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: November 9, 2009
Date Validated: December 9, 2009	Sample End Date: November 10, 2009
Parameters Included: Volatile Organic Compounds (VOC) by Solid Waste 846 (SW-846) Method 8260B, Total Petroleum Hydrocarbons (TPH) Gasoline Range Organics (GRO) and TPH Diesel Range Organics (DRO) by SW-846 Method 8015B, 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 20th 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: 1170459	
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 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.

Tier II Data Validation Report Summary

SAMPLE NUMBERS TABLE

Client Sample ID	Laboratory Sample Number
MW-104S,110909	5833203
MW-104S,110909 Filtered	5833204
MW-100S,111009	5833205
MW-100S,111009 Filtered	5833206
MW-124,111009	5833207
MW-124,111009 Filtered	5833208
Trip Blank,111009	5833209

Tier II Data Validation Report

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 sample analyses performed past holding time, a trip blank detection and an out of range matrix spike recovery.

Data qualifiers used during this validation included:

J – Estimated concentration

U – Evaluated to be undetected at the reporting limit

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	
1. Was the report free of any non-conformances related to the analytical data identified by the laboratory?	Yes
Comments: The laboratory noted no non-conformances related to the data.	
2. Were data qualification flags or any other notes used by the laboratory? If yes, define.	Yes
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.	
3. Were sample COC forms complete?	Yes
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.	
4. Were detection limits in accordance with the QAPP, permit, or method, or indicated as acceptable by the Tier I validator?	Yes
Comments: The detection limits were acceptable. For sample MW-100S, dilutions of 50 times were required for the chloride analysis, 10 times for the sulfate analysis, and 2 times for the nitrate analysis. The final usability of the data with respect to dilutions will be determined by the project team.	
5. Were the requested analytical methods in compliance with the QAPP, permit, or COC?	Yes
Comments: The requested analytical methods were in compliance with the COC and the analyte list (*Analytical Requests for Groundwater*) attached to the COC.	
6. Were samples received in good condition within method specified requirements?	No
Comments: The samples were received in good condition and below the recommended temperature range of 4°C +/- 2°C at 1.0°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.	
7. Were samples analyzed within method specified or technical holding times?	No
Comments: Samples were analyzed within the method specified or technical holding times with the following exceptions. **In sample MW-100S 111109, the analyte ferrous iron was analyzed past the recommended holding time of immediately (interpreted as within 24 hours) at 31 hours and 30 minutes. The results for ferrous iron were qualified as J, since the analyte was detected in the sample above the MDL but below the PQL.**	
8. Were reported units appropriate for the associated sample matrix/matrices and method(s) of analyses?	Yes
Comments: Sample results were reported in µg/L or mg/L, which are appropriate units for the requested analyses and the water matrix.	
9. Do the laboratory reports include all constituents requested to be reported as indicated by the Tier I validator?	Yes
Comments: The laboratory report included the requested constituents.	
10. Was there indication from the laboratory that the initial or continuing calibration verification results were within acceptable limits?	N/A
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.	

VALIDATION CRITERIA CHECKLIST	
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?	Yes
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.	
12. Were method blank samples free of analyte contamination?	Yes
Comments: There were no detections of the requested analytes reported in the method blank samples.	
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?	Yes
Comments: Matrix spike samples were prepared on at least a 5% basis for the total number of samples with one exception. Matrix spike samples were not prepared for ferrous iron batch 093272268010 or TPH-DRO batch 093150025A. Matrix spike samples for chloride/sulfate batch 09322196601B were prepared on sample MW-100S. The remaining matrix spike samples were prepared from samples not associated with this data set.	
14. Were MS/MSD percent recoveries and MS/MSD RPD values within data validation or laboratory quality control (QC) limits?	Yes
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 exception of the MS recovery for sample MW-100S 111109 for sulfate which was 86% which is below the acceptable range of 90-110%. **As a result, the sulfate result for MW-100S-111109 will be J qualified.** The MS and MSD percent recoveries for non-project samples were considered but data would not have been qualified since matrix similarity to project samples could not be guaranteed.	
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?	Yes
Comments: Laboratory control samples were prepared on at least a 5% basis for the total number of samples.	
16. Were LCS/LCSD percent recoveries and LCS/LCSD RPD values within laboratory QC limits?	Yes
Comments: The LCS/LCSD percent recoveries and LCS/LCSD RPD values were within laboratory QC limits.	
17. Were surrogate recoveries within laboratory control limits?	Yes
Comments: Surrogate recoveries were within laboratory control limits.	
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?	Yes
Comments: One trip blank ("Trip Blank 111109") for VOCs and TPH-GRO accompanied the samples of this data set.	
19. Were the trip blank, field blank, and/or equipment blank samples free of analyte contamination?	No
Comments: In the trip blank sample, toluene was detected at 2.0 ug/L. **Samples MW-100S and MW-104S were qualified U for blank detection since the value was between the MDL and the RL.**	
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?	N/A
Comments: Field duplicate samples were not collected with the samples of this data set.	
21. Were field duplicate RPD values within data validation QC limits (soil 0-50%, water 0-30%, or air 0-25%)?	N/A
Comments: Field duplicate samples were not collected with the samples of this data set.	

VALIDATION CRITERIA CHECKLIST	
22. Were laboratory duplicate RPD values within laboratory-specified limits?	Yes
Comments: Laboratory duplicates were prepared for metals, nitrate, nitrite, total organic carbon, kjeldahl nitrogen, chloride, sulfate, sulfide, ferrous iron, chemical oxygen demand, alkalinity at pH of 4.5 and 8.3, and ammonia-nitrogen. Laboratory duplicates were prepared for chloride/sulfate batch 09322196601B from sample MW-100S 111109. The remaining laboratory duplicates were prepared from samples not associated with this data set and matrix similarity to project samples could not be guaranteed.	
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.	

DATA QUALIFICATION SUMMARY

Analyte	Field Sample ID	Lab Sample ID	Result	Units	Reviewer Qualifier	Reviewer Qualifier Reason
Chemical Oxygen Demand	MW-100S,111009	5833205	16.5	mg/L	J	Flagged by the Laboratory.
Diesel Range Organics	MW-100S,111009	5833205	42	ug/L	J	Flagged by the Laboratory.
Iron, Ferrous	MW-100S,111009	5833205	0.027	mg/L	J	Sample was analyzed outside of the acceptable holding time.
Nitrogen, Nitrate	MW-100S,111009	5833205	5	mg/L	J	Flagged by the Laboratory/ Sample was analyzed outside of the acceptable holding time.
Sulfate	MW-100S,111009	5833205	82.9	mg/L	J	The MS recovery was below the acceptable limits indicating possible matrix interference.
Toluene	MW-100S,111009	5833205	0.7	ug/L	U	Trip blank detection
Toluene	MW-104S,110909	5833203	0.9	ug/L	U	Trip blank detection