Tier II Data Validation Report Summary

Client: Chevron Environmental Management Company (EMC) Cincinnati	Laboratory: Lancaster Laboratories, Inc.
Project Name: Routine Final Remedy Monitoring	Sample Matrix: Groundwater
Project Number: 500-017-012	Sample Start Date: October 12, 2009
Date Validated: October 28, 2009	Sample End Date: October 12, 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: 1166070	
Data Validator: Jessica Swanson, Environmental Chemist	

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 field duplicate and 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 equipment and trip blanks 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
EB-2, 101209	5804205
EB-2, 101209 Filtered	5804206
MW-35, 101209	5804207
MW-35, 101209 Filtered	5804208
BD-1, 101209	5804209
BD-1, 101209 Filtered	5804210
MW-115S, 101209	5804211
MW-115S, 101209 Filtered	5804212
MW-115S, 101209 MS	5804213
MW-115S, 101209 MS Filtered	5804214
MW-115S, 101209 MSD	5804215
MW-115S, 101209 MSD Filt	5804216
MW-115S, 101209 DUP Filt	5804217
Trip Blank, 101209	5804218

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
- ⊗ Equipment and Trip Blanks

OVERALL DATA PACKAGE ASSESSMENT

Based on a data validation review, the data are acceptable as delivered. 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, poor precision as indicated by high RPD values in the laboratory duplicates, and due to equipment blank detections.

Data qualifiers used during this validation included:

J – Estimated concentration

UJ – Estimated 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 points were rejected. The data completeness measure for this data package is 100% and is acceptable.

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 did not note any non-conformances related to the analytical 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 * - Outside of specification (1) – The result for one or both determinations was less than five times the limit of quantitation (LOQ). (2) – The un-spiked 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. Dilutions of 20 times were required for the chloride analysis and dilutions of 5 to 10 times were required for the sulfate analysis in samples MW-35, 101209 and MW-115S, 101209. A 100 times dilution for the methane analysis and a 10 times dilution for ferrous iron analysis were required in sample MW-115S, 101209. 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 attached analyte list, Analytical Requests for Groundwater.	
6. Were samples received in good condition within method specified requirements?	Yes
Comments: The samples were received in good condition and both within and below the recommended temperature range of 4°C +/- 2°C at 1.1°C, 1.6°C, and 4.8°C. The cooler temperatures below 2°C were 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-35, 101209, the analyte ferrous iron was analyzed past the recommended holding time of immediately (interpreted as within 24 hours) at 36 hours and 5 minutes and in sample MW-115S, 101209 at 34 hours and 45 minutes. The results for ferrous iron were qualified as J, since the analyte was detected in the samples.**	
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.	

VALIDATION CRITERIA CHECKLIST	
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.	
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?	No
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 ammonia nitrogen batch 09286022101A, these data were validated using the LCS/LCSD results. Matrix spike samples for metals batch 092881848002 were prepared from sample MW-115S, 101209 Filtered. Matrix spike samples for VOC batch W092881AA, TPH-GRO batch 09287A20A, TPH-DRO batch 092870012A, methane batch 092870001A, nitrite nitrogen batch 09286105101B, TOC batch 09289049501A, Kjeldahl nitrogen batch 09292108101A, and ferrous iron batch 09286834401A were prepared from sample MW-115S, 101209. 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?	No
Comments: Project specific MS and MSD percent recoveries for target analytes were within laboratory-specified limits, data validation limits, or were not applicable due to sample concentrations that were greater than four times the spiked amounts with the following exception. In batch 09286105101B, nitrite nitrogen was recovered in the MS above the limits of 90-110% at 114%. As a result of possible high bias, detections in the samples would have been qualified as J, but the sample results were reported as non-detect. The MS and MSD percent recoveries for non-project samples were considered but data were not 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 with the following exceptions. The TPH-GRO surrogate trifluorotoluene-F, associated with batch 09287A20A, was recovered in sample MW-115S, 101209 MS at 146%, in sample MW-115S, 101209 MSD at 140%, and additionally reported in the MS and MSD samples at those same recoveries. No qualification was necessary since these were matrix spike samples and the individual sample recoveries were acceptable.	

VALIDATION CRITERIA CHECKLIST	
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: There was one trip blank (Trip_Blank, 101209) and one equipment blank (EB-2, 101209) collected with the samples of this data set, which is greater than 10% the total number of samples.	
19. Were the trip blank, field blank, and/or equipment blank samples free of analyte contamination?	No
Comments: There were no detections of the requested analytes in the equipment and trip blank samples with the following exceptions. **In sample EB-2, 101209, TPH-DRO was detected at a concentration of 72 µg/L. Associated detections for TPH-DRO less than 10 times the blank detections but greater than or equal to both the blank detection and the reporting limit were qualified as JB, indicating that the results were estimated due to blank contamination.** In sample Trip Blank, 101209, toluene was detected at a concentration of 2 µg/L. No qualification was necessary since the sample results were reported as non-detect for toluene.	
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?	Yes
Comments: There was one field duplicate collected with this data set. Sample BD-1, 101209 was collected as a duplicate of sample MW-35, 101209, which is at least 10% of the total number of samples.	
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 RPD values could not be calculated since both the parent and duplicate sample results were reported as non-detect or the analyte was not requested for analysis in the duplicate sample.	
22. Were laboratory duplicate RPD values within laboratory-specified limits?	No
Comments: Laboratory duplicates were prepared for metals batch 092881848002 from sample MW-115S, 101209 Filtered. Laboratory duplicates for nitrite nitrogen batch 09286105101B, TOC batch 09289049501A, Kjeldahl nitrogen batch 09292108101A, and ferrous iron batch 09286834401A were prepared from sample MW-115S, 101209. 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 with the following exception. **The laboratory duplicate RPD value for ammonia nitrogen batch 09286022101A was above the limit of 2% at 4%. As a result of possible poor repeatability, the samples were qualified as J or UJ.**	

DATA QUALIFICATION SUMMARY

Analyte	Field Sample ID	Lab Sample ID	Result	Units	Reviewer Qualifier	Reviewer Qualifier Reason
Arsenic, Dissolved	MW-115S,101209 Filtered	5804212	0.0109	mg/L	J	Flagged by the Lab: Result between MDL and RL.
Benzene	MW-115S,101209	5804211	0.8	µg/L	J	Flagged by the Lab: Result between MDL and RL.
Diesel Range Organics	EB-2,101209	5804205	72	µg/L L	J	Flagged by the Lab: Result between MDL and RL.
Diesel Range Organics	MW-115S,101209	5804211	220	µg/L	JB	Equipment blank detection
Iron, Ferrous	MW-115S,101209	5804211	5.1	mg/L	J	Sample was analyzed outside of the acceptable holding time.
Iron, Ferrous	MW-35,101209	5804207	0.02	mg/L	J	Sample was analyzed outside of the acceptable holding time.
Nitrogen, Ammonia	MW-115S,101209	5804211	ND (0.6)	mg/L	UJ	Laboratory duplicate RPD outside QC limits
Nitrogen, Ammonia	MW-35,101209	5804207	ND (0.6)	mg/L	UJ	Laboratory duplicate RPD outside QC limits
Sulfate	MW-115S,101209	5804211	4	mg/L	J	Flagged by the Lab: Result between MDL and RL.
Toluene	Trip Blank,101209	5804218	2	µg/L	J	Flagged by the Lab: Result between MDL and RL.