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Memorandum

Date: October 30, 2007
To: Sally Bilodeau/Camarillo
From: Sheena Blair/Westford
Subject: Data Review
Routine Monitoring Program
Quarterly Performance Report for Remediation Systems
Tronox LLC Henderson, Nevada

Distribution: Robert Kennedy/Westford 04020-023-110
3rdQtr.2007Full

SUMMARY

A Tier 2 validation was performed on the data for raw groundwater samples, raw surface water samples, an equipment blank, and a field blank analyzed for all or a subset of the following parameters:

- Perchlorate by EPA Method 314
- Hexavalent chromium by SW-846 Method 7196
- Total chromium by SW846 6010B
- Total dissolved solids by EPA Method 160.1

The samples were collected at the Tronox LLC site in Henderson, Nevada from August 1 through 6, 2007 and submitted to MWH Laboratories in Monrovia, California for analysis. The MWH project numbers, sample collection dates, and analyses included in this review are summarized in Attachment A at the end of this memo. The data reports provided by MWH did not support a validation at the Tier 2 level as requested by NDEP. MWH was contacted and the information required to perform a Tier 2 validation was requested. All provided quality control (QC) elements submitted by MWH were reviewed and results of that are summarized below.

The sample results were assessed according to the "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review" (October 2004), the Region 9 Superfund Data Evaluation/Validation Guidance, NDEP guidance (May 2006), and by the laboratory QC criteria. The validation guidelines were modified to accommodate the non-CLP methodologies.

The data reviewed required minor qualification for selected samples and appear generally acceptable for decision making. No major problems were identified and no data were rejected.

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REVIEW ELEMENTS

Sample data were reviewed for the following elements:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Initial and continuing calibrations
- Interference check sample (ICS) results (total chromium only)
- Laboratory blanks/equipment blanks/field blanks
- Laboratory control sample/laboratory control sample duplicate (LCS/LCSD) results
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Laboratory duplicate results
- Field duplicate results
- ICP serial dilution results (total chromium only)
- Sample results/detection limits

DISCUSSION**Agreement of Analyses Conducted with COC Requests**

Sample reports were checked to verify that the results reported corresponded to analytical requests as detailed on the COC documentation. The following discrepancies were noted:

- It should be noted that sample results for chlorate and perchlorate in several data packages had analysis times on the “Laboratory Data Report” which did not match the analysis time as recorded on the instrument raw data. The laboratory was contacted about this issue and provided the following information: “Analysis time for tests with holding times greater than 72 hours is typically shown on reports either as 00:00 or defaults to the time of the first injection on a batch of samples and does not reflect the specific analysis time for the individual sample”. No validation action was taken other than this notation.

Holding Times and Sample Preservation

Method-specified holding times were met for all samples analyzed except for the following:

- **Report number 212263:** The hexavalent chromium analyses for samples M-84, M-100, M-36, M-11, and M-10 were performed four hours beyond the method specified 24-hour holding time criterion. Detected and nondetect results for these samples were qualified as estimated (J and UJ, respectively).
- **Report number 21247R:** The hexavalent chromium analyses for samples M-12A, EB-2, and MD-2 were performed two hours beyond the method specified 24-hour holding time criterion. Detected and nondetect results for these samples were qualified as estimated (J and UJ, respectively).

The cooler temperatures upon receipt at the laboratory met the acceptable range of 4± 2°C.

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Documentation regarding sample pH verification upon receipt at the laboratory for total chromium and hexavalent chromium was not included in the data package. No action was taken except for this notation.

Initial and Continuing Calibrations

All criteria were met for the calibration curves and the initial and continuing calibration verification (ICV/CCV) standards (where applicable).

ICS Results

All criteria were met for the analyses of the ICS A and ICS AB solutions.

Laboratory Blanks/Equipment Blanks/Field Blanks

Field blank FB-1 (collected July 30, 2007) and equipment blank EB-2 (collected August 1, 2007) were associated with selected samples reported under this data set. Field blank FB-1 (reported under SDG 211929R2) was the source water for equipment blank EB-2.

In instances where laboratory blanks, i.e., method blanks (MBs) and the initial and continuing calibration blanks (ICBs and CCBs), equipment blanks, and field blanks are associated with a given sample, laboratory blanks and field blanks were evaluated in the following order:

- Laboratory blank actions were applied to equipment blank and field blank samples as well as associated field samples.
- Field blank actions were applied to the associated equipment blanks.
- Equipment blank actions were applied to the associated field samples.

Target analytes were not detected in the laboratory blanks or field blank FB-1. No validation actions were required on this basis.

The following analytes were detected in equipment blank sample EB-2. The following table summarizes the concentration detected and the associated samples.

Equipment Blank	Analyte	Conc. Detected
EB-2	Perchlorate	28 µg/L
	Total Dissolved Solids	26 mg/L
Associated samples: M-92, M-97, M31A, M-50, M-34, M-35, M-19, M-39, M-68, M-61, I-K, I-J, I-Z, M-67, I-I, I-V, M-12A, MD-2		

The perchlorate and total dissolved solids results for the associated samples were significantly greater than the reporting limits and the concentrations detected in equipment blank EB-2. It was considered that the low levels of blank contamination present would have no impact on the results of perchlorate and total dissolved solids for the associated samples. No validation action was taken on this basis.

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LCS/LCSD Results

The percent recoveries (%Rs) and relative percent differences (RPDs) of the LCSs/LCSDs for perchlorate, total dissolved solids, total chromium, and hexavalent chromium met the laboratory acceptance criteria.

MS/MSD Results

The %Rs and RPDs of the MS/MSDs performed on all client specific samples met the laboratory acceptance criteria.

In most cases the batch MS/MSD analyses were performed on samples from other clients, and although this practice is acceptable, the results could not be directly applied to the samples reviewed in these data packages due to possible differences in the sample matrix and type. No validation action was taken on this basis.

Laboratory Duplicate Results

The RPDs of the laboratory duplicates for the total dissolved solids analyses performed on client specific samples met the laboratory acceptance criteria.

In most cases batch laboratory duplicate analyses were performed on samples from other clients, and although this practice is acceptable, the results could not be directly applied to the samples reviewed in these data packages due to possible differences in the sample matrix and type. No validation action was taken on this basis.

No laboratory duplicates were analyzed for perchlorate, total chromium, and hexavalent chromium. Precision in the laboratory was demonstrated by the MS/MSD and/or the LCS/LCSD analyses (see discussions above).

Field Duplicate Results

The following field duplicate pair was submitted with selected samples in this data set. The following table summarizes the sample IDs, the detected results and the associated RPDs.

Analyte	Sample IDs/Collection Date	Sample	Duplicate	RPD
Perchlorate (µg/L)	M-12A/MD-2 (8/01/07)	320000	315000	2
Total Chromium (mg/L)		13	12	8
Total Dissolved Solids (mg/L)		7890	8080	2

The RPDs met the QC acceptance criteria of 30% maximum RPD for an aqueous matrix.

ICP Serial Dilution Results

In most cases batch serial dilution analyses were performed on samples from other clients, and although this practice is acceptable, the results could not be directly applied to the samples reviewed in these data packages due to possible differences in the sample matrix and type. No validation action was taken on this basis.

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Sample Results/Detection Limits

Calculations were spot-checked. There were no discrepancies noted.

Analytical dilutions were necessary for most samples due to matrix interferences or to bring analyte concentrations within the instrument calibration range.

Attachment A

MWH Report #	Sample Collection Date	Analyses
212147R	8/1/07	Perchlorate, Total Chromium, Total Dissolved Solids, Hexavalent Chromium
212263	8/2/07	Perchlorate, Total Chromium, Total Dissolved Solids, Hexavalent Chromium
212470	8/6/07	Perchlorate, Total Dissolved Solids