# Appendix O
# Data Usability Summary Reports

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:** Julia Leung, Langan Project Engineer

**From:** Emily Strake, Langan Senior Project Chemist

**Date:** November 5, 2018

**Re:** Data Usability Summary Report
For 300 West 122nd Street
Samples Collected in August and October 2018
Langan Project No.: 170500201

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of soil samples collected in August and October 2018 by Langan Engineering and Environmental Services ("Langan") at the 300 West 122nd Street site ("the site"). The samples were analyzed by Alpha Analytical Laboratories, Inc. (NYSDOH NELAC registration # 11148) for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), herbicides, polychlorinated biphenyls (PCBs), pesticides, metals, mercury (Hg), cyanide (CN), hexavalent chromium (CrVI), trivalent chromium (CrIII), and total solids by the methods specified below.

- VOCs by SW-846 Method 8260C
- SVOCs by SW-846 Method 8270D
- Herbicides by SW-846 Method 8151A
- PCBs by SW-846 Method 8082A
- Pesticides by SW-846 Method 8081B
- Metals by SW-846 Method 6010D
- Mercury by SW-846 Method 7471B
- Cyanide by SW-846 Method 9012B
- Hexavalent Chromium by SW-846 Method 7196A
- Trivalent Chromium (calculated)
- Total Solids by Standard Method 2540G

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* |
|---|---|---|---|---|
| L1831933 | L1831933-01 | REUSE01_GRAB01_17-20 | 8/15/2018 | VOCs, Total Solids |
| L1831933 | L1831933-02 | REUSE01_GRAB02_17-20 | 8/15/2018 | VOCs, Total Solids |
| L1831933 | L1831933-03 | REUSE01_COMP01_17-20 | 8/15/2018 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, Total Solids |
| L1841056 | L1841056-01 | UST10_B1_17-18 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-02 | UST10_B2_17-18 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-03 | UST10_N_SW_15-16 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-04 | UST10_E_SW_15-16 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-05 | UST10_S_SW_15-16 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-06 | UST10W_S_SW_15-16 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-07 | UST11_B1_20-21 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-08 | UST11_B2_20-21 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-09 | UST11_E_SW_18-19 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-10 | UST11_S_SW_18-19 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-11 | UST11_W_SW_18-19 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-12 | UST12_B2_20-21 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-13 | UST12_B1_20-21 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-14 | UST12_N_SW_18-19 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-15 | UST12_E_SW_18-19 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-16 | UST12_W_SW_18-19 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1843101 | L1843101-01 | UST13_B1_14-15 | 10/23/2018 | VOCs, SVOCs, Total Solids |
| L1843101 | L1843101-02 | UST13_B2_14-15 | 10/23/2018 | VOCs, SVOCs, Total Solids |

**Validation Overview**

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-34A, "Trace Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-33A, "Low/Medium Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-35A, "Semivolatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-17, "Validating Chlorinated Herbicides" (December 2010, Revision 3.1), USEPA Region II SOP #HW-37A, "Polychlorinated Biphenyl (PCB) Aroclor Data Validation" (June 2015, Revision 0), USEPA Region II SOP #HW-36A, "Pesticide Data Validation" (October 2016, Revision 1), USEPA Region II SOP #HW-3a, "ICP-AES Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-3c, "Mercury and Cyanide Data Validation" (September 2016, Revision 1), the USEPA Contract Laboratory Program "National Functional Guidelines for Organic Superfund Methods Data Review" (EPA-540-R-2017-002, January 2017), USEPA "National Functional Guidelines for Inorganic Superfund Methods Data Review" (EPA-540-R-2017-001, January 2017) and the specifics of the methods employed.

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, and field 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* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| REUSE01_GRAB01_17-20 | 8260C | 79-00-5 | 1,1,2-Trichloroethane | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 142-28-9 | 1,3-Dichloropropane | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 75-71-8 | Dichlorodifluoromethane | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 79-20-9 | Methyl Acetate | UJ |
| REUSE01_COMP01_17-20 | 8151A | 93-76-5 | 2,4,5-T | UJ |
| REUSE01_COMP01_17-20 | 8270D | 62-75-9 | n-Nitrosodimethylamine | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 74-83-9 | Bromomethane | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 75-00-3 | Chloroethane | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 179601-23-1 | p/m-Xylene | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 127-18-4 | Tetrachloroethene | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 108-88-3 | Toluene | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 10061-02-6 | trans-1,3-Dichloropropene | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 108-87-2 | Methyl cyclohexane | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 104-51-8 | n-Butylbenzene | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 95-47-6 | o-Xylene | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 135-98-8 | sec-Butylbenzene | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 79-01-6 | Trichloroethene | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 75-01-4 | Vinyl chloride | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 79-00-5 | 1,1,2-Trichloroethane | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 142-28-9 | 1,3-Dichloropropane | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 74-83-9 | Bromomethane | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 75-00-3 | Chloroethane | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| REUSE01_GRAB02_17-20 | 8260C | 75-71-8 | Dichlorodifluoromethane | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 79-20-9 | Methyl Acetate | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 179601-23-1 | p/m-Xylene | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 127-18-4 | Tetrachloroethene | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 108-88-3 | Toluene | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 10061-02-6 | trans-1,3-Dichloropropene | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 108-87-2 | Methyl cyclohexane | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 104-51-8 | n-Butylbenzene | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 95-47-6 | o-Xylene | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 135-98-8 | sec-Butylbenzene | UJ |
| REUSE01_COMP01_17-20 | 8081B | 72-54-8 | 4,4'-DDD | UJ |
| REUSE01_COMP01_17-20 | 8081B | 72-55-9 | 4,4'-DDE | J |
| REUSE01_COMP01_17-20 | 8081B | 50-29-3 | 4,4'-DDT | J |
| REUSE01_COMP01_17-20 | 8081B | 309-00-2 | Aldrin | UJ |
| REUSE01_COMP01_17-20 | 8081B | 319-84-6 | Alpha-BHC | UJ |
| REUSE01_COMP01_17-20 | 8081B | 319-85-7 | Beta-BHC | UJ |
| REUSE01_COMP01_17-20 | 8081B | 5103-71-9 | cis-Chlordane | J |
| REUSE01_COMP01_17-20 | 8081B | 319-86-8 | Delta-BHC | UJ |
| REUSE01_COMP01_17-20 | 8081B | 60-57-1 | Dieldrin | UJ |
| REUSE01_COMP01_17-20 | 8081B | 959-98-8 | Endosulfan I | UJ |
| REUSE01_COMP01_17-20 | 8081B | 33213-65-9 | Endosulfan II | UJ |
| REUSE01_COMP01_17-20 | 8081B | 1031-07-8 | Endosulfan sulfate | UJ |
| REUSE01_COMP01_17-20 | 8081B | 72-20-8 | Endrin | UJ |
| REUSE01_COMP01_17-20 | 8081B | 7421-93-4 | Endrin aldehyde | UJ |
| REUSE01_COMP01_17-20 | 8081B | 53494-70-5 | Endrin ketone | UJ |
| REUSE01_COMP01_17-20 | 8081B | 76-44-8 | Heptachlor | UJ |
| REUSE01_COMP01_17-20 | 8081B | 1024-57-3 | Heptachlor epoxide | UJ |
| REUSE01_COMP01_17-20 | 8081B | 58-89-9 | Lindane | UJ |
| REUSE01_COMP01_17-20 | 8081B | 72-43-5 | Methoxychlor | UJ |
| REUSE01_COMP01_17-20 | 8081B | 5103-74-2 | trans-Chlordane | J |
| REUSE01_GRAB02_17-20 | 8260C | 79-01-6 | Trichloroethene | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 75-01-4 | Vinyl chloride | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| REUSE01_COMP01_17-20 | 9012B | 57-12-5 | Cyanide, Total | 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.

**L1831933:**

**VOCs by SW-846 Method 8260C:**

The initial calibration verification (ICV) for batch WG1147681 on instrument VOA111 exhibited a percent difference (%D) above the control limit for 1,1,2-trichloroethane (-35.8%), 1,3-dichloropropane (-34.7%), dichlorodifluoromethane (-58%), methyl acetate (-20.7%), p/m-xylene (-21.8%), tetrachloroethene (-21.2%), toluene (-21.7%), and trans-1,3-dichloropropene (-36.1%). The associated results in samples REUSE01_GRAB01_17-20 and REUSE01_GRAB02_17-20 are qualified as "UJ" based on potential indeterminate bias.

The continuing calibration verification (CCV) for batch WG1147681 on instrument VOA111 exhibited a %D above the control limit for bromomethane (-24.4%), chloroethane (-25.1%), methyl cyclohexane (-25.9%), n-butylbenzene (-23.5%), o-xylene (-21.1%), sec-butylbenzene (-20.3%), trichloroethene (-20.2%), and vinyl chloride (-28.4%). The associated results in samples REUSE01_GRAB01_17-20 and REUSE01_GRAB02_17-20 are qualified as "UJ" based on potential indeterminate bias.

**SVOCs by SW-846 Method 8270D:**

The CCV for batch WG1146985 on instrument BUFFY exhibited a %D above the control limit for n-nitrosodimethylamine (-24.4%). The associated results in sample REUSE01_COMP01_17-20 are qualified as "UJ" based on potential indeterminate bias.

**Herbicides by SW-846 Method 8151A:**

The CCV for batch WG1147122 on instrument PEST17 exhibited a %D above the control limit for 2,4,5-t (-35.3%). The associated results in sample REUSE01_COMP01_17-20 are qualified as "UJ" based on potential indeterminate bias.

**Pesticides by SW-846 Method 8081B:**

The laboratory control sample and duplicate (LCS/LCSD) for batch WG1146665 exhibited a relative percent difference (RPD) above the control limit for delta-BHC (44%), alpha-BHC (42%), beta-BHC (45%), heptachlor epoxide (41%), heptachlor (36%), aldrin (43%), ednrin (42%), lindane (45%), endrin aldehyde (39%), endrin ketone (43%), dieldrin (42%), 4,4'-DDE (43%), 4,4'-DDD (40%), 4,4'-DDT (39%), endosulfan I (42%), endosulfan II (43%), endosulfan sulfate (38%), methoxychlor (39%), cis-chlordane (46%), and trans-chlordane (39%). The associated results in sample REUSE01_COMP01_17-20 are qualified as "J" and "UJ" based on potential indeterminate bias.

**Cyanide by SW-846 Method 9012B:**

The laboratory control sample (LCS) for batch WG1147227 exhibited a percent recovery below the lower control limit (LCL) for cyanide, total (72%). The associated results in sample REUSE01_COMP01_17-20 are qualified as "UJ" based on potential low bias.

**OTHER DEFICIENCIES:**

Other deficiencies include anomalies that do not directly impact data quality and do not necessitate qualification. No other deficiencies were identified.

**L1831933:**

**Pesticides by SW-846 Method 8081B:**

Sample REUSE01_COMP01_17-20 exhibited a relative percent difference (RPD) above the control limit between the primary and secondary columns for cis-chlordane and trans-chlordane. The associated results in sample REUSE01_COMP01_17-20 were previous qualified on the basis of the LCS/LCSD.

**COMMENTS:**

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 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, CEP
Senior Project Chemist

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:** Julia Leung, Langan Project Engineer

**From:** Emily Strake, Langan Senior Project Chemist

**Date:** January 9, 2019

**Re:** Data Usability Summary Report
For 300 West 122nd Street
Soil Samples Collected December 2018
Langan Project No.: 170500202

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of soil samples collected in December 2018 by Langan Engineering and Environmental Services ("Langan") at the 300 West 122nd Street site ("the Site"). The samples were analyzed by Alpha Analytical Laboratories located Westborough, MA (NYSDOH ELAP registration # 11148) for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, herbicides, polychlorinated biphenyls (PCB), metals including mercury, cyanide, hexavalent chromium and general chemistry parameters by the analytical methods listed below.

- VOCs by SW-846 Method 8260C
- SVOCs by SW-846 Method 8270D
- Pesticides by SW-846 Method 8081B
- Herbicides by SW-846 Method 8151A
- PCBs by SW-846 Method 8082A
- Metals by SW-846 Methods 6010D
- Mercury (Hg) by SW-846 Methods 7470A and 7471B
- Cyanide (CN) by SW-846 Methods 9010C/9012B
- Hexavalent Chromium (CrVI) by SW-847 7196A
- Percent Solids (%S) by Standard Method 2540G

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* |
|---|---|---|---|---|
| L1850028 | L1850028-01 | EP18_7_120618 | 12/06/18 | VOCs, SVOCs, Pests/Herbs, PCBs, Metals, Hg, CrVI, CN, %S |
| L1850360 | L1850360-01 | UST14_B1_15.5-16 | 12/07/18 | VOCs, SVOCs, %S |
| L1850360 | L1850360-02 | UST14_B2_15.5-16 | 12/07/18 | VOCs, SVOCs, %S |
| L1850360 | L1850360-03 | UST15_B1_15.5-16 | 12/07/18 | VOCs, SVOCs, %S |
| L1850360 | L1850360-04 | UST15_B2_15.5-16 | 12/07/18 | VOCs, SVOCs, %S |
| L1850360 | L1850360-05 | UST16_B1_15.5-16 | 12/07/18 | VOCs, SVOCs, %S |
| L1850360 | L1850360-06 | UST16_B2_15.5-16 | 12/07/18 | VOCs, SVOCs, %S |
| L1850360 | L1850360-07 | UST17_B1_15.5-16 | 12/07/18 | VOCs, SVOCs, %S |
| L1850360 | L1850360-08 | UST17_B2_15.5-16 | 12/07/18 | VOCs, SVOCs, %S |
| L1850360 | L1850360-09 | UST_DUP01_120718 | 12/07/18 | VOCs, SVOCs, %S |
| L1850360 | L1850360-10 | UST_DUP02_120718 | 12/07/18 | VOCs, SVOCs, %S |
| L1850360 | L1850360-11 | EP_FB01_120718 | 12/07/18 | VOCs, SVOCs, Pests/Herbs, PCBs, Metals, Hg, CrVI, CN, %S |
| L1851440 | L1851440-01 | EP01_9_121318 | 12/13/18 | VOCs, SVOCs, Pests/Herbs, PCBs, Metals, Hg, CrVI, CN, %S |
| L1851440 | L1851440-02 | EP01_10.5_121318 | 12/13/18 | VOCs, SVOCs, Pests/Herbs, PCBs, Metals, Hg, CrVI, CN, %S |

**Validation Overview**

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-34a, "Trace Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-33A, "Low/Medium Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-35A, "Semivolatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-3a, "ICP-AES Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-36A, "Pesticide Data Validation" (October 2016, Revision 1), USEPA Region II SOP #HW-3c, "Mercury and Cyanide Data Validation" (Revision 1, September 2016), USEPA Region II SOP #HW-17, USEPA Region II SOP #HW-37A, "PCB Aroclor Data Validation" (Revision 0, June 2015), the USEPA Contract Laboratory Program "National Functional Guidelines for Organic Superfund Methods Data Review" (EPA-540-R-2017-002, January 2017), the USEPA Contract Laboratory Program "National Functional Guidelines for Inorganic Superfund Methods Data Review" (EPA-540-R-2017-001, January 2017) and the specifics of the methods employed.

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, and field 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* | *Analysis CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP18_7_120618 | 6010D | 7440-70-2 | Calcium, Total | J |
| EP18_7_120618 | 6010D | 7439-95-4 | Magnesium, Total | J |
| EP18_7_120618 | SW8151A | 93-72-1 | 2,4,5-TP (Silvex) | UJ |
| EP18_7_120618 | SW8151A | 94-75-7 | 2,4-D | UJ |
| EP18_7_120618 | 8260C | 123-91-1 | 1,4-Dioxane | UJ |

| *Client Sample ID* | *Analysis* | *Analysis CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP18_7_120618 | 8260C | 107-13-1 | Acrylonitrile | UJ |
| EP18_7_120618 | 8260C | 108-05-4 | Vinyl acetate | UJ |
| EP18_7_120618 | 8270D | 108-60-1 | Bis(2-chloroisopropyl)ether | UJ |
| EP18_7_120618 | 8270D | 117-81-7 | Bis(2-ethylhexyl)phthalate | U (180) |
| EP_FB01_120718 | SW7470A | 7439-97-6 | Mercury, Total | UJ |
| UST15_B2_15.5-16 | 8260C | 95-63-6 | 1,2,4-Trimethylbenzene | J |
| UST15_B2_15.5-16 | 8260C | 108-67-8 | 1,3,5-Trimethylbenzene | J |
| UST15_B2_15.5-16 | 8260C | 100-41-4 | Ethylbenzene | J |
| UST15_B2_15.5-16 | 8260C | 98-82-8 | Isopropylbenzene | J |
| UST15_B2_15.5-16 | 8260C | 91-20-3 | Naphthalene | J |
| UST15_B2_15.5-16 | 8260C | 108-88-3 | Toluene | J |
| UST15_B2_15.5-16 | 8260C | 133-02-07 | Xylenes, Total | J |
| UST15_B2_15.5-16 | 8260C | 104-51-8 | n-Butylbenzene | J |
| UST15_B2_15.5-16 | 8260C | 103-65-1 | n-Propylbenzene | J |
| UST15_B2_15.5-16 | 8260C | 95-47-6 | o-Xylene | J |
| UST15_B2_15.5-16 | 8260C | 179601-23-1 | p/m-Xylene | J |
| UST_DUP01_120718 | 8270D | 191-24-2 | Benzo(g,h,i)perylene | J |
| EP_FB01_120718 | SW8151A | 93-76-5 | 2,4,5-T | UJ |
| EP_FB01_120718 | SW8151A | 93-72-1 | 2,4,5-TP (Silvex) | UJ |
| EP_FB01_120718 | 8260C | 123-91-1 | 1,4-Dioxane | UJ |
| EP_FB01_120718 | 8260C | 74-83-9 | Bromomethane | UJ |
| EP_FB01_120718 | 8270D | 121-14-2 | 2,4-Dinitrotoluene | UJ |
| EP_FB01_120718 | 8270D | 88-74-4 | 2-Nitroaniline | UJ |
| EP_FB01_120718 | 8270D | 91-94-1 | 3,3'-Dichlorobenzidine | UJ |
| EP_FB01_120718 | 8270D | 100-01-6 | 4-Nitroaniline | UJ |
| EP_FB01_120718 | 8270D | 86-74-8 | Carbazole | UJ |
| EP01_9_121318 | 6010D | 7439-92-1 | Lead, Total | J |
| EP01_9_121318 | 8260C | 74-83-9 | Bromomethane | UJ |
| EP01_9_121318 | 8260C | 67-66-3 | Chloroform | UJ |
| EP01_9_121318 | 8270D | 108-60-1 | Bis(2-chloroisopropyl)ether | UJ |
| EP01_10.5_121318 | 6010D | 7439-92-1 | Lead, Total | J |
| EP01_10.5_121318 | 8260C | 71-55-6 | 1,1,1-Trichloroethane | UJ |
| EP01_10.5_121318 | 8260C | 75-35-4 | 1,1-Dichloroethene | UJ |
| EP01_10.5_121318 | 8260C | 594-20-7 | 2,2-Dichloropropane | UJ |
| EP01_10.5_121318 | 8260C | 74-83-9 | Bromomethane | UJ |
| EP01_10.5_121318 | 8260C | 56-23-5 | Carbon tetrachloride | UJ |
| EP01_10.5_121318 | 8260C | 75-00-3 | Chloroethane | UJ |

| *Client Sample ID* | *Analysis* | *Analysis CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP01_10.5_121318 | 8260C | 75-71-8 | Dichlorodifluoromethane | UJ |
| EP01_10.5_121318 | 8260C | 75-69-4 | Trichlorofluoromethane | UJ |
| EP01_10.5_121318 | 8260C | 75-01-4 | Vinyl chloride | UJ |
| EP01_10.5_121318 | 8270D | 108-60-1 | Bis(2-chloroisopropyl)ether | 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:

**L1850028**

The continuing calibration verification (CCV) for instrument VOA111 on 12/08/18 at 10:05 exhibited a percent difference above the control limit for acrylonitrile (33.7%), vinyl acetate (27.8%), and 1,4-dioxane (24.3%). The associated results for sample EP18_7_120618 are qualified as "UJ" based on potential indeterminate bias.

**L1850360**

The surrogate 4-bromofluorobenzene was recovered above the control limit for samples UST15_B2_18-19 (reanalysis) and UST_DUP01_120718 at 142% and 135%, respectively. The associated aromatic detections are qualified as "J" based on potential high bias.

The CCV for instrument VOA101 on 12/12/18 8:24 exhibited a percent difference above the control limit for bromomethane (46.2%) and 1,4-dioxane (-42.1%). The associated results for sample EP_FB01_120718 are qualified as "UJ" based on potential indeterminate bias.

**L1851440**

The CCV for instrument VOA110 on 12/18/18 at 19:26 exhibited a percent difference above the control limit for bromomethane (-52.4%) and chloroform (20.4%). The associated results for sample EP01_9_121318 are qualified as "UJ" based on potential indeterminate bias.

The CCV for instrument VOA111 on 12/19/18 at 7:03 exhibited a percent difference above the control limit for dichlorodifluoromethane (-76.1%), vinyl chloride (-48%), bromomethane (-55.1%), chloroethane (-47.1%), trichlorofluoromethane (-61.6%), 1,1-dichloroethene (-26%), 2,2-dichloropropane (-24.9%), carbon tetrachloride (-39.7%), and 1,1,1-trichloroethane (-29.2). The associated results for sample EP01_10.5_121318 are qualified as "UJ" based on potential indeterminate bias.

SVOCs by SW-846 Methods 8270D:

**L1850028**

The method blank WG1186597-1 exhibited a detection of bis(2-ethylhexyl)phthalate at 73 ug/kg. The associated result for sample EP18_7_120618 is qualified as "U" at the reporting limit due to potential high bias.

The CCV for instrument SV112 on 12/7/18 at 19:21 exhibited a percent difference above the control limit for bis(2-chloroisopropyl)ether (23.5%). The associated result for sample EP18_7_120618 is qualified as "UJ" based on potential indeterminate bias.

**L1850360**

The laboratory control sample (LCS) WG1187304-2 exhibited a percent recovery below the control limit for 3,3'-dichlorobenzidine (37%), 2,4-dinitrotoluene (40%), 2-nitroaniline (46%), 4-nitroaniline (48%), and carbazole (52%). The associated results for sample EP_FB01_120718 are qualified as "UJ" based on potential low bias.

**L1851440**

The CCV for instrument SV109 on 12/17/18 at 22:07 exhibited a percent difference above the control limit for bis(2-chloroisopropyl)ether (-21.9%). The associated results for samples EP01_9_121318 and EP01_10.5_121318 are qualified as "UJ" based on potential indeterminate bias.

Metals by SW-846 Methods 6010D:

**L1850028**

The laboratory duplicate WG1187074-4 and parent sample, L1850028-01, exhibited a relative percent difference (RPD) greater that the control limit for calcium (63%) and magnesium (63%). The associated results for sample EP18_7_120618 are qualified as "J" based on potential indeterminate bias.

**L1851440**

The CCV R1143208-46 exhibited a percent recovery above the control limit for iron (111%). The associated results for samples EP01_9_121318 and EP01_10.5_121318 are qualified as "J" based on potential indeterminate bias.

Mercury by SW-846 7471B:

**L1850360**

The CCV R1140764-20 exhibited a percent recovery above the control limit at 116%. The associated result for sample EP_FB01_120718 is qualified as "UJ" based on potential indeterminate bias.

Herbicides by SW-846 Method 8151A:

**L1850028**

The CCV for instrument PEST17 on 12/10/18 at 4:22 exhibited a percent difference above the control limit for 2,4,5-TP (Silvex) (-16.3%). The associated result for sample EP18_7_120618 is qualified as "UJ" based on potential indeterminate bias.

The CCV for instrument PEST17 on 12/10/18 at 7:50 exhibited a percent difference above the control limit for 2,4-D (-15.4%). The associated result for sample EP18_7_120618 is qualified as "UJ" based on potential indeterminate bias.

**L1850360**

The CCV for instrument PEST17 on 12/14/18 at 12:14 exhibited a percent difference above the control limit for 2,4,5-TP (Silvex ) (-15.3%), and 2,4,5-T (-25.8%). The associated results for sample EP_FB01_120718 are qualified as "UJ" based on potential indeterminate bias.

**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.

VOCs by SW-846 Method 8260C:

**L1850028**

The LCS WG1187477-3 exhibited a percent recovery above the control limit for 2-hexanone (68%) and acrylonitrile (66%). The associated results for sample EP18_7_120618 are non-detects; no qualification is necessary.

**L1850360**

The field blank sample EP_FB01_120718 exhibited a detection of acetone at 3.5 ug/l. Acetone concentrations were not reported for the additional samples; no qualification is necessary.

**L1851440**

The LCS/Laboratory Control Sample Duplicate (LCSD) WG1190705-8/9 exhibited a percent recovery above the control limit for carbon tetrachloride (140%/141%), trichlorofluoromethane (161%/156%), vinyl chloride (148%/144%), dichlorodifluoromethane (177%/170%) and bromomethane (155%, LCS). The associated results for sample EP01_10.5_121318 are non-detects; no qualification is necessary.

The LCS/LCSD WG1191009-3/4 exhibited a percent recovery above the control limit for bromomethane (152%/150%). The associated result for sample EP01_9_121318 is a non-detect; no qualification is necessary.

Metals by SW-846 Methods 6010D:

**L1850028**

The method blank WG1187074-1 exhibited a detection of iron at 2.44 mg/kg and manganese at 0.080 mg/kg. The associated sample results are greater than 10X the blank concentrations; no qualification is necessary.

The matrix spike (MS) WG1187074-3 (parent sample L1850028-01) exhibited a percent recovery above the control limit for aluminum (394%), calcium (147%), iron (882%), and lead (164%). The post digestion spike was within the acceptable limits for calcium and lead and the sample concentration was greater than 4X the spike concentration for aluminum and iron. No qualification is necessary.

**L1850360**

The method blank WG1189136-1 exhibited a percent detection of thallium at 0.003 mg/l and the field blank sample EP_FB01_120718 exhibited a detection of calcium and copper at 0.037 mg/l and 0.002 mg/l, respectively. The additional samples were not analyzed for metals; no qualification is necessary.

**L1851440**

The MS/Matrix Spike Duplicate (MSD) WG1190821-3/4 exhibited a percent recovery and RPD above the control limit for aluminum (226%/0%; RPD 21%), arsenic (63%, MSD), calcium (632%/5320%; RPD 131%), chromium (74%, MSD), copper (0%, MSD; RPD 26%), iron

(1450%/0%; RPD 35%), lead (65%/9.5%; RPD 22%), magnesium (414%/3440%; RPD 141%), manganese (628%/1120%; RPD 24%), thallium (74%, MSD), and zinc (0%, MSD; RPD 24%). The associated parent samples is not a site specific sample; no qualification is necessary.

Mercury by SW-846 7471B:

**L1850028**

The MS WG1187069-3 exhibited a percent recovery above the control limit at 136%. The associated result was a non-detect; no qualification is necessary.

**COMMENTS:**

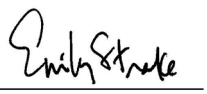
Two field duplicate and parent sample pairs were collected. For results less than 5X the RL, analytes meet the precision criteria if the absolute difference is less than ±RL. For results greater than 5X the RL, analytes meet the precision criteria if the RPD is less than or equal to 50%. The following analytes did not meet the precision criteria:

- UST17_B1_15.5-16 and UST_DUP01_120718: none.
- UST14_B1_15.5-16 and UST_DUP02_120718: none.

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 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, CEP**
Senior Project Chemist

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:** Ashley Stappenbeck, Langan Staff Engineer

**From:** Emily Strake, Langan Senior Project Chemist

**Date:** May 8, 2019

**Re:** Data Usability Summary Report
For 300 West 122nd Street
Soil Samples Collected in April 2019
Langan Project No.: 170500202

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of soil samples collected in April 2019 by Langan Engineering and Environmental Services ("Langan") at the 300 West 122nd Street site ("the site"). The samples were analyzed by Alpha Analytical Laboratories (NYSDOH NELAP registration # 11148) for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), herbicides, polychlorinated biphenyls (PCBs), pesticides, metals, mercury (Hg), cyanide (CN), hexavalent chromium (CrVI), trivalent chromium (CrIII), and total solids (%S) by the methods specified below.

- VOCs by SW-846 Method 8260C
- SVOCs by SW-846 Method 8270D
- Herbicides by SW-846 Method 8151A
- PCBs by SW-846 Method 8082A
- Pesticides by SW-846 Method 8081B
- Metals by SW-846 Method 6010D
- Mercury by SW-846 Method 7471B
- Cyanide by SW-846 Method 9012B
- Hexavalent Chromium by SW-846 Method 7196A
- Trivalent Chromium (calculated)
- Total Solids by Standard Method 2540G

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* |
|---|---|---|---|---|
| L1913648 | L1913648-01 | EP20_14_040419 | 4/4/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1913648 | L1913648-02 | EP21_14.5_040419 | 4/4/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1913801 | L1913801-01 | REUSE03_GRAB01 | 4/5/2019 | VOCs, %S |
| L1913801 | L1913801-02 | REUSE03_COMP01 | 4/5/2019 | SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1914743 | L1914743-01 | REUSE04_GRAB01 | 4/11/2019 | VOCs, %S |
| L1914743 | L1914743-02 | REUSE04_COMP01 | 4/11/2019 | SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1915326 | L1915326-01 | EP20_SE_11_0415219 | 4/15/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1915326 | L1915326-02 | EP20_S_12_0415219 | 4/15/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1915326 | L1915326-03 | EP20_NE_12_0415219 | 4/15/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1915786 | L1915786-01 | EP14_15.5_041719 | 4/17/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, %S |

**Validation Overview**

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-34A, "Trace Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-33A, "Low/Medium Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-35A, "Semivolatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-17, "Validating Chlorinated Herbicides" (December 2010, Revision 3.1), USEPA Region II SOP #HW-37A, "Polychlorinated Biphenyl (PCB) Aroclor Data Validation" (June 2015, Revision 0), USEPA Region II SOP #HW-36A, "Pesticide Data Validation" (October 2016, Revision 1), USEPA Region II SOP #HW-3a, "ICP-AES Data

Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-3c, "Mercury and Cyanide Data Validation" (September 2016, Revision 1), the USEPA Contract Laboratory Program "National Functional Guidelines for Organic Superfund Methods Data Review" (EPA-540-R-2017-002, January 2017), USEPA "National Functional Guidelines for Inorganic Superfund Methods Data Review" (EPA-540-R-2017-001, January 2017) and the specifics of the methods employed.

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, serial dilutions, and dual column performance and overall system performance.

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* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP20_14_040419 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |
| EP20_14_040419 | 8260C | 96-18-4 | 1,2,3-TRICHLOROPROPANE | UJ |
| EP20_14_040419 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP20_14_040419 | 8260C | 78-93-3 | 2-BUTANONE | UJ |
| EP20_14_040419 | 8260C | 75-25-2 | BROMOFORM | UJ |
| EP20_14_040419 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP20_14_040419 | 8260C | 108-05-4 | VINYL ACETATE | UJ |
| EP20_14_040419 | 8260C | 75-01-4 | VINYL CHLORIDE | UJ |
| EP20_14_040419 | 8270D | 51-28-5 | 2,4-DINITROPHENOL | UJ |
| EP20_14_040419 | 8270D | 88-74-4 | 2-NITROANILINE | UJ |
| EP20_14_040419 | 8270D | 88-75-5 | 2-NITROPHENOL | UJ |
| EP20_14_040419 | 8270D | 534-52-1 | 4,6-DINITRO-O-CRESOL | UJ |
| EP20_14_040419 | 8270D | 100-02-7 | 4-NITROPHENOL | UJ |
| EP20_14_040419 | 8270D | 77-47-4 | HEXACHLOROCYCLOPENTADIENE | UJ |
| EP20_14_040419 | 8151A | 93-72-1 | 2,4,5-TP (SILVEX) | UJ |
| EP21_14.5_040419 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |
| EP21_14.5_040419 | 8260C | 96-18-4 | 1,2,3-TRICHLOROPROPANE | UJ |
| EP21_14.5_040419 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP21_14.5_040419 | 8260C | 78-93-3 | 2-BUTANONE | UJ |
| EP21_14.5_040419 | 8260C | 75-25-2 | BROMOFORM | UJ |
| EP21_14.5_040419 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP21_14.5_040419 | 8260C | 108-05-4 | VINYL ACETATE | UJ |
| EP21_14.5_040419 | 8260C | 75-01-4 | VINYL CHLORIDE | UJ |
| EP21_14.5_040419 | 8270D | 51-28-5 | 2,4-DINITROPHENOL | UJ |
| EP21_14.5_040419 | 8270D | 88-74-4 | 2-NITROANILINE | UJ |
| EP21_14.5_040419 | 8270D | 88-75-5 | 2-NITROPHENOL | UJ |
| EP21_14.5_040419 | 8270D | 534-52-1 | 4,6-DINITRO-O-CRESOL | UJ |
| EP21_14.5_040419 | 8270D | 100-02-7 | 4-NITROPHENOL | UJ |
| EP21_14.5_040419 | 8270D | 77-47-4 | HEXACHLOROCYCLOPENTADIENE | UJ |
| EP21_14.5_040419 | 8151A | 93-72-1 | 2,4,5-TP (SILVEX) | UJ |
| REUSE03_GRAB01 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| REUSE03_GRAB01 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| REUSE03_GRAB01 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| REUSE03_GRAB01 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| REUSE03_GRAB01 | 8260C | 79-20-9 | METHYL ACETATE | UJ |
| REUSE03_GRAB01 | 8260C | 75-65-0 | TERT-BUTYL ALCOHOL | UJ |
| REUSE03_COMP01 | 6010D | 7439-92-1 | LEAD, TOTAL | J |
| REUSE03_COMP01 | 6010D | 7439-95-4 | MAGNESIUM, TOTAL | J |
| REUSE03_COMP01 | 8270D | 121-14-2 | 2,4-DINITROTOLUENE | UJ |
| REUSE03_COMP01 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |
| REUSE04_GRAB01 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| REUSE04_GRAB01 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| REUSE04_GRAB01 | 8260C | 75-15-0 | CARBON DISULFIDE | UJ |
| REUSE04_GRAB01 | 8260C | 74-87-3 | CHLOROMETHANE | UJ |
| REUSE04_GRAB01 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| REUSE04_GRAB01 | 8260C | 108-87-2 | METHYL CYCLOHEXANE | UJ |
| REUSE04_GRAB01 | 8260C | 75-09-2 | METHYLENE CHLORIDE | UJ |
| REUSE04_GRAB01 | 8260C | 75-65-0 | TERT-BUTYL ALCOHOL | J |
| REUSE04_GRAB01 | 8260C | 105-05-5 | 1,4-DIETHYLBENZENE | UJ |
| REUSE04_COMP01 | 8270D | 100-02-7 | 4-NITROPHENOL | UJ |
| REUSE04_COMP01 | 8270D | 50-32-8 | BENZO(A)PYRENE | UJ |
| REUSE04_COMP01 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |
| EP20_SE_11_0415219 | 8270D | 100-02-7 | 4-NITROPHENOL | UJ |
| EP20_SE_11_0415219 | 8260C | 75-34-3 | 1,1-DICHLOROETHANE | UJ |
| EP20_SE_11_0415219 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP20_SE_11_0415219 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| EP20_SE_11_0415219 | 8260C | 67-64-1 | ACETONE | UJ |
| EP20_SE_11_0415219 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP20_SE_11_0415219 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| EP20_SE_11_0415219 | 6010D | 7440-38-2 | ARSENIC, TOTAL | U (0.828) |
| EP20_SE_11_0415219 | 6010D | 7440-70-2 | CALCIUM, TOTAL | J |
| EP20_SE_11_0415219 | 6010D | 7439-89-6 | IRON, TOTAL | J |
| EP20_SE_11_0415219 | 6010D | 7439-95-4 | MAGNESIUM, TOTAL | J |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP20_SE_11_0415219 | 6010D | 7440-23-5 | SODIUM, TOTAL | U (166) |
| EP20_SE_11_0415219 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |
| EP20_S_12_0415219 | 8260C | 75-34-3 | 1,1-DICHLOROETHANE | UJ |
| EP20_S_12_0415219 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP20_S_12_0415219 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| EP20_S_12_0415219 | 8260C | 67-64-1 | ACETONE | J |
| EP20_S_12_0415219 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP20_S_12_0415219 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| EP20_S_12_0415219 | 8270D | 100-02-7 | 4-NITROPHENOL | UJ |
| EP20_S_12_0415219 | 6010D | 7440-38-2 | ARSENIC, TOTAL | U (0.86) |
| EP20_S_12_0415219 | 6010D | 7440-70-2 | CALCIUM, TOTAL | J |
| EP20_S_12_0415219 | 6010D | 7439-89-6 | IRON, TOTAL | J |
| EP20_S_12_0415219 | 6010D | 7439-95-4 | MAGNESIUM, TOTAL | J |
| EP20_S_12_0415219 | 6010D | 7440-23-5 | SODIUM, TOTAL | U (161) |
| EP20_S_12_0415219 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |
| EP20_NE_12_0415219 | 8260C | 75-34-3 | 1,1-DICHLOROETHANE | UJ |
| EP20_NE_12_0415219 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP20_NE_12_0415219 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| EP20_NE_12_0415219 | 8260C | 67-64-1 | ACETONE | UJ |
| EP20_NE_12_0415219 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP20_NE_12_0415219 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| EP20_NE_12_0415219 | 8270D | 100-02-7 | 4-NITROPHENOL | UJ |
| EP20_NE_12_0415219 | 6010D | 7440-38-2 | ARSENIC, TOTAL | U (0.803) |
| EP20_NE_12_0415219 | 6010D | 7440-70-2 | CALCIUM, TOTAL | J |
| EP20_NE_12_0415219 | 6010D | 7439-89-6 | IRON, TOTAL | J |
| EP20_NE_12_0415219 | 6010D | 7439-95-4 | MAGNESIUM, TOTAL | J |
| EP20_NE_12_0415219 | 6010D | 7440-23-5 | SODIUM, TOTAL | U (161) |
| EP20_NE_12_0415219 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |
| EP14_15.5_041719 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |
| EP14_15.5_041719 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP14_15.5_041719 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP14_15.5_041719 | 8260C | 75-15-0 | CARBON DISULFIDE | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP14_15.5_041719 | 8260C | 105-05-5 | 1,4-DIETHYLBENZENE | UJ |
| EP14_15.5_041719 | 8270D | 100-02-7 | 4-NITROPHENOL | UJ |
| EP14_15.5_041719 | 8082A | 11096-82-5 | AROCLOR 1260 | J |
| EP14_15.5_041719 | 8081B | 72-55-9 | 4,4'-DDE | J |
| EP14_15.5_041719 | 8081B | 1024-57-3 | HEPTACHLOR EPOXIDE | J |
| EP14_15.5_041719 | 8081B | 5103-71-9 | CIS-CHLORDANE | J |

**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:**

L1913648:

The initial calibration (ICAL) for instrument VOA104 exhibited a response factor (RF) below the control limit for 1,4-dioxane (0.002). The associated results in samples EP20_14_040419 and EP21_14.5_040419 are qualified as "UJ" based on potential indeterminate bias.

The initial calibration verification (ICV) analyzed on 4/3/2019 at 20:14 exhibited percent differences (%Ds) above the control limit for vinyl chloride (-22.2%), bromomethane (-79.9%), vinyl acetate (-26.6%), and bromoform (-20.2%), and 1,2,3-trichloropropane (-20.1%). The associated results in samples EP20_14_040419 and EP21_14.5_040419 are qualified as "UJ" based on potential indeterminate bias.

The continuing calibration verification (CCV) analyzed on 4/9/2019 at 9:11 exhibited a RF below the control limit for 2-butanone (0.093). The associated results in samples EP20_14_040419 and EP21_14.5_040419 are qualified as "UJ" based on potential indeterminate bias.

L1913801:

The ICAL for instrument VOA100 exhibited RFs below the control limit for methyl acetate (0.086), tert-butyl alcohol (0.015), and 1,4-dioxane (0.002), and 4-methyl-2-pentanone (0.075). The

associated results in sample REUSE03_GRAB01 are qualified as "UJ" based on potential indeterminate bias.

The ICV analyzed on 3/15/2019 at 13:00 exhibited %Ds above the control limit for dichlorodifluoromethane (-21.5%) and bromomethane (-29.2%). The associated results in sample REUSE03_GRAB01 are qualified as "UJ" based on potential indeterminate bias.

L1914743:

The ICAL for instrument VOA123 exhibited RFs below the control limit for 1,4-dioxane (0.003) and tert-butyl alcohol (0.049). The associated results in sample REUSE04_GRAB01 are qualified as "J" or "UJ" based on potential indeterminate bias.

The ICV analyzed on 3/19/2019 at 3:11 exhibited %Ds above the control limit for bromomethane (-26%), and carbon disulfide (21.7%), and p-diethylbenzene (20.5%). The associated results in sample REUSE04_GRAB01 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 4/14/2019 at 14:58 exhibited %Ds above the control limit for dichlorodifluoromethane (30.8%), chloromethane (22.8%), and methylene chloride (21.9%), and methyl cyclohexane (21.3%). The associated results in sample REUSE04_GRAB01 are qualified as "UJ" based on potential indeterminate bias.

L1915326:

The ICAL for instrument VOA100 exhibited RFs below the control limit for 1,4-dioxane (0.002) and 4-methyl-2-pentanone (0.075). The associated results in samples EP20_S_12_0415219, EP20_NE_12_0415219, and EP20_SE_11_0415219 are qualified as "UJ" based on potential indeterminate bias.

The ICV analyzed on 3/15/2019 at 13:00 exhibited %Ds above the control limit for dichlorodifluoromethane (-21.5%) and bromomethane (-29.2%). The associated results in samples EP20_S_12_0415219, EP20_NE_12_0415219, and EP20_SE_11_0415219 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 4/16/2019 at 6:49 exhibited %Ds above the control limit for acetone (-29.7%) and 1,1-dichloroethane (-22%). The associated results in samples EP20_S_12_0415219, EP20_NE_12_0415219, and EP20_SE_11_0415219 are qualified as "J" or "UJ" based on potential indeterminate bias.

L1915786:

The ICAL for instrument VOA123 exhibited a RF below the control limit for 1,4-dioxane (0.003). The associated results in sample EP14_15.5_041719 are qualified as "UJ" based on potential indeterminate bias.

The ICV analyzed on 3/19/2019 at 3:11 exhibited %Ds above the control limit for bromomethane (-26%), and carbon disulfide (21.7%), and p-diethylbenzene (20.5%). The associated results in sample EP14_15.5_041719 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 4/22/2019 at 19:12 exhibited %Ds above the control limit for chloroethane (-29.6%), trichlorofluoromethane (-40.7%), 2,2-dichloropropane (-30.4%), chloroform (-21.8%), carbon tetrachloride (-33.4%), and 1,1,1-trichloroethane (-27.3%), and 1,2-dichloroethane (-20.9%). The associated results in sample EP14_15.5_041719 are qualified as "UJ" based on potential indeterminate bias.

**SVOCs by SW-846 Method 8270D:**

L1913648:

The CCV analyzed on 4/10/2019 at 20:27 exhibited %Ds above the control limit for 2-nitrophenol (-34.7%), hexachlorocyclopentadiene (20.2%), 2-nitroaniline (-22.1%), 2,4-dinitrophenol (-33.7%), and 4-nitrophenol (-30.8%), and 4,6-dinitro-o-cresol (-34.6%). The associated results in samples EP20_14_040419 and EP21_14.5_040419 are qualified as "UJ" based on potential indeterminate bias.

L1913801:

The CCV analyzed on 4/6/2019 at 22:09 exhibited a %D above the control limit for 2,4-dinitrotoluene (-22.8%). The associated results in sample REUSE03_COMP01 are qualified as "UJ" based on potential indeterminate bias.

L1914743:

The CCV analyzed on 4/14/2019 at 10:14 exhibited %Ds above the control limit for 4-nitrophenol (-33.8%) and benzo(a)pyrene (-22.8%). The associated results in sample REUSE04_COMP01 are qualified as "UJ" based on potential indeterminate bias.

L1915326:

The CCV analyzed on 4/16/2019 at 0:23 exhibited a %D above the control limit for 4-nitrophenol (-31.1%). The associated results in samples EP20_S_12_0415219, EP20_NE_12_0415219, and EP20_SE_11_0415219 are qualified as "UJ" based on potential indeterminate bias.

L1915786:

The CCV analyzed on 4/24/2019 at 1:13 exhibited a %D above the control limit for 4-nitrophenol (-32.3%). The associated results in sample EP14_15.5_041719 are qualified as "UJ" based on potential indeterminate bias.

**Herbicides by SW-846 Method 8151A:**

L1913648:

The CCV analyzed on 4/11/2019 at 11:11 exhibited a %D above the control limit for 2,4,5-TP (-15.8%). The associated results in samples EP20_14_040419 and EP21_14.5_040419 are qualified as "UJ" based on potential indeterminate bias.

**PCBs by SW-846 Method 8082A:**

L1915786:

The sample EP14_15.5_041719 exhibited a exhibited a relative percent difference (RPD) above the control limit between the primary and secondary chromatography columns for PCB 1260. The associated results are qualified as "J" based on potential indeterminate bias.

**Pesticides by SW-846 Method 8081B:**

L1915786:

The sample EP14_15.5_041719 exhibited a exhibited RPDs above the control limit between the primary and secondary chromatography columns for 4,4'-DDE, and heptachlor epoxide, and cis-chlordane. The associated results are qualified as "J" based on potential indeterminate bias.

**Metals by SW-846 Method 6010D:**

L1913801:

The matrix spike (MS) for batch WG1223761 exhibited a percent recovery below the lower control limit (LCL) for total lead (30%). The associated results in sample REUSE03_COMP01 are qualified as "J" based on potential low bias.

The laboratory duplicate and parent sample (REUSE03_COMP01) exhibited a RPD above the control limit for total magnesium (29%). The associated results are qualified as "J" based on potential indeterminate bias.

L1915326:

The method blank (MB) for batch WG1226719 exhibited detections of total arsenic (0.1 mg/kg) and total sodium (15.9 mg/kg). The associated results in samples EP20_S_12_0415219, EP20_NE_12_0415219, and EP20_SE_11_0415219 are qualified as "U" at the higher of the sample concentration and the reporting limit based on potential blank contamination.

The CCV analyzed on 04/16/19 10:46 exhibited percent recoveries above the control limit for total calcium (111%), total iron (113%), and total magnesium (111%). The associated results in samples EP20_S_12_0415219, EP20_NE_12_0415219, and EP20_SE_11_0415219 are qualified as "J" based on potential high bias.

**Cyanide by SW-846 Method 9012B:**

L1913648:

The laboratory control sample duplicate (LCSD) for batch WG1223991 exhibited a percent recovery below the LCL for total cyanide (77%). The associated results in samples EP20_14_040419 and EP21_14.5_040419 are qualified as "UJ" based on potential low bias.

L1913801:

The LCSD for batch WG1223991 exhibited a percent recovery below the LCL for total cyanide (77%). The associated results in sample REUSE03_COMP01 are qualified as "UJ" based on potential low bias.

L1914743:

The laboratory control sample (LCS) and duplicate for batch WG1225893 exhibited percent recoveries below the LCL for total cyanide (54%, 56%). The associated results in sample REUSE04_COMP01 are qualified as "UJ" based on potential low bias.

L1915326:

The LCS/LCSD for batch WG1226706 exhibited percent recoveries below the LCL for total cyanide (70%, 63%). The associated results in samples EP20_S_12_0415219, EP20_NE_12_0415219, and EP20_SE_11_0415219 are qualified as "UJ" based on potential low bias.

L1915786:

The LCS/LCSD for batch WG1228242 exhibited percent recoveries below the LCL for total cyanide (67%, 69%). The associated results in sample EP14_15.5_041719 are qualified as "UJ" based on potential low bias.

**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.

**VOCs by SW-846 Method 8260C:**

L1913648:

The LCS/LCSD for batch WG1224758 exhibited percent recoveries above the upper control limit (UCL) for bromomethane (163%, 159%). The associated results are non-detections. No qualification is necessary.

L1913801:

The MB for batch WG1224216 exhibited detections of bromomethane (1.4 ug/kg) and methyl tert-butyl ether (0.24 ug/kg). The associated results are non-detections. No qualification is necessary.

L1914743:

The MB for batch WG1225834 exhibited a detection of bromomethane (2 ug/kg). The associated results are non-detections. No qualification is necessary.

L1915326:

The MB for batch WG1226794 exhibited a detection of bromomethane (1.5 ug/kg). The associated results are non-detections. No qualification is necessary.

L1915786:

The MB for batch WG1229201 exhibited a detection of bromomethane (1.6 ug/kg). The associated results are non-detections. No qualification is necessary.

The LCS/LCSD for batch WG1229201 exhibited percent recoveries above the UCL for bromomethane (198%, 164%), and carbon tetrachloride (133%), and trichlorofluoromethane (141%). The associated results are non-detections. No qualification is necessary.

The sample EP14_15.5_041719 exhibited a percent recovery above the UCL for the surrogate 1,2-dichloroethane-d4 (135%). The other three volatile surrogates were recovered within the control limits. No qualification is necessary.

**SVOCs by SW-846 Method 8270D:**

L1913648:

The LCS/LCSD for batch WG1224806 exhibited percent recoveries above the UCL for 4,6-dinitro-o-cresol (133%, 133%) and 4-nitrophenol (129%, 125%). The associated results are non-detections. No qualification is necessary.

L1915786:

The LCSD for batch WG1229114 exhibited a percent recovery above the UCL for 4-nitrophenol (131%). The associated results are non-detections. No qualification is necessary.

**Metals by SW-846 Method 6010D:**

L1913648:

The MB for batch WG1223678 exhibited detections of total iron (1.31 mg/kg), total manganese (0.156 mg/kg), and total sodium (3.59 mg/kg). The associated results are >10X the contamination. No qualification is necessary.

L1913801:

The MB for batch WG1223761 exhibited a detection of total iron (0.544 mg/kg). The associated results are >10X the contamination. No qualification is necessary.

The matrix spike and duplicate (MS/MSD) for batch WG1223761 exhibited a percent recovery above the UCL for total aluminum (155%). The associated results in the parent sample are >4X the spiked amount. No qualification is necessary.

The MS/MSD for batch WG1223761 exhibited percent recoveries below the LCL for total iron (0%) and total manganese (0%). The associated results in the parent sample are >4X the spiked amount. No qualification is necessary.

The laboratory duplicate and parent sample (REUSE03_COMP01) exhibited a RPD above the control limit for total lead (58%). The associated results were previously qualified. No further action is necessary.

L1914743:

The MB for batch WG1226074 exhibited detections of total aluminum (1.12 mg/kg), total calcium (6.12 mg/kg), total chromium (0.112 mg/kg), total cobalt (0.088 mg/kg), total iron (2.55 mg/kg), total manganese (0.08 mg/kg), total nickel (0.46 mg/kg), and total sodium (2.58 mg/kg). The associated results are >10X the contamination. No qualification is necessary.

L1915326:

The MB for batch WG1226719 exhibited detections of total chromium (0.052 mg/kg) and total potassium (5.77 mg/kg). The associated results are >10X the contamination. No qualification is necessary.

L1915786:

The MB for batch WG1228321 exhibited a detection of total sodium (3.68 mg/kg). The associated results are >10X the contamination. No qualification is necessary.

**COMMENTS:**

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 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, CEP
Senior Project Chemist

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:** Ashley Stappenbeck, Langan Staff Engineer

**From:** Emily Strake, Langan Senior Project Chemist

**Date:** June 3, 2019

**Re:** Data Usability Summary Report
For 300 West 122nd Street
April and May 2019 Soil Samples
Langan Project No.: 170500201

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of soil samples collected in April and May 2019 by Langan Engineering and Environmental Services ("Langan") at the 300 West 122nd Street site ("the site"). The samples were analyzed by Alpha Analytical Laboratories, Inc. (NYSDOH NELAP registration # 11148) for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), herbicides, polychlorinated biphenyls (PCBs), pesticides, metals including mercury (Hg), cyanide (CN), hexavalent chromium (CrVI), trivalent chromium (CrIII), and total solids (%S) by the methods specified below.

- VOCs by SW-846 Method 8260C
- SVOCs by SW-846 Method 8270D
- Herbicides by SW-846 Method 8151A
- PCBs by SW-846 Method 8082A
- Pesticides by SW-846 Method 8081B
- Metals by SW-846 Method 6010D
- Mercury by SW-846 Method 7471B
- Cyanide by SW-846 Method 9012B
- Hexavalent Chromium by SW-846 Method 7196A
- Trivalent Chromium (calculated)
- Total Solids by Standard Method 2540G

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* |
|---|---|---|---|---|
| L1917598 | L1917598-01 | EP14_E_14.5_042919 | 4/29/2019 | VOCs, SVOCs, PCBs, Pesticides, Herbicides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1917598 | L1917598-02 | EP22_15_042919 | 4/29/2019 | VOCs, SVOCs, PCBs, Pesticides, Herbicides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1917598 | L1917598-03 | EP14_S_10_042919 | 4/29/2019 | VOCs, SVOCs, PCBs, Pesticides, Herbicides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1917598 | L1917598-04 | EP14_S_14.5_042919 | 4/29/2019 | VOCs, SVOCs, PCBs, Pesticides, Herbicides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1917794 | L1917794-01 | EP19_12.5_043019 | 4/30/2019 | VOCs, SVOCs, PCBs, Pesticides, Herbicides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1918070 | L1918070-01 | EP14_E_11.5_050119 | 5/1/2019 | VOCs, SVOCs, PCBs, Pesticides, Herbicides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1918070 | L1918070-02 | EP14_10.5_050119 | 5/1/2019 | VOCs, SVOCs, PCBs, Pesticides, Herbicides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1918070 | L1918070-03 | EP14_N_11.5_050119 | 5/1/2019 | VOCs, SVOCs, PCBs, Pesticides, Herbicides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1921393 | L1921393-01 | EP02_14.5_052119 | 5/21/2019 | VOCs, SVOCs, PCBs, Pesticides, Herbicides, Metals, Hg, CN, CrVI, CrIII, %S |

**Validation Overview**

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-34A, "Trace Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-33A, "Low/Medium Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-35A, "Semivolatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-17, "Validating Chlorinated Herbicides" (December 2010, Revision 3.1), USEPA Region II SOP #HW-37A, "Polychlorinated Biphenyl (PCB) Aroclor Data Validation" (June 2015, Revision 0), USEPA Region II SOP #HW-36A, "Pesticide Data Validation" (October 2016, Revision 1), USEPA Region II SOP #HW-3a, "ICP-AES Data

Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-3c, "Mercury and Cyanide Data Validation" (September 2016, Revision 1), the USEPA Contract Laboratory Program "National Functional Guidelines for Organic Superfund Methods Data Review" (EPA-540-R-2017-002, January 2017), USEPA "National Functional Guidelines for Inorganic Superfund Methods Data Review" (EPA-540-R-2017-001, January 2017) and the specifics of the methods employed.

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, serial dilutions, dual column performance, and overall system performance,

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* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP14_E_14.5_042919 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP14_E_14.5_042919 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| EP14_E_14.5_042919 | 8081B | 319-84-6 | ALPHA-BHC | UJ |
| EP14_E_14.5_042919 | 8082A | 12672-29-6 | AROCLOR 1248 | UJ |
| EP14_E_14.5_042919 | 8082A | 11097-69-1 | AROCLOR 1254 | J |
| EP14_E_14.5_042919 | 8082A | 11096-82-5 | AROCLOR 1260 | UJ |
| EP14_E_14.5_042919 | 8082A | 37324-23-5 | AROCLOR 1262 | UJ |
| EP14_E_14.5_042919 | 8082A | 11100-14-4 | AROCLOR 1268 | UJ |
| EP14_E_14.5_042919 | 8270D | 65-85-0 | BENZOIC ACID | UJ |
| EP14_E_14.5_042919 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP14_E_14.5_042919 | 6010D | 7440-70-2 | CALCIUM, TOTAL | J |
| EP14_E_14.5_042919 | 8081B | 57-74-9 | CHLORDANE | UJ |
| EP14_E_14.5_042919 | 8260C | 74-87-3 | CHLOROMETHANE | UJ |
| EP14_E_14.5_042919 | 8081B | 5103-71-9 | CIS-CHLORDANE | J |
| EP14_E_14.5_042919 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| EP14_E_14.5_042919 | 8260C | 79-01-6 | TRICHLOROETHENE | UJ |
| EP22_15_042919 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP22_15_042919 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| EP22_15_042919 | 8081B | 319-84-6 | ALPHA-BHC | UJ |
| EP22_15_042919 | 8082A | 12672-29-6 | AROCLOR 1248 | UJ |
| EP22_15_042919 | 8082A | 11097-69-1 | AROCLOR 1254 | J |
| EP22_15_042919 | 8082A | 11096-82-5 | AROCLOR 1260 | UJ |
| EP22_15_042919 | 8082A | 37324-23-5 | AROCLOR 1262 | UJ |
| EP22_15_042919 | 8082A | 11100-14-4 | AROCLOR 1268 | UJ |
| EP22_15_042919 | 8270D | 65-85-0 | BENZOIC ACID | UJ |
| EP22_15_042919 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP22_15_042919 | 8081B | 57-74-9 | CHLORDANE | UJ |
| EP22_15_042919 | 8260C | 74-87-3 | CHLOROMETHANE | UJ |
| EP22_15_042919 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| EP22_15_042919 | 8260C | 79-01-6 | TRICHLOROETHENE | UJ |
| EP14_S_10_042919 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP14_S_10_042919 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| EP14_S_10_042919 | 8081B | 319-84-6 | ALPHA-BHC | UJ |
| EP14_S_10_042919 | 8082A | 12672-29-6 | AROCLOR 1248 | UJ |
| EP14_S_10_042919 | 8082A | 11097-69-1 | AROCLOR 1254 | UJ |
| EP14_S_10_042919 | 8082A | 11096-82-5 | AROCLOR 1260 | UJ |
| EP14_S_10_042919 | 8082A | 37324-23-5 | AROCLOR 1262 | UJ |
| EP14_S_10_042919 | 8082A | 11100-14-4 | AROCLOR 1268 | UJ |
| EP14_S_10_042919 | 8270D | 65-85-0 | BENZOIC ACID | UJ |
| EP14_S_10_042919 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP14_S_10_042919 | 8081B | 57-74-9 | CHLORDANE | UJ |
| EP14_S_10_042919 | 8260C | 74-87-3 | CHLOROMETHANE | UJ |
| EP14_S_10_042919 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| EP14_S_10_042919 | 8260C | 79-01-6 | TRICHLOROETHENE | UJ |
| EP19_12.5_043019 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP19_12.5_043019 | 8270D | 88-75-5 | 2-NITROPHENOL | UJ |
| EP19_12.5_043019 | 8270D | 91-94-1 | 3,3'-DICHLOROBENZIDINE | UJ |
| EP19_12.5_043019 | 8260C | 67-64-1 | ACETONE | UJ |
| EP19_12.5_043019 | 8270D | 108-60-1 | BIS(2-CHLOROISOPROPYL)ETHER | UJ |
| EP19_12.5_043019 | 8270D | 117-81-7 | BIS(2-ETHYLHEXYL)PHTHALATE | UJ |
| EP19_12.5_043019 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP19_12.5_043019 | 8260C | 74-87-3 | CHLOROMETHANE | UJ |
| EP19_12.5_043019 | 9012B | 57-12-5 | CYANIDE, TOTAL | J |
| EP19_12.5_043019 | 8270D | 77-47-4 | HEXACHLOROCYCLOPENTADIENE | UJ |
| EP19_12.5_043019 | 8270D | 87-86-5 | PENTACHLOROPHENOL | UJ |
| EP14_10.5_050119 | 8260C | 95-93-2 | 1,2,4,5-TETRAMETHYLBENZENE | UJ |
| EP14_10.5_050119 | 8260C | 96-12-8 | 1,2-DIBROMO-3-CHLOROPROPANE | UJ |
| EP14_10.5_050119 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP14_10.5_050119 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP14_10.5_050119 | 8260C | 75-00-3 | CHLOROETHANE | UJ |
| EP14_10.5_050119 | 8260C | 74-87-3 | CHLOROMETHANE | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP14_10.5_050119 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |
| EP14_10.5_050119 | 8270D | 131-11-3 | DIMETHYL PHTHALATE | U (170) |
| EP14_10.5_050119 | 8260C | 87-68-3 | HEXACHLOROBUTADIENE | UJ |
| EP14_10.5_050119 | 8260C | 91-20-3 | NAPHTHALENE | UJ |
| EP14_10.5_050119 | 8270D | 87-86-5 | PENTACHLOROPHENOL | UJ |
| EP14_10.5_050119 | 6010D | 7440-23-5 | SODIUM, TOTAL | U (163) |
| EP14_10.5_050119 | 8260C | 98-06-6 | TERT-BUTYLBENZENE | UJ |
| EP14_E_11.5_050119 | 8260C | 95-93-2 | 1,2,4,5-TETRAMETHYLBENZENE | UJ |
| EP14_E_11.5_050119 | 8260C | 96-12-8 | 1,2-DIBROMO-3-CHLOROPROPANE | UJ |
| EP14_E_11.5_050119 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP14_E_11.5_050119 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP14_E_11.5_050119 | 8260C | 75-00-3 | CHLOROETHANE | UJ |
| EP14_E_11.5_050119 | 8260C | 74-87-3 | CHLOROMETHANE | UJ |
| EP14_E_11.5_050119 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |
| EP14_E_11.5_050119 | 8270D | 131-11-3 | DIMETHYL PHTHALATE | U (170) |
| EP14_E_11.5_050119 | 8260C | 87-68-3 | HEXACHLOROBUTADIENE | UJ |
| EP14_E_11.5_050119 | 8260C | 91-20-3 | NAPHTHALENE | UJ |
| EP14_E_11.5_050119 | 8270D | 87-86-5 | PENTACHLOROPHENOL | UJ |
| EP14_E_11.5_050119 | 6010D | 7440-23-5 | SODIUM, TOTAL | U (158) |
| EP14_E_11.5_050119 | 8260C | 98-06-6 | TERT-BUTYLBENZENE | UJ |
| EP14_N_11.5_050119 | 8260C | 95-93-2 | 1,2,4,5-TETRAMETHYLBENZENE | UJ |
| EP14_N_11.5_050119 | 8260C | 96-12-8 | 1,2-DIBROMO-3-CHLOROPROPANE | UJ |
| EP14_N_11.5_050119 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP14_N_11.5_050119 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP14_N_11.5_050119 | 8260C | 75-00-3 | CHLOROETHANE | UJ |
| EP14_N_11.5_050119 | 8260C | 74-87-3 | CHLOROMETHANE | UJ |
| EP14_N_11.5_050119 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |
| EP14_N_11.5_050119 | 8270D | 131-11-3 | DIMETHYL PHTHALATE | U (170) |
| EP14_N_11.5_050119 | 8260C | 87-68-3 | HEXACHLOROBUTADIENE | UJ |
| EP14_N_11.5_050119 | 8260C | 91-20-3 | NAPHTHALENE | UJ |
| EP14_N_11.5_050119 | 8270D | 87-86-5 | PENTACHLOROPHENOL | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP14_N_11.5_050119 | 8260C | 98-06-6 | TERT-BUTYLBENZENE | UJ |
| EP02_14.5_052119 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP02_14.5_052119 | 8270D | 51-28-5 | 2,4-DINITROPHENOL | UJ |
| EP02_14.5_052119 | 8270D | 121-14-2 | 2,4-DINITROTOLUENE | UJ |
| EP02_14.5_052119 | 8260C | 78-93-3 | 2-BUTANONE | UJ |
| EP02_14.5_052119 | 8270D | 88-75-5 | 2-NITROPHENOL | UJ |
| EP02_14.5_052119 | 8270D | 91-94-1 | 3,3'-DICHLOROBENZIDINE | UJ |
| EP02_14.5_052119 | 8270D | 534-52-1 | 4,6-DINITRO-O-CRESOL | UJ |
| EP02_14.5_052119 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| EP02_14.5_052119 | 8270D | 100-02-7 | 4-NITROPHENOL | UJ |
| EP02_14.5_052119 | 8260C | 67-64-1 | ACETONE | J |
| EP02_14.5_052119 | 6010D | 7429-90-5 | ALUMINUM, TOTAL | J |
| EP02_14.5_052119 | 6010D | 7440-36-0 | ANTIMONY, TOTAL | U (4.17) |
| EP02_14.5_052119 | 8260C | 75-15-0 | CARBON DISULFIDE | UJ |
| EP02_14.5_052119 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |
| EP02_14.5_052119 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| EP02_14.5_052119 | 6010D | 7439-89-6 | IRON, TOTAL | J |
| EP02_14.5_052119 | 8081B | 72-43-5 | METHOXYCHLOR | UJ |
| EP02_14.5_052119 | 8260C | 1634-04-4 | METHYL TERT BUTYL ETHER | U (2.5) |
| EP02_14.5_052119 | 8260C | 79-01-6 | TRICHLOROETHENE | 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:**

L1917598:

The initial calibration (ICAL) for instrument VOA100 exhibited response factors (RFs) below the control limit for 1,4-dioxane (0.002) and 4-methyl-2-pentanone (0.075). The associated results in samples EP14_E_14.5_042919, EP22_15_042919, and EP14_S_10_042919 are qualified as "UJ" based on potential indeterminate bias.

The initial calibration verification (ICV) analyzed on 3/15/2019 at 13:00 exhibited percent differences (%Ds) above the control limit for dichlorodifluoromethane (-21.5%) and bromomethane (-29.2%). The associated results in samples EP14_E_14.5_042919, EP22_15_042919, and EP14_S_10_042919 are qualified as "UJ" based on potential indeterminate bias.

The continuing calibration verification (CCV) analyzed on 4/30/2019 at 7:44 exhibited a %D above the control limit for chloromethane (22.4%). The associated results in samples EP14_E_14.5_042919, EP22_15_042919, and EP14_S_10_042919 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 4/30/2019 at 7:44 exhibited a RF below the control limit for trichloroethene (0.193). The associated results in samples EP14_E_14.5_042919, EP22_15_042919, and EP14_S_10_042919 are qualified as "UJ" based on potential indeterminate bias.

L1917794:

The ICAL for instrument VOA110 exhibited a RF below the control limit for 1,4-dioxane (0.005). The associated results in sample EP19_12.5_043019 are qualified as "UJ" based on potential indeterminate bias.

The ICV analyzed on 3/27/2019 at 4:29 exhibited %Ds above the control limit for chloromethane (-20.1%) and bromomethane (-25.7%). The associated results in sample EP19_12.5_043019 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 5/4/2019 at 6:47 exhibited a %D above the control limit for acetone (-26.6%). The associated results in sample EP19_12.5_043019 are qualified as "UJ" based on potential indeterminate bias.

L1918070:

The ICAL for instrument VOA110 exhibited a RF below the control limit for 1,4-dioxane (0.005). The associated results in samples EP14_E_11.5_050119, EP14_10.5_050119, and EP14_N_11.5_050119 are qualified as "UJ" based on potential indeterminate bias.

The ICV analyzed on 3/27/2019 at 4:29 exhibited %Ds above the control limit for chloromethane (-20.1%) and bromomethane (-25.7%). The associated results in samples EP14_E_11.5_050119, EP14_10.5_050119, and EP14_N_11.5_050119 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 5/2/2019 at 6:59 exhibited %Ds above the control limit for chloroethane (27%), tert-butylbenzene (20%), 1,2,4,5-tetramethylbenzene (21.2%), 1,2-dibromo-3-chloropropane (21.1%), hexachlorobutadiene (20.4%), and naphthalene (23.2%). The associated results in samples EP14_E_11.5_050119, EP14_10.5_050119, and EP14_N_11.5_050119 are qualified as "UJ" based on potential indeterminate bias.

L1921393:

The method blank (MB) for batch WG1241674 exhibited a detection of methyl tert butyl ether (0.22 ug/kg). The associated results in sample EP02_14.5_052119 are qualified as "U" at the reporting limit based on potential blank contamination.

The ICAL for instrument VOA111 exhibited RFs below the control limit for 2-butanone (0.065), 1,4-dioxane (0.002), and 4-methyl-2-pentanone (0.078). The associated results in sample EP02_14.5_052119 are qualified as "UJ" based on potential indeterminate bias.

The ICV analyzed on 5/3/2019 at 15:26 exhibited %Ds above the control limit for dichlorodifluoromethane (20.4%) and carbon disulfide (23.6%). The associated results in sample EP02_14.5_052119 are qualified as "UJ" based on potential indeterminate bias.

The ICV analyzed on 5/3/2019 at 15:26 exhibited a RF below the control limit for trichloroethene (0.197). The associated results in sample EP02_14.5_052119 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 5/25/2019 at 7:03 exhibited a %D above the control limit for acetone (-27.7%). The associated results in sample EP02_14.5_052119 are qualified as "J" based on potential indeterminate bias.

**SVOCs by SW-846 Method 8270D:**

L1917598:

The lab control sample and duplicate (LCS/LCSD) for batch WG1231750 exhibited a percent recovery below the lower control limit (LCL) for benzoic acid (0%). The associated results in samples EP14_E_14.5_042919, EP22_15_042919, and EP14_S_10_042919 are qualified as "UJ" based on potential low bias.

L1917794:

The CCV analyzed on 5/7/2019 at 10:17 exhibited %Ds above the control limit for bis(2-chloroisopropyl) ether (-22.1%), 2-nitrophenol (-23.4%), hexachlorocyclopentadiene (26.3%), pentachlorophenol (24.4%), 3,3'-dichlorobenzidine (-20.7%), and bis(2-ethylhexyl)phthalate (-26.3%). The associated results in sample EP19_12.5_043019 are qualified as "UJ" based on potential indeterminate bias.

L1918070:

The MB for batch WG1232213 exhibited a detection of dimethyl phthalate (93 ug/kg). The associated results in samples EP14_E_11.5_050119, EP14_10.5_050119, and EP14_N_11.5_050119 are qualified as "U" at the reporting limit based on potential blank contamination.

The CCV analyzed on 5/2/2019 at 14:09 exhibited a %D above the control limit for pentachlorophenol (23.2%). The associated results in samples EP14_E_11.5_050119, EP14_10.5_050119, and EP14_N_11.5_050119 are qualified as "UJ" based on potential indeterminate bias.

L1921393:

The CCV analyzed on 5/29/2019 at 12:05 exhibited %Ds above the control limit for 2-nitrophenol (-23%), 2,4-dinitrophenol (-58.9%), 2,4-dinitrotoluene (-21.9%), 4-nitrophenol (-22.4%), 4,6-dinitro-o-cresol (-46.7%), and 3,3'-dichlorobenzidine (-21.4%). The associated results in sample EP02_14.5_052119 are qualified as "UJ" based on potential indeterminate bias.

**PCBs by SW-846 Method 8082A:**

L1917598:

The CCV analyzed on 4/30/2019 at 8:51 exhibited a %D above the control limit for PCB-1260 (20.3%). The associated results in samples EP14_E_14.5_042919, EP22_15_042919, and

EP14_S_10_042919 from the primary gas chromatography (GC) column are qualified as "J" or "UJ" based on potential indeterminate bias.

**Pesticides by SW-846 Method 8081B:**

L1917598:

The CCV analyzed on 4/30/2019 at 9:08 exhibited a %D above the control limit for chlordane (-20.2%). The associated results in samples EP14_E_14.5_042919, EP22_15_042919, and EP14_S_10_042919 from the primary GC column are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 4/30/2019 at 9:44 exhibited a %D above the control limit for alpha-BHC (-21.7%). The associated results in samples EP14_E_14.5_042919, EP22_15_042919, and EP14_S_10_042919 from the primary GC column are qualified as "UJ" based on potential indeterminate bias.

The sample EP14_E_14.5_042919 exhibited a relative percent difference (RPD) above the control limit between the primary and secondary GC columns for cis-chlordane. The associated results are qualified as "J" based on potential indeterminate bias.

L1921393:

The CCV analyzed on 5/25/2019 at 8:08 exhibited a %D above the control limit for methoxychlor (22.5%). The associated results in sample EP02_14.5_052119 from the primary GC column are qualified as "UJ" based on potential indeterminate bias.

**Metals by SW-846 Method 6010D:**

L1917598:

The laboratory duplicate and parent sample (EP14_E_14.5_042919) exhibited a RPD above the control limit for calcium (22%). The associated results are qualified as "J" based on potential indeterminate bias.

L1918070:

The MB for batch WG1232740 exhibited a detection of sodium (10.9 mg/kg). The associated results in samples EP14_E_11.5_050119 and EP14_10.5_050119 are qualified as "U" at the reporting limit based on potential blank contamination.

L1921393:

The MB for batch WG1241090 exhibited a detection of antimony (0.788 mg/kg). The associated results in sample EP02_14.5_052119 are qualified as "U" at the reporting limit based on potential blank contamination.

The CCV analyzed on 5/28/2019 at 14:10 exhibited percent recoveries above the upper control limit (UCL) for aluminum (111%) and iron (130%). The associated results in sample EP02_14.5_052119 are qualified as "J" based on potential high bias.

**Cyanide by SW-846 Method 9012B:**

L1917598:

The LCS/LCSD for batch WG1231767 exhibited percent recoveries below the LCL for cyanide (79%, 69%). The associated results in samples EP14_E_14.5_042919, EP22_15_042919, and EP14_S_10_042919 are qualified as "UJ" based on potential low bias.

L1917794:

The LCS/LCSD for batch WG1232346 exhibited a RPD above the control limit for cyanide (53%). The associated results in sample EP19_12.5_043019 are qualified as "J" based on potential indeterminate bias.

L1918070:

The LCS/LCSD for batch WG1232687 exhibited a RPD above the control limit for cyanide (68%). The associated results in samples EP14_E_11.5_050119, EP14_10.5_050119, and EP14_N_11.5_050119 are qualified as "UJ" based on potential indeterminate bias.

L1921393:

The LCS/LCSD for batch WG1240406 exhibited a RPD above the control limit for cyanide (67%). The associated results in sample EP02_14.5_052119 are qualified as "UJ" based on potential indeterminate bias.

**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.

**VOCs by SW-846 Method 8260C:**

L1917598:

The MB for batch WG1231864 exhibited detections of bromomethane (1.6 ug/kg) and naphthalene (0.69 ug/kg). The associated results are non-detections. No qualification is necessary.

L1917794:

The LCS for batch WG1233822 exhibited a percent recovery above the UCL for chloromethane (131%). The associated results are non-detections. No qualification is necessary.

The CCV analyzed on 5/4/2019 at 6:47 exhibited %Ds above the control limit for chloromethane (-30.5%) and bromomethane (27%). The associated results were previously qualified. No further action is necessary.

L1918070:

The CCV analyzed on 5/2/2019 at 6:59 exhibited a %D above the control limit for bromomethane (25%). The associated results were previously qualified. No further action is necessary.

**Metals by SW-846 Method 6010D:**

L1917598:

The matrix spike and duplicate for batch WG1231761 exhibited percent recoveries above the UCL for aluminum (477%), calcium (580%), iron (314%), and manganese (191%). The associated results in the parent sample are greater than four times the spiked amount. No qualification is necessary.

L1918070:

The MB for batch WG1232740 exhibited detections of iron (0.684 mg/kg) and manganese (0.304 mg/kg). The associated results are greater than 10 times the contamination. No qualification is necessary.

**COMMENTS:**

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 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, CEP
Senior Project Chemist

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:** Ashley Stappenbeck, Langan Staff Engineer

**From:** Emily Strake, Langan Senior Project Chemist

**Date:** June 20, 2019

**Re:** Data Usability Summary Report
For 300 West 122nd Street
June 2019 Soil Samples
Langan Project No.: 170500201

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of soil samples collected in June 2019 by Langan Engineering and Environmental Services ("Langan") at the 300 West 122nd Street site ("the site"). The samples were analyzed by Alpha Analytical Laboratories, Inc. (NYSDOH NELAP registration # 11148) for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), herbicides, polychlorinated biphenyls (PCBs), pesticides, metals including mercury (Hg), cyanide (CN), hexavalent chromium (CrVI), trivalent chromium (CrIII), and total solids (%S) by the methods specified below.

- VOCs by SW-846 Method 8260C
- SVOCs by SW-846 Method 8270D and 8270D SIM
- Herbicides by SW-846 Method 8151A
- PCBs by SW-846 Method 8082A
- Pesticides by SW-846 Method 8081B
- Metals by SW-846 Method 6020B
- Mercury by SW-846 Method 7473
- Cyanide by SW-846 Method 9012B
- Hexavalent Chromium by SW-846 Method 7196A
- Trivalent Chromium (calculated)
- Total Solids by Standard Method 2540G

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* |
|---|---|---|---|---|
| L1924375 | L1924375-01 | EP02_14_060719 | 6/7/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1924375 | L1924375-02 | EP02_SE_14_060719 | 6/7/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1924375 | L1924375-03 | EP02_SW_14_060719 | 6/7/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1924375 | L1924375-04 | EP02_NE_14_060719 | 6/7/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1924375 | L1924375-05 | EP02_NW_14_060719 | 6/7/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1925840 | L1925840-01 | UST18_B1_9-9.5 | 6/14/2019 | VOCs, SVOCs |
| L1925840 | L1925840-02 | UST18_B2_9-9.5 | 6/14/2019 | VOCs, SVOCs |
| L1925840 | L1925840-03 | UST18_SW_9-10 | 6/14/2019 | VOCs, SVOCs |

**Validation Overview**

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-34A, "Trace Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-33A, "Low/Medium Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-35A, "Semivolatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-17, "Validating Chlorinated Herbicides" (December 2010, Revision 3.1), USEPA Region II SOP #HW-37A, "Polychlorinated Biphenyl (PCB) Aroclor Data Validation" (June 2015, Revision 0), USEPA Region II SOP #HW-36A, "Pesticide Data Validation" (October 2016, Revision 1), USEPA Region II SOP #HW-3a, "ICP-AES Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-3c, "Mercury and Cyanide Data Validation" (September 2016, Revision 1), the USEPA Contract Laboratory Program "National Functional Guidelines for Organic Superfund Methods Data Review" (EPA-540-R-2017-002, January 2017), the USEPA Contract Laboratory Program "National Functional Guidelines for Inorganic Superfund Methods Data Review" (EPA-540-R-2017-001, January 2017) and the specifics of the methods employed.

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, and dual column performance.

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* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP02_14_060719 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP02_14_060719 | 8151A | 93-76-5 | 2,4,5-T | UJ |
| EP02_14_060719 | 8151A | 93-72-1 | 2,4,5-TP | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP02_14_060719 | 8151A | 94-75-7 | 2,4-D | UJ |
| EP02_14_060719 | 8260C | 78-93-3 | 2-BUTANONE | UJ |
| EP02_14_060719 | 8260C | 591-78-6 | 2-HEXANONE | UJ |
| EP02_14_060719 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| EP02_14_060719 | 8260C | 67-64-1 | ACETONE | J |
| EP02_14_060719 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP02_14_060719 | 8260C | 75-00-3 | CHLOROETHANE | UJ |
| EP02_14_060719 | 7196A | 18540-29-9 | CHROMIUM, HEXAVALENT | J |
| EP02_14_060719 | 6010D | 7440-47-3 | CHROMIUM, TOTAL | J |
| EP02_14_060719 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |
| EP02_14_060719 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| EP02_14_060719 | 8081B | 1031-07-8 | ENDOSULFAN SULFATE | UJ |
| EP02_14_060719 | 8260C | 87-68-3 | HEXACHLOROBUTADIENE | UJ |
| EP02_14_060719 | 8270D | 77-47-4 | HEXACHLOROCYCLOPENTADIENE | UJ |
| EP02_14_060719 | 6010D | 7439-95-4 | MAGNESIUM, TOTAL | J |
| EP02_14_060719 | 8081B | 72-43-5 | METHOXYCHLOR | UJ |
| EP02_14_060719 | 6010D | 7440-02-0 | NICKEL, TOTAL | J |
| EP02_14_060719 | 8260C | 75-01-4 | VINYL CHLORIDE | UJ |
| EP02_SE_14_060719 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP02_SE_14_060719 | 8151A | 93-76-5 | 2,4,5-T | UJ |
| EP02_SE_14_060719 | 8151A | 93-72-1 | 2,4,5-TP | UJ |
| EP02_SE_14_060719 | 8151A | 94-75-7 | 2,4-D | UJ |
| EP02_SE_14_060719 | 8260C | 78-93-3 | 2-BUTANONE | UJ |
| EP02_SE_14_060719 | 8260C | 591-78-6 | 2-HEXANONE | UJ |
| EP02_SE_14_060719 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| EP02_SE_14_060719 | 8260C | 67-64-1 | ACETONE | J |
| EP02_SE_14_060719 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP02_SE_14_060719 | 8260C | 75-00-3 | CHLOROETHANE | UJ |
| EP02_SE_14_060719 | 7196A | 18540-29-9 | CHROMIUM, HEXAVALENT | J |
| EP02_SE_14_060719 | 6010D | 7440-47-3 | CHROMIUM, TOTAL | J |
| EP02_SE_14_060719 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |
| EP02_SE_14_060719 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP02_SE_14_060719 | 8081B | 1031-07-8 | ENDOSULFAN SULFATE | UJ |
| EP02_SE_14_060719 | 8260C | 87-68-3 | HEXACHLOROBUTADIENE | UJ |
| EP02_SE_14_060719 | 8270D | 77-47-4 | HEXACHLOROCYCLOPENTADIENE | UJ |
| EP02_SE_14_060719 | 6010D | 7439-95-4 | MAGNESIUM, TOTAL | J |
| EP02_SE_14_060719 | 8081B | 72-43-5 | METHOXYCHLOR | UJ |
| EP02_SE_14_060719 | 6010D | 7440-02-0 | NICKEL, TOTAL | J |
| EP02_SE_14_060719 | 8260C | 75-01-4 | VINYL CHLORIDE | UJ |
| EP02_SW_14_060719 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP02_SW_14_060719 | 8151A | 93-76-5 | 2,4,5-T | UJ |
| EP02_SW_14_060719 | 8151A | 93-72-1 | 2,4,5-TP | UJ |
| EP02_SW_14_060719 | 8151A | 94-75-7 | 2,4-D | UJ |
| EP02_SW_14_060719 | 8260C | 78-93-3 | 2-BUTANONE | UJ |
| EP02_SW_14_060719 | 8260C | 591-78-6 | 2-HEXANONE | UJ |
| EP02_SW_14_060719 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| EP02_SW_14_060719 | 8260C | 67-64-1 | ACETONE | J |
| EP02_SW_14_060719 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP02_SW_14_060719 | 8260C | 75-00-3 | CHLOROETHANE | UJ |
| EP02_SW_14_060719 | 7196A | 18540-29-9 | CHROMIUM, HEXAVALENT | J |
| EP02_SW_14_060719 | 6010D | 7440-47-3 | CHROMIUM, TOTAL | J |
| EP02_SW_14_060719 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |
| EP02_SW_14_060719 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| EP02_SW_14_060719 | 8081B | 1031-07-8 | ENDOSULFAN SULFATE | UJ |
| EP02_SW_14_060719 | 8260C | 87-68-3 | HEXACHLOROBUTADIENE | UJ |
| EP02_SW_14_060719 | 8270D | 77-47-4 | HEXACHLOROCYCLOPENTADIENE | UJ |
| EP02_SW_14_060719 | 6010D | 7439-95-4 | MAGNESIUM, TOTAL | J |
| EP02_SW_14_060719 | 8081B | 72-43-5 | METHOXYCHLOR | UJ |
| EP02_SW_14_060719 | 6010D | 7440-02-0 | NICKEL, TOTAL | J |
| EP02_SW_14_060719 | 8260C | 75-01-4 | VINYL CHLORIDE | UJ |
| EP02_NE_14_060719 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP02_NE_14_060719 | 8151A | 93-76-5 | 2,4,5-T | UJ |
| EP02_NE_14_060719 | 8151A | 93-72-1 | 2,4,5-TP | UJ |
| EP02_NE_14_060719 | 8151A | 94-75-7 | 2,4-D | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP02_NE_14_060719 | 8260C | 78-93-3 | 2-BUTANONE | UJ |
| EP02_NE_14_060719 | 8260C | 591-78-6 | 2-HEXANONE | UJ |
| EP02_NE_14_060719 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| EP02_NE_14_060719 | 8260C | 67-64-1 | ACETONE | J |
| EP02_NE_14_060719 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP02_NE_14_060719 | 8260C | 75-00-3 | CHLOROETHANE | UJ |
| EP02_NE_14_060719 | 7196A | 18540-29-9 | CHROMIUM, HEXAVALENT | J |
| EP02_NE_14_060719 | 6010D | 7440-47-3 | CHROMIUM, TOTAL | J |
| EP02_NE_14_060719 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |
| EP02_NE_14_060719 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| EP02_NE_14_060719 | 8081B | 1031-07-8 | ENDOSULFAN SULFATE | UJ |
| EP02_NE_14_060719 | 8260C | 87-68-3 | HEXACHLOROBUTADIENE | UJ |
| EP02_NE_14_060719 | 8270D | 77-47-4 | HEXACHLOROCYCLOPENTADIENE | UJ |
| EP02_NE_14_060719 | 6010D | 7439-95-4 | MAGNESIUM, TOTAL | J |
| EP02_NE_14_060719 | 8081B | 72-43-5 | METHOXYCHLOR | UJ |
| EP02_NE_14_060719 | 6010D | 7440-02-0 | NICKEL, TOTAL | J |
| EP02_NE_14_060719 | 8260C | 75-01-4 | VINYL CHLORIDE | UJ |
| EP02_NW_14_060719 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP02_NW_14_060719 | 8151A | 93-72-1 | 2,4,5-TP | UJ |
| EP02_NW_14_060719 | 8151A | 94-75-7 | 2,4-D | UJ |
| EP02_NW_14_060719 | 8260C | 78-93-3 | 2-BUTANONE | UJ |
| EP02_NW_14_060719 | 8260C | 591-78-6 | 2-HEXANONE | UJ |
| EP02_NW_14_060719 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| EP02_NW_14_060719 | 8260C | 67-64-1 | ACETONE | J |
| EP02_NW_14_060719 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP02_NW_14_060719 | 8260C | 75-00-3 | CHLOROETHANE | UJ |
| EP02_NW_14_060719 | 7196A | 18540-29-9 | CHROMIUM, HEXAVALENT | UJ |
| EP02_NW_14_060719 | 6010D | 7440-47-3 | CHROMIUM, TOTAL | J |
| EP02_NW_14_060719 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |
| EP02_NW_14_060719 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| EP02_NW_14_060719 | 8081B | 1031-07-8 | ENDOSULFAN SULFATE | UJ |
| EP02_NW_14_060719 | 8260C | 87-68-3 | HEXACHLOROBUTADIENE | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP02_NW_14_060719 | 8270D | 77-47-4 | HEXACHLOROCYCLOPENTADIENE | UJ |
| EP02_NW_14_060719 | 6010D | 7439-95-4 | MAGNESIUM, TOTAL | J |
| EP02_NW_14_060719 | 8081B | 72-43-5 | METHOXYCHLOR | UJ |
| EP02_NW_14_060719 | 6010D | 7440-02-0 | NICKEL, TOTAL | J |
| EP02_NW_14_060719 | 8260C | 75-01-4 | VINYL CHLORIDE | UJ |
| UST18_B1_9-9.5 | 8270D | 56-55-3 | BENZO(A)ANTHRACENE | U (120) |
| UST18_B2_9-9.5 | 8270D | 56-55-3 | BENZO(A)ANTHRACENE | U (110) |
| UST18_SW_9-10 | 8270D | 56-55-3 | BENZO(A)ANTHRACENE | U (120) |

**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:**

L1924375:

The initial calibration (ICAL) for instrument VOA100 exhibited response factors (RFs) below the control limit for 1,4-dioxane (0.002) and 4-methyl-2-pentanone (0.075). The associated results in samples EP02_14_060719, EP02_SE_14_060719, EP02_SW_14_060719, EP02_NE_14_060719, and EP02_NW_14_060719 are qualified as "UJ" based on potential indeterminate bias.

The initial calibration verification (ICV) analyzed on 3/15/2019 at 13:00 exhibited percent differences (%Ds) above the control limit for dichlorodifluoromethane (-21.5%) and bromomethane (-29.2%). The associated results in samples EP02_14_060719, EP02_SE_14_060719, EP02_SW_14_060719, EP02_NE_14_060719, and EP02_NW_14_060719 are qualified as "UJ" based on potential indeterminate bias.

The continuing calibration verification (CCV) analyzed on 6/9/2019 at 15:50 exhibited %Ds above the control limit for vinyl chloride (23.7%), chloroethane (38.4%), acetone (23%), 2-butanone (29.2%), 2-hexanone (25.7%), and hexachlorobutadiene (-25.9%). The associated results in

samples EP02_14_060719, EP02_SE_14_060719, EP02_SW_14_060719, EP02_NE_14_060719, and EP02_NW_14_060719 are qualified as "J" or "UJ" based on potential indeterminate bias.

**SVOCs by SW-846 Method 8270D:**

L1924375:

The CCV analyzed on 6/9/2019 at 13:54 exhibited a %D above the control limit for hexachlorocyclopentadiene (42.1%). The associated results in samples EP02_14_060719, EP02_SE_14_060719, EP02_SW_14_060719, EP02_NE_14_060719, and EP02_NW_14_060719 are qualified as "UJ" based on potential indeterminate bias.

L1925840:

The MB for batch WG1250700 exhibited a detection of benzo(a)anthracene (19 ug/kg). The associated results in sample UST18_B1_9-9.5, UST18_B2_9-9.5, and UST18_SW_9-10 are qualified as "U" at the reporting limit based on potential blank contamination.

**Herbicides by SW-846 Method 8151A:**

L1924375:

The CCV analyzed on 6/10/2019 at 11:32 exhibited %Ds above the control limit for 2,4-D (-21.3%), 2,4,5-TP (-24.7%), and 2,4,5-T (-21.1%). The associated results in samples EP02_14_060719, EP02_SE_14_060719, EP02_SW_14_060719, and EP02_NE_14_060719 from the primary gas chromatography (GC) column are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 6/11/2019 at 12:23 exhibited %Ds above the control limit for 2,4-D (-16.5%) and 2,4,5-TP (-15.3%). The associated results in sample EP02_NW_14_060719 from the primary GC column are qualified as "UJ" based on potential indeterminate bias.

**Pesticides by SW-846 Method 8081B:**

L1924375:

The laboratory control sample and duplicate (LCS/LCSD) for batch WG1246025 exhibited a relative percent difference (RPD) above the control limit for endosulfan sulfate (33%). The associated results in samples EP02_14_060719, EP02_SE_14_060719, EP02_SW_14_060719, EP02_NE_14_060719, and EP02_NW_14_060719 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 6/10/2019 at 10:04 exhibited a %D above the control limit for methoxychlor (-22.7%). The associated results in samples EP02_14_060719, EP02_SE_14_060719,

EP02_SW_14_060719, EP02_NE_14_060719, and EP02_NW_14_060719 from the primary GC column are qualified as "UJ" based on potential indeterminate bias.

**Metals by SW-846 Method 6010D:**

L1924375:

The matrix spike (MS) for batch WG1246599 exhibited percent recoveries below the lower control limit (LCL) for chromium (4.8%), magnesium (18%), and nickel (64%). The associated results in samples EP02_14_060719, EP02_SE_14_060719, EP02_SW_14_060719, EP02_NE_14_060719, and EP02_NW_14_060719 are qualified as "J" based on potential low bias.

**Cyanide by SW-846 Method 9012B:**

L1924375:

The LCS/LCSD for batch WG1246196 exhibited a percent recovery below the LCL for cyanide, total (69%, 76%). The associated results in samples EP02_14_060719, EP02_SE_14_060719, EP02_SW_14_060719, EP02_NE_14_060719, and EP02_NW_14_060719 are qualified as "UJ" based on potential low bias.

**Hexavalent Chromium by SW-846 Method 7196A:**

L1924375:

The LCS for batch WG1246277 exhibited a percent recovery below the LCL for chromium, hexavalent (77%). The associated results in samples EP02_14_060719, EP02_SE_14_060719, EP02_SW_14_060719, EP02_NE_14_060719, and EP02_NW_14_060719 are qualified as "J" or "UJ" based on potential low bias.

**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.

**VOCs by SW-846 Method 8260C:**

L1924375:

The MB for batch WG1246390 exhibited a detection of bromomethane (1.3 ug/kg). The associated results are non-detections. No qualification is necessary.

**SVOCs by SW-846 Method 8270D:**

L1924375:

The sample EP02_SW_14_060719 exhibited a percent recovery above the upper control limit (UCL) for the surrogate 4-terphenyl-d14 (126%). The other two base/neutral extractable surrogates were recovered within the control limits. No qualification is necessary.

The sample EP02_NE_14_060719 exhibited a percent recovery above the UCL for the surrogate 4-terphenyl-d14 (123%). The other two base/neutral extractable surrogates were recovered within the control limits. No qualification is necessary.

The LCSD for batch WG1246032 exhibited a percent recovery above the UCL for phenol (91%). The associated results are non-detections. No qualification is necessary.

**Metals by SW-846 Method 6010D:**

L1924375:

The MB for batch WG1246599 exhibited detections of chromium (0.084 mg/kg), iron (2.8 mg/kg), and sodium (1.87 mg/kg). The associated results are >10X the contamination. No qualification is necessary.

The MS/MSD for batch WG1246599 exhibited percent recoveries below the LCL for aluminum (6%) and iron (0%). The associated results in the parent sample are >4X the spiked amount. No qualification is necessary.

The MS/MSD for batch WG1246599 exhibited a percent recovery above the UCL for manganese (159%). The associated results in the parent sample are >4X the spiked amount. No qualification is necessary.

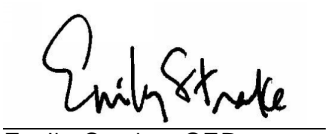
The laboratory duplicate and parent sample (EP02_14_060719) exhibited RPDs above the control limit for chromium (95%), magnesium (38%), and nickel (75%). The associated results were previously qualified. No further action is necessary.

**COMMENTS:**

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 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, CEP
Senior Project Chemist

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:** Ashley Stappenbeck, Langan Staff Engineer

**From:** Emily Strake, Langan Senior Project Chemist

**Date:** June 26, 2019

**Re:** Data Usability Summary Report
For 300 West 122nd Street
June 2019 Groundwater Sample
Langan Project No.: 170500202

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of a groundwater sample collected in June 2019 by Langan Engineering and Environmental Services ("Langan") at the 300 West 122nd Street site ("the site"). The sample was analyzed by Alpha Analytical Laboratories, Inc. (NYSDOH NELAP registration # 11148) for volatile organic compounds (VOCs) by the methods specified below.

- VOCs by SW-846 Method 8260C

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* |
|---|---|---|---|---|
| L1924375 | L1924375-01 | EP02_14_060719 | 6/7/2019 | VOCs |

**Validation Overview**

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-34A, "Trace Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-33A, "Low/Medium Volatile Data Validation" (September 2016, Revision 1), the USEPA Contract Laboratory Program "National Functional Guidelines for Organic Superfund Methods Data Review" (EPA-540-R-2017-002, January 2017), and the specifics of the methods employed.

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, 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, and overall system performance.

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* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| PM_GW01_053019 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| PM_GW01_053019 | 8260C | 594-20-7 | 2,2-DICHLOROPROPANE | UJ |
| PM_GW01_053019 | 8260C | 78-93-3 | 2-BUTANONE | UJ |
| PM_GW01_053019 | 8260C | 591-78-6 | 2-HEXANONE | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| PM_GW01_053019 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| PM_GW01_053019 | 8260C | 67-64-1 | ACETONE | J |
| PM_GW01_053019 | 8260C | 107-13-1 | ACRYLONITRILE | UJ |
| PM_GW01_053019 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| PM_GW01_053019 | 8260C | 10061-01-5 | CIS-1,3-DICHLOROPROPENE | UJ |
| PM_GW01_053019 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | 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 calibration (ICAL) for instrument VOA122 exhibited response factors below the control limit for acetone (0.032), acrylonitrile (0.042), 2-butanone (0.051), 1,4-dioxane (0.001), 4-methyl-2-pentanone (0.063), and 2-hexanone (0.097). The associated results in sample PM_GW01_053019 are qualified as "J" or "UJ" based on potential indeterminate bias.

The initial calibration verification (ICV) analyzed on 5/8/2019 at 3:17 exhibited percent differences (%Ds) above the control limit for bromomethane (22.4%), and 2,2-dichloropropane (20.2%), cis-1,3-dichloropropene (20%). The associated results in sample PM_GW01_053019 are qualified as "UJ" based on potential indeterminate bias.

The continuing calibration verification (CCV) analyzed on 6/5/2019 at 7:17 exhibited a %D above the control limit for dichlorodifluoromethane (21.2%). The associated results in sample PM_GW01_053019 are qualified as "UJ" based on potential indeterminate bias.

**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.

**VOCs by SW-846 Method 8260C:**

The ICV analyzed on 5/8/2019 at 3:17 exhibited a %D above the control limit for 1,4-dioxane (21.3%). The associated results were previously qualified. No further action is necessary.

The CCV analyzed on 6/5/2019 at 7:17 exhibited %Ds above the control limit for 1,4-dioxane (21.3%) and 2-hexanone (20.6%). The associated results were previously qualified. No further action is necessary.

**COMMENTS:**

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 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, CEP
Senior Project Chemist

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:** Julia Leung, Langan Project Engineer

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

**Date:** July 5, 2018

**Re:** Data Usability Summary Report
For 300 W. 122nd Street
New York, New York
Soil Samples Collected June 2018
Langan Project No.: 170500202

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of soil samples collected in June, 2018 by Langan Engineering and Environmental Services ("Langan") at 300 West 122nd Street located in New York, New York. The samples were analyzed by Alpha Analytical located in Westborough, MA (NYSDOH ELAP registration number 11148) for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and percent solids (%S) using the analytical methods specified below.

- VOCs by SW-846 Method 8260C
- SVOCs by SW-846 Method 8270D
- Percent Solids by SM2540G

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* |
|---|---|---|---|---|
| L1821412 | L1821412-01 | UST01_B1_4-5 | 06/08/18 | VOCs, SVOCs, %S |
| L1821412 | L1821412-02 | UST01_B2_4-5 | 06/08/18 | VOCs, SVOCs, %S |

## VALIDATION OVERVIEW

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-34a, "Trace Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-35A, "Semivolatile Data Validation" (September 2016, Revision 1), the USEPA Contract Laboratory Program "National Functional Guidelines for Organic Superfund Methods Data Review" (EPA-540-R-2017-002, January 2017), and the specifics of the methods employed.

Validation includes evaluation 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, instrument tuning, instrument calibration, laboratory blanks, laboratory control samples, system monitoring compounds, internal standard area counts, matrix spike/spike duplicate recoveries, interference check samples, laboratory duplicates, target compound identification and quantification, chromatograms, and overall system performance.

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 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 subject to 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**

| *Project Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| UST01_B1_4-5 | 8260C | 108-88-3 | Toluene | U (1.8) |

**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:**

Method blank sample WG1125779-5 displayed a positive detection for toluene at 0.43 µg/kg. The associated positive sample result is 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. No other deficiencies that were identified.

**COMMENTS:**

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 laboratory data packages met ASP Category B requirements and all sample holding times were met.

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

Emily Strake, CEP
Senior Project Chemist/Risk Assessor

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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:** Julia Leung, Langan Project Engineer

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

**Date:** July 6, 2018

**Re:** Data Usability Summary Report
For 300 W. 122nd Street
New York, New York
Soil Samples Collected June 2018
Langan Project No.: 170500201

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of soil samples collected in June, 2018 by Langan Engineering and Environmental Services ("Langan") at 300 West 122nd Street located in New York, New York. The samples were analyzed by Alpha Analytical located in Westborough, MA (NYSDOH ELAP registration number 11148) for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and percent solids (%S) using the analytical methods specified below.

- VOCs by SW-846 Method 8260C
- SVOCs by SW-846 Method 8270D
- Percent Solids by SM2540G

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* |
|---|---|---|---|---|
| L1823575 | L1823575-01 | UST02_B1_8 | 06/20/18 | VOCs, SVOCs, %S |
| L1823575 | L1823575-02 | UST02_B2_8 | 06/20/18 | VOCs, SVOCs, %S |

## VALIDATION OVERVIEW

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-34a, "Trace Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-35A, "Semivolatile Data Validation" (September 2016, Revision 1), the USEPA Contract Laboratory Program "National Functional Guidelines for Organic Superfund Methods Data Review" (EPA-540-R-2017-002, January 2017), and the specifics of the methods employed.

Validation includes evaluation 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, instrument tuning, instrument calibration, laboratory blanks, laboratory control samples, system monitoring compounds, internal standard area counts, matrix spike/spike duplicate recoveries, interference check samples, laboratory duplicates, target compound identification and quantification, chromatograms, and overall system performance.

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 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 subject to 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**

| *Project Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| UST02_B1_8 | 8270D | 208-96-8 | Acenaphthylene | J |
| UST02_B1_8 | 8270D | 205-99-2 | Benzo(b)fluoranthene | J |
| UST02_B1_8 | 8270D | 193-39-5 | Indeno(1,2,3-cd)pyrene | J |
| UST02_B2_8 | 8270D | 208-96-8 | Acenaphthylene | J |
| UST02_B2_8 | 8270D | 205-99-2 | Benzo(b)fluoranthene | J |
| UST02_B2_8 | 8270D | 193-39-5 | Indeno(1,2,3-cd)pyrene | J |

**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.

**SVOCs by SW-846 Method 8270D:**

Laboratory control sample/control sample duplicate (LCS/LCSD) displayed relative percent differences (RPDs) greater than the control limit for benzo(b)fluoranthene at 52%, acenaphthylene at 52%, and indeno(1,2,3-cd)pyrene at 51%. The associated sample results are qualified as "J".

**OTHER DEFICIENCIES:**

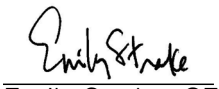
Other deficiencies include anomalies that do not directly impact data quality and do not necessitate qualification. No other deficiencies that were identified.

**COMMENTS:**

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 laboratory data packages met ASP Category B requirements and all sample holding times were met.

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, CEP
Senior Project Chemist/Risk Assessor

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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:** Julia Leung, Langan Project Engineer

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

**Date:** August 2, 2018

**Re:** Data Usability Summary Report
For 300 W. 122nd Street
New York, New York
Soil Samples Collected July 2018
Langan Project No.: 170500201

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of soil samples collected in July, 2018 by Langan Engineering and Environmental Services ("Langan") at 300 West 122nd Street located in New York, New York. The samples were analyzed by Alpha Analytical located in Westborough, MA (NYSDOH ELAP registration number 11148) for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and percent solids (%S) using the analytical methods specified below.

- VOCs by SW-846 Method 8260C
- SVOCs by SW-846 Method 8270D
- Percent Solids by SM2540G

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* |
|---|---|---|---|---|
| L1826255 | L1826255-01 | UST04_B1_11-12 | 7/11/18 | VOCs, SVOCs, %S |
| L1826255 | L1826255-02 | UST04_B2_11-12 | 7/11/18 | VOCs, SVOCs, %S |
| L1826255 | L1826255-03 | UST05_B1_9-10 | 7/11/18 | VOCs, SVOCs, %S |
| L1826255 | L1826255-04 | UST05_B2_9-10 | 7/11/18 | VOCs, SVOCs, %S |

## VALIDATION OVERVIEW

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-34a, "Trace Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-35A, "Semivolatile Data Validation" (September 2016, Revision 1), the USEPA Contract Laboratory Program "National Functional Guidelines for Organic Superfund

Methods Data Review" (EPA-540-R-2017-002, January 2017), and the specifics of the methods employed.

Validation includes evaluation 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, instrument tuning, instrument calibration, laboratory blanks, laboratory control samples, system monitoring compounds, internal standard area counts, matrix spike/spike duplicate recoveries, interference check samples, laboratory duplicates, target compound identification and quantification, chromatograms, and overall system performance.

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 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 subject to 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**

| *Project Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| UST04_B1_11-12 | 8260C | 1634-04-4 | Methyl tert butyl ether | U (2) |
| UST04_B1_11-12 | 8260C | 91-20-3 | Naphthalene | J |
| UST04_B2_11-12 | 8260C | 1634-04-4 | Methyl tert butyl ether | U (1.9) |
| UST04_B2_11-12 | 8260C | 91-20-3 | Naphthalene | J |

| *Project Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| UST05_B1_9-10 | 8260C | 91-20-3 | Naphthalene | J |

**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:**

Method blank sample WG1136066-5 displayed a positive detection for MTBE at 0.27 µg/kg. The associated sample results are qualified as "U" at the reporting limit.

Sample UST04_B1_11-12 displayed sample concentrations greater than the range of the instrument calibration for toluene and 1,2,4-trimethylbenzene at a 1X dilution. The samples were reanalyzed using the high level method with methanol, and these results should be used for data interpretation.

The continuing calibration analyzed on 7/15/18 at 13:49 displayed a %D greater than the control limit for naphthalene at 20.6%. The associated sample results are qualified as "J".

**SVOCs by SW-846 Method 8270D:**

Sample UST05_B2_9-10 displayed a sample concentration greater than the range of the instrument calibration for naphthalene at a 1X dilution. The samples were reanalyzed at a 5X dilution, and these results should be used for data interpretation.

**OTHER DEFICIENCIES:**

Other deficiencies include anomalies that do not directly impact data quality and do not necessitate qualification. No other deficiencies were identified.

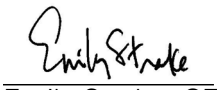
**COMMENTS:**

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 laboratory data packages met ASP Category B requirements and all sample holding times were met.

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, CEP
Senior Project Chemist/Risk Assessor

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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:** Julia Leung, Langan Project Engineer

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

**Date:** August 2, 2018

**Re:** Data Usability Summary Report
For 300 W. 122nd Street
New York, New York
Soil Samples Collected July 2018
Langan Project No.: 170500201

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of soil samples collected in July, 2018 by Langan Engineering and Environmental Services ("Langan") at 300 West 122nd Street located in New York, New York. The samples were analyzed by Alpha Analytical located in Westborough, MA (NYSDOH ELAP registration number 11148) for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and percent solids (%S) using the analytical methods specified below.

- VOCs by SW-846 Method 8260C
- SVOCs by SW-846 Method 8270D
- Percent Solids by SM2540G

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* |
|---|---|---|---|---|
| L1825132 | L1825132-01 | UST03_N_SW_8-9 | 07/02/18 | VOCs, SVOCs, %S |
| L1825132 | L1825132-02 | UST03_W_SW_7-8 | 07/02/18 | VOCs, SVOCs, %S |
| L1825132 | L1825132-03 | UST03_S_SW_7-8 | 07/02/18 | VOCs, SVOCs, %S |
| L1825132 | L1825132-04 | UST03_B01_9-10 | 07/02/18 | VOCs, SVOCs, %S |
| L1825132 | L1825132-05 | UST03_B02_9-10 | 07/02/18 | VOCs, SVOCs, %S |

## VALIDATION OVERVIEW

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-34a, "Trace Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-35A, "Semivolatile Data Validation" (September 2016, Revision 1),

the USEPA Contract Laboratory Program "National Functional Guidelines for Organic Superfund Methods Data Review" (EPA-540-R-2017-002, January 2017), and the specifics of the methods employed.

Validation includes evaluation 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, instrument tuning, instrument calibration, laboratory blanks, laboratory control samples, system monitoring compounds, internal standard area counts, matrix spike/spike duplicate recoveries, interference check samples, laboratory duplicates, target compound identification and quantification, chromatograms, and overall system performance.

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 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 subject to 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**

| *Project Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| UST03_S_SW_7-8 | 8260C | 1634-04-4 | Methyl tert butyl ether | U (2.2) |
| UST03_B02_9-10 | 8260C | 1634-04-4 | Methyl tert butyl ether | U (1.6) |

**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:**

Method blank sample WG1133786-5 displayed a positive detection for MTBE at 0.92 μg/kg. The associated sample results are qualified as "U" at the reporting limit.

**SVOCs by SW-846 Method 8270D:**

Sample UST03_B02_9-10 displayed sample concentrations greater than the range of the instrument calibration for fluoranthene, benzo(b)fluoranthene, phenanthrene, and pyrene at a 1X dilution. The samples were reanalyzed at a 4X dilution, and these results should be used for data interpretation.

**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.

**VOCs by SW-846 Method 8260C:**

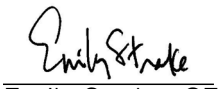
Method blank sample WG1133815-5 displayed a positive detection for MTBE at 46 μg/kg. The associated sample result is non-detect; qualification is not necessary.

**COMMENTS:**

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 laboratory data packages met ASP Category B requirements and all sample holding times were met.

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, CEP
Senior Project Chemist/Risk Assessor

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:** Ashley Stappenbeck, Langan Staff Engineer

**From:** Emily Strake, Langan Senior Project Chemist

**Date:** August 13, 2019

**Re:** Data Usability Summary Report
For 300 West 122nd Street
June through August 2019 Groundwater Samples
Langan Project No.: 170500201

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of groundwater samples collected in June through August 2019 by Langan Engineering and Environmental Services ("Langan") at the 300 West 122nd Street site ("the site"). The samples were analyzed by Alpha Analytical Laboratories, Inc. (NYSDOH NELAP registration # 11148) for volatile organic compounds (VOCs) by the methods specified below.

- VOCs by SW-846 Method 8260C

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* |
|---|---|---|---|---|
| L1927447 | L1927447-01 | PM_GW02_062419 | 6/24/2019 | VOCs |
| L1929436 | L1929436-01 | PM_GW03_070819 | 7/8/2019 | VOCs |
| L1932327 | L1932327-01 | PM_GW04_072219 | 7/22/2019 | VOCs |
| L1934819 | L1934819-01 | PM_GW05_080519 | 8/5/2019 | VOCs |

**Validation Overview**

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-34A, "Trace Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-33A, "Low/Medium Volatile Data Validation" (September 2016, Revision 1), the USEPA Contract Laboratory Program "National Functional Guidelines for Organic

Superfund Methods Data Review" (EPA-540-R-2017-002, January 2017), and the specifics of the methods employed.

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, 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, and overall system performance.

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* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| PM_GW02_062419 | 8260C | 108-67-8 | 1,3,5-TRIMETHYLBENZENE | UJ |
| PM_GW02_062419 | 8260C | 106-46-7 | 1,4-DICHLOROBENZENE | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| PM_GW02_062419 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| PM_GW02_062419 | 8260C | 594-20-7 | 2,2-DICHLOROPROPANE | UJ |
| PM_GW02_062419 | 8260C | 78-93-3 | 2-BUTANONE | UJ |
| PM_GW02_062419 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| PM_GW02_062419 | 8260C | 67-64-1 | ACETONE | UJ |
| PM_GW02_062419 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| PM_GW02_062419 | 8260C | 74-87-3 | CHLOROMETHANE | UJ |
| PM_GW02_062419 | 8260C | 98-82-8 | ISOPROPYLBENZENE | UJ |
| PM_GW02_062419 | 8260C | 91-20-3 | NAPHTHALENE | UJ |
| PM_GW02_062419 | 8260C | 95-49-8 | O-CHLOROTOLUENE | UJ |
| PM_GW02_062419 | 8260C | 99-87-6 | P-ISOPROPYLTOLUENE | UJ |
| PM_GW02_062419 | 8260C | 98-06-6 | TERT-BUTYLBENZENE | UJ |
| PM_GW03_070819 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| PM_GW03_070819 | 8260C | 78-93-3 | 2-BUTANONE | J |
| PM_GW03_070819 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| PM_GW03_070819 | 8260C | 67-64-1 | ACETONE | J |
| PM_GW03_070819 | 8260C | 74-83-9 | BROMOMETHANE | J |
| PM_GW03_070819 | 8260C | 74-87-3 | CHLOROMETHANE | UJ |
| PM_GW03_070819 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| PM_GW03_070819 | 8260C | 75-69-4 | TRICHLOROFLUOROMETHANE | UJ |
| PM_GW03_070819 | 8260C | 75-01-4 | VINYL CHLORIDE | UJ |
| PM_GW04_072219 | 8260C | 87-61-6 | 1,2,3-TRICHLOROBENZENE | UJ |
| PM_GW04_072219 | 8260C | 96-18-4 | 1,2,3-TRICHLOROPROPANE | UJ |
| PM_GW04_072219 | 8260C | 120-82-1 | 1,2,4-TRICHLOROBENZENE | UJ |
| PM_GW04_072219 | 8260C | 96-12-8 | 1,2-DIBROMO-3-CHLOROPROPANE | UJ |
| PM_GW04_072219 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| PM_GW04_072219 | 8260C | 594-20-7 | 2,2-DICHLOROPROPANE | UJ |
| PM_GW04_072219 | 8260C | 591-78-6 | 2-HEXANONE | UJ |
| PM_GW04_072219 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| PM_GW04_072219 | 8260C | 67-64-1 | ACETONE | UJ |
| PM_GW04_072219 | 8260C | 107-13-1 | ACRYLONITRILE | UJ |
| PM_GW04_072219 | 8260C | 74-83-9 | BROMOMETHANE | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| PM_GW04_072219 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| PM_GW04_072219 | 8260C | 91-20-3 | NAPHTHALENE | UJ |
| PM_GW04_072219 | 8260C | 110-57-6 | TRANS-1,4-DICHLORO-2-BUTENE | UJ |
| PM_GW05_080519 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| PM_GW05_080519 | 8260C | 67-64-1 | ACETONE | UJ |
| PM_GW05_080519 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| PM_GW05_080519 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| PM_GW05_080519 | 8260C | 110-57-6 | TRANS-1,4-DICHLORO-2-BUTENE | 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:**

L1927447:

The laboratory control sample and duplicate (LCS/LCSD) for batch WG1254666 exhibited a relative percent difference (RPD) above the control limit for 1,3,5-trimethylbenzene (27%), 1,4-dichlorobenzene (21%), isopropylbenzene (23%), naphthalene (33%), o-chlorotoluene (21%), p-isopropyltoluene (25%), and tert-butylbenzene (21%). The associated results in sample PM_GW02_062419 are qualified as "UJ" based on potential indeterminate bias.

The LCSD for batch WG1254666 exhibited percent recoveries below the lower control limit (LCL) for chloromethane (59%). The associated results in sample PM_GW02_062419 are qualified as "UJ" based on potential low bias.

The initial calibration (ICAL) for instrument ELAINE exhibited response factors (RFs) below the control limit for acetone (0.054), 2-butanone (0.073), 1,4-dioxane (0.002), and 4-methyl-2-pentanone (0.070). The associated results in sample PM_GW02_062419 are qualified as "UJ" based on potential indeterminate bias.

The continuing calibration verification (CCV) analyzed on 6/28/2019 at 06:45 exhibited percent differences (%Ds) above the control limit for bromomethane (47.0%) and 2,2-dichloropropane (-29.7%). The associated results in sample PM_GW02_062419 are qualified as "UJ" based on potential indeterminate bias.

L1929436:

The LCSD for batch WG1258652 exhibited percent recoveries below the LCL for bromomethane (38%) and chloromethane (59%). The associated results in sample PM_GW03_070819 are qualified as "J" or "UJ" based on potential low bias.

The ICAL for instrument ELAINE exhibited RFs below the control limit for acetone (0.054), 2-butanone (0.073), 1,4-dioxane (0.002), and 4-methyl-2-pentanone (0.070). The associated results in sample PM_GW03_070819 are qualified as "J" or "UJ" based on potential indeterminate bias.

The CCV analyzed on 7/11/2019 at 06:54 exhibited %Ds above the control limit for dichlorodifluoromethane (37.4%), vinyl chloride (21.8%), and trichlorotrifluoromethane (28.6%). The associated results in sample PM_GW03_070819 are qualified as "UJ" based on potential indeterminate bias.

L1932327:

The LCS/LCSD for batch WG1265036 exhibited percent recoveries below the LCL for 1,2,3-trichlorobenzene (54%, 55%), 1,2,4-trichlorobenzene (63%), naphthalene (49%, 49%), and trans-1,4-dichloro-2-butene (64%, 68%). The associated results in sample PM_GW04_072219 are qualified as "UJ" based on potential low bias.

The ICV analyzed on 5/24/2019 at 21:32 exhibited %Ds above the control limit for dichlorodifluoromethane (-20.6%), acetone (-22.9%), and 1,4-dioxane (-20.3%). The associated results in sample PM_GW04_072219 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 7/26/2019 at 08:09 exhibited %Ds above the control limit for bromomethane (33.5%), acrylonitrile (22.0%), 2,2-dichloropropane (-20.4%), 4-methyl-2-pentanone (31.3%), 2-hexanone (25.5%), 1,2,3-trichloropropane (23.5%), and 1,2-dibromo-3-chloropropane (26.9%). The associated results in sample PM_GW04_072219 are qualified as "UJ" based on potential indeterminate bias.

L1934819:

The LCS/LCSD for batch WG1270660 exhibited RPDs above the control limit for trans-1,4-dichloro-2-butene (23%). The associated results in sample PM_GW05_080519 are qualified as "UJ" based on potential indeterminate bias.

The ICAL for instrument VOA108 exhibited RFs below the control limit for acetone (0.089) and 1,4-dioxane (0.002). The associated results in sample PM_GW05_080519 are qualified as "UJ" based on potential indeterminate bias.

The ICV analyzed on 7/29/2019 at 22:42 exhibited %Ds above the control limit for dichlorodifluoromethane (-21.8%). The associated results in sample PM_GW05_080519 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 8/8/2019 at 19:55 exhibited RFs below the control limit for bromomethane (0.096). The associated results in sample PM_GW05_080519 are qualified as "UJ" based on potential indeterminate bias.

**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.

**VOCs by SW-846 Method 8260C:**

L1927447:

The CCV analyzed on 6/28/2019 at 06:45 exhibited %Ds above the control limit for chloromethane (27.6%). The associated results were previously qualified. No further action is necessary.

L1929436:

The CCV analyzed on 7/11/2019 at 06:54 exhibited %Ds above the control limit for chloromethane (34.4%), bromomethane (58.5%), and acetone (20.4%). The associated results were previously qualified. No further action is necessary.

L1932327:

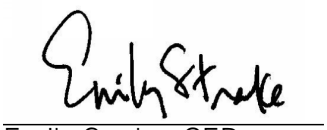
The CCV analyzed on 7/26/2019 at 08:09 exhibited %Ds above the control limit for 1,4-dioxane (26.6%), trans-1,4-dichloro-2-butene (35.3%), 1,2,4-trichlorobenzene (28.9%), naphthalene (51.2%), and 1,2,3-trichlorobenzene (45.9%). The associated results were previously qualified. No further action is necessary.

**COMMENTS:**

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 data packages met ASP Category B requirements.

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

Signed:



Emily Strake, CEP
Senior Project Chemist

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:** Ashley Stappenbeck, Langan Staff Engineer

**From:** Emily Strake, Langan Senior Project Chemist

**Date:** August 21, 2019

**Re:** Data Usability Summary Report
For 300 West 122nd Street
May through July 2019 Soil Samples
Langan Project No.: 170500201

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of soil samples collected in May through July 2019 by Langan Engineering and Environmental Services ("Langan") at the 300 West 122nd Street site ("the site"). The samples were analyzed by Alpha Analytical Laboratories, Inc. (NYSDOH NELAP registration # 11148) for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), herbicides, polychlorinated biphenyls (PCBs), pesticides, metals including mercury (Hg), cyanide (CN), hexavalent chromium (CrVI), trivalent chromium (CrIII), and total solids (%S) by the methods specified below.

- VOCs by SW-846 Method 8260C
- SVOCs by SW-846 Method 8270D
- Herbicides by SW-846 Method 8151A
- PCBs by SW-846 Method 8082A
- Pesticides by SW-846 Method 8081B
- Metals by SW-846 Method 6020B
- Mercury by SW-846 Method 7473
- Cyanide by SW-846 Method 9012B
- Hexavalent Chromium by SW-846 Method 7196A
- Trivalent Chromium (calculated)
- Total Solids by Standard Method 2540G

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* |
|---|---|---|---|---|
| L1918068 | L1918068-01 | EP15_11.5_050119 | 5/1/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1918914 | L1918914-01 | EP11_10_050719 | 5/7/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1919135 | L1919135-01 | EP09_11.5_050819 | 5/8/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1926886 | L1926886-01 | EP04_8.5_062019 | 6/20/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1929474 | L1929474-01 | EP18_3.5_070819 | 7/8/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1933114 | L1933114-01 | EP08_6.5_072519 | 7/25/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1933360 | L1933360-01 | EP12_6.5_072619 | 7/26/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1933360 | L1933360-02 | EP10_3_072619 | 7/26/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, %S |

**Validation Overview**

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-34A, "Trace Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-33A, "Low/Medium Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-35A, "Semivolatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-17, "Validating Chlorinated Herbicides" (December 2010, Revision 3.1), USEPA Region II SOP #HW-37A, "Polychlorinated Biphenyl (PCB) Aroclor Data Validation" (June 2015, Revision 0), USEPA Region II SOP #HW-36A, "Pesticide Data Validation" (October 2016, Revision 1), USEPA Region II SOP #HW-3a, "ICP-AES Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-3c, "Mercury and Cyanide Data Validation" (September 2016, Revision 1), the USEPA Contract Laboratory Program

"National Functional Guidelines for Organic Superfund Methods Data Review" (EPA-540-R-2017-002, January 2017), the USEPA Contract Laboratory Program "National Functional Guidelines for Inorganic Superfund Methods Data Review" (EPA-540-R-2017-001, January 2017) and the specifics of the methods employed.

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, serial dilutions, dual column performance, and overall system performance.

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* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP15_11.5_050119 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP15_11.5_050119 | 8151A | 93-76-5 | 2,4,5-T | UJ |
| EP15_11.5_050119 | 8151A | 93-72-1 | 2,4,5-TP | UJ |
| EP15_11.5_050119 | 8270D | 88-06-2 | 2,4,6-TRICHLOROPHENOL | UJ |
| EP15_11.5_050119 | 8151A | 94-75-7 | 2,4-D | UJ |
| EP15_11.5_050119 | 8270D | 51-28-5 | 2,4-DINITROPHENOL | UJ |
| EP15_11.5_050119 | 8270D | 534-52-1 | 4,6-DINITRO-O-CRESOL | UJ |
| EP15_11.5_050119 | 8270D | 65-85-0 | BENZOIC ACID | UJ |
| EP15_11.5_050119 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP15_11.5_050119 | 8260C | 74-87-3 | CHLOROMETHANE | UJ |
| EP15_11.5_050119 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |
| EP15_11.5_050119 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| EP15_11.5_050119 | 8270D | 77-47-4 | HEXACHLOROCYCLOPENTADIENE | UJ |
| EP15_11.5_050119 | 6010D | 7439-95-4 | MAGNESIUM, TOTAL | J |
| EP15_11.5_050119 | 6010D | 7440-23-5 | SODIUM, TOTAL | U (162) |
| EP11_10_050719 | 8260C | 106-93-4 | 1,2-DIBROMOETHANE | UJ |
| EP11_10_050719 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP11_10_050719 | 8270D | 51-28-5 | 2,4-DINITROPHENOL | UJ |
| EP11_10_050719 | 8260C | 78-93-3 | 2-BUTANONE | UJ |
| EP11_10_050719 | 8270D | 534-52-1 | 4,6-DINITRO-O-CRESOL | UJ |
| EP11_10_050719 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP11_10_050719 | 8260C | 74-87-3 | CHLOROMETHANE | UJ |
| EP11_10_050719 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |
| EP11_10_050719 | 8260C | 75-69-4 | TRICHLOROFLUOROMETHANE | UJ |
| EP09_11.5_050819 | 8260C | 106-93-4 | 1,2-DIBROMOETHANE | UJ |
| EP09_11.5_050819 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP09_11.5_050819 | 8270D | 51-28-5 | 2,4-DINITROPHENOL | UJ |
| EP09_11.5_050819 | 8260C | 78-93-3 | 2-BUTANONE | UJ |
| EP09_11.5_050819 | 8260C | 591-78-6 | 2-HEXANONE | UJ |
| EP09_11.5_050819 | 8270D | 88-75-5 | 2-NITROPHENOL | UJ |
| EP09_11.5_050819 | 8081B | 50-29-3 | 4,4'-DDT | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP09_11.5_050819 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP09_11.5_050819 | 8260C | 75-00-3 | CHLOROETHANE | UJ |
| EP09_11.5_050819 | 8260C | 74-87-3 | CHLOROMETHANE | UJ |
| EP09_11.5_050819 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |
| EP09_11.5_050819 | 8081B | 60-57-1 | DIELDRIN | UJ |
| EP09_11.5_050819 | 8081B | 1031-07-8 | ENDOSULFAN SULFATE | UJ |
| EP09_11.5_050819 | 8081B | 53494-70-5 | ENDRIN KETONE | UJ |
| EP09_11.5_050819 | 8260C | 110-57-6 | TRANS-1,4-DICHLORO-2-BUTENE | UJ |
| EP09_11.5_050819 | 8260C | 75-69-4 | TRICHLOROFLUOROMETHANE | UJ |
| EP09_11.5_050819 | 8260C | 75-01-4 | VINYL CHLORIDE | UJ |
| EP04_8.5_062019 | 8260C | 120-82-1 | 1,2,4-TRICHLOROBENZENE | UJ |
| EP04_8.5_062019 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP04_8.5_062019 | 8151A | 93-76-5 | 2,4,5-T | UJ |
| EP04_8.5_062019 | 8151A | 93-72-1 | 2,4,5-TP | UJ |
| EP04_8.5_062019 | 8260C | 78-93-3 | 2-BUTANONE | UJ |
| EP04_8.5_062019 | 8260C | 67-64-1 | ACETONE | UJ |
| EP04_8.5_062019 | 8270D | 86-74-8 | CARBAZOLE | UJ |
| EP04_8.5_062019 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |
| EP04_8.5_062019 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| EP04_8.5_062019 | 8260C | 87-68-3 | HEXACHLOROBUTADIENE | UJ |
| EP04_8.5_062019 | 8270D | 77-47-4 | HEXACHLOROCYCLOPENTADIENE | UJ |
| EP04_8.5_062019 | 6010D | 7440-23-5 | SODIUM, TOTAL | U (167) |
| EP04_8.5_062019 | 8081B | 5103-74-2 | TRANS-CHLORDANE | UJ |
| EP18_3.5_070819 | 8260C | 120-82-1 | 1,2,4-TRICHLOROBENZENE | UJ |
| EP18_3.5_070819 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP18_3.5_070819 | 8151A | 93-76-5 | 2,4,5-T | UJ |
| EP18_3.5_070819 | 8151A | 93-72-1 | 2,4,5-TP | UJ |
| EP18_3.5_070819 | 8151A | 94-75-7 | 2,4-D | UJ |
| EP18_3.5_070819 | 8260C | 78-93-3 | 2-BUTANONE | UJ |
| EP18_3.5_070819 | 8260C | 591-78-6 | 2-HEXANONE | UJ |
| EP18_3.5_070819 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| EP18_3.5_070819 | 8270D | 100-02-7 | 4-NITROPHENOL | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP18_3.5_070819 | 8260C | 67-64-1 | ACETONE | UJ |
| EP18_3.5_070819 | 8260C | 107-13-1 | ACRYLONITRILE | UJ |
| EP18_3.5_070819 | 8270D | 108-60-1 | BIS(2-CHLOROISOPROPYL)ETHER | UJ |
| EP18_3.5_070819 | 8270D | 85-68-7 | BUTYL BENZYL PHTHALATE | UJ |
| EP18_3.5_070819 | 8260C | 74-87-3 | CHLOROMETHANE | UJ |
| EP18_3.5_070819 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |
| EP18_3.5_070819 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| EP18_3.5_070819 | 8081B | 53494-70-5 | ENDRIN KETONE | UJ |
| EP18_3.5_070819 | 8081B | 8001-35-2 | TOXAPHENE | UJ |
| EP08_6.5_072519 | 8260C | 71-55-6 | 1,1,1-TRICHLOROETHANE | UJ |
| EP08_6.5_072519 | 8260C | 75-35-4 | 1,1-DICHLOROETHENE | UJ |
| EP08_6.5_072519 | 8260C | 563-58-6 | 1,1-DICHLOROPROPENE | UJ |
| EP08_6.5_072519 | 8260C | 95-63-6 | 1,2,4-TRIMETHYLBENZENE | UJ |
| EP08_6.5_072519 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP08_6.5_072519 | 8260C | 594-20-7 | 2,2-DICHLOROPROPANE | UJ |
| EP08_6.5_072519 | 8270D | 121-14-2 | 2,4-DINITROTOLUENE | UJ |
| EP08_6.5_072519 | 8260C | 78-93-3 | 2-BUTANONE | UJ |
| EP08_6.5_072519 | 8270D | 88-75-5 | 2-NITROPHENOL | UJ |
| EP08_6.5_072519 | 8270D | 534-52-1 | 4,6-DINITRO-O-CRESOL | UJ |
| EP08_6.5_072519 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| EP08_6.5_072519 | 8081B | 319-85-7 | BETA-BHC | UJ |
| EP08_6.5_072519 | 8260C | 75-15-0 | CARBON DISULFIDE | UJ |
| EP08_6.5_072519 | 8260C | 56-23-5 | CARBON TETRACHLORIDE | UJ |
| EP08_6.5_072519 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |
| EP08_6.5_072519 | 8260C | 87-68-3 | HEXACHLOROBUTADIENE | UJ |
| EP08_6.5_072519 | 8081B | 72-43-5 | METHOXYCHLOR | UJ |
| EP08_6.5_072519 | 8270D | 87-86-5 | PENTACHLOROPHENOL | UJ |
| EP08_6.5_072519 | 8260C | 99-87-6 | P-ISOPROPYLTOLUENE | UJ |
| EP08_6.5_072519 | 8260C | 127-18-4 | TETRACHLOROETHENE | UJ |
| EP08_6.5_072519 | 8260C | 156-60-5 | TRANS-1,2-DICHLOROETHENE | UJ |
| EP08_6.5_072519 | 8260C | 79-01-6 | TRICHLOROETHENE | UJ |
| EP08_6.5_072519 | 8260C | 75-69-4 | TRICHLOROFLUOROMETHANE | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP12_6.5_072619 | 8260C | 71-55-6 | 1,1,1-TRICHLOROETHANE | UJ |
| EP12_6.5_072619 | 8260C | 79-34-5 | 1,1,2,2-TETRACHLOROETHANE | UJ |
| EP12_6.5_072619 | 8260C | 75-35-4 | 1,1-DICHLOROETHENE | UJ |
| EP12_6.5_072619 | 8260C | 563-58-6 | 1,1-DICHLOROPROPENE | UJ |
| EP12_6.5_072619 | 8260C | 95-63-6 | 1,2,4-TRIMETHYLBENZENE | UJ |
| EP12_6.5_072619 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP12_6.5_072619 | 8260C | 594-20-7 | 2,2-DICHLOROPROPANE | UJ |
| EP12_6.5_072619 | 8270D | 121-14-2 | 2,4-DINITROTOLUENE | UJ |
| EP12_6.5_072619 | 8260C | 78-93-3 | 2-BUTANONE | UJ |
| EP12_6.5_072619 | 8260C | 591-78-6 | 2-HEXANONE | UJ |
| EP12_6.5_072619 | 8270D | 88-75-5 | 2-NITROPHENOL | UJ |
| EP12_6.5_072619 | 8270D | 534-52-1 | 4,6-DINITRO-O-CRESOL | UJ |
| EP12_6.5_072619 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| EP12_6.5_072619 | 6010D | 7429-90-5 | ALUMINUM, TOTAL | J |
| EP12_6.5_072619 | 8260C | 74-97-5 | BROMOCHLOROMETHANE | UJ |
| EP12_6.5_072619 | 6010D | 7440-70-2 | CALCIUM, TOTAL | J |
| EP12_6.5_072619 | 8260C | 75-15-0 | CARBON DISULFIDE | UJ |
| EP12_6.5_072619 | 8260C | 56-23-5 | CARBON TETRACHLORIDE | UJ |
| EP12_6.5_072619 | 8260C | 156-59-2 | CIS-1,2-DICHLOROETHENE | UJ |
| EP12_6.5_072619 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |
| EP12_6.5_072619 | 8260C | 87-68-3 | HEXACHLOROBUTADIENE | UJ |
| EP12_6.5_072619 | 6010D | 7439-89-6 | IRON, TOTAL | J |
| EP12_6.5_072619 | 6010D | 7439-95-4 | MAGNESIUM, TOTAL | J |
| EP12_6.5_072619 | 8260C | 104-51-8 | N-BUTYLBENZENE | UJ |
| EP12_6.5_072619 | 8270D | 87-86-5 | PENTACHLOROPHENOL | UJ |
| EP12_6.5_072619 | 8260C | 99-87-6 | P-ISOPROPYLTOLUENE | UJ |
| EP12_6.5_072619 | 8260C | 127-18-4 | TETRACHLOROETHENE | UJ |
| EP12_6.5_072619 | 8260C | 156-60-5 | TRANS-1,2-DICHLOROETHENE | UJ |
| EP12_6.5_072619 | 8260C | 110-57-6 | TRANS-1,4-DICHLORO-2-BUTENE | UJ |
| EP12_6.5_072619 | 8260C | 79-01-6 | TRICHLOROETHENE | UJ |
| EP12_6.5_072619 | 8260C | 75-69-4 | TRICHLOROFLUOROMETHANE | UJ |
| EP10_3_072619 | 8260C | 79-34-5 | 1,1,2,2-TETRACHLOROETHANE | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP10_3_072619 | 8260C | 79-00-5 | 1,1,2-TRICHLOROETHANE | UJ |
| EP10_3_072619 | 8260C | 120-82-1 | 1,2,4-TRICHLOROBENZENE | UJ |
| EP10_3_072619 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP10_3_072619 | 8270D | 121-14-2 | 2,4-DINITROTOLUENE | UJ |
| EP10_3_072619 | 8260C | 78-93-3 | 2-BUTANONE | UJ |
| EP10_3_072619 | 8270D | 88-75-5 | 2-NITROPHENOL | UJ |
| EP10_3_072619 | 8270D | 534-52-1 | 4,6-DINITRO-O-CRESOL | UJ |
| EP10_3_072619 | 8260C | 67-64-1 | ACETONE | UJ |
| EP10_3_072619 | 8260C | 107-13-1 | ACRYLONITRILE | UJ |
| EP10_3_072619 | 6010D | 7429-90-5 | ALUMINUM, TOTAL | J |
| EP10_3_072619 | 6010D | 7440-70-2 | CALCIUM, TOTAL | J |
| EP10_3_072619 | 8260C | 75-00-3 | CHLOROETHANE | UJ |
| EP10_3_072619 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |
| EP10_3_072619 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| EP10_3_072619 | 8260C | 100-41-4 | ETHYLBENZENE | UJ |
| EP10_3_072619 | 8260C | 87-68-3 | HEXACHLOROBUTADIENE | UJ |
| EP10_3_072619 | 6010D | 7439-89-6 | IRON, TOTAL | J |
| EP10_3_072619 | 6010D | 7439-95-4 | MAGNESIUM, TOTAL | J |
| EP10_3_072619 | 8260C | 104-51-8 | N-BUTYLBENZENE | J |
| EP10_3_072619 | 8260C | 103-65-1 | N-PROPYLBENZENE | UJ |
| EP10_3_072619 | 8270D | 87-86-5 | PENTACHLOROPHENOL | UJ |
| EP10_3_072619 | 8260C | 75-01-4 | VINYL CHLORIDE | 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:**

L1918068:

The laboratory control sample and duplicate (LCS/LCSD) for batch WG1234007 exhibited a percent recovery below the lower control limit (LCL) for bromomethane (48%, 46%). The associated results in sample EP15_11.5_050119 are qualified as "UJ" based on potential low bias.

The initial calibration (ICAL) for instrument VOA110 exhibited a response factor (RF) below the control limit for 1,4-dioxane (0.005). The associated results in sample EP15_11.5_050119 are qualified as "UJ" based on potential indeterminate bias.

The initial calibration verification (ICV) analyzed on 3/27/2019 at 04:29 exhibited a percent difference (%D) above the control limit for chloromethane (-20.1%). The associated results in sample EP15_11.5_050119 are qualified as "UJ" based on potential indeterminate bias.

The continuing calibration verification (CCV) analyzed on 5/6/2019 at 09:59 exhibited a %D above the control limit for dichlorodifluoromethane (-20.4%). The associated results in sample EP15_11.5_050119 are qualified as "UJ" based on potential indeterminate bias.

L1918914:

The LCSD for batch WG1235363 exhibited percent recoveries below the LCL for bromomethane (55%) and trichlorofluoromethane (66%). The associated results in sample EP11_10_050719 are qualified as "UJ" based on potential low bias.

The ICAL for instrument VOA110 exhibited a RF below the control limit for 1,4-dioxane (0.005). The associated results in sample EP11_10_050719 are qualified as "UJ" based on potential indeterminate bias.

The ICV analyzed on 3/27/2019 at 04:29 exhibited a %D above the control limit for chloromethane (-20.1%). The associated results in sample EP11_10_050719 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 5/9/2019 at 07:12 exhibited %Ds above the control limit for 2-butanone (24.7%) and 1,2-dibromoethane (21.3%). The associated results in sample EP11_10_050719 are qualified as "UJ" based on potential indeterminate bias.

L1919135:

The LCS/LCSD for batch WG1236505 exhibited percent recoveries below the LCL for 2-hexanone (68%), bromomethane (51%, 49%), 2-butanone (66%), trichlorofluoromethane (66%), and vinyl

chloride (63%). The associated results in sample EP09_11.5_050819 are qualified as "UJ" based on potential low bias.

The LCS/LCSD for batch WG1236505 exhibited a relative percent difference (RPD) above the control limit for 1,2-dibromoethane (45%). The associated results in sample EP09_11.5_050819 are qualified as "UJ" based on potential indeterminate bias.

The ICAL for instrument VOA110 exhibited a RF below the control limit for 1,4-dioxane (0.005). The associated results in sample EP09_11.5_050819 are qualified as "UJ" based on potential indeterminate bias.

The ICV analyzed on 3/27/2019 at 04:29 exhibited a %D above the control limit for chloromethane (-20.1%). The associated results in sample EP09_11.5_050819 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 5/13/2019 at 06:15 exhibited %Ds above the control limit for chloroethane (40.2%) and trans-1,4-dichloro-2-butene (21.4%). The associated results in sample EP09_11.5_050819 are qualified as "UJ" based on potential indeterminate bias.

L1926886:

The ICAL for instrument VOA100 exhibited RFs below the control limit for acetone (0.065), 2-butanone (0.093), and 1,4-dioxane (0.002). The associated results in sample EP04_8.5_062019 are qualified as "UJ" based on potential indeterminate bias.

The ICV analyzed on 6/17/2019 at 12:22 exhibited %Ds above the control limit for dichlorodifluoromethane (23.8%) and 1,2,4-trichlorobenzene (-20.6%). The associated results in sample EP04_8.5_062019 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 6/21/2019 at 05:59 exhibited a %D above the control limit for hexachlorobutadiene (-22.2%). The associated results in sample EP04_8.5_062019 are qualified as "UJ" based on potential indeterminate bias.

L1929474:

The ICAL for instrument VOA100 exhibited RFs below the control limit for acetone (0.065), 2-butanone (0.093), and 1,4-dioxane (0.002). The associated results in sample EP18_3.5_070819 are qualified as "UJ" based on potential indeterminate bias.

The ICV analyzed on 6/17/2019 at 12:22 exhibited %Ds above the control limit for dichlorodifluoromethane (23.8%) and 1,2,4-trichlorobenzene (-20.6%). The associated results in sample EP18_3.5_070819 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 7/9/2019 at 05:19 exhibited %Ds above the control limit for chloromethane (20.9%), acrylonitrile (25.0%), and 2-hexanone (28.7%). The associated results in sample EP18_3.5_070819 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 7/9/2019 at 05:19 exhibited RFs below the control limit for 4-methyl-2-pentanone (0.096). The associated results in sample EP18_3.5_070819 are qualified as "UJ" based on potential indeterminate bias.

L1933114:

The ICAL for instrument VOA111 exhibited RFs below the control limit for 2-butanone (0.090), 1,4-dioxane (0.002), and 4-methyl-2-pentanone (0.092). The associated results in sample EP08_6.5_072519 are qualified as "UJ" based on potential indeterminate bias.

The ICV analyzed on 6/17/2019 at 12:12 exhibited %Ds above the control limit for carbon disulfide (23.1%) and 1,2,4-trimethylbenzene (-21.6%). The associated results in sample EP08_6.5_072519 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 7/27/2019 at 07:17 exhibited %Ds above the control limit for trichlorofluoromethane (-32.7%), 1,1-dichloroethene (-30.7%), trans-1,2-dichloroethene (-25.5%), 2,2-dichloropropane (-26.1%), carbon tetrachloride (-36.5%), 1,1,1-trichloroethane (-26.6%), 1,1-dichloropropene (-28.6%), trichloroethene (-21.2%), tetrachloroethene (-30.4%), p-isopropyltoluene (-21.5%), and hexachlorobutadiene (-34.1%). The associated results in sample EP08_6.5_072519 are qualified as "UJ" based on potential indeterminate bias.

L1933360:

The ICAL for instrument VOA100 exhibited RFs below the control limit for acetone (0.065), 2-butanone (0.093), and 1,4-dioxane (0.002). The associated results in sample EP10_3_072619 are qualified as "UJ" based on potential indeterminate bias.

The ICV analyzed on 6/17/2019 at 12:22 exhibited %Ds above the control limit for dichlorodifluoromethane (23.8%) and 1,2,4-trichlorobenzene (-20.6%). The associated results in sample EP10_3_072619 are qualified as "UJ" based on potential indeterminate bias.

The ICAL for instrument VOA111 exhibited RFs below the control limit for 2-butanone (0.090), 1,4-dioxane (0.002), and 4-methyl-2-pentanone (0.092). The associated results in sample EP12_6.5_072619 are qualified as "UJ" based on potential indeterminate bias.

The ICV analyzed on 6/17/2019 at 12:12 exhibited %Ds above the control limit for carbon disulfide (23.1%), 1,2,4-trimethylbenzene (-21.6%), p-isopropyltoluene (-20.2%), and n-butylbenzene (-

20.8%). The associated results in sample EP12_6.5_072619 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 7/30/2019 at 17:48 exhibited %Ds above the control limit for vinyl chloride (-22.6%), chloroethane (-30.6%), acrylonitrile (22.4%), 1,1,2-trichloroethane (-22.9%), ethylbenzene (-21.7%), n-propylbenzene (-24.1%), 1,1,2,2-tetrachloroethane (-20.0%), n-butylbenzene (-27.6%), and hexachlorobutadiene (-34.7%). The associated results in sample EP10_3_072619 are qualified as "J" or "UJ" based on potential indeterminate bias.

The CCV analyzed on 7/30/2019 at 18:30 exhibited %Ds above the control limit for trichlorotrifluoromethane (-44.4%), 1,1-dichloroethene (-31.9%), trans-1,2-dichloroethene (-29.2%), cis-1,2-dichloroethene (-23.4%), 2,2-dichloropropane (-30.8%), bromochloromethane (-33.9%), carbon tetrachloride (-51.0%), 1,1,1-trichloroethane (-38.5%), 1,1-dichloropropene (-26.1%), trichloroethene (-25.0%), tetrachloroethene (-28.5%), 2-hexanone (22.2%), 1,1,2,2-tetrachloroethane (20.2%), trans-1,4-dichloro-2-butene (20.2%), and hexachlorobutadiene (-28.2%). The associated results in sample EP12_6.5_072619 are qualified as "UJ" based on potential indeterminate bias.

**SVOCs by SW-846 Method 8270D:**

L1918068:

The ICV analyzed on 5/2/2019 at 23:15 exhibited %Ds above the control limit for benzoic acid (25.6%) and 2,4-dinitrophenol (28.4%). The associated results in sample EP15_11.5_050119 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 5/8/2019 at 19:48 exhibited %Ds above the control limit for hexachlorocyclopentadiene (-22.9%), 2,4,6-trichlorophenol (-24.5%), and 4,6-dinitro-2-methylphenol (-35.3%). The associated results in sample EP15_11.5_050119 are qualified as "UJ" based on potential indeterminate bias.

L1918914:

The CCV analyzed on 5/10/2019 at 08:45 exhibited %Ds above the control limit for 2,4-dinitrophenol (-31.0%) and 4,6-dinitro-2-methylphenol (-29.0%). The associated results in sample EP11_10_050719 are qualified as "UJ" based on potential indeterminate bias.

L1919135:

The CCV analyzed on 5/14/2019 at 12:42 exhibited %Ds above the control limit for 2-nitrophenol (-23.6%) and 2,4-dinitrophenol (-32.0%). The associated results in sample EP09_11.5_050819 are qualified as "UJ" based on potential indeterminate bias.

L1926886:

The LCS for batch WG1251402 exhibited percent recoveries below the LCL for carbazole (50%) and hexachlorocyclopentadiene (37%). The associated results in sample EP04_8.5_062019 are qualified as "UJ" based on potential low bias.

L1929474:

The CCV analyzed on 7/9/2019 at 09:47 exhibited %Ds above the control limit for bis(2-chloroisopropyl)ether (-28.9%), 4-nitrophenol (-20.9%), and butyl benzyl phthalate (-28.8%). The associated results in sample EP18_3.5_070819 are qualified as "UJ" based on potential indeterminate bias.

L1933114:

The CCV analyzed on 7/29/2019 at 21:45 exhibited %Ds above the control limit for 2-nitrophenol (-21.5%), 2,4-dintrotoluene (-20.2%), 4,6-dinitro-2-methylphenol (-29.7%), and pentachlorophenol (-24.8%). The associated results in sample EP08_6.5_072519 are qualified as "UJ" based on potential indeterminate bias.

L1933360:

The CCV analyzed on 7/29/2019 at 21:45 exhibited %Ds above the control limit for 2-nitrophenol (-21.5%), 2,4-dinitrotoluene (-20.2%), 4,6-dinitro-2-methylphenol (-29.7%), and pentachlorophenol (-24.8%). The associated results in samples EP12_6.5_072619 and EP10_3_072619 are qualified as "UJ" based on potential indeterminate bias.

**Herbicides by SW-846 Method 8151A:**

L1918068:

The CCV analyzed on 5/5/2019 at 10:13 exhibited %Ds above the control limit for 2,4-D (-16.0%), 2,4,5-TP (-24.2%), and 2,4,5-T (-18.4%). The associated results in sample EP15_11.5_050119 are qualified as "UJ" based on potential indeterminate bias.

L1926886:

The CCV analyzed on 6/22/2019 at 09:54 exhibited %Ds above the control limit for 2,4,5-TP (-16.8%) and 2,4,5-T (-20.0%). The associated results in sample EP04_8.5_062019 are qualified as "UJ" based on potential indeterminate bias.

L1929474:

The CCV analyzed on 7/9/2019 at 09:12 exhibited %Ds above the control limit for 2,4-D (-33.0%), 2,4,5-TP (-20.5%), and 2,4,5-T (-32.1%). The associated results in sample EP18_3.5_070819 are qualified as "UJ" based on potential indeterminate bias.

**Pesticides by SW-846 Method 8081B:**

L1919135:

The CCV analyzed on 5/14/2019 at 09:44 exhibited %Ds above the control limit for dieldrin (-22.2%), 4,4'-DDT (-20.4%), endosulfan sulfate (-23.0%), and endrin ketone (-33.7%). The associated results in sample EP09_11.5_050819 are qualified as "UJ" based on potential indeterminate bias.

L1926886:

The LCS/LCSD for batch WG1251510 exhibited a RPD above the control limit for trans-chlordane (32%). The associated results in sample EP04_8.5_062019 are qualified as "UJ" based on potential indeterminate bias.

L1929474:

The CCV analyzed on 7/9/2019 at 10:20 exhibited %Ds above the control limit for toxaphene (-27.8%). The associated results in sample EP18_3.5_070819 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 7/9/2019 at 11:45 exhibited %Ds above the control limit for endrin ketone (-21.1%). The associated results in sample EP18_3.5_070819 are qualified as "UJ" based on potential indeterminate bias.

L1933114:

The CCV analyzed on 7/28/2019 at 12:22 exhibited %Ds above the control limit for beta BHC (21.7%) and methoxychlor (23.7%). The associated results in sample EP08_6.5_072519 are qualified as "UJ" based on potential indeterminate bias.

**Metals by SW-846 Method 6020B:**

L1918068:

The method blank (MB) for batch WG1232740 exhibited a detection of sodium (10.9 mg/kg). The associated results in sample EP15_11.5_050119 are qualified as "U" at the reporting limit based on potential blank contamination.

The CCV analyzed on 5/2/2019 at 14:52 exhibited a percent recovery above the upper control limit UCL for magnesium (111%). The associated results in sample EP15_11.5_050119 are qualified as "J" based on potential high bias.

L1926886:

The MB for batch WG1251666 exhibited a detection of sodium (4.6 mg/kg). The associated results in sample EP04_8.5_062019 are qualified as "U" at the reporting limit based on potential blank contamination.

L1933360:

The CCV analyzed on 7/28/2019 at 14:12 exhibited percent recoveries above the UCL for aluminum (112%), calcium (110%), iron (111%), and magnesium (110%). The associated results in samples EP12_6.5_072619 and EP10_3_072619 are qualified as "J" based on potential high bias.

**Cyanide by SW-846 Method 9012B:**

L1918068:

The LCS/LCSD for batch WG1233001 exhibited a percent recovery below the LCL for cyanide (64%, 72%). The associated results in sample EP15_11.5_050119 are qualified as "UJ" based on potential low bias.

L1918914:

The LCS/LCSD for batch WG1234818 exhibited a percent recovery below the LCL for cyanide (42%, 44%). The associated results in sample EP11_10_050719 are qualified as "UJ" based on potential low bias.

L1919135:

The LCS for batch WG1235321 exhibited a percent recovery below the LCL for cyanide (61%). The associated results in sample EP09_11.5_050819 are qualified as "UJ" based on potential low bias.

L1926886:

The LCS for batch WG1251432 exhibited a percent recovery below the LCL for cyanide (79%). The associated results in sample EP04_8.5_062019 are qualified as "UJ" based on potential low bias.

L1929474:

The LCS/LCSD for batch WG1257312 exhibited RPDs above the control limit for cyanide (28%). The associated results in sample EP18_3.5_070819 are qualified as "UJ" based on potential indeterminate bias.

L1933114:

The LCS/LCSD for batch WG1264934 exhibited a percent recovery below the LCL for cyanide (72%, 78%). The associated results in sample EP08_6.5_072519 are qualified as "UJ" based on potential low bias.

L1933360:

The LCS/LCSD for batch WG1265580 exhibited percent recoveries below the LCL for cyanide (59%, 65%). The associated results in samples EP12_6.5_072619 and EP10_3_072619 are qualified as "UJ" based on potential low bias.

**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.

**VOCs by SW-846 Method 8260C:**

L1918068:

The ICV analyzed on 3/27/2019 at 04:29 exhibited a %D above the control limit for bromomethane (-25.7%). The associated results were previously qualified. No further action is necessary.

The CCV analyzed on 5/6/2019 at 09:59 exhibited %Ds above the control limit for chloromethane (-28.5%) and bromomethane (51.9%). The associated results were previously qualified. No further action is necessary.

L1918914:

The ICV analyzed on 3/27/2019 at 04:29 exhibited a %D above the control limit for bromomethane (-25.7%). The associated results were previously qualified. No further action is necessary.

The CCV analyzed on 5/9/2019 at 07:12 exhibited %Ds above the control limit for bromomethane (39.4%), chloromethane (22.5%), and trichlorofluoromethane (22.5%). The associated results were previously qualified. No further action is necessary.

L1919135:

The ICV analyzed on 3/27/2019 at 04:29 exhibited a %D above the control limit for bromomethane (-25.7%). The associated results were previously qualified. No further action is necessary.

The CCV analyzed on 5/13/2019 at 06:15 exhibited %Ds above the control limit for vinyl chloride (31.4%), bromomethane (48.9%), trichlorofluoromethane (28.6%), 2-butanone (29.9%), and 2-hexanone (32.0%). The associated results were previously qualified. No further action is necessary.

L1929474:

The sample EP18_3.5_070819 exhibited a percent recovery above the UCL for the surrogate 4-bromofluorobenzene (163%). The other four volatile surrogates were recovered within the control limits. No qualification is necessary.

The MB for batch WG1257413 exhibited detections of methyl tert butyl ether (10 ug/kg). The associated results are non-detections. No qualification is necessary.

The CCV analyzed on 7/9/2019 at 05:19 exhibited %Ds above the control limit for acetone (27.7%) and 2-butanone (22.6%). The associated results were previously qualified. No further action is necessary.

L1933114:

The LCS/LCSD for batch WG1265639 exhibited percent recoveries above the UCL for carbon tetrachloride (137%, 136%) and hexachlorobutadiene (134%, 132%). The associated results are non-detections. No qualification is necessary.

The MB for batch WG1265639 exhibited detections of methyl tert butyl ether (0.23 ug/kg). The associated results are non-detections. No qualification is necessary.

L1933360:

The sample EP10_3_072619 exhibited percent recoveries above the UCL for the surrogates 4-bromofluorobenzene (144%). The other three volatile surrogates were recovered within the control limits. No qualification is necessary.

The LCS/LCSD for batch WG1266691 exhibited percent recoveries above the UCL for 1,1,1-trichloroethane (139%, 137%), 2,2-dichloropropane (131%), bromochloromethane (134%, 135%), carbon tetrachloride (151%, 150%), and trichlorofluoromethane (145%, 145%). The associated results are non-detections. No qualification is necessary.

The MB for batch WG1266691 exhibited detections of methyl tert butyl ether (0.25 ug/kg). The associated results are non-detections. No qualification is necessary.

The LCS for batch WG1266714 exhibited percent recoveries above the UCL for hexachlorobutadiene (135%, 138%). The associated results are non-detections. No qualification is necessary.

The CCV analyzed on 7/30/2019 at 17:48 exhibited %Ds above the control limit for acetone (26.2%) and 2-butanone (28.0%). The associated results were previously qualified. No further action is necessary.

**SVOCs by SW-846 Method 8270D:**

L1918068:

The CCV analyzed on 5/8/2019 at 19:48 exhibited a %D above the control limit for 2,4-dinitrophenol (-35.1%). The associated results were previously qualified. No further action is necessary.

L1918914:

The MB for batch WG1235315 exhibited a detection of bis(2-ethylhexyl)phthalate (91 ug/kg). The associated results are non-detections. No qualification is necessary.

L1933114:

The LCSD for batch WG1265491 exhibited percent recoveries above the UCL for pentachlorophenol (115%) and phenol (93%). The associated results are non-detections. No qualification is necessary.

L1933360:

The sample EP12_6.5_072619 exhibited a percent recovery above the UCL for the surrogate nitrobenzene-d5 (127%). The other two base/neutral extractable surrogates were recovered within the control limits. No qualification is necessary.

The LCSD for batch WG1265491 exhibited percent recoveries above the UCL for pentachlorophenol (115%) and phenol (93%). The associated results are non-detections. No qualification is necessary.

**Metals by SW-846 Method 6020B:**

L1918068:

The MB for batch WG1232740 exhibited detections of iron (0.684 mg/kg) and manganese (0.304 mg/kg). The associated results are greater than ten times the contamination. No qualification is necessary.

L1918914:

The MB for batch WG1235017 exhibited detections of iron (0.704 mg/kg) and sodium (1.6 mg/kg). The associated results are greater than ten times the contamination. No qualification is necessary.

L1919135:

The MB for batch WG1235222 exhibited detections of barium (0.116 mg/kg), iron (0.98 mg/kg), and manganese (0.076 mg/kg). The associated results are greater than ten times the contamination. No qualification is necessary.

L1926886:

The MB for batch WG1251666 exhibited a detection of lead (0.112 mg/kg). The associated results are greater than ten times the contamination. No qualification is necessary.

L1929474:

The MB for batch WG1257421 exhibited detections of copper (0.116 mg/kg), sodium (2.4 mg/kg), and zinc (0.128 mg/kg). The associated results are greater than ten times the contamination. No qualification is necessary.

L1933360:

The MB for batch WG1265299 exhibited detections of antimony (0.176 mg/kg) and manganese (0.348 mg/kg). The associated results are greater than ten times the contamination or non-detections. No qualification is necessary.

**Cyanide by SW-846 Method 9012B:**

L1919135:

The MB for batch WG1235321 exhibited a detection of cyanide (0.4 mg/kg). The associated results are non-detections. No qualification is necessary.

**COMMENTS:**

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 data packages met ASP Category B requirements.

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

Signed:

Emily Strake, CEP
Senior Project Chemist

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:** Ashley Stappenbeck, Langan Staff Engineer

**From:** Emily Strake, Langan Senior Project Chemist

**Date:** August 27, 2019

**Re:** Data Usability Summary Report
For 300 West 122nd Street
April 2019 Soil Samples
Langan Project No.: 170500201

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of soil samples collected in April 2019 by Langan Engineering and Environmental Services ("Langan") at the 300 West 122nd Street site ("the site"). The samples were analyzed by Alpha Analytical Laboratories, Inc. (NYSDOH NELAP registration # 11148) for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), herbicides, polychlorinated biphenyls (PCBs), pesticides, metals including mercury (Hg), cyanide (CN), hexavalent chromium (CrVI), trivalent chromium (CrIII), and total solids (%S) by the methods specified below.

- VOCs by SW-846 Method 8260C
- SVOCs by SW-846 Method 8270D
- Herbicides by SW-846 Method 8151A
- PCBs by SW-846 Method 8082A
- Pesticides by SW-846 Method 8081B
- Metals by SW-846 Method 6010D
- Mercury by SW-846 Method 7471B
- Cyanide by SW-846 Method 9012B
- Hexavalent Chromium by SW-846 Method 7196A
- Trivalent Chromium (calculated)
- Total Solids by Standard Method 2540G

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* |
|---|---|---|---|---|
| L1917599 | L1917599-01 | REUSE05_GRAB01 | 4/29/2019 | VOCs, %S |
| L1917599 | L1917599-02 | REUSE05_GRAB02 | 4/29/2019 | VOCs, %S |
| L1917599 | L1917599-03 | REUSE05_COMP01 | 4/29/2019 | SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, %S |

**Validation Overview**

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-34A, "Trace Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-33A, "Low/Medium Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-35A, "Semivolatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-17, "Validating Chlorinated Herbicides" (December 2010, Revision 3.1), USEPA Region II SOP #HW-37A, "Polychlorinated Biphenyl (PCB) Aroclor Data Validation" (June 2015, Revision 0), USEPA Region II SOP #HW-36A, "Pesticide Data Validation" (October 2016, Revision 1), USEPA Region II SOP #HW-3a, "ICP-AES Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-3c, "Mercury and Cyanide Data Validation" (September 2016, Revision 1), the USEPA Contract Laboratory Program "National Functional Guidelines for Organic Superfund Methods Data Review" (EPA-540-R-2017-002, January 2017), the USEPA Contract Laboratory Program "National Functional Guidelines for Inorganic Superfund Methods Data Review" (EPA-540-R-2017-001, January 2017) and the specifics of the methods employed.

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, dual column performance, and overall system performance.

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* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| REUSE05_GRAB01 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| REUSE05_GRAB01 | 8260C | 67-64-1 | ACETONE | J |
| REUSE05_GRAB01 | 8260C | 107-02-8 | ACROLEIN | UJ |
| REUSE05_GRAB01 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| REUSE05_GRAB01 | 8260C | 74-87-3 | CHLOROMETHANE | UJ |
| REUSE05_GRAB01 | 8260C | 79-20-9 | METHYL ACETATE | UJ |
| REUSE05_GRAB01 | 8260C | 75-69-4 | TRICHLOROFLUOROMETHANE | UJ |
| REUSE05_GRAB02 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| REUSE05_GRAB02 | 8260C | 67-64-1 | ACETONE | UJ |
| REUSE05_GRAB02 | 8260C | 107-02-8 | ACROLEIN | UJ |
| REUSE05_GRAB02 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| REUSE05_GRAB02 | 8260C | 74-87-3 | CHLOROMETHANE | UJ |
| REUSE05_GRAB02 | 8260C | 79-20-9 | METHYL ACETATE | UJ |
| REUSE05_GRAB02 | 8260C | 75-69-4 | TRICHLOROFLUOROMETHANE | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| REUSE05_COMP01 | 8081B | 5103-74-2 | TRANS-CHLORDANE | J |
| REUSE05_COMP01 | 8082A | 12672-29-6 | AROCLOR 1248 | UJ |
| REUSE05_COMP01 | 8082A | 11097-69-1 | AROCLOR 1254 | UJ |
| REUSE05_COMP01 | 8082A | 11096-82-5 | AROCLOR 1260 | UJ |
| REUSE05_COMP01 | 8082A | 37324-23-5 | AROCLOR 1262 | UJ |
| REUSE05_COMP01 | 8082A | 11100-14-4 | AROCLOR 1268 | UJ |
| REUSE05_COMP01 | 8270D | 92-87-5 | BENZIDINE | UJ |
| REUSE05_COMP01 | 8270D | 65-85-0 | BENZOIC ACID | R |
| REUSE05_COMP01 | 8270D | 117-81-7 | BIS(2-ETHYLHEXYL)PHTHALATE | UJ |
| REUSE05_COMP01 | 8270D | 117-84-0 | DI-N-OCTYLPHTHALATE | UJ |
| REUSE05_COMP01 | 8270D | 77-47-4 | HEXACHLOROCYCLOPENTADIENE | UJ |
| REUSE05_COMP01 | 8270D | 87-86-5 | PENTACHLOROPHENOL | UJ |
| REUSE05_COMP01 | 9012B | 57-12-5 | CYANIDE, TOTAL | UJ |

**MAJOR DEFICIENCIES:**

Major deficiencies include those that grossly impact data quality and necessitate the rejection of results. The section below describes the major deficiencies that were identified.

**SVOCs by SW-846 Method 8270D:**

The laboratory control sample and duplicate (LCS/LCSD) for batch WG1231750 exhibited a percent recovery below 10% for benzoic acid (0%, 0%). The associated result in sample REUSE05_COMP01 is rejected based on significant variance.

**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 calibration (ICAL) for instrument VOA110 exhibited a response factor (RF) below the control limit for 1,4-dioxane (0.005). The associated results in samples REUSE05_GRAB01 and REUSE05_GRAB02 are qualified as "UJ" based on potential indeterminate bias.

The initial calibration verification (ICV) analyzed on 3/27/2019 at 04:29 exhibited percent differences (%Ds) above the control limit for chloromethane (-20.1%) and bromomethane (-25.7%). The associated results in samples REUSE05_GRAB01 and REUSE05_GRAB02 are qualified as "UJ" based on potential indeterminate bias.

The continuing calibration verification (CCV) analyzed on 4/30/2019 at 07:28 exhibited %Ds above the control limit for trichlorofluoromethane (24.6%), acrolein (-21.1%), acetone (-22.9%), and methyl acetate (-23.4%). The associated results in samples REUSE05_GRAB01 and REUSE05_GRAB02 are qualified as "J" or "UJ" based on potential indeterminate bias.

**SVOCs by SW-846 Method 8270D:**

The CCV analyzed on 4/30/2019 at 04:30 exhibited %Ds above the control limit for hexachlorocyclopentadiene (20.3%), pentachlorophenol (-24.6%), benzidine (23.3%), bis(2-ethylhexyl)phthalate (-27.9%), and di-n-octylphthalate (-27.5%). The associated results in sample REUSE05_COMP01 are qualified as "UJ" based on potential indeterminate bias.

**PCBs by SW-846 Method 8082A:**

The CCV analyzed on 4/30/2019 at 08:51 exhibited a %D above the control limit for PCB 1260 (20.3%). The associated results in sample REUSE05_COMP01 are qualified as "UJ" based on potential indeterminate bias.

**Pesticides by SW-846 Method 8081B:**

The sample REUSE05_COMP01 exhibited a relative percent difference above the control limit between the primary and secondary GC columns for trans-chlordane. The associated result is qualified as "J" based on potential indeterminate bias.

**Cyanide by SW-846 Method 9012B:**

The LCS/LCSD for batch WG1231767 exhibited a percent recovery below the lower control limit for total cyanide (79%, 69%). The associated result in sample REUSE05_COMP01 is qualified as "UJ" based on potential low bias.

**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:**

The sample REUSE05_COMP01 exhibited a percent recovery above the upper control limit for the surrogate 2,4,6-tribromophenol (166%). The other two acid extractable surrogates were recovered within the control limits. No qualification is necessary.

**COMMENTS:**

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 data packages met ASP Category B requirements.

All data are considered usable, as qualified, with the exception of the rejected results. In addition, completeness, defined as the percentage of analytical results that are judged to be valid, is 99.7%.

Signed:

Emily Strake, CEP
Senior Project Chemist

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:** Julia Leung, Langan Project Engineer

**From:** Emily Strake, Langan Senior Project Chemist

**Date:** September 6, 2018

**Re:** Data Usability Summary Report
For 300 W. 122nd Street
New York, New York
Soil Samples Collected August 2018
Langan Project No.: 170500202

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of soil samples collected in August, 2018 by Langan Engineering and Environmental Services ("Langan") at 300 West 122nd Street located in New York, New York. The samples were analyzed by Alpha Analytical located in Westborough, MA (NYSDOH ELAP registration number 11148) for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and percent solids (%S) using the analytical methods specified below.

- VOCs by SW-846 Method 8260C
- SVOCs by SW-846 Method 8270D
- Percent Solids by SM2540G

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* |
|---|---|---|---|---|
| L1830851 | L1830851-01 | UST06_B1_9-10 | 08/08/18 | VOCs, SVOCs, %S |
| L1830851 | L1830851-02 | UST06_B2_9-10 | 08/08/18 | VOCs, SVOCs, %S |
| L1831141 | L1831141-01 | UST07_B1_13-14 | 08/09/18 | VOCs, SVOCs, %S |
| L1831141 | L1831141-02<br>L1831141-03 | UST07_B2_13-14 | 08/09/18<br>08/10/18 | VOCs, %S<br>SVOCs, %S |
| L1831308 | L1831308-01 | UST07_B2_13-14 | 08/09/18 | VOCs, SVOCs, %S |
| L1831308 | L1831308-02 | UST08_B1_13-14 | 08/10/18 | VOCs, SVOCs, %S |
| L1831308 | L1831308-03 | UST08_B2_13-14 | 08/10/18 | VOCs, SVOCs, %S |
| L1831308 | L1831308-04 | UST09_B1_11-12 | 08/10/18 | VOCs, SVOCs, %S |
| L1831308 | L1831308-05 | UST09_B2_11-12 | 08/10/18 | VOCs, SVOCs, %S |

## VALIDATION OVERVIEW

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-34a, "Trace Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-35A, "Semivolatile Data Validation" (September 2016, Revision 1), the USEPA Contract Laboratory Program "National Functional Guidelines for Organic Superfund Methods Data Review" (EPA-540-R-2017-002, January 2017), and the specifics of the methods employed.

Validation includes evaluation 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, instrument tuning, instrument calibration, laboratory blanks, laboratory control samples, system monitoring compounds, internal standard area counts, matrix spike/spike duplicate recoveries, interference check samples, laboratory duplicates, target compound identification and quantification, chromatograms, and overall system performance.

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 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 subject to 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**

| *Project Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| UST07_B1_13-14 | 8260C | 71-43-2 | Benzene | J |

**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 continuing calibration analyzed on 8/11/18 at 09:55 displayed a %D greater than the control limit with a positive bias for benzene at 20.6%. The associated positive detection is qualified as "J", for estimated.

**OTHER DEFICIENCIES:**

Other deficiencies include anomalies that do not directly impact data quality and do not necessitate qualification. No other deficiencies that were identified.

**COMMENTS:**

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 laboratory data packages met ASP Category B requirements and all sample holding times were met.

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, CEP
Senior Project Chemist

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# 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:** Ashley Stappenbeck, Langan Staff Engineer

**From:** Emily Strake, Langan Senior Project Chemist

**Date:** September 12, 2019

**Re:** Data Usability Summary Report
For 300 W 122nd Street
September 2018 and 2019 Soil Samples
Langan Project No.: 170500201

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of soil samples collected in September 2018 and 2019 by Langan Engineering and Environmental Services ("Langan") at the 300 W 122nd Street site ("the site"). The samples were analyzed by Alpha Analytical Laboratories, Inc. (NYSDOH NELAP registration # 11148) for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), herbicides, polychlorinated biphenyls (PCBs), pesticides, metals including mercury (Hg), cyanide (CN), hexavalent chromium (CrVI), trivalent chromium (CrIII), and total solids (%S) by the methods specified below.

- VOCs by SW-846 Method 8260C
- SVOCs by SW-846 Method 8270D
- Herbicides by SW-846 Method 8151A
- PCBs by SW-846 Method 8082A
- Pesticides by SW-846 Method 8081B
- Metals by SW-846 Method 6010D
- Mercury by SW-846 Method 7471B
- Cyanide by SW-846 Method 9012B
- Hexavalent Chromium by SW-846 Method 7196A
- Trivalent Chromium (calculated)
- Total Solids by Standard Method 2540G

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* |
|---|---|---|---|---|
| L1835505 | L1835505-01 | REUSE02_COMP01 | 9/7/2018 | SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, %S |
| L1835505 | L1835505-02 | REUSE02_GRAB01 | 9/7/2018 | VOCs, %S |
| L1939948 | L1939948-01 | EP05_9.0_090319 | 9/3/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, %S |

**Validation Overview**

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-34A, "Trace Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-33A, "Low/Medium Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-35A, "Semivolatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-17, "Validating Chlorinated Herbicides" (December 2010, Revision 3.1), USEPA Region II SOP #HW-37A, "Polychlorinated Biphenyl (PCB) Aroclor Data Validation" (June 2015, Revision 0), USEPA Region II SOP #HW-36A, "Pesticide Data Validation" (October 2016, Revision 1), USEPA Region II SOP #HW-3a, "ICP-AES Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-3c, "Mercury and Cyanide Data Validation" (September 2016, Revision 1), the USEPA Contract Laboratory Program "National Functional Guidelines for Organic Superfund Methods Data Review" (EPA-540-R-2017-002, January 2017), the USEPA Contract Laboratory Program "National Functional Guidelines for Inorganic Superfund Methods Data Review" (EPA-540-R-2017-001, January 2017) and the specifics of the methods employed.

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, serial dilutions, dual column performance, and overall system performance.

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* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| REUSE02_COMP01 | 8081B | 5103-71-9 | CIS-CHLORDANE | J |
| REUSE02_COMP01 | 8081B | 5103-74-2 | TRANS-CHLORDANE | J |
| REUSE02_COMP01 | 8270D | 105-60-2 | CAPROLACTAM | UJ |
| REUSE02_COMP01 | 9012B | 57-12-5 | CYANIDE | UJ |
| REUSE02_GRAB01 | 8260C | 630-20-6 | 1,1,1,2-TETRACHLOROETHANE | UJ |
| REUSE02_GRAB01 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| REUSE02_GRAB01 | 8260C | 78-93-3 | 2-BUTANONE | UJ |
| REUSE02_GRAB01 | 8260C | 107-02-8 | ACROLEIN | UJ |
| REUSE02_GRAB01 | 8260C | 75-27-4 | BROMODICHLOROMETHANE | UJ |
| REUSE02_GRAB01 | 8260C | 75-25-2 | BROMOFORM | UJ |
| REUSE02_GRAB01 | 8260C | 74-83-9 | BROMOMETHANE | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| REUSE02_GRAB01 | 8260C | 75-15-0 | CARBON DISULFIDE | UJ |
| REUSE02_GRAB01 | 8260C | 56-23-5 | CARBON TETRACHLORIDE | UJ |
| REUSE02_GRAB01 | 8260C | 74-87-3 | CHLOROMETHANE | UJ |
| REUSE02_GRAB01 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| REUSE02_GRAB01 | 8260C | 75-65-0 | TERT-BUTYL ALCOHOL | J |
| REUSE02_GRAB01 | 8260C | 108-05-4 | VINYL ACETATE | UJ |
| EP05_9.0_090319 | 7196A | 18540-29-9 | CHROMIUM, HEXAVALENT | UJ |
| EP05_9.0_090319 | 8081B | 1031-07-8 | ENDOSULFAN SULFATE | UJ |
| EP05_9.0_090319 | 8081B | 7421-93-4 | ENDRIN ALDEHYDE | UJ |
| EP05_9.0_090319 | 8081B | 53494-70-5 | ENDRIN KETONE | UJ |
| EP05_9.0_090319 | 8151A | 93-76-5 | 2,4,5-T | UJ |
| EP05_9.0_090319 | 8151A | 93-72-1 | 2,4,5-TP | UJ |
| EP05_9.0_090319 | 8260C | 95-63-6 | 1,2,4-TRIMETHYLBENZENE | UJ |
| EP05_9.0_090319 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP05_9.0_090319 | 8260C | 78-93-3 | 2-BUTANONE | UJ |
| EP05_9.0_090319 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| EP05_9.0_090319 | 8260C | 107-13-1 | ACRYLONITRILE | UJ |
| EP05_9.0_090319 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP05_9.0_090319 | 8260C | 75-15-0 | CARBON DISULFIDE | UJ |
| EP05_9.0_090319 | 8260C | 75-00-3 | CHLOROETHANE | UJ |
| EP05_9.0_090319 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| EP05_9.0_090319 | 8260C | 104-51-8 | N-BUTYLBENZENE | UJ |
| EP05_9.0_090319 | 8260C | 105-05-5 | 1,4-DIETHYLBENZENE | UJ |
| EP05_9.0_090319 | 8260C | 622-96-8 | 4-ETHYLTOLUENE | UJ |
| EP05_9.0_090319 | 8260C | 99-87-6 | P-ISOPROPYLTOLUENE | UJ |
| EP05_9.0_090319 | 8260C | 110-57-6 | TRANS-1,4-DICHLORO-2-BUTENE | UJ |
| EP05_9.0_090319 | 8270D | 91-94-1 | 3,3'-DICHLOROBENZIDINE | UJ |
| EP05_9.0_090319 | 8270D | 65-85-0 | BENZOIC ACID | R |
| EP05_9.0_090319 | 8270D | 117-81-7 | BIS(2-ETHYLHEXYL)PHTHALATE | UJ |
| EP05_9.0_090319 | 8270D | 117-84-0 | DI-N-OCTYLPHTHALATE | UJ |
| EP05_9.0_090319 | 6010D | 7440-70-2 | CALCIUM | J |
| EP05_9.0_090319 | 6010D | 7440-47-3 | CHROMIUM | J |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP05_9.0_090319 | 6010D | 7440-50-8 | COPPER | J |
| EP05_9.0_090319 | 9012B | 57-12-5 | CYANIDE | UJ |
| EP05_9.0_090319 | 6010D | 7439-96-5 | MANGANESE | J |
| EP05_9.0_090319 | 6010D | 7440-02-0 | NICKEL | J |
| EP05_9.0_090319 | 6010D | 7440-62-2 | VANADIUM | J |
| EP05_9.0_090319 | 6010D | 7440-66-6 | ZINC | J |

**MAJOR DEFICIENCIES:**

Major deficiencies include those that grossly impact data quality and necessitate the rejection of results. The section below describes the major deficiencies that were identified.

**SVOCs by SW-846 Method 8270D:**

L1939948:

The laboratory control sample and duplicate (LCS/LCSD) for batch WG1279865 exhibited a percent recovery less than 10% for benzoic acid (0%). The associated results in sample EP05_9.0_090319 are rejected.

**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:**

L1835505:

The LCSD for batch WG1156524 exhibited a percent recovery below the lower control limit (LCL) for 2-butanone (69%). The associated results in sample REUSE02_GRAB01 are qualified as "UJ" based on potential low bias.

The initial calibration (ICAL) for instrument CHARLIE exhibited response factors (RFs) below the control limit for acrolein (0.043), tert-butyl alcohol (0.035), and 1,4-dioxane (0.004). The associated results in sample REUSE02_GRAB01 are qualified as "J" or "UJ" based on potential indeterminate bias.

The initial calibration verification (ICV) analyzed on 9/7/2018 at 04:07 exhibited percent differences (%Ds) above the control limit for dichlorodifluoromethane (-39.3%), chloromethane (-20.6%),

bromomethane (-47.6%), carbon disulfide (26.5%), and vinyl acetate (24.5%). The associated results in sample REUSE02_GRAB01 are qualified as "UJ" based on potential indeterminate bias.

The continuing calibration verification (CCV) analyzed on 9/12/2018 at 18:34 exhibited %Ds above the control limit for carbon tetrachloride (20.9%), bromodichloromethane (20.3%), 1,1,1,2-tetrachloroethane (20.2%), and bromoform (20.1%). The associated results in sample REUSE02_GRAB01 are qualified as "UJ" based on potential indeterminate bias.

L1939948:

The ICAL for instrument VOA111 exhibited RFs below the control limit for 2-butanone (0.090), 1,4-dioxane (0.002), and 4-methyl-2-pentanone (0.092). The associated results in sample EP05_9.0_090319 are qualified as "UJ" based on potential indeterminate bias.

The ICV analyzed on 6/17/2019 at 12:12 exhibited %Ds above the control limit for carbon disulfide (23.1%), 1,2,4-trimethylbenzene (-21.6%), p-isopropyltoluene (-20.2%), and n-butylbenzene (-20.8%). The associated results in sample EP05_9.0_090319 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 9/4/2019 at 06:17 exhibited %Ds above the control limit for dichlorodifluoromethane (54.5%), bromomethane (30.7%), chloroethane (20.6%), acrylonitrile (-25.0%), 4-ethyltoluene (-23.4%), trans-1,4-dichloro-2-butene (-20.2%), p-diethylbenzene (-23.6%), 1,2,4,5-tetramethylbenzene (-22.4%), and 1,3,5-trichlorobenzene (-20.5%). The associated results in sample EP05_9.0_090319 are qualified as "UJ" based on potential indeterminate bias.

**SVOCs by SW-846 Method 8270D:**

L1835505:

The LCS/LCSD for batch WG1154975 exhibited percent recoveries above the upper control limit (UCL) for 4-nitrophenol (146%, 131%) and p-chloro-m-cresol (106%). The associated results are non-detections. No qualification is necessary.

The CCV analyzed on 9/11/2018 at 21:12 exhibited a %D above the control limit for caprolactam (-25.7%). The associated results in sample REUSE02_COMP01 are qualified as "UJ" based on potential indeterminate bias.

L1939948:

The LCS/LCSD for batch WG1279865 exhibited a percent recovery below the LCL for 3,3'-dichlorobenzidine (39%, 38%). The associated results in sample EP05_9.0_090319 are qualified as "UJ" based on potential low bias.

The CCV analyzed on 9/4/2019 at 10:39 exhibited %Ds above the control limit for bis(2-ethylhexyl)phthalate (-27.9%) and di-n-octylphthalate (-28.8%). The associated results in sample EP05_9.0_090319 are qualified as "UJ" based on potential indeterminate bias.

**Herbicides by SW-846 Method 8151A:**

L1939948:

The CCV analyzed on 9/4/2019 at 12:27 exhibited %Ds above the control limit for 2,4,5-tp (-15.8%) and 2,4,5-t (-42.1%). The associated results in sample EP05_9.0_090319 are qualified as "UJ" based on potential indeterminate bias.

**Pesticides by SW-846 Method 8081B:**

L1835505:

The sample REUSE02_COMP01 exhibited RPDs above the control limit between the primary and secondary GC columns for cis-chlordane (46%) and trans-chlordane (187%). The associated results are qualified as "J" based on potential indeterminate bias.

L1939948:

The LCS/LCSD for batch WG1279447 exhibited RPDs above the control limit for endosulfan sulfate (58%), endrin aldehyde (58%), and endrin ketone (34%). The associated results in sample EP05_9.0_090319 are qualified as "UJ" based on potential indeterminate bias.

**Metals by SW-846 Method 6010D:**

L1939948:

The laboratory duplicate and parent sample (EP05_9.0_090319) exhibited RPDs above the control limit for chromium (40%), copper (25%), nickel (30%), vanadium (45%), and zinc (29%). The associated results are qualified as "J" based on potential indeterminate bias.

The serial dilution for sample EP05_9.0_090319 exhibited %Ds above the control limit for calcium (33%) and manganese (21%). The associated results are qualified as "J" based on potential indeterminate bias.

**Cyanide by SW-846 Method 9012B:**

L1835505:

The LCSD for batch WG1154932 exhibited a percent recovery below the LCL for cyanide (77%). The associated results in sample REUSE02_COMP01 are qualified as "UJ" based on potential low bias.

L1939948:

The LCS/LCSD for batch WG1279929 exhibited a percent recovery below the LCL for cyanide (57%, 68%). The associated results in sample EP05_9.0_090319 are qualified as "UJ" based on potential low bias.

**Hexavalent Chromium by SW-846 Method 7196A:**

L1939948:

The LCS for batch WG1279930 exhibited a percent recovery below the LCL for chromium, hexavalent (77%). The associated results in sample EP05_9.0_090319 are qualified as "UJ" based on potential low bias.

**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.

**VOCs by SW-846 Method 8260C:**

L1835505:

The CCV analyzed on 9/12/2018 at 18:34 exhibited %Ds above the control limit for chloromethane (21.0%), tert-butyl alcohol (20.0%), vinyl acetate (26.0%), and 2-butanone (28.6%). The associated results were previously qualified. No further action is necessary.

L1939948:

The method blank (MB) for batch WG1280099 exhibited detections of chloroform (0.16 ug/kg) and methyl tert-butyl ether (0.35 ug/kg). The associated results are non-detections. No qualification is necessary.

The CCV analyzed on 9/4/2019 at 06:17 exhibited %Ds above the control limit for 4-methyl-2-pentanone (-28.3%) and n-butylbenzene (-21.2%). The associated results were previously qualified. No further action is necessary.

**Pesticides by SW-846 Method 8081B:**

L1939948:

The CCV analyzed on 9/4/2019 at 09:00 exhibited a %D above the control limit for endosulfan sulfate (-25.6%). The associated results were previously qualified. No further action is necessary.

**Metals by SW-846 Method 6010D:**

L1835505:

The MB for batch WG1156575 exhibited a detection of iron (0.544 mg/kg). The associated results are greater than ten times the contamination. No qualification is necessary.

L1939948:

The MB for batch WG1279932 exhibited detections of iron (0.64 mg/kg) and manganese (0.192 mg/kg). The associated results are greater than ten times the contamination. No qualification is necessary.

The matrix spike and duplicate for batch WG1279932 exhibited percent recoveries above the UCL for aluminum (463%) and iron (1000%). The associated results in the parent sample are greater than four times the spiked amount. No qualification is necessary.

**COMMENTS:**

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 data packages met ASP Category B requirements.

All data are considered usable, as qualified, with the exception of the rejected results. In addition, completeness, defined as the percentage of analytical results that are judged to be valid, is 99.8%.

Signed:

Emily Strake, CEP
Senior Project Chemist

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:** Ashley Stappenbeck, Langan Staff Engineer

**From:** Emily Strake, Langan Senior Project Chemist

**Date:** September 12, 2019

**Re:** Data Usability Summary Report
For 300 W 122nd Street
September 2019 Groundwater Sample
Langan Project No.: 170500201

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of one groundwater sample collected in September 2019 by Langan Engineering and Environmental Services ("Langan") at the 300 W 122nd Street site ("the site"). The sample was analyzed by Alpha Analytical Laboratories, Inc. (NYSDOH NELAP registration # 11148) for volatile organic compounds (VOCs) by the method specified below.

- VOCs by SW-846 Method 8260C

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* |
|---|---|---|---|---|
| L1939948 | L1939948-02 | PM_GW07_090319 | 9/3/2019 | VOCs |

**Validation Overview**

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-34A, "Trace Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-33A, "Low/Medium Volatile Data Validation" (September 2016, Revision 1), the USEPA Contract Laboratory Program "National Functional Guidelines for Organic Superfund Methods Data Review" (EPA-540-R-2017-002, January 2017), and the specifics of the methods employed.

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, instrument tuning, instrument calibration, laboratory blanks, laboratory control samples, system monitoring compounds, internal standard area counts, target compound identification and quantification, chromatograms, and overall system performance.

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* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| PM_GW07_090319 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| PM_GW07_090319 | 8260C | 78-93-3 | 2-BUTANONE | UJ |
| PM_GW07_090319 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| PM_GW07_090319 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| PM_GW07_090319 | 8260C | 135-98-8 | SEC-BUTYLBENZENE | 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 calibration verification analyzed on 8/5/2019 at 22:33 exhibited percent differences (%Ds) above the control limit for dichlorodifluoromethane (-26.5%), 1,4-dioxane (54.8%), and sec-butylbenzene (-23.6%). The associated results in sample PM_GW07_090319 are qualified as "UJ" based on potential indeterminate bias.

The continuing calibration verification (CCV) analyzed on 9/8/2019 at 12:46 exhibited %Ds above the control limit for bromomethane (41.6%) and 2-butanone (-23.5%). The associated results in sample PM_GW07_090319 are qualified as "UJ" based on potential indeterminate bias.

**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.

**VOCs by SW-846 Method 8260C:**

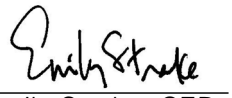
The CCV analyzed on 9/8/2019 at 12:46 exhibited a %D above the control limit for 1,4-dioxane (-31.5%). The associated results were previously qualified. No further action is necessary.

**COMMENTS:**

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 data packages met ASP Category B requirements.

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

Signed:



Emily Strake, CEP
Senior Project Chemist

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:** Ashley Stappenbeck, Langan Staff Engineer

**From:** Emily Strake, Langan Senior Project Chemist

**Date:** September 13, 2019

**Re:** Data Usability Summary Report
For 300 West 122nd Street
August 2019 Groundwater Samples
Langan Project No.: 170500201

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of groundwater samples collected in August 2019 by Langan Engineering and Environmental Services ("Langan") at the 300 West 122nd Street site ("the site"). The samples were analyzed by Alpha Analytical Laboratories, Inc. (NYSDOH NELAP registration # 11148) for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs) by the method specified below.

- VOCs by SW-846 Method 8260C

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* |
|---|---|---|---|---|
| L1937322 | L1937322-01 | PM_GW06_081919 | 8/19/2019 | VOCs |
| L1937322 | L1937322-02 | PM_DUP01_081919 | 8/19/2019 | VOCs |

**Validation Overview**

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-34A, "Trace Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-33A, "Low/Medium Volatile Data Validation" (September 2016, Revision 1), the USEPA Contract Laboratory Program "National Functional Guidelines for Organic Superfund Methods Data Review" (EPA-540-R-2017-002, January 2017), and the specifics of the methods employed.

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, 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, and field duplicate 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* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| PM_GW06_081919 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| PM_GW06_081919 | 8260C | 67-64-1 | ACETONE | J |
| PM_GW06_081919 | 8260C | 74-83-9 | BROMOMETHANE | J |
| PM_GW06_081919 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| PM_GW06_081919 | 8260C | 95-49-8 | O-CHLOROTOLUENE | UJ |
| PM_GW06_081919 | 8260C | 135-98-8 | SEC-BUTYLBENZENE | J |
| PM_GW06_081919 | 8260C | 75-69-4 | TRICHLOROFLUOROMETHANE | UJ |
| PM_DUP01_081919 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| PM_DUP01_081919 | 8260C | 67-64-1 | ACETONE | J |
| PM_DUP01_081919 | 8260C | 74-83-9 | BROMOMETHANE | J |
| PM_DUP01_081919 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| PM_DUP01_081919 | 8260C | 95-49-8 | O-CHLOROTOLUENE | UJ |
| PM_DUP01_081919 | 8260C | 135-98-8 | SEC-BUTYLBENZENE | J |
| PM_DUP01_081919 | 8260C | 75-69-4 | TRICHLOROFLUOROMETHANE | 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 laboratory control sample and duplicate for batch WG1275704 exhibited a relative percent difference (RPD) above the control limit for o-chlorotoluene (23%). The associated results in sample PM_GW06_081919 and PM_DUP01_081919 are qualified as "UJ" based on potential indeterminate bias.

The initial calibration verification analyzed on 8/5/2019 at 22:33 exhibited percent differences (%Ds) above the control limit for 1,4-dioxane (54.8%), dichlorodifluoromethane (-26.5%), and sec-butylbenzene (-23.6%). The associated results in sample PM_GW06_081919 and PM_DUP01_081919 are qualified as "J" or "UJ" based on potential indeterminate bias.

The continuing calibration verification (CCV) analyzed on 8/22/2019 at 18:57 exhibited %Ds above the control limit for bromomethane (55.7%), trichlorofluoromethane (20.5%), and acetone (-22.6%). The associated results in sample PM_GW06_081919 and PM_DUP01_081919 are qualified as "J" or "UJ" based on potential indeterminate bias.

**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.

**VOCs by SW-846 Method 8260C:**

The matrix spike and duplicate (MS/MSD) for batch WG1275704 exhibited percent recoveries above the upper control limit for 1,1,2-trichloroethane (390%, 410%), 2-butanone (470%, 490%), 2-hexanone (140%, 160%), and naphthalene (140%). Organic results are not qualified on the basis of MS/MSD recoveries alone. No qualification is necessary.

The MS/MSD for batch WG1275704 exhibited an RPD above the control limit for 1,4-dioxane (29%). Organic results are not qualified on the basis of MS/MSD RPDs alone. No qualification is necessary.

The CCV analyzed on 8/22/2019 at 18:57 exhibited a %D above the control limit for dichlorodifluoromethane (24.0%). The associated results were previously qualified. No further action is necessary.

**COMMENTS:**

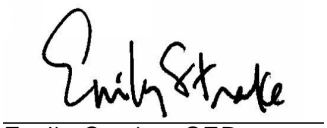
One field duplicate and parent sample pair was collected and analyzed for all parameters. For results less than 5X the RL, analytes meet the precision criteria if the absolute difference is less than ±1X the RL. For results greater than 5X the RL, analytes meet the precision criteria if the RPD is less than or equal to 30% for groundwater. The following field duplicate and parent sample pair was compared to the precision criteria:

- PM_DUP01_081919 and PM_GW06_081919: Criteria met for all analytes.

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 data packages met ASP Category B requirements.

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

Signed:



Emily Strake, CEP
Senior Project Chemist

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:** Ashley Stappenbeck, Langan Staff Engineer

**From:** Emily Strake, Langan Senior Project Chemist

**Date:** September 16, 2019

**Re:** Data Usability Summary Report
For 300 West 122nd Street
August 2019 Soil Samples
Langan Project No.: 170500201

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of soil samples collected in August 2019 by Langan Engineering and Environmental Services ("Langan") at the 300 West 122nd Street site ("the site"). The samples were analyzed by Alpha Analytical Laboratories, Inc. (NYSDOH NELAP registration # 11148) for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), herbicides, polychlorinated biphenyls (PCBs), pesticides, metals including mercury (Hg), cyanide (CN), hexavalent chromium (CrVI), trivalent chromium (CrIII), and total solids (%S) by the methods specified below.

- VOCs by SW-846 Method 8260C
- SVOCs by SW-846 Methods 8270D and 8270D SIM
- Herbicides by SW-846 Method 8151A
- PCBs by SW-846 Method 8082A
- Pesticides by SW-846 Method 8081B
- Metals by SW-846 Methods 6010D and 6020B
- Mercury by SW-846 Methods 7471B and 7470A
- Cyanide by SW-846 Method 9012B
- Hexavalent Chromium by SW-846 Method 7196A
- Trivalent Chromium (calculated)
- Total Solids by Standard Method 2540G

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* |
|---|---|---|---|---|
| L1936709 | L1936709-01 | EP13_10.5_081419 | 8/14/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, HG, CN, CrVI, CrIII, %S |
| L1936709 | L1936709-02 | EP16_9.5_081419 | 8/14/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, HG, CN, CrVI, CrIII, %S |
| L1936709 | L1936709-03 | DUP01_081419 | 8/14/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, HG, CN, CrVI, CrIII, %S |
| L1936709 | L1936709-04 | DUP02_081419 | 8/14/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, HG, CN, CrVI, CrIII, %S |
| L1936709 | L1936709-05 | EP_FB02_081419 | 8/14/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, HG, CN, CrVI, CrIII, %S |
| L1937835 | L1937835-01 | EP07_8.5_082119 | 8/21/2019 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, HG, CN, CrVI, CrIII, %S |

**Validation Overview**

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-34A, "Trace Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-33A, "Low/Medium Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-35A, "Semivolatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-17, "Validating Chlorinated Herbicides" (December 2010, Revision 3.1), USEPA Region II SOP #HW-37A, "Polychlorinated Biphenyl (PCB) Aroclor Data Validation" (June 2015, Revision 0), USEPA Region II SOP #HW-36A, "Pesticide Data Validation" (October 2016, Revision 1), USEPA Region II SOP #HW-3a, "ICP-AES Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-3b, "ICP-MS Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-3c, "Mercury and Cyanide Data Validation" (September 2016, Revision 1), the USEPA Contract Laboratory Program "National Functional Guidelines for Organic Superfund Methods Data Review" (EPA-540-R-2017-002, January 2017), the USEPA Contract Laboratory Program "National Functional Guidelines for Inorganic Superfund Methods Data Review" (EPA-540-R-2017-001, January 2017) and the specifics of the methods employed.

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, and field 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* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP13_10.5_081419 | 8260C | 96-12-8 | 1,2-DIBROMO-3-CHLOROPROPANE | UJ |
| EP13_10.5_081419 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP13_10.5_081419 | 8151A | 93-76-5 | 2,4,5-T | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP13_10.5_081419 | 8151A | 93-72-1 | 2,4,5-TP | UJ |
| EP13_10.5_081419 | 8151A | 94-75-7 | 2,4-D | UJ |
| EP13_10.5_081419 | 8260C | 78-93-3 | 2-BUTANONE | UJ |
| EP13_10.5_081419 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| EP13_10.5_081419 | 8260C | 67-64-1 | ACETONE | J |
| EP13_10.5_081419 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP13_10.5_081419 | 8260C | 75-15-0 | CARBON DISULFIDE | UJ |
| EP13_10.5_081419 | 8260C | 74-87-3 | CHLOROMETHANE | UJ |
| EP13_10.5_081419 | 9012B | 57-12-5 | CYANIDE | UJ |
| EP13_10.5_081419 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| EP13_10.5_081419 | 8270D | 117-84-0 | DI-N-OCTYLPHTHALATE | UJ |
| EP13_10.5_081419 | 8270D | 193-39-5 | INDENO(1,2,3-CD)PYRENE | J |
| EP13_10.5_081419 | 6010D | 7439-92-1 | LEAD | J |
| EP13_10.5_081419 | 8260C | 79-01-6 | TRICHLOROETHENE | UJ |
| EP13_10.5_081419 | 8260C | 108-05-4 | VINYL ACETATE | UJ |
| EP13_10.5_081419 | 8260C | 75-01-4 | VINYL CHLORIDE | UJ |
| EP16_9.5_081419 | 8260C | 96-12-8 | 1,2-DIBROMO-3-CHLOROPROPANE | UJ |
| EP16_9.5_081419 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP16_9.5_081419 | 8151A | 93-76-5 | 2,4,5-T | UJ |
| EP16_9.5_081419 | 8151A | 93-72-1 | 2,4,5-TP | UJ |
| EP16_9.5_081419 | 8151A | 94-75-7 | 2,4-D | UJ |
| EP16_9.5_081419 | 8260C | 78-93-3 | 2-BUTANONE | UJ |
| EP16_9.5_081419 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| EP16_9.5_081419 | 8260C | 67-64-1 | ACETONE | J |
| EP16_9.5_081419 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP16_9.5_081419 | 8260C | 75-15-0 | CARBON DISULFIDE | UJ |
| EP16_9.5_081419 | 8260C | 74-87-3 | CHLOROMETHANE | UJ |
| EP16_9.5_081419 | 6010D | 7440-47-3 | CHROMIUM | J |
| EP16_9.5_081419 | CALC | 16065-83-1 | CHROMIUM, TRIVALENT | J |
| EP16_9.5_081419 | 9012B | 57-12-5 | CYANIDE | UJ |
| EP16_9.5_081419 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| EP16_9.5_081419 | 8270D | 117-84-0 | DI-N-OCTYLPHTHALATE | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP16_9.5_081419 | 8270D | 193-39-5 | INDENO(1,2,3-CD)PYRENE | J |
| EP16_9.5_081419 | 8260C | 79-01-6 | TRICHLOROETHENE | UJ |
| EP16_9.5_081419 | 8260C | 108-05-4 | VINYL ACETATE | UJ |
| EP16_9.5_081419 | 8260C | 75-01-4 | VINYL CHLORIDE | UJ |
| DUP01_081419 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| DUP01_081419 | 8151A | 93-76-5 | 2,4,5-T | UJ |
| DUP01_081419 | 8151A | 93-72-1 | 2,4,5-TP | UJ |
| DUP01_081419 | 8260C | 591-78-6 | 2-HEXANONE | UJ |
| DUP01_081419 | 8270D | 534-52-1 | 4,6-DINITRO-O-CRESOL | UJ |
| DUP01_081419 | 8260C | 67-64-1 | ACETONE | J |
| DUP01_081419 | 8260C | 107-13-1 | ACRYLONITRILE | UJ |
| DUP01_081419 | 6010D | 7440-38-2 | ARSENIC | U (0.85) |
| DUP01_081419 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| DUP01_081419 | 8270D | 85-68-7 | BUTYL BENZYL PHTHALATE | UJ |
| DUP01_081419 | 8260C | 75-15-0 | CARBON DISULFIDE | UJ |
| DUP01_081419 | 8260C | 75-00-3 | CHLOROETHANE | UJ |
| DUP01_081419 | 8081B | 5103-71-9 | CIS-CHLORDANE | J |
| DUP01_081419 | 9012B | 57-12-5 | CYANIDE | UJ |
| DUP01_081419 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| DUP01_081419 | 8270D | 84-74-2 | DI-N-BUTYLPHTHALATE | UJ |
| DUP01_081419 | 8260C | 60-29-7 | ETHYL ETHER | UJ |
| DUP01_081419 | 6010D | 7439-92-1 | LEAD | J |
| DUP01_081419 | 6010D | 7439-95-4 | MAGNESIUM | J |
| DUP01_081419 | 7471B | 7439-97-6 | MERCURY | J |
| DUP01_081419 | 8260C | 1634-04-4 | METHYL TERT BUTYL ETHER | UJ |
| DUP01_081419 | 8260C | 75-09-2 | METHYLENE CHLORIDE | UJ |
| DUP01_081419 | 6010D | 7440-09-7 | POTASSIUM | J |
| DUP01_081419 | 8260C | 110-57-6 | TRANS-1,4-DICHLORO-2-BUTENE | UJ |
| DUP01_081419 | 8260C | 75-69-4 | TRICHLOROFLUOROMETHANE | UJ |
| DUP01_081419 | 8260C | 75-01-4 | VINYL CHLORIDE | UJ |
| DUP01_081419 | 6010D | 7440-66-6 | ZINC | J |
| DUP02_081419 | 8260C | 95-93-2 | 1,2,4,5-TETRAMETHYLBENZENE | J |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| DUP02_081419 | 8260C | 105-05-5 | 1,4-DIETHYLBENZENE | UJ |
| DUP02_081419 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| DUP02_081419 | 8151A | 93-76-5 | 2,4,5-T | UJ |
| DUP02_081419 | 8151A | 93-72-1 | 2,4,5-TP | UJ |
| DUP02_081419 | 8081B | 72-55-9 | 4,4'-DDE | J |
| DUP02_081419 | 8270D | 534-52-1 | 4,6-DINITRO-O-CRESOL | UJ |
| DUP02_081419 | 8260C | 622-96-8 | 4-ETHYLTOLUENE | J |
| DUP02_081419 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| DUP02_081419 | 8260C | 107-13-1 | ACRYLONITRILE | UJ |
| DUP02_081419 | 6010D | 7440-38-2 | ARSENIC | U (1.38) |
| DUP02_081419 | 8270D | 108-60-1 | BIS(2-CHLOROISOPROPYL)ETHER | UJ |
| DUP02_081419 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| DUP02_081419 | 6010D | 7440-47-3 | CHROMIUM | J |
| DUP02_081419 | CALC | 16065-83-1 | CHROMIUM, TRIVALENT | J |
| DUP02_081419 | 9012B | 57-12-5 | CYANIDE | UJ |
| DUP02_081419 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| DUP02_081419 | 8260C | 60-29-7 | ETHYL ETHER | UJ |
| DUP02_081419 | 8260C | 87-68-3 | HEXACHLOROBUTADIENE | UJ |
| DUP02_081419 | 8270D | 77-47-4 | HEXACHLOROCYCLOPENTADIENE | UJ |
| DUP02_081419 | 6010D | 7439-95-4 | MAGNESIUM | J |
| DUP02_081419 | 7471B | 7439-97-6 | MERCURY | J |
| DUP02_081419 | 8260C | 91-20-3 | NAPHTHALENE | J |
| DUP02_081419 | 6010D | 7440-09-7 | POTASSIUM | J |
| DUP02_081419 | 6010D | 7440-66-6 | ZINC | J |
| EP_FB02_081419 | 8260C | 96-12-8 | 1,2-DIBROMO-3-CHLOROPROPANE | UJ |
| EP_FB02_081419 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP_FB02_081419 | 8151A | 93-76-5 | 2,4,5-T | UJ |
| EP_FB02_081419 | 8151A | 93-72-1 | 2,4,5-TP | UJ |
| EP_FB02_081419 | 8260C | 78-93-3 | 2-BUTANONE | UJ |
| EP_FB02_081419 | 8081B | 72-54-8 | 4,4'-DDD | UJ |
| EP_FB02_081419 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| EP_FB02_081419 | 8270D | 100-02-7 | 4-NITROPHENOL | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP_FB02_081419 | 8260C | 67-64-1 | ACETONE | J |
| EP_FB02_081419 | 8260C | 107-13-1 | ACRYLONITRILE | UJ |
| EP_FB02_081419 | 8270D | 108-60-1 | BIS(2-CHLOROISOPROPYL)ETHER | UJ |
| EP_FB02_081419 | 8260C | 75-25-2 | BROMOFORM | UJ |
| EP_FB02_081419 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP_FB02_081419 | 8260C | 75-00-3 | CHLOROETHANE | UJ |
| EP_FB02_081419 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| EP_FB02_081419 | 8081B | 33213-65-9 | ENDOSULFAN II | UJ |
| EP_FB02_081419 | 8081B | 1031-07-8 | ENDOSULFAN SULFATE | UJ |
| EP_FB02_081419 | 8081B | 72-20-8 | ENDRIN | UJ |
| EP_FB02_081419 | 8081B | 7421-93-4 | ENDRIN ALDEHYDE | UJ |
| EP_FB02_081419 | 8081B | 53494-70-5 | ENDRIN KETONE | UJ |
| EP_FB02_081419 | 6020 | 7439-89-6 | IRON | U (0.05) |
| EP_FB02_081419 | 8081B | 72-43-5 | METHOXYCHLOR | UJ |
| EP_FB02_081419 | 8260C | 1634-04-4 | METHYL TERT BUTYL ETHER | UJ |
| EP_FB02_081419 | 8270D | 621-64-7 | N-NITROSODI-N-PROPYLAMINE | UJ |
| EP_FB02_081419 | 8260C | 10061-02-6 | TRANS-1,3-DICHLOROPROPENE | UJ |
| EP_FB02_081419 | 8260C | 110-57-6 | TRANS-1,4-DICHLORO-2-BUTENE | UJ |
| EP_FB02_081419 | 8260C | 75-69-4 | TRICHLOROFLUOROMETHANE | UJ |
| EP07_8.5_082119 | 8260C | 75-34-3 | 1,1-DICHLOROETHANE | UJ |
| EP07_8.5_082119 | 8260C | 563-58-6 | 1,1-DICHLOROPROPENE | UJ |
| EP07_8.5_082119 | 8260C | 95-63-6 | 1,2,4-TRIMETHYLBENZENE | J |
| EP07_8.5_082119 | 8260C | 78-87-5 | 1,2-DICHLOROPROPANE | UJ |
| EP07_8.5_082119 | 8260C | 123-91-1 | 1,4-DIOXANE | UJ |
| EP07_8.5_082119 | 8151A | 93-76-5 | 2,4,5-T | UJ |
| EP07_8.5_082119 | 8151A | 93-72-1 | 2,4,5-TP | UJ |
| EP07_8.5_082119 | 8260C | 78-93-3 | 2-BUTANONE | J |
| EP07_8.5_082119 | 8081B | 72-55-9 | 4,4'-DDE | J |
| EP07_8.5_082119 | 8270D | 534-52-1 | 4,6-DINITRO-O-CRESOL | UJ |
| EP07_8.5_082119 | 8260C | 108-10-1 | 4-METHYL-2-PENTANONE | UJ |
| EP07_8.5_082119 | 8260C | 67-64-1 | ACETONE | J |
| EP07_8.5_082119 | 8260C | 107-13-1 | ACRYLONITRILE | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP07_8.5_082119 | 8270D | 108-60-1 | BIS(2-CHLOROISOPROPYL)ETHER | UJ |
| EP07_8.5_082119 | 8260C | 74-83-9 | BROMOMETHANE | UJ |
| EP07_8.5_082119 | 8260C | 75-15-0 | CARBON DISULFIDE | UJ |
| EP07_8.5_082119 | 8081B | 5103-71-9 | CIS-CHLORDANE | J |
| EP07_8.5_082119 | 9012B | 57-12-5 | CYANIDE | UJ |
| EP07_8.5_082119 | 8260C | 75-71-8 | DICHLORODIFLUOROMETHANE | UJ |
| EP07_8.5_082119 | 8081B | 60-57-1 | DIELDRIN | UJ |
| EP07_8.5_082119 | 8270D | 77-47-4 | HEXACHLOROCYCLOPENTADIENE | UJ |
| EP07_8.5_082119 | 8260C | 104-51-8 | N-BUTYLBENZENE | UJ |
| EP07_8.5_082119 | 8260C | 99-87-6 | P-ISOPROPYLTOLUENE | J |
| EP07_8.5_082119 | 8081B | 5103-74-2 | TRANS-CHLORDANE | UJ |
| EP07_8.5_082119 | 8260C | 108-05-4 | VINYL ACETATE | 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:**

L1936709:

The laboratory control sample and duplicate (LCS/LCSD) for batch WG1274413 exhibited a percent recovery below the lower control limit (LCL) for trichlorofluoromethane (59%, 61%). The associated results in sample DUP01_081419 are qualified as "UJ" based on potential low bias.

The LCS/LCSD for batch WG1275024 exhibited percent recoveries below the LCL for bromomethane (30%, 26%) and trans-1,4-dichloro-2-butene (48%, 51%). The associated results in sample EP_FB02_081419 are qualified as "UJ" based on potential low bias.

The initial calibration (ICAL) for instrument VOA126 exhibited response factors (RFs) below the control limit for 2-butanone (0.098) and 1,4-dioxane (0.002). The associated results in sample

EP13_10.5_081419 and EP16_9.5_081419 are qualified as "UJ" based on potential indeterminate bias.

The initial calibration verification (ICV) analyzed on 4/27/2019 at 05:55 exhibited percent differences (%Ds) above the control limit for bromomethane (-25.4%) and vinyl acetate (-25.5%). The associated results in sample EP13_10.5_081419 and EP16_9.5_081419 are qualified as "UJ" based on potential indeterminate bias.

The ICV analyzed on 4/27/2019 at 05:55 exhibited RFs below the control limit for trichloroethene (0.196) and 4-methyl-2-pentanone (0.100). The associated results in sample EP13_10.5_081419 and EP16_9.5_081419 are qualified as "UJ" based on potential indeterminate bias.

The ICAL for instrument VOA123 exhibited a RF below the control limit for 1,4-dioxane (0.003). The associated results in sample DUP01_081419 are qualified as "UJ" based on potential indeterminate bias.

The ICV analyzed on 6/21/2019 at 08:41 exhibited %Ds above the control limit for acetone (-27.3%) and acrylonitrile (-22.6%). The associated results in sample DUP01_081419 are qualified as "J" or "UJ" based on potential indeterminate bias.

The ICAL for instrument VOA117 exhibited RFs below the control limit for acrylonitrile (0.044), 1,4-dioxane (0.001), and 4-methyl-2-pentanone (0.079). The associated results in sample DUP02_081419 are qualified as "UJ" based on potential indeterminate bias.

The ICV analyzed on 7/27/2019 at 01:56 exhibited %Ds above the control limit for dichlorodifluoromethane (-75.3%), 4-ethyltoluene (20.7%), p-diethylbenzene (25.9%), and 1,2,4,5-tetramethylbenzene (22.8%). The associated results in sample DUP02_081419 are qualified as "J" or "UJ" based on potential indeterminate bias.

The ICAL for instrument VOA105 exhibited RFs below the control limit for chloroethane (0.066), acrylonitrile (0.046), 2-butanone (0.060), 1,4-dioxane (0.001), 4-methyl-2-pentanone (0.060), and 1,2-dibromo-3-chloropropane (0.048). The associated results in sample EP_FB02_081419 are qualified as "UJ" based on potential indeterminate bias.

The ICV analyzed on 8/13/2019 at 01:06 exhibited a %D above the control limit for dichlorodifluoromethane (-27.5%). The associated results in sample EP_FB02_081419 are qualified as "UJ" based on potential indeterminate bias.

The continuing calibration verification (CCV) analyzed on 8/15/2019 at 05:42 exhibited %Ds above the control limit for dichlorodifluoromethane (45.2%), chloromethane (20.8%), vinyl chloride

(20.9%), carbon disulfide (22.3%), acetone (41.0%), and 1,2-dibromo-3-chloropropane (20.4%). The associated results in sample EP13_10.5_081419 and EP16_9.5_081419 are qualified as "J" or "UJ" based on potential indeterminate bias.

The CCV analyzed on 8/19/2019 at 18:40 exhibited %Ds above the control limit for dichlorodifluoromethane (42.5%), vinyl chloride (27.6%), bromomethane (34.8%), chloroethane (46.4%), ethyl ether (25.9%), carbon disulfide (24.1%), methylene chloride (22.1%), methyl tert-butyl ether (24.6%), 2-hexanone (-30.6%), and trans-1,4-dichloro-2-butene (24.1%). The associated results in sample DUP01_081419 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 8/20/2019 at 07:40 exhibited %Ds above the control limit for bromomethane (25.2%), ethyl ether (26.1%), hexachlorobutadiene (20.6%), and naphthalene (23.2%). The associated results in sample DUP02_081419 are qualified as "J" or "UJ" based on potential indeterminate bias.

The CCV analyzed on 8/20/2019 at 19:38 exhibited %Ds above the control limit for trichlorofluoromethane (-29.3%), acetone (-22.7%), methyl tert-butyl ether (20.9%), trans-1,3-dichloropropene (21.8%), and bromoform (36.6%). The associated results in sample EP_FB02_081419 are qualified as "J" or "UJ" based on potential indeterminate bias.

L1937835:

The LCSD for batch WG1275402 exhibited a percent recovery above the upper control limit (UCL) for 2-butanone (131%). The associated results in sample EP07_8.5_082119 are qualified as "J" based on potential high bias.

The ICAL for instrument VOA111 exhibited RFs below the control limit for 1,4-dioxane (0.002) and 4-methyl-2-pentanone (0.092). The associated results in sample EP07_8.5_082119 are qualified as "UJ" based on potential indeterminate bias.

The ICV analyzed on 6/17/2019 at 12:12 exhibited %Ds above the control limit for carbon disulfide (23.1%), 1,2,4-trimethylbenzene (-21.6%), p-isopropyltoluene (-20.2%), and n-butylbenzene (-20.8%). The associated results in sample EP07_8.5_082119 are qualified as "J" or "UJ" based on potential indeterminate bias.

The CCV analyzed on 8/22/2019 at 04:37 exhibited %Ds above the control limit for dichlorodifluoromethane (47.8%), bromomethane (21.7%), acetone (-20.3%), 1,1-dichloroethane (-20.9%), acrylonitrile (-35.0%), vinyl acetate (-25.9%), 1,1-dichloropropene (-20.8%), and 1,2-

dichloropropane (-20.4%). The associated results in sample EP07_8.5_082119 are qualified as "J" or "UJ" based on potential indeterminate bias.

**SVOCs by SW-846 Methods 8270D and 8270D SIM:**

L1936709:

The LCS for batch WG1274373 exhibited a percent recovery below the LCL for 4-nitrophenol (83%). The associated results in sample EP_FB02_081419 are qualified as "UJ" based on potential low bias.

The CCV analyzed on 8/15/2019 at 13:24 exhibited %Ds above the control limit for di-n-octylphthalate (-23.0%) and indeno(1,2,3-cd)pyrene (-22.8%). The associated results in sample EP13_10.5_081419 and EP16_9.5_081419 are qualified as "J" or "UJ" based on potential indeterminate bias.

The CCV analyzed on 8/22/2019 at 07:58 exhibited %Ds above the control limit for 4,6-dinitro-o-cresol (-24.0%), di-n-butylphthalate (-27.5%), and butyl benzyl phthalate (-28.2%). The associated results in sample DUP01_081419 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 8/20/2019 at 22:55 exhibited %Ds above the control limit for bis(2-chloroisopropyl)ether (-30.0%) and n-nitrosodi-n-propylamine (-20.5%). The associated results in sample EP_FB02_081419 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 8/22/2019 at 20:31 exhibited %Ds above the control limit for bis(2-chloroisopropyl)ether (23.3%), hexachlorocyclopentadiene (26.4%), and 4,6-dinitro-o-cresol (-31.5%). The associated results in sample DUP02_081419 are qualified as "UJ" based on potential indeterminate bias.

L1937835:

The CCV analyzed on 8/22/2019 at 20:31 exhibited %Ds above the control limit for bis(2-chloroisopropyl)ether (23.3%), hexachlorocyclopentadiene (26.4%), and 4,6-dinitro-o-cresol (-31.5%). The associated results in sample EP07_8.5_082119 are qualified as "UJ" based on potential indeterminate bias.

**Herbicides by SW-846 Method 8151A:**

L1936709:

The CCV analyzed on 8/15/2019 at 14:00 exhibited %Ds above the control limit for 2,4-D (-48.6%), 2,4,5-TP (-23.2%), and 2,4,5-T (-27.4%). The associated results in sample EP13_10.5_081419 and EP16_9.5_081419 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 8/20/2019 at 02:30 exhibited %Ds above the control limit for 2,4,5-TP (-17.4%) and 2,4,5-T (-22.1%). The associated results in sample DUP01_081419 and DUP02_081419 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 8/20/2019 at 05:32 exhibited %Ds above the control limit for 2,4,5-TP (-15.3%) and 2,4,5-T (-18.4%). The associated results in sample EP_FB02_081419 are qualified as "UJ" based on potential indeterminate bias.

L1937835:

The CCV analyzed on 8/23/2019 at 16:55 exhibited %Ds above the control limit for 2,4,5-TP (-16.3%) and 2,4,5-T (-17.4%). The associated results in sample EP07_8.5_082119 are qualified as "UJ" based on potential indeterminate bias.

**Pesticides by SW-846 Method 8081B:**

L1936709:

The LCS/LCSD for batch WG1272050 exhibited relative percent differences (RPDs) above the control limit for 4,4'-DDD (21%), endosulfan II (22%), endosulfan sulfate (23%), endrin (21%), endrin aldehyde (26%), endrin ketone (26%), and methoxychlor (22%). The associated results in sample EP_FB02_081419 are qualified as "UJ" based on potential indeterminate bias.

The sample DUP01_081419 exhibited a RPD above the control limit between the primary and secondary GC columns for cis-chlordane (49%). The associated results are qualified as "J" based on potential indeterminate bias.

The sample DUP02_081419 exhibited a RPD above the control limit between the primary and secondary GC columns for 4,4'-DDE (50%). The associated results are qualified as "J" based on potential indeterminate bias.

L1937835:

The sample EP07_8.5_082119 exhibited RPDs above the control limit between the primary and secondary GC columns for 4,4'-DDE (64%), cis-chlordane (48%), and trans-chlordane (173%). The associated results are qualified as "J" or "UJ" based on potential indeterminate bias.

The CCV analyzed on 8/22/2019 at 14:20 exhibited a %D above the control limit for dieldrin (-20.8%). The associated results in sample EP07_8.5_082119 are qualified as "UJ" based on potential indeterminate bias.

**Metals by SW-846 Methods 6010D and 6020B:**

L1936709:

The method blank (MB) for batch WG1274688 exhibited a detection of arsenic (0.192 mg/kg). The associated results in sample DUP01_081419 and DUP02_081419 are qualified as "U" at the sample concentration based on potential blank contamination.

The matrix spike and duplicate (MS/MSD) for batch WG1274688 exhibited a RPD above the control limit for magnesium (25%). The associated results in sample DUP01_081419 and DUP02_081419 are qualified as "J" based on potential indeterminate bias.

The MS/MSD for batch WG1274688 exhibited a percent recovery above the UCL for potassium (129%). The associated results in sample DUP01_081419 and DUP02_081419 are qualified as "J" based on potential high bias.

The MS/MSD for batch WG1274688 exhibited a RPD above the control limit for zinc (35%). The associated results in sample DUP01_081419 and DUP02_081419 are qualified as "J" based on potential indeterminate bias.

The field duplicate and parent sample (DUP01_081419 and EP13_10.5_081419) exhibited an absolute difference above the RL for lead (8.5 mg/kg). The associated results are qualified as "J" based on potential indeterminate bias.

The field duplicate and parent sample (DUP02_081419 and EP16_9.5_081419) exhibited a RPD above the control limit for chromium (53%). The associated results are qualified as "J" based on potential indeterminate bias.

The continuing calibration blank (CCB) analyzed on 8/20/2019 at 14:03 exhibited a detection of iron (42.6 ug/L). The associated results in sample EP_FB02_081419 are qualified as "U" at the reporting limit based on potential blank contamination.

**Mercury by SW-846 Methods 7471B and 7470A:**

L1936709:

The MSD for batch WG1274822 exhibited a percent recovery above the UCL for mercury (123%). The associated results in sample DUP01_081419 and DUP02_081419 are qualified as "J" based on potential high bias.

**Cyanide by SW-846 Method 9012B:**

L1936709:

The LCS/LCSD for batch WG1272629 exhibited a RPD above the control limit for cyanide (67%). The associated results in sample EP13_10.5_081419 and EP16_9.5_081419 are qualified as "UJ" based on potential indeterminate bias.

The LCS/LCSD for batch WG1272727 exhibited a percent recovery below the LCL for cyanide (68%, 70%). The associated results in sample DUP01_081419 are qualified as "UJ" based on potential low bias.

The LCSD for batch WG1273149 exhibited a percent recovery below the LCL for cyanide (75%). The associated results in sample DUP02_081419 are qualified as "UJ" based on potential low bias.

L1937835:

The LCS/LCSD for batch WG1275333 exhibited a percent recovery below the LCL for cyanide (55%, 66%). The associated results in sample EP07_8.5_082119 are qualified as "UJ" based on potential low bias.

**Trivalent Chromium (calculated):**

L1936709:

The field duplicate and parent sample (DUP02_081419 and EP16_9.5_081419) exhibited a RPD above the control limit for chromium, trivalent (54%). The associated results are qualified as "J" based on potential indeterminate bias.

**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.

**VOCs by SW-846 Method 8260C:**

L1936709:

The LCS/LCSD for batch WG1274413 exhibited percent recoveries above the UCL for 2-hexanone (131%, 139%) and 2-butanone (140%). The associated results are non-detections. No qualification is necessary.

The MB for batch WG1274413 exhibited a detection of bromomethane (0.68 ug/kg). The associated results are non-detections. No qualification is necessary.

The MS/MSD for batch WG1274413 exhibited percent recoveries above the UCL for 2-butanone (150%, 138%), 2-hexanone (152%, 148%), 4-methyl-2-pentanone (132%), acrylonitrile (134%), chloromethane (147%, 142%), and trichloroethene (151%). Organic results are not qualified on the basis of MS/MSDs alone. No qualification is necessary.

The MS/MSD for batch WG1274413 exhibited percent recoveries below the LCL for 1,2,3-trichlorobenzene (65%, 58%), 1,2,4-trichlorobenzene (65%, 55%), vinyl acetate (17%, 15%), hexachlorobutadiene (45%), and n-butylbenzene (67%). Organic results are not qualified on the basis of MS/MSDs alone. No qualification is necessary.

The MS/MSD for batch WG1274413 exhibited a RPD above the control limit for 1,1,2,2-tetrachloroethane (69%). Organic results are not qualified on the basis of MS/MSDs alone. No qualification is necessary.

The MS/MSD for batch WG1274719 exhibited a RPD above the control limit for 1,1,2,2-tetrachloroethane (127%). Organic results are not qualified on the basis of MS/MSDs alone. No qualification is necessary.

The MS/MSD for batch WG1274719 exhibited percent recoveries below the LCL for 1,2,3-trichlorobenzene (58%, 54%), 1,2,4,5-tetramethylbenzene (64%), 1,2,4-trichlorobenzene (57%, 54%), 1,3-dichlorobenzene (68%), 1,4-dichlorobenzene (65%), hexachlorobutadiene (46%, 38%), vinyl acetate (21%, 21%), n-butylbenzene (62%), 1,4-diethylbenzene (63%), p-isopropyltoluene (66%), and sec-butylbenzene (68%). Organic results are not qualified on the basis of MS/MSDs alone. No qualification is necessary.

The MS/MSD for batch WG1274719 exhibited percent recoveries above the UCL for 1,4-dioxane (139%), 2-butanone (131%), acetone (160%, 161%), trichloroethene (176%, 163%), trichlorofluoromethane (147%, 142%), and vinyl chloride (146%, 144%). Organic results are not qualified on the basis of MS/MSDs alone. No qualification is necessary.

The LCS/LCSD for batch WG1275024 exhibited a percent recovery above the UCL for chloroethane (160%, 150%). The associated results are non-detections. No qualification is necessary.

The field blank (EP_FB02_081419) exhibited a detection of acetone (3.4 ug/L). The associated results are greater than ten times the contamination. No qualification is necessary.

The ICV analyzed on 6/21/2019 at 08:41 exhibited a %D above the control limit for 1,4-dioxane (-23.0%). The associated results were previously qualified. No further action is necessary.

The ICV analyzed on 7/27/2019 at 01:56 exhibited a %D above the control limit for 1,4-dioxane (20.1%). The associated results were previously qualified. No further action is necessary.

The ICAL for instrument VOA105 exhibited a RF below the control limit for bromomethane (0.076). The associated results were previously qualified. No further action is necessary.

The ICV analyzed on 8/13/2019 at 01:06 exhibited a %D above the control limit for bromomethane (-32.9%). The associated results were previously qualified. No further action is necessary.

The CCV analyzed on 8/15/2019 at 05:42 exhibited a %D above the control limit for vinyl acetate (-28.4%). The associated results were previously qualified. No further action is necessary.

The CCV analyzed on 8/19/2019 at 18:40 exhibited a %D above the control limit for trichlorofluoromethane (40.8%). The associated results were previously qualified. No further action is necessary.

The CCV analyzed on 8/20/2019 at 19:38 exhibited %Ds above the control limit for bromomethane (69.7%), chloroethane (-65.2%), 1,4-dioxane (20.0%), trans-1,4-dichloro-2-butene (51.0%), and 1,2-dibromo-3-chloropropane (35.4%). The associated results were previously qualified. No further action is necessary.

L1937835:

The sample EP07_8.5_082119 exhibited a percent recovery above the UCL for the surrogate 4-bromofluorobenzene (132%). The other three volatile surrogates were recovered within the control limits. No qualification is necessary.

The LCS/LCSD for batch WG1275402 exhibited percent recoveries above the UCL for acrylonitrile (134%, 141%) and vinyl acetate (131%). The associated results are non-detections. No qualification is necessary.

The MB for batch WG1275402 exhibited a detection of methyl tert butyl ether (0.3 ug/kg). The associated results are non-detections. No qualification is necessary.

The ICAL for instrument VOA111 exhibited a RF below the control limit for 2-butanone (0.090). The associated results were previously qualified. No further action is necessary.

The CCV analyzed on 8/22/2019 at 04:37 exhibited %Ds above the control limit for 2-butanone (-26.7%), 1,4-dioxane (-23.0%), and 4-methyl-2-pentanone (-20.7%). The associated results were previously qualified. No further action is necessary.

**SVOCs by SW-846 Methods 8270D and 8270D SIM:**

L1936709:

The sample DUP01_081419 exhibited a percent recovery above the UCL for the surrogate nitrobenzene-d5 (128%). The other two base/neutral extractable surrogates were recovered within the control limits. No qualification is necessary.

The sample DUP01_081419 exhibited a percent recovery above the UCL for the surrogate phenol-d6 (121%). The other two acid extractable surrogates were recovered within the control limits. No qualification is necessary.

The LCS/LCSD for batch WG1274740 exhibited percent recoveries above the UCL for 1,2,4-trichlorobenzene (108%), 2-chlorophenol (108%, 120%), 2-methylphenol (134%), 2-nitrophenol (132%), 4,6-dinitro-o-cresol (140%), 4-nitrophenol (124%), bis(2-chloroethoxy)methane (120%), phenol (102%, 108%), n-nitrosodi-n-propylamine (126%), and p-chloro-m-cresol (106%, 106%). The associated results are non-detections. No qualification is necessary.

The MS/MSD for batch WG1274740 exhibited percent recoveries below the LCL for 2,4-dinitrophenol (0%), 4,6-dinitro-o-cresol (7.2%, 6.7%), benzoic acid (0%), and hexachlorocyclopentadiene (26%, 20%). Organic results are not qualified on the basis of MS/MSDs alone. No qualification is necessary.

The MS/MSD for batch WG1274740 exhibited percent recoveries below the LCL for 1,4-dioxane (30%), 2,4-dinitrophenol (0%), benzoic acid (0%), and 4,6-dinitro-o-cresol (9.2%). Organic results are not qualified on the basis of MS/MSDs alone. No qualification is necessary.

The MS/MSD for batch WG1274740 exhibited a RPD above the control limit for pentachlorophenol (57%). Organic results are not qualified on the basis of MS/MSDs alone. No qualification is necessary.

The MB for batch WG1274374 exhibited a detection of phenanthrene (0.03 ug/L). The associated results are non-detections. No qualification is necessary.

**Pesticides by SW-846 Method 8081B:**

L1937835:

The CCV analyzed on 8/22/2019 at 14:20 exhibited a %D above the control limit for 4,4'-DDE (-23.0%). The associated results were previously qualified. No further action is necessary.

**Metals by SW-846 Methods 6010D and 6020B:**

L1936709:

The MB for batch WG1272713 exhibited detections of iron (0.704 mg/kg) and sodium (7.46 mg/kg). The associated results are greater than ten times the contamination. No qualification is necessary.

The MB for batch WG1274688 exhibited detections of iron (0.672 mg/kg) and sodium (4.13 mg/kg). The associated results are greater than ten times the contamination. No qualification is necessary.

The MS/MSD for batch WG1274688 exhibited percent recoveries below the LCL for aluminum (56%) and iron (0%). The associated results in the parent sample are greater than four times the spiked amount. No qualification is necessary.

The MS/MSD for batch WG1274688 exhibited percent recoveries above the UCL for manganese (128%, 181%), aluminum (155%), iron (718%), and manganese (181%). The associated results in the parent sample are greater than four times the spiked amount. No qualification is necessary.

The MS/MSD for batch WG1274688 exhibited a RPD above the control limit for calcium (47%). The associated results in the parent sample are greater than four times the spiked amount. No qualification is necessary.

The MS/MSD for batch WG1274688 exhibited percent recoveries above the UCL for aluminum (256%, 202%), calcium (180%, 358%), and iron (1200%, 2270%). The associated results in the parent sample are greater than four times the spiked amount. No qualification is necessary.

The MS for batch WG1274688 exhibited a percent recovery below the LCL for magnesium (67%). The associated results were previously qualified. No further action is necessary.

The MS/MSD for batch WG1274688 exhibited a percent recovery below the LCL for manganese (45%). The associated results in the parent sample are greater than four times the spiked amount. No qualification is necessary.

The MSD for batch WG1274688 exhibited a percent recovery above the UCL for magnesium (134%). The associated results were previously qualified. No further action is necessary.

The field blank (EP_FB02_081419) exhibited detections of barium (0.00081 mg/L) and iron (0.0303 mg/L). The associated results are greater than ten times the contamination. No qualification is necessary.

The CCB analyzed on 8/20/2019 at 14:03 exhibited detections of antimony (1.27 ug/L) and thallium (0.341 ug/L). The associated results are non-detections. No qualification is necessary.

L1937835:

The MB for batch WG1275415 exhibited detections of chromium (0.08 mg/kg), iron (0.396 mg/kg), manganese (0.272 mg/kg), and sodium (1.5 mg/kg). The associated results are greater than ten times the contamination. No qualification is necessary.

**COMMENTS:**

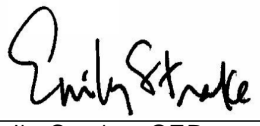
Two field duplicate and parent sample pairs were collected and analyzed for all parameters. For results less than 5X the RL, analytes meet the precision criteria if the absolute difference is less than ±2X the RL. For results greater than 5X the RL, analytes meet the precision criteria if the RPD is less than or equal to 50% for soil. The following analytes did not meet the precision criteria:

- DUP01_081419 and EP13_10.5_081419: lead
- DUP02_081419 and EP16_9.5_081419: total and trivalent chromium

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 data packages met ASP Category B requirements.

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

Signed:



Emily Strake, CEP
Senior Project Chemist

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:** Julia Leung, Langan Project Engineer

**From:** Emily Strake, Langan Senior Project Chemist

**Date:** October 5, 2018

**Re:** Data Usability Summary Report
For 300 West 122nd Street
Harlem, New York
Soil Samples Collected September 2018
Langan Project No.: 170500202

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of soil samples collected on September 12, 2018 by Langan Engineering and Environmental Services ("Langan") at 300 West 122nd Street located in Harlem, New York. The samples were analyzed by Alpha Analytical located in Westborough, MA (NYSDOH ELAP registration #11148) for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), pesticides, herbicides, total metals, total mercury (Hg), cyanide (CN), hexavalent chromium (CrVI) and general chemistry parameters using the analytical method specified below.

- VOCs by SW-846 Method 8260C
- SVOCs by SW-846 Method 8270D
- PCBs by SW-846 8082A
- Pesticides by SW-848 8081B
- Herbicides by SW-846 8151A
- Metals by SW-846 6010D
- Mercury by SW-846 7471B
- CN by USEPA Method 9012B
- CrVI by SW-846 7196A
- Total Solids (%S) by Standard Method 2540G

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* |
|---|---|---|---|---|
| L1836154 | L1836154-01 | EP03_15.0_091218 | 09/12/18 | VOCs, SVOCs, PCBs, Pests, Herbs, Metals, Hg, CN, CrVI, %S |
| L1836154 | L1836154-02 | EP06_15.5_091218 | 09/12/18 | VOCs, SVOCs, PCBs, Pests, Herbs, Metals, Hg, CN, CrVI, %S |
| L1836154 | L1836154-03 | EP09_14.5_091218 | 09/12/18 | VOCs, SVOCs, PCBs, Pests, Herbs, Metals, Hg, CN, CrVI, %S |
| L1836154 | L1836154-04 | EP11_14.5_091218 | 09/12/18 | VOCs, SVOCs, PCBs, Pests, Herbs, Metals, Hg, CN, CrVI, %S |
| L1836154 | L1836154-05 | EP17_14.0_091218 | 09/12/18 | VOCs, SVOCs, PCBs, Pests, Herbs, Metals, Hg, CN, CrVI, %S |
| L1836154 | L1836154-06 | EP23_13.5_091218 | 09/12/18 | VOCs, SVOCs, PCBs, Pests, Herbs, Metals, Hg, CN, CrVI, %S |
| L1836154 | L1836154-07 | TB01_091218 | 09/12/18 | VOCs |

**VALIDATION OVERVIEW**

This data validation was performed in accordance with USEPA Region II SOP #HW-33A, "Low/Medium Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-35A, "Semivolatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-37A, "PCB Aroclor Data Validation" (June 2015, Revision 0), USEPA Region II SOP #HW-36A, "Pesticide Data Validation" (October 2016, Revision 1), USEPA Region II SOP #HW-17, "Validating Chlorinated Herbicides" (December 2010, Revision 3.1), USEPA Region II SOP #HW-3a, "ICP-AES Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-3c, "Mercury and Cyanide Data Validation" (September 2016, Revision 1), "National Functional Guidelines for Organic Superfund Methods Data Review" (EPA-540-R-2017-002, January 2017), the USEPA Contract Laboratory Program, "National Functional Guidelines for Inorganic Superfund Methods Data Review" (EPA-540-R-2017-001, January 2017) and the specifics of the methods employed.

Validation includes evaluation 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 sample preservation, holding times, instrument tuning, instrument calibration, laboratory blanks, laboratory control samples, matrix spike/matrix spike duplicates, laboratory duplicates, extraction/digestion logs, serial dilutions, interference checks, post-spike samples, initial and continuing calibration blanks, system monitoring compounds, internal standard area counts, field duplicates, trip blanks, field blanks, target compound identification and quantification, chromatograms, and overall system performance.

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 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 subject to 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**

| *Project Sample ID* | *Analysis* | *CAS No.* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP03_15.0_091218 | 8081B | 50-29-3 | 4,4'-DDT | J |
| EP03_15.0_091218 | 8081B | 5103-74-2 | trans-Chlordane | J |
| EP06_15.5_091218 | 8081B | 76-44-8 | Heptachlor | J |
| EP06_15.5_091218 | 8081B | 5103-71-9 | cis-Chlordane | J |

| *Project Sample ID* | *Analysis* | *CAS No.* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| EP06_15.5_091218 | 8081B | 5103-74-2 | trans-Chlordane | J |
| EP09_14.5_091218 | 8260C | 74-83-9 | Bromomethane | UJ |
| EP09_14.5_091218 | 8260C | 75-00-3 | Chloroethane | UJ |
| EP09_14.5_091218 | 8260C | 75-01-4 | Vinyl chloride | UJ |
| EP11_14.5_091218 | 8081B | 5103-74-2 | trans-Chlordane | J |
| EP11_14.5_091218 | 8260C | 74-83-9 | Bromomethane | UJ |
| EP11_14.5_091218 | 8260C | 75-00-3 | Chloroethane | UJ |
| EP11_14.5_091218 | 8260C | 75-01-4 | Vinyl chloride | UJ |
| EP17_14.0_091218 | 8081B | 5103-74-2 | trans-Chlordane | J |
| EP17_14.0_091218 | 8260C | 74-83-9 | Bromomethane | UJ |
| EP17_14.0_091218 | 8260C | 75-00-3 | Chloroethane | UJ |
| EP17_14.0_091218 | 8260C | 75-01-4 | Vinyl chloride | UJ |
| EP23_13.5_091218 | 8260C | 74-83-9 | Bromomethane | UJ |
| EP23_13.5_091218 | 8260C | 75-00-3 | Chloroethane | UJ |
| EP23_13.5_091218 | 8260C | 75-01-4 | Vinyl chloride | 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 minor deficiencies are identified below.

VOCs by SW-846 Method 8260C:

LCS/LCSD WG1157382 exhibited recoveries less than the lower control limit for bromomethane at 47% and 42%, vinyl chloride at 62% and 59%, and chloroethane at 44% and 42%. The associated soil sample results are qualified as "UJ". In addition, the LCS recovery of 2-butanone was greater than the upper control limit for 2-butanone. The associated sample results were non-detect; qualification is not necessary.

Pesticides by SW-846 Method 8081B:

Sample EP03_15.0_091218 exhibited percent differences greater than the control limit between the primary and secondary chromatography columns for 4,4'-DDT and trans-chlordane. The associated sample results are qualified as "J".

Sample EP06_15.5_091218 exhibited percent differences greater than the control limit between the primary and secondary chromatography columns for heptachlor, cis-chlordane, and trans-chlordane. The associated sample results are qualified as "J".

Sample EP11_14.5_091218 exhibited a percent difference greater than the control limit between the primary and secondary chromatography columns for trans-chlordane. The associated sample result is qualified as "J".

Sample EP17_14.0_091218 exhibited a percent difference greater than the control limit between the primary and secondary chromatography columns for trans-chlordane. The associated sample result is qualified as "J".

**OTHER DEFICIENCIES:**

Other deficiencies include anomalies that do not directly impact data quality and do not necessitate qualification. The other deficiencies are identified below.

VOCs by SW-846 Method 8260C:

LCS/LCSD WG1157491 displayed recoveries greater than the upper control limit for chloromethane. The associated sample results were non-detect; qualification is not necessary.

The trip blank sample exhibited a positive detection for acetone at 2.5 µg/L. The associated sample results were greater than the reporting limit; on the basis of professional judgment, qualification is not necessary.

SVOCs by SW-846 Method 8270D:

LCS/LCSD WG1156736 exhibited recoveries greater than the control limit for p-chloro-m-cresol and 4-nitrophenol. The associated sample results were non-detect; qualification is not necessary.

Pesticides by SW-846 Method 8081A:

LCS/LCSD WG1156752 displayed a RPD greater than the control limit for beta-BHC at 32%. The associated sample results were non-detect; on the basis of professional judgment, qualification is not necessary.

Herbicides by SW-846 Method 8151A:

LCS/LCSD WG1156742 displayed recoveries greater than the upper control limit for 2,4-D. The associated sample results were non-detect; qualification is not necessary.

Metals by SW-846 Method 6010D:

Preparation blank sample WG1158179 displayed positive detections for iron manganese, and sodium at 0.72 mg/kg, 0.14 mg/kg, and 2.81 mg/kg, respectively. The associated sample results were orders of magnitude greater than the blank amounts; qualification is not necessary.

MS/SD sample WG1158179 exhibited multiple recoveries and RPDs outside of control limits. The spiked volume did not originate from the site; qualification is not necessary.

Mercury by SW-846 Method 7471B:

MS/SD sample WG1158089-3/4 exhibited recoveries and a RPD outside of control limits. The spiked volume did not originate from the site; qualification is not necessary.

**COMMENTS:**

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 laboratory data packages met ASP Category B requirements and all sample holding times were met.

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, CEP
Senior Project Chemist

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:** Julia Leung, Langan Project Engineer

**From:** Emily Strake, Langan Senior Project Chemist

**Date:** November 5, 2018

**Re:** Data Usability Summary Report
For 300 West 122nd Street
Samples Collected in August and October 2018
Langan Project No.: 170500201

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of soil samples collected in August and October 2018 by Langan Engineering and Environmental Services ("Langan") at the 300 West 122nd Street site ("the site"). The samples were analyzed by Alpha Analytical Laboratories, Inc. (NYSDOH NELAC registration # 11148) for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), herbicides, polychlorinated biphenyls (PCBs), pesticides, metals, mercury (Hg), cyanide (CN), hexavalent chromium (CrVI), trivalent chromium (CrIII), and total solids by the methods specified below.

- VOCs by SW-846 Method 8260C
- SVOCs by SW-846 Method 8270D
- Herbicides by SW-846 Method 8151A
- PCBs by SW-846 Method 8082A
- Pesticides by SW-846 Method 8081B
- Metals by SW-846 Method 6010D
- Mercury by SW-846 Method 7471B
- Cyanide by SW-846 Method 9012B
- Hexavalent Chromium by SW-846 Method 7196A
- Trivalent Chromium (calculated)
- Total Solids by Standard Method 2540G

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* |
|---|---|---|---|---|
| L1831933 | L1831933-01 | REUSE01_GRAB01_17-20 | 8/15/2018 | VOCs, Total Solids |
| L1831933 | L1831933-02 | REUSE01_GRAB02_17-20 | 8/15/2018 | VOCs, Total Solids |
| L1831933 | L1831933-03 | REUSE01_COMP01_17-20 | 8/15/2018 | VOCs, SVOCs, Herbicides, PCBs, Pesticides, Metals, Hg, CN, CrVI, CrIII, Total Solids |
| L1841056 | L1841056-01 | UST10_B1_17-18 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-02 | UST10_B2_17-18 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-03 | UST10_N_SW_15-16 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-04 | UST10_E_SW_15-16 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-05 | UST10_S_SW_15-16 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-06 | UST10W_S_SW_15-16 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-07 | UST11_B1_20-21 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-08 | UST11_B2_20-21 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-09 | UST11_E_SW_18-19 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-10 | UST11_S_SW_18-19 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-11 | UST11_W_SW_18-19 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-12 | UST12_B2_20-21 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-13 | UST12_B1_20-21 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-14 | UST12_N_SW_18-19 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-15 | UST12_E_SW_18-19 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1841056 | L1841056-16 | UST12_W_SW_18-19 | 10/10/2018 | VOCs, SVOCs, Total Solids |
| L1843101 | L1843101-01 | UST13_B1_14-15 | 10/23/2018 | VOCs, SVOCs, Total Solids |
| L1843101 | L1843101-02 | UST13_B2_14-15 | 10/23/2018 | VOCs, SVOCs, Total Solids |

**Validation Overview**

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-34A, "Trace Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-33A, "Low/Medium Volatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-35A, "Semivolatile Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-17, "Validating Chlorinated Herbicides" (December 2010, Revision 3.1), USEPA Region II SOP #HW-37A, "Polychlorinated Biphenyl (PCB) Aroclor Data Validation" (June 2015, Revision 0), USEPA Region II SOP #HW-36A, "Pesticide Data Validation" (October 2016, Revision 1), USEPA Region II SOP #HW-3a, "ICP-AES Data Validation" (September 2016, Revision 1), USEPA Region II SOP #HW-3c, "Mercury and Cyanide Data Validation" (September 2016, Revision 1), the USEPA Contract Laboratory Program "National Functional Guidelines for Organic Superfund Methods Data Review" (EPA-540-R-2017-002, January 2017), USEPA "National Functional Guidelines for Inorganic Superfund Methods Data Review" (EPA-540-R-2017-001, January 2017) and the specifics of the methods employed.

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, and field 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* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| REUSE01_GRAB01_17-20 | 8260C | 79-00-5 | 1,1,2-Trichloroethane | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 142-28-9 | 1,3-Dichloropropane | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 75-71-8 | Dichlorodifluoromethane | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 79-20-9 | Methyl Acetate | UJ |
| REUSE01_COMP01_17-20 | 8151A | 93-76-5 | 2,4,5-T | UJ |
| REUSE01_COMP01_17-20 | 8270D | 62-75-9 | n-Nitrosodimethylamine | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 74-83-9 | Bromomethane | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 75-00-3 | Chloroethane | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 179601-23-1 | p/m-Xylene | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 127-18-4 | Tetrachloroethene | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 108-88-3 | Toluene | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 10061-02-6 | trans-1,3-Dichloropropene | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 108-87-2 | Methyl cyclohexane | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 104-51-8 | n-Butylbenzene | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 95-47-6 | o-Xylene | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 135-98-8 | sec-Butylbenzene | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 79-01-6 | Trichloroethene | UJ |
| REUSE01_GRAB01_17-20 | 8260C | 75-01-4 | Vinyl chloride | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 79-00-5 | 1,1,2-Trichloroethane | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 142-28-9 | 1,3-Dichloropropane | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 74-83-9 | Bromomethane | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 75-00-3 | Chloroethane | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| REUSE01_GRAB02_17-20 | 8260C | 75-71-8 | Dichlorodifluoromethane | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 79-20-9 | Methyl Acetate | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 179601-23-1 | p/m-Xylene | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 127-18-4 | Tetrachloroethene | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 108-88-3 | Toluene | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 10061-02-6 | trans-1,3-Dichloropropene | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 108-87-2 | Methyl cyclohexane | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 104-51-8 | n-Butylbenzene | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 95-47-6 | o-Xylene | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 135-98-8 | sec-Butylbenzene | UJ |
| REUSE01_COMP01_17-20 | 8081B | 72-54-8 | 4,4'-DDD | UJ |
| REUSE01_COMP01_17-20 | 8081B | 72-55-9 | 4,4'-DDE | J |
| REUSE01_COMP01_17-20 | 8081B | 50-29-3 | 4,4'-DDT | J |
| REUSE01_COMP01_17-20 | 8081B | 309-00-2 | Aldrin | UJ |
| REUSE01_COMP01_17-20 | 8081B | 319-84-6 | Alpha-BHC | UJ |
| REUSE01_COMP01_17-20 | 8081B | 319-85-7 | Beta-BHC | UJ |
| REUSE01_COMP01_17-20 | 8081B | 5103-71-9 | cis-Chlordane | J |
| REUSE01_COMP01_17-20 | 8081B | 319-86-8 | Delta-BHC | UJ |
| REUSE01_COMP01_17-20 | 8081B | 60-57-1 | Dieldrin | UJ |
| REUSE01_COMP01_17-20 | 8081B | 959-98-8 | Endosulfan I | UJ |
| REUSE01_COMP01_17-20 | 8081B | 33213-65-9 | Endosulfan II | UJ |
| REUSE01_COMP01_17-20 | 8081B | 1031-07-8 | Endosulfan sulfate | UJ |
| REUSE01_COMP01_17-20 | 8081B | 72-20-8 | Endrin | UJ |
| REUSE01_COMP01_17-20 | 8081B | 7421-93-4 | Endrin aldehyde | UJ |
| REUSE01_COMP01_17-20 | 8081B | 53494-70-5 | Endrin ketone | UJ |
| REUSE01_COMP01_17-20 | 8081B | 76-44-8 | Heptachlor | UJ |
| REUSE01_COMP01_17-20 | 8081B | 1024-57-3 | Heptachlor epoxide | UJ |
| REUSE01_COMP01_17-20 | 8081B | 58-89-9 | Lindane | UJ |
| REUSE01_COMP01_17-20 | 8081B | 72-43-5 | Methoxychlor | UJ |
| REUSE01_COMP01_17-20 | 8081B | 5103-74-2 | trans-Chlordane | J |
| REUSE01_GRAB02_17-20 | 8260C | 79-01-6 | Trichloroethene | UJ |
| REUSE01_GRAB02_17-20 | 8260C | 75-01-4 | Vinyl chloride | UJ |

| *Client Sample ID* | *Analysis* | *CAS #* | *Analyte* | *Validator Qualifier* |
|---|---|---|---|---|
| REUSE01_COMP01_17-20 | 9012B | 57-12-5 | Cyanide, Total | 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.

**L1831933:**

**VOCs by SW-846 Method 8260C:**

The initial calibration verification (ICV) for batch WG1147681 on instrument VOA111 exhibited a percent difference (%D) above the control limit for 1,1,2-trichloroethane (-35.8%), 1,3-dichloropropane (-34.7%), dichlorodifluoromethane (-58%), methyl acetate (-20.7%), p/m-xylene (-21.8%), tetrachloroethene (-21.2%), toluene (-21.7%), and trans-1,3-dichloropropene (-36.1%). The associated results in samples REUSE01_GRAB01_17-20 and REUSE01_GRAB02_17-20 are qualified as "UJ" based on potential indeterminate bias.

The continuing calibration verification (CCV) for batch WG1147681 on instrument VOA111 exhibited a %D above the control limit for bromomethane (-24.4%), chloroethane (-25.1%), methyl cyclohexane (-25.9%), n-butylbenzene (-23.5%), o-xylene (-21.1%), sec-butylbenzene (-20.3%), trichloroethene (-20.2%), and vinyl chloride (-28.4%). The associated results in samples REUSE01_GRAB01_17-20 and REUSE01_GRAB02_17-20 are qualified as "UJ" based on potential indeterminate bias.

**SVOCs by SW-846 Method 8270D:**

The CCV for batch WG1146985 on instrument BUFFY exhibited a %D above the control limit for n-nitrosodimethylamine (-24.4%). The associated results in sample REUSE01_COMP01_17-20 are qualified as "UJ" based on potential indeterminate bias.

**Herbicides by SW-846 Method 8151A:**

The CCV for batch WG1147122 on instrument PEST17 exhibited a %D above the control limit for 2,4,5-t (-35.3%). The associated results in sample REUSE01_COMP01_17-20 are qualified as "UJ" based on potential indeterminate bias.

**Pesticides by SW-846 Method 8081B:**

The laboratory control sample and duplicate (LCS/LCSD) for batch WG1146665 exhibited a relative percent difference (RPD) above the control limit for delta-BHC (44%), alpha-BHC (42%), beta-BHC (45%), heptachlor epoxide (41%), heptachlor (36%), aldrin (43%), ednrin (42%), lindane (45%), endrin aldehyde (39%), endrin ketone (43%), dieldrin (42%), 4,4'-DDE (43%), 4,4'-DDD (40%), 4,4'-DDT (39%), endosulfan I (42%), endosulfan II (43%), endosulfan sulfate (38%), methoxychlor (39%), cis-chlordane (46%), and trans-chlordane (39%). The associated results in sample REUSE01_COMP01_17-20 are qualified as "J" and "UJ" based on potential indeterminate bias.

**Cyanide by SW-846 Method 9012B:**

The laboratory control sample (LCS) for batch WG1147227 exhibited a percent recovery below the lower control limit (LCL) for cyanide, total (72%). The associated results in sample REUSE01_COMP01_17-20 are qualified as "UJ" based on potential low bias.

**OTHER DEFICIENCIES:**

Other deficiencies include anomalies that do not directly impact data quality and do not necessitate qualification. No other deficiencies were identified.

**L1831933:**

**Pesticides by SW-846 Method 8081B:**

Sample REUSE01_COMP01_17-20 exhibited a relative percent difference (RPD) above the control limit between the primary and secondary columns for cis-chlordane and trans-chlordane. The associated results in sample REUSE01_COMP01_17-20 were previous qualified on the basis of the LCS/LCSD.

**COMMENTS:**

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 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, CEP
Senior Project Chemist