerialDilution>UCL
RMW-02-32-0106	Sodium (Dissolved)	1340000	J	SerialDilution>UCL
RMW-02-50-0106	Sodium (Dissolved)	167001	J	SerialDilution>UCL
RMW-03-15-0106	Sodium (Dissolved)	345999	J	SerialDilution>UCL
RMW-08-15-0106	Sodium (Dissolved)	96900	J	SerialDilution>UCL
RMW-08-35-0106	Potassium (Dissolved)	5000	U	LB<RL
RMW-08-35-0106	Sodium (Dissolved)	255999	J	SerialDilution>UCL
RMW-12-32-0106	Iron (Dissolved)	100	U	CCB<RL
RMW-12-32-0106	Magnesium (Dissolved)	5000	U	CCB<RL
RMW-12-32-0106	Sodium (Dissolved)	501000	J	SerialDilution>UCL
RMW-12-51-0106	Potassium (Dissolved)	5000	U	SerialDilution>UCL
RMW-12-51-0106	Sodium (Dissolved)	194001	J	SerialDilution>UCL

CCB<RL = Continuing calibration blank concentration less than RL
LB<RL = Laboratory blank concentration less than RL
SerialDilution>UCL = Percent difference between the initial and serial dilution results greater than 10%

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	January 23, 2006
Report Date:	February 6, 2006
Parameters:	ICP Metals
Laboratory:	Sentinel, Inc.
Sample Delivery Group:	MY2BR9

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Method ILM05.3. Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the USEPA National Functional Guidelines for Inorganic Data Review (NFG), October 2004, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier III data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier III data validation. The intended objective of the data review process was to provide a technical review of the raw data and to provide verification of calculations and analyte identification. It was not intended to determine contract compliance.

The scope of the data review included the chain-of-custody (CoC) records, the case narrative, completed contract laboratory program (CLP) data summary forms and raw data.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J- — The analyte was positively identified but biased low; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ — The analyte was positively identified but biased high; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All technical holding-time requirements were met.

II. Calibration

The initial calibration verification, continuing calibration verification standards and contract required quantitation limit (CRQL) check standards met acceptance criteria.

III. Laboratory Blanks

A method blank (MB) was analyzed as required. Potassium was detected in the MB below the CRQL, equivalent to the reporting limit (RL). Sample results greater than the method detection limit (MDL) and below the CRQL for potassium were not qualified because only the equipment blanks (EB) were affected.

Initial calibration blanks had no detected results.

Continuing calibration blanks had detected results greater than the MDL and less than the CRQL for magnesium. Detected sample results were greater than the CRQL and were not qualified.

IV. Field Blanks

There was one EB submitted in this SDG: MW-EB-09-0106. Potassium was detected in the EB less than the CRQL. All associated results were greater than the CRQL and were not qualified.

V. Interference Check Sample

The interference check samples were analyzed as required and were within acceptance criteria.

VI. Laboratory Control Sample

All laboratory control sample recoveries were within criteria.

VII. Laboratory Duplicate

A laboratory duplicate was analyzed on sample MW-12-0106. All recoveries were within acceptance criteria.

VIII. Matrix Spike/Matrix Spike Duplicate

A matrix spike was analyzed on sample MW-12-0106 for aluminum and iron. The aluminum recovery was within acceptance criteria. Iron was recovered above acceptance criteria. However, iron in the parent sample was greater than four times the spiked concentration and therefore, no data were qualified.

IX. Serial Dilution

A serial dilution was performed on sample MW-12-0106. Potassium and sodium were each detected at a concentration greater than 50 times the MDL, and the percent difference between the initial and serial dilution sample results were determined to be greater than 10 percent. The associated detected results were qualified as estimated and flagged “J”.

X. Field Duplicates

There were no field duplicates in this SDG.

XI. Compound Quantitation and Reported CRQLs

Raw data were reviewed and calculations were verified. Sample RMW-02-32-0106 contained sodium at a concentration above the linear range. The sample was reanalyzed at a dilution for sodium.

XII. Overall Assessment of Data

- Tier III review was performed. All of the results are useable for project objectives and therefore, the completeness objectives were met for all method/analyte combinations.
- The results of laboratory and matrix-related accuracy and precision indicators are acceptable.
- Samples were collected and analyzed based on approved methods/procedures and results are reported using industry-standardized units.
- Blank contamination was minimal and had no impact on reported results.
- Low recovery of potassium and sodium in the serial dilution resulted in qualification of associated sample results as estimated concentrations.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MW-12-0106	Potassium	19700	J	SerialDilution>UCL
MW-12-0106	Sodium	189999	J	SerialDilution>UCL

SerialDilution>UCL = Serial dilution % difference exceeded criteria >10%

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	January 19, 20 and 23, 2006
Report Date:	February 03, 2006
Parameters:	PCDD/PCDF
Laboratory:	Paradigm Analytical Laboratories, Inc.
Sample Delivery Group:	MW-EB-07-0106

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. The case narrative indicates that the samples in this SDG were analyzed by a modified version of USEPA Contract Laboratory Program (CLP) Statement of Work DLM01.4 for polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/PCDF). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Chlorinated Dioxin/Furan Data Review, August 2002.

Tier II review was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative, completed CLP data summary forms, and instrument-generated summary reports only.

Data qualifiers have been applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may be imprecise.
- R — The sample result is unusable. The analyte may or may not be present in the sample.

I. Holding Times, Storage and Preservation

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. The laboratory indicates in the case narrative that the samples did not have EPA sample tags attached to the containers when they were received.

All holding-time requirements were met.

The CoC indicates that the samples were not preserved with sodium thiosulfate. There is no information whether the test for residual chlorine was performed. In the absence of information regarding the need for sodium thiosulfate, the data have not been qualified for absence of preservation.

II. Performance Evaluation Samples

Not applicable – there were no performance evaluation samples associated with this SDG.

III. Mass Calibration and Mass Spectrometer Resolution

Mass calibration and mass spectrometer resolution met the acceptance criteria.

IV. Window Defining Mix

All requirements within the scope of the Tier II review were determined to have been met.

V. Chromatographic Resolution

The GC resolution criteria were met.

VI. Instrument Stability

The absolute and relative retention times of the CS3 standard in all the injections indicated adequate stability.

The ion abundance and response criteria were met.

Summary reports off of the data system indicate acceptable instrument sensitivity. Verification of the accuracy of these reports was not within the scope of the Tier II review.

VII. HRGC/HRMS Initial Calibration

Initial calibration was performed at the required frequency.

The standard concentrations used for initial calibration were as specified in the CLP Statement of Work (SOW).

The ion abundance and linearity criteria were met.

Summary reports off of the data system indicate acceptable instrument sensitivity, GC resolution, and retention times. Verification of the accuracy of these reports was not within the scope of the Tier II review.

VIII. HRGC/HRMS Calibration Verification

The absolute retention time of the first eluting internal standard met the criteria. Comparison of the absolute retention times of the rest of the internal standards with those obtained during initial calibration was not within the scope of the Tier II review.

The relative retention times of the labeled 1,2,3,4,6,7,8-HpCDD standard in the continuing calibration verification standards injected at the beginning, middle, and end of the analytical sequence were below the lower acceptance limit. The relative retention times of the labeled 1,2,3,4,7,8-HxCDF standard in the same injections of the continuing calibration verification standard exceeded the upper acceptance limit. The absolute retention times of both of these labeled standards were fairly consistent in the three injections. Since adequate stability was indicated by all the injections, no data have been qualified.

The ion abundances and analyte responses met the criteria.

Summary reports off of the data system indicate acceptable instrument sensitivity. Verification of the accuracy of these reports was not within the scope of the Tier II review.

IX. Identification Criteria

Evaluation of the relative retention times, peak identifications, signal-to-noise ratios, and polychlorinated diphenyl ether interferences was not within the scope of the Tier II review.

X. Method Blank Analysis

Several target analytes were detected in the method blank. All detections were at concentrations below the CLP contract required quantitation limits (CRQLs). Where these analytes were reported by the laboratory as detected below the CRQL in the associated samples, they have been flagged as not detected ("U") at the respective CRQLs; sample results above the CRQLs have been flagged as estimated ("J").

XI. Laboratory Control Sample Analysis

A laboratory control sample was analyzed with the samples in this SDG. The results met the acceptance criteria.

XII. Toxicity Equivalency Factor and Isomer Specificity

A Form 1DFB with completed heading was included for each of the samples. However, no toxicity equivalences were calculated or reported on the forms.

XIII. Dilution by Addition of Solvent

No sample was analyzed at a dilution, and there is no indication in the data package that any of the positive results exceeded the calibration range. No verification was performed since raw data were outside the scope of the Tier II review.

XIV. Dilution by Re-extraction and Reanalysis

There is no indication that any of the samples required re-extraction or reanalysis at a dilution.

XV. Second Column Confirmation

No 2,3,7,8-TCDF was detected at or above the CRQL in any of the samples in this SDG.

XVI. Estimated Detection Limit and Estimated Maximum Possible Concentration

All EDLs and EMPCs were properly reported, except that EMPCs are not reported on EPA Form 2DF for samples in which EMPCs are reported on the corresponding EPA Form 1DFA.

Verification of EDL and EMPC calculations was not within the scope of the Tier II review.

XVII. Labeled Compound Recoveries

All labeled standards were recovered within the acceptance limits.

The ion abundance ratios of detected analytes and labeled standards met the criteria.

Verification of signal-to-noise ratios was not within the scope of the Tier II review.

XVIII. Field Blanks

Some target PCDDs/PCDFs were detected below the CRQLs in each of the equipment blanks. The detections were attributed to laboratory contamination as evident from the method blank results.

XIX. Field Duplicates

The results of sample MW-88-0106 were reproducible with those of its field duplicate, RMW-12-51-0106.

XX. Overall Assessment of Data

There were reporting issues with respect to the toxicity equivalences (TEQs) and total homologue concentrations. No TEQs were reported on EPA Form 1DFB for any of the samples. EMPCs are not reported on EPA Form 2DF for samples in which EMPCs are reported on the corresponding EPA Form 1DFA. Per the CLP SOW, the total EMPC is to be reported under the "EMPC/EDL" column.

Except for the above reporting anomalies, the overall quality of the data appears to be acceptable.

Data Qualification Summary

Field ID	Analyte	Final Result	Final Flag	Validation Comments
MW-EB-07-0106	1,2,3,7,8-PeCDD	0.050	U	LB<RL
	Total PeCDD	0.050	U	
	OCDD	0.100	U	
	2,3,7,8-TCDF	0.010	U	
	Total TCDF	0.010	U	
	1,2,3,7,8-PeCDF	0.050	U	
	2,3,4,7,8-PeCDF	0.050	U	
	Total PeCDF	0.050	U	
	1,2,3,4,7,8-HxCDF	0.050	U	
	2,3,4,6,7,8-HxCDF	0.050	U	
	Total HxCDF	0.050	U	
RMW-01-17-0106	OCDD	0.944	J	LB<RL
	2,3,7,8-TCDF	0.010	U	
	Total TCDF	0.010	U	
	1,2,3,7,8-PeCDF	0.050	U	
	2,3,4,7,8-PeCDF	0.050	U	
	Total PeCDF	0.050	U	
	2,3,4,6,7,8-HxCDF	0.050	U	
	Total HxCDF	0.050	U	
	1,2,3,4,6,7,8-HpCDF	0.050	U	
	Total HpCDF	0.0924	J	
RMW-01-35-0106	OCDD	0.100	U	LB<RL
	2,3,7,8-TCDF	0.010	U	
	Total TCDF	0.010	U	
	1,2,3,7,8-PeCDF	0.050	U	
	2,3,4,7,8-PeCDF	0.050	U	
	Total PeCDF	0.050	U	
	1,2,3,4,7,8-HxCDF	0.050	U	
	1,2,3,6,7,8-HxCDF	0.050	U	
	2,3,4,6,7,8-HxCDF	0.050	U	
	Total HxCDF	0.050	U	
	1,2,3,4,6,7,8-HpCDF	0.050	U	
	Total HpCDF	0.050	U	
RMW-08-15-0106	OCDD	0.100	U	LB<RL
	2,3,7,8-TCDF	0.010	U	
	Total TCDF	0.010	U	
	1,2,3,7,8-PeCDF	0.050	U	
	2,3,4,7,8-PeCDF	0.050	U	
	Total PeCDF	0.050	U	
	1,2,3,4,7,8-HxCDF	0.050	U	
	1,2,3,6,7,8-HxCDF	0.050	U	
	2,3,4,6,7,8-HxCDF	0.050	U	
	Total HxCDF	0.050	U	
RMW-08-35-0106	OCDD	0.100	U	LB<RL
	2,3,7,8-TCDF	0.010	U	
	Total TCDF	0.010	U	
	1,2,3,7,8-PeCDF	0.050	U	
	2,3,4,7,8-PeCDF	0.050	U	
	Total PeCDF	0.050	U	
MW-88-0106	OCDD	0.100	U	LB<RL
	2,3,7,8-TCDF	0.010	U	
	Total TCDF	0.010	U	
	1,2,3,7,8-PeCDF	0.050	U	
	2,3,4,7,8-PeCDF	0.050	U	
	Total PeCDF	0.050	U	

Field ID	Analyte	Final Result	Final Flag	Validation Comments
	1,2,3,4,7,8-HxCDF	0.050	U	
	2,3,4,6,7,8-HxCDF	0.050	U	
	Total HxCDF	0.050	U	
MW-EB-08-0106	2,3,7,8-TCDF	0.010	U	LB<RL
	Total TCDF	0.010	U	
	1,2,3,7,8-PeCDF	0.050	U	
	2,3,4,7,8-PeCDF	0.050	U	
	Total PeCDF	0.050	U	
	1,2,3,4,7,8-HxCDF	0.050	U	
	1,2,3,6,7,8-HxCDF	0.050	U	
	2,3,4,6,7,8-HxCDF	0.050	U	
	Total HxCDF	0.050	U	
RMW-12-32-0106	OCDD	0.100	U	LB<RL
	2,3,7,8-TCDF	0.010	U	
	Total TCDF	0.0323	J	
	1,2,3,7,8-PeCDF	0.050	U	
	2,3,4,7,8-PeCDF	0.050	U	
	Total PeCDF	0.050	U	
	1,2,3,4,7,8-HxCDF	0.050	U	
	1,2,3,6,7,8-HxCDF	0.050	U	
	Total HxCDF	0.050	U	
	1,2,3,4,6,7,8-HpCDF	0.050	U	
	Total HpCDF	0.050	U	
RMW-12-51-0106	OCDD	0.100	U	LB<RL
	2,3,7,8-TCDF	0.010	U	
	Total TCDF	0.010	U	
	1,2,3,7,8-PeCDF	0.050	U	
	2,3,4,7,8-PeCDF	0.050	U	
	Total PeCDF	0.050	U	
	1,2,3,4,7,8-HxCDF	0.050	U	
	1,2,3,6,7,8-HxCDF	0.050	U	
	2,3,4,6,7,8-HxCDF	0.050	U	
	Total HxCDF	0.050	U	
MW-12-0106	OCDD	0.312	J	LB<RL
	2,3,7,8-TCDF	0.010	U	
	Total TCDF	0.010	U	
	1,2,3,4,6,7,8-HpCDF	0.050	U	
	Total HpCDF	0.050	U	
MW-EB-09-0106	2,3,7,8-TCDF	0.010	U	LB<RL
	Total TCDF	0.010	U	
	1,2,3,7,8-PeCDF	0.050	U	
	2,3,4,7,8-PeCDF	0.050	U	
	Total PeCDF	0.050	U	
	1,2,3,4,7,8-HxCDF	0.050	U	
	1,2,3,6,7,8-HxCDF	0.050	U	
	2,3,4,6,7,8-HxCDF	0.050	U	
	Total HxCDF	0.050	U	
RMW-02-13-0106	OCDD	10.5	J	LB<RL
	1,2,3,7,8-PeCDD	0.050	U	
	Total PeCDD	0.050	U	
	2,3,7,8-TCDF	0.010	U	
	Total TCDF	0.0385	J	
	1,2,3,7,8-PeCDF	0.050	U	
	2,3,4,7,8-PeCDF	0.050	U	
	Total PeCDF	0.0881	J	
	1,2,3,4,7,8-HxCDF	0.050	U	
	1,2,3,6,7,8-HxCDF	0.050	U	
	2,3,4,6,7,8-HxCDF	0.050	U	

Field ID	Analyte	Final Result	Final Flag	Validation Comments
	Total HxCDF	0.176	J	
	1,2,3,4,6,7,8-HpCDF	0.147	J	
	Total HpCDF	0.712	J	
RMW-02-32-0106	OCDD	0.100	U	LB<RL
	1,2,3,7,8-PeCDF	0.050	U	
	2,3,4,7,8-PeCDF	0.050	U	
	Total PeCDF	0.050	U	
	2,3,4,6,7,8-HxCDF	0.050	U	
	Total HxCDF	0.050	U	
RMW-02-50-0106	OCDD	0.100	U	LB<RL

LB<RL = Laboratory blank < reporting limit (CRQL)

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	January 19, 20 and 23, 2006
Report Date:	February 03, 2006
Parameters:	PCDD/PCDF
Laboratory:	Paradigm Analytical Laboratories, Inc.
Sample Delivery Group:	MW-EB-07-0106

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. The case narrative indicates that the samples in this SDG were analyzed by a modified version of USEPA Contract Laboratory Program (CLP) Statement of Work DLM01.4 for polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/PCDF). Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the USEPA Contract Laboratory Program National Functional Guidelines for Chlorinated Dioxin/Furan Data Review, August 2002, were mainly used as the basis for this review.

Tier II review was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative, completed CLP data summary forms and instrument-generated summary reports only.

Data qualifiers have been applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may be imprecise.
- R — The sample result is unusable. The analyte may or may not be present in the sample.

I. Holding Times, Storage and Preservation

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. The laboratory indicates in the case narrative that the samples did not have EPA sample tags attached to the containers when they were received.

All holding-time requirements were met.

The CoC indicates that the samples were not preserved with sodium thiosulfate. There is no information whether the test for residual chlorine was performed. In the absence of

information regarding the need for sodium thiosulfate, the data were not qualified for absence of preservation.

II. Performance Evaluation Samples

There were no performance evaluation samples associated with this SDG.

III. Mass Calibration and Mass Spectrometer Resolution

Mass calibration and mass spectrometer resolution met the acceptance criteria.

IV. Window Defining Mix

All requirements within the scope of the Tier II review were determined to be met.

V. Chromatographic Resolution

The GC resolution criteria were met.

VI. Instrument Stability

The absolute and relative retention times of the CS3 standard in all the injections indicated adequate stability.

The ion abundance and response criteria were met.

Summary reports off of the data system indicate acceptable instrument sensitivity. Verification of the accuracy of these reports was not within the scope of the Tier II review.

VII. HRGC/HRMS Initial Calibration

Initial calibration was performed at the required frequency.

The standard concentrations used for initial calibration were as specified in the CLP Statement of Work (SOW).

The ion abundance and linearity criteria were met.

Summary reports off of the data system indicate acceptable instrument sensitivity, GC resolution, and retention times. Verification of the accuracy of these reports was not within the scope of the Tier II review.

VIII. HRGC/HRMS Calibration Verification

The absolute retention time of the first eluting internal standard met the criteria. Comparison of the absolute retention times of the rest of the internal standards with those obtained during initial calibration was not within the scope of the Tier II review.

The relative retention times of the labeled 1,2,3,4,6,7,8-HpCDD standard in the continuing calibration verification standards injected at the beginning, middle, and end of the analytical sequence were below the lower acceptance limit. The relative retention times of the labeled 1,2,3,4,7,8-HxCDF standard in the same injections of the continuing calibration verification standard exceeded the upper acceptance limit. The absolute retention times of both of these labeled standards were fairly consistent in the three injections. Since adequate stability was indicated by all the injections, no data were qualified.

The ion abundances and analyte responses met the criteria.

Summary reports off of the data system indicate acceptable instrument sensitivity. Verification of the accuracy of these reports was not within the scope of the Tier II review.

IX. Identification Criteria

Evaluation of the relative retention times, peak identifications, signal-to-noise ratios, and polychlorinated diphenyl ether interferences was not within the scope of the Tier II review.

X. Method Blank Analysis

Several target analytes were detected in the method blank. All detections were at concentrations below the CLP contract required quantitation limits (CRQL). Where these analytes were reported by the laboratory as detected below the CRQL in the associated samples, they were flagged as not detected ("U") at the respective CRQLs; sample results above the CRQLs were flagged as estimated ("J").

XI. Laboratory Control Sample Analysis

A laboratory control sample was analyzed with the samples in this SDG. The results met the acceptance criteria.

XII. Toxicity Equivalency Factor and Isomer Specificity

A Form 1DFB with completed heading was included for each of the samples. However, no toxicity equivalences were calculated or reported on the forms.

XIII. Dilution by Addition of Solvent

No sample was analyzed at a dilution, and there is no indication in the data package that any of the positive results exceeded the calibration range. No verification was performed since raw data were outside the scope of the Tier II review.

XIV. Dilution by Re-extraction and Reanalysis

There is no indication that any of the samples required re-extraction or reanalysis at a dilution.

XV. Second Column Confirmation

No 2,3,7,8-TCDF was detected at or above the CRQL in any of the samples in this SDG.

XVI. Estimated Detection Limit and Estimated Maximum Possible Concentration

All estimated detection limits (EDL) and estimated maximum possible concentrations (EMPC) were properly reported in the hardcopy, except that EMPCs were not reported on EPA Form 2DF for samples in which EMPCs were reported on the corresponding EPA Form 1DFA.

Verification of EDL and EMPC calculations was not within the scope of the Tier II review.

XVII. Labeled Compound Recoveries

All labeled standards were recovered within the acceptance limits.

The ion abundance ratios of detected analytes and labeled standards met the criteria.

Verification of signal-to-noise ratios was not within the scope of the Tier II review.

XVIII. Field Blanks

Some target PCDDs/PCDFs were detected below the CRQLs in each of the equipment blanks. The detections were attributed to laboratory contamination as evident from the method blank results.

XIX. Field Duplicates

The results of sample MW-88-0106 were reproducible with those of its field duplicate, RMW-12-51-0106.

XX. Overall Assessment of Data

There were reporting issues with respect to the toxicity equivalences (TEQ) and total homologue concentrations. No TEQs were reported on EPA Form 1DFB for any of the samples. EMPCs are not reported on EPA Form 2DF for samples in which EMPCs are reported on the corresponding EPA Form 1DFA. Per the CLP SOW, the total EMPC is to be reported under the "EMPC/EDL" column.

Except for the above reporting anomalies, the overall quality of the data appears to be acceptable.

Data Qualification Summary

Field ID	Analyte	Final Result (ng/L)	Final Flag	Validation Comments
MW-12-0106	1,2,3,4,6,7,8-HpCDF	0.05	U	LB<RL
MW-12-0106	2,3,7,8-TCDF	0.01	U	LB<RL
MW-12-0106	HPCDF (total)	0.05	U	LB<RL
MW-12-0106	OCDD	0.312	J	LB<RL
MW-12-0106	TCDF (total)	0.01	U	LB<RL
MW-88-0106	1,2,3,4,7,8-HxCDF	0.05	U	LB<RL
MW-88-0106	1,2,3,7,8-PeCDF	0.05	U	LB<RL
MW-88-0106	2,3,4,6,7,8-Hexachlorodibenzofuran	0.05	U	LB<RL
MW-88-0106	2,3,4,7,8-PeCDF	0.05	U	LB<RL
MW-88-0106	2,3,7,8-TCDF	0.01	U	LB<RL
MW-88-0106	HxCDF (total)	0.05	U	LB<RL
MW-88-0106	OCDD	0.1	U	LB<RL
MW-88-0106	PeCDF (total)	0.05	U	LB<RL
MW-88-0106	TCDF (total)	0.01	U	LB<RL
RMW-01-17-0106	1,2,3,4,6,7,8-HpCDF	0.05	U	LB<RL
RMW-01-17-0106	1,2,3,7,8-PeCDF	0.05	U	LB<RL
RMW-01-17-0106	2,3,4,6,7,8-Hexachlorodibenzofuran	0.05	U	LB<RL
RMW-01-17-0106	2,3,4,7,8-PeCDF	0.05	U	LB<RL
RMW-01-17-0106	2,3,7,8-TCDF	0.01	U	LB<RL
RMW-01-17-0106	HPCDF (total)	0.0924	J	LB<RL
RMW-01-17-0106	HxCDF (total)	0.05	U	LB<RL
RMW-01-17-0106	OCDD	0.944	J	LB<RL
RMW-01-17-0106	PeCDF (total)	0.05	U	LB<RL
RMW-01-17-0106	TCDF (total)	0.01	U	LB<RL
RMW-01-35-0106	1,2,3,4,6,7,8-HpCDF	0.05	U	LB<RL
RMW-01-35-0106	1,2,3,4,7,8-HxCDF	0.05	U	LB<RL
RMW-01-35-0106	1,2,3,6,7,8-HxCDF	0.05	U	LB<RL
RMW-01-35-0106	1,2,3,7,8-PeCDF	0.05	U	LB<RL
RMW-01-35-0106	2,3,4,6,7,8-Hexachlorodibenzofuran	0.05	U	LB<RL
RMW-01-35-0106	2,3,4,7,8-PeCDF	0.05	U	LB<RL
RMW-01-35-0106	2,3,7,8-TCDF	0.01	U	LB<RL
RMW-01-35-0106	HPCDF (total)	0.05	U	LB<RL
RMW-01-35-0106	HxCDF (total)	0.05	U	LB<RL
RMW-01-35-0106	OCDD	0.1	U	LB<RL
RMW-01-35-0106	PeCDF (total)	0.05	U	LB<RL
RMW-01-35-0106	TCDF (total)	0.01	U	LB<RL
RMW-02-13-0106	1,2,3,4,6,7,8-HpCDF	0.147	J	LB<RL
RMW-02-13-0106	1,2,3,4,7,8-HxCDF	0.05	U	LB<RL
RMW-02-13-0106	1,2,3,6,7,8-HxCDF	0.05	U	LB<RL

Field ID	Analyte	Final Result (ng/L)	Final Flag	Validation Comments
RMW-02-13-0106	1,2,3,7,8-PeCDD	0.05	U	LB<RL
RMW-02-13-0106	1,2,3,7,8-PeCDF	0.05	U	LB<RL
RMW-02-13-0106	2,3,4,6,7,8-Hexachlorodibenzofuran	0.05	U	LB<RL
RMW-02-13-0106	2,3,4,7,8-PeCDF	0.05	U	LB<RL
RMW-02-13-0106	2,3,7,8-TCDF	0.01	U	LB<RL
RMW-02-13-0106	HPCDF (total)	0.712	J	LB<RL
RMW-02-13-0106	HxCDF (total)	0.176	J	LB<RL
RMW-02-13-0106	OCDD	10.5	J	LB<RL
RMW-02-13-0106	PeCDD (total)	0.05	U	LB<RL
RMW-02-13-0106	PeCDF (total)	0.0881	J	LB<RL
RMW-02-13-0106	TCDF (total)	0.0385	J	LB<RL
RMW-02-32-0106	1,2,3,7,8-PeCDF	0.05	U	LB<RL
RMW-02-32-0106	2,3,4,6,7,8-Hexachlorodibenzofuran	0.05	U	LB<RL
RMW-02-32-0106	2,3,4,7,8-PeCDF	0.05	U	LB<RL
RMW-02-32-0106	HxCDF (total)	0.05	U	LB<RL
RMW-02-32-0106	OCDD	0.1	U	LB<RL
RMW-02-32-0106	PeCDF (total)	0.05	U	LB<RL
RMW-02-50-0106	OCDD	0.1	U	LB<RL
RMW-08-15-0106	1,2,3,4,7,8-HxCDF	0.05	U	LB<RL
RMW-08-15-0106	1,2,3,6,7,8-HxCDF	0.05	U	LB<RL
RMW-08-15-0106	1,2,3,7,8-PeCDF	0.05	U	LB<RL
RMW-08-15-0106	2,3,4,6,7,8-Hexachlorodibenzofuran	0.05	U	LB<RL
RMW-08-15-0106	2,3,4,7,8-PeCDF	0.05	U	LB<RL
RMW-08-15-0106	2,3,7,8-TCDF	0.01	U	LB<RL
RMW-08-15-0106	HxCDF (total)	0.05	U	LB<RL
RMW-08-15-0106	OCDD	0.1	U	LB<RL
RMW-08-15-0106	PeCDF (total)	0.05	U	LB<RL
RMW-08-15-0106	TCDF (total)	0.01	U	LB<RL
RMW-08-35-0106	1,2,3,7,8-PeCDF	0.05	U	LB<RL
RMW-08-35-0106	2,3,4,7,8-PeCDF	0.05	U	LB<RL
RMW-08-35-0106	2,3,7,8-TCDF	0.01	U	LB<RL
RMW-08-35-0106	OCDD	0.1	U	LB<RL
RMW-08-35-0106	PeCDF (total)	0.05	U	LB<RL
RMW-08-35-0106	TCDF (total)	0.01	U	LB<RL
RMW-12-32-0106	1,2,3,4,6,7,8-HpCDF	0.05	U	LB<RL
RMW-12-32-0106	1,2,3,4,7,8-HxCDF	0.05	U	LB<RL
RMW-12-32-0106	1,2,3,6,7,8-HxCDF	0.05	U	LB<RL
RMW-12-32-0106	1,2,3,7,8-PeCDF	0.05	U	LB<RL
RMW-12-32-0106	2,3,4,7,8-PeCDF	0.05	U	LB<RL
RMW-12-32-0106	2,3,7,8-TCDF	0.01	U	LB<RL
RMW-12-32-0106	HPCDF (total)	0.05	U	LB<RL
RMW-12-32-0106	HxCDF (total)	0.05	U	LB<RL

Field ID	Analyte	Final Result (ng/L)	Final Flag	Validation Comments
RMW-12-32-0106	OCDD	0.1	U	LB<RL
RMW-12-32-0106	PeCDF (total)	0.05	U	LB<RL
RMW-12-32-0106	TCDF (total)	0.0323	J	LB<RL
RMW-12-51-0106	1,2,3,4,7,8-HxCDF	0.05	U	LB<RL
RMW-12-51-0106	1,2,3,6,7,8-HxCDF	0.05	U	LB<RL
RMW-12-51-0106	1,2,3,7,8-PeCDF	0.05	U	LB<RL
RMW-12-51-0106	2,3,4,6,7,8-Hexachlorodibenzofuran	0.05	U	LB<RL
RMW-12-51-0106	2,3,4,7,8-PeCDF	0.05	U	LB<RL
RMW-12-51-0106	2,3,7,8-TCDF	0.01	U	LB<RL
RMW-12-51-0106	HxCDF (total)	0.05	U	LB<RL
RMW-12-51-0106	OCDD	0.1	U	LB<RL
RMW-12-51-0106	PeCDF (total)	0.05	U	LB<RL
RMW-12-51-0106	TCDF (total)	0.01	U	LB<RL

LB<RL = Laboratory blank contamination less than the RL

Data Validation Report

(Revised September 11, 2006)

Project/Site Name:	AMCO
Collection Date:	January 10, 11, 12 and 13, 2006
Report Date:	February 3, 2006
Parameters:	Organochlorine Pesticides and PCBs
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y2BJ4

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 for pesticides and polychlorinated biphenyls (PCB). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review, June 2001, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier III data validation was performed by CH2M HILL chemists. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review included the chain of custody (CoC) records, case narrative, completed CLP data summary forms, raw data and calculation verification for selected detected results.

The laboratory was requested to re-evaluate surrogate manual integrations. Resubmitted data were reviewed and data qualifiers were revised as needed. Revisions are noted under the surrogate recovery section and summarized in the overall data assessment.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All technical holding times were met.

II. Instrument Performance Checks

Resolution check and performance evaluation mixtures were analyzed as required by the method and met acceptance criteria.

III. Calibration

The initial calibration (ICAL) was within acceptance criteria.

In the closing continuing calibration verification (CCV), the beta-BHC percent difference (%D) was biased high on one column. On the other column, the heptachlor epoxide %D exceeded criteria; whereas, heptachlor and methoxychlor had low biased %Ds. Since the associated sample results were not detected and did not require confirmation, data were not qualified.

The calibration factor (CF) and relative standard deviation (RSD) calculations for the ICAL were verified for 4,4'-DDD. The %D calculations for the CCVs presented on the Calibration Verification Summary Forms could not be verified for 4,4'-DDT, 4,4'-DDD, and 4,4'-DDE. The reported calculated amounts for these compounds do not match the raw data reports. Raw data were reviewed and the %D for these compounds met criteria.

IV. Method Blanks

A method blank was analyzed as required. There were no detected results in the method blank.

V. Field Blanks

There was four equipment blanks (EB) in this SDG: MW-EB-01-0106, MW-EB-02-0106, MW-EB-03-0106 and MW-EB-04-0106. Gamma-BHC was detected above the contract required quantitation limit (CRQL), equivalent to the reporting limit (RL), in all EBs. Gamma-BHC was not detected in the associated samples and therefore, no flags were applied.

VI. Surrogate Recovery

Manual integration was performed on some of the surrogate peaks. These manual integrations were inconsistent. A more accurate integration would have created high-biased recoveries. Since analytes had non-detected results, no flags were applied.

Manual integration of the surrogates were re-evaluated by the laboratory and revised as needed. The decachlorobiphenyl recovery was high in one column for sample RMW-07-05-0106, but acceptable in the other column. The tetrachloro-m-xylene (TCX) recovery was high in one column for sample BMW-08-0106, but acceptable in the other column. All target analytes were not detected in these two samples and therefore, no flags were applied.

VII. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on sample RMW-14-50-0106. Heptachlor and aldrin MS/MSD recoveries grossly exceeded the upper control limits. Neither of these compounds was detected in the parent sample and therefore, no flags were applied.

The MS/MSD relative percent difference (RPD) criteria was exceeded for gamma-BHC, heptachlor, aldrin, dieldrin and 4,4′-DDT. The non-detected parent sample results were qualified as estimated and flagged "UJ".

The recovery of 4,4′-DDT was less than the lower control limit in the MSD. The parent sample non-detected result was qualified as estimated and flagged "UJ".

VIII. Laboratory Control Sample

All acceptance criteria were met.

IX. Field Duplicates

Field duplicates were not included in this SDG.

X. Confirmation

The confirmation RPDs for dieldrin and 4,4′-DDD exceeded criteria in sample BMW-06-0106. The detected sample results were qualified as estimated and flagged "J".

XI. Target Compound Identification and Quantitation

Compound identification was verified by raw data review. Selected detected results were verified.

Manual integration was performed on the surrogates and target compounds in several samples. "Before" and "after" documentation was provided for most of the manual integrations. However, the manual integrations were inconsistent. Manual integrations on a peak shoulder, partial peak, multiple peaks, or on the baseline, although documented, did not appear to be appropriate. Also, manual integration was not performed on peaks that appeared to require reintegration (TCX, page 946). Most of the manual integrations were performed on the surrogates. More consistent integrations would have results in high recoveries. Since most of the samples had non-detected results, reported results were not affected.

XII. Overall Assessment of Data

- Confirmation exceedances for 4,4-DDD and dieldrin resulted in data qualified as estimated concentrations.
- MS/MSD exceedances resulted in samples qualified as estimated concentrations.
- The completeness objectives were met for all method/analyte combinations.
- Selected reported results on the CCV summary forms need further review.
- Manual integrations should be re-evaluated by the laboratory.
- Resubmitted surrogate manual integrations were evaluated. No flags were revised.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
BMW-06-0106	4,4'-DDD	0.011	J	CF>RPD
BMW-06-0106	Dieldrin	0.003	J	CF>RPD
RMW-14-50-0106	4,4'-DDT	0.02	UJ	MSRPD, SD<LCL
RMW-14-50-0106	Aldrin	0.01	UJ	MSRPD
RMW-14-50-0106	Dieldrin	0.02	UJ	MSRPD
RMW-14-50-0106	gamma-BHC	0.01	UJ	MSRPD
RMW-14-50-0106	Heptachlor	0.01	UJ	MSRPD

CF>RPD = Confirmation precision exceeded
MSRPD = Matrix spike RPD criteria exceedance
SD<LCL= Matrix spike duplicate recovery criteria less than lower limit

Data Validation Report

(Revised September 11, 2006)

Project/Site Name:	AMCO
Collection Date:	January 17, 18 and 19, 2006
Report Date:	February 15, 2006
Parameters:	Organochlorine Pesticides and PCBs
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y2BM5

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 for pesticides and polychlorinated biphenyls (PCB). The data review was performed using the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Low Concentration Organic Data Review (NFG), June 2001, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier III data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the analytical raw data and to provide verification of calculations and analyte identification. It was not intended to determine contract compliance.

The scope of the data review included the chain-of-custody (CoC) records, the case narrative, completed CLP data summary forms and raw data.

The laboratory was requested to re-evaluate surrogate manual integrations. Resubmitted data were reviewed and data qualifiers were revised as needed. Revisions are noted under the surrogate and matrix spike/matrix spike duplicate (MS/MSD) recovery sections and summarized in the overall data assessment.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID

numbers. Several samples were received with broken bottles; however, sufficient sample remained for the analyses.

The samples were analyzed within the required holding time.

II. Instrument Performance Checks

Resolution check and performance evaluation mixtures were analyzed as required by the method and met acceptance criteria. Resolution and breakdown calculations were verified.

III. Calibration

An initial calibration was analyzed at the correct concentrations. Calibration factor and relative standard deviation calculations were verified.

The continuing calibration standards were analyzed at the method frequency and concentration. All acceptance criteria were met.

The percent difference calculation was verified.

IV. Method Blanks

The method blank and instrument blanks were analyzed as required by the method. Raw data were reviewed. There were no target compounds detected in the blanks. All acceptance criteria were met.

V. Field Blanks

There were three equipment blanks (EB) in this SDG: MW-EB-05-0106, MW-EB-06-0106 and MW-EB-07-0106. Gamma-BHC was detected above the contract required quantitation limit (CRQL), equivalent to reporting limit (RL), in each of the EBs. Gamma-BHC was not detected in the samples and therefore, no flags were applied.

VI. Surrogate Recovery

The method required surrogate compounds were analyzed.

Manual integration was performed on the surrogates in several samples. The tetrachloro-m-xylene (TCX) manual integration was inconsistent between samples. “Before” and “after” documentation was provided for each manual integration. However, manual integration on a peak shoulder, partial peak, multiple peaks, or on the baseline, although documented, did not appear to be appropriate.

Manual integration of the surrogates were re-evaluated by the laboratory and revised as needed. Sample RMW-08-15-0106 had a high TCX recovery on one column but the TCX recovery on the other column was within acceptance criteria. Endrin ketone was reported from the column with the high TCX recovery and was therefore qualified as estimated and flagged “J”.

Surrogate recovery calculation was verified.

VII. Matrix Spike/Matrix Spike Duplicate

A MS/MSD was analyzed on sample RMW-10-35-0106. Heptachlor and gamma-BHC MS/MSD recoveries were grossly above the acceptance criteria. Endrin and 4,4’-DDT

recoveries in the MS and the 4,4′-DDT recovery in the MSD were below the acceptance criteria. The dieldrin recovery in the MSD was above the acceptance criteria. Relative percent differences (RPD) for gamma-BHC, heptachlor, dieldrin, endrin and 4,4′-DDT were above acceptance criteria. In addition, manual integration was performed on each spike target analyte. The manual integrations were resubmitted by the laboratory and reviewed. There were no reported detected results in the parent sample. The non-detected endrin and 4,4′-DDT results were qualified as estimated and flagged "UJ".

MS/MSD recovery and RPD calculations were verified.

VIII. Laboratory Control Sample

A laboratory control sample (LCS) was analyzed as required by the method. All acceptance criteria were met.

The LCS recovery calculation was checked.

IX. Compound Quantitation and Reported CRQLs.

Sample RMW-01-17-0106 required a dilution because a target analyte was detected above the calibration range. 4,4′-DDD was reported from the sample dilution.

Raw data were reviewed. Compound quantitation and accuracy were verified.

X. Field Duplicates

There were two field duplicate pairs in this SDG: RMW-10-15-0106 and MW-90-0106, and RMW-08-35-0106 and MW-92-0106. All acceptance criteria were met.

XI. Confirmation

In samples RMW-08-35-0106 and MW-92-0106, the 4,4′-DDD and 4,4′-DDE detected concentrations with an RPD between the primary and secondary column of greater than 25 percent were qualified as estimated concentrations and flagged "J". Endrin ketone in sample BMW-03-0106 and 4,4′-DDE in sample RMW-01-17-0106 were also above the confirmation acceptance criteria and were qualified as estimated and flagged "J".

The manual integration of 4,4′-DDD in sample RMW-08-15-0106 was resubmitted and reviewed. The RPD between the primary and secondary columns was greater than 25 percent. The reported result was qualified as estimated and flagged "J".

XII. Overall Assessment of Data

- The MS/MSD recoveries were outside acceptance criteria. Parent sample results were qualified as estimated concentrations.
- Confirmation exceedances for endrin ketone, 4,4′-DDD and 4,4′-DDE resulted in qualification of detected results as estimated concentrations.
- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

- Resubmitted surrogate manual integrations were evaluated and data were qualified as needed. Flags were added due to surrogate recovery, MS/SD recovery and confirmation RPD exceedances.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
BMW-03-0106	Endrin ketone	0.17	J	CF>RPD
MW-92-0106	4,4'-DDD	0.13	J	CF>RPD
MW-92-0106	4,4'-DDE	0.033	J	CF>RPD
RMW-01-17-0106	4,4'-DDE	0.028	J	CF>RPD
RMW-08-15-0106	Endrin ketone	0.022	J	Sur>UCL
RMW-08-15-0106	4,4′-DDD	0.016	J	CF>RPD
RMW-08-35-0106	4,4'-DDD	0.16	J	CF>RPD
RMW-08-35-0106	4,4'-DDE	0.044	J	CF>RPD
RMW-10-35-0106	4,4'-DDT	0.02	UJ	MS<LCL, MSRPD , SD<LCL
RMW-10-35-0106	Endrin	0.02	UJ	MS<LCL, MSRPD

CF>RPD = Confirmation precision exceeded
MS<LCL = Matrix spike recovery less than lower limit
MSRPD = Matrix spike RPD criteria exceedance
SD<LCL = Matrix spike duplicate recovery criteria less than lower limit
Sur>UCL = Surrogate recovery greater than upper control limit

Data Validation Report

(Revised September 11, 2006)

Project/Site Name:	AMCO
Collection Date:	January 20 and 23, 2006
Report Date:	February 17, 2006
Parameters:	Organochlorine Pesticides and PCBs
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y2BQ4

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 for pesticides and polychlorinated biphenyls (PCB). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review, June 2001, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier III data validation was performed by CH2M HILL chemists. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review included the chain of custody (CoC) records, case narrative, completed CLP data summary forms, raw data and calculation verification for selected detected results.

The laboratory was requested to re-evaluate surrogate manual integrations. Resubmitted data were reviewed and data qualifiers were revised as needed. Revisions are noted under the surrogate and matrix spike/matrix spike duplicate (MS/MSD) recovery sections and summarized in the overall data assessment.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All technical holding times were met.

II. Instrument Performance Checks

Resolution check and performance evaluation mixtures were analyzed as required by the method and met acceptance criteria.

III. Calibration

The initial calibration (ICAL) and continuing calibration verifications (CCV) were generally within acceptance criteria. The ICAL relative standard deviation (RSD) for methoxychlor was above the QC limits on one column. The non-detected methoxychlor results did not require confirmation; therefore, no data were qualified.

The calibration factor (CF) and RSD calculations for the ICAL were verified for dieldrin on column one, RTX-PEST. However, there were discrepancies for the low and high CFs on column two, RTX-PEST2, for several compounds. The reported calibration information for column two could not be confirmed. However, all of the reported mid-level standard CFs were correct. Since the mid-level standard was used for calculations, the detected results were not impacted. The percent difference (%D) calculations for the CCVs presented on the Calibration Verification Summary Forms could not be verified for 4,4'-DDT, 4,4'-DDD and 4,4'-DDE. The reported calculated amounts for these compounds did not match the raw data reports. Raw data were reviewed and the %D for these compounds met criteria.

IV. Method Blanks

A method blank was analyzed as required. There were no detected results in the method blank.

V. Field Blanks

There were two equipment blanks (EB) in this SDG: MW-EB-08-0106 and MW-EB-09-0106. No contamination was detected.

VI. Surrogate Recovery

The method required surrogate compounds were analyzed. Manual integration was performed on the surrogates in several samples. "Before" and "after" documentation was provided for most of the manual integrations. However, the manual integrations were inconsistent. Manual integrations on a peak shoulder, partial peak, multiple peaks, or on the baseline, although documented, did not appear to be appropriate. The manual integration documentation in the case narrative was incomplete. Most of the manual integrations were performed on the surrogates.

Manual integration of the surrogates were re-evaluated by the laboratory and revised as needed.

The recovery of decachlorobiphenyl (DCB) was below the lower control limit (LCL) in one column for sample RMW-02-32-0106. One associated detected result reported from this column was qualified as estimated and flagged "J".

The DCB and tetrachloro-m-xylene (TCX) recoveries were above the acceptance criteria in one column for sample RMW-02-13-0106. The associated detected results reported from this column were qualified as estimated and flagged "J".

TCX was manually integrated on both columns for sample MW-12-0106. The original manual integrations were performed on peak shoulders in the TCX retention time window and the associated non-detected results were qualified unusable and flagged "R". The revised manual integrations showed acceptable surrogate recoveries on the column from which all results were reported. The "R" flags were removed.

VII. Matrix Spike/Matrix Spike Duplicate

Manual integration was performed on some of the spike target analytes. The manual integrations were resubmitted by the laboratory and reviewed.

A MS/MSD analysis was performed on samples RMW-12-51-0106 and RMW-02-13-0106. For sample RMW-12-51-0106, MS/MSD recoveries for aldrin, dieldrin and endrin were below the LCL. MSD recoveries were also below the LCL for heptachlor and 4,4'-DDT. The relative percent difference (RPD) exceeded criteria on both columns for heptachlor, dieldrin, endrin and 4,4'-DDT. The RPD was exceeded for aldrin on one column. Detected and non-detected results for these analytes in the parent sample were qualified as estimated and flagged "J" and "UJ", respectively.

For sample RMW-02-13-0106, MS and/or MSD recoveries were below the LCL for gamma-BHC, endrin, heptachlor and 4,4'-DDT. Aldrin and dieldrin were not recovered in either the MS or MSD. The RPD criteria were exceeded for all analytes. The second column yielded similar results. Detected and non-detected results for these analytes in the parent sample were qualified as estimated and flagged "J" and "UJ", respectively.

VIII. Laboratory Control Sample

The laboratory control sample summary form was not provided.

IX. Field Duplicates

Samples RMW-12-51-0106 and MW-88-0106 were designated as a field duplicate pair. The RPD criteria was exceeded for 4,4'-DDE. All acceptance criteria were met.

X. Confirmation

The confirmation RPD of several compounds exceeded criteria in samples RMW-12-51-0106, MW-88-0106, RMW-3-15-0106, MW-12-0106 and RMW-02-13-0106. The results were qualified as estimated and flagged "J".

XI. Target Compound Identification and Quantitation

Compound identification was verified by raw data review. Selected detected results were verified.

4,4'-DDT in sample MW-12-0106 and 4,4'-DDD, 4,4'-DDE and dieldrin in sample RMW-02-13-0106 were reported as estimated values above the linear range. Sample dilutions were not provided. The data were qualified as estimated and flagged "J".

4,4′-DDE manual integration for sample RMW-03-15-0106 was biased low because only part of a peak was integrated. The detected result was qualified as estimated and flagged "J".

XII. Overall Assessment of Data

- Confirmation exceedances for several analytes resulted in samples qualified as estimated concentrations.
- Surrogate and MS/MSD exceedances resulted in samples qualified as estimated concentrations.
- The completeness objectives were met for all method/analyte combinations.
- Selected reported results on the CCV summary forms need further review because the results could not be confirmed by raw data review.
- The ICAL summary form for the RTX-PEST2 CFs did not match raw the raw data.
- Resubmitted surrogate and MS/MSD manual integrations were evaluated and data qualifiers were added or deleted as needed.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MW-12-0106	4,4'-DDD	0.33	J	>ICLinearRange
MW-12-0106	4,4'-DDE	0.098	J	CF>RPD
MW-88-0106	4,4'-DDD	0.14	J	CF>RPD
MW-88-0106	4,4'-DDE	0.004	J	CF>RPD
RMW-02-13-0106	4,4'-DDD	2	J	>ICLinearRange, Sur>UCL, CF>RPD
RMW-02-13-0106	4,4'-DDE	0.33	J	>ICLinearRange, Sur>UCL, CF>RPD
RMW-02-13-0106	4,4'-DDT	0.02	UJ	MSRPD, SD<LCL
RMW-02-13-0106	Aldrin	0.13	J	CF>RPD, MS<LCL, SD<LCL, Sur>UCL
RMW-02-13-0106	Dieldrin	0.53	J	>ICLinearRange, CF>RPD, MS<LCL, SD<LCL, Sur>UCL
RMW-02-13-0106	Endrin	0.02	UJ	SD<LCL
RMW-02-13-0106	gamma-BHC	0.01	UJ	MS<LCL, MSRPD, SD<LCL
RMW-02-13-0106	Heptachlor	0.01	UJ	MS<LCL, MSRPD, SD<LCL
RMW-02-32-0106	Dieldrin	0.071	J	Sur<LCL
RMW-03-15-0106	4,4'-DDD	0.007	J	CF>RPD
RMW-03-15-0106	4,4'-DDE	0.022		ReintegratedResult
RMW-12-51-0106	4,4'-DDE	0.01	J	CF>RPD
RMW-12-51-0106	4,4'-DDT	0.02	UJ	MSRPD, SD<LCL
RMW-12-51-0106	Aldrin	0.01	UJ	MS<LCL, SD<LCL
RMW-12-51-0106	Dieldrin	0.066	J	CF>RPD, MS<LCL, MSRPD, SD<LCL
RMW-12-51-0106	Endrin	0.02	UJ	MS<LCL, MSRPD, SD<LCL
RMW-12-51-0106	Heptachlor	0.01	UJ	MSRPD, SD<LCL

>ICLinearRange= Result greater than linear calibration range
CF>RPD = Confirmation precision exceeded
MS<LCL= Matrix spike recovery less than lower limit
MSRPD = Matrix spike RPD criteria exceedance
ReintegratedResult = Manual integration revision
SD<LCL= Matrix spike duplicate recovery criteria less than lower limit
Sur<LCL = Surrogate recovery less than lower limit
Sur>UCL= Surrogate recovery greater than upper limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	January 10, 11, 12 and 13, 2006
Report Date:	January 26, 20206
Parameters:	RSK-175
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	06011A

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901113. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier III data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the analytical raw data and to provide verification of calculations and analyte identification. It was not intended to determine contract compliance.

The scope of the data validation included review of the chain-of-custody (CoC) records, the case narrative, completed data summary forms and raw data.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperature and with appropriate CoC forms and custody seals intact.

Samples BMW-08-0106 and BPZ-01-0106 were received without proper preservation. Samples were analyzed within seven days of sample collection and therefore, no flags were applied.

Holding-time requirements were met.

II. Calibration

The method used for the gas analysis is a variation of method RSK-175 and it is not clearly identified as a modification of method RSK-175 in the data package. The RSK-175 method uses Henry's Law (using partial pressure of the gas, Henry's law constant, temperature of the sample, volume of the sample bottle, and atomic weight of the gas) to calculate the concentrations of analytes in the aqueous phase from the concentration of analytes in the headspace. The method used by the laboratory was modified to perform a direct comparison at a constant equilibrium temperature of standards and samples by using the exact volume of water and the exact ratio of water to headspace for all standards, samples and associated QC samples. It is unknown if a comparison study was conducted to verify results for the modified method.

The volumes of standards to samples and the ratio of headspace of standards and of samples were not documented in the data package. The preparation log provided only the initial and final volumes of the samples.

The initial calibration and continuing calibration verifications met acceptance criteria. Calculations for the calibration factor, relative standard deviation and percent difference were verified.

III. Blanks

A method blank (MB) was analyzed as required by the method. The initial MB analysis did not have acceptable surrogate recovery. The MB was reanalyzed at the end of the analytical sequence. Methane was detected in the MB at 0.24ug/L. The method detection limit (MDL) for methane was not provided by the laboratory. However, there were no methane detected results less than five times the blank concentration and therefore, no data were qualified.

IV. Surrogates

Acetylene was used for the surrogate and met acceptance criteria. The surrogate recovery calculation was verified.

V. Matrix Spike/Matrix Spike Duplicate

Sample BMW-06-0106 was used for the matrix spike/matrix spike duplicate (MS/MSD). All acceptance criteria were met. The MS/MSD relative percent difference calculation was validated.

VI. Laboratory Control Sample

All acceptance criteria were met and the laboratory control sample calculation was validated.

VII. Target Compound Identification

Compound identification was verified by raw data review.

VIII. Compound Quantitation and Reported CRQLs

Quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), were verified by raw data review on a percentage of the detected sample results.

IX. Field Blanks

No field blanks in this SDG.

X. Field Duplicates

No field duplicates in this SDG.

XI. Laboratory Duplicates

No laboratory duplicates in this SDG.

XII. System Performance

The system performance was evaluated by reviewing the chromatographic data for this SDG.

XIII. Overall Assessment of Data

- The completeness objectives were met for all method/analyte combinations.
- The method used for analysis is a modification of method RSK-175. The method is modified to perform a direct comparison between analysis of standards, QC samples and field samples. The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	January 17, 18, 19, 20 and 23, 2006
Report Date:	February 16, 2006
Parameters:	RSK-175
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group:	06017C

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed as requested by the Technical Direction Form #00901113. The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (NFG), October 1999, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative and completed data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact.

All technical holding-time criteria were met.

II. Calibration

All acceptance criteria were met.

III. Blanks

Method blanks were analyzed as required by the method. There were no detected results in the method blanks.

IV. Surrogates

The surrogate recoveries for samples MW-90-0106 for ethene and ethane; RMW-12-32-0106 for methane, ethene, and ethane; and RMW-02-13-0106 for methane and ethene exceeded the laboratory control limit. The detected results were qualified as estimated and flagged "J". The surrogate recovery for ethene and ethane in sample RMW-10-35-0106 was below the laboratory control limit. The detected results were qualified as estimated and flagged "J".

V. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate was performed on sample RMW-10-35-0106. Methane was not recovered because the sample concentration was greater than four times the spike concentration. Data were not qualified.

VI. Laboratory Control Sample

All acceptance criteria were met.

VII. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

VIII. Compound Quantitation and Reported CRQLs

Several samples required a dilution due to the concentrations of the target analytes.

Verification of quantitation and accuracy of reported contract required quantitation limits (CRQL), equivalent to reporting limits (RL), was not within the scope of the data review for this SDG.

IX. Field Blanks

No field blanks in this SDG.

X. Field Duplicates

There were three sets of field duplicates in this SDG: samples RMW-12-51-0106 and MW-88-0106, samples RMW-10-15-0106 and MW-90-0106, and samples RMW-08-35-0106 and MW-92-0106. All acceptance criteria were met.

XI. Laboratory Duplicates

No laboratory duplicates in this SDG.

XII. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XIII. Overall Assessment of Data

- Results for several samples were qualified as estimated due to surrogate recoveries outside acceptance criteria.
- The completeness objectives were met for all method/analyte combinations.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
RMW-02-13-0106	Ethene	900	J	Sur>UCL
RMW-02-13-0106	Methane	22000	J	Sur>UCL
RMW-10-35-0106	Ethane	0.6	J	Sur<LCL
RMW-10-35-0106	Ethene	2	J	Sur<LCL
RMW-12-32-0106	Ethane	260	J	Sur>UCL
RMW-12-32-0106	Ethene	1800	J	Sur>UCL
RMW-12-32-0106	Methane	4200	J	Sur>UCL

Sur>UCL = Surrogate recovery greater than upper limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	January 10, 11, 12 and 13, 2006
Report Date:	April 6, 2006
Parameters:	GC/MS Semivolatile SIM for Selected Compounds
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y2BJ6

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 for a subset of semivolatile compounds (SVOC) GC/MS selected ion monitoring (SIM) analysis using project-approved modifications described in Modification Reference Number 1328.2 (MOD 1328.2). Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Low Concentration Organic Data Review (NFG), June 2001, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier III data validation was performed by CH2M HILL chemists. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review included the chain of custody (CoC) records, case narrative, completed CLP data summary forms, raw data and calculation verification for selected detected results.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All technical holding-time requirements were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Calibration

In the initial calibration (ICAL) of 2/23/06, the percent relative standard deviations (%RSD) were exceeded for bis(2-chloroethoxy)methane, 2,4,6-trichlorphenol, atrazine and bis(2-ethylhexyl)phthalate. In the ICAL of 2/24/06, the %RSDs were exceeded for n-nitroso-di-n-propylamine, bis(2-chloroethoxy)methane, atrazine and bis(2-ethylhexyl)phthalate. In the ICAL of 2/25/06, the %RSDs were exceeded for n-nitroso-di-n-propylamine, nitrobenzene, 2,4,5-trichlorophenol, atrazine and bis(2-ethylhexyl)phthalate. Detected results were qualified as estimated and flagged "J".

Incomplete information was provided for the standard concentrations for each target analyte in the ICAL. Therefore, the linear range of each analyte was not known.

The abundances in the low standard were extremely low and many analytes required manual integration.

1,4-Dioxane was evaluated using only the primary ion of 88 without the secondary ions of 58 and 43.

The continuing calibration was within acceptance criteria.

IV. Method Blank

A method blank (MB) was analyzed as required. Bis(2-ethylhexyl)phthalate was detected in the MB at a concentration less than five times the reporting limit (RL) used by the laboratory. Sample results that were less than five times the blank concentration but were greater than the RL were qualified as non-detected at the detected concentration and flagged "U".

V. Laboratory Control Sample

No laboratory control sample data were provided. These data were assumed to be performed under full scan.

VI. Matrix Spike/Matrix Spike Duplicate

Matrix spike/matrix spike duplicates were not required as per MOD 1328.2.

VII. Surrogate Recovery

Surrogate recoveries met acceptance criteria.

VIII. Internal Standard Recovery

A summary form was provided for only three of the six internal standards used by the laboratory; 1,4-dichlorobenzene-d4, naphthalene-d8 and acenaphthene-d10. Internal standard 1,4-dichlorobenzene-d4 exceeded criteria in sample RMW-14-50-0106. The sample was reanalyzed with an acceptable recovery and therefore, flags were not applied. Internal standard acenaphthene-d10 exceeded criteria in samples RMW-07-35-0106, RMW-04-15-

0106, BMW-01-0106, RMW-13-35-0106 and BMW-07-0106. The samples were reanalyzed with acceptable recoveries. No flags were applied. Phenanthrene-d10, chrysene-d12 and perylene-d12 internal standard recoveries were not evaluated.

IX. Field Duplicates

No field duplicates in this SDG.

X. Field Blanks

This SDG contained four equipment blanks (EB): MW-EB-01-0106, MW-EB-02-0106, MW-EB-03-0106 and MW-EB-04-0106. Bis(2-ethylhexyl)phthalate was detected in all four EBs at concentrations less than the laboratory RL. Sample results were flagged for bis(2-ethylhexyl)phthalate MB contamination and therefore, no further flags were applied. Carbazole was detected in EB samples MW-EB-01-0106, MW-EB-02-0106 and MW-EB-03-0106 at concentrations greater than the laboratory RL. Sample results that were less than five times the blank concentration but were greater than the RL were qualified as non-detected at the detected concentration and flagged "U".

XI. Target Compound Identification

Raw data were reviewed to verify detected results.

XII. Compound Quantitation and Reported CRQLs

The laboratory RLs were less than the contract required quantitation limits (CRQL) designated in MOD 1328.2 for bis(2-ethylhexyl)phthalate, atrazine, 2,4,6-trichlorophenol, 3,3'-dichlorobenzene, hexachlorobutadiene, hexachlorobenzene, hexachloroethane, nitrobenzene, 1,4-dioxane and chrysene. The laboratory exceeded the CRQL for n-nitroso-di-n-propylamine.

Quantitation and accuracy of reported CRQLs were verified by raw data review. Samples BMW-01-0106RE, BPZ-01-0106, MW-EB-04-0106, RMW-07-15-0106, RMW-07-35-0106 and RMW-06-15-0106RE reported detected results on the Form 1s that were determined to be non-detected on review of the raw data. These results were flagged "U" at the RL. In addition, there were discrepancies between the original and reanalyzed results.

1,4-Dioxane results for samples BMW-07-0106, BMW-08-0106, BPZ-01-0106 and RMW-14-50-0106RE were flagged as estimated by the laboratory on the Form 1s and in the electronic data. Re-evaluation of the ICAL determined that the results were not over the linear range and therefore, the laboratory-applied flags were removed.

XIII. Tentatively Identified Compounds

Not applicable.

XIV. Overall Assessment of Data

- The completeness objectives were met for all method/analyte combinations; however, not all the CRQLs were met by the laboratory.
- Calibration exceedances resulted in data qualified as estimated concentrations.
- Contamination in the MB and EBs resulted in data qualified as not detected.

- A summary form was not provided for three of the six internal standards. Phenanthrene-d10, chrysene-d12 and perylene-d12 were not evaluated.
- 2,4-Dinitrophenol was reported in the electronic data but not on the hardcopy. This analyte was not a required target analyte on the list in MOD 1328.2.
- Reporting errors were discovered through Tier III validation. Incorrect detected results were reported in both the hardcopy and electronic data. In addition, "E" flags were applied to data that did not exceed the calibration range. There were reporting discrepancies between original and reanalyzed samples. It is recommended that the laboratory re-evaluate the reported data

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
BMW-01-0106RE	Benzo(a)pyrene	0.1	U	Result<>rawdata
BMW-01-0106RE	Benzo(k)fluoranthene	0.1	U	Result<>rawdata
BMW-01-0106RE	bis(2-Ethylhexyl)phthalate	0.25	U	LB<RL, EB<RL, IC%RSD
BMW-01-0106RE	Carbazole	0.11	U	EB>RL
BMW-01-0106RE	Hexachloroethane	0.1	U	Result<>rawdata
BMW-01-0106RE	Nitrobenzene	0.1	U	Result<>rawdata
BMW-01-0106RE	N-Nitrosodi-n-propylamine	0.1	U	Result<>rawdata
BMW-06-0106	bis(2-Ethylhexyl)phthalate	0.39	U	LB<RL, EB<RL, IC%RSD
BMW-06-0106	Carbazole	0.12	U	EB>RL
BMW-07-0106	bis(2-Ethylhexyl)phthalate	0.27	U	LB<RL, EB<RL, IC%RSD
BMW-08-0106	bis(2-Ethylhexyl)phthalate	0.24	U	LB<RL, EB<RL, IC%RSD
BPZ-01-0106	3,3'-Dichlorobenzidine	0.1	U	Result<>rawdata
BPZ-01-0106	Benzo(a)anthracene	0.02	J	Result<>rawdata
BPZ-01-0106	Benzo(a)pyrene	0.1	U	Result<>rawdata
BPZ-01-0106	Benzo(b)fluoranthene	0.1	U	Result<>rawdata
BPZ-01-0106	Benzo(k)fluoranthene	0.1	U	Result<>rawdata
BPZ-01-0106	bis(2-Ethylhexyl)phthalate	0.17	U	LB<RL, EB<RL, IC%RSD
BPZ-01-0106	Hexachloroethane	0.1	U	Result<>rawdata
BPZ-01-0106	Nitrobenzene	0.1	U	Result<>rawdata
BPZ-01-0106	N-Nitrosodi-n-propylamine	0.1	U	Result<>rawdata
MW-EB-04-0106	1,4-Dioxane (p-dioxane)	2	U	Result<>rawdata
MW-EB-04-0106	Benzo(a)pyrene	0.1	U	Result<>rawdata
MW-EB-04-0106	Benzo(k)fluoranthene	0.1	U	Result<>rawdata
MW-EB-04-0106	Nitrobenzene	0.1	U	Result<>rawdata
MW-EB-04-0106	N-Nitrosodi-n-propylamine	0.1	U	Result<>rawdata
RMW-04-15-0106RE	bis(2-Ethylhexyl)phthalate	0.35	U	LB<RL, EB<RL, IC%RSD
RMW-04-15-0106RE	Carbazole	0.11	U	EB>RL
RMW-06-15-0106	bis(2-Ethylhexyl)phthalate	0.21	U	LB<RL, EB<RL, IC%RSD
RMW-06-15-0106	Carbazole	0.12	U	EB>RL
RMW-07-15-0106	bis(2-Ethylhexyl)phthalate	0.2	U	LB<RL, EB<RL, IC%RSD
RMW-07-15-0106	Carbazole	0.11	U	EB>RL
RMW-07-15-0106RE	3,3'-Dichlorobenzidine	0.1	U	Result<>rawdata
RMW-07-15-0106RE	Benzo(a)pyrene	0.1	U	Result<>rawdata
RMW-07-15-0106RE	Benzo(k)fluoranthene	0.1	U	Result<>rawdata
RMW-07-15-0106RE	Hexachloroethane	0.1	U	Result<>rawdata
RMW-07-15-0106RE	Nitrobenzene	0.1	U	Result<>rawdata

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
RMW-07-15-0106RE	N-Nitrosodi-n-propylamine	0.1	U	Result<>rawdata
RMW-07-35-0106RE	Benzo(a)pyrene	0.1	U	Result<>rawdata
RMW-07-35-0106RE	bis(2-Ethylhexyl)phthalate	0.51	J	IC%RSD
RMW-07-35-0106RE	Dibenz(a,h)anthracene	0.1	U	Result<>rawdata
RMW-07-35-0106RE	Nitrobenzene	0.1	U	Result<>rawdata
RMW-07-35-0106RE	N-Nitrosodi-n-propylamine	0.1	U	Result<>rawdata
RMW-11-35-0106	bis(2-Ethylhexyl)phthalate	0.29	U	LB<RL, EB<RL, IC%RSD
RMW-11-35-0106	Carbazole	0.12	U	EB>RL
RMW-13-35-0106RE	bis(2-Ethylhexyl)phthalate	0.17	U	LB<RL, EB<RL, IC%RSD
RMW-13-35-0106RE	Carbazole	0.11	U	EB>RL
RMW-14-50-0106RE	bis(2-Ethylhexyl)phthalate	0.18	U	LB<RL, EB<RL, IC%RSD

EB<RL = Equipment blank concentration less than the RL
EB>RL = Equipment blank concentration greater than the RL
IC%RSD= Initial calibration RSD exceeded
LB<RL= Laboratory blank contamination less than the RL
Result<>rawdata = Result discrepancy between Form I and raw data

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	January 17, 18 and 19, 2006
Report Date:	April 5, 2006
Parameters:	GC/MS Semivolatile SIM for Selected Compounds
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y2BM6

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 for a subset of semivolatile compounds (SVOC) GC/MS selected ion monitoring (SIM) analysis using project-approved modifications described in Modification Reference Number 1328.2 (MOD 1328.2). Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Low Concentration Organic Data Review (NFG), June 2001, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier III data validation was performed by CH2M HILL chemists. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review included the chain of custody (CoC) records, case narrative, completed CLP data summary forms, raw data and calculation verification for selected detected results.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All technical holding-time requirements were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Calibration

In the initial calibration (ICAL), the percent relative standard deviation was exceeded for n-nitroso-di-n-propylamine, nitrobenzene, 2,4,6-trichlorophenol, atrazine and bis(2-ethylhexyl)phthalate. Detected results were qualified as estimated and flagged "J".

Incomplete information was provided for the standard concentrations for each target analyte in the ICAL. Therefore, the linear range of each analyte was not known.

The abundances in the low standard were extremely low and many analytes required manual integration.

1,4-Dioxane was evaluated using only the primary ion of 88 without the secondary ions of 58 and 43.

The continuing calibration was within the acceptance criteria.

IV. Method Blank

A method blank (MB) was analyzed as required. Bis(2-ethylhexyl)phthalate was detected in the MB at a concentration less than five times the reporting limit (RL) used by the laboratory. Sample results that were less than the five times the blank concentration and less than the RL were qualified as non-detected results at the RL and flagged "U". Sample results that were less than five times the blank concentration but were greater than the RL were qualified as non-detected at the detected concentration and flagged "U".

V. Laboratory Control Sample

No laboratory control sample data were provided. These data were assumed to be performed under full scan.

VI. Matrix Spike/Matrix Spike Duplicate

Matrix spike/matrix spike duplicates were not required as per MOD 1328.2.

VII. Surrogate Recovery

Surrogate recoveries met acceptance criteria.

VIII. Internal Standard Recovery

A summary form was provided for only three of the six internal standards used by the laboratory; 1,4-dichlorobenzene-d4, naphthalene-d8 and acenaphthene-d10. The three internal standards met acceptance criteria. Phenanthrene-d10, chrysene-d12 and perylene-d12 internal standard recoveries were not evaluated.

IX. Field Duplicates

Samples RMW-10-15-0106 and MW-90-0106 and samples RMW-08-35-0106 and MW-92-0106 were designated as field duplicate (FD) pairs in this SDG. N-Nitroso-di-n-propylamine exceeded acceptance criteria in samples RMW-08-35-0106 and MW-92-0106. The detected

result was qualified as estimated and flagged "J" and the non-detected result was flagged "UJ".

X. Field Blanks

This SDG contained three equipment blanks (EB): MW-EB-05-0106, MW-EB-06-0106, and MW-EB-07-0106. Bis(2-ethylhexyl)phthalate was detected in all three EBs at concentrations less than the laboratory RL. Sample results were flagged for bis(2-ethylhexyl)phthalate MB contamination and therefore, no further flags were applied.

XI. Target Compound Identification

Compound identification was verified by raw data review.

XII. Compound Quantitation and Reported CRQLs

Samples BMW-03-0106 and RMW-10-35-0106 were not reanalyzed at dilutions for 1,4-dioxane that exceeded the calibration range. The sample results were qualified as estimated and flagged "J".

The laboratory RLs were less than the contract required quantitation limits (CRQL) as designated in MOD 1328.2 for bis(2-ethylhexyl)phthalate, atrazine, 2,4,6-trichlorophenol, 3,3'-dichlorobenzene, hexachlorobutadiene, hexachlorobenzene, hexachloroethane, nitrobenzene, 1,4-dioxane and chrysene. The laboratory exceeded the CRQL for n-nitroso-di-n-propylamine.

Quantitation and accuracy of reported CRQLs were verified by raw data review. Samples RMW-10-15-0106, MW-90-0106, MW-92-0106, RMW-01-35-0106 and MW-EB-07-0106 reported detected results on the Form 1s that were determined to be non-detected on review of the raw data. These results were flagged "U" at the RL.

1,4-Dioxane results for samples RMW-05-15-0106, RMW-10-15-0106, MW-90-0106, RMW-09-15-0106, RMW-09-35-0106 and RMW-01-35-0106 were flagged as estimated by the laboratory on the Form 1s and in the electronic data. Re-evaluation of the ICAL determined that the results were not over the linear range and therefore, the laboratory-applied flags were removed.

XIII. Tentatively Identified Compounds

Not applicable.

XIV. Overall Assessment of Data

- The completeness objectives were met for all method/analyte combinations; however, not all the CRQLs were met by the laboratory.
- Detected results over the calibration range were qualified as estimated concentrations.
- Calibration and FD exceedances resulted in data qualified as estimated concentrations.
- Contamination in the MB and EBs resulted in data qualified as not detected.
- A summary form was not provided for three of the six internal standards. Phenanthrene-d10, chrysene-d12 and perylene-d12 were not evaluated.

- 2,4-Dinitrophenol was reported in the electronic data but not on the hardcopy. This analyte was not a required target analyte on the list in MOD 1328.2.
- Reporting errors were discovered through Tier III validation. Incorrect detected results were reported in both the hardcopy and electronic data. In addition, "E" flags were applied to data that did not exceed the calibration range. It is recommended that the laboratory re-evaluate the reported data.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
BMW-03-0106	1,4-Dioxane (p-dioxane)	170	J	>ICLinearRange
BMW-03-0106	bis(2-Ethylhexyl)phthalate	0.1	U	LB<RL, EB<RL, IC%RSD
MW-90-0106	2,4,6-Trichlorophenol	0.5	U	Result<>rawdata
MW-90-0106	Atrazine	0.1	U	Result<>rawdata
MW-90-0106	Benzo(a)pyrene	0.1	U	Result<>rawdata
MW-90-0106	Benzo(g,h,i)perylene	0.1	U	Result<>rawdata
MW-90-0106	Benzo(k)fluoranthene	0.1	U	Result<>rawdata
MW-90-0106	bis(2-Ethylhexyl)phthalate	0.17	U	LB<RL, EB<RL, IC%RSD
MW-90-0106	Carbazole	0.1	U	Result<>rawdata
MW-90-0106	Nitrobenzene	0.1	U	Result<>rawdata
MW-90-0106	N-Nitrosodi-n-propylamine	0.1	U	Result<>rawdata
MW-92-0106	3,3'-Dichlorobenzidine	0.1	U	Result<>rawdata
MW-92-0106	Benzo(a)pyrene	0.1	U	Result<>rawdata
MW-92-0106	Benzo(k)fluoranthene	0.1	U	Result<>rawdata
MW-92-0106	bis(2-Ethylhexyl)phthalate	0.1	U	LB<RL, EB<RL, IC%RSD
MW-92-0106	N-Nitrosodi-n-propylamine	0.1	U	Result<>rawdata
MW-EB-07-0106	Benzo(a)pyrene	0.1	U	Result<>rawdata
MW-EB-07-0106	Benzo(k)fluoranthene	0.1	U	Result<>rawdata
MW-EB-07-0106	Nitrobenzene	0.1	U	Result<>rawdata
MW-EB-07-0106	N-Nitrosodi-n-propylamine	0.1	U	Result<>rawdata
RMW-01-17-0106	bis(2-Ethylhexyl)phthalate	0.1	U	LB<RL, EB<RL, IC%RSD
RMW-01-35-0106	3,3'-Dichlorobenzidine	0.1	U	Result<>rawdata
RMW-01-35-0106	Benzo(a)pyrene	0.1	U	Result<>rawdata
RMW-01-35-0106	Benzo(k)fluoranthene	0.1	U	Result<>rawdata
RMW-01-35-0106	bis(2-Ethylhexyl)phthalate	0.11	U	LB<RL, EB<RL, IC%RSD
RMW-01-35-0106	Hexachloroethane	0.1	U	Result<>rawdata
RMW-01-35-0106	Nitrobenzene	0.1	U	Result<>rawdata
RMW-01-35-0106	N-Nitrosodi-n-propylamine	0.1	U	Result<>rawdata
RMW-05-15-0106	bis(2-Ethylhexyl)phthalate	0.18	U	LB<RL, EB<RL, IC%RSD
RMW-08-15-0106	bis(2-Ethylhexyl)phthalate	0.1	U	LB<RL, EB<RL, IC%RSD
RMW-08-35-0106	bis(2-Ethylhexyl)phthalate	0.1	U	LB<RL, EB<RL, IC%RSD
RMW-09-15-0106	bis(2-Ethylhexyl)phthalate	0.2	U	LB<RL, EB<RL, IC%RSD
RMW-09-35-0106	bis(2-Ethylhexyl)phthalate	0.13	U	LB<RL, EB<RL, IC%RSD
RMW-10-15-0106	2,4,6-Trichlorophenol	0.5	U	Result<>rawdata
RMW-10-15-0106	Atrazine	0.1	U	Result<>rawdata
RMW-10-15-0106	Benzo(a)pyrene	0.1	U	Result<>rawdata

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
RMW-10-15-0106	Benzo(k)fluoranthene	0.1	U	Result<>rawdata
RMW-10-15-0106	bis(2-Ethylhexyl)phthalate	0.18	U	LB<RL, EB<RL, IC%RSD
RMW-10-15-0106	Carbazole	0.1	U	Result<>rawdata
RMW-10-15-0106	Hexachloroethane	0.1	U	Result<>rawdata
RMW-10-15-0106	Nitrobenzene	0.1	U	Result<>rawdata
RMW-10-15-0106	N-Nitrosodi-n-propylamine	0.1	U	Result<>rawdata
RMW-10-35-0106	1,4-Dioxane (p-dioxane)	98	J	>ICLinearRange
RMW-10-35-0106	bis(2-Ethylhexyl)phthalate	0.73	J	IC%RSD

>ICLinearRange = Result greater than linear calibration range
IC%RSD= Initial calibration RSD exceeded
EB<RL = Equipment blank concentration less than the RL
LB<RL= Laboratory blank contamination less than the RL
Result<>rawdata = Result discrepancy between Form I and raw data

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	January 20 and 23, 2006
Report Date:	February 28, 2006
Parameters:	GC/MS Semivolatile SIM for Selected Compounds
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y2BQ5

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 for a subset of semivolatile organic compounds (SVOC) GC/MS selected ion monitoring (SIM) analysis using project-approved modifications described in Modification Reference Number 1328.2 (MOD 1328.2). Specifications and requirements in the Remedial Investigation Sampling and Analysis Plan AMCO Chemical Superfund Site (SAP), August 2004, and the EPA National Functional Guidelines for Low Concentration Organic Data Review (NFG), June 2001, were mainly used as the basis for this review. Laboratory acceptance limits were used in cases where the SAP and NFG do not specify any limits.

Tier III data validation was performed by CH2M HILL chemists as required by the SAP. The CH2M HILL chemists consulted the CADRE automated data validation reports as needed to complete the Tier III data validation. The intended objective of the data review process was to provide a technical review of the analytical raw data and to provide verification of calculations and analyte identification. It was not intended to determine contract compliance.

The scope of the data review included the chain of custody (CoC) records, the case narrative, completed CLP data summary forms and raw data.

Data qualifiers were applied to the sample results when indicated by the data review process. Data were not qualified in this SDG.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All technical holding-time requirements were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met. Ion abundance calculations were verified for several masses.

III. Calibration

Relative standard deviations (RSD) for nitrobenzene, 2,4,6-trichlorophenol, atrazine and bis(2-ethylhexyl)phthalate exceeded criteria in the initial calibration (ICAL). There were no detections in the samples and therefore, flags were not applied.

Calculations for the ICAL relative response factor (RRF) and RSD criteria were verified. For the RRF determination, the actual standard concentration was rounded. The actual standard concentrations (in ug/ml) were 0.13, 0.53, 1.03, 2.03 and 5.03. The laboratory used concentrations of 0.1, 0.5, 1, 2 and 5 to calculate the RRFs and RSDs. The mid-range ICAL standard of 1ug/ml was used for the continuing calibration verification (CCV). The CCV RRFs were used to calculate the detected results and therefore, the impact of rounding the standard concentrations on the detected results was minimal.

All continuing calibration criteria were met. The continuing calibration RRF and percent difference (%D) calculations were verified.

Incomplete information was provided for the standard concentrations for each target analyte in the ICAL. Therefore, the linear range of each analyte was not known.

The abundances in the low standard were extremely low and each analyte required manual integration.

1,4-Dioxane was evaluated using only the primary ion of 88 without the secondary ions of 58 and 43.

IV. Method Blank

A method blank (MB) was analyzed as required. Bis(2-ethylhexyl)phthalate was detected in the MB at a concentration less than five times the reporting limit (RL) used by the laboratory. Sample results that were less than five times the blank concentration but were greater than the RL were qualified as non-detected at the detected concentration and flagged “U”.

V. Laboratory Control Sample

No laboratory control sample data were provided. These data were assumed to be performed under full scan.

VI. Matrix Spike/Matrix Spike Duplicate

Matrix spike/matrix spike duplicates were not required as per MOD 1328.2.

VII. Surrogate Recovery

A method required surrogate was analyzed as required. There was no surrogate recovery in samples RMW-12-32-0106 and RMW-02-50-0106. As per MOD 1328.2, only 1,4-dioxane

required flagging. One detected result was qualified as estimated and flagged "J" and one non-detected result was not useable and flagged "R". There was no discussion in the case narrative regarding surrogate outliers.

The surrogate calculation was verified.

VIII. Internal Standard Recovery

The internal standard summary (Form 8) was only provided for the first three internal standards: 1,4-dichlorobenzene-d4, naphthalene-d8 and acenaphthalene-d10. Upper and lower control limits for phenanthrene-d10, chrysene-12 and perylene-12 were calculated from the raw data.

There were internal standard recoveries above the upper control limit in samples RMW-03-15-0106, RMW-02-32-0106, MW-12-0106 and RMW-02-13-0106. Associated detected concentrations were qualified as estimated and flagged "J".

IX. Field Duplicates

This SDG contained one field duplicate pair: RMW-12-51-0106 and MW-88-0106. Dibenzo(a,h)anthracene was detected in the parent sample and was non-detected in the field duplicate. The results were qualified as estimated and flagged "J" and "UJ", respectively.

X. Field Blanks

This SDG contained two equipment blanks (EB): MW-EB-08-0106 and MW-EB-09-0106. Bis(2-ethylhexyl)phthalate was detected in both EBs at concentrations similar to that detected in the MB. Therefore, no further flags were applied to the associated samples.

XI. Target Compound Identification

Compound identification was verified by raw data review.

XII. Compound Quantitation and Reported CRQLs

Samples RMW-12-32-0106 and RMW-02-32-0106 were not reanalyzed at dilutions for 1,4-dioxane that exceeded the calibration range. Carbazole in sample RMW-02-13-0106 also exceeded the calibration range. The sample results were qualified as estimated and flagged "J".

The laboratory RLs were less than the contract required quantitation limits (CRQL) as designated in MOD 1328.2 for bis(2-ethylhexyl)phthalate, atrazine, 2,4,6-trichlorophenol, 3,3'-dichlorobenzene, hexachlorobutadiene, hexachlorobenzene, hexachloroethane, nitrobenzene and chrysene. The laboratory exceeded the CRQL for n-nitroso-di-n-propylamine.

Quantitation and accuracy of RLs were verified by raw data review on a percentage of the detected sample results. Samples RMW-02-32-0106 and RMW-02-13-0106 reported detected results on the Form 1s that were determined to be non-detected on review of the raw data. These results were flagged "U" at the RL.

1,4-Dioxane results for samples MW-12-0106, RMW-03-15-0106, and RMW-02-13-0106 were flagged as estimated by the laboratory on the Form 1s and in the electronic data. Re-evaluation of the ICAL determined that the results were not over the linear range and therefore, the laboratory-applied flags were removed.

XIII. Tentatively Identified Compounds

These data were assumed to be performed under full scan.

XIV. Overall Assessment of Data

- Detected results over the calibration range were qualified as estimated concentrations.
- Calibration, field duplicate and internal standard exceedances caused results to be qualified as estimated concentrations.
- The completeness goal was not met because one sample with no surrogate recovery resulted in 1,4-dioxane flagged as not useable.
- Laboratory RLs were below the CRQLs for several compounds and above the CRQL for one compound.
- Contamination in the MB resulted in data qualified as not detected.
- 2,4-Dinitrophenol was reported in the electronic data but not on the hardcopy. This analyte was not a required target analyte on the list in MOD 1328.2.
- Reporting errors were discovered through Tier III validation. Incorrect detected results were reported in both the hardcopy and electronic data. In addition, “E” flags were applied to data that did not exceed the calibration range. It is recommended that the laboratory re-evaluate the reported data.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MW-12-0106	bis(2-Ethylhexyl)phthalate	0.73	U	IS>UCL, LB<RL
MW-12-0106	Carbazole	0.5	J	IS>UCL
MW-12-0106	Pentachlorophenol	13	J	IS>UCL
MW-88-0106	bis(2-Ethylhexyl)phthalate	0.55	U	LB<RL
RMW-02-13-0106	2,4,6-Trichlorophenol	0.5	U	Result<>rawdata
RMW-02-13-0106	3,3'-Dichlorobenzidine	0.1	U	Result<>rawdata
RMW-02-13-0106	Atrazine	0.1	U	Result<>rawdata
RMW-02-13-0106	Benzo(a)anthracene	0.35	J	IS>UCL
RMW-02-13-0106	Benzo(a)pyrene	0.19	J	IS>UCL
RMW-02-13-0106	Benzo(b)fluoranthene	0.43	J	IS>UCL
RMW-02-13-0106	Benzo(g,h,i)perylene	0.1	U	Result<>rawdata
RMW-02-13-0106	Benzo(k)fluoranthene	0.46	J	IS>UCL
RMW-02-13-0106	bis(2-Chloroethoxy)methane	0.1	U	Result<>rawdata
RMW-02-13-0106	bis(2-Chloroethyl)ether	0.1	U	Result<>rawdata
RMW-02-13-0106	bis(2-Ethylhexyl)phthalate	0.3	U	IS>UCL, LB<RL
RMW-02-13-0106	Carbazole	11	J	>ICLinearRange, IS>UCL
RMW-02-13-0106	Chrysene	0.42	J	IS>UCL
RMW-02-13-0106	Dibenz(a,h)anthracene	0.1	U	Result<>rawdata
RMW-02-13-0106	Hexachloroethane	0.1	U	Result<>rawdata
RMW-02-13-0106	Indeno(1,2,3-c,d)pyrene	0.1	U	Result<>rawdata
RMW-02-13-0106	Nitrobenzene	0.1	U	Result<>rawdata
RMW-02-13-0106	N-Nitrosodi-n-propylamine	0.1	U	Result<>rawdata
RMW-02-13-0106	Pentachlorophenol	3.7	J	IS>UCL
RMW-02-32-0106	1,4-Dioxane (p-dioxane)	610	J	>ICLinearRange, IS>UCL
RMW-02-32-0106	3,3'-Dichlorobenzidine	0.1	U	Result<>rawdata
RMW-02-32-0106	Atrazine	0.1	U	Result<>rawdata
RMW-02-32-0106	Benzo(a)pyrene	0.17	J	IS>UCL
RMW-02-32-0106	Benzo(k)fluoranthene	0.1	U	Result<>rawdata
RMW-02-32-0106	bis(2-Chloroethoxy)methane	0.1	U	Result<>rawdata
RMW-02-32-0106	bis(2-Chloroethyl)ether	0.1	U	Result<>rawdata
RMW-02-32-0106	bis(2-Ethylhexyl)phthalate	0.36	U	IS>UCL, LB<RL
RMW-02-32-0106	Carbazole	0.54	J	IS>UCL
RMW-02-32-0106	Hexachloroethane	0.1	U	Result<>rawdata
RMW-02-32-0106	Nitrobenzene	0.1	U	Result<>rawdata
RMW-02-32-0106	N-Nitrosodi-n-propylamine	0.1	U	Result<>rawdata
RMW-02-50-0106	1,4-Dioxane (p-dioxane)	2	R	Sur<LCL
RMW-02-50-0106	bis(2-Ethylhexyl)phthalate	0.25	U	LB<RL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
RMW-03-15-0106	Benzo(a)pyrene	0.33	J	IS>UCL
RMW-03-15-0106	bis(2-Ethylhexyl)phthalate	0.27	U	IS>UCL, LB<RL
RMW-12-32-0106	1,4-Dioxane (p-dioxane)	140	J	>ICLinearRange, Sur<LCL
RMW-12-32-0106	bis(2-Ethylhexyl)phthalate	0.17	U	LB<RL
RMW-12-51-0106	bis(2-Ethylhexyl)phthalate	0.62	U	LB<RL

>ICLinearRange = Result greater than linear calibration range
EB<RL = Equipment blank concentration less than the RL
IS>UCL = Internal standard response greater than upper control limit
LB<RL= Laboratory blank contamination less than the RL
Result<>rawdata = Result discrepancy between Form I and raw data
Sur<LCL = Surrogate recovery less than lower limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	January 10, 11, 12 and 13, 2006
Report Date:	February 22, 2006
Parameters:	Semivolatile Organic Compounds
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y2BJ4

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 and project-approved modifications described in Modification Reference Number 1328.2 for semivolatile organic compounds (SVOC). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review, June 2001, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative, and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

Holding-time requirements were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Calibration

All initial and continuing calibrations me acceptance criteria.

IV. Method Blanks

A method blank was analyzed as required. There were no detected results in the method blank.

V. Field Blanks

This SDG contained four equipment blanks (EB): MW-EB-01-0106, MW-EB-02-0106, MW-EB-03-0106 and MW-EB-04-0106. Each EB contained 4-chloro-3-methylphenol below the contract required quantitation limit (CRQL), equivalent to reporting limit (RL). There were no associated detected results and therefore, no data were qualified.

VI. Surrogate Recovery

4-Chloroaniline-d4 was recovered above the upper control limit (UCL) in sample BPZ-01-0106. There were no associated detected results and therefore, no data were qualified.

Acenaphthalene-d8 was recovered below the lower control limit (LCL) in sample RMW-07-35-0106. Associated non-detected results were qualified as estimated and flagged "UJ".

4-Chloroaniline-d4 was not recovered and the benzo(a)pyrene-d12 recovery was below 10 percent in sample RMW-07-35-0106. Associated non-detected results were unusable and flagged "R".

Dimethylphthalate-d6 and acenaphthalene-d8 were recovered below the LCL in sample BMW-07-0106. Associated non-detected results were qualified as estimated and flagged "UJ".

Dimethylphthalate-d6, acenaphthalene-d8, fluorine-d10 and anthracene-d10 were recovered below the LCL in sample BMW-08-0106. Associated non-detected results were qualified as estimated and flagged "UJ".

VII. Matrix Spike/Matrix Spike Duplicate

The matrix spike/matrix spike duplicate (MS/MSD) was analyzed on sample BMW-07-0106. 4-Nitrophenol was recovered above the UCL in the MS and MSD. Pentachlorophenol was recovered above the UCL in the MSD. These compounds were not detected in the parent sample and therefore, no data were qualified.

VIII. Laboratory Control Sample

Not applicable.

IX. Internal Standards

All acceptance criteria were met.

X. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

XI. Compound Quantitation and Reported CRQLs

Verification of quantitation and accuracy of reported CRQLs was not within the scope of the data review for this SDG.

XII. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XIII. Field Duplicates

No field duplicates were included in this SDG.

XIV. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XV. Overall Assessment of Data

- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.
- Surrogate exceedances resulted in data qualified as estimated concentrations and data qualified as rejected.
- The completeness objectives were met for all method/analyte combinations except for associated non-detected results in sample RMW-07-35-0106 that were qualified as unusable due to surrogate exceedances.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
BMW-07-0106	2-Chloronaphthalene	5	UJ	Sur<LCL
BMW-07-0106	2-Methylnaphthalene	5	UJ	Sur<LCL
BMW-07-0106	Acenaphthene	5	UJ	Sur<LCL
BMW-07-0106	Acenaphthylene	5	UJ	Sur<LCL
BMW-07-0106	Benzyl butyl phthalate	5	UJ	Sur<LCL
BMW-07-0106	Biphenyl (diphenyl)	5	UJ	Sur<LCL
BMW-07-0106	bis(2-Ethylhexyl)phthalate	5	UJ	Sur<LCL
BMW-07-0106	Caprolactam	5	UJ	Sur<LCL
BMW-07-0106	Diethylphthalate	5	UJ	Sur<LCL
BMW-07-0106	Dimethylphthalate	5	UJ	Sur<LCL
BMW-07-0106	Di-n-butyl phthalate	5	UJ	Sur<LCL
BMW-07-0106	Di-n-octyl phthalate	5	UJ	Sur<LCL
BMW-07-0106	Naphthalene	5	UJ	Sur<LCL
BMW-08-0106	2-Chloronaphthalene	5	UJ	Sur<LCL
BMW-08-0106	2-Methylnaphthalene	5	UJ	Sur<LCL
BMW-08-0106	4-Bromophenylphenyl ether	5	UJ	Sur<LCL
BMW-08-0106	4-Chlorophenylphenyl ether	5	UJ	Sur<LCL
BMW-08-0106	Acenaphthene	5	UJ	Sur<LCL
BMW-08-0106	Acenaphthylene	5	UJ	Sur<LCL
BMW-08-0106	Anthracene	5	UJ	Sur<LCL
BMW-08-0106	Atrazine	5	UJ	Sur<LCL
BMW-08-0106	Benzyl butyl phthalate	5	UJ	Sur<LCL
BMW-08-0106	Biphenyl (diphenyl)	5	UJ	Sur<LCL
BMW-08-0106	bis(2-Ethylhexyl)phthalate	5	UJ	Sur<LCL
BMW-08-0106	Caprolactam	5	UJ	Sur<LCL
BMW-08-0106	Dibenzofuran	5	UJ	Sur<LCL
BMW-08-0106	Diethylphthalate	5	UJ	Sur<LCL
BMW-08-0106	Dimethylphthalate	5	UJ	Sur<LCL
BMW-08-0106	Di-n-butyl phthalate	5	UJ	Sur<LCL
BMW-08-0106	Di-n-octyl phthalate	5	UJ	Sur<LCL
BMW-08-0106	Fluorene	5	UJ	Sur<LCL
BMW-08-0106	Hexachlorobenzene	5	UJ	Sur<LCL
BMW-08-0106	Naphthalene	5	UJ	Sur<LCL
BMW-08-0106	Phenanthrene	5	UJ	Sur<LCL
RMW-07-35-0106	2-Chloronaphthalene	5	UJ	Sur<LCL
RMW-07-35-0106	2-Methylnaphthalene	5	UJ	Sur<LCL
RMW-07-35-0106	3,3'-Dichlorobenzidine	5	R	Sur<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
RMW-07-35-0106	4-Chloroaniline	5	R	Sur<LCL
RMW-07-35-0106	Acenaphthene	5	UJ	Sur<LCL
RMW-07-35-0106	Acenaphthylene	5	UJ	Sur<LCL
RMW-07-35-0106	Benzo(a)pyrene	5	R	Sur<LCL
RMW-07-35-0106	Benzo(b)fluoranthene	5	R	Sur<LCL
RMW-07-35-0106	Benzo(g,h,i)perylene	5	R	Sur<LCL
RMW-07-35-0106	Benzo(k)fluoranthene	5	R	Sur<LCL
RMW-07-35-0106	Dibenz(a,h)anthracene	5	R	Sur<LCL
RMW-07-35-0106	Hexachlorocyclopentadiene	5	R	Sur<LCL
RMW-07-35-0106	Indeno(1,2,3-c,d)pyrene	5	R	Sur<LCL
RMW-07-35-0106	Naphthalene	5	UJ	Sur<LCL

Sur<LCL = Surrogate recovery less than lower limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	January 17, 18 and 19, 2006
Report Date:	February 15, 2006
Parameters:	Semivolatile Organic Compounds
Laboratory:	A4 Scientific Inc.
Sample Delivery Group:	Y2BM5

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 and project-approved modifications described in Modification Reference Number 1328.2 for semivolatile organic compounds (SVOC). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review (NFG), June 2001, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier III data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data and to provide verification of calculations and analyte identification. It was not intended to determine contract compliance.

The scope of the data review included the chain-of-custody (CoC) records, the case narrative, completed CLP data summary forms and raw data.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The samples were received at the laboratory within control temperatures and with appropriate CoC forms; however, the custody seal on the cooler was not intact. Individual sample bottles did not contain sample tag ID numbers. Several samples were received with broken bottles; however, sufficient sample remained for the analyses.

All technical holding-time requirements were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met. Samples were analyzed within the 12-hour tune time. Ion abundance calculations were verified for several masses.

III. Calibration

All calibration criteria for the initial calibration standards (ICAL) were met. Calculations for the ICAL relative response factor (RRF) and relative standard deviation were verified.

All continuing calibration criteria were met with the exception of the following: caprolactam, butylbenzylphthalate, 3,3′-dichlorobenzidine, bis(2-ethylhexyl)phthalate, and di-n-octylphthalate had low biased percent difference (%D) recoveries in the continuing calibration verification analyzed on February 01, 2006. The associated non-detected sample results were qualified as estimated and flagged "UJ". The continuing calibration RRF and %D calculations were verified.

IV. Method Blanks

A method blank was analyzed as required. There were no detected results in the method blank.

V. Field Blanks

There were three equipment blanks (EB) associated with this SDG: MW-EB-05-0106, MW-EB-06-0106 and MW-EB-07-0106. EB samples MW-EB-05-0106 and MW-EB-07-0106 each had 4-chloro-3-methylphenol detected results below the contract required quantitation limit (CRQL), equivalent to the reporting limit (RL). There were no associated detected sample results; therefore, no data were qualified.

VI. Surrogate Recovery

The method required deuterated monitoring compounds (DMC) were analyzed.

Sample RMW-09-15-0106 had 4-chloroaniline-d4 recovery at one percent. Associated non-detected results were unusable and flagged "R".

Sample RMW-09-35-0106 had dimethylphthalate-d6, acenaphthylene-d8 and fluorene-d10 recoveries below the respective lower control limits (LCL). Associated non-detected results were qualified as estimated and flagged "UJ".

Sample RMW-10-35-0106 had bis(2-chloroethyl)ether-d8, 4-methyphenol-d8, and acenaphthylene-d8 recoveries below the LCL. Associated non-detected results were qualified as estimated and flagged "UJ".

RMW-08-35-0106 and MW-92-0106 each had bis(2-chloroethyl)ether-d8 recoveries below the LCL. Associated non-detected results were qualified as estimated and flagged "UJ".

The calculation for DMC recovery was verified.

VII. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate (MS/MSD) was analyzed on sample RMW-10-35-0106. MSD recoveries for 4-chloro-3-methylphenol and pentachlorophenol were above the respective upper control limit (UCL). The relative percent differences (RPD) were above the UCL for pentachlorophenol, 2-chlorophenol, n-nitroso-di-n-propylamine and acenaphthene. These compounds were not detected in the parent sample; therefore, no data were qualified.

MS/MSD percent recoveries and RPD calculations were verified.

VIII. Laboratory Control Sample

The applicable Statement of Work does not require analysis of a laboratory control sample (LCS); therefore, no LCS was analyzed.

IX. Internal Standards

All internal standard areas and retention times were within the acceptance limits. A percentage of raw data was reviewed to verify results reported on the summary form.

X. Target Compound Identification

Compound identification was verified by raw data review on a percentage of the detected sample results.

XI. Compound Quantitation and Reported CRQLs

Sample RMW-01-35-0106 was reanalyzed at a five-fold dilution because target compounds were over the linear range. 4-Methylphenol, 2,4-dimethylphenol and 4-chloro-3-methylphenol were reported from the sample dilution. Nitrobenzene was detected in the diluted sample below the CRQL and not in the undiluted analysis. Nitrobenzene was reported from the diluted sample analysis.

Compound quantitation and accuracy were verified.

XII. Tentatively Identified Compounds

Tentative identifications were reviewed on a percentage of the samples.

XIII. Field Duplicates

There were two field duplicate pairs in this SDG: RMW-10-15-0106 and MW-90-0106, and RMW-08-35-0106 and MW-92-0106. All acceptance criteria were met.

XIV. System Performance

The system performance was evaluated by reviewing the chromatographic data. Overall, the system was in control.

XV. Overall Assessment of Data

- Instrument calibration was generally acceptable.
- There was no method blank contamination.

- DMC exceedances resulted in data qualified as estimated concentrations and data qualified as rejected.
- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MW-92-0106	bis(2-Chloroethoxy)methane	5	UJ	Sur<LCL
MW-92-0106	bis(2-Chloroethyl)ether	5	UJ	Sur<LCL
MW-92-0106	bis(2-Chloroisopropyl) ether	5	UJ	Sur<LCL
RMW-01-35-0106	3,3'-Dichlorobenzidine	5	UJ	CCV<LCL
RMW-01-35-0106	Benzyl butyl phthalate	5	UJ	CCV<LCL
RMW-01-35-0106	bis(2-Ethylhexyl)phthalate	5	UJ	CCV<LCL
RMW-01-35-0106	Caprolactam	5	UJ	CCV<LCL
RMW-01-35-0106	Di-n-octyl phthalate	5	UJ	CCV<LCL
RMW-08-35-0106	bis(2-Chloroethoxy)methane	5	UJ	Sur<LCL
RMW-08-35-0106	bis(2-Chloroethyl)ether	5	UJ	Sur<LCL
RMW-08-35-0106	bis(2-Chloroisopropyl) ether	5	UJ	Sur<LCL
RMW-09-15-0106	3,3'-Dichlorobenzidine	5	R	Sur<LCL
RMW-09-15-0106	4-Chloroaniline	5	R	Sur<LCL
RMW-09-15-0106	Hexachlorocyclopentadiene	5	R	Sur<LCL
RMW-09-35-0106	2-Chloronaphthalene	5	UJ	Sur<LCL
RMW-09-35-0106	2-Methylnaphthalene	5	UJ	Sur<LCL
RMW-09-35-0106	4-Bromophenylphenyl ether	5	UJ	Sur<LCL
RMW-09-35-0106	4-Chlorophenylphenyl ether	5	UJ	Sur<LCL
RMW-09-35-0106	Acenaphthene	5	UJ	Sur<LCL
RMW-09-35-0106	Acenaphthylene	5	UJ	Sur<LCL
RMW-09-35-0106	Benzyl butyl phthalate	5	UJ	Sur<LCL
RMW-09-35-0106	Biphenyl (diphenyl)	5	UJ	Sur<LCL
RMW-09-35-0106	bis(2-Ethylhexyl)phthalate	5	UJ	Sur<LCL
RMW-09-35-0106	Caprolactam	5	UJ	Sur<LCL
RMW-09-35-0106	Dibenzofuran	5	UJ	Sur<LCL
RMW-09-35-0106	Diethylphthalate	5	UJ	Sur<LCL
RMW-09-35-0106	Dimethylphthalate	5	UJ	Sur<LCL
RMW-09-35-0106	Di-n-butyl phthalate	5	UJ	Sur<LCL
RMW-09-35-0106	Di-n-octyl phthalate	5	UJ	Sur<LCL
RMW-09-35-0106	Fluorene	5	UJ	Sur<LCL
RMW-09-35-0106	Naphthalene	5	UJ	Sur<LCL
RMW-10-35-0106	2,4-Dimethylphenol	5	UJ	Sur<LCL
RMW-10-35-0106	2-Chloronaphthalene	5	UJ	Sur<LCL
RMW-10-35-0106	2-Methylnaphthalene	5	UJ	Sur<LCL
RMW-10-35-0106	2-Methylphenol	5	UJ	Sur<LCL
RMW-10-35-0106	4-Methylphenol	5	UJ	Sur<LCL
RMW-10-35-0106	Acenaphthene	5	UJ	Sur<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
RMW-10-35-0106	Acenaphthylene	5	UJ	Sur<LCL
RMW-10-35-0106	bis(2-Chloroethoxy)methane	5	UJ	Sur<LCL
RMW-10-35-0106	bis(2-Chloroethyl)ether	5	UJ	Sur<LCL
RMW-10-35-0106	bis(2-Chloroisopropyl) ether	5	UJ	Sur<LCL
RMW-10-35-0106	Naphthalene	5	UJ	Sur<LCL

CCV<LCL = Continuing calibration recovery less than lower control limit
Sur<LCL = Surrogate recovery less than lower limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	January 21 and 23, 2006
Report Date:	February 17, 2006
Parameters:	Semivolatile Organic Compounds
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y2BQ4

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 and project-approved modifications described in Modification Reference Number 1328.2 for semivolatile organic compounds (SVOC). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review, June 2001, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier II data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review was limited to the chain-of-custody (CoC) records, the case narrative, and completed CLP data summary forms only.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

The samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

Holding-time requirements were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Calibration

The initial calibration was within acceptance criteria.

The percent difference (%D) recoveries of pyrene, butyl-benzyl phthalate, bis(2-ethylhexyl)phthalate and di-n-octylphthalate exceeded criteria in the the continuing calibration verification (CCV) analyzed on 2/2/06, while indeno(1,2,3-cd)pyrene and dibenzo(a,h)anthracene recoveries were less than acceptable criteria limits. Samples RMW-12-51-0106, RMW-03-15-0106 and MW-88-0106 were associated with this CCV. The associated non-detected results were qualified as estimated and flagged "UJ".

IV. Method Blanks

Method blanks were analyzed as required. No contamination detected.

V. Field Blanks

There were two equipment blanks in this SDG: MW-EB-08-0106 and MW-EB-09-0106. Acetophenone and 4-chloro-3-methylphenol was detected below the contract required quantitation limit (CRQL), equivalent to reporting limit (RL) in both EB samples. Benzaldehyde was also detected below the CRQL in EB sample MW-EB-08-0106. Acetophenone in sample RMW-12-32-0106 was qualified as non-detect at the CRQL and flagged "U".

VI. Surrogate Recovery

Benzo(a)pyrene-d12 was recovered below the lower control limit (LCL) in sample RMW-12-51-0106, as well as, in the matrix spike/matrix spike duplicate (MS/MSD) of this sample. Associated non-detected results were qualified as estimated and flagged "UJ".

In sample RMW-12-32-0106, dimethylphthalate-d6, anthracene-d10 and benzo(a)pyrene-d12 were recovered below the LCL. Associated non-detected results were qualified as estimated and flagged "UJ". In addition, 4-chloroaniline-d4 had no recovery in the sample. Associated non-detected results were unusable and flagged "R".

Dimethylphthalate-d6 was below the LCL in sample RMW-02-50-0106. Associated non-detected results were flagged "UJ" and qualified as estimated.

Dimethylphthalate-d6, fluorene-d10, pyrene-d10, phenol-d5, bis-(2-chloroethyl)ether-d8, 4-methylphenol-d8, and 2,4-dichlorophenol-d3 were recovered above the upper control limit (UCL) in the undiluted analysis of sample RMW-02-32-0106. Di-n-butylphthalate was the only detected result reported from this dilution. The result was qualified as estimated and flagged "J". All other detected results were reported from the diluted sample analysis. 4-Nitrophenol-4 and 4-chloroaniline-d4 were recovered below the LCL in sample RMW-02-32-0106. Associated non-detected results were qualified as estimated and flagged "UJ".

Sample RMW-02-13-0106 had recoveries for dimethylphthalate-d6, acenaphthylene-d8, 4-nitrophenol-d4, fluorene-d10, anthracene-d10, pyrene-d10, benzo(a)pyrene-d12, 2-nitropheneol-d4, and 2,4-dichlorophenol-d3 below the LCL. Detected and non-detected results reported from this sample dilution were qualified as estimated and flagged "J" and "UJ", respectively.

Dimethylphthalate-d6, acenaphthylene-d8, 4-nitrophenol-d4, and fluorene-d10 were not recovered in the undiluted analysis of sample MW-12-0106. Associated detected results were qualified as estimated and flagged "UJ". Non-detected results were not usable and flagged "R". Phenol-d5, bis-(2-chloroethyl)ether-d8, and 4-methylphenol-d8 were recovered above the UCL. There were no associated detected results and therefore, no data were qualified.

VII. Matrix Spike/Matrix Spike Duplicate

The MS/MSD was analyzed on sample RMW-12-51-0106. The acenaphthene recovery in the MSD was below the LCL. The pyrene relative percent difference (RPD) exceeded the UCL. The parent sample non-detected results were qualified as estimated and flagged "UJ".

VIII. Laboratory Control Sample

Not applicable.

IX. Internal Standards

Acenaphthene-d10 was above the QC limit in sample MW-12-0106. There were no associated detected results; therefore, no data were qualified.

X. Target Compound Identification

Verification of compound identification was not within the scope of the data review for this SDG.

XI. Compound Quantitation and Reported CRQLs

Samples RMW-02-32-0106, RMW-02-13-0106 and MW-12-0106 were analyzed at dilutions because target analytes were detected above the linear range.

Verification of quantitation and accuracy of reported CRQLs was not within the scope of the data review for this SDG.

XII. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XIII. Field Duplicates

Samples RMW-12-51-0106 and MW-88-0106 were designated as a field duplicate pair. All acceptance criteria were met.

XIV. System Performance

Raw data review was not within the scope of this task, and the system performance could not be evaluated.

XV. Overall Assessment of Data

- Calibration and MS/MSD exceedances resulted in data qualified as estimated concentrations.

- Surrogate exceedances resulted in data qualified as estimated concentrations and data qualified as rejected for project use.
- Contamination in the EBs resulted in data qualified as not detected.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MW-12-0106	2,4-Dinitrophenol	20	R	Sur<LCL
MW-12-0106	2-Chloronaphthalene	5	R	Sur<LCL
MW-12-0106	2-Methylnaphthalene	70	J	Sur<LCL
MW-12-0106	2-Nitroaniline	20	R	Sur<LCL
MW-12-0106	3-Nitroaniline	20	R	Sur<LCL
MW-12-0106	4-Bromophenylphenyl ether	5	R	Sur<LCL
MW-12-0106	4-Chlorophenylphenyl ether	5	R	Sur<LCL
MW-12-0106	4-Nitroaniline	20	R	Sur<LCL
MW-12-0106	4-Nitrophenol	20	R	Sur<LCL
MW-12-0106	Acenaphthene	5	R	Sur<LCL
MW-12-0106	Acenaphthylene	5	R	Sur<LCL
MW-12-0106	Benzyl butyl phthalate	5	R	Sur<LCL
MW-12-0106	Biphenyl (diphenyl)	5	R	Sur<LCL
MW-12-0106	bis(2-Ethylhexyl)phthalate	5	R	Sur<LCL
MW-12-0106	Caprolactam	5	R	Sur<LCL
MW-12-0106	Dibenzofuran	5	R	Sur<LCL
MW-12-0106	Diethylphthalate	5	R	Sur<LCL
MW-12-0106	Dimethylphthalate	5	R	Sur<LCL
MW-12-0106	Di-n-butyl phthalate	5	R	Sur<LCL
MW-12-0106	Di-n-octyl phthalate	5	R	Sur<LCL
MW-12-0106	Fluorene	5	R	Sur<LCL
MW-12-0106	Naphthalene	76	J	Sur<LCL
MW-88-0106	Benzyl butyl phthalate	5	UJ	CCV>UCL
MW-88-0106	bis(2-Ethylhexyl)phthalate	5	UJ	CCV>UCL
MW-88-0106	Dibenz(a,h)anthracene	5	UJ	CCV<LCL
MW-88-0106	Di-n-octyl phthalate	5	UJ	CCV>UCL
MW-88-0106	Indeno(1,2,3-c,d)pyrene	5	UJ	CCV<LCL
MW-88-0106	Pyrene	5	UJ	CCV>UCL
RMW-02-13-0106	1,2,4,5-Tetrachlorobenzene	5	UJ	Sur<LCL
RMW-02-13-0106	2,4,5-Trichlorophenol	20	UJ	Sur<LCL
RMW-02-13-0106	2,4,6-Trichlorophenol	5	UJ	Sur<LCL
RMW-02-13-0106	2,4-Dichlorophenol	5	UJ	Sur<LCL
RMW-02-13-0106	2,4-Dinitrophenol	20	UJ	Sur<LCL
RMW-02-13-0106	2-Chloronaphthalene	5	UJ	Sur<LCL
RMW-02-13-0106	2-Nitroaniline	20	UJ	Sur<LCL
RMW-02-13-0106	2-Nitrophenol	5	UJ	Sur<LCL
RMW-02-13-0106	3-Nitroaniline	20	UJ	Sur<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
RMW-02-13-0106	4-Bromophenylphenyl ether	5	UJ	Sur<LCL
RMW-02-13-0106	4-Chloro-3-methylphenol	5	UJ	Sur<LCL
RMW-02-13-0106	4-Chlorophenylphenyl ether	5	UJ	Sur<LCL
RMW-02-13-0106	4-Nitroaniline	20	UJ	Sur<LCL
RMW-02-13-0106	4-Nitrophenol	20	UJ	Sur<LCL
RMW-02-13-0106	Acenaphthene	1.2	J	Sur<LCL
RMW-02-13-0106	Acenaphthylene	5	UJ	Sur<LCL
RMW-02-13-0106	Anthracene	5	UJ	Sur<LCL
RMW-02-13-0106	Atrazine	5	UJ	Sur<LCL
RMW-02-13-0106	Benzo(a)anthracene	5	UJ	Sur<LCL
RMW-02-13-0106	Benzo(a)pyrene	5	UJ	Sur<LCL
RMW-02-13-0106	Benzo(b)fluoranthene	5	UJ	Sur<LCL
RMW-02-13-0106	Benzo(g,h,i)perylene	5	UJ	Sur<LCL
RMW-02-13-0106	Benzo(k)fluoranthene	5	UJ	Sur<LCL
RMW-02-13-0106	Benzyl butyl phthalate	5	UJ	Sur<LCL
RMW-02-13-0106	Biphenyl (diphenyl)	1.3	J	Sur<LCL
RMW-02-13-0106	bis(2-Ethylhexyl)phthalate	5	UJ	Sur<LCL
RMW-02-13-0106	Caprolactam	5	UJ	Sur<LCL
RMW-02-13-0106	Chrysene	5	UJ	Sur<LCL
RMW-02-13-0106	Dibenz(a,h)anthracene	5	UJ	Sur<LCL
RMW-02-13-0106	Dibenzofuran	5	UJ	Sur<LCL
RMW-02-13-0106	Diethylphthalate	5	UJ	Sur<LCL
RMW-02-13-0106	Dimethylphthalate	5	UJ	Sur<LCL
RMW-02-13-0106	Di-n-butyl phthalate	2.1	J	Sur<LCL
RMW-02-13-0106	Di-n-octyl phthalate	5	UJ	Sur<LCL
RMW-02-13-0106	Fluoranthene	1.1	J	Sur<LCL
RMW-02-13-0106	Fluorene	5	UJ	Sur<LCL
RMW-02-13-0106	Hexachlorobenzene	5	UJ	Sur<LCL
RMW-02-13-0106	Hexachlorobutadiene	5	UJ	Sur<LCL
RMW-02-13-0106	Indeno(1,2,3-c,d)pyrene	5	UJ	Sur<LCL
RMW-02-13-0106	Isophorone	5	UJ	Sur<LCL
RMW-02-13-0106	Pentachlorophenol	1.7	J	Sur<LCL
RMW-02-13-0106	Phenanthrene	2.6	J	Sur<LCL
RMW-02-13-0106	Pyrene	5	UJ	Sur<LCL
RMW-02-32-0106	2,4-Dinitrophenol	20	UJ	Sur<LCL
RMW-02-32-0106	2-Nitroaniline	20	UJ	Sur<LCL
RMW-02-32-0106	3,3'-Dichlorobenzidine	5	UJ	Sur<LCL
RMW-02-32-0106	3-Nitroaniline	20	UJ	Sur<LCL
RMW-02-32-0106	4-Chloroaniline	5	UJ	Sur<LCL
RMW-02-32-0106	4-Nitroaniline	20	UJ	Sur<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
RMW-02-32-0106	4-Nitrophenol	20	UJ	Sur<LCL
RMW-02-32-0106	Di-n-butyl phthalate	2.9	J	Sur>UCL
RMW-02-32-0106	Hexachlorocyclopentadiene	5	UJ	Sur<LCL
RMW-02-50-0106	Benzyl butyl phthalate	5	UJ	Sur<LCL
RMW-02-50-0106	Biphenyl (diphenyl)	5	UJ	Sur<LCL
RMW-02-50-0106	bis(2-Ethylhexyl)phthalate	5	UJ	Sur<LCL
RMW-02-50-0106	Caprolactam	5	UJ	Sur<LCL
RMW-02-50-0106	Diethylphthalate	5	UJ	Sur<LCL
RMW-02-50-0106	Dimethylphthalate	5	UJ	Sur<LCL
RMW-02-50-0106	Di-n-butyl phthalate	5	UJ	Sur<LCL
RMW-02-50-0106	Di-n-octyl phthalate	5	UJ	Sur<LCL
RMW-03-15-0106	Benzyl butyl phthalate	5	UJ	CCV>UCL
RMW-03-15-0106	bis(2-Ethylhexyl)phthalate	5	UJ	CCV>UCL
RMW-03-15-0106	Dibenz(a,h)anthracene	5	UJ	CCV<LCL
RMW-03-15-0106	Di-n-octyl phthalate	5	UJ	CCV>UCL
RMW-03-15-0106	Indeno(1,2,3-c,d)pyrene	5	UJ	CCV<LCL
RMW-03-15-0106	Pyrene	5	UJ	CCV>UCL
RMW-12-32-0106	3,3'-Dichlorobenzidine	5	R	Sur<LCL
RMW-12-32-0106	4-Chloroaniline	5	R	Sur<LCL
RMW-12-32-0106	Acetophenone	5	U	EB<RL
RMW-12-32-0106	Anthracene	5	UJ	Sur<LCL
RMW-12-32-0106	Atrazine	5	UJ	Sur<LCL
RMW-12-32-0106	Benzo(a)pyrene	5	UJ	Sur<LCL
RMW-12-32-0106	Benzo(b)fluoranthene	5	UJ	Sur<LCL
RMW-12-32-0106	Benzo(g,h,i)perylene	5	UJ	Sur<LCL
RMW-12-32-0106	Benzo(k)fluoranthene	5	UJ	Sur<LCL
RMW-12-32-0106	Benzyl butyl phthalate	5	UJ	CCV>UCL, Sur<LCL
RMW-12-32-0106	Biphenyl (diphenyl)	5	UJ	Sur<LCL
RMW-12-32-0106	bis(2-Ethylhexyl)phthalate	5	UJ	CCV>UCL, Sur<LCL
RMW-12-32-0106	Caprolactam	5	UJ	Sur<LCL
RMW-12-32-0106	Dibenz(a,h)anthracene	5	UJ	CCV<LCL
RMW-12-32-0106	Diethylphthalate	5	UJ	Sur<LCL
RMW-12-32-0106	Dimethylphthalate	5	UJ	Sur<LCL
RMW-12-32-0106	Di-n-butyl phthalate	5	UJ	Sur<LCL
RMW-12-32-0106	Di-n-octyl phthalate	5	UJ	CCV>UCL, Sur<LCL
RMW-12-32-0106	Hexachlorobenzene	5	UJ	Sur<LCL
RMW-12-32-0106	Hexachlorocyclopentadiene	5	R	Sur<LCL
RMW-12-32-0106	Indeno(1,2,3-c,d)pyrene	5	UJ	CCV<LCL
RMW-12-32-0106	Phenanthrene	5	UJ	Sur<LCL
RMW-12-32-0106	Pyrene	5	UJ	CCV>UCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
RMW-12-51-0106	Acenaphthene	5	UJ	SD<LCL
RMW-12-51-0106	Benzo(a)pyrene	5	UJ	Sur<LCL
RMW-12-51-0106	Benzo(b)fluoranthene	5	UJ	Sur<LCL
RMW-12-51-0106	Benzo(g,h,i)perylene	5	UJ	Sur<LCL
RMW-12-51-0106	Benzo(k)fluoranthene	5	UJ	Sur<LCL
RMW-12-51-0106	Benzyl butyl phthalate	5	UJ	CCV>UCL
RMW-12-51-0106	bis(2-Ethylhexyl)phthalate	5	UJ	CCV>UCL
RMW-12-51-0106	Dibenz(a,h)anthracene	5	UJ	CCV<LCL
RMW-12-51-0106	Di-n-octyl phthalate	5	UJ	CCV>UCL
RMW-12-51-0106	Indeno(1,2,3-c,d)pyrene	5	UJ	CCV<LCL
RMW-12-51-0106	Pyrene	5	UJ	CCV>UCL, MSRPD

CCV<LCL= Continuing calibration recovery less than lower control limit
CCV>UCL= Continuing calibration recovery greater than upper control limit
EB<RL= Equipment blank concentration less than the RL
MSRPD = Matrix spike RPD criteria exceedance
SD<LCL= Matrix spike duplicate recovery criteria less than lower limit
Sur<LCL = Surrogate recovery less than lower limit
Sur>UCL = Surrogate recovery greater than upper limit

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	January 10, 11, 12 and 13, 2006
Report Date:	February 3, 2006
Parameters:	Volatile Organic Compounds
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y2BJ4

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 and project-approved modifications described in Modification Reference Number 1328.2 for volatile organic compounds (VOC). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review, June 2001, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier III data validation was performed by CH2M HILL chemists. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review included the chain of custody (CoC) records, case narrative, completed CLP data summary forms, raw data and calculation verification for selected detected results.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All technical holding times were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Calibration

The relative standard deviation (RSD) for methylene chloride, trichloroethene and 1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113) exceeded criteria in the initial calibration (ICAL) performed on 1/11/06. The RSD for methyl acetate, methylene chloride, styrene and isopropylbenzene exceeded criteria in the ICAL performed on 1/17/06. Associated detected sample results were qualified as estimated and flagged "J".

The percent difference (%D) of methyl acetate was less than criteria in the continuing calibration verification (CCV) analyzed on 1/18/06. The associated non-detected results were qualified as estimated and flagged "UJ".

IV. Method Blanks

The method blanks (MB) were analyzed as required. Two MBs contained chloromethane above the contract required quantitation limit (CRQL), equivalent to reporting limit (RL), and one MB contained chloromethane below the CRQL. This was determined by the laboratory to be a contaminant in the purchased deuterated monitoring compound (DMC) solution. The chloromethane sample concentrations similar to those detected in the MBs were qualified as non-detected results and flagged "U".

Methylene chloride, chloromethane, trichloroethane, 1,2,4-trichlorobenzene and 1,2,3-trichlorobenzene were detected in the associated MBs. Associated sample results less than the CRQL and less than the blank concentration were qualified as non-detected at the CRQL and flagged "U". Sample results greater than the CRQL but less than the blank concentration were qualified as non-detected at the detected concentration and flagged "U".

V. Field Blanks

This SDG contained three trip blanks and four equipment blanks.

Chloromethane was detected in three of the field blanks. Because this was identified as a contaminant associated with the DMC solution, no additional flags were applied to the samples.

Acetone, methylene chloride, carbon disulfide and toluene were detected in the trip and equipment blanks. Associated sample results less than the CRQL and less than the blank concentration were qualified as non-detected at the CRQL and flagged "U". Sample results greater than the CRQL but less than the blank concentration were also flagged "U" and qualified as non-detected at the detected concentration. Sample results that were greater than the CRQL and the blank concentration were not qualified.

VI. Surrogate Recovery

Samples RMW-11-35-0106, RMW-07-15-0106, RMW-07-35-0106, RMW-06-15-0106, BMW-01-0106, RMW-13-35-0106 and BMW-07-0106 contained surrogates which exceeded acceptable QC limits. The associated detected results were qualified as estimated and "J" flagged.

Samples RMW-07-15-0106, RMW-07-35-0106 and RMW-06-15-0106 contained 1,2-dichloropropane-d6 recoveries below the lower control limit (LCL). The associated non-detected sample results were qualified as estimated and flagged "UJ".

VII. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate (MS/MSD) was performed on sample BMW-07-0106 and met all accuracy and precision criteria.

VIII. Laboratory Control Sample

Not applicable.

IX. Internal Standards

All acceptance criteria were met.

X. Target Compound Identification

Compound identification was verified by raw data review.

XI. Compound Quantitation and Reported CRQLs

Calculations for the ICAL, CCV and selected detected sample results were verified for one compound associated with each internal standard. Selected detected results for vinyl chloride, tetrachlorethene, and bromoform were verified.

Manual integrations were documented in the case narrative. However, no "before" manual integration snapshots were provided.

XII. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XIII. Field Duplicates

There were no field duplicates associated with this SDG.

XIV. System Performance

The system performance was evaluated by reviewing the chromatographic and mass spectral data. Overall, the system was in control.

XV. Overall Assessment of Data

- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.
- Low levels of target analytes in the MB, equipment and trip blanks resulted in data qualified as non-detected concentrations.
- Calibration and surrogate exceedances resulted in data qualified as estimated concentrations.
- The completeness objectives were met for all method/analyte combinations.
- No systemic issues were found. Data quality, as reviewed, was acceptable.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
BMW-01-0106	Chloromethane	0.84	U	LB>RL
BMW-01-0106	Methylene chloride	0.89	U	LB<RL, EB<RL, TB<RL, IC%RSD
BMW-06-0106	Chloromethane	0.75	U	LB>RL
BMW-06-0106	Methylene chloride	2.3	U	LB<RL, TB<RL, EB<RL, IC%RSD
BMW-07-0106	Chloromethane	0.58	U	LB<RL
BMW-07-0106	cis-1,2-Dichloroethene	0.28	J	Sur>UCL
BMW-07-0106	Methyl acetate	0.5	UJ	CCV<LCL
BMW-07-0106	Methylene chloride	0.75	U	LB<RL, EB<RL, TB<RL, IC%RSD
BMW-08-0106	Acetone	7.2	U	EB<RL, TB<RL
BMW-08-0106	Carbon disulfide	0.24	U	TB>RL
BMW-08-0106	Methyl acetate	0.5	UJ	CCV<LCL
BMW-08-0106	Methylene chloride	0.94	U	LB<RL, EB<RL, TB<RL, IC%RSD
BPZ-01-0106	Acetone	7.4	U	EB<RL, TB<RL
BPZ-01-0106	Methyl acetate	0.5	UJ	CCV<LCL
BPZ-01-0106	Methylene chloride	1.1	U	LB<RL, EB<RL, TB<RL, IC%RSD
BPZ-01-0106	Toluene	0.16	U	EB<RL
RMW-04-15-0106	Chloromethane	0.76	U	LB>RL
RMW-04-15-0106	Methylene chloride	0.98	U	LB<RL, EB<RL, TB<RL, IC%RSD
RMW-06-15-0106	1,2-Dichloropropane	0.5	UJ	Sur<LCL
RMW-06-15-0106	Bromodichloromethane	0.5	UJ	Sur<LCL
RMW-06-15-0106	Chloromethane	0.84	U	LB>RL
RMW-06-15-0106	Cyclohexane	0.5	UJ	Sur<LCL
RMW-06-15-0106	Methylcyclohexane	0.5	UJ	Sur<LCL
RMW-06-15-0106	Methylene chloride	1.9	U	LB<RL, EB<RL, TB<RL, IC%RSD
RMW-07-15-0106	1,2-Dichloropropane	0.5	UJ	Sur<LCL
RMW-07-15-0106	Bromodichloromethane	0.5	UJ	Sur<LCL
RMW-07-15-0106	Cyclohexane	0.5	UJ	Sur<LCL
RMW-07-15-0106	Methylcyclohexane	0.5	UJ	Sur<LCL
RMW-07-15-0106	Methylene chloride	1.6	U	LB<RL, EB<RL, TB<RL, IC%RSD
RMW-07-35-0106	1,2-Dichloropropane	0.5	UJ	Sur<LCL
RMW-07-35-0106	Bromodichloromethane	0.5	UJ	Sur<LCL
RMW-07-35-0106	Chloromethane	0.76	U	LB>RL
RMW-07-35-0106	Cyclohexane	0.5	UJ	Sur<LCL
RMW-07-35-0106	Methylcyclohexane	0.5	UJ	Sur<LCL
RMW-07-35-0106	Methylene chloride	1.6	U	LB<RL, EB<RL, TB<RL, IC%RSD
RMW-07-35-0106	Trichloroethene	6.8	J	IC%RSD
RMW-11-35-0106	Methylene chloride	2	U	LB<RL, EB<RL, TB<RL, IC%RSD

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
RMW-13-35-0106	Chloromethane	0.91	U	LB>RL
RMW-13-35-0106	Methylene chloride	1.3	U	LB<RL, EB<RL, TB<RL, IC%RSD
RMW-14-50-0106	Acetone	5	U	EB<RL, TB<RL
RMW-14-50-0106	Methyl acetate	0.5	UJ	CCV<LCL
RMW-14-50-0106	Methylene chloride	1.7	U	LB<RL, EB<RL, TB<RL, IC%RSD

CCV<LCL = Continuing calibration recovery less than lower control limit
EB<RL = Equipment blank concentration less than the RL
IC%RSD = Initial calibration RSD exceeded
LB<RL = Laboratory blank contamination less than the RL
LB>RL = Laboratory blank contamination greater than the RL
Sur<LCL = Surrogate recovery less than lower limit
Sur>UCL = Surrogate recovery greater than upper limit
TB<RL = Trip blank concentration less than RL
TB>RL= Trip blank concentration greater than RL

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	January 17, 18 and 19, 2006
Report Date:	February 15, 2006
Parameters:	Volatile Organic Compounds
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y2BM5

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 and project-approved modifications described in Modification Reference Number 1328.2 for volatile organic compounds (VOC). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review (NFG), June 2001, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier III data validation was performed by CH2M HILL chemists as required by the SAP. The intended objective of the data review process was to provide a technical review of the analytical raw data and to provide verification of calculations and analyte identification. It was not intended to determine contract compliance.

The scope of the data review included the chain-of-custody (CoC) records, the case narrative, completed CLP data summary forms and raw data.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

- U — The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R — The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

All other technical holding-time requirements were met.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met. Samples were analyzed within respective 12-hour tune times. Ion abundance calculations were verified for several masses. Raw abundances were relatively low for each tune.

III. Calibration

The relative standard deviation (RSD) for methyl acetate, methylene chloride, styrene and isopropylbenzene exceeded acceptance criteria in the initial calibration (ICAL) performed on 01/17/06. The RSD for methyl acetate, methylene chloride, chloroform, styrene and isopropylbenzene exceeded criteria in the ICAL analyzed on 01/29/06. Associated detected sample results were qualified as estimated and flagged "J".

Calculations for the ICAL relative response factor (RRF) and RSD criteria were verified. The second page of the 01/17/06 ICAL summary form was missing from the data package.

Methylene chloride had a low-bias percent difference (%D) in the continuing calibration verifications (CCV) analyzed on 01/23/06, 01/24/06, 01/25/06 (CCV0818 and CCV1738), 01/26/06 (CCV0805) and 01/29/06. Detected and non-detected methylene chloride results were qualified as estimated and flagged "J" and "UJ", respectively.

The continuing calibration RRF and %D calculations were verified.

IV. Method Blanks

The method blanks (MB) were analyzed as required. Several of the MBs contained chloromethane above the contract required quantitation limit (CRQL), equivalent to reporting limit (RL). This was determined by the laboratory to be a contaminant in the purchased deuterated monitoring compound (DMC) solution. Chloromethane sample concentrations similar to those detected in the MBs were qualified as non-detected results and flagged "U".

Methylene chloride was detected in each MB. Methylene chloride is a common laboratory contaminant. Associated sample results less than the CRQL and less than 10 times the blank concentration were qualified as non-detected at the CRQL and flagged "U". Sample results greater than the CRQL but less than 10 times the blank concentration were qualified as non-detected at the concentration and flagged "U".

Trichloroethene was also detected in MB VBLK58 below the CRQL. The associated detected trichloroethene result was greater than five times the blank concentration and greater than the CRQL and was therefore not qualified.

A storage blank was analyzed as required and met all acceptance criteria.

V. Field Blanks

There were three equipment blanks (EB) and two trip blanks (TB) associated with this SDG.

MW-TB-04-0106 and MW-TB-05-0106 each contained acetone, carbon disulfide and methylene chloride. Associated sample results less than the CRQL and less than the blank concentration (less than 10 times for methylene chloride and less than 2 times for acetone) were qualified as non-detected at the CRQL and flagged "U". Sample results greater than the CRQL but less than the blank concentration were qualified as non-detected at the concentration and flagged "U". MW-TB-05-0106 also contained chloromethane at the RL. Associated detected results less than

the blank concentration and less than the CRQL were qualified as non-detected at the CRQL and flagged "U".

MW-EB-05-0106 contained acetone and methylene chloride above the CRQL and tert-butyl alcohol below the CRQL. MW-EB-06-0106 contained acetone below the CRQL and methylene chloride above the CRQL. Acetone and toluene were detected below the CRQL in MW-EB-07-0106 and methylene chloride was detected above the CRQL. Associated sample results less than the CRQL and less than the blank concentration (less than 10 times for methylene chloride and less than 2 times for acetone) were qualified as non-detected at the CRQL and flagged "U". Sample results greater than the CRQL but less than the blank concentration were qualified as non-detected at the concentration and flagged "U".

VI. Surrogate Recovery

The method required deuterated monitoring compounds (DMC) were analyzed. Bromoform-d was below the lower control limit (LCL) in RMW-09-15-0106. In BMW-03-0106, trans-1,3-dichloropropene-d4 was below the LCL. In sample RMW-01-17-0106, 1,2-dichloropropene-d6, toluene-d8, trans-1,3-dichloropropene-d4 and bromoform-d were below the LCL. In RMW-08-15-0106, toluene-d8 and trans-1,3-dichloropropene-d4 were below the LCL. In MW-92-0106, 1,2-dichloroethane-d4 was less than the LCL. Associated detected and non-detected results were qualified as estimated and flagged "J" and "UJ", respectively.

1,2-Dichloropropane-d6 was below the LCL in RMW-10-35-0106 and RMW-10-35-0106MS/MSD. Toluene-d8 was less than the LCL in RMW-08-35-0106, RMW-01-35-0106. Trans-1,3-Dichloropropene-d4 was below the LCL in samples RMW-08-35-0106, RMW-10-35-0106, RMW-10-35-0106MS/MSD and MW-92-0106. Bromoform-d was less than the LCL in RMW-10-35-0106, RMW-10-35-0106MS/MSD and RMW-01-35-0106. 1,1,2,2-Tetrachloroethane-d4 was below the LCL in MW-92-0106. Associated detected and non-detected results were qualified as estimated and flagged "J" and "UJ", respectively.

The surrogate calculation was verified.

VII. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate (MS/MSD) were analyzed on sample RMW-10-35-0106. The MS/MSD was not analyzed on the same day or under the same 12-hour tune as the parent sample. Trichloroethene was recovered above the upper control limit (UCL) in the MS and MSD. The trichloroethene parent concentration was greater than four times the spike concentration and therefore, no flags were applied. The MS/MSD relative percent difference (RPD) was outside acceptance criteria for benzene and trichloroethene. The benzene parent detected result was flagged "J".

MS/MSD recoveries and RPD calculations were verified.

VIII. Laboratory Control Sample

The applicable Statement of Work does not require analysis of a laboratory control sample (LCS); therefore, no LCS was analyzed.

IX. Internal Standards

The 1,4-dichlorobenzene-d4 internal standard recovery was above acceptance criteria in samples RMW-01-17-0106, RMW-10-35-0106 and RMW-01-35-0106. Chlorobenzene-d5 was above the UCL in sample RMW-10-35-0106. Associated detected results were qualified as estimated and flagged "J".

Raw data was reviewed to verify LCLs and UCLs.

X. Target Compound Identification

Compound identification was verified by raw data review on a percentage of the sample detected results.

XI. Compound Quantitation and Reported CRQLs

Several samples were reanalyzed at dilutions due to high concentrations of target compounds.

Compound quantitation and accuracy were verified.

XII. Tentatively Identified Compounds

Tentatively identified compounds in the samples were reviewed.

XIII. Field Duplicates

Two field duplicate pairs were designated in this SDG: RMW-10-15-0106 and MW-90-0106; and RMW-08-35-0106 and MW-92-0106. All acceptance criteria were met.

XIV. System Performance

The system performance was evaluated by reviewing the chromatographic data. Overall, the system was in control.

XV. Overall Assessment of Data

- Calibration and internal standard exceedances resulted in data qualified as estimated concentrations.
- MB, EB and TB contamination resulted in data qualified as non-detected.
- Surrogate and MS/MSD exceedances resulted in data qualified as estimated concentrations.
- There were discrepancies discovered between the hardcopy results and the electronic data results for chloromethane. Other data were not verified.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
BMW-03-0106	1,1,2-Trichloroethane	0.5	UJ	Sur<LCL
BMW-03-0106	Acetone	5	U	EB>RL
BMW-03-0106	cis-1,3-Dichloropropene	0.5	UJ	Sur<LCL
BMW-03-0106	Methylene chloride	1.3	U	CCV<LCL, EB>RL, LB<RL, IC%RSD
BMW-03-0106	trans-1,3-Dichloropropene	0.5	UJ	Sur<LCL
MW-90-0106	Acetone	10	U	EB>RL
MW-90-0106	Methylene chloride	6.1	U	CCV<LCL, EB>RL, LB>RL, IC%RSD
MW-92-0106	1,1,1-Trichloroethane	0.5	UJ	Sur<LCL
MW-92-0106	1,1,2,2-Tetrachloroethane	0.5	UJ	Sur<LCL
MW-92-0106	1,1,2-Trichloroethane	0.5	UJ	Sur<LCL
MW-92-0106	1,1-Dichloroethene	0.46	J	Sur<LCL
MW-92-0106	1,2-Dibromo-3-chloropropane	0.5	UJ	Sur<LCL
MW-92-0106	1,2-Dichloroethane	0.5	UJ	Sur<LCL
MW-92-0106	Acetone	5	U	EB<RL
MW-92-0106	Carbon tetrachloride	0.5	UJ	Sur<LCL
MW-92-0106	cis-1,3-Dichloropropene	0.5	UJ	Sur<LCL
MW-92-0106	Freon 11	0.5	UJ	Sur<LCL
MW-92-0106	Freon 113	0.5	UJ	Sur<LCL
MW-92-0106	Methyl acetate	0.5	UJ	Sur<LCL
MW-92-0106	Methyl tert-butyl ether	4.9	J	Sur<LCL
MW-92-0106	Methylene chloride	1.2	U	EB>RL, LB<RL, IC%RSD, Sur<LCL
MW-92-0106	Toluene	0.5	U	EB<RL
MW-92-0106	trans-1,3-Dichloropropene	0.5	UJ	Sur<LCL
RMW-01-17-0106	1,1,2-Trichloroethane	0.5	UJ	Sur<LCL
RMW-01-17-0106	1,2-Dibromoethane	0.5	UJ	Sur<LCL
RMW-01-17-0106	1,2-Dichloropropane	0.5	UJ	Sur<LCL
RMW-01-17-0106	1,3-Dichlorobenzene	0.18	J	IS>UCL
RMW-01-17-0106	1,4-Dichlorobenzene	6.6	J	IS>UCL
RMW-01-17-0106	Bromodichloromethane	0.5	UJ	Sur<LCL
RMW-01-17-0106	Bromoform	0.5	UJ	Sur<LCL
RMW-01-17-0106	Chloromethane	0.5	U	LB>RL, TB>RL
RMW-01-17-0106	cis-1,3-Dichloropropene	0.5	UJ	Sur<LCL
RMW-01-17-0106	Cyclohexane	0.5	UJ	Sur<LCL
RMW-01-17-0106	Dibromochloromethane	0.5	UJ	Sur<LCL
RMW-01-17-0106	Ethylbenzene	1.4	J	Sur<LCL
RMW-01-17-0106	Isopropylbenzene (cumene)	14	J	Sur<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
RMW-01-17-0106	Methylcyclohexane	0.5	UJ	Sur<LCL
RMW-01-17-0106	Methylene chloride	1.1	U	CCV<LCL, EB>RL, LB>RL, IC%RSD
RMW-01-17-0106	Styrene	0.5	UJ	Sur<LCL
RMW-01-17-0106	Tetrachloroethene	0.5	UJ	Sur<LCL
RMW-01-17-0106	Toluene	0.5	UJ	Sur<LCL
RMW-01-17-0106	trans-1,3-Dichloropropene	0.5	UJ	Sur<LCL
RMW-01-17-0106	Trichloroethene	0.22	J	Sur<LCL
RMW-01-17-0106	Xylenes, total	2	J	Sur<LCL
RMW-01-35-0106	1,2-Dibromoethane	0.5	UJ	Sur<LCL
RMW-01-35-0106	1,3-Dichlorobenzene	5.9	J	IS>UCL
RMW-01-35-0106	Acetone	5	U	EB<RL
RMW-01-35-0106	Bromoform	0.5	UJ	Sur<LCL
RMW-01-35-0106	Chloromethane	0.5	U	TB>RL
RMW-01-35-0106	Dibromochloromethane	0.5	UJ	Sur<LCL
RMW-01-35-0106	Ethylbenzene	6.1	J	Sur<LCL
RMW-01-35-0106	Isopropylbenzene (cumene)	2.6	J	Sur<LCL
RMW-01-35-0106	Methylene chloride	3.3	U	EB>RL, LB<RL, IC%RSD
RMW-01-35-0106	Styrene	0.5	UJ	Sur<LCL
RMW-01-35-0106	Tetrachloroethene	1.6	J	Sur<LCL
RMW-01-35-0106	Toluene	20	J	Sur<LCL
RMW-01-35-0106	Trichloroethene	3.9	J	Sur<LCL
RMW-01-35-0106	Xylenes, total	15	J	Sur<LCL
RMW-05-15-0106	Acetone	5	U	EB>RL
RMW-05-15-0106	Methylene chloride	1.2	U	EB>RL, LB<RL, CCV<LCL, IC%RSD
RMW-08-15-0106	1,1,2-Trichloroethane	0.5	UJ	Sur<LCL
RMW-08-15-0106	Acetone	8.1	U	EB<RL
RMW-08-15-0106	Chloromethane	0.55	U	TB>RL
RMW-08-15-0106	cis-1,3-Dichloropropene	0.5	UJ	Sur<LCL
RMW-08-15-0106	Ethylbenzene	0.5	UJ	Sur<LCL
RMW-08-15-0106	Isopropylbenzene (cumene)	0.5	UJ	Sur<LCL
RMW-08-15-0106	Methylene chloride	4.1	U	EB>RL, LB>RL, CCV<LCL, IC%RSD
RMW-08-15-0106	Styrene	0.5	UJ	Sur<LCL
RMW-08-15-0106	Tetrachloroethene	0.5	UJ	Sur<LCL
RMW-08-15-0106	Toluene	0.5	U	EB<RL, Sur<LCL
RMW-08-15-0106	trans-1,3-Dichloropropene	0.5	UJ	Sur<LCL
RMW-08-15-0106	Trichloroethene	0.83	J	Sur<LCL
RMW-08-15-0106	Xylenes, total	0.5	UJ	Sur<LCL
RMW-08-35-0106	1,1,2-Trichloroethane	0.5	UJ	Sur<LCL
RMW-08-35-0106	Acetone	5	U	EB<RL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
RMW-08-35-0106	cis-1,3-Dichloropropene	0.5	UJ	Sur<LCL
RMW-08-35-0106	Ethylbenzene	0.5	UJ	Sur<LCL
RMW-08-35-0106	Isopropylbenzene (cumene)	0.5	UJ	Sur<LCL
RMW-08-35-0106	Methylene chloride	0.5	U	EB>RL, LB<RL, CCV<LCL, IC%RSD
RMW-08-35-0106	Styrene	0.5	UJ	Sur<LCL
RMW-08-35-0106	Tetrachloroethene	5.4	J	Sur<LCL
RMW-08-35-0106	Toluene	0.5	U	EB<RL, Sur<LCL
RMW-08-35-0106	trans-1,3-Dichloropropene	0.5	UJ	Sur<LCL
RMW-08-35-0106	Trichloroethene	16	J	Sur<LCL
RMW-08-35-0106	Xylenes, total	0.5	UJ	Sur<LCL
RMW-09-15-0106	1,2-Dibromoethane	0.5	UJ	Sur<LCL
RMW-09-15-0106	Bromoform	0.5	UJ	Sur<LCL
RMW-09-15-0106	Chloromethane	0.5	U	LB<RL
RMW-09-15-0106	Dibromochloromethane	0.5	UJ	Sur<LCL
RMW-09-15-0106	Methylene chloride	1.7	U	EB>RL, LB<RL, CCV<LCL, IC%RSD
RMW-09-35-0106	Acetone	5	U	EB<RL
RMW-09-35-0106	Chloromethane	0.5	U	LB<RL
RMW-09-35-0106	Methylene chloride	1.6	U	EB>RL, LB<RL, CCV<LCL, IC%RSD
RMW-10-15-0106	Acetone	10	U	EB>RL
RMW-10-15-0106	Chloromethane	0.59	U	LB<RL
RMW-10-15-0106	Methylene chloride	1.8	U	EB>RL, LB<RL, IC%RSD
RMW-10-35-0106	1,1,2-Trichloroethane	0.5	UJ	Sur<LCL
RMW-10-35-0106	1,2-Dibromoethane	0.5	UJ	Sur<LCL
RMW-10-35-0106	1,2-Dichloropropane	0.5	UJ	Sur<LCL
RMW-10-35-0106	Benzene	5.4	J	IS>UCL, MSRPD
RMW-10-35-0106	Bromodichloromethane	0.5	UJ	Sur<LCL
RMW-10-35-0106	Bromoform	0.5	UJ	Sur<LCL
RMW-10-35-0106	cis-1,3-Dichloropropene	0.5	UJ	Sur<LCL
RMW-10-35-0106	Cyclohexane	0.5	UJ	Sur<LCL
RMW-10-35-0106	Dibromochloromethane	0.5	UJ	Sur<LCL
RMW-10-35-0106	Ethylbenzene	1.2	J	IS>UCL
RMW-10-35-0106	Methylcyclohexane	0.5	UJ	Sur<LCL
RMW-10-35-0106	Methylene chloride	0.95	U	EB>RL, LB<RL, IC%RSD
RMW-10-35-0106	Toluene	1.5	J	IS>UCL
RMW-10-35-0106	trans-1,3-Dichloropropene	0.5	UJ	Sur<LCL
RMW-10-35-0106	Xylenes, total	1.3	J	IS>UCL

CCV<LCL = Continuing calibration recovery less than lower control limit
EB<RL = Equipment blank concentration less than the RL

EB>RL = Equipment blank concentration greater than the RL
IC%RSD = Initial calibration RSD exceeded
IS>UCL = Internal standard response greater than upper control limit
LB<RL = Internal standard response less than upper control limit
LB>RL = Laboratory blank contamination greater than the RL
MSRPD = Matrix spike RPD criteria exceedance
Sur<LCL = Surrogate recovery less than lower limit
TB>RL = Trip blank concentration greater than the RL

Data Validation Report

Project/Site Name:	AMCO
Collection Date:	January 20 and 23, 2006
Report Date:	February 17, 2006
Parameters:	Volatile Organic Compounds
Laboratory:	A4 Scientific, Inc.
Sample Delivery Group:	Y2BQ4

Introduction

This data review covers the sample delivery group (SDG) listed on the cover sheet. This SDG represents project samples analyzed by USEPA Contract Laboratory Program (CLP) Statement of Work OLC03.2 and project-approved modifications described in Modification Reference Number 1328.2 for volatile organic compounds (VOC). The data review was performed using the USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review, June 2001, as well as the criteria specified in the Remedial Investigation Sampling and Analysis Plan, AMCO Chemical Superfund Site (SAP), August 2004.

Tier III data validation was performed by CH2M HILL chemists. The intended objective of the data review process was to provide a technical review of the data. It was not intended to determine contract compliance.

The scope of the data review included the chain of custody (CoC) records, case narrative, completed CLP data summary forms, raw data and calculation verification for selected detected results.

Data qualifiers were applied to the sample results when indicated by the data review process. A summary table at the end of the report shows all sample results and the required data qualifiers.

The data qualifiers are defined below:

U The analyte was analyzed for but was not detected above the reported sample quantitation limit.

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control (QC) criteria. The presence or absence of the analyte cannot be verified.

I. Technical Holding Time and Sample Custody

Samples were received at the laboratory within control temperatures and with appropriate CoC forms and custody seals intact. Individual sample bottles did not contain sample tag ID numbers.

Technical holding times were met for all samples.

II. GC/MS Instrument Performance Check

All instrument performance check requirements were met.

III. Calibration

The relative standard deviation (RSD) for methyl acetate, methylene chloride, styrene and isopropylbenzene exceeded acceptance criteria in the initial calibration (ICAL) performed on 1/17/06. The RSD for methyl acetate, methylene chloride, chloroform, styrene and isopropylbenzene exceeded criteria in the ICAL analyzed on 1/29/06. Associated detected sample results were qualified as estimated and flagged "J".

The percent difference (%D) of methylene chloride was less than criteria in the continuing calibration verifications (CCV) analyzed on 1/24/06 and 1/25/06. The methyl acetate %D was less than criteria in the CCV analyzed on 2/3/06. Tert-butyl alcohol exceeded the %D criteria in the CCV analyzed on 2/01/06. Associated non-detected results were qualified as estimated and flagged "UJ" and detected results were qualified as estimated and flagged "J".

IV. Method Blanks

The method blanks (MB) were analyzed as required. One MB contained chloromethane above the contract required quantitation limit (CRQL), equivalent to reporting limit (RL). This was determined by the laboratory to be a contaminant in the purchased deuterated monitoring compound (DMC) solution. There were no associated sample results and therefore, no flags were applied.

Methylene chloride and trichloroethane were detected in the associated MBs. Associated sample results less than the CRQL and less than the blank concentration were qualified as non-detected at the CRQL and flagged "U". Sample results greater than the CRQL but less than the blank concentration were qualified as non-detected at the concentration and flagged "U".

V. Field Blanks

This SDG contained two trip blanks (TB) and two equipment blanks (EB).

Acetone, methylene chloride, carbon disulfide, bromoform, ethylbenzene, toluene, trichloroethane and xylene (total) were detected in the TB and EB. Chloromethane was detected in the two TBs. Associated sample results below the CRQL were qualified as non-detected at the CRQL and flagged "U". Sample results greater than the CRQL but less than the blank concentration were also flagged "U" and qualified as non-detected at the detected concentration.

VI. Surrogate Recovery

Samples RMW-12-51-0106, RMW-12-32-0106, RMW-02-32-0106, RMW-02-50-0106, MW-12-0106 and RMW-02-13-0106 had surrogate recoveries above the upper control limit (UCL). The associated detected sample results were qualified as estimated and flagged "J".

Samples RMW-12-32-0106, RMW-02-50-0106, RMW-02-32-0106 and MW-12-0106 had surrogate recoveries below the lower control limit (LCL). Associated detected and non-detected results were qualified as estimated and flagged "J" and "UJ", respectively.

VII. Matrix Spike/Matrix Spike Duplicate

A matrix spike/matrix spike duplicate (MS/MSD) was performed on sample RMW-12-32-0106. The MS/MSD met all accuracy and precision criteria.

VIII. Laboratory Control Sample

Not applicable.

IX. Internal Standards

The recovery of 1,4-dichorobenzene-d4 exceeded the UCL in samples RMW-12-32-0106, RMW-02-32-0106 and MW-12-0106. The associated detected analytes were qualified as estimated results and flagged "J".

X. Target Compound Identification

Compound identification was verified by raw data review.

XI. Compound Quantitation and Reported CRQLs

Several samples were reanalyzed at dilutions due to high concentrations of target compounds. A detected result above the calibration range that became a non-detected result in the sample dilution was reported from the original analysis. The detected result was qualified as estimated and flagged "J".

Calculations for the ICAL, CCV and selected detected sample results were verified for one compound associated with each internal standard. Selected detected results for cis,1,2-dichloroethene, benzene, and 1,4-dichlorobenzene were verified.

Manual integrations were documented in the case narrative. However, no "before" manual integration snapshots were provided.

XII. Tentatively Identified Compounds

Verification of tentative identifications was not within the scope of the data review for this SDG.

XIII. Field Duplicates

Samples RMW-12-51-0106 and MW-88-0106 were designated as a field duplicate pair. All acceptance criteria were met.

XIV. System Performance

The system performance was evaluated by reviewing the chromatographic and mass spectral data. Overall, the system was in control.

XV. Overall Assessment of Data

- The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggests that the project goals have been met.
- Low levels of target analytes in the MBs, EBs and TBs resulted in data qualified as non-detected concentrations.
- Calibration and surrogate exceedances resulted in data qualified as estimated concentrations.

- An internal standard exceedance resulted in data qualified as estimated concentrations.
- The completeness objectives were met for all method/analyte combinations.
- No systemic issues were found. Data quality, as reviewed, was acceptable.

Data Qualification Summary

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
MW-12-0106	1,1,1-Trichloroethane	640	J	>ICLinearRange
MW-12-0106	1,1,2-Trichloroethane	18	J	Sur>UCL
MW-12-0106	1,2-Dibromoethane	5	UJ	Sur<LCL
MW-12-0106	1,2-Dichlorobenzene	11	J	IS>UCL
MW-12-0106	1,4-Dichlorobenzene	1.6	J	IS>UCL
MW-12-0106	Benzene	270	J	>ICLinearRange
MW-12-0106	Bromoform	5	UJ	Sur<LCL
MW-12-0106	Carbon disulfide	5	U	TB<RL
MW-12-0106	Dibromochloromethane	5	UJ	Sur<LCL
MW-12-0106	Ethylbenzene	300	J	>ICLinearRange
MW-12-0106	Isopropylbenzene (cumene)	42	J	IC%RSD, IS>UCL
MW-12-0106	Methyl acetate	5	UJ	CCV<LCL
MW-12-0106	Methyl isobutyl ketone	11000	J	>ICLinearRange
MW-12-0106	Methylene chloride	13	U	EB<RL, LB<RL, TB<RL, IC%RSD
MW-12-0106	trans-1,2-Dichloroethene	610	J	>ICLinearRange
MW-12-0106	Trichloroethene	32	U	EB<RL
MW-12-0106	Xylenes, total	3100	J	>ICLinearRange
MW-88-0106	Acetone	5	U	EB<RL, TB<RL
MW-88-0106	Chloromethane	0.61	U	TB<RL
MW-88-0106	Methylene chloride	2	U	EB<RL, LB<RL, TB>RL, IC%RSD, CCV<LCL
RMW-02-13-0106	Chloroethane	68	J	Sur>UCL
RMW-02-13-0106	Methylene chloride	14	U	EB>RL, LB>RL, TB<RL
RMW-02-13-0106	Trichloroethene	6.4	U	EB<RL
RMW-02-13-0106DL	Acetone	5000	U	EB<RL
RMW-02-32-0106	1,2,4-Trichlorobenzene	34	J	IC%RSD
RMW-02-32-0106	1,2-Dibromoethane	5	UJ	Sur<LCL
RMW-02-32-0106	Bromoform	5	UJ	Sur<LCL
RMW-02-32-0106	cis-1,2-Dichloroethene	340	J	>ICLinearRange
RMW-02-32-0106	Dibromochloromethane	5	UJ	Sur<LCL
RMW-02-32-0106	Isopropylbenzene (cumene)	210	J	IC%RSD, IS>UCL
RMW-02-32-0106	Methylene chloride	41	U	EB<RL, LB<RL, TB<RL, IC%RSD
RMW-02-32-0106	Tert-Butyl Alcohol	500	UJ	CCV>UCL
RMW-02-32-0106	Trichloroethene	6.7	U	EB<RL
RMW-02-50-0106	1,1,2,2-Tetrachloroethane	0.5	UJ	Sur<LCL
RMW-02-50-0106	1,1,2-Trichloroethane	0.5	UJ	Sur<LCL

Field ID	Analyte	Final Result (ug/L)	Final Flag	Validation Comments
RMW-02-50-0106	1,2-Dibromo-3-chloropropane	0.5	UJ	Sur<LCL
RMW-02-50-0106	Acetone	5	U	EB<RL
RMW-02-50-0106	cis-1,3-Dichloropropene	0.5	UJ	Sur<LCL
RMW-02-50-0106	Methylene chloride	1.1	U	EB<RL, LB<RL, TB<RL, IC%RSD
RMW-02-50-0106	trans-1,3-Dichloropropene	0.5	UJ	Sur<LCL
RMW-02-50-0106	Trichloroethene	0.5	U	EB<RL, LB<RL
RMW-03-15-0106	Acetone	6.7	U	EB<RL, TB<RL
RMW-03-15-0106	Methylene chloride	2.5	U	EB<RL, LB<RL, TB>RL, IC%RSD, CCV<LCL
RMW-12-32-0106	1,2-Dibromoethane	0.5	UJ	Sur<LCL
RMW-12-32-0106	1,2-Dichlorobenzene	1.1	J	IS>UCL
RMW-12-32-0106	Bromoform	0.5	UJ	Sur<LCL
RMW-12-32-0106	Carbon disulfide	0.9	U	TB>RL
RMW-12-32-0106	Chloromethane	0.58	U	TB<RL
RMW-12-32-0106	Dibromochloromethane	0.5	UJ	Sur<LCL
RMW-12-32-0106	Isopropylbenzene (cumene)	3.8	J	IC%RSD, IS>UCL
RMW-12-32-0106	Methylene chloride	2.7	U	EB<RL, LB<RL, TB>RL, IC%RSD, CCV<LCL
RMW-12-32-0106DL	Acetone	400	U	EB<RL, TB<RL
RMW-12-51-0106	Acetone	5	U	EB<RL, TB<RL, Sur>UCL
RMW-12-51-0106	Chloromethane	0.68	U	TB<RL
RMW-12-51-0106	Ethylbenzene	0.18	U	TB<RL
RMW-12-51-0106	Isopropylbenzene (cumene)	0.11	J	IC%RSD
RMW-12-51-0106	Methylene chloride	1.5	U	EB<RL, LB<RL, TB<RL, IC%RSD, CCV<LCL
RMW-12-51-0106	Xylenes, total	0.5	U	TB<RL

>ICLinearRange = Result greater than linear calibration range
CCV<LCL = Continuing calibration recovery less than lower control limit
EB<RL = Equipment blank concentration less than the RL
EB>RL = Equipment blank concentration greater than the RL
IC%RSD = Initial calibration RSD exceeded
IS>UCL= Internal standard response greater than upper control limit
LB<RL = Laboratory blank contamination less than the RL
LB>RL = Laboratory blank contamination greater than the RL
Sur<LCL = Surrogate recovery less than lower limit
Sur>UCL = Surrogate recovery greater than upper limit
TB<RL = Trip blank concentration less than RL
TB>RL = Trip blank concentration greater than RL