



MEMORANDUM

Date: 10 Apr 02

To: Dave Sawicki, Project Manager, Tetra Tech EM Inc. (Tetra Tech)
Superfund Technical Assessment and Response Team (START) for Region 5

From: Harry Ellis, Chemist, Tetra Tech START for Region 5

Subject: Data Validation for
St. Clair Shores Site
St. Clair Shores, Michigan
Analytical Technical Direction Document (TDD) No. S05-0203-003
Project TDD No. S05-0203-002

Laboratory: AAC Trinity (AACT), Farmington Hills, Michigan
Work Orders No. 02-0614 and 02-0617
Polychlorinated Biphenyl (PCB) and Resource Conservation and Recovery Act (RCRA)
Metals Analysis of 11 Water Samples and 8 Sediment Samples

1.0 INTRODUCTION

The Tetra Tech START for Region 5 evaluated PCB and RCRA metals analytical data for 11 water samples and 8 sediment samples collected on 06 March 02 during a removal site evaluation of the St. Clair Shores site in St. Clair Shores, Michigan. The samples were analyzed under the above-referenced work orders by AACT using U.S. Environmental Protection Agency (U.S. EPA) SW-846 Method 8082 for PCB analysis and SW-846 Methods 6010A, 6020, 7061, 7131, 7421, 7470A, 7471A, 7741, and 7761 for RCRA metals of water and sediment samples.

The organic and inorganic data were evaluated in general accordance with U.S. EPA's "Contract Laboratory Program National Functional Guidelines for Organic Data Review" dated Oct 99 and "Contract Laboratory Program National Functional Guidelines for Inorganic Data Review" dated Feb 94,

respectively. Organic data validation consisted of a review of the following quality control (QC) parameters: holding times, initial and continuing calibrations, blank results, matrix spike and matrix spike duplicate (MS/MSD) results, surrogate recovery results, laboratory control sample (LCS) results, and sample quantitation. Inorganic data validation consisted of a review of the following QC parameters: holding times, initial and continuing calibrations, blank results, MS/MSD and method duplicate results, LCS results, interference check sample (ICS) results, and sample quantitation.

Samples from both work orders were analyzed together with common QC samples. Therefore, QC sample results for both work orders are discussed together. Specifically, Section 2.0 discusses the results of the organic data validation, Section 3.0 discusses the results of the inorganic data validation, and Section 4.0 presents an overall assessment of the data. The attachment contains AACT's summary of sample analytical results as well as START's handwritten data qualifications where warranted.

2.0 ORGANIC DATA VALIDATION RESULTS

The results of START's data validation for the organic analyses are summarized below in terms of the QC parameters reviewed. The data qualifier below was applied to the sample analytical results where warranted (see the attachment).

- U - The analyte was not detected. The reported numerical value is the sample reporting limit.

2.1 HOLDING TIMES

All sediment samples were analyzed within the holding time limits of 14 days to extraction and 40 days from extraction to analysis, and all water samples were analyzed within the holding time limits of 7 days to extraction and 40 days from extraction to analysis.

2.2 INITIAL AND CONTINUING CALIBRATIONS

All correlation coefficients from the initial calibration results were well within the QC limit of greater than 0.99 and most exceeded 0.999. The laboratory used five-point calibration curves for all Aroclors, although the method requires only five-point curves for Aroclors 1016 and 1260 and single-point calibrations for the other Aroclors. All continuing calibration results for the quantitation and confirmation columns were within the QC limit of 15 percent difference.

2.3 BLANK RESULTS

A method blank was run with each analytical batch in the proper sequence. The aqueous method blank contained traces of peaks corresponding to Aroclor 1248. Similar concentrations detected in the investigative samples were therefore flagged "U" as not detected because they may be laboratory artifacts, probably due to cross-contamination from the more concentrated samples. Aroclor 1248 was detected in the sediment method blank. However, Aroclor 1248 was detected at greater than five times the blank concentrations in all soil samples; therefore, no qualifications are warranted.

2.4 MS/MSD RESULTS

A sediment MS and MSD were analyzed. The percent recoveries for the MS and MSD and the relative percent difference (RPD) between the MS and MSD recoveries could not be determined because sample No. M6971-S contained Aroclor 1248 at concentrations about 150 times higher than the concentrations of Aroclors 1016 and 1260 added as spikes. Therefore, the Aroclor 1248 peaks masked the peaks from the spikes. No qualifications are warranted for this data gap.

2.5 SURROGATE RECOVERY RESULTS

Most of the surrogate recovery results were within the QC limits. Some were slightly outside QC limits

because of interference from various compounds in the samples. No qualifications are warranted for these minor deviations. Surrogate recovery results are not available for the more diluted samples. No qualifications are warranted for this data gap.

2.6 LCS RESULTS

An LCS was analyzed with each analytical batch, and LCS results were within the laboratory-established QC limits.

2.7 SAMPLE QUANTITATION

Sample quantitation was manually verified for at least one sample of each medium. Sample quantitation was performed correctly.

None of the environmental sample chromatograms were a good match to the Aroclor standards. Therefore, the laboratory used its best judgment in deciding which Aroclor should be used for quantitation. Different Aroclor choices would have yielded somewhat different quantitative results.

3.0 INORGANIC DATA VALIDATION RESULTS

The results of START's data validation for the inorganic analyses are summarized below in terms of the QC parameters reviewed. The data qualifiers below were applied to the sample analytical results where warranted (see the attachment).

- U - The analyte was not detected. The reported numerical value is the sample detection limit.
- J - The analyte was detected. The reported numerical value is considered estimated for QC reasons.

- UJ - The analyte was not detected. The reported sample detection limit is considered to be estimated for QC reasons.

3.1 HOLDING TIMES

All samples were analyzed within the holding time limits of 28 days for mercury and 6 months for all other metals.

3.2 INITIAL AND CONTINUING CALIBRATIONS

Initial and continuing calibrations were performed as required by the analytical methods. The percent recoveries for initial and continuing calibration results were within the QC limit of 90 to 110 percent.

3.3 BLANK RESULTS

Blanks were analyzed with each analytical batch. Low concentrations of target analytes were detected in some of the blanks. All target analyte sample results less than five times the concentration of the highest associated blank target analyte result are flagged "U" as not detected because they may be laboratory artifacts. Sample data qualified include many aqueous arsenic, mercury, selenium, and silver results.

3.4 MS/MSD AND METHOD DUPLICATE RESULTS

MS/MSD and method duplicate analyses were performed as required, and most results were within the laboratory-established QC limits. Soil MS/MSD and method duplicate analyses were performed on a sample from another site; therefore, results for these analyses are irrelevant for data validation purposes for this project.

Aqueous MS/MSD analyses were performed on sample No. M6971-SW, which had recoveries of 55 percent for chromium and selenium. Selenium MS and MSD results had a RPD of 49 percent. The

QC limits are 75 to 125 percent for recovery and 25 percent for RPD. All aqueous chromium and selenium results are therefore qualified "J" or "UJ" as appropriate to indicate that they are estimates (biased low).

3.5 LCS RESULTS

An LCS was analyzed with each analytical batch, and most LCS results were within the laboratory-established QC limits. The aqueous LCS had a 55 percent recovery for chromium, versus the QC limit of 80 to 120 percent. This laboratory irregularity is probably the cause of the MS/MSD irregularities associated with chromium. No qualifications are warranted other than the qualifications associated with MS/MSD results discussed in Section 3.4.

3.6 ICS RESULTS

ICS results were within QC limit of 80 to 120 percent recovery.

3.7 SAMPLE QUANTITATION

Calculations were verified for at least one metal result for at least one sample of each medium. All calculations were performed correctly, and the sediment results were corrected to dry weight.

4.0 OVERALL ASSESSMENT OF DATA

All sample analytical data generated by AACT are acceptable for use as qualified.

The primary problem with the sample results was associated with the identification of the PCB mixture because the sample PCB chromatographic peak patterns were not good matches to the calibration standards. This problem is characteristic of environmental samples and is due to (1) the samples originating from different batches of PCB products than the standards, (2) the samples containing

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mixtures of two or more Aroclors, and (3) the degradation of PCBs in the environment (typically through dechlorination and oxygenation). Sample quantitation is a function of PCB identification; therefore, the reported concentrations may vary by a factor of up to two based on the analyst's judgment on the Aroclor pattern that best matches the sample result.

ATTACHMENT

AACT SUMMARY OF SAMPLE ANALYTICAL RESULTS

(20 Sheets)