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Tier II Data Validation Report Summary

Client: Chevron Environmental Management Company (EMC) Cincinnati	Laboratory: Lancaster Laboratories, Inc.
Project Name: Routine Final Remedy Groundwater Monitoring	Sample Matrix: Groundwater
Project Number: 500-017-012	Sample Start Date: October 20, 2009
Date Validated: January 7, 2010	Sample End Date: October 20, 2009
Parameters Included: Volatile Organic Compounds (VOC) by Solid Waste 846 (SW-846) Method 8260B, Total and Dissolved Metals by SW-846 Method 6010B, Methane by SW-846 Method 8015B Modified, Ferric Iron by SW-846 Method 6010B Modified, Chloride and Sulfate by Environmental Protection Agency (EPA) Method 300.0, Kjeldahl Nitrogen by EPA Method 351.2, Nitrate Nitrogen and Nitrite Nitrogen by EPA Method 353.2, Total Organic Carbon (TOC) by Standard Method 20 th Edition (SM20) Method 5310C, Chemical Oxygen Demand (COD) by EPA Method 410.4, Alkalinity by SM20 2320B, Ferrous Iron by SM 20 3500 Fe B Modified, Sulfide by SM20 4500 S ₂ D, and Ammonia Nitrogen by SM20 4500 NH ₃ B/C Modified	
Laboratory Project ID: 1167268	
Data Validator: Mike Gaither, Environmental Scientist	

DATA EVALUATION CRITERIA SUMMARY

A Tier II Data Validation was performed by Trihydro Corporation's Chemical Data Evaluation Services group on the analytical data report package generated by Lancaster Laboratories evaluating samples from the Chevron EMC site located in Cincinnati, Ohio.

Precision, accuracy, method compliance, and completeness of this data package were assessed during this data review. Precision was determined by evaluating the calculated relative percent difference (RPD) values of samples from laboratory duplicate pairs. Laboratory accuracy was established by reviewing the demonstrated percent recoveries of matrix spike (MS) and matrix spike duplicate (MSD) samples, and of laboratory control samples (LCS) and laboratory control sample duplicates (LCSD) to verify that none of the data were biased. Additionally, field accuracy was established by collecting a field and trip blank to monitor for possible ambient or cross contamination during sampling. Method compliance was established by reviewing holding times, detection limits, surrogate recoveries, method blanks, and the LCS and LCSD percent recoveries against method specific requirements. Completeness was evaluated by determining the overall ratio of the number of samples planned versus the number of samples with valid analyses. Determination of completeness included a review of the chain-of-custody, laboratory analytical methods, and any other necessary documents associated with this analytical data set.

Data were evaluated in general accordance with validation criteria set forth in the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Superfund Organic Methods Data Review, document number USEPA-540-R-08-01, June 2008 with additional reference to USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Data Review, document number EPA 540/R-99-008 of October 1999 and the USEPA CLP National Functional Guidelines for Inorganic Data Review, document number EPA 540R-04-004, October 2004. Review of duplicates is conducted in accordance with USEPA Region 1 Laboratory Data Validation Function Guidelines for Evaluation of Organic Analysis, December 1996.





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SAMPLE NUMBERS TABLE

Client Sample ID	Laboratory Sample Number
Field Blank-1,102009	5811620
MW-37,102009	5811621
MW-37,102009 Filtered-091020	5811622
MW-131,102009	5811623
MW-131,102009 Filtered -091020	5811624
Trip Blank,102009	5811625

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The samples were analyzed for client-specified analytes. Chain-of-custody (COC) completeness is included in Section #3. The laboratory data were reviewed to evaluate compliance with the required methods and the quality of the reported data. A leading check mark (✓) indicates that the referenced data were deemed acceptable. A preceding crossed circle (⊗) signifies problems with the referenced data that may have warranted attaching qualifiers to the data.

- ✓ Data Completeness
- ✓ COC Documentation
- ⊗ Holding Times and Preservation
- ⊗ Laboratory Blanks
- ✓ System Monitoring Compounds (i.e. Surrogates)
- ✓ Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD)
- ✓ Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- ⊗ Laboratory Duplicates
- ✓ Trip Blank

OVERALL DATA PACKAGE ASSESSMENT

Based on a data validation review, the data are acceptable as delivered with the exceptions noted below as rejected data. Data qualified by the laboratory are discussed in Section #2.

The purpose of validating data and assigning qualifiers is to assist in proper data interpretation. Data which are not qualified meet the site data quality objectives. If values are assigned qualifiers other than an R, the data may be used for site evaluation, with the reasons for qualification being given consideration when interpreting sample concentrations. Data points which are assigned an R qualifier should not be used for any site evaluation purposes. Data were qualified with J data flags by the laboratory if the result was greater than or equal to the method detection limit (MDL) but less than the limit of quantitation (LOQ). Laboratory J flags were preserved in the data and included in the Data Qualification Summary table at the end of this report. Data were also qualified due to a method blank detection, a laboratory duplicate, and out of range holding times.

Data qualifiers used during this validation included:

- J – Estimated concentration
- UJ – Estimated reporting limit
- U – Evaluated to be undetected at the reporting limit
- JB – Estimated concentration due to blank contamination

Data Completeness

The analyses appeared to be performed as requested on the chain-of-custody records. The associated samples were received by the laboratory and appeared to be analyzed properly. No data were rejected for this sample set. The data completeness measure for this data package is 100%.

VALIDATION CRITERIA CHECKLIST	
<p>1. Was the report free of any non-conformances related to the analytical data identified by the laboratory?</p> <p>Comments: The laboratory noted no non-conformances related to the data.</p>	<p>Yes</p>
<p>2. Were data qualification flags or any other notes used by the laboratory? If yes, define.</p> <p>Comments: The laboratory noted that the samples were filtered in the field for dissolved metals. The laboratory used the following data qualification flags with this data set. J – Estimated value (1) – The result for one or both determinations was less than five times the LOQ. (2) – The unspiked result was more than four times the spike added.</p>	<p>Yes</p>
<p>3. Were sample COC forms complete?</p> <p>Comments: The COC form was complete from the field to the laboratory. Custody was maintained as evidenced by proper signatures, dates, and times of receipt.</p>	<p>Yes</p>
<p>4. Were detection limits in accordance with the QAPP, permit, or method, or indicated as acceptable by the Tier I validator?</p> <p>Comments: The detection limits were acceptable. For chloride analysis, dilutions of 20 times were required, 5 and 20 times for the sulfate analysis for MW-37 and MW-131, and 2 times for methane analysis and 20 times for ferrous iron analysis for MW-131. The final usability of the data with respect to dilutions will be determined by the project team.</p>	<p>Yes</p>
<p>5. Were the requested analytical methods in compliance with the QAPP, permit, or COC?</p> <p>Comments: The requested analytical methods were in compliance with the COC and the analyte list (<i>Analytical Requests for Groundwater</i>) attached to the COC.</p>	<p>Yes</p>
<p>6. Were samples received in good condition within method specified requirements?</p> <p>Comments: The samples were received in good condition but below the recommended temperature range of 4°C +/- 2°C at 1.1°C. The cooler temperature below 2°C was judged as acceptable since the samples were not reported to be frozen upon receipt at the laboratory and the sample containers were reported to be intact. Custody seals were present and intact.</p>	<p>No</p>
<p>7. Were samples analyzed within method specified or technical holding times?</p> <p>Comments: Samples were analyzed within the method specified or technical holding times with the following exceptions. In sample MW-37 102009, the analyte ferrous iron was analyzed past the recommended holding time of immediately (interpreted as within 24 hours) at 34 hours and 15 minutes. This is within the laboratory holding time of 1 day but outside the method holding time of 24 hours. The results for ferrous iron were qualified UJ. In sample MW-131 102009, the analyte ferrous iron was analyzed past the recommended holding time of immediately (interpreted as within 24 hours) at 32 hours and 50 minutes. This is within the laboratory holding time of 1 day but outside the method holding time of 24 hours. The results for ferrous iron were qualified J.</p>	<p>No</p>
<p>8. Were reported units appropriate for the associated sample matrix/matrices and method(s) of analyses?</p> <p>Comments: Sample results were reported in µg/L or mg/L, which are appropriate units for the requested analyses and the water matrix.</p>	<p>Yes</p>
<p>9. Do the laboratory reports include all constituents requested to be reported as indicated by the Tier I validator?</p> <p>Comments: The laboratory report included the requested constituents.</p>	<p>Yes</p>

VALIDATION CRITERIA CHECKLIST	
<p>10. Was there indication from the laboratory that the initial or continuing calibration verification results were within acceptable limits?</p> <p>Comments: Initial and continuing calibration data were not included as part of this data set; however, these data are assumed to be acceptable as the laboratory did not note that any calibration verification results were outside acceptable limits.</p>	N/A
<p>11. Was the total number of method blank samples prepared equal to at least 5% of the total number of samples, or analyzed as required by the method?</p> <p>Comments: The total number of method blanks prepared was greater than 5% of the total number of samples. The laboratory stated through historical correspondence that a LRB (laboratory reagent blank) was prepared with each batch of samples analyzed for COD, which was used to zero the spectrophotometer. As such, the laboratory does not include a method blank with the batch QC for COD.</p>	Yes
<p>12. Were method blank samples free of analyte contamination?</p> <p>Comments: There were no detections of the requested analytes reported in the method blank samples with one exception. Arsenic was reported in the method blank for metals batch 092951848005 at 0.0022 ug/L. As a result arsenic detections will be qualified U or JB for method blank detection.</p>	No
<p>13. Was the total number of matrix spike samples prepared equal to at least 5% of the total number of samples, or analyzed as required by the method?</p> <p>Comments: Matrix spike samples were prepared on at least a 5% basis for the total number of samples. Matrix spike samples for nitrate (batch 09294105101B), total organic carbon (09296049502B), nitrite (batch 09298106101B), and total kjeldahl nitrogen (TKN) (batch 09307108101A) were prepared on sample MW-37. The MS/MSD pair for ferrous iron batch 09294834401A was prepared from sample MW-131. The remaining laboratory duplicates were prepared from samples not associated with this data set and matrix similarity to project samples could not be guaranteed.</p>	Yes
<p>14. Were MS/MSD percent recoveries and MS/MSD RPD values within data validation or laboratory quality control (QC) limits?</p> <p>Comments: Project specific MS and MSD percent recoveries and RPD values for target analytes were within laboratory-specified limits or data validation limits with the following exceptions. The MS recovery for sample MW-37 for kjeldahl nitrogen batch 09307108101A was 119% which is above the acceptable range of 90-110%. No qualification is necessary since a high recovery indicates a possible high bias and the associated results were non-detect. The MS and MSD percent recoveries for non-project samples were considered but data are not qualified since matrix similarity to project samples could not be guaranteed.</p>	No
<p>15. Was the total number of LCSs analyzed equal to at least 5% of the total number of samples, or analyzed as required by the method?</p> <p>Comments: Laboratory control samples were prepared on at least a 5% basis for the total number of samples.</p>	Yes
<p>16. Were LCS/LCSD percent recoveries and LCS/LCSD RPD values within laboratory QC limits?</p> <p>Comments: The LCS/LCSD percent recoveries and LCS/LCSD RPD values were within laboratory QC limits.</p>	Yes
<p>17. Were surrogate recoveries within laboratory control limits?</p> <p>Comments: Surrogate recoveries were within laboratory control limits.</p>	Yes
<p>18. Was the number of equipment, trip, or field blanks collected equal to at least 10% of the total number of samples, or as required by the project guidelines, QAPP, SAP, or permit, or as indicated by the Tier I validator?</p> <p>Comments: One trip blank (Trip Blank 102009) and one field blank (Field Blank 102009) accompanied the samples of this data set.</p>	Yes

VALIDATION CRITERIA CHECKLIST	
<p>19. Were the trip blank, field blank, and/or equipment blank samples free of analyte contamination?</p> <p>Comments: In the trip blank sample, toluene was detected at 1.0 ug/L. There were no other detections reported for toluene for this data set.</p>	<p>No</p>
<p>20. Were the field duplicates collected equal to at least 10% of the total number of samples, or as required by the project guidelines, QAPP, SAP, or permit, or as indicated by the Tier I validator?</p> <p>Comments: Field duplicate samples were not collected with the samples of this data set.</p>	<p>N/A</p>
<p>21. Were field duplicate RPD values within data validation QC limits (soil 0-50%, water 0-30%, or air 0-25%)?</p> <p>Comments: Field duplicate samples were not collected with the samples of this data set.</p>	<p>N/A</p>
<p>22. Were laboratory duplicate RPD values within laboratory-specified limits?</p> <p>Comments: Laboratory duplicate RPD values were within laboratory-specified limits and/or were qualified by the laboratory with a (1) flag indicating that the result for one or both determinations was less than five times the LOQ with one exception. Laboratory duplicates were prepared for metals, nitrate, nitrite, kjedahl nitrogen, chloride, sulfate, sulfide, ferrous iron, ammonia nitrogen, chemical oxygen demand, and alkalinity to pH of 4.5 and 8.3. The laboratory duplicates for nitrate (batch 09294105101B), total organic carbon (09296049502B), nitrite (batch 09298106101B), and total kjeldahl nitrogen (TKN) (batch 09307108101A) were prepared on sample MW-37. The duplicate for ferrous iron batch 09294834401A was prepared from sample MW-131. The remaining laboratory duplicates were prepared from samples not associated with this data set and matrix similarity to project samples could not be guaranteed. The laboratory duplicate prepared for nitrate (batch 09298106101B) analysis from sample MW-37 had an RPD value of 5% which was above the specified limit of 2%. As a result, the associated nitrate data will be J/UJ qualified due to possible poor repeatability.</p>	<p>Yes</p>

DATA QUALIFICATION SUMMARY

Analyte	Field Sample ID	Lab Sample ID	Result	Units	Reviewer Qualifier	Reviewer Qualifier Reason
Arsenic, Dissolved	MW-131,102009 Filtered -091020	5811624	0.0266	mg/L	U	Method blank detection
Arsenic, Dissolved	MW-37,102009 Filtered-091020	5811622	0.003	mg/L	JB	Method blank detection
Iron, Ferric	MW-37,102009	5811621	0.081	mg/L	J	Flagged by the Lab: Result between MDL and RL.
Iron, Ferrous	MW-131,102009	5811623	4.3	mg/L	J	Sample was analyzed outside of method holding time but within laboratory holding time.
Iron, Ferrous	MW-37,102009	5811621	ND(0.1)	mg/L	UJ	Sample was analyzed outside of method holding time but within laboratory holding time.
Iron, Total	MW-37,102009	5811621	0.0807	mg/L	J	Flagged by the Lab: Result between MDL and RL.
Manganese, Dissolved	MW-37,102009 Filtered-091020	5811622	0.0033	mg/L	J	Flagged by the Lab: Result between MDL and RL.
Nitrogen, Nitrate	MW-131,102009	5811623	ND(0.1)	mg/L	UJ	Laboratory duplicate RPD outside QC limits
Nitrogen, Nitrate	MW-37,102009	5811621	1.2	mg/L	J	Laboratory duplicate RPD outside QC limits
Toluene	Trip Blank,102009	5811625	1	ug/L	J	Flagged by the Lab: Result between MDL and RL.