LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

Technical Memorandum

2700 Kelly Road, Suite 200 Warrington, PA 18976 T: 215.491.6500 F: 215.491.6501
Mailing Address: P.O. Box 1569 Doylestown, PA 18901

To: Monika Boguszewski, Langan Senior Staff Scientist

From: Emily Strake, Langan Senior Project Chemist/Risk Assessor

Date: March 28, 2016

Re: Data Usability Summary Report
For 450 Union Street
Groundwater Samples Collected March 2016
Langan Project No.: 170301202

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of groundwater samples collected in March 2016 by Langan Engineering and Environmental Services ("Langan") at the 450 Union Street site ("the Site"). The samples were analyzed by Alpha Analytical (NYSDOH ELAP registration # 11148) for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), pesticides, metals, and mercury (Hg).

- VOCs by SW-846 Method 8260C
- SVOCs SW-846 Method 8270D and 8270C with SIM
- PCBs by SW-846 Method 8082A
- Pesticides by SW-846 Method 8081B
- Metals by SW-846 6010C and 6020A
- Mercury by SW-846 Method 7470A

Table 1, below, summarizes the laboratory and client sample identification numbers, sample collection dates, and analytical parameters subject to review.

Table 1: Sample Summary

SDG	***Lab Sample ID***	***Client Sample ID***	***Sample Date***	***Analytical Parameters***
L1606583	L1606583-01	MW14_030816	3/8/16	VOCs, SVOCs, PCBs, Pest, Metals, Hg
L1606583	L1606583-02	MW16_030816	3/8/16	VOCs, SVOCs, PCBs, Pest, Metals, Hg
L1606583	L1606583-03	MW17_030816	3/8/16	VOCs, SVOCs, PCBs, Pest, Metals, Hg
L1606583	L1606583-04	MW11_030816	3/8/16	VOCs, SVOCs, PCBs, Pest, Metals, Hg

SDG	*Lab Sample ID*	*Client Sample ID*	*Sample Date*	*Analytical Parameters*
L1606583	L1606583-05	MW15_030816	3/8/16	VOCs, SVOCs, PCBs, Pest, Metals, Hg
L1606583	L1606583-06	DUP01_030816	3/8/16	VOCs, SVOCs, PCBs, Pest, Metals, Hg
L1606583	L1606583-07	TB01_030816	3/8/16	VOCs
L1606583	L1606583-08	TB02_030816	3/8/16	VOCs
L1606583	L1606583-09	TB03_030816	3/8/16	VOCs
L1606583	L1606583-10	FB01_030816	3/8/16	VOCs, SVOCs, PCBs, Pest, Metals, Hg
L1606763	L1606763-01	MW12_030916	3/9/16	VOCs, SVOCs, PCBs, Pest, Metals, Hg
L1606763	L1606763-02	TB04_030916	3/9/16	VOCs

Validation Overview

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-34, "Trace Volatile Data Validation" (February 2013, Revision 3), USEPA Region II SOP #HW-35, "Semivolatile Data Validation" (March 2013, Revision 2), USEPA Region II SOP #HW-36, "Pesticide Data Validation" (May 2013, Revision 4), USEPA Region II SOP #HW-37, "PCB Aroclor Data Validation" (May 2013, Revision 3), USEPA Region II SOP #HW-2a, "ICP-AES Data Validation" (December 2012, Revision 15), USEPA Region II SOP #HW2c, "Mercury and Cyanide Data Validation," the USEPA Contract Laboratory Program "National Functional Guidelines for Superfund Organic Methods Data Review" (USEPA-540R-014-002, August 2014), and the "National Functional Guidelines for Inorganic Superfund Data Review" (USEPA-540R-10-011, January 2010).

Validation includes review of the analytical data to verify that data are easily traceable and sufficiently complete to permit logical reconstruction by a qualified individual other than the originator. Items subject to review in this memorandum include holding times, sample preservation, sample extraction and digestion, instrument tuning, instrument calibration, laboratory blanks, laboratory control samples, system monitoring compounds, internal standard area counts, matrix spike/spike duplicate recoveries, target compound identification and quantification, chromatograms, overall system performance, serial dilutions, dual column performance, field duplicate, field blank and trip blank sample results.

As a result of the review process, the following qualifiers may be assigned to the data in accordance with the USEPA's guidelines and best professional judgment:

R – The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.

J – The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.

UJ – The analyte was not detected at a level greater than or equal to the reporting limit (RL); however, the reported RL is approximate and may be inaccurate or imprecise.

U – The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL or the sample concentration for results impacted by blank contamination.

NJ – The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

If any validation qualifiers are assigned these qualifiers should supersede any laboratory-applied qualifiers. Data that is not qualified as a result of this data validation is considered acceptable on the basis of the items specified for review. Data that is qualified as "R" are not sufficiently valid and technically supportable to be used for data interpretation. Data that is otherwise qualified due to minor data quality anomalies are usable, as qualified.

Table 2: Validator-applied qualification

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
MW14_030816	VOCs	1,4-Dioxane	123-91-1	UJ
MW14_030816	SVOCs	Hexachloroethane	67-72-1	UJ
MW14_030816	Metals	Dissolved Antimony	7440-36-0	U (0.002)
MW16_030816	VOCs	1,4-Dioxane	123-91-1	UJ
MW16_030816	SVOCs	Hexachloroethane	67-72-1	UJ
MW16_030816	Metals	Dissolved Antimony	7440-36-0	U (0.002)
MW17_030816	VOCs	1,4-Dioxane	123-91-1	UJ
MW17_030816	SVOCs	Hexachloroethane	67-72-1	UJ
MW17_030816	VOCs	Naphthalene	91-20-3	U (3.3)
MW11_030816	VOCs	1,4-Dioxane	123-91-1	UJ
MW11_030816	SVOCs	Hexachloroethane	67-72-1	UJ

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
MW11_030816	Metals	Dissolved Antimony	7440-36-0	U (0.002)
MW15_030816	VOCs	1,4-Dioxane	123-91-1	UJ
MW15_030816	VOCs	Naphthalene	91-20-3	U (2.5)
MW15_030816	SVOCs	Hexachloroethane	67-72-1	UJ
MW15_030816	Metals	Dissolved Antimony	7440-36-0	U (0.002)
DUP01_030816	VOCs	1,4-Dioxane	123-91-1	UJ
DUP01_030816	SVOCs	Hexachloroethane	67-72-1	UJ
DUP01_030816	Metals	Dissolved Antimony	7440-36-0	U (0.002)
TB01_030816	VOCs	1,4-Dioxane	123-91-1	UJ
TB02_030816	VOCs	1,4-Dioxane	123-91-1	UJ
TB03_030816	VOCs	1,4-Dioxane	123-91-1	UJ
FB01_030816	VOCs	1,4-Dioxane	123-91-1	UJ
FB01_030816	SVOCs	Hexachloroethane	67-72-1	UJ
FB01_030816	Metals	Dissolved Chromium	7440-47-3	U (0.002)
FB01_030816	Metals	Dissolved Copper	7440-50-8	U (0.003)
FB01_030816	Metals	Dissolved Nickel	7440-02-0	U (0.003)
FB01_030816	Metals	Total Chromium	7440-47-3	U (0.001)
FB01_030816	Metals	Total Nickel	7440-02-0	U (0.003)
MW12_030916	VOCs	1,4-Dioxane	123-91-1	UJ
MW12_030916	Metals	Dissolved Antimony	7440-36-0	U (0.002)
MW12_030916	Metals	Dissolved Chromium	7440-47-3	U (0.001)
TB04_030916	VOCs	1,4-Dioxane	123-91-1	UJ

Major Deficiencies:

Major deficiencies include those that grossly impact data quality and necessitate the rejection of results. No major deficiencies were identified.

Minor Deficiencies:

Minor deficiencies include anomalies that directly impact data quality and necessitate qualification, but do not result in unusable data. The section below describes the minor deficiencies that were identified.

VOCs by SW-846 Method 8260C:

The initial and continuing calibrations analyzed on instrument Gonzo.i displayed a relative response factor (RRF) less than the control limit 1,4-dioxane. 1,4-Dioxane is a poor performer (USEPA 2014 NFG); associated results were non-detect and are qualified as "UJ" on the basis of professional judgment.

Trip blank sample TB01 displayed a positive detection for naphthalene at 0.90 µg/L. The associated sample results are qualified as "U" at the higher of the reporting limit and the sample concentration.

SVOCs by SW-846 Method 8270D and 8720C with SIM:

LCS/LCSD WG872792-2/3 displayed recoveries less than the lower control limit for hexachloroethane at 29% and 26%, respectively. The associated sample results were non-detect and are qualified as "UJ."

Metals by SW-846 Method 6020A and 6010C:

Method blank sample WG873887-1 displayed positive detections for dissolved antimony, chromium, and nickel. The associated positive detections are qualified as "U" at the reporting limit.

Method blank sample WG873562-1 displayed positive detections for dissolved chromium, copper, and nickel. The associated positive detections are qualified as "U" at the reporting limit.

The field blank sample displayed a positive detection for antimony. The associated field sample results are qualified as "U" at the reporting limit.

Method blank sample WG873478-1 displayed positive detections for total chromium and nickel. The associated positive detections are qualified as "U" at the reporting limit.

Other Deficiencies:

Other deficiencies include anomalies that do not directly impact data quality and do not necessitate qualification. The section below describes the other deficiencies that were

identified.

SVOCs by SW-846 Method 8270D and 8720C with SIM:

Sample MW-12 displayed a surrogate recovery greater than the upper control limit for 2,4,6-tribromophenol at 128%. The associated acid-extractable compounds were non-detect; qualification is not required.

LCS/LCSD WG872791 displayed recoveries greater than the control limit for 2,4-dinitrotoluene, p-chloro-m-cresol, and 2,4-dinitrophenol. In addition, the LCS/LCSD RPD was greater than the control limit for 2,4-dimethylphenol. The associated sample results were non-detect; qualification is not required.

The continuing calibration analyzed on GCMS5.i on 3/14/16 at 12:32 displayed %Ds greater than the control limit with positive biases for 2,4-dinitrophenol, di-n-butylphthalate, and di-n-octylphthalate. The associated sample results were non-detect; qualification is not required.

Metals by SW-846 Method 6020A and 6010C:

Method blank sample WG873478-1 displayed positive detections for total barium, total chromium, and total nickel. The associated sample results were orders of magnitude greater than the blank amounts; qualification is not necessary.

The continuing calibration blanks analyzed on 3/15/16 and 3/16/16 displayed positive detections for total antimony, barium, arsenic, manganese and nickel, and dissolved antimony, arsenic, and nickel. The associated sample results were either orders of magnitude greater than the blank amounts or non-detect; qualification is not necessary.

MS/SD sample WG873887-4 displayed multiple recoveries and RPDs outside of control limits. The spiked volume did not originate from the Site; qualification is not necessary.

The field blank sample displayed positive detections for dissolved barium, chromium, copper, nickel, and sodium. Chromium, copper and nickel were "U" qualified due to method blank contamination. Barium and sodium were orders of magnitude less than the associated sample results; qualification is not necessary.

Method blank sample WG873478-1 displayed a positive detection for total barium. The associated positive detections are orders of magnitude less than the associated sample results; qualification is not necessary.

MS/SD sample MW16 displayed a recovery greater than the upper control limit for dissolved selenium. The associated sample result was non-detect; qualification is not required.

Comments:

A field duplicate and parent sample pair (DUP01_030816 and MW14) was collected and analyzed for all parameters. For results less than 5X the RL, analytes meet the precision criteria if the absolute difference is less than ±1X the RL. For results greater than 5X the RL, analytes meet the precision criteria if the RPD is less than or equal to 35%. All analytes met the precision criteria.

On the basis of this evaluation, the laboratory appears to have followed the specified analytical methods with the exception of errors discussed above. If a given fraction is not mentioned above, that means that all specified criteria were met for that parameter. All of the sample holdtimes were met and data packages met ASP Category B requirements.

All data are considered usable, as qualified. In addition, completeness, defined as the percentage of analytical results that are judged to be valid, is 100%.

Signed:

Emily Strake
Senior Project Chemist/Risk Assessor