

December 11, 2020

Ms. Kelly Lee Kinkaid PG; Licensed Professional Geologist

Pennsylvania Department of Environmental Protection
Bureau of Waste Management
909 Elmerton Avenue
Harrisburg, PA 17110-8200

REF: 3rd Quarter 2020 Form 19, 50 and 52 Submittal
Frey Farm Landfill; BWM Permit #101389

Dear Ms. Kinkaid:

In accordance with the Municipal Waste Management Regulations, the Lancaster County Solid Waste Management Authority (LCSWMA) continues the above-referenced monitoring program.

ARM Group has provided an analysis for the groundwater, leachate, and contiguous landowners data. ARM Group's report is attached to this submittal.

Groundwater:

In accordance with the Municipal Waste Management Regulations, the Lancaster County Solid Waste Management Authority (LCSWMA) continues the above-referenced monitoring program.

Attached are the Forms 19 (quarterly parameters), laboratory reports, and data export excel file for uploading the data into your LandLinks Access database.

Leachate:

In accordance with both the Pennsylvania Municipal Waste Management and the Federal Subtitle D Regulations, the Lancaster County Solid Waste Management Authority (LCSWMA) continues to complete the above referenced monitoring program. Enclosed is the Department's Form 50 - "Municipal Waste Landfill Leachate Analysis" for the quarterly monitoring period.

- LCSWMA continues to monitor the Form 50 parameters from location FFLEINFS. This location is the leachate collection system for the Frey Farm Landfill and represents "raw" leachate characteristics for the facility, as collected from the six (6) landfill cells.
- As indicated on the Form 50, the primary leachate collection and secondary detection

systems encompass approximately 93 acres of drainage area including the Stage 1 of the Vertical Expansion.

- At DEP's request, we have included analyses of the four (4) secondary individual detection zone discharges with an individual Form 50 for each.
- Included on the CD are files which contains the FFLEINFS data in a compatible format for your LandLinks software. The CD also contains a pdf file of the laboratory results and the Form 50.

In accordance with Section 273.255(d)(1)(2) and (3) of the Municipal Waste Management Regulations, the Lancaster County Solid Waste Management Authority (LCSWMA) is providing this secondary flow report.

The 3rd Quarter 2020 Frey Farm Landfill (FFLF) secondary flow was noted at 1.26 gallons per day per acre (gpdpa); which is below the regulatory limit of 100 gpdpa. The 3rd Quarter 2020 secondary flow was 1.07% of the primary flow, which is below the regulatory 10% (maximum). Table 1 indicates this quarter's weekly flow information for the six (6) operational cells at the FFLF, cells 2 and 4 continue to indicate no secondary flow present.

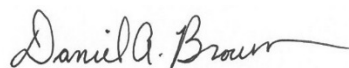
- Consistent with all previous monitoring events, LCSWMA remains well below the secondary leachate flow threshold (100-gpdpa)

Contiguous Landowners:

Attached are the Forms 52, laboratory reports, and a data export excel file for uploading the data into your LandLinks Access database.

Please do not hesitate in contacting me if you have any questions or concerns at dbrown@lcswma.org.

Respectfully submitted,



Daniel A. Brown
Environmental Compliance Manager

Enclosures

Cc: LCSWMA: Environmental, John Ridinger, Aaron Rice
PA DEP: Ed Rawski, Randy Weiss



ARM Group LLC

Engineers and Scientists

December 7, 2020

Mr. Daniel Brown
Environmental Compliance Manager
Lancaster County Solid Waste
Management Authority
1299 Harrisburg Pike
PO Box 4425
Lancaster, PA 17604

Re: LCSWMA Frey Farm Landfill
Permit No. 101389
Manor Township
Lancaster County, Pennsylvania
Third Quarter 2020 Water Quality Data Review
ARM Project 190783

Dear Mr. Brown:

ARM Group LLC (ARM) has prepared this assessment at the request of the Lancaster County Solid Waste Management Authority (LCSWMA) to evaluate the Third Quarter 2020 water quality monitoring results for Frey Farm Landfill (FFLF). As part of this evaluation, ARM reviewed the historic and Third Quarter 2020 laboratory analytical results for the sampled upgradient and downgradient Form 19 groundwater monitoring wells, Form 50 leachate collection and detection zones, and Form 52 contiguous private wells.

The groundwater, leachate, and contiguous private well samples collected by LCSWMA during the Third Quarter 2020 were analyzed for quarterly Form 19, Form 50, and Form 52 parameters, respectively. The following narrative provides a summary of noteworthy observations of the results for the Third Quarter of 2020, as well as a general discussion of recent data trends.

Background/Upgradient Parameter Concentrations

To determine if the concentration of a given parameter at each groundwater monitoring location is elevated compared to the background/upgradient concentration, ARM calculated the 95% upper prediction limits (UPLs) using historical data from the upgradient well, FFMP002W (MP-2), using laboratory analytical results provided by LCSWMA from the First Quarter 2009 through the most recent quarter (Third Quarter 2020).

The UPL approach is used to predict the upper limit of possible future values based on a background data set. A 95% UPL established from background data represents the upper limit which will predict if an independently obtained future sample result exceeds background levels with 95% confidence. If the concentration of a given parameter in a downgradient well exceeds its established UPL, this represents a statistically significant exceedance of background groundwater quality.

To calculate the UPLs, ARM first applied the Dixon's and Rosner's Tests for outliers in ChemStat® statistical analysis software (version 6.3.0.2, Starpoint Software, Inc., ©1996-2013) to identify potential historical anomalous concentrations in MP-2. The Dixon's Test applies to populations of 3-25 values, and the Rosner's Test is valid for populations of more than 25 values. ARM identified 44 statistical outliers at a 95% significance level in the historical dataset which did not appear to be part of a long-term concentration trend. No outliers were identified from the Third Quarter 2020 analytical results.

The most appropriate method of calculating a UPL varies according to the distribution of each dataset. After removing outliers, ARM assessed the remaining historical MP-2 concentration data for each parameter to determine the best fitting statistical distribution (i.e., normal, lognormal, gamma or no distribution) at a 95% significance level using the EPA's ProUCL statistical analysis software (version 5.1.002, EPA, 2015). ARM then used ProUCL to calculate the 95% UPLs for each parameter, which are summarized in the enclosed **Attachment 1**. The exported ProUCL statistical calculation sheets are included in the enclosed **Attachment 2**.

For pH, a one-sided UPL is not appropriate because of the double-sided nature of this parameter. ARM assessed the downgradient pH data by investigating time-series concentration plots for identifiable trends and comparing the Third Quarter 2020 results to the historical range of concentrations in both the sampled well and the upgradient well.

The Interstate Technology and Regulatory Council (ITRC) recommends that a UPL should only be applied for background populations of at least 8-10 observations. Use of smaller populations containing either fewer measurements or multiple non-detections can result in skewed datasets and statistically flawed UPL calculations.

The background population is less than 8 for all quarterly volatile organic compounds (VOCs), chemical oxygen demand (COD), dissolved iron, and total phenolics because of a historical lack of detections in MP-2. A background level could therefore not be accurately calculated for these parameters, which are labeled with asterisks in the enclosed **Attachment 1**. ARM substituted the laboratory reporting detection limit for the statistical background standard when assessing these parameters in the downgradient wells due to their historical absence in the upgradient groundwater.

The attached **Table 1** summarizes the background exceedances in the downgradient Form 19 wells during the Third Quarter 2020. The attached **Table 2** summarizes the background exceedances in the downgradient Form 52 wells during the Third Quarter 2020. Background exceedances shown in **Tables 1 and 2** denote a statistically significant increase of concentrations relative to those observed historically in the upgradient well MP-2. Close attention should be



paid to results from the monitoring locations with noted water quality changes during future sampling events to evaluate the presence of any positive or negative trends for the parameters of concern.

Individual Form 19 Well Summary

- MP-2 – No parameters are above the statistical background level in this upgradient well for the Third Quarter 2020, indicating that groundwater quality appears relatively stable upgradient of the site. Concentrations of several parameters increased rapidly in 2012 to historical high levels. All these concentrations have returned to apparently stable, long-term trends in line with historical average levels since 2014. pH has fluctuated over a range of approximately 1.0 unit since 2014 but appears to have a stable long-term trend. All other Form 19 analytical parameters appear to be stable and within historical concentration ranges.
- MP-5 – Parameters above background in this well include calcium, chloride, magnesium, sodium, specific conductance (SpC), total dissolved solids (TDS), and total organic carbon (TOC). Concentrations of these parameters historically appeared stable until an increase in 2018. These concentrations decreased during 2019 and now generally appear in line with the historical averages. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.5 unit higher, on average, while fluctuating over a slightly wider range.
- MP-15 – Chloride, magnesium, and nitrate were observed above background in this well. These concentrations appear to be increasing since early 2018 along with those of other parameters (calcium, potassium, sodium, SpC, and TDS) which still remain below background levels. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.6 unit higher, on average, while fluctuating over a slightly wider range.
- MP-16 – Parameters observed above background in this well include chloride, magnesium, sodium, SpC, and TDS. Concentrations of these parameters appear to have a long-term stable trend with short-term fluctuations since approximately 2012. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.7 unit higher than background, on average.
- MP-17 – Parameters observed above background in this well include calcium, chloride, magnesium, manganese, sodium, SpC, TDS, TOC, and total phenolics. Concentrations of most of these parameters appear to be increasing over time. Two instances of apparent rapid increases in concentration occurred during 2012 and 2016. After both events, these parameter levels have generally stabilized. Total phenolics have been sporadically detected in this well, although no long-term trend is apparent. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.7 unit higher than background.
- MP-18 – Parameters observed above background in this well include chloride, magnesium, and sodium. Concentrations of these parameters appeared to spike during the First Quarter 2018 sampling event but have since returned to near-historical levels. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.4 unit higher, on average.



- MP-19 – Chloride was observed above background in this well and appears to be increasing slowly in concentration over time. pH appears to mimic the trend observed in the upgradient well at levels approximately 1.5 units higher, on average.
- MP-25 – Chloride and magnesium levels were observed above background in this well. Concentrations of these parameters appear to be fluctuating rapidly over time with a long-term, slowly increasing trend. pH appears to be increasing slowly since 2016 and is currently approximately 0.9 unit higher than background.
- MP-28 – Parameters observed above background in this well include chloride, magnesium, sodium, and TDS. Chloride, sodium, and TDS concentrations appear to be elevated yet stable over time. Magnesium concentrations appear to be decreasing as a long-term trend with occasional fluctuations. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.6 unit higher, on average, while fluctuating over a slightly wider range.
- MP-29 – Chloride was observed above background in this well and appears to fluctuate between 20-160 mg/L in a seasonal pattern. However, there does not appear to be a long-term increasing or decreasing trend. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.4 unit higher, on average.
- MP-2DW – Parameters observed above background in this well include calcium, chloride, magnesium, sodium, SpC, TDS, and turbidity. These parameter concentrations appear to have increased from 2017-2018 but have since stabilized, apart from minor fluctuations, during the last several quarters. pH appears to mimic the trend observed in the upgradient well at levels approximately 2.1 units higher, on average.
- MP-2SW – Parameters observed above background in this well include chloride, iron, sodium, TOC, and turbidity. Chloride and sodium levels appear to be decreasing over time. Iron, TOC, and turbidity appear to be fluctuating over relatively wide concentration ranges with an apparent slowly increasing long-term trend. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.6 unit higher, on average.
- MP-31 – Iron, total phenolics, and turbidity were observed above background in this well. Iron and turbidity levels appear to be increasing slowly since the First Quarter 2018 sampling event. Total phenolics have been detected sporadically in this well, although no long-term trend is apparent. pH appears to mimic the trend observed in the upgradient well at levels approximately 2.0 units higher, on average, while fluctuating over a wider range.
- MP-32 – Parameters observed above background in this well include ammonia-N, iron, manganese, and turbidity. Ammonia-N appears to be decreasing over time with occasional concentration fluctuations. Iron, manganese, and turbidity appear to be fluctuating rapidly but do not appear to show a long-term increasing or decreasing trend. pH appears to mimic the trend observed in the upgradient well at levels approximately 1.7 units higher, on average, while fluctuating over a wider range.



- MP-33 – Parameters observed above background in this well include ammonia-N, chloride, and iron. Chloride appears to be fluctuating seasonally with a long-term, slowly increasing trend. The other noted parameter concentrations appear to be fluctuating but do not appear to show a long-term increasing or decreasing trend. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.8 unit higher, on average.
- MP-3A – Magnesium levels were observed above background in this well but appear to be steady long-term, apart from minor fluctuations. pH appears to be increasing slowly over time and is currently approximately 0.3 unit higher than background.
- MP-4A – Parameters observed above background in this well include alkalinity (bicarbonate and total), calcium, chloride, sodium, SpC, and TDS. All these parameter concentrations appear to be either stable over time or decreasing. Several metals concentrations observed in the Third Quarter 2020 (calcium, magnesium, and sodium) appear anomalously low relative to historical results. ARM will reassess these results in future quarters to determine if any apparent trends develop. pH appears to mimic the trend observed in the upgradient well at levels approximately 1.8 units higher, on average, while fluctuating over a slightly wider range.
- MP-26R – Parameters observed above background in this well include chloride, magnesium, manganese, sodium, SpC, sulfate, and TDS. Most of these parameters appear to be increasing slowly since 2014. Sulfate and TOC appear to be fluctuating but not increasing long-term. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.4 unit higher, on average.
- MP-30R – Parameters observed above background in this well include chemical oxygen demand (COD), chloride, magnesium, manganese, sodium, SpC, and TDS. Most of these parameter concentrations appear to be fluctuating across a relatively wide range of values with no apparent long-term trends. COD has been detected sporadically in this well, although no long-term trend is apparent. The Third Quarter 2020 result for COD appears to be anomalously high relative to historical results. ARM will reassess COD in future quarters to determine if any apparent trends develop. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.5 unit higher, on average, while fluctuating over a wider range.

Parameters not noted above are either at or below background levels. Overall, the groundwater quality at FFLF generally appears to be stable. Most parameters noted as being elevated above background levels do not appear to be increasing over time. Several parameters appear to be fluctuating but do not show an apparent long-term increasing or decreasing trend. ARM will continue to closely assess the noted parameters with increasing trends to see if any changes to the trends occur over time.



Form 50 Leachate Zone Summary

ARM reviewed the historic and Third Quarter 2020 laboratory analytical results for sample location FFLEINFS (grab samples collected from the combined flow from FFLF's primary leachate collection lines) and four (4) manholes which represent the secondary leachate detection zones (FFMH01SS, FFMH03SS, FFMH05SS, and FFMH06SS).

The combined primary leachate flow from FFLEINS tends to range between approximately 100-400 gallons per day per acre (gpd/ac) but does not appear to be increasing over time. Flows from the secondary zones appear to fluctuate seasonally, with the highest flows generally occurring in the first quarter and the lowest flows generally occurring in the third quarter. Flow from FFMH01SS tends to range between approximately 5-25 gpd/ac and appears to be decreasing since 2014. Flow from FFMH03SS tends to range between approximately 0.1-4.0 gpd/ac and appears to be increasing since 2018. Flow from FFMH05SS tends to range between approximately 0.1-2.0 gpd/ac and appears to be generally stable except for a short-term spike in the flow rate to 15 gpd/ac in early 2018; FFMH05SS flows have since returned to near-historical levels. Flow from FFMH06SS tends to fluctuate seasonally between approximately 0.2-5.8 gpd/ac but does not appear to be increasing over time.

Form 50 VOC Detections and Apparent Trends

2-butanone (MEK), 4-methyl-2-pentanone, and acetone were observed in FFLEINS in the Third Quarter 2020 and have been historically present in the primary leachate samples. MEK appears to fluctuate between approximately 30-1,300 µg/L and appears to be gradually decreasing over time. 4-methyl-2-pentanone has been only been detected sporadically since 2014, and no long-term trend is apparent. Acetone appears to fluctuate between approximately 50-3,300 µg/L and appears to be gradually decreasing over time.

1,1-dichloroethane, 1,4-dichlorobenzene, acetone, and ethylbenzene were detected in FFMH01SS and have historically been present at low levels (between 1-7 µg/L). 1,4-dichlorobenzene and ethylbenzene levels appear to be very gradually increasing over time, and 1,1-dichloroethane and acetone appear to be stable over time apart from minor fluctuations.

Acetone was detected in FFMH03SS for the third time since 2016. These recent detections have all ranged between 10.5-14.5 µg/L, which is only slightly greater than the laboratory detection limit of 10 µg/L. ARM will continue to assess further detections to determine if any concentration trends become apparent.

Other Form 50 Detections and Apparent Trends

Ammonia-N, barium, chloride, iron, pH, potassium, sodium, and TOC levels appear to be increasing long-term at FFLEINFS and FFMH01SS. COD, nitrate-N, SpC, sulfate, TDS, and TOC appear to be decreasing at FFMH05SS. Alkalinity, calcium, magnesium, and manganese concentrations fluctuate across a wide range of values in the historical leachate results, but no long-term trends are apparent for these parameters. ARM will continue to closely assess the noted parameters with increasing trends to see if any changes to the trends occur over time.



Form 50 MCL Exceedances and Form 19 Subtitle D Parameter Analysis

Form 19 groundwater monitoring wells are subject to additional analysis of Subtitle D parameters at the next scheduled annual sampling event if secondary leachate samples collected from an upgradient cell are found to exceed the primary maximum contaminant limit (MCL) of a regulated compound. For the Third Quarter 2020, MCL exceedances were noted in the analyses for the secondary leachate samples collected from FFMH01SS (barium and cadmium) and FFMH03SS (nitrate). All wells downgradient of these zones should therefore be sampled for Subtitle D Form 19 parameters during the 2021 annual sampling event.

Form 52 Contiguous Private Wells Summary

ARM reviewed the historic and Third Quarter 2020 groundwater monitoring results for ten (10) contiguous privately-owned wells. Samples collected from these wells were analyzed for quarterly Form 52 parameters. The attached **Table 2** summarizes the background exceedances in the downgradient Form 52 wells during the Third Quarter 2020. Background exceedances shown in **Table 2** denote a statistically significant increase of concentrations relative to those observed historically in the upgradient well MP-2.

- 3044RIVERRD – Total magnesium was detected above background but appears to be stable and not increasing over time. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.6 unit higher, on average, while fluctuating over a slightly wider range.
- 3052RIVERRD – No parameters were observed above background in this well. pH appears to be slowly increasing since 2017 and is currently approximately 0.3 unit higher than the upgradient well.
- 3056RIVERRD – Total and dissolved magnesium were detected above background in this well. Concentrations of both parameters appear to be stable and not increasing over time. pH appears to mimic the trend observed in the upgradient well at approximately equal levels, on average, while fluctuating over a slightly wider range.
- 3060RIVERRD – COD and magnesium (total and dissolved) were detected above background in this well. COD has been detected sporadically in this well, and no long-term trend is apparent. Magnesium concentrations appear to be decreasing over time. pH appears to mimic the trend observed in the upgradient well at approximately equal levels, on average, while fluctuating over a slightly wider range.
- 3076RIVERRD – Chloride, COD, dissolved sodium, and total organic halogen (TOX) were detected above background in this well. Chloride and sodium concentrations appear to be stable and not increasing over time. COD has only been detected twice in the historical record, and this is the first detection of TOX. No trends are apparent for either parameter. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.3 unit higher, on average.



- 3079RIVERRD – Chloride and COD were detected above background in this well. Chloride levels fluctuate in an apparently seasonal manner but do not appear to be increasing over time. COD has been detected sporadically in this well, and no long-term trend is apparent. pH appears to be slowly increasing since 2017 and is currently approximately 0.9 unit higher than the upgradient well.
- 3088RIVERRD – Parameters observed above background in this well include total and bicarbonate alkalinity, chloride, COD, sodium (total and dissolved), SpC, TDS, and total phenolics. ARM understands that the property owner at this location installed a water treatment system in 2013 which coincides with several significant changes in parameter concentrations and trends (i.e., an increase in alkalinity, chloride, sodium, SpC, and TDS; and a decrease in calcium, magnesium, potassium, and sulfate). COD and total phenolics have been detected sporadically in this well, and no long-term trends are apparent. pH appears to mimic the trend observed in the upgradient well at levels approximately 1.6 units higher, on average, while fluctuating over a slightly wider range.
- 3100RIVERRD – Chloride and COD were detected above background in this well. Chloride appears to be decreasing after a peak in late 2016. COD has been detected sporadically in this well, and no long-term trend is apparent. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.5 unit higher, on average.
- 3106RIVERRD – Chloride, COD, magnesium (total and dissolved), and sodium (total and dissolved) were observed above background in this well. COD has been detected sporadically in this well, and no long-term trend is apparent. Concentrations of the remaining parameters appear to be decreasing over the last three quarters after increasing to a relative peak in the Fourth Quarter 2019. Since late 2015, pH appears to mimic the trend observed in the upgradient well at levels approximately 0.8 unit higher, on average.
- 3125RIVERRD – Chloride, COD, and sodium (total and dissolved) were observed above background in this well. COD has been detected sporadically in this well, and no long-term trend is apparent. Chloride levels fluctuate in an apparently seasonal manner but do not appear to be trending toward an increase over time. Sodium appears to be decreasing since the Second Quarter 2018. pH also appears to be increasing since early 2018 and is currently approximately 1.6 units higher than background.

Form 52 parameters not noted above are either at or below background levels. ARM will continue to assess the noted apparent trends in the Form 52 results to see if any changes in the trends develop.



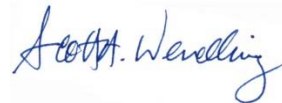
Closing

If you have any questions regarding this water quality data evaluation, please contact the undersigned at 717-533-8600. ARM sincerely appreciates the opportunity to assist LCSWMA with its assessment of quarterly water quality data collected at FFLF.

Sincerely,
ARM Group LLC



Ryan Brandon, P.G.
Project Manager



Scott Wendling, P.G.
Vice President, Sr. Project Manager

Enclosed: Tables 1-2
Attachments 1-2



TABLES



Table 1. LCSWMA Frey Farm Landfill Form 19 Groundwater Monitoring Well Background Standard Comparisons - 3rd Quarter 2020

Parameter	Background Standard	Units	FFMP002W	FFMP005W	FFMP015W	FFMP016W	FFMP017W	FFMP018W	FFMP019W	FFMP025W	FFMP028W	FFMP029W	FFMP02DW	FFMP02SW	FFMP031W	FFMP032W	FFMP033W	FFMP03AW	FFMP04AW	FFMP26RW	FFMP30RW
<i>Quarterly Analytes</i>																					
AMMONIA-NITROGEN	0.303	mg/L	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	0.737	0.612	< 0.100	< 0.100	< 0.100	< 0.100
BICARBONATE	132	mg/L	< 5	47	15	30	75	24	63	23	26	10	109	18	68	68	42	14	192	44	28
CALCIUM, TOTAL	72.5	mg/L	18.5	75.9	18.3	43.6	99.8	32.0	58.8	22.8	39.5	13.1	127	15.3	39.5	14.4	26.8	17.7	34.9	69.0	37.2
COD (CHEMICAL OXYGEN DEMAND)	15*	mg/L	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	61
CHLORIDE	30.9	mg/L	16.1	187	31.5	129	352	99.8	84.9	57.9	82.3	58.6	334	52.2	21.8	16.9	43.4	28.6	300	181	191
FLUORIDE	0.50	mg/L	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
IRON, TOTAL	0.70	mg/L	< 0.067	< 0.067	< 0.067	< 0.067	< 0.067	< 0.067	< 0.067	< 0.067	< 0.067	< 0.067	0.47	1.0	3.2	9.7	6.8	< 0.067	0.25	< 0.067	0.069
MAGNESIUM, TOTAL	10.3	mg/L	7.9	18.5	24.0	19.1	42.8	15.8	5.7	12.4	16.6	9.4	20.0	5.7	4.0	5.3	9.1	12.9	10.1	18.5	16.2
MANGANESE, TOTAL	0.47	mg/L	0.22	0.092	0.064	0.043	1.7	0.24	< 0.0056	0.0096	< 0.0056	0.027	0.46	0.021	0.30	0.59	0.39	0.29	0.11	0.56	2.2
NITRATE-NITROGEN	28.6	mg/L	20.8	2.3	32.7	9.9	1.8	4.9	0.24	9.5	17.3	3.7	7.9	10.8	< 0.20	< 0.20	11.6	23.6	0.24	1.7	5.2
pH-FIELD	None**	S.U.	4.40	5.31	5.18	4.20	5.34	5.26	6.28	3.37	4.15	4.47	6.91	5.44	7.78	6.68	4.77	4.73	6.78	5.28	5.13
pH-LAB	None**	S.U.	5.25	6.14	5.87	5.88	6.47	6.14	7.07	6.16	6.08	6.39	8.06	6.33	7.86	7.48	6.30	5.52	7.77	6.13	6.41
POTASSIUM, TOTAL	13.4	mg/L	1.1	3.5	2.8	3.7	7.6	5.4	1.1	2.7	2.5	2.2	2.7	6.1	1.2	1.3	1.9	1.6	3.8	8.4	7.1
SODIUM, TOTAL	26.5	mg/L	14	49.3	23.9	42.4	94.6	34.4	10.8	20.0	27.5	21.7	127	42.6	10.7	13.6	13.8	12.5	26.6	59.6	95.5
SPEC. COND., FIELD	636	µmhos/cm	294	894	487	680	1,524	551	471	389	563	317	1,473	426	325	220	363	326	1,472	904	852
SPEC. COND., LAB	743	µmhos/cm	266	835	462	581	1,370	504	435	372	538	282	1,390	374	281	179	340	308	1,390	899	802
SULFATE	69.9	mg/L	10.8	60.9	31.5	30.8	69.7	39.8	15.3	2.8	25.1	6.1	31.5	25.8	42.1	< 2.0	6.4	12.9	45.1	78.8	24.8
ALKALINITY	140	mg/L	< 5	47	15	30	75	24	63	23	26	10	109	18	68	68	42	14	192	44	28
TDS (TOTAL DISSOLVED SOLIDS)	387	mg/L	222	596	272	432	936	330	282	230	400	166	712	152	150	90	242	194	830	634	390
TOC (TOTAL ORGANIC CARBON)	1.33	mg/L	0.53	1.5	1.3	1.1	2.6	0.86	1.3	0.74	1.3	< 0.50	0.81	6.9	< 0.50	< 0.50	< 0.50	0.82	1.0	1.1	0.93
TOTAL PHENOLICS	0.005*	mg/L	< 0.005	< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TURBIDITY	4.60	NTU	0.22	0.12	0.22	0.12	0.28	0.18	0.23	0.26	0.24	0.29	5.50	47.6	11.9	105	3.69	0.13	0.46	0.71	0.91
BENZENE	1.0*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-DIBROMOETHANE (EDB)	1.0*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-DICHLOROETHANE	1.0*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-DICHLOROETHENE	1.0*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-DICHLOROETHANE	1.0*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis 1,2-DICHLOROETHENE	1.0*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans 1,2-DICHLOROETHENE	1.0*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
ETHYLBENZENE	1.0*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
METHYLENE CHLORIDE	1.0*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TETRACHLOROETHENE	1.0*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TOLUENE	1.0*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-TRICHLOROETHANE	1.0*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TRICHLOROETHENE	1.0*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
VINYL CHLORIDE	1.0*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
XYLENES (TOTAL)	3.0*	µg/L	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0

Notes:

Gray text indicates a parameter non-detection.

Shaded text indicates a background standard exceedance.

* Reporting limit substituted for background standard due to lack of historical detections in the upgradient well.

** One-sided background standards are not appropriate for pH. Other analysis used in report.

Table 2. LCSWMA Frey Farm Landfill Form 52 Groundwater Monitoring Well Background Standard Comparisons - 3rd Quarter 2020

Parameter	FFLF Background Standard	Units	3044 RIVER RD	3052 RIVER RD	3056 RIVER RD	3060 RIVER RD	3076 RIVER RD	3079 RIVER RD	3088 RIVER RD	3100 RIVER RD	3106 RIVER RD	3125 RIVER RD
ALKALINITY, TOTAL	140	mg/L	6	6			6	32	168	11	12	124
BICARBONATE	132	mg/L	6	6			6	32	168	11	12	124
CALCIUM, DISSOLVED	79.4	mg/L	13.7	16.6	11.6	11	14.7	10.5	0.14	14.5	22.2	0.28
CALCIUM, TOTAL	72.5	mg/L	13.4	16.4	11.5	10.8	14.2	10.3	0.16	14.0	21.4	0.30
CHLORIDE	30.9	mg/L	20.8	21.2	26.7	21.0	48.8	32.7	222	41.8	109	85.0
COD (CHEMICAL OXYGEN DEMAND)	15*	mg/L				23	22	22	22	23	24	21
IRON, TOTAL	0.70	mg/L		0.040							0.052	
MAGNESIUM, DISSOLVED	10.9	mg/L	10.8	9.0	13.7	11.9	8.9	5.7		6.4	14.9	
MAGNESIUM, TOTAL	10.3	mg/L	10.7	8.8	13.6	11.6	8.5	5.6	0.055	6.2	14.6	0.056
MANGANESE, DISSOLVED	0.53	mg/L	0.029	0.037	0.10	0.11	0.18	0.12		0.0082	0.045	
MANGANESE, TOTAL	0.47	mg/L	0.030	0.037	0.10	0.11	0.18	0.12		0.0081	0.044	
NITRATE-NITROGEN	28.6	mg/L	18.3	17.6	22.6	16.2	9.8		5.7	4.7	10.8	4.7
pH-FIELD	None**	S.U.	4.86	4.89	3.74	4.09	4.90	5.38	6.33	5.09	5.24	6.16
pH-LAB	None**	S.U.	5.61	5.59	4.03	4.54	5.52	6.13	6.94	5.64	6.04	6.89
POTASSIUM, DISSOLVED	11.4	mg/L	1.7	2.0	2.3	2.6	3.5	2.1	2.8	1.6	2.3	2.0
POTASSIUM, TOTAL	13.4	mg/L	1.9	2.0	2.5	2.7	3.6	2.2	3.1	1.6	2.3	2.3
SODIUM, DISSOLVED	21.6	mg/L	9.1	8.2	9.2	9.0	25.3	14.6	226	16.9	46.2	125.0
SODIUM, TOTAL	26.5	mg/L	8.9	7.9	8.9	8.5	23.8	14.2	209	16.2	43.4	120.0
SPEC. COND., FIELD	636	µmhos/cm	282	259	322	264	328	207	328	259	452	554
SPEC. COND., LAB	743	µmhos/cm	230	218	277	226	284	192	1,010	216	469	563
SULFATE	69.9	mg/L		2.3		9.8	11.1	10.8	8.4	8.7	5.6	9.8
TDS (TOT. DISSOLVED SOLIDS)	387	mg/L	180	170	202	152	182	150	522	162	296	300
TOC (TOTAL ORGANIC CARBON)	1.33	mg/L										0.61
TOTAL ORGANIC HALOGEN	20.0*	µg/L					20.1					
TOTAL PHENOLICS	0.005*	mg/L	0.005	0.005				0.005	0.006	0.005		
TURBIDITY	4.60	NTU		0.69	0.14	0.14	0.23	0.19	0.23	0.15	0.29	0.16

Notes:

Gray text indicates a parameter non-detection.

Shaded text indicates a background standard exceedance.

* Reporting limit substituted for background standard due to lack of historical detections in the upgradient well.

** One-sided background standards are not appropriate for pH. Other analysis used in report.

ATTACHMENT 1

BACKGROUND UPPER PREDICTION LIMITS



Attachment 1

LCSWMA FREY FARM LANDFILL			
3rd Quarter 2020 - Background Upper Prediction Limits (FFMP002W)			
Form 19 Quarterly Parameters			
Parameter	Distribution	Upper Prediction Limit	Unit
AMMONIA-NITROGEN	Normal	0.303	mg/L
BICARBONATE	No Distribution	132	mg/L
CALCIUM, TOTAL	No Distribution	72.5	mg/L
CALCIUM, DISSOLVED	No Distribution	79.4	mg/L
COD (CHEMICAL OXYGEN DEMAND)	NA	15*	mg/L
CHLORIDE	Normal	30.9	mg/L
FLUORIDE	No Distribution	0.50	mg/L
IRON, TOTAL	No Distribution	0.70	mg/L
IRON, DISSOLVED	NA	0.056*	mg/L
MAGNESIUM, TOTAL	No Distribution	10.3	mg/L
MAGNESIUM, DISSOLVED	Normal	10.9	mg/L
MANGANESE, TOTAL	No Distribution	0.47	mg/L
MANGANESE, DISSOLVED	Lognormal	0.53	mg/L
NITRATE-NITROGEN	No Distribution	28.6	mg/L
pH-FIELD	NA	None**	S.U.
pH-LAB	NA	None**	S.U.
POTASSIUM, TOTAL	No Distribution	13.4	mg/L
POTASSIUM, DISSOLVED	No Distribution	11.4	mg/L
SODIUM, TOTAL	No Distribution	26.5	mg/L
SODIUM, DISSOLVED	Normal	21.6	mg/L
SPEC. COND., FIELD	No Distribution	636	µmhos/cm
SPEC. COND., LAB	No Distribution	743	µmhos/cm
SULFATE	No Distribution	69.9	mg/L
TOTAL ALKALINITY	No Distribution	140	mg/L
TDS (TOTAL DISSOLVED SOLIDS)	Lognormal	387	mg/L
TOC (TOTAL ORGANIC CARBON)	Normal	1.33	mg/L
TOTAL PHENOLICS	NA	0.005*	mg/L
TURBIDITY	No Distribution	4.60	NTU
BENZENE	NA	1.0*	µg/L
1,2-DIBROMOETHANE	NA	1.0*	µg/L
1,1-DICHLOROETHANE	NA	1.0*	µg/L
1,1-DICHLOROETHENE	NA	1.0*	µg/L
1,2-DICHLOROETHANE	NA	1.0*	µg/L
cis 1,2-DICHLOROETHENE	NA	1.0*	µg/L
trans 1,2-DICHLOROETHENE	NA	1.0*	µg/L
ETHYLBENZENE	NA	1.0*	µg/L
METHYLENE CHLORIDE	NA	1.0*	µg/L
TETRACHLOROETHENE	NA	1.0*	µg/L
TOLUENE	NA	1.0*	µg/L
1,1,1-TRICHLOROETHANE	NA	1.0*	µg/L
TRICHLOROETHENE	NA	1.0*	µg/L
VINYL CHLORIDE	NA	1.0*	µg/L
XYLENES (TOTAL)	NA	3.0*	µg/L

Notes:

"NA" denotes parameter not detected or not enough detections in upgradient well over course of historical data to develop tolerance limits.

* Reporting limit substituted for background standard due to lack of historical detections.

** One-sided background standards are not appropriate for pH. Other analysis used in report.

ATTACHMENT 2

STATISTICAL CALCULATION SHEETS



	A	B	C	D	E	F	G	H	I	J	K	L
1				Background Statistics for Data Sets with Non-Detects								
2	User Selected Options											
3	Date/Time of Computation			ProUCL 5.111/24/2020 4:23:37 PM								
4	From File			FFMP002W ProUCL Input 20Q3.xls								
5	Full Precision			OFF								
6	Confidence Coefficient			95%								
7	Coverage			95%								
8	Different or Future K Observations			1								
9	Number of Bootstrap Operations			2000								
10												
11	AMMONIA-NITROGEN											
12												
13	General Statistics											
14	Total Number of Observations			47			Number of Missing Observations			0		
15	Number of Distinct Observations			7								
16	Number of Detects			7			Number of Non-Detects			40		
17	Number of Distinct Detects			7			Number of Distinct Non-Detects			1		
18	Minimum Detect			0.1			Minimum Non-Detect			0.1		
19	Maximum Detect			0.63			Maximum Non-Detect			0.1		
20	Variance Detected			0.0395			Percent Non-Detects			85.11%		
21	Mean Detected			0.304			SD Detected			0.199		
22	Mean of Detected Logged Data			-1.389			SD of Detected Logged Data			0.699		
23												
24	Critical Values for Background Threshold Values (BTVs)											
25	Tolerance Factor K (For UTL)			2.074			d2max (for USL)			2.933		
26												
27	Normal GOF Test on Detects Only											
28	Shapiro Wilk Test Statistic			0.904			Shapiro Wilk GOF Test					
29	5% Shapiro Wilk Critical Value			0.803			Detected Data appear Normal at 5% Significance Level					
30	Lilliefors Test Statistic			0.254			Lilliefors GOF Test					
31	5% Lilliefors Critical Value			0.304			Detected Data appear Normal at 5% Significance Level					
32	Detected Data appear Normal at 5% Significance Level											
33												
34	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
35	KM Mean			0.13			KM SD			0.102		
36	95% UTL95% Coverage			0.341			95% KM UPL (t)			0.303		
37	90% KM Percentile (z)			0.261			95% KM Percentile (z)			0.298		
38	99% KM Percentile (z)			0.367			95% KM USL			0.429		
39												
40	DL/2 Substitution Background Statistics Assuming Normal Distribution											
41	Mean			0.0879			SD			0.116		
42	95% UTL95% Coverage			0.329			95% UPL (t)			0.285		
43	90% Percentile (z)			0.237			95% Percentile (z)			0.279		
44	99% Percentile (z)			0.358			95% USL			0.429		
45	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
46												
47	Gamma GOF Tests on Detected Observations Only											
48	A-D Test Statistic			0.319			Anderson-Darling GOF Test					
49	5% A-D Critical Value			0.713			Detected data appear Gamma Distributed at 5% Significance Level					
50	K-S Test Statistic			0.212			Kolmogorov-Smirnov GOF					

	A	B	C	D	E	F	G	H	I	J	K	L	
51	5% K-S Critical Value				0.314	Detected data appear Gamma Distributed at 5% Significance Level							
52	Detected data appear Gamma Distributed at 5% Significance Level												
53													
54	Gamma Statistics on Detected Data Only												
55	k hat (MLE)				2.665	k star (bias corrected MLE)				1.618			
56	Theta hat (MLE)				0.114	Theta star (bias corrected MLE)				0.188			
57	nu hat (MLE)				37.3	nu star (bias corrected)				22.65			
58	MLE Mean (bias corrected)				0.304								
59	MLE Sd (bias corrected)				0.239	95% Percentile of Chisquare (2kstar)				8.22			
60													
61	Gamma ROS Statistics using Imputed Non-Detects												
62	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs												
63	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)												
64	For such situations, GROS method may yield incorrect values of UCLs and BTVs												
65	This is especially true when the sample size is small.												
66	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates												
67	Minimum				0.01	Mean				0.0538			
68	Maximum				0.63	Median				0.01			
69	SD				0.128	CV				2.377			
70	k hat (MLE)				0.524	k star (bias corrected MLE)				0.504			
71	Theta hat (MLE)				0.103	Theta star (bias corrected MLE)				0.107			
72	nu hat (MLE)				49.23	nu star (bias corrected)				47.42			
73	MLE Mean (bias corrected)				0.0538	MLE Sd (bias corrected)				0.0758			
74	95% Percentile of Chisquare (2kstar)				3.863	90% Percentile				0.145			
75	95% Percentile				0.206	99% Percentile				0.355			
76	The following statistics are computed using Gamma ROS Statistics on Imputed Data												
77	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods												
78					WH	HW					WH	HW	
79	95% Approx. Gamma UTL with 95% Coverage				0.236	0.224	95% Approx. Gamma UPL				0.172	0.159	
80	95% Gamma USL				0.436	0.447							
81													
82	Estimates of Gamma Parameters using KM Estimates												
83	Mean (KM)				0.13	SD (KM)				0.102			
84	Variance (KM)				0.0103	SE of Mean (KM)				0.016			
85	k hat (KM)				1.646	k star (KM)				1.556			
86	nu hat (KM)				154.8	nu star (KM)				146.2			
87	theta hat (KM)				0.0792	theta star (KM)				0.0838			
88	80% gamma percentile (KM)				0.201	90% gamma percentile (KM)				0.269			
89	95% gamma percentile (KM)				0.336	99% gamma percentile (KM)				0.485			
90													
91	The following statistics are computed using gamma distribution and KM estimates												
92	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods												
93					WH	HW					WH	HW	
94	95% Approx. Gamma UTL with 95% Coverage				0.292	0.286	95% Approx. Gamma UPL				0.253	0.247	
95	95% KM Gamma Percentile				0.248	0.242	95% Gamma USL				0.397	0.393	
96													
97	Lognormal GOF Test on Detected Observations Only												
98	Shapiro Wilk Test Statistic				0.935	Shapiro Wilk GOF Test							
99	5% Shapiro Wilk Critical Value				0.803	Detected Data appear Lognormal at 5% Significance Level							
100	Lilliefors Test Statistic				0.19	Lilliefors GOF Test							

	A	B	C	D	E	F	G	H	I	J	K	L	
101	5% Lilliefors Critical Value				0.304	Detected Data appear Lognormal at 5% Significance Level							
102	Detected Data appear Lognormal at 5% Significance Level												
103													
104	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects												
105	Mean in Original Scale				0.0601	Mean in Log Scale				-4.377			
106	SD in Original Scale				0.127	SD in Log Scale				1.894			
107	95% UTL95% Coverage				0.638	95% BCA UTL95% Coverage				0.564			
108	95% Bootstrap (%) UTL95% Coverage				0.564	95% UPL (t)				0.312			
109	90% Percentile (z)				0.142	95% Percentile (z)				0.283			
110	99% Percentile (z)				1.029	95% USL				3.245			
111													
112	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution												
113	KM Mean of Logged Data				-2.167	95% KM UTL (Lognormal)95% Coverage				0.268			
114	KM SD of Logged Data				0.41	95% KM UPL (Lognormal)				0.23			
115	95% KM Percentile Lognormal (z)				0.225	95% KM USL (Lognormal)				0.381			
116													
117	Background DL/2 Statistics Assuming Lognormal Distribution												
118	Mean in Original Scale				0.0879	Mean in Log Scale				-2.756			
119	SD in Original Scale				0.116	SD in Log Scale				0.631			
120	95% UTL95% Coverage				0.235	95% UPL (t)				0.185			
121	90% Percentile (z)				0.143	95% Percentile (z)				0.179			
122	99% Percentile (z)				0.276	95% USL				0.404			
123	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.												
124													
125	Nonparametric Distribution Free Background Statistics												
126	Data appear to follow a Discernible Distribution at 5% Significance Level												
127													
128	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)												
129	Order of Statistic, r				46	95% UTL with95% Coverage				0.46			
130	Approx, f used to compute achieved CC				1.211	Approximate Actual Confidence Coefficient achieved by UTL				0.688			
131	Approximate Sample Size needed to achieve specified CC				93	95% UPL				0.44			
132	95% USL				0.63	95% KM Chebyshev UPL				0.578			
133													
134	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.												
135	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers												
136	and consists of observations collected from clean unimpacted locations.												
137	The use of USL tends to provide a balance between false positives and false negatives provided the data												
138	represents a background data set and when many onsite observations need to be compared with the BTV.												
139													
140	BICARBONATE												
141													
142	General Statistics												
143	Total Number of Observations				47	Number of Missing Observations				0			
144	Number of Distinct Observations				14								
145	Number of Detects				20	Number of Non-Detects				27			
146	Number of Distinct Detects				14	Number of Distinct Non-Detects				1			
147	Minimum Detect				5	Minimum Non-Detect				5			
148	Maximum Detect				182	Maximum Non-Detect				5			
149	Variance Detected				2624	Percent Non-Detects				57.45%			
150	Mean Detected				36.65	SD Detected				51.23			

	A	B	C	D	E	F	G	H	I	J	K	L
151	Mean of Detected Logged Data					2.823	SD of Detected Logged Data					1.241
152												
153	Critical Values for Background Threshold Values (BTVs)											
154	Tolerance Factor K (For UTL)				2.074	d2max (for USL)					2.933	
155												
156	Normal GOF Test on Detects Only											
157	Shapiro Wilk Test Statistic				0.673	Shapiro Wilk GOF Test						
158	5% Shapiro Wilk Critical Value				0.905	Data Not Normal at 5% Significance Level						
159	Lilliefors Test Statistic				0.268	Lilliefors GOF Test						
160	5% Lilliefors Critical Value				0.192	Data Not Normal at 5% Significance Level						
161	Data Not Normal at 5% Significance Level											
162												
163	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
164	KM Mean			18.47	KM SD					36.13		
165	95% UTL95% Coverage			93.41	95% KM UPL (t)					79.77		
166	90% KM Percentile (z)			64.78	95% KM Percentile (z)					77.9		
167	99% KM Percentile (z)			102.5	95% KM USL					124.4		
168												
169	DL/2 Substitution Background Statistics Assuming Normal Distribution											
170	Mean			17.03	SD					37.08		
171	95% UTL95% Coverage			93.94	95% UPL (t)					79.94		
172	90% Percentile (z)			64.56	95% Percentile (z)					78.03		
173	99% Percentile (z)			103.3	95% USL					125.8		
174	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
175												
176	Gamma GOF Tests on Detected Observations Only											
177	A-D Test Statistic			1.343	Anderson-Darling GOF Test							
178	5% A-D Critical Value			0.779	Data Not Gamma Distributed at 5% Significance Level							
179	K-S Test Statistic			0.251	Kolmogorov-Smirnov GOF							
180	5% K-S Critical Value			0.201	Data Not Gamma Distributed at 5% Significance Level							
181	Data Not Gamma Distributed at 5% Significance Level											
182												
183	Gamma Statistics on Detected Data Only											
184	k hat (MLE)			0.767	k star (bias corrected MLE)					0.685		
185	Theta hat (MLE)			47.81	Theta star (bias corrected MLE)					53.51		
186	nu hat (MLE)			30.66	nu star (bias corrected)					27.4		
187	MLE Mean (bias corrected)			36.65								
188	MLE Sd (bias corrected)			44.28	95% Percentile of Chisquare (2kstar)					4.699		
189												
190	Gamma ROS Statistics using Imputed Non-Detects											
191	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
192	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
193	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
194	This is especially true when the sample size is small.											
195	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
196	Minimum			0.01	Mean					15.6		
197	Maximum			182	Median					0.01		
198	SD			37.67	CV					2.415		
199	k hat (MLE)			0.179	k star (bias corrected MLE)					0.181		
200	Theta hat (MLE)			87.33	Theta star (bias corrected MLE)					85.99		

	A	B	C	D	E	F	G	H	I	J	K	L
201	nu hat (MLE)				16.79	nu star (bias corrected)				17.05		
202	MLE Mean (bias corrected)				15.6	MLE Sd (bias corrected)				36.63		
203	95% Percentile of Chisquare (2kstar)				1.916	90% Percentile				47.07		
204	95% Percentile				82.38	99% Percentile				181.2		
205	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
206	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
207					WH	HW					WH	HW
208	95% Approx. Gamma UTL with 95% Coverage				89.78	103.2	95% Approx. Gamma UPL				59.4	61.9
209	95% Gamma USL				193.9	271.1						
210												
211	Estimates of Gamma Parameters using KM Estimates											
212	Mean (KM)				18.47	SD (KM)				36.13		
213	Variance (KM)				1306	SE of Mean (KM)				5.408		
214	k hat (KM)				0.261	k star (KM)				0.259		
215	nu hat (KM)				24.55	nu star (KM)				24.32		
216	theta hat (KM)				70.7	theta star (KM)				71.38		
217	80% gamma percentile (KM)				27.14	90% gamma percentile (KM)				55.29		
218	95% gamma percentile (KM)				88.48	99% gamma percentile (KM)				176.4		
219												
220	The following statistics are computed using gamma distribution and KM estimates											
221	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
222					WH	HW					WH	HW
223	95% Approx. Gamma UTL with 95% Coverage				73.23	71.03	95% Approx. Gamma UPL				55.63	52.8
224	95% KM Gamma Percentile				53.47	50.62	95% Gamma USL				126.3	129.8
225												
226	Lognormal GOF Test on Detected Observations Only											
227	Shapiro Wilk Test Statistic				0.864	Shapiro Wilk GOF Test						
228	5% Shapiro Wilk Critical Value				0.905	Data Not Lognormal at 5% Significance Level						
229	Lilliefors Test Statistic				0.212	Lilliefors GOF Test						
230	5% Lilliefors Critical Value				0.192	Data Not Lognormal at 5% Significance Level						
231	Data Not Lognormal at 5% Significance Level											
232												
233	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
234	Mean in Original Scale				16.05	Mean in Log Scale				0.681		
235	SD in Original Scale				37.49	SD in Log Scale				2.285		
236	95% UTL95% Coverage				225.9	95% BCA UTL95% Coverage				157.4		
237	95% Bootstrap (%) UTL95% Coverage				173.6	95% UPL (t)				95.34		
238	90% Percentile (z)				36.94	95% Percentile (z)				84.74		
239	99% Percentile (z)				402.2	95% USL				1607		
240												
241	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
242	KM Mean of Logged Data				2.126	95% KM UTL (Lognormal)95% Coverage				65.46		
243	KM SD of Logged Data				0.991	95% KM UPL (Lognormal)				45.03		
244	95% KM Percentile Lognormal (z)				42.79	95% KM USL (Lognormal)				153.4		
245												
246	Background DL/2 Statistics Assuming Lognormal Distribution											
247	Mean in Original Scale				17.03	Mean in Log Scale				1.728		
248	SD in Original Scale				37.08	SD in Log Scale				1.243		
249	95% UTL95% Coverage				74.04	95% UPL (t)				46.32		
250	90% Percentile (z)				27.66	95% Percentile (z)				43.45		

	A	B	C	D	E	F	G	H	I	J	K	L
251	99% Percentile (z)				101.3	95% USL				215.2		
252	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
253												
254	Nonparametric Distribution Free Background Statistics											
255	Data do not follow a Discernible Distribution (0.05)											
256												
257	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
258	Order of Statistic, r				46	95% UTL with 95% Coverage				154		
259	Approx, f used to compute achieved CC				1.211	Approximate Actual Confidence Coefficient achieved by UTL				0.688		
260	Approximate Sample Size needed to achieve specified CC				93	95% UPL				132.4		
261	95% USL				182	95% KM Chebyshev UPL				177.6		
262												
263	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
264	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
265	and consists of observations collected from clean unimpacted locations.											
266	The use of USL tends to provide a balance between false positives and false negatives provided the data											
267	represents a background data set and when many onsite observations need to be compared with the BTV.											
268												
269	CALCIUM, TOTAL											
270												
271	General Statistics											
272	Total Number of Observations				46	Number of Distinct Observations				40		
273						Number of Missing Observations				1		
274	Minimum				18.4	First Quartile				20.83		
275	Second Largest				74.7	Median				23.1		
276	Maximum				93	Third Quartile				24.85		
277	Mean				27.46	SD				15.03		
278	Coefficient of Variation				0.547	Skewness				3.173		
279	Mean of logged Data				3.231	SD of logged Data				0.356		
280												
281	Critical Values for Background Threshold Values (BTVs)											
282	Tolerance Factor K (For UTL)				2.079	d2max (for USL)				2.924		
283												
284	Normal GOF Test											
285	Shapiro Wilk Test Statistic				0.533	Shapiro Wilk GOF Test						
286	5% Shapiro Wilk Critical Value				0.945	Data Not Normal at 5% Significance Level						
287	Lilliefors Test Statistic				0.352	Lilliefors GOF Test						
288	5% Lilliefors Critical Value				0.129	Data Not Normal at 5% Significance Level						
289	Data Not Normal at 5% Significance Level											
290												
291	Background Statistics Assuming Normal Distribution											
292	95% UTL with 95% Coverage				58.71	90% Percentile (z)				46.72		
293	95% UPL (t)				52.98	95% Percentile (z)				52.18		
294	95% USL				71.41	99% Percentile (z)				62.43		
295												
296	Gamma GOF Test											
297	A-D Test Statistic				6.376	Anderson-Darling Gamma GOF Test						
298	5% A-D Critical Value				0.752	Data Not Gamma Distributed at 5% Significance Level						
299	K-S Test Statistic				0.308	Kolmogorov-Smirnov Gamma GOF Test						
300	5% K-S Critical Value				0.131	Data Not Gamma Distributed at 5% Significance Level						

	A	B	C	D	E	F	G	H	I	J	K	L	
301	Data Not Gamma Distributed at 5% Significance Level												
302													
303	Gamma Statistics												
304					k hat (MLE)	6.269					k star (bias corrected MLE)	5.875	
305					Theta hat (MLE)	4.381					Theta star (bias corrected MLE)	4.675	
306					nu hat (MLE)	576.8					nu star (bias corrected)	540.5	
307					MLE Mean (bias corrected)	27.46					MLE Sd (bias corrected)	11.33	
308													
309	Background Statistics Assuming Gamma Distribution												
310	95% Wilson Hilferty (WH) Approx. Gamma UPL				48.36					90% Percentile	42.61		
311	95% Hawkins Wixley (HW) Approx. Gamma UPL				47.82					95% Percentile	48.36		
312	95% WH Approx. Gamma UTL with 95% Coverage				54.76					99% Percentile	60.41		
313	95% HW Approx. Gamma UTL with 95% Coverage				54.3								
314	95% WH USL				70.88					95% HW USL	70.97		
315													
316	Lognormal GOF Test												
317	Shapiro Wilk Test Statistic				0.683					Shapiro Wilk Lognormal GOF Test			
318	5% Shapiro Wilk Critical Value				0.945					Data Not Lognormal at 5% Significance Level			
319	Lilliefors Test Statistic				0.279					Lilliefors Lognormal GOF Test			
320	5% Lilliefors Critical Value				0.129					Data Not Lognormal at 5% Significance Level			
321	Data Not Lognormal at 5% Significance Level												
322													
323	Background Statistics assuming Lognormal Distribution												
324	95% UTL with 95% Coverage				53					90% Percentile (z)	39.91		
325	95% UPL (t)				46.27					95% Percentile (z)	45.42		
326	95% USL				71.57					99% Percentile (z)	57.87		
327													
328	Nonparametric Distribution Free Background Statistics												
329	Data do not follow a Discernible Distribution (0.05)												
330													
331	Nonparametric Upper Limits for Background Threshold Values												
332	Order of Statistic, r				45					95% UTL with 95% Coverage	74.7		
333	Approx, f used to compute achieved CC				1.184					Approximate Actual Confidence Coefficient achieved by UTL		0.677	
334										Approximate Sample Size needed to achieve specified CC		93	
335	95% Percentile Bootstrap UTL with 95% Coverage				88.43					95% BCA Bootstrap UTL with 95% Coverage	86.83		
336	95% UPL				72.46					90% Percentile	34.45		
337	90% Chebyshev UPL				73.04					95% Percentile	64.4		
338	95% Chebyshev UPL				93.68					99% Percentile	84.76		
339	95% USL				93								
340													
341	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.												
342	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers												
343	and consists of observations collected from clean unimpacted locations.												
344	The use of USL tends to provide a balance between false positives and false negatives provided the data												
345	represents a background data set and when many onsite observations need to be compared with the BTV.												
346													
347	CALCIUM, DISSOLVED												
348													
349	General Statistics												
350	Total Number of Observations				12					Number of Distinct Observations	11		

	A	B	C	D	E	F	G	H	I	J	K	L
351											Number of Missing Observations	34
352					Minimum	18.3					First Quartile	20.73
353					Second Largest	26.6					Median	23.4
354					Maximum	79.4					Third Quartile	24.9
355					Mean	27.18					SD	16.69
356					Coefficient of Variation	0.614					Skewness	3.285
357					Mean of logged Data	3.208					SD of logged Data	0.389
358												
359	Critical Values for Background Threshold Values (BTVs)											
360					Tolerance Factor K (For UTL)	2.736					d2max (for USL)	2.285
361												
362	Normal GOF Test											
363					Shapiro Wilk Test Statistic	0.487					Shapiro Wilk GOF Test	
364					5% Shapiro Wilk Critical Value	0.859					Data Not Normal at 5% Significance Level	
365					Lilliefors Test Statistic	0.43					Lilliefors GOF Test	
366					5% Lilliefors Critical Value	0.243					Data Not Normal at 5% Significance Level	
367	Data Not Normal at 5% Significance Level											
368												
369	Background Statistics Assuming Normal Distribution											
370					95% UTL with 95% Coverage	72.84					90% Percentile (z)	48.56
371					95% UPL (t)	58.37					95% Percentile (z)	54.63
372					95% USL	65.31					99% Percentile (z)	66
373												
374	Gamma GOF Test											
375					A-D Test Statistic	1.988					Anderson-Darling Gamma GOF Test	
376					5% A-D Critical Value	0.732					Data Not Gamma Distributed at 5% Significance Level	
377					K-S Test Statistic	0.379					Kolmogorov-Smirnov Gamma GOF Test	
378					5% K-S Critical Value	0.246					Data Not Gamma Distributed at 5% Significance Level	
379	Data Not Gamma Distributed at 5% Significance Level											
380												
381	Gamma Statistics											
382					k hat (MLE)	5.469					k star (bias corrected MLE)	4.157
383					Theta hat (MLE)	4.969					Theta star (bias corrected MLE)	6.537
384					nu hat (MLE)	131.3					nu star (bias corrected)	99.78
385					MLE Mean (bias corrected)	27.18					MLE Sd (bias corrected)	13.33
386												
387	Background Statistics Assuming Gamma Distribution											
388					95% Wilson Hilferty (WH) Approx. Gamma UPL	53.58					90% Percentile	45.04
389					95% Hawkins Wixley (HW) Approx. Gamma UPL	52.97					95% Percentile	52.14
390					95% WH Approx. Gamma UTL with 95% Coverage	71.75					99% Percentile	67.29
391					95% HW Approx. Gamma UTL with 95% Coverage	71.69						
392					95% WH USL	61.85					95% HW USL	61.42
393												
394	Lognormal GOF Test											
395					Shapiro Wilk Test Statistic	0.643					Shapiro Wilk Lognormal GOF Test	
396					5% Shapiro Wilk Critical Value	0.859					Data Not Lognormal at 5% Significance Level	
397					Lilliefors Test Statistic	0.342					Lilliefors Lognormal GOF Test	
398					5% Lilliefors Critical Value	0.243					Data Not Lognormal at 5% Significance Level	
399	Data Not Lognormal at 5% Significance Level											
400												

	A	B	C	D	E	F	G	H	I	J	K	L
401	Background Statistics assuming Lognormal Distribution											
402	95% UTL with 95% Coverage			71.76							90% Percentile (z)	40.73
403	95% UPL (t)			51.21							95% Percentile (z)	46.92
404	95% USL			60.2							99% Percentile (z)	61.18
405												
406	Nonparametric Distribution Free Background Statistics											
407	Data do not follow a Discernible Distribution (0.05)											
408												
409	Nonparametric Upper Limits for Background Threshold Values											
410	Order of Statistic, r			12	95% UTL with 95% Coverage						79.4	
411	Approx, f used to compute achieved CC			0.632	Approximate Actual Confidence Coefficient achieved by UTL						0.46	
412					Approximate Sample Size needed to achieve specified CC						59	
413	95% Percentile Bootstrap UTL with 95% Coverage			79.4	95% BCA Bootstrap UTL with 95% Coverage						79.4	
414	95% UPL			79.4	90% Percentile						26.55	
415	90% Chebyshev UPL			79.29	95% Percentile						50.36	
416	95% Chebyshev UPL			102.9	99% Percentile						73.59	
417	95% USL			79.4								
418												
419	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
420	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
421	and consists of observations collected from clean unimpacted locations.											
422	The use of USL tends to provide a balance between false positives and false negatives provided the data											
423	represents a background data set and when many onsite observations need to be compared with the BTV.											
424												
425	COD (CHEMICAL OXYGEN DEMAND)											
426												
427	General Statistics											
428	Total Number of Observations			47	Number of Missing Observations						0	
429	Number of Distinct Observations			4								
430	Number of Detects			0	Number of Non-Detects						47	
431	Number of Distinct Detects			0	Number of Distinct Non-Detects						4	
432	Minimum Detect			N/A	Minimum Non-Detect						5	
433	Maximum Detect			N/A	Maximum Non-Detect						75	
434	Variance Detected			N/A	Percent Non-Detects						100%	
435	Mean Detected			N/A	SD Detected						N/A	
436	Mean of Detected Logged Data			N/A	SD of Detected Logged Data						N/A	
437												
438	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
439	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
440	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
441												
442	The data set for variable COD (CHEMICAL OXYGEN DEMAND) was not processed!											
443												
444												
445	CHLORIDE											
446												
447	General Statistics											
448	Total Number of Observations			47	Number of Distinct Observations						41	
449	Minimum			16.1	First Quartile						22.2	
450	Second Largest			34.3	Median						24.8	

	A	B	C	D	E	F	G	H	I	J	K	L
451					Maximum	34.5					Third Quartile	26.45
452					Mean	24.73					SD	3.635
453					Coefficient of Variation	0.147					Skewness	0.643
454					Mean of logged Data	3.197					SD of logged Data	0.145
455												
456	Critical Values for Background Threshold Values (BTVs)											
457					Tolerance Factor K (For UTL)	2.074					d2max (for USL)	2.933
458												
459	Normal GOF Test											
460					Shapiro Wilk Test Statistic	0.954					Shapiro Wilk GOF Test	
461					5% Shapiro Wilk Critical Value	0.946					Data appear Normal at 5% Significance Level	
462					Lilliefors Test Statistic	0.105					Lilliefors GOF Test	
463					5% Lilliefors Critical Value	0.128					Data appear Normal at 5% Significance Level	
464	Data appear Normal at 5% Significance Level											
465												
466	Background Statistics Assuming Normal Distribution											
467					95% UTL with 95% Coverage	32.26					90% Percentile (z)	29.38
468					95% UPL (t)	30.89					95% Percentile (z)	30.7
469					95% USL	35.38					99% Percentile (z)	33.18
470												
471	Gamma GOF Test											
472					A-D Test Statistic	0.465					Anderson-Darling Gamma GOF Test	
473					5% A-D Critical Value	0.747					Detected data appear Gamma Distributed at 5% Significance Level	
474					K-S Test Statistic	0.0899					Kolmogorov-Smirnov Gamma GOF Test	
475					5% K-S Critical Value	0.129					Detected data appear Gamma Distributed at 5% Significance Level	
476	Detected data appear Gamma Distributed at 5% Significance Level											
477												
478	Gamma Statistics											
479					k hat (MLE)	48.52					k star (bias corrected MLE)	45.44
480					Theta hat (MLE)	0.51					Theta star (bias corrected MLE)	0.544
481					nu hat (MLE)	4561					nu star (bias corrected)	4271
482					MLE Mean (bias corrected)	24.73					MLE Sd (bias corrected)	3.668
483												
484	Background Statistics Assuming Gamma Distribution											
485					95% Wilson Hilferty (WH) Approx. Gamma UPL	31.13					90% Percentile	29.53
486					95% Hawkins Wixley (HW) Approx. Gamma UPL	31.16					95% Percentile	31.05
487					95% WH Approx. Gamma UTL with 95% Coverage	32.73					99% Percentile	34.05
488					95% HW Approx. Gamma UTL with 95% Coverage	32.81						
489					95% WH USL	36.59					95% HW USL	36.78
490												
491	Lognormal GOF Test											
492					Shapiro Wilk Test Statistic	0.973					Shapiro Wilk Lognormal GOF Test	
493					5% Shapiro Wilk Critical Value	0.946					Data appear Lognormal at 5% Significance Level	
494					Lilliefors Test Statistic	0.0869					Lilliefors Lognormal GOF Test	
495					5% Lilliefors Critical Value	0.128					Data appear Lognormal at 5% Significance Level	
496	Data appear Lognormal at 5% Significance Level											
497												
498	Background Statistics assuming Lognormal Distribution											
499					95% UTL with 95% Coverage	33.06					90% Percentile (z)	29.47
500					95% UPL (t)	31.3					95% Percentile (z)	31.07

	A	B	C	D	E	F	G	H	I	J	K	L
501					95% USL	37.45					99% Percentile (z)	34.3
502												
503	Nonparametric Distribution Free Background Statistics											
504	Data appear Normal at 5% Significance Level											
505												
506	Nonparametric Upper Limits for Background Threshold Values											
507					Order of Statistic, r	46					95% UTL with 95% Coverage	34.3
508					Approx, f used to compute achieved CC	1.211					Approximate Actual Confidence Coefficient achieved by UTL	0.688
509											Approximate Sample Size needed to achieve specified CC	93
510					95% Percentile Bootstrap UTL with 95% Coverage	34.44					95% BCA Bootstrap UTL with 95% Coverage	34.44
511					95% UPL	33.62					90% Percentile	28.42
512					90% Chebyshev UPL	35.74					95% Percentile	31.85
513					95% Chebyshev UPL	40.74					99% Percentile	34.41
514					95% USL	34.5						
515												
516	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
517	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
518	and consists of observations collected from clean unimpacted locations.											
519	The use of USL tends to provide a balance between false positives and false negatives provided the data											
520	represents a background data set and when many onsite observations need to be compared with the BTV.											
521												
522	FLUORIDE											
523												
524	General Statistics											
525					Total Number of Observations	46					Number of Missing Observations	1
526					Number of Distinct Observations	7						
527					Number of Detects	15					Number of Non-Detects	31
528					Number of Distinct Detects	6					Number of Distinct Non-Detects	2
529					Minimum Detect	0.12					Minimum Non-Detect	0.2
530					Maximum Detect	0.24					Maximum Non-Detect	0.5
531					Variance Detected	0.00157					Percent Non-Detects	67.39%
532					Mean Detected	0.157					SD Detected	0.0396
533					Mean of Detected Logged Data	-1.881					SD of Detected Logged Data	0.237
534												
535	Critical Values for Background Threshold Values (BTVs)											
536					Tolerance Factor K (For UTL)	2.079					d2max (for USL)	2.924
537												
538	Normal GOF Test on Detects Only											
539					Shapiro Wilk Test Statistic	0.807					Shapiro Wilk GOF Test	
540					5% Shapiro Wilk Critical Value	0.881					Data Not Normal at 5% Significance Level	
541					Lilliefors Test Statistic	0.263					Lilliefors GOF Test	
542					5% Lilliefors Critical Value	0.22					Data Not Normal at 5% Significance Level	
543	Data Not Normal at 5% Significance Level											
544												
545	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
546					KM Mean	0.142					KM SD	0.0293
547					95% UTL95% Coverage	0.203					95% KM UPL (t)	0.192
548					90% KM Percentile (z)	0.18					95% KM Percentile (z)	0.19
549					99% KM Percentile (z)	0.21					95% KM USL	0.228
550												

	A	B	C	D	E	F	G	H	I	J	K	L	
551	DL/2 Substitution Background Statistics Assuming Normal Distribution												
552					Mean	0.158					SD	0.0645	
553					95% UTL	95% Coverage	0.292					95% UPL (t)	0.267
554					90% Percentile (z)	0.24					95% Percentile (z)	0.264	
555					99% Percentile (z)	0.308					95% USL	0.346	
556	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons												
557													
558	Gamma GOF Tests on Detected Observations Only												
559					A-D Test Statistic	1.282							Anderson-Darling GOF Test
560					5% A-D Critical Value	0.735							Data Not Gamma Distributed at 5% Significance Level
561					K-S Test Statistic	0.254							Kolmogorov-Smirnov GOF
562					5% K-S Critical Value	0.221							Data Not Gamma Distributed at 5% Significance Level
563	Data Not Gamma Distributed at 5% Significance Level												
564													
565	Gamma Statistics on Detected Data Only												
566					k hat (MLE)	18.4					k star (bias corrected MLE)	14.76	
567					Theta hat (MLE)	0.00852					Theta star (bias corrected MLE)	0.0106	
568					nu hat (MLE)	551.9					nu star (bias corrected)	442.9	
569					MLE Mean (bias corrected)	0.157							
570					MLE Sd (bias corrected)	0.0408					95% Percentile of Chisquare (2kstar)	43.19	
571													
572	Gamma ROS Statistics using Imputed Non-Detects												
573	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs												
574	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)												
575	For such situations, GROS method may yield incorrect values of UCLs and BTVs												
576	This is especially true when the sample size is small.												
577	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates												
578					Minimum	0.0906					Mean	0.144	
579					Maximum	0.24					Median	0.139	
580					SD	0.0318					CV	0.22	
581					k hat (MLE)	22.55					k star (bias corrected MLE)	21.09	
582					Theta hat (MLE)	0.0064					Theta star (bias corrected MLE)	0.00684	
583					nu hat (MLE)	2075					nu star (bias corrected)	1941	
584					MLE Mean (bias corrected)	0.144					MLE Sd (bias corrected)	0.0314	
585					95% Percentile of Chisquare (2kstar)	58.34					90% Percentile	0.186	
586					95% Percentile	0.2					99% Percentile	0.227	
587	The following statistics are computed using Gamma ROS Statistics on Imputed Data												
588	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods												
589					WH	HW					WH	HW	
590	95% Approx. Gamma UTL with 95% Coverage				0.215	0.216	95% Approx. Gamma UPL				0.2	0.201	
591	95% Gamma USL				0.251	0.253							
592													
593	Estimates of Gamma Parameters using KM Estimates												
594					Mean (KM)	0.142					SD (KM)	0.0293	
595					Variance (KM)	8.5725E-4					SE of Mean (KM)	0.00562	
596					k hat (KM)	23.63					k star (KM)	22.1	
597					nu hat (KM)	2174					nu star (KM)	2033	
598					theta hat (KM)	0.00602					theta star (KM)	0.00644	
599					80% gamma percentile (KM)	0.167					90% gamma percentile (KM)	0.182	
600					95% gamma percentile (KM)	0.196					99% gamma percentile (KM)	0.222	

	A	B	C	D	E	F	G	H	I	J	K	L
601												
602	The following statistics are computed using gamma distribution and KM estimates											
603	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
604					WH	HW				WH	HW	
605	95% Approx. Gamma UTL with 95% Coverage				0.203	0.203	95% Approx. Gamma UPL				0.19	0.19
606	95% KM Gamma Percentile				0.189	0.188	95% Gamma USL				0.232	0.233
607												
608	Lognormal GOF Test on Detected Observations Only											
609	Shapiro Wilk Test Statistic				0.828		Shapiro Wilk GOF Test					
610	5% Shapiro Wilk Critical Value				0.881		Data Not Lognormal at 5% Significance Level					
611	Lilliefors Test Statistic				0.24		Lilliefors GOF Test					
612	5% Lilliefors Critical Value				0.22		Data Not Lognormal at 5% Significance Level					
613	Data Not Lognormal at 5% Significance Level											
614												
615	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
616	Mean in Original Scale				0.145		Mean in Log Scale				-1.953	
617	SD in Original Scale				0.0302		SD in Log Scale				0.197	
618	95% UTL95% Coverage				0.214		95% BCA UTL95% Coverage				0.2	
619	95% Bootstrap (%) UTL95% Coverage				0.23		95% UPL (t)				0.198	
620	90% Percentile (z)				0.183		95% Percentile (z)				0.196	
621	99% Percentile (z)				0.224		95% USL				0.252	
622												
623	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
624	KM Mean of Logged Data				-1.967		95% KM UTL (Lognormal)95% Coverage				0.203	
625	KM SD of Logged Data				0.179		95% KM UPL (Lognormal)				0.189	
626	95% KM Percentile Lognormal (z)				0.188		95% KM USL (Lognormal)				0.236	
627												
628	Background DL/2 Statistics Assuming Lognormal Distribution											
629	Mean in Original Scale				0.158		Mean in Log Scale				-1.926	
630	SD in Original Scale				0.0645		SD in Log Scale				0.395	
631	95% UTL95% Coverage				0.331		95% UPL (t)				0.285	
632	90% Percentile (z)				0.242		95% Percentile (z)				0.279	
633	99% Percentile (z)				0.365		95% USL				0.462	
634	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
635												
636	Nonparametric Distribution Free Background Statistics											
637	Data do not follow a Discernible Distribution (0.05)											
638												
639	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
640	Order of Statistic, r				45		95% UTL with95% Coverage				0.5	
641	Approx, f used to compute achieved CC				1.184		Approximate Actual Confidence Coefficient achieved by UTL				0.677	
642	Approximate Sample Size needed to achieve specified CC				93		95% UPL				0.5	
643	95% USL				0.5		95% KM Chebyshev UPL				0.271	
644												
645	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
646	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
647	and consists of observations collected from clean unimpacted locations.											
648	The use of USL tends to provide a balance between false positives and false negatives provided the data											
649	represents a background data set and when many onsite observations need to be compared with the BTV.											
650												

	A	B	C	D	E	F	G	H	I	J	K	L
651	IRON, TOTAL											
652												
653	General Statistics											
654	Total Number of Observations				47		Number of Missing Observations				0	
655	Number of Distinct Observations				14							
656	Number of Detects				16		Number of Non-Detects				31	
657	Number of Distinct Detects				12		Number of Distinct Non-Detects				2	
658	Minimum Detect				0.07		Minimum Non-Detect				0.05	
659	Maximum Detect				1.8		Maximum Non-Detect				0.06	
660	Variance Detected				0.201		Percent Non-Detects				65.96%	
661	Mean Detected				0.311		SD Detected				0.448	
662	Mean of Detected Logged Data				-1.672		SD of Detected Logged Data				0.883	
663												
664	Critical Values for Background Threshold Values (BTVs)											
665	Tolerance Factor K (For UTL)				2.074		d2max (for USL)				2.933	
666												
667	Normal GOF Test on Detects Only											
668	Shapiro Wilk Test Statistic				0.548		Shapiro Wilk GOF Test					
669	5% Shapiro Wilk Critical Value				0.887		Data Not Normal at 5% Significance Level					
670	Lilliefors Test Statistic				0.347		Lilliefors GOF Test					
671	5% Lilliefors Critical Value				0.213		Data Not Normal at 5% Significance Level					
672	Data Not Normal at 5% Significance Level											
673												
674	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
675	KM Mean		0.139		KM SD		0.282					
676	95% UTL95% Coverage		0.723		95% KM UPL (t)		0.617					
677	90% KM Percentile (z)		0.5		95% KM Percentile (z)		0.602					
678	99% KM Percentile (z)		0.794		95% KM USL		0.965					
679												
680	DL/2 Substitution Background Statistics Assuming Normal Distribution											
681	Mean		0.125		SD		0.289					
682	95% UTL95% Coverage		0.725		95% UPL (t)		0.616					
683	90% Percentile (z)		0.496		95% Percentile (z)		0.601					
684	99% Percentile (z)		0.798		95% USL		0.973					
685	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
686												
687	Gamma GOF Tests on Detected Observations Only											
688	A-D Test Statistic		1.779		Anderson-Darling GOF Test							
689	5% A-D Critical Value		0.761		Data Not Gamma Distributed at 5% Significance Level							
690	K-S Test Statistic		0.294		Kolmogorov-Smirnov GOF							
691	5% K-S Critical Value		0.221		Data Not Gamma Distributed at 5% Significance Level							
692	Data Not Gamma Distributed at 5% Significance Level											
693												
694	Gamma Statistics on Detected Data Only											
695	k hat (MLE)		1.131		k star (bias corrected MLE)		0.961					
696	Theta hat (MLE)		0.275		Theta star (bias corrected MLE)		0.323					
697	nu hat (MLE)		36.2		nu star (bias corrected)		30.74					
698	MLE Mean (bias corrected)		0.311									
699	MLE Sd (bias corrected)		0.317		95% Percentile of Chisquare (2kstar)				5.838			
700												

	A	B	C	D	E	F	G	H	I	J	K	L
701	Gamma ROS Statistics using Imputed Non-Detects											
702	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
703	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
704	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
705	This is especially true when the sample size is small.											
706	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
707					Minimum	0.01				Mean		0.112
708					Maximum	1.8				Median		0.01
709					SD	0.294				CV		2.614
710					k hat (MLE)	0.454				k star (bias corrected MLE)		0.439
711					Theta hat (MLE)	0.247				Theta star (bias corrected MLE)		0.256
712					nu hat (MLE)	42.67				nu star (bias corrected)		41.28
713					MLE Mean (bias corrected)	0.112				MLE Sd (bias corrected)		0.17
714					95% Percentile of Chisquare (2kstar)	3.533				90% Percentile		0.312
715					95% Percentile	0.452				99% Percentile		0.8
716	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
717	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
718					WH	HW				WH	HW	
719					95% Approx. Gamma UTL with 95% Coverage	0.522	0.521			95% Approx. Gamma UPL	0.376	0.36
720					95% Gamma USL	0.986	1.082					
721												
722	Estimates of Gamma Parameters using KM Estimates											
723					Mean (KM)	0.139				SD (KM)		0.282
724					Variance (KM)	0.0794				SE of Mean (KM)		0.0424
725					k hat (KM)	0.242				k star (KM)		0.241
726					nu hat (KM)	22.79				nu star (KM)		22.67
727					theta hat (KM)	0.572				theta star (KM)		0.575
728					80% gamma percentile (KM)	0.199				90% gamma percentile (KM)		0.417
729					95% gamma percentile (KM)	0.679				99% gamma percentile (KM)		1.378
730												
731	The following statistics are computed using gamma distribution and KM estimates											
732	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
733					WH	HW				WH	HW	
734					95% Approx. Gamma UTL with 95% Coverage	0.487	0.465			95% Approx. Gamma UPL	0.381	0.359
735					95% KM Gamma Percentile	0.368	0.346			95% Gamma USL	0.797	0.791
736												
737	Lognormal GOF Test on Detected Observations Only											
738					Shapiro Wilk Test Statistic	0.834				Shapiro Wilk GOF Test		
739					5% Shapiro Wilk Critical Value	0.887				Data Not Lognormal at 5% Significance Level		
740					Lilliefors Test Statistic	0.255				Lilliefors GOF Test		
741					5% Lilliefors Critical Value	0.213				Data Not Lognormal at 5% Significance Level		
742	Data Not Lognormal at 5% Significance Level											
743												
744	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
745					Mean in Original Scale	0.117				Mean in Log Scale		-3.592
746					SD in Original Scale	0.292				SD in Log Scale		1.747
747					95% UTL95% Coverage	1.031				95% BCA UTL95% Coverage		1.32
748					95% Bootstrap (%) UTL95% Coverage	1.536				95% UPL (t)		0.533
749					90% Percentile (z)	0.258				95% Percentile (z)		0.487
750					99% Percentile (z)	1.602				95% USL		4.62

	A	B	C	D	E	F	G	H	I	J	K	L
751												
752	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
753	KM Mean of Logged Data				-2.545		95% KM UTL (Lognormal)95% Coverage				0.413	
754	KM SD of Logged Data				0.801		95% KM UPL (Lognormal)				0.306	
755	95% KM Percentile Lognormal (z)				0.293		95% KM USL (Lognormal)				0.823	
756												
757	Background DL/2 Statistics Assuming Lognormal Distribution											
758	Mean in Original Scale				0.125		Mean in Log Scale				-2.886	
759	SD in Original Scale				0.289		SD in Log Scale				1.016	
760	95% UTL95% Coverage				0.459		95% UPL (t)				0.313	
761	90% Percentile (z)				0.205		95% Percentile (z)				0.297	
762	99% Percentile (z)				0.593		95% USL				1.098	
763	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
764												
765	Nonparametric Distribution Free Background Statistics											
766	Data do not follow a Discernible Distribution (0.05)											
767												
768	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
769	Order of Statistic, r				46		95% UTL with95% Coverage				0.92	
770	Approx, f used to compute achieved CC				1.211		Approximate Actual Confidence Coefficient achieved by UTL				0.688	
771	Approximate Sample Size needed to achieve specified CC				93		95% UPL				0.7	
772	95% USL				1.8		95% KM Chebyshev UPL				1.38	
773												
774	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
775	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
776	and consists of observations collected from clean unimpacted locations.											
777	The use of USL tends to provide a balance between false positives and false negatives provided the data											
778	represents a background data set and when many onsite observations need to be compared with the BTV.											
779												
780	IRON, DISSOLVED											
781												
782	General Statistics											
783	Total Number of Observations				12		Number of Missing Observations				34	
784	Number of Distinct Observations				2							
785	Number of Detects				0		Number of Non-Detects				12	
786	Number of Distinct Detects				0		Number of Distinct Non-Detects				2	
787	Minimum Detect				N/A		Minimum Non-Detect				0.05	
788	Maximum Detect				N/A		Maximum Non-Detect				0.06	
789	Variance Detected				N/A		Percent Non-Detects				100%	
790	Mean Detected				N/A		SD Detected				N/A	
791	Mean of Detected Logged Data				N/A		SD of Detected Logged Data				N/A	
792												
793	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
794	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
795	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
796												
797	The data set for variable IRON, DISSOLVED was not processed!											
798												
799												
800	MAGNESIUM, TOTAL											

	A	B	C	D	E	F	G	H	I	J	K	L	
801													
802	General Statistics												
803	Total Number of Observations				46		Number of Distinct Observations				25		
804									Number of Missing Observations				1
805	Minimum				4.6		First Quartile				8.425		
806	Second Largest				10.4		Median				8.9		
807	Maximum				10.6		Third Quartile				9.45		
808	Mean				8.75		SD				1.106		
809	Coefficient of Variation				0.126		Skewness				-1.966		
810	Mean of logged Data				2.159		SD of logged Data				0.151		
811													
812	Critical Values for Background Threshold Values (BTVs)												
813	Tolerance Factor K (For UTL)				2.079		d2max (for USL)				2.924		
814													
815	Normal GOF Test												
816	Shapiro Wilk Test Statistic				0.833		Shapiro Wilk GOF Test						
817	5% Shapiro Wilk Critical Value				0.945		Data Not Normal at 5% Significance Level						
818	Lilliefors Test Statistic				0.15		Lilliefors GOF Test						
819	5% Lilliefors Critical Value				0.129		Data Not Normal at 5% Significance Level						
820	Data Not Normal at 5% Significance Level												
821													
822	Background Statistics Assuming Normal Distribution												
823	95% UTL with 95% Coverage				11.05		90% Percentile (z)				10.17		
824	95% UPL (t)				10.63		95% Percentile (z)				10.57		
825	95% USL				11.98		99% Percentile (z)				11.32		
826													
827	Gamma GOF Test												
828	A-D Test Statistic				2.714		Anderson-Darling Gamma GOF Test						
829	5% A-D Critical Value				0.747		Data Not Gamma Distributed at 5% Significance Level						
830	K-S Test Statistic				0.179		Kolmogorov-Smirnov Gamma GOF Test						
831	5% K-S Critical Value				0.13		Data Not Gamma Distributed at 5% Significance Level						
832	Data Not Gamma Distributed at 5% Significance Level												
833													
834	Gamma Statistics												
835	k hat (MLE)				50.94		k star (bias corrected MLE)				47.63		
836	Theta hat (MLE)				0.172		Theta star (bias corrected MLE)				0.184		
837	nu hat (MLE)				4687		nu star (bias corrected)				4382		
838	MLE Mean (bias corrected)				8.75		MLE Sd (bias corrected)				1.268		
839													
840	Background Statistics Assuming Gamma Distribution												
841	95% Wilson Hilferty (WH) Approx. Gamma UPL				10.96		90% Percentile				10.41		
842	95% Hawkins Wixley (HW) Approx. Gamma UPL				11.01		95% Percentile				10.93		
843	95% WH Approx. Gamma UTL with 95% Coverage				11.52		99% Percentile				11.97		
844	95% HW Approx. Gamma UTL with 95% Coverage				11.6								
845	95% WH USL				12.82		95% HW USL				12.96		
846													
847	Lognormal GOF Test												
848	Shapiro Wilk Test Statistic				0.723		Shapiro Wilk Lognormal GOF Test						
849	5% Shapiro Wilk Critical Value				0.945		Data Not Lognormal at 5% Significance Level						
850	Lilliefors Test Statistic				0.198		Lilliefors Lognormal GOF Test						

	A	B	C	D	E	F	G	H	I	J	K	L
851	5% Lilliefors Critical Value					0.129	Data Not Lognormal at 5% Significance Level					
852	Data Not Lognormal at 5% Significance Level											
853												
854	Background Statistics assuming Lognormal Distribution											
855	95% UTL with 95% Coverage				11.87						90% Percentile (z)	10.52
856	95% UPL (t)				11.2						95% Percentile (z)	11.11
857	95% USL				13.48						99% Percentile (z)	12.32
858												
859	Nonparametric Distribution Free Background Statistics											
860	Data do not follow a Discernible Distribution (0.05)											
861												
862	Nonparametric Upper Limits for Background Threshold Values											
863	Order of Statistic, r				45	95% UTL with 95% Coverage					10.4	
864	Approx, f used to compute achieved CC				1.184	Approximate Actual Confidence Coefficient achieved by UTL					0.677	
865						Approximate Sample Size needed to achieve specified CC					93	
866	95% Percentile Bootstrap UTL with 95% Coverage				10.55	95% BCA Bootstrap UTL with 95% Coverage					10.45	
867	95% UPL				10.26	90% Percentile					9.7	
868	90% Chebyshev UPL				12.1	95% Percentile					9.95	
869	95% Chebyshev UPL				13.62	99% Percentile					10.51	
870	95% USL				10.6							
871												
872	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
873	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
874	and consists of observations collected from clean unimpacted locations.											
875	The use of USL tends to provide a balance between false positives and false negatives provided the data											
876	represents a background data set and when many onsite observations need to be compared with the BTV.											
877												
878	MAGNESIUM, DISSOLVED											
879												
880	General Statistics											
881	Total Number of Observations				12	Number of Distinct Observations					10	
882						Number of Missing Observations					34	
883	Minimum				7.3	First Quartile					8.525	
884	Second Largest				9.8	Median					9.25	
885	Maximum				10.7	Third Quartile					9.6	
886	Mean				9.033	SD					0.992	
887	Coefficient of Variation				0.11	Skewness					-0.491	
888	Mean of logged Data				2.195	SD of logged Data					0.114	
889												
890	Critical Values for Background Threshold Values (BTVs)											
891	Tolerance Factor K (For UTL)				2.736	d2max (for USL)					2.285	
892												
893	Normal GOF Test											
894	Shapiro Wilk Test Statistic				0.935	Shapiro Wilk GOF Test						
895	5% Shapiro Wilk Critical Value				0.859	Data appear Normal at 5% Significance Level						
896	Lilliefors Test Statistic				0.153	Lilliefors GOF Test						
897	5% Lilliefors Critical Value				0.243	Data appear Normal at 5% Significance Level						
898	Data appear Normal at 5% Significance Level											
899												
900	Background Statistics Assuming Normal Distribution											

	A	B	C	D	E	F	G	H	I	J	K	L
901	95% UTL with 95% Coverage					11.75	90% Percentile (z)					10.3
902	95% UPL (t)					10.89	95% Percentile (z)					10.67
903	95% USL					11.3	99% Percentile (z)					11.34
904												
905	Gamma GOF Test											
906	A-D Test Statistic					0.486	Anderson-Darling Gamma GOF Test					
907	5% A-D Critical Value					0.731	Detected data appear Gamma Distributed at 5% Significance Level					
908	K-S Test Statistic					0.167	Kolmogorov-Smirnov Gamma GOF Test					
909	5% K-S Critical Value					0.245	Detected data appear Gamma Distributed at 5% Significance Level					
910	Detected data appear Gamma Distributed at 5% Significance Level											
911												
912	Gamma Statistics											
913	k hat (MLE)					86.71	k star (bias corrected MLE)					65.09
914	Theta hat (MLE)					0.104	Theta star (bias corrected MLE)					0.139
915	nu hat (MLE)					2081	nu star (bias corrected)					1562
916	MLE Mean (bias corrected)					9.033	MLE Sd (bias corrected)					1.12
917												
918	Background Statistics Assuming Gamma Distribution											
919	95% Wilson Hilferty (WH) Approx. Gamma UPL					11.02	90% Percentile					10.49
920	95% Hawkins Wixley (HW) Approx. Gamma UPL					11.04	95% Percentile					10.95
921	95% WH Approx. Gamma UTL with 95% Coverage					12.06	99% Percentile					11.84
922	95% HW Approx. Gamma UTL with 95% Coverage					12.1						
923	95% WH USL					11.51	95% HW USL					11.54
924												
925	Lognormal GOF Test											
926	Shapiro Wilk Test Statistic					0.916	Shapiro Wilk Lognormal GOF Test					
927	5% Shapiro Wilk Critical Value					0.859	Data appear Lognormal at 5% Significance Level					
928	Lilliefors Test Statistic					0.174	Lilliefors Lognormal GOF Test					
929	5% Lilliefors Critical Value					0.243	Data appear Lognormal at 5% Significance Level					
930	Data appear Lognormal at 5% Significance Level											
931												
932	Background Statistics assuming Lognormal Distribution											
933	95% UTL with 95% Coverage					12.26	90% Percentile (z)					10.39
934	95% UPL (t)					11.11	95% Percentile (z)					10.83
935	95% USL					11.64	99% Percentile (z)					11.7
936												
937	Nonparametric Distribution Free Background Statistics											
938	Data appear Normal at 5% Significance Level											
939												
940	Nonparametric Upper Limits for Background Threshold Values											
941	Order of Statistic, r					12	95% UTL with 95% Coverage					10.7
942	Approx, f used to compute achieved CC					0.632	Approximate Actual Confidence Coefficient achieved by UTL					0.46
943							Approximate Sample Size needed to achieve specified CC					59
944	95% Percentile Bootstrap UTL with 95% Coverage					10.7	95% BCA Bootstrap UTL with 95% Coverage					10.7
945	95% UPL					10.7	90% Percentile					9.78
946	90% Chebyshev UPL					12.13	95% Percentile					10.21
947	95% Chebyshev UPL					13.53	99% Percentile					10.6
948	95% USL					10.7						
949												
950	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											

	A	B	C	D	E	F	G	H	I	J	K	L
951	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
952	and consists of observations collected from clean unimpacted locations.											
953	The use of USL tends to provide a balance between false positives and false negatives provided the data											
954	represents a background data set and when many onsite observations need to be compared with the BTV.											
955												
956	MANGANESE, TOTAL											
957												
958	General Statistics											
959	Total Number of Observations				47				Number of Missing Observations			
960	Number of Distinct Observations				21							
961	Number of Detects				45				Number of Non-Detects			
962	Number of Distinct Detects				19				Number of Distinct Non-Detects			
963	Minimum Detect				0.04				Minimum Non-Detect			
964	Maximum Detect				0.58				Maximum Non-Detect			
965	Variance Detected				0.00759				Percent Non-Detects			
966	Mean Detected				0.27				SD Detected			
967	Mean of Detected Logged Data				-1.37				SD of Detected Logged Data			
968												
969	Critical Values for Background Threshold Values (BTVs)											
970	Tolerance Factor K (For UTL)				2.074				d2max (for USL)			
971												
972	Normal GOF Test on Detects Only											
973	Shapiro Wilk Test Statistic				0.818				Shapiro Wilk GOF Test			
974	5% Shapiro Wilk Critical Value				0.945				Data Not Normal at 5% Significance Level			
975	Lilliefors Test Statistic				0.188				Lilliefors GOF Test			
976	5% Lilliefors Critical Value				0.131				Data Not Normal at 5% Significance Level			
977	Data Not Normal at 5% Significance Level											
978												
979	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
980	KM Mean				0.259				KM SD			
981	95% UTL95% Coverage				0.465				95% KM UPL (t)			
982	90% KM Percentile (z)				0.386				95% KM Percentile (z)			
983	99% KM Percentile (z)				0.489				95% KM USL			
984												
985	DL/2 Substitution Background Statistics Assuming Normal Distribution											
986	Mean				0.26				SD			
987	95% UTL95% Coverage				0.465				95% UPL (t)			
988	90% Percentile (z)				0.386				95% Percentile (z)			
989	99% Percentile (z)				0.49				95% USL			
990	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
991												
992	Gamma GOF Tests on Detected Observations Only											
993	A-D Test Statistic				3.542				Anderson-Darling GOF Test			
994	5% A-D Critical Value				0.75				Data Not Gamma Distributed at 5% Significance Level			
995	K-S Test Statistic				0.237				Kolmogorov-Smirnov GOF			
996	5% K-S Critical Value				0.132				Data Not Gamma Distributed at 5% Significance Level			
997	Data Not Gamma Distributed at 5% Significance Level											
998												
999	Gamma Statistics on Detected Data Only											
1000	k hat (MLE)				8.247				k star (bias corrected MLE)			

	A	B	C	D	E	F	G	H	I	J	K	L	
1001					Theta hat (MLE)	0.0328					Theta star (bias corrected MLE)	0.035	
1002					nu hat (MLE)	742.2					nu star (bias corrected)	694.1	
1003					MLE Mean (bias corrected)	0.27							
1004					MLE Sd (bias corrected)	0.0973					95% Percentile of Chisquare (2kstar)	25.55	
1005													
1006					Gamma ROS Statistics using Imputed Non-Detects								
1007					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs								
1008					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)								
1009					For such situations, GROS method may yield incorrect values of UCLs and BTVs								
1010					This is especially true when the sample size is small.								
1011					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates								
1012					Minimum	0.04					Mean	0.264	
1013					Maximum	0.58					Median	0.26	
1014					SD	0.0902					CV	0.342	
1015					k hat (MLE)	7.425					k star (bias corrected MLE)	6.965	
1016					Theta hat (MLE)	0.0356					Theta star (bias corrected MLE)	0.0379	
1017					nu hat (MLE)	697.9					nu star (bias corrected)	654.7	
1018					MLE Mean (bias corrected)	0.264					MLE Sd (bias corrected)	0.1	
1019					95% Percentile of Chisquare (2kstar)	23.59					90% Percentile	0.398	
1020					95% Percentile	0.447					99% Percentile	0.551	
1021					The following statistics are computed using Gamma ROS Statistics on Imputed Data								
1022					Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods								
1023					WH	HW					WH	HW	
1024					95% Approx. Gamma UTL with 95% Coverage	0.504	0.518				95% Approx. Gamma UPL	0.449	0.458
1025					95% Gamma USL	0.643	0.675						
1026													
1027					Estimates of Gamma Parameters using KM Estimates								
1028					Mean (KM)	0.259					SD (KM)	0.0989	
1029					Variance (KM)	0.00979					SE of Mean (KM)	0.0146	
1030					k hat (KM)	6.87					k star (KM)	6.446	
1031					nu hat (KM)	645.8					nu star (KM)	605.9	
1032					theta hat (KM)	0.0377					theta star (KM)	0.0402	
1033					80% gamma percentile (KM)	0.339					90% gamma percentile (KM)	0.396	
1034					95% gamma percentile (KM)	0.447					99% gamma percentile (KM)	0.554	
1035													
1036					The following statistics are computed using gamma distribution and KM estimates								
1037					Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods								
1038					WH	HW					WH	HW	
1039					95% Approx. Gamma UTL with 95% Coverage	0.623	0.683				95% Approx. Gamma UPL	0.534	0.574
1040					95% KM Gamma Percentile	0.523	0.56				95% Gamma USL	0.859	0.99
1041													
1042					Lognormal GOF Test on Detected Observations Only								
1043					Shapiro Wilk Test Statistic	0.738					Shapiro Wilk GOF Test		
1044					5% Shapiro Wilk Critical Value	0.945					Data Not Lognormal at 5% Significance Level		
1045					Lilliefors Test Statistic	0.262					Lilliefors GOF Test		
1046					5% Lilliefors Critical Value	0.131					Data Not Lognormal at 5% Significance Level		
1047					Data Not Lognormal at 5% Significance Level								
1048													
1049					Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects								
1050					Mean in Original Scale	0.264					Mean in Log Scale	-1.403	

	A	B	C	D	E	F	G	H	I	J	K	L
1051				SD in Original Scale		0.0907					SD in Log Scale	0.421
1052				95% UTL95% Coverage		0.589				95% BCA UTL95% Coverage		0.55
1053				95% Bootstrap (%) UTL95% Coverage		0.571				95% UPL (t)		0.502
1054				90% Percentile (z)		0.422				95% Percentile (z)		0.491
1055				99% Percentile (z)		0.655				95% USL		0.845
1056												
1057	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
1058				KM Mean of Logged Data		-1.512				95% KM UTL (Lognormal)95% Coverage		1.144
1059				KM SD of Logged Data		0.794				95% KM UPL (Lognormal)		0.848
1060				95% KM Percentile Lognormal (z)		0.814				95% KM USL (Lognormal)		2.262
1061												
1062	Background DL/2 Statistics Assuming Lognormal Distribution											
1063				Mean in Original Scale		0.26				Mean in Log Scale		-1.501
1064				SD in Original Scale		0.0988				SD in Log Scale		0.797
1065				95% UTL95% Coverage		1.163				95% UPL (t)		0.861
1066				90% Percentile (z)		0.619				95% Percentile (z)		0.826
1067				99% Percentile (z)		1.422				95% USL		2.305
1068	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
1069												
1070	Nonparametric Distribution Free Background Statistics											
1071	Data do not follow a Discernible Distribution (0.05)											
1072												
1073	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
1074				Order of Statistic, r		46				95% UTL with95% Coverage		0.55
1075				Approx, f used to compute achieved CC		1.211				Approximate Actual Confidence Coefficient achieved by UTL		0.688
1076				Approximate Sample Size needed to achieve specified CC		93				95% UPL		0.466
1077				95% USL		0.58				95% KM Chebyshev UPL		0.695
1078												
1079	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1080	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1081	and consists of observations collected from clean unimpacted locations.											
1082	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1083	represents a background data set and when many onsite observations need to be compared with the BTV.											
1084												
1085	MANGANESE, DISSOLVED											
1086												
1087	General Statistics											
1088				Total Number of Observations		12				Number of Distinct Observations		9
1089										Number of Missing Observations		34
1090				Minimum		0.11				First Quartile		0.238
1091				Second Largest		0.32				Median		0.255
1092				Maximum		0.57				Third Quartile		0.31
1093				Mean		0.281				SD		0.108
1094				Coefficient of Variation		0.385				Skewness		1.616
1095				Mean of logged Data		-1.333				SD of logged Data		0.377
1096												
1097	Critical Values for Background Threshold Values (BTVs)											
1098				Tolerance Factor K (For UTL)		2.736				d2max (for USL)		2.285
1099												
1100	Normal GOF Test											

	A	B	C	D	E	F	G	H	I	J	K	L
1101	Shapiro Wilk Test Statistic					0.818	Shapiro Wilk GOF Test					
1102	5% Shapiro Wilk Critical Value					0.859	Data Not Normal at 5% Significance Level					
1103	Lilliefors Test Statistic					0.275	Lilliefors GOF Test					
1104	5% Lilliefors Critical Value					0.243	Data Not Normal at 5% Significance Level					
1105	Data Not Normal at 5% Significance Level											
1106												
1107	Background Statistics Assuming Normal Distribution											
1108	95% UTL with 95% Coverage					0.577	90% Percentile (z)					0.419
1109	95% UPL (t)					0.483	95% Percentile (z)					0.459
1110	95% USL					0.528	99% Percentile (z)					0.532
1111												
1112	Gamma GOF Test											
1113	A-D Test Statistic					0.71	Anderson-Darling Gamma GOF Test					
1114	5% A-D Critical Value					0.731	Detected data appear Gamma Distributed at 5% Significance Level					
1115	K-S Test Statistic					0.227	Kolmogorov-Smirnov Gamma GOF Test					
1116	5% K-S Critical Value					0.246	Detected data appear Gamma Distributed at 5% Significance Level					
1117	Detected data appear Gamma Distributed at 5% Significance Level											
1118												
1119	Gamma Statistics											
1120	k hat (MLE)					8.062	k star (bias corrected MLE)					6.102
1121	Theta hat (MLE)					0.0348	Theta star (bias corrected MLE)					0.046
1122	nu hat (MLE)					193.5	nu star (bias corrected)					146.5
1123	MLE Mean (bias corrected)					0.281	MLE Sd (bias corrected)					0.114
1124												
1125	Background Statistics Assuming Gamma Distribution											
1126	95% Wilson Hilferty (WH) Approx. Gamma UPL					0.503	90% Percentile					0.433
1127	95% Hawkins Wixley (HW) Approx. Gamma UPL					0.509	95% Percentile					0.49
1128	95% WH Approx. Gamma UTL with 95% Coverage					0.647	99% Percentile					0.61
1129	95% HW Approx. Gamma UTL with 95% Coverage					0.664						
1130	95% WH USL					0.569	95% HW USL					0.58
1131												
1132	Lognormal GOF Test											
1133	Shapiro Wilk Test Statistic					0.881	Shapiro Wilk Lognormal GOF Test					
1134	5% Shapiro Wilk Critical Value					0.859	Data appear Lognormal at 5% Significance Level					
1135	Lilliefors Test Statistic					0.22	Lilliefors Lognormal GOF Test					
1136	5% Lilliefors Critical Value					0.243	Data appear Lognormal at 5% Significance Level					
1137	Data appear Lognormal at 5% Significance Level											
1138												
1139	Background Statistics assuming Lognormal Distribution											
1140	95% UTL with 95% Coverage					0.739	90% Percentile (z)					0.427
1141	95% UPL (t)					0.533	95% Percentile (z)					0.49
1142	95% USL					0.623	99% Percentile (z)					0.633
1143												
1144	Nonparametric Distribution Free Background Statistics											
1145	Data appear Gamma Distributed at 5% Significance Level											
1146												
1147	Nonparametric Upper Limits for Background Threshold Values											
1148	Order of Statistic, r					12	95% UTL with 95% Coverage					0.57
1149	Approx, f used to compute achieved CC					0.632	Approximate Actual Confidence Coefficient achieved by UTL					0.46
1150							Approximate Sample Size needed to achieve specified CC					59

	A	B	C	D	E	F	G	H	I	J	K	L
1151	95% Percentile Bootstrap UTL with 95% Coverage					0.57	95% BCA Bootstrap UTL with 95% Coverage					0.57
1152	95% UPL					0.57	90% Percentile					0.319
1153	90% Chebyshev UPL					0.618	95% Percentile					0.433
1154	95% Chebyshev UPL					0.771	99% Percentile					0.543
1155	95% USL					0.57						
1156												
1157	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1158	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1159	and consists of observations collected from clean unimpacted locations.											
1160	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1161	represents a background data set and when many onsite observations need to be compared with the BTV.											
1162												
1163	NITRATE-NITROGEN											
1164												
1165	General Statistics											
1166	Total Number of Observations					46	Number of Distinct Observations					38
1167							Number of Missing Observations					1
1168	Minimum					4.9	First Quartile					19.85
1169	Second Largest					29	Median					22.5
1170	Maximum					31.7	Third Quartile					25.88
1171	Mean					21.06	SD					6.261
1172	Coefficient of Variation					0.297	Skewness					-1.009
1173	Mean of logged Data					2.983	SD of logged Data					0.406
1174												
1175	Critical Values for Background Threshold Values (BTVs)											
1176	Tolerance Factor K (For UTL)					2.079	d2max (for USL)					2.924
1177												
1178	Normal GOF Test											
1179	Shapiro Wilk Test Statistic					0.898	Shapiro Wilk GOF Test					
1180	5% Shapiro Wilk Critical Value					0.945	Data Not Normal at 5% Significance Level					
1181	Lilliefors Test Statistic					0.181	Lilliefors GOF Test					
1182	5% Lilliefors Critical Value					0.129	Data Not Normal at 5% Significance Level					
1183	Data Not Normal at 5% Significance Level											
1184												
1185	Background Statistics Assuming Normal Distribution											
1186	95% UTL with 95% Coverage					34.08	90% Percentile (z)					29.09
1187	95% UPL (t)					31.69	95% Percentile (z)					31.36
1188	95% USL					39.37	99% Percentile (z)					35.63
1189												
1190	Gamma GOF Test											
1191	A-D Test Statistic					3.025	Anderson-Darling Gamma GOF Test					
1192	5% A-D Critical Value					0.751	Data Not Gamma Distributed at 5% Significance Level					
1193	K-S Test Statistic					0.24	Kolmogorov-Smirnov Gamma GOF Test					
1194	5% K-S Critical Value					0.131	Data Not Gamma Distributed at 5% Significance Level					
1195	Data Not Gamma Distributed at 5% Significance Level											
1196												
1197	Gamma Statistics											
1198	k hat (MLE)					7.935	k star (bias corrected MLE)					7.432
1199	Theta hat (MLE)					2.655	Theta star (bias corrected MLE)					2.834
1200	nu hat (MLE)					730	nu star (bias corrected)					683.7

	A	B	C	D	E	F	G	H	I	J	K	L
1201	MLE Mean (bias corrected)					21.06	MLE Sd (bias corrected)					7.726
1202												
1203	Background Statistics Assuming Gamma Distribution											
1204	95% Wilson Hilferty (WH) Approx. Gamma UPL					35.42	90% Percentile					31.37
1205	95% Hawkins Wixley (HW) Approx. Gamma UPL					36.2	95% Percentile					35.17
1206	95% WH Approx. Gamma UTL with 95% Coverage					39.65	99% Percentile					43.06
1207	95% HW Approx. Gamma UTL with 95% Coverage					40.86						
1208	95% WH USL					50.16	95% HW USL					52.74
1209												
1210	Lognormal GOF Test											
1211	Shapiro Wilk Test Statistic					0.782	Shapiro Wilk Lognormal GOF Test					
1212	5% Shapiro Wilk Critical Value					0.945	Data Not Lognormal at 5% Significance Level					
1213	Lilliefors Test Statistic					0.263	Lilliefors Lognormal GOF Test					
1214	5% Lilliefors Critical Value					0.129	Data Not Lognormal at 5% Significance Level					
1215	Data Not Lognormal at 5% Significance Level											
1216												
1217	Background Statistics assuming Lognormal Distribution											
1218	95% UTL with 95% Coverage					45.97	90% Percentile (z)					33.24
1219	95% UPL (t)					39.36	95% Percentile (z)					38.53
1220	95% USL					64.79	99% Percentile (z)					50.82
1221												
1222	Nonparametric Distribution Free Background Statistics											
1223	Data do not follow a Discernible Distribution (0.05)											
1224												
1225	Nonparametric Upper Limits for Background Threshold Values											
1226	Order of Statistic, r					45	95% UTL with 95% Coverage					29
1227	Approx, f used to compute achieved CC					1.184	Approximate Actual Confidence Coefficient achieved by UTL					0.677
1228							Approximate Sample Size needed to achieve specified CC					93
1229	95% Percentile Bootstrap UTL with 95% Coverage					31.03	95% BCA Bootstrap UTL with 95% Coverage					30.73
1230	95% UPL					28.58	90% Percentile					26.7
1231	90% Chebyshev UPL					40.05	95% Percentile					27.63
1232	95% Chebyshev UPL					48.65	99% Percentile					30.49
1233	95% USL					31.7						
1234												
1235	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1236	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1237	and consists of observations collected from clean unimpacted locations.											
1238	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1239	represents a background data set and when many onsite observations need to be compared with the BTV.											
1240												
1241	pH-FIELD											
1242												
1243	General Statistics											
1244	Total Number of Observations					46	Number of Distinct Observations					39
1245							Number of Missing Observations					1
1246	Minimum					3.91	First Quartile					4.55
1247	Second Largest					6.55	Median					4.66
1248	Maximum					7.44	Third Quartile					5.143
1249	Mean					4.963	SD					0.669
1250	Coefficient of Variation					0.135	Skewness					1.711

	A	B	C	D	E	F	G	H	I	J	K	L
1251	Mean of logged Data					1.594	SD of logged Data					0.124
1252												
1253	Critical Values for Background Threshold Values (BTVs)											
1254	Tolerance Factor K (For UTL)				2.079	d2max (for USL)					2.924	
1255												
1256	Normal GOF Test											
1257	Shapiro Wilk Test Statistic				0.834	Shapiro Wilk GOF Test						
1258	5% Shapiro Wilk Critical Value				0.945	Data Not Normal at 5% Significance Level						
1259	Lilliefors Test Statistic				0.196	Lilliefors GOF Test						
1260	5% Lilliefors Critical Value				0.129	Data Not Normal at 5% Significance Level						
1261	Data Not Normal at 5% Significance Level											
1262												
1263	Background Statistics Assuming Normal Distribution											
1264	95% UTL with 95% Coverage			6.353	90% Percentile (z)					5.82		
1265	95% UPL (t)			6.098	95% Percentile (z)					6.063		
1266	95% USL			6.918	99% Percentile (z)					6.518		
1267												
1268	Gamma GOF Test											
1269	A-D Test Statistic			2.374	Anderson-Darling Gamma GOF Test							
1270	5% A-D Critical Value			0.747	Data Not Gamma Distributed at 5% Significance Level							
1271	K-S Test Statistic			0.197	Kolmogorov-Smirnov Gamma GOF Test							
1272	5% K-S Critical Value			0.13	Data Not Gamma Distributed at 5% Significance Level							
1273	Data Not Gamma Distributed at 5% Significance Level											
1274												
1275	Gamma Statistics											
1276	k hat (MLE)			63.2	k star (bias corrected MLE)					59.09		
1277	Theta hat (MLE)			0.0785	Theta star (bias corrected MLE)					0.084		
1278	nu hat (MLE)			5814	nu star (bias corrected)					5436		
1279	MLE Mean (bias corrected)			4.963	MLE Sd (bias corrected)					0.646		
1280												
1281	Background Statistics Assuming Gamma Distribution											
1282	95% Wilson Hilferty (WH) Approx. Gamma UPL			6.082	90% Percentile					5.806		
1283	95% Hawkins Wixley (HW) Approx. Gamma UPL			6.081	95% Percentile					6.07		
1284	95% WH Approx. Gamma UTL with 95% Coverage			6.362	99% Percentile					6.587		
1285	95% HW Approx. Gamma UTL with 95% Coverage			6.365								
1286	95% WH USL			7.013	95% HW USL					7.027		
1287												
1288	Lognormal GOF Test											
1289	Shapiro Wilk Test Statistic			0.879	Shapiro Wilk Lognormal GOF Test							
1290	5% Shapiro Wilk Critical Value			0.945	Data Not Lognormal at 5% Significance Level							
1291	Lilliefors Test Statistic			0.193	Lilliefors Lognormal GOF Test							
1292	5% Lilliefors Critical Value			0.129	Data Not Lognormal at 5% Significance Level							
1293	Data Not Lognormal at 5% Significance Level											
1294												
1295	Background Statistics assuming Lognormal Distribution											
1296	95% UTL with 95% Coverage			6.372	90% Percentile (z)					5.772		
1297	95% UPL (t)			6.078	95% Percentile (z)					6.038		
1298	95% USL			7.076	99% Percentile (z)					6.571		
1299												
1300	Nonparametric Distribution Free Background Statistics											

	A	B	C	D	E	F	G	H	I	J	K	L
1301	Data do not follow a Discernible Distribution (0.05)											
1302												
1303	Nonparametric Upper Limits for Background Threshold Values											
1304	Order of Statistic, r				45		95% UTL with 95% Coverage				6.55	
1305	Approx, f used to compute achieved CC				1.184		Approximate Actual Confidence Coefficient achieved by UTL				0.677	
1306					Approximate Sample Size needed to achieve specified CC				93			
1307	95% Percentile Bootstrap UTL with 95% Coverage				7.175		95% BCA Bootstrap UTL with 95% Coverage				7.068	
1308	95% UPL				6.491		90% Percentile				5.8	
1309	90% Chebyshev UPL				6.99		95% Percentile				6.273	
1310	95% Chebyshev UPL				7.909		99% Percentile				7.04	
1311	95% USL				7.44							
1312												
1313	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1314	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1315	and consists of observations collected from clean unimpacted locations.											
1316	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1317	represents a background data set and when many onsite observations need to be compared with the BTV.											
1318												
1319	pH-LAB											
1320												
1321	General Statistics											
1322	Total Number of Observations				46		Number of Distinct Observations				41	
1323					Number of Missing Observations				1			
1324	Minimum				4.81		First Quartile				5.36	
1325	Second Largest				9.33		Median				5.57	
1326	Maximum				9.42		Third Quartile				5.763	
1327	Mean				5.817		SD				0.968	
1328	Coefficient of Variation				0.166		Skewness				2.521	
1329	Mean of logged Data				1.75		SD of logged Data				0.143	
1330												
1331	Critical Values for Background Threshold Values (BTVs)											
1332	Tolerance Factor K (For UTL)				2.079		d2max (for USL)				2.924	
1333												
1334	Normal GOF Test											
1335	Shapiro Wilk Test Statistic				0.694		Shapiro Wilk GOF Test					
1336	5% Shapiro Wilk Critical Value				0.945		Data Not Normal at 5% Significance Level					
1337	Lilliefors Test Statistic				0.291		Lilliefors GOF Test					
1338	5% Lilliefors Critical Value				0.129		Data Not Normal at 5% Significance Level					
1339	Data Not Normal at 5% Significance Level											
1340												
1341	Background Statistics Assuming Normal Distribution											
1342	95% UTL with 95% Coverage				7.83		90% Percentile (z)				7.058	
1343	95% UPL (t)				7.46		95% Percentile (z)				7.409	
1344	95% USL				8.648		99% Percentile (z)				8.069	
1345												
1346	Gamma GOF Test											
1347	A-D Test Statistic				4.126		Anderson-Darling Gamma GOF Test					
1348	5% A-D Critical Value				0.748		Data Not Gamma Distributed at 5% Significance Level					
1349	K-S Test Statistic				0.269		Kolmogorov-Smirnov Gamma GOF Test					
1350	5% K-S Critical Value				0.13		Data Not Gamma Distributed at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
1351	Data Not Gamma Distributed at 5% Significance Level											
1352												
1353	Gamma Statistics											
1354	k hat (MLE)				45.34		k star (bias corrected MLE)				42.4	
1355	Theta hat (MLE)				0.128		Theta star (bias corrected MLE)				0.137	
1356	nu hat (MLE)				4171		nu star (bias corrected)				3900	
1357	MLE Mean (bias corrected)				5.817		MLE Sd (bias corrected)				0.893	
1358												
1359	Background Statistics Assuming Gamma Distribution											
1360	95% Wilson Hilferty (WH) Approx. Gamma UPL				7.376		90% Percentile				6.987	
1361	95% Hawkins Wixley (HW) Approx. Gamma UPL				7.366		95% Percentile				7.36	
1362	95% WH Approx. Gamma UTL with 95% Coverage				7.773		99% Percentile				8.094	
1363	95% HW Approx. Gamma UTL with 95% Coverage				7.767							
1364	95% WH USL				8.702		95% HW USL				8.712	
1365												
1366	Lognormal GOF Test											
1367	Shapiro Wilk Test Statistic				0.769		Shapiro Wilk Lognormal GOF Test					
1368	5% Shapiro Wilk Critical Value				0.945		Data Not Lognormal at 5% Significance Level					
1369	Lilliefors Test Statistic				0.258		Lilliefors Lognormal GOF Test					
1370	5% Lilliefors Critical Value				0.129		Data Not Lognormal at 5% Significance Level					
1371	Data Not Lognormal at 5% Significance Level											
1372												
1373	Background Statistics assuming Lognormal Distribution											
1374	95% UTL with 95% Coverage				7.751		90% Percentile (z)				6.913	
1375	95% UPL (t)				7.338		95% Percentile (z)				7.283	
1376	95% USL				8.749		99% Percentile (z)				8.03	
1377												
1378	Nonparametric Distribution Free Background Statistics											
1379	Data do not follow a Discernible Distribution (0.05)											
1380												
1381	Nonparametric Upper Limits for Background Threshold Values											
1382	Order of Statistic, r				45		95% UTL with 95% Coverage				9.33	
1383	Approx, f used to compute achieved CC				1.184		Approximate Actual Confidence Coefficient achieved by UTL				0.677	
1384							Approximate Sample Size needed to achieve specified CC				93	
1385	95% Percentile Bootstrap UTL with 95% Coverage				9.398		95% BCA Bootstrap UTL with 95% Coverage				9.33	
1386	95% UPL				8.798		90% Percentile				6.845	
1387	90% Chebyshev UPL				8.753		95% Percentile				7.668	
1388	95% Chebyshev UPL				10.08		99% Percentile				9.38	
1389	95% USL				9.42							
1390												
1391	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1392	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1393	and consists of observations collected from clean unimpacted locations.											
1394	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1395	represents a background data set and when many onsite observations need to be compared with the BTV.											
1396												
1397	POTASSIUM, TOTAL											
1398												
1399	General Statistics											
1400	Total Number of Observations				45		Number of Distinct Observations				17	

	A	B	C	D	E	F	G	H	I	J	K	L
1401											Number of Missing Observations	2
1402					Minimum	0.95					First Quartile	1.2
1403					Second Largest	14.4					Median	1.3
1404					Maximum	132					Third Quartile	1.9
1405					Mean	5.066					SD	19.53
1406					Coefficient of Variation	3.855					Skewness	6.529
1407					Mean of logged Data	0.583					SD of logged Data	0.901
1408												
1409	Critical Values for Background Threshold Values (BTVs)											
1410					Tolerance Factor K (For UTL)	2.085					d2max (for USL)	2.915
1411												
1412	Normal GOF Test											
1413					Shapiro Wilk Test Statistic	0.214					Shapiro Wilk GOF Test	
1414					5% Shapiro Wilk Critical Value	0.945					Data Not Normal at 5% Significance Level	
1415					Lilliefors Test Statistic	0.429					Lilliefors GOF Test	
1416					5% Lilliefors Critical Value	0.131					Data Not Normal at 5% Significance Level	
1417	Data Not Normal at 5% Significance Level											
1418												
1419	Background Statistics Assuming Normal Distribution											
1420					95% UTL with 95% Coverage	45.78					90% Percentile (z)	30.09
1421					95% UPL (t)	38.24					95% Percentile (z)	37.19
1422					95% USL	62					99% Percentile (z)	50.49
1423												
1424	Gamma GOF Test											
1425					A-D Test Statistic	10.08					Anderson-Darling Gamma GOF Test	
1426					5% A-D Critical Value	0.804					Data Not Gamma Distributed at 5% Significance Level	
1427					K-S Test Statistic	0.377					Kolmogorov-Smirnov Gamma GOF Test	
1428					5% K-S Critical Value	0.138					Data Not Gamma Distributed at 5% Significance Level	
1429	Data Not Gamma Distributed at 5% Significance Level											
1430												
1431	Gamma Statistics											
1432					k hat (MLE)	0.595					k star (bias corrected MLE)	0.57
1433					Theta hat (MLE)	8.512					Theta star (bias corrected MLE)	8.883
1434					nu hat (MLE)	53.56					nu star (bias corrected)	51.32
1435					MLE Mean (bias corrected)	5.066					MLE Sd (bias corrected)	6.708
1436												
1437	Background Statistics Assuming Gamma Distribution											
1438					95% Wilson Hilferty (WH) Approx. Gamma UPL	13.99					90% Percentile	13.32
1439					95% Hawkins Wixley (HW) Approx. Gamma UPL	12.1					95% Percentile	18.56
1440					95% WH Approx. Gamma UTL with 95% Coverage	18.9					99% Percentile	31.29
1441					95% HW Approx. Gamma UTL with 95% Coverage	16.58						
1442					95% WH USL	33.08					95% HW USL	30.28
1443												
1444	Lognormal GOF Test											
1445					Shapiro Wilk Test Statistic	0.62					Shapiro Wilk Lognormal GOF Test	
1446					5% Shapiro Wilk Critical Value	0.945					Data Not Lognormal at 5% Significance Level	
1447					Lilliefors Test Statistic	0.274					Lilliefors Lognormal GOF Test	
1448					5% Lilliefors Critical Value	0.131					Data Not Lognormal at 5% Significance Level	
1449	Data Not Lognormal at 5% Significance Level											
1450												

	A	B	C	D	E	F	G	H	I	J	K	L
1451	Background Statistics assuming Lognormal Distribution											
1452	95% UTL with 95% Coverage				11.73						90% Percentile (z)	5.685
1453	95% UPL (t)				8.28						95% Percentile (z)	7.887
1454	95% USL				24.78						99% Percentile (z)	14.58
1455												
1456	Nonparametric Distribution Free Background Statistics											
1457	Data do not follow a Discernible Distribution (0.05)											
1458												
1459	Nonparametric Upper Limits for Background Threshold Values											
1460	Order of Statistic, r			44	95% UTL with 95% Coverage					14.4		
1461	Approx, f used to compute achieved CC				1.158	Approximate Actual Confidence Coefficient achieved by UTL					0.665	
1462						Approximate Sample Size needed to achieve specified CC					93	
1463	95% Percentile Bootstrap UTL with 95% Coverage				108.5	95% BCA Bootstrap UTL with 95% Coverage					107.8	
1464	95% UPL				13.41	90% Percentile					5.02	
1465	90% Chebyshev UPL				64.3	95% Percentile					10.28	
1466	95% Chebyshev UPL				91.13	99% Percentile					80.26	
1467	95% USL				132							
1468												
1469	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1470	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1471	and consists of observations collected from clean unimpacted locations.											
1472	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1473	represents a background data set and when many onsite observations need to be compared with the BTV.											
1474												
1475	POTASSIUM, DISSOLVED											
1476												
1477	General Statistics											
1478	Total Number of Observations				12	Number of Distinct Observations					8	
1479						Number of Missing Observations					34	
1480	Minimum				0.95	First Quartile					1.075	
1481	Second Largest				1.6	Median					1.2	
1482	Maximum				11.4	Third Quartile					1.45	
1483	Mean				2.071	SD					2.946	
1484	Coefficient of Variation				1.423	Skewness					3.43	
1485	Mean of logged Data				0.373	SD of logged Data					0.672	
1486												
1487	Critical Values for Background Threshold Values (BTVs)											
1488	Tolerance Factor K (For UTL)				2.736	d2max (for USL)					2.285	
1489												
1490	Normal GOF Test											
1491	Shapiro Wilk Test Statistic				0.393	Shapiro Wilk GOF Test						
1492	5% Shapiro Wilk Critical Value				0.859	Data Not Normal at 5% Significance Level						
1493	Lilliefors Test Statistic				0.48	Lilliefors GOF Test						
1494	5% Lilliefors Critical Value				0.243	Data Not Normal at 5% Significance Level						
1495	Data Not Normal at 5% Significance Level											
1496												
1497	Background Statistics Assuming Normal Distribution											
1498	95% UTL with 95% Coverage				10.13	90% Percentile (z)					5.846	
1499	95% UPL (t)				7.578	95% Percentile (z)					6.917	
1500	95% USL				8.802	99% Percentile (z)					8.924	

	A	B	C	D	E	F	G	H	I	J	K	L
1501												
1502	Gamma GOF Test											
1503	A-D Test Statistic				2.705		Anderson-Darling Gamma GOF Test					
1504	5% A-D Critical Value				0.745		Data Not Gamma Distributed at 5% Significance Level					
1505	K-S Test Statistic				0.43		Kolmogorov-Smirnov Gamma GOF Test					
1506	5% K-S Critical Value				0.249		Data Not Gamma Distributed at 5% Significance Level					
1507	Data Not Gamma Distributed at 5% Significance Level											
1508												
1509	Gamma Statistics											
1510	k hat (MLE)				1.554		k star (bias corrected MLE)				1.221	
1511	Theta hat (MLE)				1.332		Theta star (bias corrected MLE)				1.695	
1512	nu hat (MLE)				37.31		nu star (bias corrected)				29.31	
1513	MLE Mean (bias corrected)				2.071		MLE Sd (bias corrected)				1.874	
1514												
1515	Background Statistics Assuming Gamma Distribution											
1516	95% Wilson Hilferty (WH) Approx. Gamma UPL				5.973		90% Percentile				4.538	
1517	95% Hawkins Wixley (HW) Approx. Gamma UPL				5.75		95% Percentile				5.785	
1518	95% WH Approx. Gamma UTL with 95% Coverage				9.471		99% Percentile				8.638	
1519	95% HW Approx. Gamma UTL with 95% Coverage				9.378							
1520	95% WH USL				7.517		95% HW USL				7.325	
1521												
1522	Lognormal GOF Test											
1523	Shapiro Wilk Test Statistic				0.569		Shapiro Wilk Lognormal GOF Test					
1524	5% Shapiro Wilk Critical Value				0.859		Data Not Lognormal at 5% Significance Level					
1525	Lilliefors Test Statistic				0.359		Lilliefors Lognormal GOF Test					
1526	5% Lilliefors Critical Value				0.243		Data Not Lognormal at 5% Significance Level					
1527	Data Not Lognormal at 5% Significance Level											
1528												
1529	Background Statistics assuming Lognormal Distribution											
1530	95% UTL with 95% Coverage				9.124		90% Percentile (z)				3.435	
1531	95% UPL (t)				5.097		95% Percentile (z)				4.384	
1532	95% USL				6.739		99% Percentile (z)				6.929	
1533												
1534	Nonparametric Distribution Free Background Statistics											
1535	Data do not follow a Discernible Distribution (0.05)											
1536												
1537	Nonparametric Upper Limits for Background Threshold Values											
1538	Order of Statistic, r				12		95% UTL with 95% Coverage				11.4	
1539	Approx, f used to compute achieved CC				0.632		Approximate Actual Confidence Coefficient achieved by UTL				0.46	
1540							Approximate Sample Size needed to achieve specified CC				59	
1541	95% Percentile Bootstrap UTL with 95% Coverage				11.4		95% BCA Bootstrap UTL with 95% Coverage				11.4	
1542	95% UPL				11.4		90% Percentile				1.6	
1543	90% Chebyshev UPL				11.27		95% Percentile				6.01	
1544	95% Chebyshev UPL				15.44		99% Percentile				10.32	
1545	95% USL				11.4							
1546												
1547	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1548	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1549	and consists of observations collected from clean unimpacted locations.											
1550	The use of USL tends to provide a balance between false positives and false negatives provided the data											

	A	B	C	D	E	F	G	H	I	J	K	L		
1551	represents a background data set and when many onsite observations need to be compared with the BTV.													
1552														
1553	SODIUM, TOTAL													
1554														
1555	General Statistics													
1556	Total Number of Observations				45		Number of Distinct Observations				35			
1557									Number of Missing Observations				2	
1558	Minimum				13.3		First Quartile				14.4			
1559	Second Largest				27.5		Median				15.5			
1560	Maximum				54.2		Third Quartile				18.5			
1561	Mean				17.5		SD				6.329			
1562	Coefficient of Variation				0.362		Skewness				4.712			
1563	Mean of logged Data				2.826		SD of logged Data				0.24			
1564														
1565	Critical Values for Background Threshold Values (BTVs)													
1566	Tolerance Factor K (For UTL)				2.085		d2max (for USL)				2.915			
1567														
1568	Normal GOF Test													
1569	Shapiro Wilk Test Statistic				0.524		Shapiro Wilk GOF Test							
1570	5% Shapiro Wilk Critical Value				0.945		Data Not Normal at 5% Significance Level							
1571	Lilliefors Test Statistic				0.253		Lilliefors GOF Test							
1572	5% Lilliefors Critical Value				0.131		Data Not Normal at 5% Significance Level							
1573	Data Not Normal at 5% Significance Level													
1574														
1575	Background Statistics Assuming Normal Distribution													
1576	95% UTL with 95% Coverage		30.7		90% Percentile (z)		25.61							
1577	95% UPL (t)		28.25		95% Percentile (z)		27.91							
1578	95% USL		35.95		99% Percentile (z)		32.22							
1579														
1580	Gamma GOF Test													
1581	A-D Test Statistic				3.717		Anderson-Darling Gamma GOF Test							
1582	5% A-D Critical Value				0.748		Data Not Gamma Distributed at 5% Significance Level							
1583	K-S Test Statistic				0.193		Kolmogorov-Smirnov Gamma GOF Test							
1584	5% K-S Critical Value				0.132		Data Not Gamma Distributed at 5% Significance Level							
1585	Data Not Gamma Distributed at 5% Significance Level													
1586														
1587	Gamma Statistics													
1588	k hat (MLE)				14		k star (bias corrected MLE)				13.08			
1589	Theta hat (MLE)				1.25		Theta star (bias corrected MLE)				1.338			
1590	nu hat (MLE)				1260		nu star (bias corrected)				1178			
1591	MLE Mean (bias corrected)				17.5		MLE Sd (bias corrected)				4.838			
1592														
1593	Background Statistics Assuming Gamma Distribution													
1594	95% Wilson Hilferty (WH) Approx. Gamma UPL		26.16		90% Percentile		23.92							
1595	95% Hawkins Wixley (HW) Approx. Gamma UPL		25.95		95% Percentile		26.14							
1596	95% WH Approx. Gamma UTL with 95% Coverage		28.61		99% Percentile		30.67							
1597	95% HW Approx. Gamma UTL with 95% Coverage		28.4											
1598	95% WH USL		34.37		95% HW USL		34.24							
1599														
1600	Lognormal GOF Test													

	A	B	C	D	E	F	G	H	I	J	K	L	
1601	Shapiro Wilk Test Statistic					0.733	Shapiro Wilk Lognormal GOF Test						
1602	5% Shapiro Wilk Critical Value					0.945	Data Not Lognormal at 5% Significance Level						
1603	Lilliefors Test Statistic					0.17	Lilliefors Lognormal GOF Test						
1604	5% Lilliefors Critical Value					0.131	Data Not Lognormal at 5% Significance Level						
1605	Data Not Lognormal at 5% Significance Level												
1606													
1607	Background Statistics assuming Lognormal Distribution												
1608	95% UTL with 95% Coverage				27.84					90% Percentile (z)	22.96		
1609	95% UPL (t)				25.38					95% Percentile (z)	25.05		
1610	95% USL				33.99					99% Percentile (z)	29.51		
1611													
1612	Nonparametric Distribution Free Background Statistics												
1613	Data do not follow a Discernible Distribution (0.05)												
1614													
1615	Nonparametric Upper Limits for Background Threshold Values												
1616	Order of Statistic, r				44	95% UTL with 95% Coverage				27.5			
1617	Approx, f used to compute achieved CC					1.158	Approximate Actual Confidence Coefficient achieved by UTL					0.665	
1618							Approximate Sample Size needed to achieve specified CC					93	
1619	95% Percentile Bootstrap UTL with 95% Coverage				48.86	95% BCA Bootstrap UTL with 95% Coverage				48.86			
1620	95% UPL				26.45	90% Percentile				20.18			
1621	90% Chebyshev UPL				36.7	95% Percentile				23.66			
1622	95% Chebyshev UPL				45.39	99% Percentile				42.45			
1623	95% USL				54.2								
1624													
1625	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.												
1626	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers												
1627	and consists of observations collected from clean unimpacted locations.												
1628	The use of USL tends to provide a balance between false positives and false negatives provided the data												
1629	represents a background data set and when many onsite observations need to be compared with the BTV.												
1630													
1631	SODIUM, DISSOLVED												
1632													
1633	General Statistics												
1634	Total Number of Observations				12	Number of Distinct Observations				10			
1635						Number of Missing Observations				34			
1636	Minimum				13	First Quartile				14.1			
1637	Second Largest				20.6	Median				16.2			
1638	Maximum				20.9	Third Quartile				18.38			
1639	Mean				16.45	SD				2.765			
1640	Coefficient of Variation				0.168	Skewness				0.485			
1641	Mean of logged Data				2.788	SD of logged Data				0.165			
1642													
1643	Critical Values for Background Threshold Values (BTVs)												
1644	Tolerance Factor K (For UTL)				2.736	d2max (for USL)				2.285			
1645													
1646	Normal GOF Test												
1647	Shapiro Wilk Test Statistic					0.907	Shapiro Wilk GOF Test						
1648	5% Shapiro Wilk Critical Value					0.859	Data appear Normal at 5% Significance Level						
1649	Lilliefors Test Statistic					0.198	Lilliefors GOF Test						
1650	5% Lilliefors Critical Value					0.243	Data appear Normal at 5% Significance Level						

	A	B	C	D	E	F	G	H	I	J	K	L	
1651	Data appear Normal at 5% Significance Level												
1652													
1653	Background Statistics Assuming Normal Distribution												
1654	95% UTL with 95% Coverage				24.02						90% Percentile (z)		19.99
1655	95% UPL (t)				21.62						95% Percentile (z)		21
1656	95% USL				22.77						99% Percentile (z)		22.88
1657													
1658	Gamma GOF Test												
1659	A-D Test Statistic				0.45		Anderson-Darling Gamma GOF Test						
1660	5% A-D Critical Value				0.73		Detected data appear Gamma Distributed at 5% Significance Level						
1661	K-S Test Statistic				0.207		Kolmogorov-Smirnov Gamma GOF Test						
1662	5% K-S Critical Value				0.245		Detected data appear Gamma Distributed at 5% Significance Level						
1663	Detected data appear Gamma Distributed at 5% Significance Level												
1664													
1665	Gamma Statistics												
1666	k hat (MLE)				39.71		k star (bias corrected MLE)				29.84		
1667	Theta hat (MLE)				0.414		Theta star (bias corrected MLE)				0.551		
1668	nu hat (MLE)				953.1		nu star (bias corrected)				716.1		
1669	MLE Mean (bias corrected)				16.45		MLE Sd (bias corrected)				3.011		
1670													
1671	Background Statistics Assuming Gamma Distribution												
1672	95% Wilson Hilferty (WH) Approx. Gamma UPL				21.92		90% Percentile				20.41		
1673	95% Hawkins Wixley (HW) Approx. Gamma UPL				21.97		95% Percentile				21.7		
1674	95% WH Approx. Gamma UTL with 95% Coverage				24.91		99% Percentile				24.25		
1675	95% HW Approx. Gamma UTL with 95% Coverage				25.05								
1676	95% WH USL				23.33		95% HW USL				23.41		
1677													
1678	Lognormal GOF Test												
1679	Shapiro Wilk Test Statistic				0.92		Shapiro Wilk Lognormal GOF Test						
1680	5% Shapiro Wilk Critical Value				0.859		Data appear Lognormal at 5% Significance Level						
1681	Lilliefors Test Statistic				0.196		Lilliefors Lognormal GOF Test						
1682	5% Lilliefors Critical Value				0.243		Data appear Lognormal at 5% Significance Level						
1683	Data appear Lognormal at 5% Significance Level												
1684													
1685	Background Statistics assuming Lognormal Distribution												
1686	95% UTL with 95% Coverage				25.52		90% Percentile (z)				20.07		
1687	95% UPL (t)				22.12		95% Percentile (z)				21.31		
1688	95% USL				23.69		99% Percentile (z)				23.85		
1689													
1690	Nonparametric Distribution Free Background Statistics												
1691	Data appear Normal at 5% Significance Level												
1692													
1693	Nonparametric Upper Limits for Background Threshold Values												
1694	Order of Statistic, r				12		95% UTL with 95% Coverage				20.9		
1695	Approx, f used to compute achieved CC				0.632		Approximate Actual Confidence Coefficient achieved by UTL				0.46		
1696							Approximate Sample Size needed to achieve specified CC				59		
1697	95% Percentile Bootstrap UTL with 95% Coverage				20.9		95% BCA Bootstrap UTL with 95% Coverage				20.9		
1698	95% UPL				20.9		90% Percentile				20.49		
1699	90% Chebyshev UPL				25.08		95% Percentile				20.74		
1700	95% Chebyshev UPL				29		99% Percentile				20.87		

	A	B	C	D	E	F	G	H	I	J	K	L
1701					95% USL	20.9						
1702												
1703	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1704	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1705	and consists of observations collected from clean unimpacted locations.											
1706	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1707	represents a background data set and when many onsite observations need to be compared with the BTV.											
1708												
1709	SPEC. COND., FIELD											
1710												
1711	General Statistics											
1712					Total Number of Observations	46					Number of Distinct Observations	37
1713									Number of Missing Observations	1		
1714					Minimum	5					First Quartile	303
1715					Second Largest	661					Median	330
1716					Maximum	684					Third Quartile	350
1717					Mean	336					SD	104.6
1718					Coefficient of Variation	0.311					Skewness	1.072
1719					Mean of logged Data	5.719					SD of logged Data	0.659
1720												
1721	Critical Values for Background Threshold Values (BTVs)											
1722					Tolerance Factor K (For UTL)	2.079					d2max (for USL)	2.924
1723												
1724	Normal GOF Test											
1725					Shapiro Wilk Test Statistic	0.774					Shapiro Wilk GOF Test	
1726					5% Shapiro Wilk Critical Value	0.945					Data Not Normal at 5% Significance Level	
1727					Lilliefors Test Statistic	0.279					Lilliefors GOF Test	
1728					5% Lilliefors Critical Value	0.129					Data Not Normal at 5% Significance Level	
1729	Data Not Normal at 5% Significance Level											
1730												
1731	Background Statistics Assuming Normal Distribution											
1732					95% UTL with 95% Coverage	553.4					90% Percentile (z)	470
1733					95% UPL (t)	513.5					95% Percentile (z)	508
1734					95% USL	641.8					99% Percentile (z)	579.3
1735												
1736	Gamma GOF Test											
1737					A-D Test Statistic	5.969					Anderson-Darling Gamma GOF Test	
1738					5% A-D Critical Value	0.753					Data Not Gamma Distributed at 5% Significance Level	
1739					K-S Test Statistic	0.284					Kolmogorov-Smirnov Gamma GOF Test	
1740					5% K-S Critical Value	0.131					Data Not Gamma Distributed at 5% Significance Level	
1741	Data Not Gamma Distributed at 5% Significance Level											
1742												
1743	Gamma Statistics											
1744					k hat (MLE)	5.282					k star (bias corrected MLE)	4.952
1745					Theta hat (MLE)	63.61					Theta star (bias corrected MLE)	67.84
1746					nu hat (MLE)	485.9					nu star (bias corrected)	455.6
1747					MLE Mean (bias corrected)	336					MLE Sd (bias corrected)	151
1748												
1749	Background Statistics Assuming Gamma Distribution											
1750					95% Wilson Hilferty (WH) Approx. Gamma UPL	604					90% Percentile	538.1

	A	B	C	D	E	F	G	H	I	J	K	L
1751	95% Hawkins Wixley (HW) Approx. Gamma UPL					643.7	95% Percentile					616.5
1752	95% WH Approx. Gamma UTL with 95% Coverage			95% Coverage		685	99% Percentile					782.3
1753	95% HW Approx. Gamma UTL with 95% Coverage			95% Coverage		742.8						
1754	95% WH USL					889.3	95% HW USL					1002
1755												
1756	Lognormal GOF Test											
1757	Shapiro Wilk Test Statistic					0.426	Shapiro Wilk Lognormal GOF Test					
1758	5% Shapiro Wilk Critical Value					0.945	Data Not Lognormal at 5% Significance Level					
1759	Lilliefors Test Statistic					0.324	Lilliefors Lognormal GOF Test					
1760	5% Lilliefors Critical Value					0.129	Data Not Lognormal at 5% Significance Level					
1761	Data Not Lognormal at 5% Significance Level											
1762												
1763	Background Statistics assuming Lognormal Distribution											
1764	95% UTL with 95% Coverage			95% Coverage		1199	90% Percentile (z)					708.9
1765	95% UPL (t)					932.5	95% Percentile (z)					900.7
1766	95% USL					2092	99% Percentile (z)					1411
1767												
1768	Nonparametric Distribution Free Background Statistics											
1769	Data do not follow a Discernible Distribution (0.05)											
1770												
1771	Nonparametric Upper Limits for Background Threshold Values											
1772	Order of Statistic, r				45	95% UTL with 95% Coverage					661	
1773	Approx, f used to compute achieved CC					1.184	Approximate Actual Confidence Coefficient achieved by UTL					0.677
1774							Approximate Sample Size needed to achieve specified CC					93
1775	95% Percentile Bootstrap UTL with 95% Coverage			95% Coverage		678.3	95% BCA Bootstrap UTL with 95% Coverage					661
1776	95% UPL					636.2	90% Percentile					376
1777	90% Chebyshev UPL					653.1	95% Percentile					559
1778	95% Chebyshev UPL					796.8	99% Percentile					673.7
1779	95% USL					684						
1780												
1781	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1782	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1783	and consists of observations collected from clean unimpacted locations.											
1784	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1785	represents a background data set and when many onsite observations need to be compared with the BTV.											
1786												
1787	SPEC. COND., LAB											
1788												
1789	General Statistics											
1790	Total Number of Observations					46	Number of Distinct Observations					38
1791							Number of Missing Observations					1
1792	Minimum					242	First Quartile					273.3
1793	Second Largest					790	Median					302
1794	Maximum					1020	Third Quartile					337.5
1795	Mean					345.1	SD					145.8
1796	Coefficient of Variation					0.422	Skewness					3.239
1797	Mean of logged Data					5.79	SD of logged Data					0.295
1798												
1799	Critical Values for Background Threshold Values (BTVs)											
1800	Tolerance Factor K (For UTL)					2.079	d2max (for USL)					2.924

	A	B	C	D	E	F	G	H	I	J	K	L
1801												
1802	Normal GOF Test											
1803	Shapiro Wilk Test Statistic					0.587	Shapiro Wilk GOF Test					
1804	5% Shapiro Wilk Critical Value					0.945	Data Not Normal at 5% Significance Level					
1805	Lilliefors Test Statistic					0.288	Lilliefors GOF Test					
1806	5% Lilliefors Critical Value					0.129	Data Not Normal at 5% Significance Level					
1807	Data Not Normal at 5% Significance Level											
1808												
1809	Background Statistics Assuming Normal Distribution											
1810	95% UTL with 95% Coverage				648.2					90% Percentile (z)		531.9
1811	95% UPL (t)				592.5					95% Percentile (z)		584.9
1812	95% USL				771.3					99% Percentile (z)		684.2
1813												
1814	Gamma GOF Test											
1815	A-D Test Statistic					4.86	Anderson-Darling Gamma GOF Test					
1816	5% A-D Critical Value					0.749	Data Not Gamma Distributed at 5% Significance Level					
1817	K-S Test Statistic					0.243	Kolmogorov-Smirnov Gamma GOF Test					
1818	5% K-S Critical Value					0.13	Data Not Gamma Distributed at 5% Significance Level					
1819	Data Not Gamma Distributed at 5% Significance Level											
1820												
1821	Gamma Statistics											
1822	k hat (MLE)				9.494					k star (bias corrected MLE)		8.889
1823	Theta hat (MLE)				36.35					Theta star (bias corrected MLE)		38.82
1824	nu hat (MLE)				873.4					nu star (bias corrected)		817.8
1825	MLE Mean (bias corrected)				345.1					MLE Sd (bias corrected)		115.7
1826												
1827	Background Statistics Assuming Gamma Distribution											
1828	95% Wilson Hilferty (WH) Approx. Gamma UPL				555.8					90% Percentile		499.2
1829	95% Hawkins Wixley (HW) Approx. Gamma UPL				551.7					95% Percentile		554.8
1830	95% WH Approx. Gamma UTL with 95% Coverage				617.1					99% Percentile		669.6
1831	95% HW Approx. Gamma UTL with 95% Coverage				613.7							
1832	95% WH USL				768.3					95% HW USL		769.4
1833												
1834	Lognormal GOF Test											
1835	Shapiro Wilk Test Statistic					0.738	Shapiro Wilk Lognormal GOF Test					
1836	5% Shapiro Wilk Critical Value					0.945	Data Not Lognormal at 5% Significance Level					
1837	Lilliefors Test Statistic					0.217	Lilliefors Lognormal GOF Test					
1838	5% Lilliefors Critical Value					0.129	Data Not Lognormal at 5% Significance Level					
1839	Data Not Lognormal at 5% Significance Level											
1840												
1841	Background Statistics assuming Lognormal Distribution											
1842	95% UTL with 95% Coverage				604.6					90% Percentile (z)		477.6
1843	95% UPL (t)				540.1					95% Percentile (z)		531.7
1844	95% USL				776					99% Percentile (z)		650.3
1845												
1846	Nonparametric Distribution Free Background Statistics											
1847	Data do not follow a Discernible Distribution (0.05)											
1848												
1849	Nonparametric Upper Limits for Background Threshold Values											
1850	Order of Statistic, r				45					95% UTL with 95% Coverage		790

	A	B	C	D	E	F	G	H	I	J	K	L
1851	Approx, f used to compute achieved CC					1.184	Approximate Actual Confidence Coefficient achieved by UTL					0.677
1852							Approximate Sample Size needed to achieve specified CC					93
1853	95% Percentile Bootstrap UTL with 95% Coverage					962.5	95% BCA Bootstrap UTL with 95% Coverage					912.3
1854	95% UPL					743.1	90% Percentile					425
1855	90% Chebyshev UPL					787.1	95% Percentile					639.3
1856	95% Chebyshev UPL					987.4	99% Percentile					916.5
1857	95% USL					1020						
1858												
1859	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1860	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1861	and consists of observations collected from clean unimpacted locations.											
1862	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1863	represents a background data set and when many onsite observations need to be compared with the BTV.											
1864												
1865	SULFATE											
1866												
1867	General Statistics											
1868	Total Number of Observations					45	Number of Distinct Observations					40
1869							Number of Missing Observations					2
1870	Minimum					6.9	First Quartile					9.8
1871	Second Largest					74	Median					12.3
1872	Maximum					188	Third Quartile					23.3
1873	Mean					23.37	SD					29.46
1874	Coefficient of Variation					1.26	Skewness					4.309
1875	Mean of logged Data					2.807	SD of logged Data					0.728
1876												
1877	Critical Values for Background Threshold Values (BTVs)											
1878	Tolerance Factor K (For UTL)					2.085	d2max (for USL)					2.915
1879												
1880	Normal GOF Test											
1881	Shapiro Wilk Test Statistic					0.534	Shapiro Wilk GOF Test					
1882	5% Shapiro Wilk Critical Value					0.945	Data Not Normal at 5% Significance Level					
1883	Lilliefors Test Statistic					0.288	Lilliefors GOF Test					
1884	5% Lilliefors Critical Value					0.131	Data Not Normal at 5% Significance Level					
1885	Data Not Normal at 5% Significance Level											
1886												
1887	Background Statistics Assuming Normal Distribution											
1888	95% UTL with 95% Coverage					84.79	90% Percentile (z)					61.12
1889	95% UPL (t)					73.41	95% Percentile (z)					71.82
1890	95% USL					109.2	99% Percentile (z)					91.9
1891												
1892	Gamma GOF Test											
1893	A-D Test Statistic					3.024	Anderson-Darling Gamma GOF Test					
1894	5% A-D Critical Value					0.766	Data Not Gamma Distributed at 5% Significance Level					
1895	K-S Test Statistic					0.239	Kolmogorov-Smirnov Gamma GOF Test					
1896	5% K-S Critical Value					0.134	Data Not Gamma Distributed at 5% Significance Level					
1897	Data Not Gamma Distributed at 5% Significance Level											
1898												
1899	Gamma Statistics											
1900	k hat (MLE)					1.597	k star (bias corrected MLE)					1.505

	A	B	C	D	E	F	G	H	I	J	K	L
1901	Theta hat (MLE)					14.63	Theta star (bias corrected MLE)					15.53
1902	nu hat (MLE)					143.7	nu star (bias corrected)					135.5
1903	MLE Mean (bias corrected)					23.37	MLE Sd (bias corrected)					19.05
1904												
1905	Background Statistics Assuming Gamma Distribution											
1906	95% Wilson Hilferty (WH) Approx. Gamma UPL					59.58	90% Percentile					48.66
1907	95% Hawkins Wixley (HW) Approx. Gamma UPL					58.64	95% Percentile					60.81
1908	95% WH Approx. Gamma UTL with 95% Coverage					73.86	99% Percentile					88.23
1909	95% HW Approx. Gamma UTL with 95% Coverage					73.67						
1910	95% WH USL					111.9	95% HW USL					115.6
1911												
1912	Lognormal GOF Test											
1913	Shapiro Wilk Test Statistic					0.877	Shapiro Wilk Lognormal GOF Test					
1914	5% Shapiro Wilk Critical Value					0.945	Data Not Lognormal at 5% Significance Level					
1915	Lilliefors Test Statistic					0.216	Lilliefors Lognormal GOF Test					
1916	5% Lilliefors Critical Value					0.131	Data Not Lognormal at 5% Significance Level					
1917	Data Not Lognormal at 5% Significance Level											
1918												
1919	Background Statistics assuming Lognormal Distribution											
1920	95% UTL with 95% Coverage					75.55	90% Percentile (z)					42.09
1921	95% UPL (t)					57.03	95% Percentile (z)					54.84
1922	95% USL					138.3	99% Percentile (z)					90.06
1923												
1924	Nonparametric Distribution Free Background Statistics											
1925	Data do not follow a Discernible Distribution (0.05)											
1926												
1927	Nonparametric Upper Limits for Background Threshold Values											
1928	Order of Statistic, r					44	95% UTL with 95% Coverage					74
1929	Approx, f used to compute achieved CC					1.158	Approximate Actual Confidence Coefficient achieved by UTL					0.665
1930							Approximate Sample Size needed to achieve specified CC					93
1931	95% Percentile Bootstrap UTL with 95% Coverage					165.2	95% BCA Bootstrap UTL with 95% Coverage					160.7
1932	95% UPL					69.92	90% Percentile					45.2
1933	90% Chebyshev UPL					112.7	95% Percentile					58.66
1934	95% Chebyshev UPL					153.2	99% Percentile					137.8
1935	95% USL					188						
1936												
1937	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1938	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1939	and consists of observations collected from clean unimpacted locations.											
1940	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1941	represents a background data set and when many onsite observations need to be compared with the BTV.											
1942												
1943	ALKALINITY											
1944												
1945	General Statistics											
1946	Total Number of Observations					46	Number of Missing Observations					1
1947	Number of Distinct Observations					14						
1948	Number of Detects					20	Number of Non-Detects					26
1949	Number of Distinct Detects					14	Number of Distinct Non-Detects					1
1950	Minimum Detect					5	Minimum Non-Detect					5

	A	B	C	D	E	F	G	H	I	J	K	L	
1951				Maximum Detect		182				Maximum Non-Detect		5	
1952				Variance Detected		3029				Percent Non-Detects		56.52%	
1953				Mean Detected		42.2				SD Detected		55.03	
1954				Mean of Detected Logged Data		2.904				SD of Detected Logged Data		1.329	
1955													
1956				Critical Values for Background Threshold Values (BTVs)									
1957				Tolerance Factor K (For UTL)		2.079				d2max (for USL)		2.924	
1958													
1959				Normal GOF Test on Detects Only									
1960				Shapiro Wilk Test Statistic		0.725				Shapiro Wilk GOF Test			
1961				5% Shapiro Wilk Critical Value		0.905				Data Not Normal at 5% Significance Level			
1962				Lilliefors Test Statistic		0.283				Lilliefors GOF Test			
1963				5% Lilliefors Critical Value		0.192				Data Not Normal at 5% Significance Level			
1964				Data Not Normal at 5% Significance Level									
1965													
1966				Kaplan Meier (KM) Background Statistics Assuming Normal Distribution									
1967				KM Mean		21.17				KM SD		39.89	
1968				95% UTL95% Coverage		104.1				95% KM UPL (t)		88.89	
1969				90% KM Percentile (z)		72.29				95% KM Percentile (z)		86.78	
1970				99% KM Percentile (z)		114				95% KM USL		137.8	
1971													
1972				DL/2 Substitution Background Statistics Assuming Normal Distribution									
1973				Mean		19.76				SD		40.92	
1974				95% UTL95% Coverage		104.9				95% UPL (t)		89.23	
1975				90% Percentile (z)		72.21				95% Percentile (z)		87.07	
1976				99% Percentile (z)		115				95% USL		139.4	
1977				DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons									
1978													
1979				Gamma GOF Tests on Detected Observations Only									
1980				A-D Test Statistic		1.479				Anderson-Darling GOF Test			
1981				5% A-D Critical Value		0.782				Data Not Gamma Distributed at 5% Significance Level			
1982				K-S Test Statistic		0.263				Kolmogorov-Smirnov GOF			
1983				5% K-S Critical Value		0.202				Data Not Gamma Distributed at 5% Significance Level			
1984				Data Not Gamma Distributed at 5% Significance Level									
1985													
1986				Gamma Statistics on Detected Data Only									
1987				k hat (MLE)		0.718				k star (bias corrected MLE)		0.644	
1988				Theta hat (MLE)		58.77				Theta star (bias corrected MLE)		65.56	
1989				nu hat (MLE)		28.72				nu star (bias corrected)		25.75	
1990				MLE Mean (bias corrected)		42.2							
1991				MLE Sd (bias corrected)		52.6				95% Percentile of Chisquare (2kstar)		4.516	
1992													
1993				Gamma ROS Statistics using Imputed Non-Detects									
1994				GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs									
1995				GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)									
1996				For such situations, GROS method may yield incorrect values of UCLs and BTVs									
1997				This is especially true when the sample size is small.									
1998				For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates									
1999				Minimum		0.01				Mean		18.35	
2000				Maximum		182				Median		0.01	

	A	B	C	D	E	F	G	H	I	J	K	L	
2001					SD	41.54					CV	2.264	
2002					k hat (MLE)	0.177					k star (bias corrected MLE)	0.179	
2003					Theta hat (MLE)	104					Theta star (bias corrected MLE)	102.3	
2004					nu hat (MLE)	16.24					nu star (bias corrected)	16.51	
2005					MLE Mean (bias corrected)	18.35					MLE Sd (bias corrected)	43.32	
2006					95% Percentile of Chisquare (2kstar)	1.9					90% Percentile	55.34	
2007					95% Percentile	97.16					99% Percentile	214.4	
2008	The following statistics are computed using Gamma ROS Statistics on Imputed Data												
2009	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods												
2010					WH	HW					WH	HW	
2011					95% Approx. Gamma UTL with 95% Coverage	107.1	123.6				95% Approx. Gamma UPL	70.53	73.64
2012					95% Gamma USL	228.9	320.5						
2013													
2014	Estimates of Gamma Parameters using KM Estimates												
2015					Mean (KM)	21.17					SD (KM)	39.89	
2016					Variance (KM)	1591					SE of Mean (KM)	6.034	
2017					k hat (KM)	0.282					k star (KM)	0.278	
2018					nu hat (KM)	25.92					nu star (KM)	25.57	
2019					theta hat (KM)	75.14					theta star (KM)	76.19	
2020					80% gamma percentile (KM)	31.81					90% gamma percentile (KM)	62.98	
2021					95% gamma percentile (KM)	99.23					99% gamma percentile (KM)	194.4	
2022													
2023	The following statistics are computed using gamma distribution and KM estimates												
2024	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods												
2025					WH	HW					WH	HW	
2026					95% Approx. Gamma UTL with 95% Coverage	87.89	85.95				95% Approx. Gamma UPL	65.89	62.81
2027					95% KM Gamma Percentile	63.18	60.03				95% Gamma USL	152.9	159.3
2028													
2029	Lognormal GOF Test on Detected Observations Only												
2030					Shapiro Wilk Test Statistic	0.844					Shapiro Wilk GOF Test		
2031					5% Shapiro Wilk Critical Value	0.905					Data Not Lognormal at 5% Significance Level		
2032					Lilliefors Test Statistic	0.225					Lilliefors GOF Test		
2033					5% Lilliefors Critical Value	0.192					Data Not Lognormal at 5% Significance Level		
2034	Data Not Lognormal at 5% Significance Level												
2035													
2036	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects												
2037					Mean in Original Scale	18.78					Mean in Log Scale	0.695	
2038					SD in Original Scale	41.36					SD in Log Scale	2.401	
2039					95% UTL95% Coverage	295					95% BCA UTL95% Coverage	164.8	
2040					95% Bootstrap (%) UTL95% Coverage	175					95% UPL (t)	118	
2041					90% Percentile (z)	43.46					95% Percentile (z)	104	
2042					99% Percentile (z)	533.8					95% USL	2242	
2043													
2044	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution												
2045					KM Mean of Logged Data	2.172					95% KM UTL (Lognormal)95% Coverage	80.91	
2046					KM SD of Logged Data	1.068					95% KM UPL (Lognormal)	53.81	
2047					95% KM Percentile Lognormal (z)	50.87					95% KM USL (Lognormal)	199.5	
2048													
2049	Background DL/2 Statistics Assuming Lognormal Distribution												
2050					Mean in Original Scale	19.76					Mean in Log Scale	1.78	

	A	B	C	D	E	F	G	H	I	J	K	L
2051				SD in Original Scale		40.92					SD in Log Scale	1.318
2052				95% UTL95% Coverage		91.98					95% UPL (t)	55.6
2053				90% Percentile (z)		32.13					95% Percentile (z)	51.87
2054				99% Percentile (z)		127.4					95% USL	280.1
2055	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
2056												
2057	Nonparametric Distribution Free Background Statistics											
2058	Data do not follow a Discernible Distribution (0.05)											
2059												
2060	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
2061				Order of Statistic, r		45					95% UTL with95% Coverage	154
2062				Approx, f used to compute achieved CC		1.184					Approximate Actual Confidence Coefficient achieved by UTL	0.677
2063				Approximate Sample Size needed to achieve specified CC		93					95% UPL	139.7
2064				95% USL		182					95% KM Chebyshev UPL	196.9
2065												
2066	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
2067	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
2068	and consists of observations collected from clean unimpacted locations.											
2069	The use of USL tends to provide a balance between false positives and false negatives provided the data											
2070	represents a background data set and when many onsite observations need to be compared with the BTV.											
2071												
2072	TDS (TOTAL DISSOLVED SOLIDS)											
2073												
2074	General Statistics											
2075				Total Number of Observations		46					Number of Distinct Observations	43
2076											Number of Missing Observations	1
2077				Minimum		135					First Quartile	201.8
2078				Second Largest		447					Median	237
2079				Maximum		619					Third Quartile	264.3
2080				Mean		247.3					SD	85.49
2081				Coefficient of Variation		0.346					Skewness	2.332
2082				Mean of logged Data		5.466					SD of logged Data	0.29
2083												
2084	Critical Values for Background Threshold Values (BTVs)											
2085				Tolerance Factor K (For UTL)		2.079					d2max (for USL)	2.924
2086												
2087	Normal GOF Test											
2088				Shapiro Wilk Test Statistic		0.795					Shapiro Wilk GOF Test	
2089				5% Shapiro Wilk Critical Value		0.945					Data Not Normal at 5% Significance Level	
2090				Lilliefors Test Statistic		0.195					Lilliefors GOF Test	
2091				5% Lilliefors Critical Value		0.129					Data Not Normal at 5% Significance Level	
2092	Data Not Normal at 5% Significance Level											
2093												
2094	Background Statistics Assuming Normal Distribution											
2095				95% UTL with 95% Coverage		425.1					90% Percentile (z)	356.9
2096				95% UPL (t)		392.5					95% Percentile (z)	388
2097				95% USL		497.3					99% Percentile (z)	446.2
2098												
2099	Gamma GOF Test											
2100				A-D Test Statistic		1.421					Anderson-Darling Gamma GOF Test	

	A	B	C	D	E	F	G	H	I	J	K	L
2101	5% A-D Critical Value					0.749	Data Not Gamma Distributed at 5% Significance Level					
2102	K-S Test Statistic					0.147	Kolmogorov-Smirnov Gamma GOF Test					
2103	5% K-S Critical Value					0.13	Data Not Gamma Distributed at 5% Significance Level					
2104	Data Not Gamma Distributed at 5% Significance Level											
2105												
2106	Gamma Statistics											
2107	k hat (MLE)					11.23	k star (bias corrected MLE)					10.51
2108	Theta hat (MLE)					22.03	Theta star (bias corrected MLE)					23.53
2109	nu hat (MLE)					1033	nu star (bias corrected)					967
2110	MLE Mean (bias corrected)					247.3	MLE Sd (bias corrected)					76.29
2111												
2112	Background Statistics Assuming Gamma Distribution											
2113	95% Wilson Hilferty (WH) Approx. Gamma UPL					386.2	90% Percentile					348.8
2114	95% Hawkins Wixley (HW) Approx. Gamma UPL					386.1	95% Percentile					384.7
2115	95% WH Approx. Gamma UTL with 95% Coverage					425.8	99% Percentile					458.4
2116	95% HW Approx. Gamma UTL with 95% Coverage					426.8						
2117	95% WH USL					522.7	95% HW USL					528.5
2118												
2119	Lognormal GOF Test											
2120	Shapiro Wilk Test Statistic					0.934	Shapiro Wilk Lognormal GOF Test					
2121	5% Shapiro Wilk Critical Value					0.945	Data Not Lognormal at 5% Significance Level					
2122	Lilliefors Test Statistic					0.125	Lilliefors Lognormal GOF Test					
2123	5% Lilliefors Critical Value					0.129	Data appear Lognormal at 5% Significance Level					
2124	Data appear Approximate Lognormal at 5% Significance Level											
2125												
2126	Background Statistics assuming Lognormal Distribution											
2127	95% UTL with 95% Coverage					431.8	90% Percentile (z)					342.7
2128	95% UPL (t)					386.6	95% Percentile (z)					380.7
2129	95% USL					551.5	99% Percentile (z)					463.8
2130												
2131	Nonparametric Distribution Free Background Statistics											
2132	Data appear Approximate Lognormal at 5% Significance Level											
2133												
2134	Nonparametric Upper Limits for Background Threshold Values											
2135	Order of Statistic, r					45	95% UTL with 95% Coverage					447
2136	Approx, f used to compute achieved CC					1.184	Approximate Actual Confidence Coefficient achieved by UTL					0.677
2137							Approximate Sample Size needed to achieve specified CC					93
2138	95% Percentile Bootstrap UTL with 95% Coverage					576	95% BCA Bootstrap UTL with 95% Coverage					572.5
2139	95% UPL					442.1	90% Percentile					320.5
2140	90% Chebyshev UPL					506.6	95% Percentile					420
2141	95% Chebyshev UPL					624	99% Percentile					541.6
2142	95% USL					619						
2143												
2144	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
2145	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
2146	and consists of observations collected from clean unimpacted locations.											
2147	The use of USL tends to provide a balance between false positives and false negatives provided the data											
2148	represents a background data set and when many onsite observations need to be compared with the BTV.											
2149												
2150	TOC (TOTAL ORGANIC CARBON)											

	A	B	C	D	E	F	G	H	I	J	K	L
2151												
2152	General Statistics											
2153	Total Number of Observations					46	Number of Missing Observations					1
2154	Number of Distinct Observations					16						
2155	Number of Detects					15	Number of Non-Detects					31
2156	Number of Distinct Detects					14	Number of Distinct Non-Detects					2
2157	Minimum Detect					0.53	Minimum Non-Detect					0.5
2158	Maximum Detect					2.4	Maximum Non-Detect					1
2159	Variance Detected					0.244	Percent Non-Detects					67.39%
2160	Mean Detected					1.011	SD Detected					0.494
2161	Mean of Detected Logged Data					-0.078	SD of Detected Logged Data					0.418
2162												
2163	Critical Values for Background Threshold Values (BTVs)											
2164	Tolerance Factor K (For UTL)					2.079	d2max (for USL)					2.924
2165												
2166	Normal GOF Test on Detects Only											
2167	Shapiro Wilk Test Statistic					0.826	Shapiro Wilk GOF Test					
2168	5% Shapiro Wilk Critical Value					0.881	Data Not Normal at 5% Significance Level					
2169	Lilliefors Test Statistic					0.205	Lilliefors GOF Test					
2170	5% Lilliefors Critical Value					0.22	Detected Data appear Normal at 5% Significance Level					
2171	Detected Data appear Approximate Normal at 5% Significance Level											
2172												
2173	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
2174	KM Mean					0.734	KM SD					0.35
2175	95% UTL95% Coverage					1.463	95% KM UPL (t)					1.329
2176	90% KM Percentile (z)					1.183	95% KM Percentile (z)					1.311
2177	99% KM Percentile (z)					1.549	95% KM USL					1.759
2178												
2179	DL/2 Substitution Background Statistics Assuming Normal Distribution											
2180	Mean					0.634	SD					0.391
2181	95% UTL95% Coverage					1.448	95% UPL (t)					1.298
2182	90% Percentile (z)					1.136	95% Percentile (z)					1.278
2183	99% Percentile (z)					1.544	95% USL					1.778
2184	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
2185												
2186	Gamma GOF Tests on Detected Observations Only											
2187	A-D Test Statistic					0.469	Anderson-Darling GOF Test					
2188	5% A-D Critical Value					0.738	Detected data appear Gamma Distributed at 5% Significance Level					
2189	K-S Test Statistic					0.174	Kolmogorov-Smirnov GOF					
2190	5% K-S Critical Value					0.222	Detected data appear Gamma Distributed at 5% Significance Level					
2191	Detected data appear Gamma Distributed at 5% Significance Level											
2192												
2193	Gamma Statistics on Detected Data Only											
2194	k hat (MLE)					5.764	k star (bias corrected MLE)					4.656
2195	Theta hat (MLE)					0.175	Theta star (bias corrected MLE)					0.217
2196	nu hat (MLE)					172.9	nu star (bias corrected)					139.7
2197	MLE Mean (bias corrected)					1.011						
2198	MLE Sd (bias corrected)					0.469	95% Percentile of Chisquare (2kstar)					17.35
2199												
2200	Gamma ROS Statistics using Imputed Non-Detects											

	A	B	C	D	E	F	G	H	I	J	K	L
2201	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
2202	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
2203	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
2204	This is especially true when the sample size is small.											
2205	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
2206		Minimum	0.01							Mean	0.601	
2207		Maximum	2.4							Median	0.586	
2208		SD	0.479							CV	0.797	
2209		k hat (MLE)	1.01							k star (bias corrected MLE)	0.958	
2210		Theta hat (MLE)	0.595							Theta star (bias corrected MLE)	0.627	
2211		nu hat (MLE)	92.9							nu star (bias corrected)	88.17	
2212		MLE Mean (bias corrected)	0.601							MLE Sd (bias corrected)	0.614	
2213		95% Percentile of Chisquare (2kstar)	5.829							90% Percentile	1.398	
2214		95% Percentile	1.828							99% Percentile	2.828	
2215	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
2216	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
2217			WH	HW						WH	HW	
2218	95% Approx. Gamma UTL with 95% Coverage		2.349	2.718				95% Approx. Gamma UPL		1.841	2.047	
2219		95% Gamma USL	3.789	4.774								
2220												
2221	Estimates of Gamma Parameters using KM Estimates											
2222		Mean (KM)	0.734							SD (KM)	0.35	
2223		Variance (KM)	0.123							SE of Mean (KM)	0.0588	
2224		k hat (KM)	4.396							k star (KM)	4.124	
2225		nu hat (KM)	404.5							nu star (KM)	379.4	
2226		theta hat (KM)	0.167							theta star (KM)	0.178	
2227		80% gamma percentile (KM)	1.009							90% gamma percentile (KM)	1.219	
2228		95% gamma percentile (KM)	1.412							99% gamma percentile (KM)	1.824	
2229												
2230	The following statistics are computed using gamma distribution and KM estimates											
2231	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
2232			WH	HW						WH	HW	
2233	95% Approx. Gamma UTL with 95% Coverage		1.423	1.422				95% Approx. Gamma UPL		1.263	1.257	
2234		95% KM Gamma Percentile	1.242	1.236				95% Gamma USL		1.823	1.841	
2235												
2236	Lognormal GOF Test on Detected Observations Only											
2237		Shapiro Wilk Test Statistic	0.944							Shapiro Wilk GOF Test		
2238		5% Shapiro Wilk Critical Value	0.881							Detected Data appear Lognormal at 5% Significance Level		
2239		Lilliefors Test Statistic	0.147							Lilliefors GOF Test		
2240		5% Lilliefors Critical Value	0.22							Detected Data appear Lognormal at 5% Significance Level		
2241	Detected Data appear Lognormal at 5% Significance Level											
2242												
2243	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
2244		Mean in Original Scale	0.682							Mean in Log Scale	-0.52	
2245		SD in Original Scale	0.402							SD in Log Scale	0.52	
2246		95% UTL95% Coverage	1.754							95% BCA UTL95% Coverage	2.15	
2247		95% Bootstrap (%) UTL95% Coverage	2.2							95% UPL (t)	1.438	
2248		90% Percentile (z)	1.158							95% Percentile (z)	1.399	
2249		99% Percentile (z)	1.995							95% USL	2.723	
2250												

	A	B	C	D	E	F	G	H	I	J	K	L
2251	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
2252	KM Mean of Logged Data				-0.383		95% KM UTL (Lognormal)95% Coverage				1.424	
2253	KM SD of Logged Data				0.354		95% KM UPL (Lognormal)				1.244	
2254	95% KM Percentile Lognormal (z)				1.221		95% KM USL (Lognormal)				1.921	
2255												
2256	Background DL/2 Statistics Assuming Lognormal Distribution											
2257	Mean in Original Scale				0.634		Mean in Log Scale				-0.583	
2258	SD in Original Scale				0.391		SD in Log Scale				0.482	
2259	95% UTL95% Coverage				1.52		95% UPL (t)				1.265	
2260	90% Percentile (z)				1.035		95% Percentile (z)				1.233	
2261	99% Percentile (z)				1.712		95% USL				2.284	
2262	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
2263												
2264	Nonparametric Distribution Free Background Statistics											
2265	Data appear to follow a Discernible Distribution at 5% Significance Level											
2266												
2267	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
2268	Order of Statistic, r				45		95% UTL with95% Coverage				1.6	
2269	Approx, f used to compute achieved CC				1.184		Approximate Actual Confidence Coefficient achieved by UTL				0.677	
2270	Approximate Sample Size needed to achieve specified CC				93		95% UPL				1.53	
2271	95% USL				2.4		95% KM Chebyshev UPL				2.278	
2272												
2273	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
2274	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
2275	and consists of observations collected from clean unimpacted locations.											
2276	The use of USL tends to provide a balance between false positives and false negatives provided the data											
2277	represents a background data set and when many onsite observations need to be compared with the BTV.											
2278												
2279	TOTAL PHENOLICS											
2280												
2281	General Statistics											
2282	Total Number of Observations				47		Number of Missing Observations				0	
2283	Number of Distinct Observations				2							
2284	Number of Detects				2		Number of Non-Detects				45	
2285	Number of Distinct Detects				1		Number of Distinct Non-Detects				2	
2286	Minimum Detect				0.01		Minimum Non-Detect				0.005	
2287	Maximum Detect				0.01		Maximum Non-Detect				0.01	
2288	Variance Detected				0		Percent Non-Detects				95.74%	
2289	Mean Detected				0.01		SD Detected				0	
2290	Mean of Detected Logged Data				-4.605		SD of Detected Logged Data				0	
2291												
2292	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!											
2293	It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).											
2294												
2295	The data set for variable TOTAL PHENOLICS was not processed!											
2296												
2297												
2298	TURBIDITY											
2299												
2300	General Statistics											

	A	B	C	D	E	F	G	H	I	J	K	L
2301	Total Number of Observations					47	Number of Missing Observations					0
2302	Number of Distinct Observations					29						
2303	Number of Detects					39	Number of Non-Detects					8
2304	Number of Distinct Detects					28	Number of Distinct Non-Detects					1
2305	Minimum Detect					0.11	Minimum Non-Detect					0.1
2306	Maximum Detect					10.1	Maximum Non-Detect					0.1
2307	Variance Detected					3.275	Percent Non-Detects					17.02%
2308	Mean Detected					0.792	SD Detected					1.81
2309	Mean of Detected Logged Data					-1.078	SD of Detected Logged Data					1.04
2310												
2311	Critical Values for Background Threshold Values (BTVs)											
2312	Tolerance Factor K (For UTL)					2.074	d2max (for USL)					2.933
2313												
2314	Normal GOF Test on Detects Only											
2315	Shapiro Wilk Test Statistic					0.397	Shapiro Wilk GOF Test					
2316	5% Shapiro Wilk Critical Value					0.939	Data Not Normal at 5% Significance Level					
2317	Lilliefors Test Statistic					0.401	Lilliefors GOF Test					
2318	5% Lilliefors Critical Value					0.14	Data Not Normal at 5% Significance Level					
2319	Data Not Normal at 5% Significance Level											
2320												
2321	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
2322	KM Mean					0.674	KM SD					1.648
2323	95% UTL95% Coverage					4.092	95% KM UPL (t)					3.47
2324	90% KM Percentile (z)					2.786	95% KM Percentile (z)					3.385
2325	99% KM Percentile (z)					4.508	95% KM USL					5.507
2326												
2327	DL/2 Substitution Background Statistics Assuming Normal Distribution											
2328	Mean					0.666	SD					1.669
2329	95% UTL95% Coverage					4.127	95% UPL (t)					3.497
2330	90% Percentile (z)					2.805	95% Percentile (z)					3.411
2331	99% Percentile (z)					4.548	95% USL					5.56
2332	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
2333												
2334	Gamma GOF Tests on Detected Observations Only											
2335	A-D Test Statistic					4.524	Anderson-Darling GOF Test					
2336	5% A-D Critical Value					0.792	Data Not Gamma Distributed at 5% Significance Level					
2337	K-S Test Statistic					0.271	Kolmogorov-Smirnov GOF					
2338	5% K-S Critical Value					0.147	Data Not Gamma Distributed at 5% Significance Level					
2339	Data Not Gamma Distributed at 5% Significance Level											
2340												
2341	Gamma Statistics on Detected Data Only											
2342	k hat (MLE)					0.713	k star (bias corrected MLE)					0.676
2343	Theta hat (MLE)					1.11	Theta star (bias corrected MLE)					1.173
2344	nu hat (MLE)					55.65	nu star (bias corrected)					52.7
2345	MLE Mean (bias corrected)					0.792						
2346	MLE Sd (bias corrected)					0.964	95% Percentile of Chisquare (2kstar)					4.659
2347												
2348	Gamma ROS Statistics using Imputed Non-Detects											
2349	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
2350	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											

	A	B	C	D	E	F	G	H	I	J	K	L
2351	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
2352	This is especially true when the sample size is small.											
2353	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
2354			Minimum		0.01					Mean		0.659
2355			Maximum		10.1					Median		0.22
2356			SD		1.672					CV		2.536
2357			k hat (MLE)		0.503					k star (bias corrected MLE)		0.485
2358			Theta hat (MLE)		1.31					Theta star (bias corrected MLE)		1.358
2359			nu hat (MLE)		47.3					nu star (bias corrected)		45.61
2360			MLE Mean (bias corrected)		0.659					MLE Sd (bias corrected)		0.946
2361			95% Percentile of Chisquare (2kstar)		3.768					90% Percentile		1.794
2362			95% Percentile		2.559					99% Percentile		4.446
2363	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
2364	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
2365				WH	HW					WH	HW	
2366	95% Approx. Gamma UTL with 95% Coverage			2.977	3.073			95% Approx. Gamma UPL		2.18	2.162	
2367		95% Gamma USL		5.469	6.191							
2368												
2369	Estimates of Gamma Parameters using KM Estimates											
2370			Mean (KM)		0.674					SD (KM)		1.648
2371			Variance (KM)		2.716					SE of Mean (KM)		0.244
2372			k hat (KM)		0.168					k star (KM)		0.171
2373			nu hat (KM)		15.75					nu star (KM)		16.07
2374			theta hat (KM)		4.027					theta star (KM)		3.944
2375			80% gamma percentile (KM)		0.809					90% gamma percentile (KM)		2.028
2376			95% gamma percentile (KM)		3.611					99% gamma percentile (KM)		8.09
2377												
2378	The following statistics are computed using gamma distribution and KM estimates											
2379	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
2380				WH	HW					WH	HW	
2381	95% Approx. Gamma UTL with 95% Coverage			2.674	2.557			95% Approx. Gamma UPL		2.014	1.884	
2382		95% KM Gamma Percentile		1.933	1.804			95% Gamma USL		4.679	4.746	
2383												
2384	Lognormal GOF Test on Detected Observations Only											
2385			Shapiro Wilk Test Statistic		0.848					Shapiro Wilk GOF Test		
2386			5% Shapiro Wilk Critical Value		0.939					Data Not Lognormal at 5% Significance Level		
2387			Lilliefors Test Statistic		0.151					Lilliefors GOF Test		
2388			5% Lilliefors Critical Value		0.14					Data Not Lognormal at 5% Significance Level		
2389	Data Not Lognormal at 5% Significance Level											
2390												
2391	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
2392			Mean in Original Scale		0.664					Mean in Log Scale		-1.47
2393			SD in Original Scale		1.67					SD in Log Scale		1.302
2394			95% UTL95% Coverage		3.418					95% BCA UTL95% Coverage		8.051
2395			95% Bootstrap (%) UTL95% Coverage		8.714					95% UPL (t)		2.091
2396			90% Percentile (z)		1.219					95% Percentile (z)		1.956
2397			99% Percentile (z)		4.748					95% USL		10.45
2398												
2399	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
2400			KM Mean of Logged Data		-1.286					95% KM UTL (Lognormal)95% Coverage		2.398

	A	B	C	D	E	F	G	H	I	J	K	L
2401	KM SD of Logged Data					1.042	95% KM UPL (Lognormal)					1.618
2402	95% KM Percentile Lognormal (z)					1.534	95% KM USL (Lognormal)					5.868
2403												
2404	Background DL/2 Statistics Assuming Lognormal Distribution											
2405	Mean in Original Scale					0.666	Mean in Log Scale					-1.404
2406	SD in Original Scale					1.669	SD in Log Scale					1.193
2407	95% UTL95% Coverage					2.916	95% UPL (t)					1.859
2408	90% Percentile (z)					1.133	95% Percentile (z)					1.748
2409	99% Percentile (z)					3.942	95% USL					8.126
2410	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
2411												
2412	Nonparametric Distribution Free Background Statistics											
2413	Data do not follow a Discernible Distribution (0.05)											
2414												
2415	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
2416	Order of Statistic, r					46	95% UTL with95% Coverage					5.48
2417	Approx, f used to compute achieved CC					1.211	Approximate Actual Confidence Coefficient achieved by UTL					0.688
2418	Approximate Sample Size needed to achieve specified CC					93	95% UPL					4.596
2419	95% USL					10.1	95% KM Chebyshev UPL					7.934
2420												
2421	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
2422	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
2423	and consists of observations collected from clean unimpacted locations.											
2424	The use of USL tends to provide a balance between false positives and false negatives provided the data											
2425	represents a background data set and when many onsite observations need to be compared with the BTV.											
2426												
2427	BENZENE											
2428												
2429	General Statistics											
2430	Total Number of Observations					47	Number of Missing Observations					0
2431	Number of Distinct Observations					1						
2432	Number of Detects					0	Number of Non-Detects					47
2433	Number of Distinct Detects					0	Number of Distinct Non-Detects					1
2434	Minimum Detect					N/A	Minimum Non-Detect					1
2435	Maximum Detect					N/A	Maximum Non-Detect					1
2436	Variance Detected					N/A	Percent Non-Detects					100%
2437	Mean Detected					N/A	SD Detected					N/A
2438	Mean of Detected Logged Data					N/A	SD of Detected Logged Data					N/A
2439												
2440	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2441	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2442	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2443												
2444	The data set for variable BENZENE was not processed!											
2445												
2446												
2447	1,2-DIBROMOETHANE											
2448												
2449	General Statistics											
2450	Total Number of Observations					47	Number of Missing Observations					0

	A	B	C	D	E	F	G	H	I	J	K	L
2451	Number of Distinct Observations					1						
2452	Number of Detects					0	Number of Non-Detects					47
2453	Number of Distinct Detects					0	Number of Distinct Non-Detects					1
2454	Minimum Detect					N/A	Minimum Non-Detect					1
2455	Maximum Detect					N/A	Maximum Non-Detect					1
2456	Variance Detected					N/A	Percent Non-Detects					100%
2457	Mean Detected					N/A	SD Detected					N/A
2458	Mean of Detected Logged Data					N/A	SD of Detected Logged Data					N/A
2459												
2460	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2461	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2462	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2463												
2464	The data set for variable 1,2-DIBROMOETHANE was not processed!											
2465												
2466												
2467	1,1-DICHLOROETHANE											
2468												
2469	General Statistics											
2470	Total Number of Observations					47	Number of Missing Observations					0
2471	Number of Distinct Observations					1						
2472	Number of Detects					0	Number of Non-Detects					47
2473	Number of Distinct Detects					0	Number of Distinct Non-Detects					1
2474	Minimum Detect					N/A	Minimum Non-Detect					1
2475	Maximum Detect					N/A	Maximum Non-Detect					1
2476	Variance Detected					N/A	Percent Non-Detects					100%
2477	Mean Detected					N/A	SD Detected					N/A
2478	Mean of Detected Logged Data					N/A	SD of Detected Logged Data					N/A
2479												
2480	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2481	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2482	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2483												
2484	The data set for variable 1,1-DICHLOROETHANE was not processed!											
2485												
2486												
2487	1,1-DICHLOROETHENE											
2488												
2489	General Statistics											
2490	Total Number of Observations					47	Number of Missing Observations					0
2491	Number of Distinct Observations					1						
2492	Number of Detects					0	Number of Non-Detects					47
2493	Number of Distinct Detects					0	Number of Distinct Non-Detects					1
2494	Minimum Detect					N/A	Minimum Non-Detect					1
2495	Maximum Detect					N/A	Maximum Non-Detect					1
2496	Variance Detected					N/A	Percent Non-Detects					100%
2497	Mean Detected					N/A	SD Detected					N/A
2498	Mean of Detected Logged Data					N/A	SD of Detected Logged Data					N/A
2499												
2500	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											

	A	B	C	D	E	F	G	H	I	J	K	L
2501	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2502	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2503												
2504	The data set for variable 1,1-DICHLOROETHENE was not processed!											
2505												
2506												
2507	1,2-DICHLOROETHANE											
2508												
2509	General Statistics											
2510	Total Number of Observations				47		Number of Missing Observations				0	
2511	Number of Distinct Observations				1							
2512	Number of Detects				0		Number of Non-Detects				47	
2513	Number of Distinct Detects				0		Number of Distinct Non-Detects				1	
2514	Minimum Detect				N/A		Minimum Non-Detect				1	
2515	Maximum Detect				N/A		Maximum Non-Detect				1	
2516	Variance Detected				N/A		Percent Non-Detects				100%	
2517	Mean Detected				N/A		SD Detected				N/A	
2518	Mean of Detected Logged Data				N/A		SD of Detected Logged Data				N/A	
2519												
2520	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2521	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2522	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2523												
2524	The data set for variable 1,2-DICHLOROETHANE was not processed!											
2525												
2526												
2527	cis 1,2-DICHLOROETHENE											
2528												
2529	General Statistics											
2530	Total Number of Observations				47		Number of Missing Observations				0	
2531	Number of Distinct Observations				1							
2532	Number of Detects				0		Number of Non-Detects				47	
2533	Number of Distinct Detects				0		Number of Distinct Non-Detects				1	
2534	Minimum Detect				N/A		Minimum Non-Detect				1	
2535	Maximum Detect				N/A		Maximum Non-Detect				1	
2536	Variance Detected				N/A		Percent Non-Detects				100%	
2537	Mean Detected				N/A		SD Detected				N/A	
2538	Mean of Detected Logged Data				N/A		SD of Detected Logged Data				N/A	
2539												
2540	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2541	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2542	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2543												
2544	The data set for variable cis 1,2-DICHLOROETHENE was not processed!											
2545												
2546												
2547	trans 1,2-DICHLOROETHENE											
2548												
2549	General Statistics											
2550	Total Number of Observations				47		Number of Missing Observations				0	

	A	B	C	D	E	F	G	H	I	J	K	L
2551	Number of Distinct Observations					1						
2552	Number of Detects					0	Number of Non-Detects					47
2553	Number of Distinct Detects					0	Number of Distinct Non-Detects					1
2554	Minimum Detect					N/A	Minimum Non-Detect					1
2555	Maximum Detect					N/A	Maximum Non-Detect					1
2556	Variance Detected					N/A	Percent Non-Detects					100%
2557	Mean Detected					N/A	SD Detected					N/A
2558	Mean of Detected Logged Data					N/A	SD of Detected Logged Data					N/A
2559												
2560	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2561	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2562	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2563												
2564	The data set for variable trans 1,2-DICHLOROETHENE was not processed!											
2565												
2566												
2567	ETHYLBENZENE											
2568												
2569	General Statistics											
2570	Total Number of Observations					47	Number of Missing Observations					0
2571	Number of Distinct Observations					1						
2572	Number of Detects					0	Number of Non-Detects					47
2573	Number of Distinct Detects					0	Number of Distinct Non-Detects					1
2574	Minimum Detect					N/A	Minimum Non-Detect					1
2575	Maximum Detect					N/A	Maximum Non-Detect					1
2576	Variance Detected					N/A	Percent Non-Detects					100%
2577	Mean Detected					N/A	SD Detected					N/A
2578	Mean of Detected Logged Data					N/A	SD of Detected Logged Data					N/A
2579												
2580	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2581	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2582	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2583												
2584	The data set for variable ETHYLBENZENE was not processed!											
2585												
2586												
2587	METHYLENE CHLORIDE											
2588												
2589	General Statistics											
2590	Total Number of Observations					47	Number of Missing Observations					0
2591	Number of Distinct Observations					1						
2592	Number of Detects					0	Number of Non-Detects					47
2593	Number of Distinct Detects					0	Number of Distinct Non-Detects					1
2594	Minimum Detect					N/A	Minimum Non-Detect					1
2595	Maximum Detect					N/A	Maximum Non-Detect					1
2596	Variance Detected					N/A	Percent Non-Detects					100%
2597	Mean Detected					N/A	SD Detected					N/A
2598	Mean of Detected Logged Data					N/A	SD of Detected Logged Data					N/A
2599												
2600	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											

	A	B	C	D	E	F	G	H	I	J	K	L
2601	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2602	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2603												
2604	The data set for variable METHYLENE CHLORIDE was not processed!											
2605												
2606												
2607	TETRACHLOROETHENE											
2608												
2609	General Statistics											
2610	Total Number of Observations				47		Number of Missing Observations				0	
2611	Number of Distinct Observations				1							
2612	Number of Detects				0		Number of Non-Detects				47	
2613	Number of Distinct Detects				0		Number of Distinct Non-Detects				1	
2614	Minimum Detect				N/A		Minimum Non-Detect				1	
2615	Maximum Detect				N/A		Maximum Non-Detect				1	
2616	Variance Detected				N/A		Percent Non-Detects				100%	
2617	Mean Detected				N/A		SD Detected				N/A	
2618	Mean of Detected Logged Data				N/A		SD of Detected Logged Data				N/A	
2619												
2620	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2621	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2622	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2623												
2624	The data set for variable TETRACHLOROETHENE was not processed!											
2625												
2626												
2627	TOLUENE											
2628												
2629	General Statistics											
2630	Total Number of Observations				46		Number of Missing Observations				1	
2631	Number of Distinct Observations				1							
2632	Number of Detects				0		Number of Non-Detects				46	
2633	Number of Distinct Detects				0		Number of Distinct Non-Detects				1	
2634	Minimum Detect				N/A		Minimum Non-Detect				1	
2635	Maximum Detect				N/A		Maximum Non-Detect				1	
2636	Variance Detected				N/A		Percent Non-Detects				100%	
2637	Mean Detected				N/A		SD Detected				N/A	
2638	Mean of Detected Logged Data				N/A		SD of Detected Logged Data				N/A	
2639												
2640	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2641	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2642	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2643												
2644	The data set for variable TOLUENE was not processed!											
2645												
2646												
2647	1,1,1-TRICHLOROETHANE											
2648												
2649	General Statistics											
2650	Total Number of Observations				47		Number of Missing Observations				0	

	A	B	C	D	E	F	G	H	I	J	K	L
2651	Number of Distinct Observations					1						
2652	Number of Detects					0	Number of Non-Detects					47
2653	Number of Distinct Detects					0	Number of Distinct Non-Detects					1
2654	Minimum Detect					N/A	Minimum Non-Detect					1
2655	Maximum Detect					N/A	Maximum Non-Detect					1
2656	Variance Detected					N/A	Percent Non-Detects					100%
2657	Mean Detected					N/A	SD Detected					N/A
2658	Mean of Detected Logged Data					N/A	SD of Detected Logged Data					N/A
2659												
2660	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2661	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2662	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2663												
2664	The data set for variable 1,1,1-TRICHLOROETHANE was not processed!											
2665												
2666												
2667	TRICHLOROETHENE											
2668												
2669	General Statistics											
2670	Total Number of Observations					47	Number of Missing Observations					0
2671	Number of Distinct Observations					1						
2672	Number of Detects					0	Number of Non-Detects					47
2673	Number of Distinct Detects					0	Number of Distinct Non-Detects					1
2674	Minimum Detect					N/A	Minimum Non-Detect					1
2675	Maximum Detect					N/A	Maximum Non-Detect					1
2676	Variance Detected					N/A	Percent Non-Detects					100%
2677	Mean Detected					N/A	SD Detected					N/A
2678	Mean of Detected Logged Data					N/A	SD of Detected Logged Data					N/A
2679												
2680	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2681	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2682	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2683												
2684	The data set for variable TRICHLOROETHENE was not processed!											
2685												
2686												
2687	VINYL CHLORIDE											
2688												
2689	General Statistics											
2690	Total Number of Observations					47	Number of Missing Observations					0
2691	Number of Distinct Observations					1						
2692	Number of Detects					0	Number of Non-Detects					47
2693	Number of Distinct Detects					0	Number of Distinct Non-Detects					1
2694	Minimum Detect					N/A	Minimum Non-Detect					1
2695	Maximum Detect					N/A	Maximum Non-Detect					1
2696	Variance Detected					N/A	Percent Non-Detects					100%
2697	Mean Detected					N/A	SD Detected					N/A
2698	Mean of Detected Logged Data					N/A	SD of Detected Logged Data					N/A
2699												
2700	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											

	A	B	C	D	E	F	G	H	I	J	K	L
2701	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2702	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2703												
2704	The data set for variable VINYL CHLORIDE was not processed!											
2705												
2706												
2707	XYLENES (TOTAL)											
2708												
2709	General Statistics											
2710	Total Number of Observations				47		Number of Missing Observations				0	
2711	Number of Distinct Observations				1							
2712	Number of Detects				0		Number of Non-Detects				47	
2713	Number of Distinct Detects				0		Number of Distinct Non-Detects				1	
2714	Minimum Detect				N/A		Minimum Non-Detect				3	
2715	Maximum Detect				N/A		Maximum Non-Detect				3	
2716	Variance Detected				N/A		Percent Non-Detects				100%	
2717	Mean Detected				N/A		SD Detected				N/A	
2718	Mean of Detected Logged Data				N/A		SD of Detected Logged Data				N/A	
2719												
2720	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2721	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2722	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2723												
2724	The data set for variable XYLENES (TOTAL) was not processed!											
2725												
2726												



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

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DEP USE ONLY

Date Received

FORM 19
MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 19, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (D° MM' SS.S")

Monitoring Point Number: FFMP015W Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County

Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 36.43 " Longitude: 76 ° 27 ' 10.82 "

Depth to Water Level: 60.91 ft Measured from: Land Surface TOC

Casing Stickup: 1.90 ft Elevation of Water Level: 515.49 ft./MSL

Sampling Depth: 135 ft Volume of Water Column: 129.23 gal

Total Well Depth: 148.9 ft Sampling Method: Pumped Bailed Grab

Well Purged: Yes No Well Volumes Purged: 1.3

Sample Field Filtered (must be 0.45 micron)?: Yes No

Spring Flow Rate: gpm

Sample Date (mm/dd/yy): 8/17/2020 Sample Collection Time: 10:01

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: Yes No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3121991001 Final Lab Analysis Completion Date: 8/25/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments: _____

I.D. No 101389

Monitoring Point No. FFMP015W

Sample Date 8/17/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE ^T	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	D6919-09
BICARBONATE ALKALINITY	15	SM20-2320B
CALCIUM, TOTAL	18.3	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	31.5	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	67 ND	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	24	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	64	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	32.7	EPA 300
pH-FIELD (SU)	5.18	FIELD
pH-LAB (SU)	5.87	SM20-4500HB
POTASSIUM, TOTAL	2.8	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	23.9	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	487	FIELD
SPEC. COND., LAB (umhos/cm)	462	SW846 9050A
SULFATE	31.5	EPA 300
ALKALINITY	15	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	272	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	1.3	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.22	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.

T Please indicate detection limit if analyte is not detected.

** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4).

Remaining quarterly samples only require total metals analysis.

I.D. No 101389

Monitoring Point No. FFMP015W

Sample Date 8/17/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES****2-Q. Organics (Enter all data in ug/l)**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
10/08/2020

DEP USE ONLY

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MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

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Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (D° MM' SS.S")

Monitoring Point Number: FFMP03AW Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County

Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 24.05 " Longitude: 76 ° 27 ' 30.58 "

Depth to Water Level: 51.61 ft Measured from: Land Surface TOC

Casing Stickup: 1.20 ft Elevation of Water Level: 539.29 ft./MSL

Sampling Depth: 130 ft Volume of Water Column: 140.39 gal

Total Well Depth: 147.2 ft Sampling Method: Pumped Bailed Grab

Well Purged: Yes No Well Volumes Purged: 0.9

Sample Field Filtered (must be 0.45 micron)?: Yes No

Spring Flow Rate: gpm

Sample Date (mm/dd/yy): 8/17/2020 Sample Collection Time: 11:29

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: Yes No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3121991002 Final Lab Analysis CompletionDate: 8/25/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments: _____

I.D. No 101389

Monitoring Point No. FFMP03AW

Sample Date 8/17/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE ^T	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	D6919-09
BICARBONATE ALKALINITY	14	SM20-2320B
CALCIUM, TOTAL	17.7	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	28.6	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	67 ND	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	12.9	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	290	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	23.6	EPA 300
pH-FIELD (SU)	4.73	FIELD
pH-LAB (SU)	5.52	SM20-4500HB
POTASSIUM, TOTAL	1.6	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	12.5	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	326	FIELD
SPEC. COND., LAB (umhos/cm)	308	SW846 9050A
SULFATE	12.9	EPA 300
ALKALINITY	14	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	194	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.82	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.13	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.

T Please indicate detection limit if analyte is not detected.

** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4).

Remaining quarterly samples only require total metals analysis.

I.D. No 101389

Monitoring Point No. FFMP03AW

Sample Date 8/17/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES****2-Q. Organics (Enter all data in ug/l)**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
10/08/2020

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FORM 19
MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

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General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (D° MM' SS.S")

Monitoring Point Number: FFMP025W Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County

Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 19.07 " Longitude: 76 ° 27 ' 1.12 "

Depth to Water Level: 25.12 ft Measured from: Land Surface TOC

Casing Stickup: 1.50 ft Elevation of Water Level: 451.68 ft./MSL

Sampling Depth: 39 ft Volume of Water Column: 21.85 gal

Total Well Depth: 40 ft Sampling Method: Pumped Bailed Grab

Well Purged: Yes No Well Volumes Purged: 3.5

Sample Field Filtered (must be 0.45 micron)?: Yes No

Spring Flow Rate: gpm

Sample Date (mm/dd/yy): 8/17/2020 Sample Collection Time: 12:15

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: Yes No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3121991003 Final Lab Analysis Completion Date: 8/25/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments: _____

I.D. No 101389

Monitoring Point No. FFMP025W

Sample Date 8/17/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE ^T	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	D6919-09
BICARBONATE ALKALINITY	23	SM20-2320B
CALCIUM, TOTAL	22.8	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	57.9	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	67 ND	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	12.4	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	9.6	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	9.5	EPA 300
pH-FIELD (SU)	3.37	FIELD
pH-LAB (SU)	6.16	SM20-4500HB
POTASSIUM, TOTAL	2.7	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	20	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	389	FIELD
SPEC. COND., LAB (umhos/cm)	372	SW846 9050A
SULFATE	2.8	EPA 300
ALKALINITY	23	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	230	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.74	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.26	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.

T Please indicate detection limit if analyte is not detected.

** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4).

Remaining quarterly samples only require total metals analysis.

I.D. No 101389

Monitoring Point No. FFMP025W

Sample Date 8/17/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES****2-Q. Organics (Enter all data in ug/l)**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

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FORM 19
MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

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General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (D° MM' SS.S")

Monitoring Point Number: FFMP028W Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County

Municipality: Manor Township

Sampling Point: Latitude: 37 ° 57 ' 21.62 " Longitude: 76 ° 27 ' 0.1 "

Depth to Water Level: 12.04 ft Measured from: Land Surface TOC

Casing Stickup: 2.50 ft Elevation of Water Level: 452.96 ft./MSL

Sampling Depth: 50 ft Volume of Water Column: _____ gal

Total Well Depth: 60 ft Sampling Method: Pumped Bailed Grab

Well Purged: Yes No Well Volumes Purged: 2.7

Sample Field Filtered (must be 0.45 micron)?: Yes No

Spring Flow Rate: _____ gpm

Sample Date (mm/dd/yy): 8/17/2020 Sample Collection Time: 13:32

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: Yes No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3121991004 Final Lab Analysis CompletionDate: 8/31/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments: _____

I.D. No 101389

Monitoring Point No. FFMP028W

Sample Date 8/17/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	D6919-09
BICARBONATE ALKALINITY	26	SM20-2320B
CALCIUM, TOTAL	39.5	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	82.3	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	67 ND	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	16.6	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	5.6 ND	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	17.3	EPA 300
pH-FIELD (SU)	4.15	FIELD
pH-LAB (SU)	6.08	SM20-4500HB
POTASSIUM, TOTAL	2.5	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	27.5	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	563	FIELD
SPEC. COND., LAB (umhos/cm)	538	SW846 9050A
SULFATE	25.1	EPA 300
ALKALINITY	26	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	400	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	1.3	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.24	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.

T Please indicate detection limit if analyte is not detected.

** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4).

Remaining quarterly samples only require total metals analysis.

I.D. No 101389

Monitoring Point No. FFMP028W

Sample Date 8/17/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES****2-Q. Organics (Enter all data in ug/l)**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

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Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (D° MM' SS.S")

Monitoring Point Number: FFMP033W Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County

Municipality: MANOR TOWNSHIP

Sampling Point: Latitude: 39 ° 57 ' 31.09 " Longitude: 76 ° 27 ' 4.98 "

Depth to Water Level: 18.76 ft Measured from: Land Surface TOC

Casing Stickup: 0.49 ft Elevation of Water Level: 497.76 ft./MSL

Sampling Depth: 79 ft Volume of Water Column: 113.44 gal

Total Well Depth: 96 ft Sampling Method: Pumped Bailed Grab

Well Purged: Yes No Well Volumes Purged: 1.0

Sample Field Filtered (must be 0.45 micron)?: Yes No

Spring Flow Rate: gpm

Sample Date (mm/dd/yy): 8/17/2020 Sample Collection Time: 14:52

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: Yes No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3121991005 Final Lab Analysis CompletionDate: 8/25/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments: _____

I.D. No 101389

Monitoring Point No. FFMP033W

Sample Date 8/17/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.612	D6919-09
BICARBONATE ALKALINITY	42	SM20-2320B
CALCIUM, TOTAL	26.8	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	43.4	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	6800	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	9.1	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	390	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	11.6	EPA 300
pH-FIELD (SU)	4.77	FIELD
pH-LAB (SU)	6.3	SM20-4500HB
POTASSIUM, TOTAL	1.9	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	13.8	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	363	FIELD
SPEC. COND., LAB (umhos/cm)	340	SW846 9050A
SULFATE	6.4	EPA 300
ALKALINITY	42	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	242	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.5 ND	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	3.69	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.

T Please indicate detection limit if analyte is not detected.

** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4).

Remaining quarterly samples only require total metals analysis.

I.D. No 101389

Monitoring Point No. FFMP033W

Sample Date 8/17/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES****2-Q. Organics (Enter all data in ug/l)**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
10/08/2020

DEP USE ONLY

Date Received

FORM 19
MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 19, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (D° MM' SS.S")

Monitoring Point Number: FFMP017W Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 8.5 " Longitude: 76 ° 27 ' 6.17 "

Depth to Water Level: 41.29 ft Measured from: Land Surface TOC

Casing Stickup: 2.00 ft Elevation of Water Level: 439.41 ft./MSL

Sampling Depth: 135 ft Volume of Water Column: 160.39 gal

Total Well Depth: 150.5 ft Sampling Method: Pumped Bailed Grab

Well Purged: Yes No Well Volumes Purged: 0.9

Sample Field Filtered (must be 0.45 micron)?: Yes No

Spring Flow Rate: gpm

Sample Date (mm/dd/yy): 8/18/2020 Sample Collection Time: 10:19

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: Yes No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3122263001 Final Lab Analysis Completion Date: 8/26/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments: _____

I.D. No 101389

Monitoring Point No. FFMP017W

Sample Date 8/18/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES
ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE ^T	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	D6919-09
BICARBONATE ALKALINITY	75	SM20-2320B
CALCIUM, TOTAL	99.8	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	352	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	67 ND	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	42.8	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	1700	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	1.8	EPA 300
pH-FIELD (SU)	5.34	FIELD
pH-LAB (SU)	6.47	SM20-4500HB
POTASSIUM, TOTAL	7.6	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	94.6	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	1524	FIELD
SPEC. COND., LAB (umhos/cm)	1370	SW846 9050A
SULFATE	69.7	EPA 300
ALKALINITY	75	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	936	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	2.6	SW846 9060A
TOTAL PHENOLICS (ug/l)	6	SW846 9066
TURBIDITY (N.T.U.)	0.28	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.

T Please indicate detection limit if analyte is not detected.

** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4).

Remaining quarterly samples only require total metals analysis.

I.D. No 101389

Monitoring Point No. FFMP017W

Sample Date 8/18/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES****2-Q. Organics (Enter all data in ug/l)**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
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FORM 19
MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

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General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (D° MM' SS.S")

Monitoring Point Number: FFMP018W Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County

Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 11.62 " Longitude: 76 ° 27 ' 5.68 "

Depth to Water Level: 26.89 ft Measured from: Land Surface TOC

Casing Stickup: 2.46 ft Elevation of Water Level: 445.31 ft./MSL

Sampling Depth: 40 ft Volume of Water Column: 16.02 gal

Total Well Depth: 51.43 ft Sampling Method: Pumped Bailed Grab

Well Purged: Yes No Well Volumes Purged: 4.0

Sample Field Filtered (must be 0.45 micron)?: Yes No

Spring Flow Rate: gpm

Sample Date (mm/dd/yy): 8/18/2020 Sample Collection Time: 10:57

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: Yes No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3122263002 Final Lab Analysis Completion Date: 8/26/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments: _____

I.D. No 101389

Monitoring Point No. FFMP018W

Sample Date 8/18/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE ^T	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	D6919-09
BICARBONATE ALKALINITY	24	SM20-2320B
CALCIUM, TOTAL	32	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	99.8	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	67 ND	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	15.8	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	240	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	4.9	EPA 300
pH-FIELD (SU)	5.26	FIELD
pH-LAB (SU)	6.14	SM20-4500HB
POTASSIUM, TOTAL	5.4	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	34.4	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	551	FIELD
SPEC. COND., LAB (umhos/cm)	504	SW846 9050A
SULFATE	39.8	EPA 300
ALKALINITY	24	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	330	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.86	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.18	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.

T Please indicate detection limit if analyte is not detected.

** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4).

Remaining quarterly samples only require total metals analysis.

I.D. No 101389

Monitoring Point No. FFMP018W

Sample Date 8/18/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES****2-Q. Organics (Enter all data in ug/l)**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

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FORM 19
MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

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General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (D^o MM' SS.S")

Monitoring Point Number: FFMP019W Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County

Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 11.58 " Longitude: 76 ° 27 ' 5.75 "

Depth to Water Level: 27.66 ft Measured from: Land Surface TOC

Casing Stickup: 1.79 ft Elevation of Water Level: 444.29 ft./MSL

Sampling Depth: 49 ft Volume of Water Column: 68.62 gal

Total Well Depth: 132.79 ft Sampling Method: Pumped Bailed Grab

Well Purged: Yes No Well Volumes Purged: 2.7

Sample Field Filtered (must be 0.45 micron)?: Yes No

Spring Flow Rate: gpm

Sample Date (mm/dd/yy): 8/18/2020 Sample Collection Time: 11:45

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: Yes No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3122263003 Final Lab Analysis Completion Date: 8/26/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments: _____

I.D. No 101389

Monitoring Point No. FFMP019W

Sample Date 8/18/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE ^T	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	D6919-09
BICARBONATE ALKALINITY	63	SM20-2320B
CALCIUM, TOTAL	58.8	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	84.9	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	67 ND	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	5.7	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	5.6 ND	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	0.24	EPA 300
pH-FIELD (SU)	6.28	FIELD
pH-LAB (SU)	7.07	SM20-4500HB
POTASSIUM, TOTAL	1.1	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	10.8	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	471	FIELD
SPEC. COND., LAB (umhos/cm)	435	SW846 9050A
SULFATE	15.3	EPA 300
ALKALINITY	63	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	282	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	1.3	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.23	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.

T Please indicate detection limit if analyte is not detected.

** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4).

Remaining quarterly samples only require total metals analysis.

I.D. No 101389

Monitoring Point No. FFMP019W

Sample Date 8/18/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES****2-Q. Organics (Enter all data in ug/l)**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

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FORM 19
MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

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General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (D° MM' SS.S")

Monitoring Point Number: FFMP005W Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County

Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 10.67 " Longitude: 76 ° 27 ' 21.3 "

Depth to Water Level: 68.82 ft Measured from: Land Surface TOC

Casing Stickup: 1.70 ft Elevation of Water Level: 468.58 ft./MSL

Sampling Depth: 135 ft Volume of Water Column: 119.23 gal

Total Well Depth: 150 ft Sampling Method: Pumped Bailed Grab

Well Purged: Yes No Well Volumes Purged: 0.9

Sample Field Filtered (must be 0.45 micron)?: Yes No

Spring Flow Rate: gpm

Sample Date (mm/dd/yy): 8/18/2020 Sample Collection Time: 13:08

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: Yes No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3122263004 Final Lab Analysis Completion Date: 8/26/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments: _____

I.D. No 101389

Monitoring Point No. FFMP005W

Sample Date 8/18/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE ^T	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	D6919-09
BICARBONATE ALKALINITY	47	SM20-2320B
CALCIUM, TOTAL	75.9	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	187	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	67 ND	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	18.5	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	92	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	2.3	EPA 300
pH-FIELD (SU)	5.31	FIELD
pH-LAB (SU)	6.14	SM20-4500HB
POTASSIUM, TOTAL	3.5	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	49.3	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	894	FIELD
SPEC. COND., LAB (umhos/cm)	835	SW846 9050A
SULFATE	60.9	EPA 300
ALKALINITY	47	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	596	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	1.5	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.12	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.

T Please indicate detection limit if analyte is not detected.

** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4).

Remaining quarterly samples only require total metals analysis.

I.D. No 101389

Monitoring Point No. FFMP005W

Sample Date 8/18/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES****2-Q. Organics (Enter all data in ug/l)**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

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MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

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SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (D^o MM' SS.S")

Monitoring Point Number: FFMP26RW Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County

Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 11.03 " Longitude: 76 ° 27 ' 20.3 "

Depth to Water Level: 80.1 ft Measured from: Land Surface TOC

Casing Stickup: 3.30 ft Elevation of Water Level: 467.30 ft./MSL

Sampling Depth: 105 ft Volume of Water Column: 49.79 gal

Total Well Depth: 114 ft Sampling Method: Pumped Bailed Grab

Well Purged: Yes No Well Volumes Purged: 1.8

Sample Field Filtered (must be 0.45 micron)?: Yes No

Spring Flow Rate: gpm

Sample Date (mm/dd/yy): 8/18/2020 Sample Collection Time: 14:36

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: Yes No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3122263005 Final Lab Analysis CompletionDate: 8/26/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments: _____

I.D. No 101389

Monitoring Point No. FFMP26RW

Sample Date 8/18/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE ^T	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	D6919-09
BICARBONATE ALKALINITY	44	SM20-2320B
CALCIUM, TOTAL	69	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	181	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	67 ND	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	18.5	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	560	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	1.7	EPA 300
pH-FIELD (SU)	5.28	FIELD
pH-LAB (SU)	6.13	SM20-4500HB
POTASSIUM, TOTAL	8.4	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	59.6	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	904	FIELD
SPEC. COND., LAB (umhos/cm)	899	SW846 9050A
SULFATE	78.8	EPA 300
ALKALINITY	44	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	634	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	1.1	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.71	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.

T Please indicate detection limit if analyte is not detected.

** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4).

Remaining quarterly samples only require total metals analysis.

I.D. No 101389

Monitoring Point No. FFMP26RW

Sample Date 8/18/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES****2-Q. Organics (Enter all data in ug/l)**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
10/08/2020

DEP USE ONLY

Date Received

FORM 19
MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 19, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (D° MM' SS.S")

Monitoring Point Number: FFMP029W Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County

Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 12.93 " Longitude: 76 ° 27 ' 0.67 "

Depth to Water Level: 38.71 ft Measured from: Land Surface TOC

Casing Stickup: 2.00 ft Elevation of Water Level: 438.59 ft./MSL

Sampling Depth: 55 ft Volume of Water Column: 29.06 gal

Total Well Depth: 58.5 ft Sampling Method: Pumped Bailed Grab

Well Purged: Yes No Well Volumes Purged: 3.8

Sample Field Filtered (must be 0.45 micron)?: Yes No

Spring Flow Rate: gpm

Sample Date (mm/dd/yy): 8/19/2020 Sample Collection Time: 10:31

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: Yes No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3122419001 Final Lab Analysis Completion Date: 8/27/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments: _____

I.D. No 101389

Monitoring Point No. FFMP029W

Sample Date 8/19/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE ^T	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	D6919-09
BICARBONATE ALKALINITY	10	SM20-2320B
CALCIUM, TOTAL	13.1	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	58.6	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	67 ND	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	9.4	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	27	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	3.7	EPA 300
pH-FIELD (SU)	4.47	FIELD
pH-LAB (SU)	6.39	SM20-4500HB
POTASSIUM, TOTAL	2.2	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	21.7	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	317	FIELD
SPEC. COND., LAB (umhos/cm)	282	SW846 9050A
SULFATE	6.1	EPA 300
ALKALINITY	10	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	166	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.5 ND	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.29	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.

T Please indicate detection limit if analyte is not detected.

** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4).

Remaining quarterly samples only require total metals analysis.

I.D. No 101389

Monitoring Point No. FFMP029W

Sample Date 8/19/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES****2-Q. Organics (Enter all data in ug/l)**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
10/08/2020

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FORM 19
MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

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General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (D° MM' SS.S")

Monitoring Point Number: FFMP031W Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County Municipality: MANOR TOWNSHIP

Sampling Point: Latitude: 39 ° 57 ' 31.2 " Longitude: 76 ° 27 ' 23.53 "

Depth to Water Level: 66.2 ft Measured from: Land Surface TOC

Casing Stickup: 2.38 ft Elevation of Water Level: 546.46 ft./MSL

Sampling Depth: 130 ft Volume of Water Column: 108.39 gal

Total Well Depth: 140 ft Sampling Method: Pumped Bailed Grab

Well Purged: Yes No Well Volumes Purged: 1.0

Sample Field Filtered (must be 0.45 micron)?: Yes No

Spring Flow Rate: gpm

Sample Date (mm/dd/yy): 8/19/2020 Sample Collection Time: 12:08

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: Yes No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3122419002 Final Lab Analysis CompletionDate: 8/27/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments: _____

I.D. No 101389

Monitoring Point No. FFMP031W

Sample Date 8/19/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE ^T	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	D6919-09
BICARBONATE ALKALINITY	68	SM20-2320B
CALCIUM, TOTAL	39.5	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	21.8	EPA 300
FLUORIDE	0.2	EPA 300
IRON, TOTAL (ug/l)	3200	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	4	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	300	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	0.2 ND	EPA 300
pH-FIELD (SU)	7.78	FIELD
pH-LAB (SU)	7.86	SM20-4500HB
POTASSIUM, TOTAL	1.2	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	10.7	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	325	FIELD
SPEC. COND., LAB (umhos/cm)	281	SW846 9050A
SULFATE	42.1	EPA 300
ALKALINITY	68	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	150	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.5 ND	SW846 9060A
TOTAL PHENOLICS (ug/l)	6	SW846 9066
TURBIDITY (N.T.U.)	11.9	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.

T Please indicate detection limit if analyte is not detected.

** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4).

Remaining quarterly samples only require total metals analysis.

I.D. No 101389

Monitoring Point No. FFMP031W

Sample Date 8/19/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES****2-Q. Organics (Enter all data in ug/l)**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

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FORM 19
MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

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General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (D° MM' SS.S")

Monitoring Point Number: FFMP002W Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 32.25 " Longitude: 76 ° 27 ' 24.03 "

Depth to Water Level: 64.38 ft Measured from: Land Surface TOC

Casing Stickup: 1.60 ft Elevation of Water Level: 548.82 ft./MSL

Sampling Depth: 85 ft Volume of Water Column: 154.53 gal

Total Well Depth: 169.6 ft Sampling Method: Pumped Bailed Grab

Well Purged: Yes No Well Volumes Purged: 0.8

Sample Field Filtered (must be 0.45 micron)?: Yes No

Spring Flow Rate: gpm

Sample Date (mm/dd/yy): 8/19/2020 Sample Collection Time: 12:52

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: Yes No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3122419003 Final Lab Analysis Completion Date: 8/27/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments: _____

I.D. No 101389

Monitoring Point No. FFMP002W

Sample Date 8/19/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	D6919-09
BICARBONATE ALKALINITY	5 ND	SM20-2320B
CALCIUM, TOTAL	18.5	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	16.1	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	67 ND	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	7.9	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	220	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	20.8	EPA 300
pH-FIELD (SU)	4.4	FIELD
pH-LAB (SU)	5.25	SM20-4500HB
POTASSIUM, TOTAL	1.1	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	14	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	294	FIELD
SPEC. COND., LAB (umhos/cm)	266	SW846 9050A
SULFATE	10.8	EPA 300
ALKALINITY	5 ND	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	222	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.53	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.22	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.

T Please indicate detection limit if analyte is not detected.

** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4).

Remaining quarterly samples only require total metals analysis.

I.D. No 101389

Monitoring Point No. FFMP002W

Sample Date 8/19/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES****2-Q. Organics (Enter all data in ug/l)**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

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FORM 19
MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

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General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (D° MM' SS.S")

Monitoring Point Number: FFMP032W Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County Municipality: MANOR TOWNSHIP

Sampling Point: Latitude: 39 ° 57 ' 33.45 " Longitude: 76 ° 27 ' 17.71 "

Depth to Water Level: 49.49 ft Measured from: Land Surface TOC

Casing Stickup: 2.06 ft Elevation of Water Level: 544.60 ft./MSL

Sampling Depth: 62 ft Volume of Water Column: 37.47 gal

Total Well Depth: 75 ft Sampling Method: Pumped Bailed Grab

Well Purged: Yes No Well Volumes Purged: 0.4

Sample Field Filtered (must be 0.45 micron)?: Yes No

Spring Flow Rate: gpm

Sample Date (mm/dd/yy): 8/19/2020 Sample Collection Time: 14:15

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: Yes No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3122419004 Final Lab Analysis Completion Date: 9/9/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments: _____

I.D. No 101389

Monitoring Point No. FFMP032W

Sample Date 8/19/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE ^T	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.737	D6919-09
BICARBONATE ALKALINITY	68	SM20-2320B
CALCIUM, TOTAL	14.4	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	16.9	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	9700	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	5.3	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	590	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	0.2 ND	EPA 300
pH-FIELD (SU)	6.68	FIELD
pH-LAB (SU)	7.48	SM20-4500HB
POTASSIUM, TOTAL	1.3	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	13.6	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	220	FIELD
SPEC. COND., LAB (umhos/cm)	179	SW846 9050A
SULFATE	2 ND	EPA 300
ALKALINITY	68	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	90	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.5 ND	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	105	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.

T Please indicate detection limit if analyte is not detected.

** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4).

Remaining quarterly samples only require total metals analysis.

I.D. No 101389

Monitoring Point No. FFMP032W

Sample Date 8/19/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES****2-Q. Organics (Enter all data in ug/l)**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
10/08/2020

DEP USE ONLY

Date Received

FORM 19
MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 19, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (D° MM' SS.S")

Monitoring Point Number: FFMP30RW Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County

Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 15.52 " Longitude: 76 ° 27 ' 26.8 "

Depth to Water Level: 36.88 ft Measured from: Land Surface TOC

Casing Stickup: 2.20 ft Elevation of Water Level: 525.42 ft./MSL

Sampling Depth: 85 ft Volume of Water Column: 78.01 gal

Total Well Depth: 90 ft Sampling Method: Pumped Bailed Grab

Well Purged: Yes No Well Volumes Purged: 1.2

Sample Field Filtered (must be 0.45 micron)?: Yes No

Spring Flow Rate: gpm

Sample Date (mm/dd/yy): 8/20/2020 Sample Collection Time: 11:57

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: Yes No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3122826001 Final Lab Analysis CompletionDate: 8/28/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments: _____

I.D. No 101389

Monitoring Point No. FFMP30RW

Sample Date 8/20/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE ^T	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	D6919-09
BICARBONATE ALKALINITY	28	SM20-2320B
CALCIUM, TOTAL	37.2	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	61	EPA 410.4
CHLORIDE	191	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	69	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	16.2	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	2200	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	5.2	EPA 300
pH-FIELD (SU)	5.13	FIELD
pH-LAB (SU)	6.41	SM20-4500HB
POTASSIUM, TOTAL	7.1	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	95.5	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	852	FIELD
SPEC. COND., LAB (umhos/cm)	802	SW846 9050A
SULFATE	24.8	EPA 300
ALKALINITY	28	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	390	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.93	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.91	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.

T Please indicate detection limit if analyte is not detected.

** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4).

Remaining quarterly samples only require total metals analysis.

I.D. No 101389

Monitoring Point No. FFMP30RW

Sample Date 8/20/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES****2-Q. Organics (Enter all data in ug/l)**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

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MUNICIPAL WASTE LANDFILL
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General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (D° MM' SS.S")

Monitoring Point Number: FFMP04AW Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County

Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 15.4 " Longitude: 76 ° 27 ' 26.58 "

Depth to Water Level: 35.78 ft Measured from: Land Surface TOC

Casing Stickup: 2.52 ft Elevation of Water Level: 524.94 ft./MSL

Sampling Depth: 146 ft Volume of Water Column: 390.28 gal

Total Well Depth: 301.52 ft Sampling Method: Pumped Bailed Grab

Well Purged: Yes No Well Volumes Purged: 0.6

Sample Field Filtered (must be 0.45 micron)?: Yes No

Spring Flow Rate: gpm

Sample Date (mm/dd/yy): 8/20/2020 Sample Collection Time: 13:12

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: Yes No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3122826002 Final Lab Analysis CompletionDate: 8/28/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments: _____

I.D. No 101389

Monitoring Point No. FFMP04AW

Sample Date 8/20/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE ^T	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	D6919-09
BICARBONATE ALKALINITY	192	SM20-2320B
CALCIUM, TOTAL	34.9	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	300	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	250	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	10.1	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	110	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	0.24	EPA 300
pH-FIELD (SU)	6.78	FIELD
pH-LAB (SU)	7.77	SM20-4500HB
POTASSIUM, TOTAL	3.8	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	26.6	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	1472	FIELD
SPEC. COND., LAB (umhos/cm)	1390	SW846 9050A
SULFATE	45.1	EPA 300
ALKALINITY	192	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	830	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	1	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.46	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.

T Please indicate detection limit if analyte is not detected.

** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4).

Remaining quarterly samples only require total metals analysis.

I.D. No 101389

Monitoring Point No. FFMP04AW

Sample Date 8/20/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES****2-Q. Organics (Enter all data in ug/l)**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

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FORM 19
MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

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General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (D° MM' SS.S")

Monitoring Point Number: FFMP02SW Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County

Municipality: MANOR TOWNSHIP

Sampling Point: Latitude: 39 ° 57 ' 27.9 " Longitude: 76 ° 27 ' 1.58 "

Depth to Water Level: 15.31 ft Measured from: Land Surface TOC

Casing Stickup: _____ ft Elevation of Water Level: 494.59 ft./MSL

Sampling Depth: 18 ft Volume of Water Column: _____ gal

Total Well Depth: 25 ft Sampling Method: Pumped Bailed Grab

Well Purged: Yes No Well Volumes Purged: 0.5

Sample Field Filtered (must be 0.45 micron)?: Yes No

Spring Flow Rate: _____ gpm

Sample Date (mm/dd/yy): 8/20/2020 Sample Collection Time: 13:38

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: Yes No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3122826003 Final Lab Analysis CompletionDate: 8/28/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments: _____

I.D. No 101389

Monitoring Point No. FFMP02SW

Sample Date 8/20/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE ^T	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	D6919-09
BICARBONATE ALKALINITY	18	SM20-2320B
CALCIUM, TOTAL	15.3	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	52.2	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	1000	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	5.7	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	21	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	10.8	EPA 300
pH-FIELD (SU)	5.44	FIELD
pH-LAB (SU)	6.33	SM20-4500HB
POTASSIUM, TOTAL	6.1	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	42.6	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	426	FIELD
SPEC. COND., LAB (umhos/cm)	374	SW846 9050A
SULFATE	25.8	EPA 300
ALKALINITY	18	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	152	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	6.9	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	47.6	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.

T Please indicate detection limit if analyte is not detected.

** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4).

Remaining quarterly samples only require total metals analysis.

I.D. No 101389

Monitoring Point No. FFMP02SW

Sample Date 8/20/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES****2-Q. Organics (Enter all data in ug/l)**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

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FORM 19
MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

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General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (D^o MM' SS.S")

Monitoring Point Number: FFMP02DW Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County

Municipality: MANOR TOWNSHIP

Sampling Point: Latitude: 39 ° 57 ' 27.74 " Longitude: 76 ° 27 ' 1.49 "

Depth to Water Level: 19.93 ft Measured from: Land Surface TOC

Casing Stickup: _____ ft Elevation of Water Level: 489.67 ft./MSL

Sampling Depth: 120 ft Volume of Water Column: _____ gal

Total Well Depth: 152 ft Sampling Method: Pumped Bailed Grab

Well Purged: Yes No Well Volumes Purged: 0.5

Sample Field Filtered (must be 0.45 micron)?: Yes No

Spring Flow Rate: _____ gpm

Sample Date (mm/dd/yy): 8/20/2020 Sample Collection Time: 14:49

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: Yes No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3122826004 Final Lab Analysis CompletionDate: 8/28/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments: _____

I.D. No 101389

Monitoring Point No. FFMP02DW

Sample Date 8/20/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE ^T	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	D6919-09
BICARBONATE ALKALINITY	109	SM20-2320B
CALCIUM, TOTAL	127	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	334	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	470	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	20	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	460	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	7.9	EPA 300
pH-FIELD (SU)	6.91	FIELD
pH-LAB (SU)	8.06	SM20-4500HB
POTASSIUM, TOTAL	2.7	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	127	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	1473	FIELD
SPEC. COND., LAB (umhos/cm)	1390	SW846 9050A
SULFATE	31.5	EPA 300
ALKALINITY	109	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	712	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.81	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	5.5	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.

T Please indicate detection limit if analyte is not detected.

** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4).

Remaining quarterly samples only require total metals analysis.

I.D. No 101389

Monitoring Point No. FFMP02DW

Sample Date 8/20/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES****2-Q. Organics (Enter all data in ug/l)**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

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Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (D° MM' SS.S")

Monitoring Point Number: FFMP016W Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County

Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 19.15 " Longitude: 76 ° 27 ' 0.88 "

Depth to Water Level: 22.98 ft Measured from: Land Surface TOC

Casing Stickup: 1.97 ft Elevation of Water Level: 451.62 ft./MSL

Sampling Depth: 135 ft Volume of Water Column: 186.25 gal

Total Well Depth: 149.8 ft Sampling Method: Pumped Bailed Grab

Well Purged: Yes No Well Volumes Purged: _____

Sample Field Filtered (must be 0.45 micron)?: Yes No

Spring Flow Rate: _____ gpm

Sample Date (mm/dd/yy): 8/21/2020 Sample Collection Time: 15:06

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: Yes No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3123266001 Final Lab Analysis Completion Date: 9/1/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments: _____

I.D. No 101389

Monitoring Point No. FFMP016W

Sample Date 8/21/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	D6919-09
BICARBONATE ALKALINITY	30	SM20-2320B
CALCIUM, TOTAL	43.6	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	129	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	67 ND	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	19.1	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	43	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	9.9	EPA 300
pH-FIELD (SU)	4.2	FIELD
pH-LAB (SU)	5.88	SM20-4500HB
POTASSIUM, TOTAL	3.7	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	42.4	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	680	FIELD
SPEC. COND., LAB (umhos/cm)	581	SW846 9050A
SULFATE	30.8	EPA 300
ALKALINITY	30	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	432	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	1.1	SW846 9060A
TOTAL PHENOLICS (ug/l)	5	SW846 9066
TURBIDITY (N.T.U.)	0.12	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.

T Please indicate detection limit if analyte is not detected.

** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4).

Remaining quarterly samples only require total metals analysis.

I.D. No 101389

Monitoring Point No. FFMP016W

Sample Date 8/21/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES****2-Q. Organics (Enter all data in ug/l)**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

September 1, 2020

Mr. Daniel Brown
Lancaster County Solid Waste Authority
1299 Hbg Pike, P.O. Box 4425
Lancaster, PA 17604

Certificate of Analysis

Project Name:	FREY FARM	Workorder:	3121991
Purchase Order:	PO1000126	Workorder ID:	3rd QTR 2020 GWMP-FORM 19Q

Dear Mr. Brown:

Enclosed are the analytical results for samples received by the laboratory on Monday, August 17, 2020.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Ms. Susan J Scherer (Project Coordinator) at (717) 944-5541.

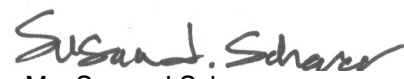
Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

This laboratory report may not be reproduced, except in full, without the written approval of ALS Environmental.

ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Ms. Ashley Gichuki , Ms. Jordan Gallagher , Mr. Jeff Musser

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.



Ms. Susan J Scherer
Project Coordinator

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SAMPLE SUMMARY

Workorder: 3121991 3rd QTR 2020 GWMP-FORM 19Q

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
3121991001	FFMP015W	Ground Water	8/17/2020 10:01	8/17/2020 16:04	Mr. Brian G Shade
3121991002	FFMP03AW	Ground Water	8/17/2020 11:29	8/17/2020 16:04	Mr. Brian G Shade
3121991003	FFMP025W	Ground Water	8/17/2020 12:15	8/17/2020 16:04	Mr. Brian G Shade
3121991004	FFMP028W	Ground Water	8/17/2020 13:32	8/17/2020 16:04	Mr. Brian G Shade
3121991005	FFMP033W	Ground Water	8/17/2020 14:52	8/17/2020 16:04	Mr. Brian G Shade

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SAMPLE SUMMARY

Workorder: 3121991 3rd QTR 2020 GWMP-FORM 19Q

Notes

- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
- The Chain of Custody document is included as part of this report.
- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are performed in the laboratory and are therefore analyzed out of hold time.
- Method references listed on this report beginning with the prefix "S" followed by a method number (such as S2310B-97) refer to methods from "Standard Methods for the Examination of Water and Wastewater".
- For microbiological analyses, the "Prepared" value is the date/time into the incubator and the "Analyzed" value is the date/time out the incubator.
- An Analysis-Prep Method Cross Reference Table is included after Analytical Results & Qualifiers section in this report.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

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ANALYTICAL RESULTS

Workorder: 3121991 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3121991001** Date Collected: 8/17/2020 10:01 Matrix: Ground Water
Sample ID: **FFMP015W** Date Received: 8/17/2020 16:04

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/20/20 05:07	PDK	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			8/20/20 05:07	PDK	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/20/20 05:07	PDK	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/20/20 05:07	PDK	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/20/20 05:07	PDK	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/20/20 05:07	PDK	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/20/20 05:07	PDK	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/20/20 05:07	PDK	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/20/20 05:07	PDK	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/20/20 05:07	PDK	G
Toluene	ND		ug/L	1.0	SW846 8260B			8/20/20 05:07	PDK	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/20/20 05:07	PDK	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/20/20 05:07	PDK	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/20/20 05:07	PDK	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/20/20 05:07	PDK	G
<i>Surrogate Recoveries</i>	<i>Results</i>	<i>Flag</i>	<i>Units</i>	<i>Limits</i>	<i>Method</i>	<i>Prepared</i>	<i>By</i>	<i>Analyzed</i>	<i>By</i>	<i>Cntr</i>
1,2-Dichloroethane-d4 (S)	84.8		%	62 - 133	SW846 8260B			8/20/20 05:07	PDK	G
4-Bromofluorobenzene (S)	114		%	79 - 114	SW846 8260B			8/20/20 05:07	PDK	G
Dibromofluoromethane (S)	80.7		%	78 - 116	SW846 8260B			8/20/20 05:07	PDK	G
Toluene-d8 (S)	91.7		%	76 - 127	SW846 8260B			8/20/20 05:07	PDK	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	15		mg/L	5	SM2320B-2011			8/19/20 21:03	R2B	B
Alkalinity, Total	15	2	mg/L	5	SM2320B-2011			8/19/20 21:03	R2B	I
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/21/20 22:33	JXL	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			8/25/20 23:58	JAM	A
Chloride	31.5		mg/L	2.0	EPA 300.0			8/18/20 06:32	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			8/18/20 06:32	MBW	B
Nitrate-N	32.7	3	mg/L	0.50	EPA 300.0			8/20/20 05:28	MBW	B
pH	5.87	1	pH_Units		S4500HB-11			8/19/20 21:03	R2B	B
Phenolics	ND		mg/L	0.005	SW846 9066	8/19/20 06:57	C_D	8/19/20 05:59	VXF	F
Specific Conductance	462		umhos/cm	1	SW846 9050A			8/19/20 21:03	R2B	B
Sulfate	31.5		mg/L	2.0	EPA 300.0			8/18/20 06:32	MBW	B
Total Dissolved Solids	272		mg/L	5	S2540C-11			8/19/20 12:07	KXH	B
Total Organic Carbon (TOC)	1.3		mg/L	0.50	SW846 9060A			8/21/20 09:44	PAG	D
Turbidity	0.22		NTU	0.10	SM2130B-2011			8/18/20 04:41	R2B	B

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ANALYTICAL RESULTS

Workorder: 3121991 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3121991001** Date Collected: 8/17/2020 10:01 Matrix: Ground Water
Sample ID: **FFMP015W** Date Received: 8/17/2020 16:04

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Calcium, Total	18.3		mg/L	0.11	SW846 6010C	8/23/20 18:45	SXC	8/25/20 12:50	SRT	J1
Iron, Total	ND		mg/L	0.067	SW846 6010C	8/23/20 18:45	SXC	8/25/20 12:50	SRT	J1
Magnesium, Total	24.0		mg/L	0.11	SW846 6010C	8/23/20 18:45	SXC	8/25/20 12:50	SRT	J1
Manganese, Total	0.064		mg/L	0.0056	SW846 6010C	8/23/20 18:45	SXC	8/25/20 12:50	SRT	J1
Potassium, Total	2.8		mg/L	0.56	SW846 6010C	8/23/20 18:45	SXC	8/25/20 12:50	SRT	J1
Sodium, Total	23.9		mg/L	0.56	SW846 6010C	8/23/20 18:45	SXC	8/25/20 12:50	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	60.91		Feet		Field			8/17/20 10:01	BGS	C
Elev Top MW Casing above MSL	576.40		Feet		Field			8/17/20 10:01	BGS	C
Flow Rate	2.16		gal/min		Field			8/17/20 10:01	BGS	C
Ground Water Elevation	515.49		ft/MSL		Field			8/17/20 10:01	BGS	C
pH, Field (SM4500B)	5.18		pH_Units		Field			8/17/20 10:01	BGS	C
Sample Depth	135.00		Feet		Field			8/17/20 10:01	BGS	C
Specific Conductance, Field	487		umhos/cm	1	Field			8/17/20 10:01	BGS	C
Temperature	12.13		Deg. C		Field			8/17/20 10:01	BGS	C
Total Well Depth	149.90		Feet		Field			8/17/20 10:01	BGS	C
Volume in Water Column	130.82		Gallons		Field			8/17/20 10:01	BGS	C
Water Level After Purge	124.32		Feet		Field			8/17/20 10:01	BGS	C
Well Volumes Purged	1.32		Vol		Field			8/17/20 10:01	BGS	C



Ms. Susan J Scherer
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3121991 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3121991002**

Date Collected: 8/17/2020 11:29

Matrix: Ground Water

Sample ID: **FFMP03AW**

Date Received: 8/17/2020 16:04

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/20/20 05:29	PDK	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			8/20/20 05:29	PDK	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/20/20 05:29	PDK	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/20/20 05:29	PDK	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/20/20 05:29	PDK	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/20/20 05:29	PDK	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/20/20 05:29	PDK	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/20/20 05:29	PDK	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/20/20 05:29	PDK	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/20/20 05:29	PDK	G
Toluene	ND		ug/L	1.0	SW846 8260B			8/20/20 05:29	PDK	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/20/20 05:29	PDK	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/20/20 05:29	PDK	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/20/20 05:29	PDK	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/20/20 05:29	PDK	G
<i>Surrogate Recoveries</i>	<i>Results</i>	<i>Flag</i>	<i>Units</i>	<i>Limits</i>	<i>Method</i>	<i>Prepared</i>	<i>By</i>	<i>Analyzed</i>	<i>By</i>	<i>Cntr</i>
1,2-Dichloroethane-d4 (S)	87.8		%	62 - 133	SW846 8260B			8/20/20 05:29	PDK	G
4-Bromofluorobenzene (S)	114		%	79 - 114	SW846 8260B			8/20/20 05:29	PDK	G
Dibromofluoromethane (S)	81		%	78 - 116	SW846 8260B			8/20/20 05:29	PDK	G
Toluene-d8 (S)	92.6		%	76 - 127	SW846 8260B			8/20/20 05:29	PDK	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	14		mg/L	5	SM2320B-2011			8/19/20 21:03	R2B	B
Alkalinity, Total	14	2	mg/L	5	SM2320B-2011			8/19/20 21:03	R2B	I
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/21/20 23:28	JXL	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			8/25/20 23:58	JAM	A
Chloride	28.6		mg/L	2.0	EPA 300.0			8/18/20 06:49	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			8/18/20 06:49	MBW	B
Nitrate-N	23.6	3	mg/L	0.50	EPA 300.0			8/20/20 05:44	MBW	B
pH	5.52	1	pH_Units		S4500HB-11			8/19/20 21:03	R2B	B
Phenolics	ND		mg/L	0.005	SW846 9066	8/19/20 06:57	C_D	8/19/20 05:59	VXF	F
Specific Conductance	308		umhos/cm	1	SW846 9050A			8/19/20 21:03	R2B	B
Sulfate	12.9		mg/L	2.0	EPA 300.0			8/18/20 06:49	MBW	B
Total Dissolved Solids	194		mg/L	5	S2540C-11			8/19/20 12:07	KXH	B
Total Organic Carbon (TOC)	0.82		mg/L	0.50	SW846 9060A			8/21/20 16:27	PAG	D
Turbidity	0.13		NTU	0.10	SM2130B-2011			8/18/20 04:41	R2B	B

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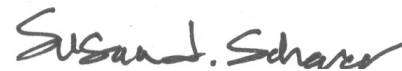
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ANALYTICAL RESULTS

Workorder: 3121991 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3121991002** Date Collected: 8/17/2020 11:29 Matrix: Ground Water
Sample ID: **FFMP03AW** Date Received: 8/17/2020 16:04

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Calcium, Total	17.7		mg/L	0.11	SW846 6010C	8/23/20 18:45	SXC	8/25/20 12:54	SRT	J1
Iron, Total	ND		mg/L	0.067	SW846 6010C	8/23/20 18:45	SXC	8/25/20 12:54	SRT	J1
Magnesium, Total	12.9		mg/L	0.11	SW846 6010C	8/23/20 18:45	SXC	8/25/20 12:54	SRT	J1
Manganese, Total	0.29		mg/L	0.0056	SW846 6010C	8/23/20 18:45	SXC	8/25/20 12:54	SRT	J1
Potassium, Total	1.6		mg/L	0.56	SW846 6010C	8/23/20 18:45	SXC	8/25/20 12:54	SRT	J1
Sodium, Total	12.5		mg/L	0.56	SW846 6010C	8/23/20 18:45	SXC	8/25/20 12:54	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	51.61		Feet		Field			8/17/20 11:29	BGS	C
Elev Top MW Casing above MSL	590.90		Feet		Field			8/17/20 11:29	BGS	C
Flow Rate	1.72		gal/min		Field			8/17/20 11:29	BGS	C
Ground Water Elevation	539.29		ft/MSL		Field			8/17/20 11:29	BGS	C
pH, Field (SM4500B)	4.73		pH_Units		Field			8/17/20 11:29	BGS	C
Sample Depth	130.00		Feet		Field			8/17/20 11:29	BGS	C
Specific Conductance, Field	326		umhos/cm	1	Field			8/17/20 11:29	BGS	C
Temperature	11.05		Deg. C		Field			8/17/20 11:29	BGS	C
Total Well Depth	148.40		Feet		Field			8/17/20 11:29	BGS	C
Volume in Water Column	142.28		Gallons		Field			8/17/20 11:29	BGS	C
Water Level After Purge	82.40		Feet		Field			8/17/20 11:29	BGS	C
Well Volumes Purged	0.85		Vol		Field			8/17/20 11:29	BGS	C



Ms. Susan J Scherer
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3121991 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3121991003** Date Collected: 8/17/2020 12:15 Matrix: Ground Water
Sample ID: **FFMP025W** Date Received: 8/17/2020 16:04

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/20/20 05:52	PDK	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			8/20/20 05:52	PDK	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/20/20 05:52	PDK	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/20/20 05:52	PDK	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/20/20 05:52	PDK	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/20/20 05:52	PDK	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/20/20 05:52	PDK	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/20/20 05:52	PDK	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/20/20 05:52	PDK	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/20/20 05:52	PDK	G
Toluene	ND		ug/L	1.0	SW846 8260B			8/20/20 05:52	PDK	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/20/20 05:52	PDK	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/20/20 05:52	PDK	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/20/20 05:52	PDK	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/20/20 05:52	PDK	G
<i>Surrogate Recoveries</i>	<i>Results</i>	<i>Flag</i>	<i>Units</i>	<i>Limits</i>	<i>Method</i>	<i>Prepared</i>	<i>By</i>	<i>Analyzed</i>	<i>By</i>	<i>Cntr</i>
1,2-Dichloroethane-d4 (S)	83.9		%	62 - 133	SW846 8260B			8/20/20 05:52	PDK	G
4-Bromofluorobenzene (S)	114		%	79 - 114	SW846 8260B			8/20/20 05:52	PDK	G
Dibromofluoromethane (S)	78.6		%	78 - 116	SW846 8260B			8/20/20 05:52	PDK	G
Toluene-d8 (S)	92.5		%	76 - 127	SW846 8260B			8/20/20 05:52	PDK	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	23		mg/L	5	SM2320B-2011			8/19/20 21:03	R2B	B
Alkalinity, Total	23	2	mg/L	5	SM2320B-2011			8/19/20 21:03	R2B	I
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/21/20 23:14	JXL	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			8/25/20 23:58	JAM	A
Chloride	57.9		mg/L	2.0	EPA 300.0			8/18/20 07:06	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			8/18/20 07:06	MBW	B
Nitrate-N	9.5		mg/L	0.20	EPA 300.0			8/18/20 07:06	MBW	B
pH	6.16	1	pH_Units		S4500HB-11			8/19/20 21:03	R2B	B
Phenolics	ND		mg/L	0.005	SW846 9066	8/19/20 06:57	C_D	8/19/20 05:59	VXF	F
Specific Conductance	372		umhos/cm	1	SW846 9050A			8/19/20 21:03	R2B	B
Sulfate	2.8		mg/L	2.0	EPA 300.0			8/18/20 07:06	MBW	B
Total Dissolved Solids	230		mg/L	5	S2540C-11			8/19/20 12:07	KXH	B
Total Organic Carbon (TOC)	0.74		mg/L	0.50	SW846 9060A			8/21/20 16:27	PAG	D
Turbidity	0.26		NTU	0.10	SM2130B-2011			8/18/20 04:41	R2B	B

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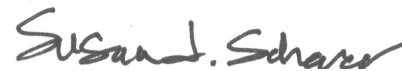
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ANALYTICAL RESULTS

Workorder: 3121991 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3121991003** Date Collected: 8/17/2020 12:15 Matrix: Ground Water
Sample ID: **FFMP025W** Date Received: 8/17/2020 16:04

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Calcium, Total	22.8		mg/L	0.11	SW846 6010C	8/23/20 18:45	SXC	8/25/20 12:57	SRT	J1
Iron, Total	ND		mg/L	0.067	SW846 6010C	8/23/20 18:45	SXC	8/25/20 12:57	SRT	J1
Magnesium, Total	12.4		mg/L	0.11	SW846 6010C	8/23/20 18:45	SXC	8/25/20 12:57	SRT	J1
Manganese, Total	0.0096		mg/L	0.0056	SW846 6010C	8/23/20 18:45	SXC	8/25/20 12:57	SRT	J1
Potassium, Total	2.7		mg/L	0.56	SW846 6010C	8/23/20 18:45	SXC	8/25/20 12:57	SRT	J1
Sodium, Total	20.0		mg/L	0.56	SW846 6010C	8/23/20 18:45	SXC	8/25/20 12:57	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	25.12		Feet		Field			8/17/20 12:15	BGS	C
Elev Top MW Casing above MSL	476.80		Feet		Field			8/17/20 12:15	BGS	C
Flow Rate	3.42		gal/min		Field			8/17/20 12:15	BGS	C
Ground Water Elevation	451.68		ft/MSL		Field			8/17/20 12:15	BGS	C
pH, Field (SM4500B)	3.37		pH_Units		Field			8/17/20 12:15	BGS	C
Sample Depth	39.00		Feet		Field			8/17/20 12:15	BGS	C
Specific Conductance, Field	389		umhos/cm	1	Field			8/17/20 12:15	BGS	C
Temperature	9.30		Deg. C		Field			8/17/20 12:15	BGS	C
Total Well Depth	41.50		Feet		Field			8/17/20 12:15	BGS	C
Volume in Water Column	24.08		Gallons		Field			8/17/20 12:15	BGS	C
Water Level After Purge	25.33		Feet		Field			8/17/20 12:15	BGS	C
Well Volumes Purged	3.55		Vol		Field			8/17/20 12:15	BGS	C



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ANALYTICAL RESULTS

Workorder: 3121991 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3121991004** Date Collected: 8/17/2020 13:32 Matrix: Ground Water
Sample ID: **FFMP028W** Date Received: 8/17/2020 16:04

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/20/20 06:15	PDK	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			8/20/20 06:15	PDK	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/20/20 06:15	PDK	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/20/20 06:15	PDK	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/20/20 06:15	PDK	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/20/20 06:15	PDK	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/20/20 06:15	PDK	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/20/20 06:15	PDK	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/20/20 06:15	PDK	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/20/20 06:15	PDK	G
Toluene	ND		ug/L	1.0	SW846 8260B			8/20/20 06:15	PDK	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/20/20 06:15	PDK	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/20/20 06:15	PDK	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/20/20 06:15	PDK	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/20/20 06:15	PDK	G
<i>Surrogate Recoveries</i>	<i>Results</i>	<i>Flag</i>	<i>Units</i>	<i>Limits</i>	<i>Method</i>	<i>Prepared</i>	<i>By</i>	<i>Analyzed</i>	<i>By</i>	<i>Cntr</i>
1,2-Dichloroethane-d4 (S)	86.9		%	62 - 133	SW846 8260B			8/20/20 06:15	PDK	G
4-Bromofluorobenzene (S)	116	2	%	79 - 114	SW846 8260B			8/20/20 06:15	PDK	G
Dibromofluoromethane (S)	80.6		%	78 - 116	SW846 8260B			8/20/20 06:15	PDK	G
Toluene-d8 (S)	94.2		%	76 - 127	SW846 8260B			8/20/20 06:15	PDK	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	26		mg/L	5	SM2320B-2011			8/19/20 21:03	R2B	B
Alkalinity, Total	26	3	mg/L	5	SM2320B-2011			8/19/20 21:03	R2B	I
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/21/20 23:56	JXL	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			8/31/20 11:50	AK	A
Chloride	82.3		mg/L	2.0	EPA 300.0			8/18/20 07:23	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			8/18/20 07:23	MBW	B
Nitrate-N	17.3		mg/L	0.20	EPA 300.0			8/18/20 07:23	MBW	B
pH	6.08	1	pH_Units		S4500HB-11			8/19/20 21:03	R2B	B
Phenolics	ND		mg/L	0.005	SW846 9066	8/19/20 06:57	C_D	8/19/20 05:59	VXF	F
Specific Conductance	538		umhos/cm	1	SW846 9050A			8/19/20 21:03	R2B	B
Sulfate	25.1		mg/L	2.0	EPA 300.0			8/18/20 07:23	MBW	B
Total Dissolved Solids	400		mg/L	5	S2540C-11			8/19/20 12:07	KXH	B
Total Organic Carbon (TOC)	1.3		mg/L	0.50	SW846 9060A			8/21/20 16:27	PAG	D
Turbidity	0.24		NTU	0.10	SM2130B-2011			8/18/20 04:41	R2B	B

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ANALYTICAL RESULTS

Workorder: 3121991 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3121991004** Date Collected: 8/17/2020 13:32 Matrix: Ground Water
Sample ID: **FFMP028W** Date Received: 8/17/2020 16:04

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Calcium, Total	39.5		mg/L	0.11	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:01	SRT	J1
Iron, Total	ND		mg/L	0.067	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:01	SRT	J1
Magnesium, Total	16.6		mg/L	0.11	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:01	SRT	J1
Manganese, Total	ND		mg/L	0.0056	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:01	SRT	J1
Potassium, Total	2.5		mg/L	0.56	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:01	SRT	J1
Sodium, Total	27.5		mg/L	0.56	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:01	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	12.04		Feet		Field			8/17/20 13:32	BGS	C
Elev Top MW Casing above MSL	465.00		Feet		Field			8/17/20 13:32	BGS	C
Flow Rate	2.89		gal/min		Field			8/17/20 13:32	BGS	C
Ground Water Elevation	452.96		ft/MSL		Field			8/17/20 13:32	BGS	C
pH, Field (SM4500B)	4.15		pH_Units		Field			8/17/20 13:32	BGS	C
Sample Depth	50.00		Feet		Field			8/17/20 13:32	BGS	C
Specific Conductance, Field	563		umhos/cm	1	Field			8/17/20 13:32	BGS	C
Temperature	9.87		Deg. C		Field			8/17/20 13:32	BGS	C
Total Well Depth	60.00		Feet		Field			8/17/20 13:32	BGS	C
Volume in Water Column	70.50		Gallons		Field			8/17/20 13:32	BGS	C
Water Level After Purge	37.03		Feet		Field			8/17/20 13:32	BGS	C
Well Volumes Purged	2.67		Vol		Field			8/17/20 13:32	BGS	C



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ANALYTICAL RESULTS

Workorder: 3121991 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3121991005**

Date Collected: 8/17/2020 14:52

Matrix: Ground Water

Sample ID: **FFMP033W**

Date Received: 8/17/2020 16:04

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/20/20 06:38	PDK	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			8/20/20 06:38	PDK	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/20/20 06:38	PDK	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/20/20 06:38	PDK	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/20/20 06:38	PDK	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/20/20 06:38	PDK	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/20/20 06:38	PDK	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/20/20 06:38	PDK	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/20/20 06:38	PDK	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/20/20 06:38	PDK	G
Toluene	ND		ug/L	1.0	SW846 8260B			8/20/20 06:38	PDK	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/20/20 06:38	PDK	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/20/20 06:38	PDK	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/20/20 06:38	PDK	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/20/20 06:38	PDK	G
<i>Surrogate Recoveries</i>	<i>Results</i>	<i>Flag</i>	<i>Units</i>	<i>Limits</i>	<i>Method</i>	<i>Prepared</i>	<i>By</i>	<i>Analyzed</i>	<i>By</i>	<i>Cntr</i>
1,2-Dichloroethane-d4 (S)	84.2		%	62 - 133	SW846 8260B			8/20/20 06:38	PDK	G
4-Bromofluorobenzene (S)	114		%	79 - 114	SW846 8260B			8/20/20 06:38	PDK	G
Dibromofluoromethane (S)	80		%	78 - 116	SW846 8260B			8/20/20 06:38	PDK	G
Toluene-d8 (S)	92.2		%	76 - 127	SW846 8260B			8/20/20 06:38	PDK	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	42		mg/L	5	SM2320B-2011			8/19/20 21:03	R2B	B
Alkalinity, Total	42	2	mg/L	5	SM2320B-2011			8/19/20 21:03	R2B	I
Ammonia-N	0.612		mg/L	0.100	ASTM D6919-09			8/21/20 22:47	JXL	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			8/25/20 23:58	JAM	A
Chloride	43.4		mg/L	2.0	EPA 300.0			8/18/20 07:40	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			8/18/20 07:40	MBW	B
Nitrate-N	11.6		mg/L	0.20	EPA 300.0			8/18/20 07:40	MBW	B
pH	6.30	1	pH_Units		S4500HB-11			8/19/20 21:03	R2B	B
Phenolics	ND		mg/L	0.005	SW846 9066	8/19/20 06:57	C_D	8/19/20 05:59	VXF	F
Specific Conductance	340		umhos/cm	1	SW846 9050A			8/19/20 21:03	R2B	B
Sulfate	6.4		mg/L	2.0	EPA 300.0			8/18/20 07:40	MBW	B
Total Dissolved Solids	242		mg/L	5	S2540C-11			8/19/20 12:07	KXH	B
Total Organic Carbon (TOC)	ND		mg/L	0.50	SW846 9060A			8/21/20 16:27	PAG	D
Turbidity	3.69		NTU	0.10	SM2130B-2011			8/18/20 04:41	R2B	B

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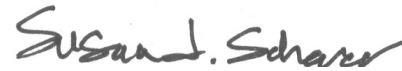
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ANALYTICAL RESULTS

Workorder: 3121991 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3121991005** Date Collected: 8/17/2020 14:52 Matrix: Ground Water
Sample ID: **FFMP033W** Date Received: 8/17/2020 16:04

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Calcium, Total	26.8		mg/L	0.11	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:05	SRT	J1
Iron, Total	6.8		mg/L	0.067	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:05	SRT	J1
Magnesium, Total	9.1		mg/L	0.11	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:05	SRT	J1
Manganese, Total	0.39		mg/L	0.0056	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:05	SRT	J1
Potassium, Total	1.9		mg/L	0.56	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:05	SRT	J1
Sodium, Total	13.8		mg/L	0.56	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:05	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	18.76		Feet		Field			8/17/20 14:52	BGS	C
Elev Top MW Casing above MSL	516.52		Feet		Field			8/17/20 14:52	BGS	C
Flow Rate	1.91		gal/min		Field			8/17/20 14:52	BGS	C
Ground Water Elevation	497.76		ft/MSL		Field			8/17/20 14:52	BGS	C
pH, Field (SM4500B)	4.77		pH_Units		Field			8/17/20 14:52	BGS	C
Sample Depth	79.00		Feet		Field			8/17/20 14:52	BGS	C
Specific Conductance, Field	363		umhos/cm	1	Field			8/17/20 14:52	BGS	C
Temperature	11.75		Deg. C		Field			8/17/20 14:52	BGS	C
Total Well Depth	100.00		Feet		Field			8/17/20 14:52	BGS	C
Volume in Water Column	119.42		Gallons		Field			8/17/20 14:52	BGS	C
Water Level After Purge	30.44		Feet		Field			8/17/20 14:52	BGS	C
Well Volumes Purged	1.04		Vol		Field			8/17/20 14:52	BGS	C



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ANALYTICAL RESULTS

Workorder: 3121991 3rd QTR 2020 GWMP-FORM 19Q

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
3121991001	1	FFMP015W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3121991001	2	FFMP015W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3121991001	3	FFMP015W	EPA 300.0	Nitrate-N
The sample was originally run within hold time, but required further analysis that exceeded hold time.				
3121991002	1	FFMP03AW	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3121991002	2	FFMP03AW	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3121991002	3	FFMP03AW	EPA 300.0	Nitrate-N
The sample was originally run within hold time, but required further analysis that exceeded hold time.				
3121991003	1	FFMP025W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3121991003	2	FFMP025W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3121991004	1	FFMP028W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3121991004	2	FFMP028W	SW846 8260B	4-Bromofluorobenzene
The surrogate 4-Bromofluorobenzene for method SW846 8260B was outside of control limits. The % Recovery was reported as 116 and the control limits were 79 to 114. This result was reported at a dilution of 1.				
3121991004	3	FFMP028W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3121991005	1	FFMP033W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3121991005	2	FFMP033W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3121991 3rd QTR 2020 GWMP-FORM 19Q

Lab ID	Sample ID	Analysis Method	Prep Method	Leachate Method
3121991001	FFMP015W	ASTM D6919-09		
3121991001	FFMP015W	EPA 300.0		
3121991001	FFMP015W	EPA 410.4		
3121991001	FFMP015W	Field		
3121991001	FFMP015W	S2540C-11		
3121991001	FFMP015W	S4500HB-11		
3121991001	FFMP015W	SM2130B-2011		
3121991001	FFMP015W	SM2320B-2011		
3121991001	FFMP015W	SW846 6010C	SW846 3015	
3121991001	FFMP015W	SW846 8260B		
3121991001	FFMP015W	SW846 9050A		
3121991001	FFMP015W	SW846 9060A		
3121991001	FFMP015W	SW846 9066	420.4/9066	
3121991002	FFMP03AW	ASTM D6919-09		
3121991002	FFMP03AW	EPA 300.0		
3121991002	FFMP03AW	EPA 410.4		
3121991002	FFMP03AW	Field		
3121991002	FFMP03AW	S2540C-11		
3121991002	FFMP03AW	S4500HB-11		
3121991002	FFMP03AW	SM2130B-2011		
3121991002	FFMP03AW	SM2320B-2011		
3121991002	FFMP03AW	SW846 6010C	SW846 3015	
3121991002	FFMP03AW	SW846 8260B		
3121991002	FFMP03AW	SW846 9050A		
3121991002	FFMP03AW	SW846 9060A		
3121991002	FFMP03AW	SW846 9066	420.4/9066	
3121991003	FFMP025W	ASTM D6919-09		
3121991003	FFMP025W	EPA 300.0		
3121991003	FFMP025W	EPA 410.4		
3121991003	FFMP025W	Field		
3121991003	FFMP025W	S2540C-11		
3121991003	FFMP025W	S4500HB-11		
3121991003	FFMP025W	SM2130B-2011		
3121991003	FFMP025W	SM2320B-2011		
3121991003	FFMP025W	SW846 6010C	SW846 3015	
3121991003	FFMP025W	SW846 8260B		
3121991003	FFMP025W	SW846 9050A		
3121991003	FFMP025W	SW846 9060A		
3121991003	FFMP025W	SW846 9066	420.4/9066	
3121991004	FFMP028W	ASTM D6919-09		
3121991004	FFMP028W	EPA 300.0		
3121991004	FFMP028W	EPA 410.4		
3121991004	FFMP028W	Field		
3121991004	FFMP028W	S2540C-11		
3121991004	FFMP028W	S4500HB-11		
3121991004	FFMP028W	SM2130B-2011		

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3121991 3rd QTR 2020 GWMP-FORM 19Q

Lab ID	Sample ID	Analysis Method	Prep Method	Leachate Method
3121991004	FFMP028W	SM2320B-2011		
3121991004	FFMP028W	SW846 6010C	SW846 3015	
3121991004	FFMP028W	SW846 8260B		
3121991004	FFMP028W	SW846 9050A		
3121991004	FFMP028W	SW846 9060A		
3121991004	FFMP028W	SW846 9066	420.4/9066	
3121991005	FFMP033W	ASTM D6919-09		
3121991005	FFMP033W	EPA 300.0		
3121991005	FFMP033W	EPA 410.4		
3121991005	FFMP033W	Field		
3121991005	FFMP033W	S2540C-11		
3121991005	FFMP033W	S4500HB-11		
3121991005	FFMP033W	SM2130B-2011		
3121991005	FFMP033W	SM2320B-2011		
3121991005	FFMP033W	SW846 6010C	SW846 3015	
3121991005	FFMP033W	SW846 8260B		
3121991005	FFMP033W	SW846 9050A		
3121991005	FFMP033W	SW846 9060A		
3121991005	FFMP033W	SW846 9066	420.4/9066	

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Mexico: Monterrey



Condition of Sample Receipt Form

Client: Lancaster County Solid Waste MA Work Order #: 3121991 Initials: TF Date: 8/18/20

Were airbills / tracking numbers present and recorded?.....	<u>NONE</u>	YES	NO
Tracking number: _____			
Are Custody Seals on shipping containers intact?.....	<u>NONE</u>	YES	NO
Are Custody Seals on sample containers intact?.....	<u>NONE</u>	YES	NO
Is there a COC (Chain-of-Custody) present?.....		<u>YES</u>	NO
Are the COC and bottle labels complete, legible and in agreement?.....		<u>YES</u>	NO
5a. Does the COC contain sample locations?.....		<u>YES</u>	NO
5b. Does the COC contain date and time of sample collection for all samples?.....		<u>YES</u>	NO
5c. Does the COC contain sample collectors name?.....	<u>Refractured</u>	<u>YES</u>	NO
5d. Does the COC note the type(s) of preservation for all bottles?.....		<u>YES</u>	NO
5e. Does the COC note the number of bottles submitted for each sample?.....		<u>YES</u>	NO
5f. Does the COC note the type of sample, composite or grab?.....		<u>YES</u>	NO
5g. Does the COC note the matrix of the sample(s)?.....		<u>YES</u>	NO
Are all aqueous samples requiring preservation preserved correctly? ¹	N/A	<u>YES</u>	NO
Were all samples placed in the proper containers for the requested analyses, with sufficient volume?.....		<u>YES</u>	NO
Are all samples within holding times for the requested analyses?.....		<u>YES</u>	NO
Were all sample containers received intact and headspace free when required? (not broken, leaking, frozen, etc.).....		<u>YES</u>	NO
0. Did we receive trip blanks (applies only for methods EPA 504, EPA 524.2 and 1631E (LL Hg)?.....	<u>N/A</u>	YES	NO
1. Were the samples received on ice?.....		<u>YES</u>	NO
2. Were sample temperatures measured at 0.0-6.0°C.....		<u>YES</u>	NO
3. Are the samples DW matrix ? If YES, fill out Reportable Drinking Water questions below.....		YES	<u>NO</u>
13a. Are the samples required for SDWA compliance reporting?.....	N/A	YES	NO
13b. Did the client provide a SDWA PWS ID#?.....	N/A	YES	NO
13c. Are all aqueous unpreserved SDWA samples pH 5-9?.....	N/A	YES	NO
13d. Did the client provide the SDWA sample location ID/Description?.....	N/A	YES	NO
13e. Did the client provide the SDWA sample type (D, E, R, C, P, S)?.....	N/A	YES	NO

Cooler #: 1
 Temperature (°C): 6°
 Thermometer ID: 294
 Radiological (µCi): _____

COMMENTS (Required for all NO responses above and any sample non-conformance):

¹Final determination of correct preservation for analysis such as volatiles, microbiology, and oil and grease is made in the analytical department at the time of or following the analysis



August 31, 2020

Mr. Daniel Brown
Lancaster County Solid Waste Authority
1299 Hbg Pike, P.O. Box 4425
Lancaster, PA 17604

Certificate of Analysis

Project Name:	FREY FARM	Workorder:	3122263
Purchase Order:	PO1000126	Workorder ID:	3rd QTR 2020 GWMP-FORM 19Q

Dear Mr. Brown:

Enclosed are the analytical results for samples received by the laboratory on Tuesday, August 18, 2020.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Ms. Susan J Scherer (Project Coordinator) at (717) 944-5541.

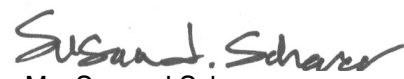
Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

This laboratory report may not be reproduced, except in full, without the written approval of ALS Environmental.

ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Ms. Ashley Gichuki , Ms. Jordan Gallagher , Mr. Jeff Musser

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.


Ms. Susan J Scherer
Project Coordinator

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SAMPLE SUMMARY

Workorder: 3122263 3rd QTR 2020 GWMP-FORM 19Q

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
3122263001	FFMP017W	Ground Water	8/18/2020 10:19	8/18/2020 17:08	Mr. Brian G Shade
3122263002	FFMP018W	Ground Water	8/18/2020 10:57	8/18/2020 17:08	Mr. Brian G Shade
3122263003	FFMP019W	Ground Water	8/18/2020 11:45	8/18/2020 17:08	Mr. Brian G Shade
3122263004	FFMP005W	Ground Water	8/18/2020 13:08	8/18/2020 17:08	Mr. Brian G Shade
3122263005	FFMP26RW	Ground Water	8/18/2020 14:36	8/18/2020 17:08	Mr. Brian G Shade

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SAMPLE SUMMARY

Workorder: 3122263 3rd QTR 2020 GWMP-FORM 19Q

Notes

- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
- The Chain of Custody document is included as part of this report.
- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are performed in the laboratory and are therefore analyzed out of hold time.
- Method references listed on this report beginning with the prefix "S" followed by a method number (such as S2310B-97) refer to methods from "Standard Methods for the Examination of Water and Wastewater".
- For microbiological analyses, the "Prepared" value is the date/time into the incubator and the "Analyzed" value is the date/time out the incubator.
- An Analysis-Prep Method Cross Reference Table is included after Analytical Results & Qualifiers section in this report.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

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ANALYTICAL RESULTS

Workorder: 3122263 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122263001**

Date Collected: 8/18/2020 10:19

Matrix: Ground Water

Sample ID: **FFMP017W**

Date Received: 8/18/2020 17:08

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/21/20 01:23	PDK	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			8/21/20 01:23	PDK	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/21/20 01:23	PDK	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/21/20 01:23	PDK	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/21/20 01:23	PDK	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/21/20 01:23	PDK	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/21/20 01:23	PDK	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/21/20 01:23	PDK	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/21/20 01:23	PDK	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/21/20 01:23	PDK	G
Toluene	ND		ug/L	1.0	SW846 8260B			8/21/20 01:23	PDK	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/21/20 01:23	PDK	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/21/20 01:23	PDK	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/21/20 01:23	PDK	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/21/20 01:23	PDK	G
<i>Surrogate Recoveries</i>	<i>Results</i>	<i>Flag</i>	<i>Units</i>	<i>Limits</i>	<i>Method</i>	<i>Prepared</i>	<i>By</i>	<i>Analyzed</i>	<i>By</i>	<i>Cntr</i>
1,2-Dichloroethane-d4 (S)	103		%	62 - 133	SW846 8260B			8/21/20 01:23	PDK	G
4-Bromofluorobenzene (S)	90.6		%	79 - 114	SW846 8260B			8/21/20 01:23	PDK	G
Dibromofluoromethane (S)	101		%	78 - 116	SW846 8260B			8/21/20 01:23	PDK	G
Toluene-d8 (S)	93.1		%	76 - 127	SW846 8260B			8/21/20 01:23	PDK	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	75		mg/L	5	SM2320B-2011			8/20/20 21:39	R2B	B
Alkalinity, Total	75	6	mg/L	5	SM2320B-2011			8/20/20 21:39	R2B	I
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/25/20 00:50	JXL	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			8/26/20 01:58	JAM	A
Chloride	352		mg/L	5.0	EPA 300.0			8/21/20 05:39	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			8/19/20 09:08	MBW	B
Nitrate-N	1.8		mg/L	0.20	EPA 300.0			8/19/20 09:08	MBW	B
pH	6.47	1	pH_Units		S4500HB-11			8/20/20 21:39	R2B	B
Phenolics	0.006		mg/L	0.005	SW846 9066	8/26/20 06:53	C_D	8/26/20 10:35	VXF	F
Specific Conductance	1370		umhos/cm	1	SW846 9050A			8/20/20 21:39	R2B	B
Sulfate	69.7		mg/L	2.0	EPA 300.0			8/19/20 09:08	MBW	B
Total Dissolved Solids	936	2	mg/L	5	S2540C-11			8/20/20 11:35	KXH	B
Total Organic Carbon (TOC)	2.6		mg/L	0.50	SW846 9060A			8/26/20 22:45	PAG	D
Turbidity	0.28		NTU	0.10	SM2130B-2011			8/19/20 07:35	R2B	B

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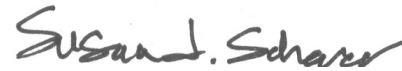
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ANALYTICAL RESULTS

Workorder: 3122263 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122263001** Date Collected: 8/18/2020 10:19 Matrix: Ground Water
Sample ID: **FFMP017W** Date Received: 8/18/2020 17:08

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Calcium, Total	99.8		mg/L	0.11	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:09	SRT	J1
Iron, Total	ND		mg/L	0.067	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:09	SRT	J1
Magnesium, Total	42.8		mg/L	0.11	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:09	SRT	J1
Manganese, Total	1.7		mg/L	0.0056	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:09	SRT	J1
Potassium, Total	7.6		mg/L	0.56	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:09	SRT	J1
Sodium, Total	94.6		mg/L	0.56	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:09	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	41.29		Feet		Field			8/18/20 10:19	BGS	C
Elev Top MW Casing above MSL	480.70		Feet		Field			8/18/20 10:19	BGS	C
Flow Rate	2.10		gal/min		Field			8/18/20 10:19	BGS	C
Ground Water Elevation	439.41		ft/MSL		Field			8/18/20 10:19	BGS	C
pH, Field (SM4500B)	5.34		pH_Units		Field			8/18/20 10:19	BGS	C
Sample Depth	135.00		Feet		Field			8/18/20 10:19	BGS	C
Specific Conductance, Field	1524		umhos/cm	1	Field			8/18/20 10:19	BGS	C
Temperature	9.50		Deg. C		Field			8/18/20 10:19	BGS	C
Total Well Depth	150.50		Feet		Field			8/18/20 10:19	BGS	C
Volume in Water Column	160.54		Gallons		Field			8/18/20 10:19	BGS	C
Water Level After Purge	47.78		Feet		Field			8/18/20 10:19	BGS	C
Well Volumes Purged	0.85		Vol		Field			8/18/20 10:19	BGS	C



Ms. Susan J Scherer
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3122263 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122263002**

Date Collected: 8/18/2020 10:57

Matrix: Ground Water

Sample ID: **FFMP018W**

Date Received: 8/18/2020 17:08

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/21/20 01:46	PDK	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			8/21/20 01:46	PDK	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/21/20 01:46	PDK	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/21/20 01:46	PDK	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/21/20 01:46	PDK	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/21/20 01:46	PDK	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/21/20 01:46	PDK	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/21/20 01:46	PDK	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/21/20 01:46	PDK	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/21/20 01:46	PDK	G
Toluene	ND		ug/L	1.0	SW846 8260B			8/21/20 01:46	PDK	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/21/20 01:46	PDK	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/21/20 01:46	PDK	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/21/20 01:46	PDK	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/21/20 01:46	PDK	G
<i>Surrogate Recoveries</i>	<i>Results</i>	<i>Flag</i>	<i>Units</i>	<i>Limits</i>	<i>Method</i>	<i>Prepared</i>	<i>By</i>	<i>Analyzed</i>	<i>By</i>	<i>Cntr</i>
1,2-Dichloroethane-d4 (S)	103		%	62 - 133	SW846 8260B			8/21/20 01:46	PDK	G
4-Bromofluorobenzene (S)	91.8		%	79 - 114	SW846 8260B			8/21/20 01:46	PDK	G
Dibromofluoromethane (S)	100		%	78 - 116	SW846 8260B			8/21/20 01:46	PDK	G
Toluene-d8 (S)	93.3		%	76 - 127	SW846 8260B			8/21/20 01:46	PDK	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	24		mg/L	5	SM2320B-2011			8/20/20 21:39	R2B	B
Alkalinity, Total	24	2	mg/L	5	SM2320B-2011			8/20/20 21:39	R2B	I
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/24/20 18:25	JXL	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			8/26/20 01:58	JAM	A
Chloride	99.8		mg/L	2.0	EPA 300.0			8/19/20 09:24	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			8/19/20 09:24	MBW	B
Nitrate-N	4.9		mg/L	0.20	EPA 300.0			8/19/20 09:24	MBW	B
pH	6.14	1	pH_Units		S4500HB-11			8/20/20 21:39	R2B	B
Phenolics	ND		mg/L	0.005	SW846 9066	8/26/20 06:53	C_D	8/26/20 10:35	VXF	F
Specific Conductance	504		umhos/cm	1	SW846 9050A			8/20/20 21:39	R2B	B
Sulfate	39.8		mg/L	2.0	EPA 300.0			8/19/20 09:24	MBW	B
Total Dissolved Solids	330		mg/L	5	S2540C-11			8/20/20 11:35	KXH	B
Total Organic Carbon (TOC)	0.86		mg/L	0.50	SW846 9060A			8/21/20 23:11	PAG	D
Turbidity	0.18		NTU	0.10	SM2130B-2011			8/19/20 07:35	R2B	B

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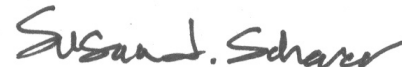
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ANALYTICAL RESULTS

Workorder: 3122263 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122263002** Date Collected: 8/18/2020 10:57 Matrix: Ground Water
 Sample ID: **FFMP018W** Date Received: 8/18/2020 17:08

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Calcium, Total	32.0		mg/L	0.11	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:20	SRT	J1
Iron, Total	ND		mg/L	0.067	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:20	SRT	J1
Magnesium, Total	15.8		mg/L	0.11	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:20	SRT	J1
Manganese, Total	0.24		mg/L	0.0056	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:20	SRT	J1
Potassium, Total	5.4		mg/L	0.56	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:20	SRT	J1
Sodium, Total	34.4		mg/L	0.56	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:20	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	26.89		Feet		Field			8/18/20 10:57	BGS	C
Elev Top MW Casing above MSL	472.20		Feet		Field			8/18/20 10:57	BGS	C
Flow Rate	4.58		gal/min		Field			8/18/20 10:57	BGS	C
Ground Water Elevation	445.31		ft/MSL		Field			8/18/20 10:57	BGS	C
pH, Field (SM4500B)	5.26		pH_Units		Field			8/18/20 10:57	BGS	C
Sample Depth	40.00		Feet		Field			8/18/20 10:57	BGS	C
Specific Conductance, Field	551		umhos/cm	1	Field			8/18/20 10:57	BGS	C
Temperature	11.70		Deg. C		Field			8/18/20 10:57	BGS	C
Total Well Depth	51.46		Feet		Field			8/18/20 10:57	BGS	C
Volume in Water Column	15.97		Gallons		Field			8/18/20 10:57	BGS	C
Water Level After Purge	27.21		Feet		Field			8/18/20 10:57	BGS	C
Well Volumes Purged	4.01		Vol		Field			8/18/20 10:57	BGS	C



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ANALYTICAL RESULTS

Workorder: 3122263 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122263003**

Date Collected: 8/18/2020 11:45

Matrix: Ground Water

Sample ID: **FFMP019W**

Date Received: 8/18/2020 17:08

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/21/20 02:10	PDK	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			8/21/20 02:10	PDK	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/21/20 02:10	PDK	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/21/20 02:10	PDK	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/21/20 02:10	PDK	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/21/20 02:10	PDK	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/21/20 02:10	PDK	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/21/20 02:10	PDK	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/21/20 02:10	PDK	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/21/20 02:10	PDK	G
Toluene	ND		ug/L	1.0	SW846 8260B			8/21/20 02:10	PDK	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/21/20 02:10	PDK	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/21/20 02:10	PDK	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/21/20 02:10	PDK	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/21/20 02:10	PDK	G
<i>Surrogate Recoveries</i>	<i>Results</i>	<i>Flag</i>	<i>Units</i>	<i>Limits</i>	<i>Method</i>	<i>Prepared</i>	<i>By</i>	<i>Analyzed</i>	<i>By</i>	<i>Cntr</i>
1,2-Dichloroethane-d4 (S)	104		%	62 - 133	SW846 8260B			8/21/20 02:10	PDK	G
4-Bromofluorobenzene (S)	91.6		%	79 - 114	SW846 8260B			8/21/20 02:10	PDK	G
Dibromofluoromethane (S)	99.4		%	78 - 116	SW846 8260B			8/21/20 02:10	PDK	G
Toluene-d8 (S)	93.1		%	76 - 127	SW846 8260B			8/21/20 02:10	PDK	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	63		mg/L	5	SM2320B-2011			8/20/20 21:39	R2B	B
Alkalinity, Total	63	3	mg/L	5	SM2320B-2011			8/20/20 21:39	R2B	I
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/24/20 15:13	JXL	A
Chemical Oxygen Demand (COD)	ND	1	mg/L	15	EPA 410.4			8/26/20 01:58	JAM	A
Chloride	84.9		mg/L	2.0	EPA 300.0			8/19/20 09:39	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			8/19/20 09:39	MBW	B
Nitrate-N	0.24		mg/L	0.20	EPA 300.0			8/19/20 09:39	MBW	B
pH	7.07	2	pH_Units		S4500HB-11			8/20/20 21:39	R2B	B
Phenolics	ND		mg/L	0.005	SW846 9066	8/26/20 06:53	C_D	8/26/20 10:35	VXF	F
Specific Conductance	435		umhos/cm	1	SW846 9050A			8/20/20 21:39	R2B	B
Sulfate	15.3		mg/L	2.0	EPA 300.0			8/19/20 09:39	MBW	B
Total Dissolved Solids	282		mg/L	5	S2540C-11			8/20/20 11:35	KXH	B
Total Organic Carbon (TOC)	1.3		mg/L	0.50	SW846 9060A			8/22/20 05:27	PAG	D
Turbidity	0.23		NTU	0.10	SM2130B-2011			8/19/20 07:35	R2B	B

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ANALYTICAL RESULTS

Workorder: 3122263 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122263003** Date Collected: 8/18/2020 11:45 Matrix: Ground Water
Sample ID: **FFMP019W** Date Received: 8/18/2020 17:08

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Calcium, Total	58.8		mg/L	0.11	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:23	SRT	J1
Iron, Total	ND		mg/L	0.067	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:23	SRT	J1
Magnesium, Total	5.7		mg/L	0.11	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:23	SRT	J1
Manganese, Total	ND		mg/L	0.0056	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:23	SRT	J1
Potassium, Total	1.1		mg/L	0.56	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:23	SRT	J1
Sodium, Total	10.8		mg/L	0.56	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:23	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	27.66		Feet		Field			8/18/20 11:45	BGS	C
Elev Top MW Casing above MSL	471.95		Feet		Field			8/18/20 11:45	BGS	C
Flow Rate	4.64		gal/min		Field			8/18/20 11:45	BGS	C
Ground Water Elevation	444.29		ft/MSL		Field			8/18/20 11:45	BGS	C
pH, Field (SM4500B)	6.28		pH_Units		Field			8/18/20 11:45	BGS	C
Sample Depth	49.00		Feet		Field			8/18/20 11:45	BGS	C
Specific Conductance, Field	471		umhos/cm	1	Field			8/18/20 11:45	BGS	C
Temperature	10.75		Deg. C		Field			8/18/20 11:45	BGS	C
Total Well Depth	132.79		Feet		Field			8/18/20 11:45	BGS	C
Volume in Water Column	68.33		Gallons		Field			8/18/20 11:45	BGS	C
Water Level After Purge	33.78		Feet		Field			8/18/20 11:45	BGS	C
Well Volumes Purged	2.72		Vol		Field			8/18/20 11:45	BGS	C



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ANALYTICAL RESULTS

Workorder: 3122263 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122263004** Date Collected: 8/18/2020 13:08 Matrix: Ground Water
Sample ID: **FFMP005W** Date Received: 8/18/2020 17:08

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/21/20 02:33	PDK	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			8/21/20 02:33	PDK	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/21/20 02:33	PDK	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/21/20 02:33	PDK	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/21/20 02:33	PDK	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/21/20 02:33	PDK	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/21/20 02:33	PDK	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/21/20 02:33	PDK	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/21/20 02:33	PDK	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/21/20 02:33	PDK	G
Toluene	ND		ug/L	1.0	SW846 8260B			8/21/20 02:33	PDK	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/21/20 02:33	PDK	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/21/20 02:33	PDK	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/21/20 02:33	PDK	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/21/20 02:33	PDK	G
<i>Surrogate Recoveries</i>	<i>Results</i>	<i>Flag</i>	<i>Units</i>	<i>Limits</i>	<i>Method</i>	<i>Prepared</i>	<i>By</i>	<i>Analyzed</i>	<i>By</i>	<i>Cntr</i>
1,2-Dichloroethane-d4 (S)	103		%	62 - 133	SW846 8260B			8/21/20 02:33	PDK	G
4-Bromofluorobenzene (S)	92.9		%	79 - 114	SW846 8260B			8/21/20 02:33	PDK	G
Dibromofluoromethane (S)	101		%	78 - 116	SW846 8260B			8/21/20 02:33	PDK	G
Toluene-d8 (S)	93.9		%	76 - 127	SW846 8260B			8/21/20 02:33	PDK	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	47		mg/L	5	SM2320B-2011			8/20/20 21:39	R2B	B
Alkalinity, Total	47	2	mg/L	5	SM2320B-2011			8/20/20 21:39	R2B	I
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/25/20 02:40	JXL	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			8/26/20 01:58	JAM	A
Chloride	187		mg/L	2.0	EPA 300.0			8/19/20 09:55	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			8/19/20 09:55	MBW	B
Nitrate-N	2.3		mg/L	0.20	EPA 300.0			8/19/20 09:55	MBW	B
pH	6.14	1	pH_Units		S4500HB-11			8/20/20 21:39	R2B	B
Phenolics	ND		mg/L	0.005	SW846 9066	8/26/20 06:53	C_D	8/26/20 10:35	VXF	F
Specific Conductance	835		umhos/cm	1	SW846 9050A			8/20/20 21:39	R2B	B
Sulfate	60.9		mg/L	2.0	EPA 300.0			8/19/20 09:55	MBW	B
Total Dissolved Solids	596		mg/L	5	S2540C-11			8/20/20 11:35	KXH	B
Total Organic Carbon (TOC)	1.5		mg/L	0.50	SW846 9060A			8/25/20 16:35	PAG	D
Turbidity	0.12		NTU	0.10	SM2130B-2011			8/19/20 07:35	R2B	B

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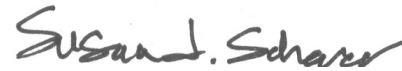
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ANALYTICAL RESULTS

Workorder: 3122263 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122263004** Date Collected: 8/18/2020 13:08 Matrix: Ground Water
 Sample ID: **FFMP005W** Date Received: 8/18/2020 17:08

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Calcium, Total	75.9		mg/L	0.11	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:27	SRT	J1
Iron, Total	ND		mg/L	0.067	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:27	SRT	J1
Magnesium, Total	18.5		mg/L	0.11	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:27	SRT	J1
Manganese, Total	0.092		mg/L	0.0056	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:27	SRT	J1
Potassium, Total	3.5		mg/L	0.56	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:27	SRT	J1
Sodium, Total	49.3		mg/L	0.56	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:27	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	68.82		Feet		Field			8/18/20 13:08	BGS	C
Elev Top MW Casing above MSL	537.40		Feet		Field			8/18/20 13:08	BGS	C
Flow Rate	1.71		gal/min		Field			8/18/20 13:08	BGS	C
Ground Water Elevation	468.58		ft/MSL		Field			8/18/20 13:08	BGS	C
pH, Field (SM4500B)	5.31		pH_Units		Field			8/18/20 13:08	BGS	C
Sample Depth	135.00		Feet		Field			8/18/20 13:08	BGS	C
Specific Conductance, Field	894		umhos/cm	1	Field			8/18/20 13:08	BGS	C
Temperature	10.45		Deg. C		Field			8/18/20 13:08	BGS	C
Total Well Depth	149.70		Feet		Field			8/18/20 13:08	BGS	C
Volume in Water Column	118.89		Gallons		Field			8/18/20 13:08	BGS	C
Water Level After Purge	87.02		Feet		Field			8/18/20 13:08	BGS	C
Well Volumes Purged	0.86		Vol		Field			8/18/20 13:08	BGS	C



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ANALYTICAL RESULTS

Workorder: 3122263 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122263005** Date Collected: 8/18/2020 14:36 Matrix: Ground Water
Sample ID: **FFMP26RW** Date Received: 8/18/2020 17:08

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/21/20 02:57	PDK	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			8/21/20 02:57	PDK	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/21/20 02:57	PDK	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/21/20 02:57	PDK	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/21/20 02:57	PDK	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/21/20 02:57	PDK	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/21/20 02:57	PDK	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/21/20 02:57	PDK	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/21/20 02:57	PDK	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/21/20 02:57	PDK	G
Toluene	ND		ug/L	1.0	SW846 8260B			8/21/20 02:57	PDK	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/21/20 02:57	PDK	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/21/20 02:57	PDK	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/21/20 02:57	PDK	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/21/20 02:57	PDK	G
<i>Surrogate Recoveries</i>	<i>Results</i>	<i>Flag</i>	<i>Units</i>	<i>Limits</i>	<i>Method</i>	<i>Prepared</i>	<i>By</i>	<i>Analyzed</i>	<i>By</i>	<i>Cntr</i>
1,2-Dichloroethane-d4 (S)	104		%	62 - 133	SW846 8260B			8/21/20 02:57	PDK	G
4-Bromofluorobenzene (S)	91.6		%	79 - 114	SW846 8260B			8/21/20 02:57	PDK	G
Dibromofluoromethane (S)	102		%	78 - 116	SW846 8260B			8/21/20 02:57	PDK	G
Toluene-d8 (S)	93.8		%	76 - 127	SW846 8260B			8/21/20 02:57	PDK	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	44		mg/L	5	SM2320B-2011			8/20/20 21:39	R2B	B
Alkalinity, Total	44	2	mg/L	5	SM2320B-2011			8/20/20 21:39	R2B	I
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/25/20 00:36	JXL	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			8/26/20 01:58	JAM	A
Chloride	181		mg/L	2.0	EPA 300.0			8/19/20 10:42	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			8/19/20 10:42	MBW	B
Nitrate-N	1.7		mg/L	0.20	EPA 300.0			8/19/20 10:42	MBW	B
pH	6.13	1	pH_Units		S4500HB-11			8/20/20 21:39	R2B	B
Phenolics	ND		mg/L	0.005	SW846 9066	8/26/20 06:53	C_D	8/26/20 10:35	VXF	F
Specific Conductance	899		umhos/cm	1	SW846 9050A			8/20/20 21:39	R2B	B
Sulfate	78.8		mg/L	2.0	EPA 300.0			8/19/20 10:42	MBW	B
Total Dissolved Solids	634		mg/L	5	S2540C-11			8/20/20 11:35	KXH	B
Total Organic Carbon (TOC)	1.1		mg/L	0.50	SW846 9060A			8/22/20 05:27	PAG	D
Turbidity	0.71		NTU	0.10	SM2130B-2011			8/19/20 07:35	R2B	B

ALS Environmental Laboratory Locations Across North America

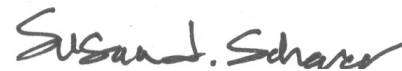
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ANALYTICAL RESULTS

Workorder: 3122263 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122263005** Date Collected: 8/18/2020 14:36 Matrix: Ground Water
Sample ID: **FFMP26RW** Date Received: 8/18/2020 17:08

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Calcium, Total	69.0		mg/L	0.11	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:31	SRT	J1
Iron, Total	ND		mg/L	0.067	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:31	SRT	J1
Magnesium, Total	18.5		mg/L	0.11	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:31	SRT	J1
Manganese, Total	0.56		mg/L	0.0056	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:31	SRT	J1
Potassium, Total	8.4		mg/L	0.56	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:31	SRT	J1
Sodium, Total	59.6		mg/L	0.56	SW846 6010C	8/23/20 18:45	SXC	8/25/20 13:31	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	80.10		Feet		Field			8/18/20 14:36	BGS	C
Elev Top MW Casing above MSL	547.40		Feet		Field			8/18/20 14:36	BGS	C
Flow Rate	1.72		gal/min		Field			8/18/20 14:36	BGS	C
Ground Water Elevation	467.30		ft/MSL		Field			8/18/20 14:36	BGS	C
pH, Field (SM4500B)	5.28		pH_Units		Field			8/18/20 14:36	BGS	C
Sample Depth	105.00		Feet		Field			8/18/20 14:36	BGS	C
Specific Conductance, Field	904		umhos/cm	1	Field			8/18/20 14:36	BGS	C
Temperature	11.42		Deg. C		Field			8/18/20 14:36	BGS	C
Total Well Depth	118.30		Feet		Field			8/18/20 14:36	BGS	C
Volume in Water Column	56.15		Gallons		Field			8/18/20 14:36	BGS	C
Water Level After Purge	93.71		Feet		Field			8/18/20 14:36	BGS	C
Well Volumes Purged	1.84		Vol		Field			8/18/20 14:36	BGS	C



Ms. Susan J Scherer
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3122263 3rd QTR 2020 GWMP-FORM 19Q

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
3122263001	1	FFMP017W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3122263001	2	FFMP017W	S2540C-11	Total Dissolved Solids
The QC sample type DUP for method S2540C-11 was outside the control limits for the analyte Total Dissolved Solids. The RPD was reported as 6.61 and the upper control limit is 5.				
3122263001	6	FFMP017W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3122263002	1	FFMP018W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3122263002	2	FFMP018W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3122263003	1	FFMP019W	EPA 410.4	Chemical Oxygen Demand (COD)
The QC sample type MSLO for method EPA 410.4 was outside the control limits for the analyte Chemical Oxygen Demand (COD). The % Recovery was reported as 112 and the control limits were 90 to 110.				
3122263003	2	FFMP019W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3122263003	3	FFMP019W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3122263004	1	FFMP005W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3122263004	2	FFMP005W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3122263005	1	FFMP26RW	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3122263005	2	FFMP26RW	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3122263 3rd QTR 2020 GWMP-FORM 19Q

Lab ID	Sample ID	Analysis Method	Prep Method	Leachate Method
3122263001	FFMP017W	ASTM D6919-09		
3122263001	FFMP017W	EPA 300.0		
3122263001	FFMP017W	EPA 410.4		
3122263001	FFMP017W	Field		
3122263001	FFMP017W	S2540C-11		
3122263001	FFMP017W	S4500HB-11		
3122263001	FFMP017W	SM2130B-2011		
3122263001	FFMP017W	SM2320B-2011		
3122263001	FFMP017W	SW846 6010C	SW846 3015	
3122263001	FFMP017W	SW846 8260B		
3122263001	FFMP017W	SW846 9050A		
3122263001	FFMP017W	SW846 9060A		
3122263001	FFMP017W	SW846 9066	420.4/9066	
3122263002	FFMP018W	ASTM D6919-09		
3122263002	FFMP018W	EPA 300.0		
3122263002	FFMP018W	EPA 410.4		
3122263002	FFMP018W	Field		
3122263002	FFMP018W	S2540C-11		
3122263002	FFMP018W	S4500HB-11		
3122263002	FFMP018W	SM2130B-2011		
3122263002	FFMP018W	SM2320B-2011		
3122263002	FFMP018W	SW846 6010C	SW846 3015	
3122263002	FFMP018W	SW846 8260B		
3122263002	FFMP018W	SW846 9050A		
3122263002	FFMP018W	SW846 9060A		
3122263002	FFMP018W	SW846 9066	420.4/9066	
3122263003	FFMP019W	ASTM D6919-09		
3122263003	FFMP019W	EPA 300.0		
3122263003	FFMP019W	EPA 410.4		
3122263003	FFMP019W	Field		
3122263003	FFMP019W	S2540C-11		
3122263003	FFMP019W	S4500HB-11		
3122263003	FFMP019W	SM2130B-2011		
3122263003	FFMP019W	SM2320B-2011		
3122263003	FFMP019W	SW846 6010C	SW846 3015	
3122263003	FFMP019W	SW846 8260B		
3122263003	FFMP019W	SW846 9050A		
3122263003	FFMP019W	SW846 9060A		
3122263003	FFMP019W	SW846 9066	420.4/9066	
3122263004	FFMP005W	ASTM D6919-09		
3122263004	FFMP005W	EPA 300.0		
3122263004	FFMP005W	EPA 410.4		
3122263004	FFMP005W	Field		
3122263004	FFMP005W	S2540C-11		
3122263004	FFMP005W	S4500HB-11		
3122263004	FFMP005W	SM2130B-2011		

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3122263 3rd QTR 2020 GWMP-FORM 19Q

Lab ID	Sample ID	Analysis Method	Prep Method	Leachate Method
3122263004	FFMP005W	SM2320B-2011		
3122263004	FFMP005W	SW846 6010C	SW846 3015	
3122263004	FFMP005W	SW846 8260B		
3122263004	FFMP005W	SW846 9050A		
3122263004	FFMP005W	SW846 9060A		
3122263004	FFMP005W	SW846 9066	420.4/9066	
3122263005	FFMP26RW	ASTM D6919-09		
3122263005	FFMP26RW	EPA 300.0		
3122263005	FFMP26RW	EPA 410.4		
3122263005	FFMP26RW	Field		
3122263005	FFMP26RW	S2540C-11		
3122263005	FFMP26RW	S4500HB-11		
3122263005	FFMP26RW	SM2130B-2011		
3122263005	FFMP26RW	SM2320B-2011		
3122263005	FFMP26RW	SW846 6010C	SW846 3015	
3122263005	FFMP26RW	SW846 8260B		
3122263005	FFMP26RW	SW846 9050A		
3122263005	FFMP26RW	SW846 9060A		
3122263005	FFMP26RW	SW846 9066	420.4/9066	

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Condition of Sample Receipt Form

Client: Concastor county Solid Waste Mgmt Work Order #: _____ Initials: 3122263 Date: _____

Were airbills / tracking numbers present and recorded?.....	<u>NONE</u>	YES	NO
Tracking number: _____			
Are Custody Seals on shipping containers intact?.....	<u>NONE</u>	YES	NO
Are Custody Seals on sample containers intact?.....	<u>NONE</u>	YES	NO
Is there a COC (Chain-of-Custody) present?.....		<u>YES</u>	NO
Are the COC and bottle labels complete, legible and in agreement?.....		<u>YES</u>	NO
5a. Does the COC contain sample locations?.....		<u>YES</u>	NO
5b. Does the COC contain date and time of sample collection for all samples?.....		<u>YES</u>	NO
5c. Does the COC contain sample collectors name?.....	<u>DOES NOT SAY</u>	<u>SAMPLED BY</u>	<u>NO</u>
5d. Does the COC note the type(s) of preservation for all bottles?.....		<u>YES</u>	NO
5e. Does the COC note the number of bottles submitted for each sample?.....		<u>YES</u>	NO
5f. Does the COC note the type of sample, composite or grab?.....		<u>YES</u>	NO
5g. Does the COC note the matrix of the sample(s)?.....		<u>YES</u>	NO
Are all aqueous samples requiring preservation preserved correctly?.....	N/A	<u>YES</u>	NO
Were all samples placed in the proper containers for the requested analyses, with sufficient volume?.....		<u>YES</u>	NO
Are all samples within holding times for the requested analyses?.....		<u>YES</u>	NO
Were all sample containers received intact and headspace free when required? (not broken, leaking, frozen, etc.).....		<u>YES</u>	NO
0. Did we receive trip blanks (applies only for methods EPA 504, EPA 524.2 and 1631E (LL Hg)?.....	<u>N/A</u>	YES	NO
1. Were the samples received on ice?.....		<u>YES</u>	NO
2. Were sample temperatures measured at 0.0-6.0°C.....		<u>YES</u>	NO
3. Are the samples DW matrix ? If YES, fill out Reportable Drinking Water questions below.....		YES	<u>NO</u>
13a. Are the samples required for SDWA compliance reporting?.....	<u>N/A</u>	YES	NO
13b. Did the client provide a SDWA PWS ID#?.....	<u>N/A</u>	YES	NO
13c. Are all aqueous unpreserved SDWA samples pH 5-9?.....	<u>N/A</u>	YES	NO
13d. Did the client provide the SDWA sample location ID/Description?.....	<u>N/A</u>	YES	NO
13e. Did the client provide the SDWA sample type (D, E, R, C, P, S)?.....	<u>N/A</u>	YES	NO

MW 8/18

Cooler #: _____
 Temperature (°C): 0°
 Thermometer ID: 204
 Radiological (µCi): _____

COMMENTS (Required for all NO responses above and any sample non-conformance):

Final determination of correct preservation for analysis such as volatiles, microbiology, and oil and grease is made in the analytical department at the time of or following the analysis



September 10, 2020

Mr. Daniel Brown
Lancaster County Solid Waste Authority
1299 Hbg Pike, P.O. Box 4425
Lancaster, PA 17604

Certificate of Analysis

Project Name:	FREY FARM	Workorder:	3122419
Purchase Order:	PO1000126	Workorder ID:	3rd QTR 2020 GWMP-FORM 19Q

Dear Mr. Brown:

Enclosed are the analytical results for samples received by the laboratory on Wednesday, August 19, 2020.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Ms. Susan J Scherer (Project Coordinator) at (717) 944-5541.

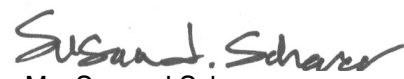
Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

This laboratory report may not be reproduced, except in full, without the written approval of ALS Environmental.

ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Ms. Ashley Gichuki , Ms. Jordan Gallagher , Mr. Jeff Musser

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.


Ms. Susan J Scherer
Project Coordinator

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SAMPLE SUMMARY

Workorder: 3122419 3rd QTR 2020 GWMP-FORM 19Q

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
3122419001	FFMP029W	Ground Water	8/19/2020 10:31	8/19/2020 15:33	Mr. Brian G Shade
3122419002	FFMP031W	Ground Water	8/19/2020 12:08	8/19/2020 15:33	Mr. Brian G Shade
3122419003	FFMP002W	Ground Water	8/19/2020 12:52	8/19/2020 15:33	Mr. Brian G Shade
3122419004	FFMP032W	Ground Water	8/19/2020 14:15	8/19/2020 15:33	Mr. Brian G Shade

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SAMPLE SUMMARY

Workorder: 3122419 3rd QTR 2020 GWMP-FORM 19Q

Notes

- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
- The Chain of Custody document is included as part of this report.
- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are performed in the laboratory and are therefore analyzed out of hold time.
- Method references listed on this report beginning with the prefix "S" followed by a method number (such as S2310B-97) refer to methods from "Standard Methods for the Examination of Water and Wastewater".
- For microbiological analyses, the "Prepared" value is the date/time into the incubator and the "Analyzed" value is the date/time out the incubator.
- An Analysis-Prep Method Cross Reference Table is included after Analytical Results & Qualifiers section in this report.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

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ANALYTICAL RESULTS

Workorder: 3122419 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122419001** Date Collected: 8/19/2020 10:31 Matrix: Ground Water
Sample ID: **FFMP029W** Date Received: 8/19/2020 15:33

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/24/20 07:36	PDK	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			8/24/20 07:36	PDK	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/24/20 07:36	PDK	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/24/20 07:36	PDK	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/24/20 07:36	PDK	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/24/20 07:36	PDK	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/24/20 07:36	PDK	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/24/20 07:36	PDK	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/24/20 07:36	PDK	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/24/20 07:36	PDK	G
Toluene	ND		ug/L	1.0	SW846 8260B			8/24/20 07:36	PDK	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/24/20 07:36	PDK	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/24/20 07:36	PDK	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/24/20 07:36	PDK	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/24/20 07:36	PDK	G
<i>Surrogate Recoveries</i>	<i>Results</i>	<i>Flag</i>	<i>Units</i>	<i>Limits</i>	<i>Method</i>	<i>Prepared</i>	<i>By</i>	<i>Analyzed</i>	<i>By</i>	<i>Cntr</i>
1,2-Dichloroethane-d4 (S)	93.3		%	62 - 133	SW846 8260B			8/24/20 07:36	PDK	G
4-Bromofluorobenzene (S)	104		%	79 - 114	SW846 8260B			8/24/20 07:36	PDK	G
Dibromofluoromethane (S)	89.4		%	78 - 116	SW846 8260B			8/24/20 07:36	PDK	G
Toluene-d8 (S)	99.3		%	76 - 127	SW846 8260B			8/24/20 07:36	PDK	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	10		mg/L	5	SM2320B-2011			8/20/20 21:39	R2B	B
Alkalinity, Total	10	2	mg/L	5	SM2320B-2011			8/20/20 21:39	R2B	I
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/26/20 02:57	JXL	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			8/27/20 04:00	JAM	A
Chloride	58.6		mg/L	2.0	EPA 300.0			8/20/20 10:01	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			8/20/20 10:01	MBW	B
Nitrate-N	3.7		mg/L	0.20	EPA 300.0			8/20/20 10:01	MBW	B
pH	6.39	1	pH_Units		S4500HB-11			8/20/20 21:39	R2B	B
Phenolics	ND	3	mg/L	0.005	SW846 9066	8/26/20 06:53	C_D	8/26/20 10:35	VXF	F
Specific Conductance	282		umhos/cm	1	SW846 9050A			8/20/20 21:39	R2B	B
Sulfate	6.1		mg/L	2.0	EPA 300.0			8/20/20 10:01	MBW	B
Total Dissolved Solids	166		mg/L	5	S2540C-11			8/20/20 13:30	KXH	B
Total Organic Carbon (TOC)	ND		mg/L	0.50	SW846 9060A			8/25/20 03:13	PAG	D
Turbidity	0.29		NTU	0.10	SM2130B-2011			8/20/20 07:34	R2B	B

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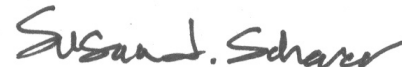
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ANALYTICAL RESULTS

Workorder: 3122419 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122419001** Date Collected: 8/19/2020 10:31 Matrix: Ground Water
Sample ID: **FFMP029W** Date Received: 8/19/2020 15:33

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Calcium, Total	13.1		mg/L	0.11	SW846 6010C	8/25/20 18:25	SXC	8/26/20 14:34	SRT	J1
Iron, Total	ND		mg/L	0.067	SW846 6010C	8/25/20 18:25	SXC	8/26/20 14:34	SRT	J1
Magnesium, Total	9.4		mg/L	0.11	SW846 6010C	8/25/20 18:25	SXC	8/26/20 14:34	SRT	J1
Manganese, Total	0.027		mg/L	0.0056	SW846 6010C	8/25/20 18:25	SXC	8/26/20 14:34	SRT	J1
Potassium, Total	2.2		mg/L	0.56	SW846 6010C	8/25/20 18:25	SXC	8/26/20 14:34	SRT	J1
Sodium, Total	21.7		mg/L	0.56	SW846 6010C	8/25/20 18:25	SXC	8/26/20 14:34	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	38.71		Feet		Field			8/19/20 10:31	BGS	C
Elev Top MW Casing above MSL	477.30		Feet		Field			8/19/20 10:31	BGS	C
Flow Rate	2.03		gal/min		Field			8/19/20 10:31	BGS	C
Ground Water Elevation	438.59		ft/MSL		Field			8/19/20 10:31	BGS	C
pH, Field (SM4500B)	4.47		pH_Units		Field			8/19/20 10:31	BGS	C
Sample Depth	55.00		Feet		Field			8/19/20 10:31	BGS	C
Specific Conductance, Field	317		umhos/cm	1	Field			8/19/20 10:31	BGS	C
Temperature	11.38		Deg. C		Field			8/19/20 10:31	BGS	C
Total Well Depth	60.50		Feet		Field			8/19/20 10:31	BGS	C
Volume in Water Column	32.03		Gallons		Field			8/19/20 10:31	BGS	C
Water Level After Purge	44.98		Feet		Field			8/19/20 10:31	BGS	C
Well Volumes Purged	3.80		Vol		Field			8/19/20 10:31	BGS	C



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ANALYTICAL RESULTS

Workorder: 3122419 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122419002**

Date Collected: 8/19/2020 12:08

Matrix: Ground Water

Sample ID: **FFMP031W**

Date Received: 8/19/2020 15:33

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/24/20 07:58	PDK	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			8/24/20 07:58	PDK	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/24/20 07:58	PDK	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/24/20 07:58	PDK	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/24/20 07:58	PDK	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/24/20 07:58	PDK	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/24/20 07:58	PDK	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/24/20 07:58	PDK	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/24/20 07:58	PDK	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/24/20 07:58	PDK	G
Toluene	ND		ug/L	1.0	SW846 8260B			8/24/20 07:58	PDK	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/24/20 07:58	PDK	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/24/20 07:58	PDK	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/24/20 07:58	PDK	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/24/20 07:58	PDK	G
<i>Surrogate Recoveries</i>	<i>Results</i>	<i>Flag</i>	<i>Units</i>	<i>Limits</i>	<i>Method</i>	<i>Prepared</i>	<i>By</i>	<i>Analyzed</i>	<i>By</i>	<i>Cntr</i>
1,2-Dichloroethane-d4 (S)	95.9		%	62 - 133	SW846 8260B			8/24/20 07:58	PDK	G
4-Bromofluorobenzene (S)	104		%	79 - 114	SW846 8260B			8/24/20 07:58	PDK	G
Dibromofluoromethane (S)	92		%	78 - 116	SW846 8260B			8/24/20 07:58	PDK	G
Toluene-d8 (S)	100		%	76 - 127	SW846 8260B			8/24/20 07:58	PDK	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	68		mg/L	5	SM2320B-2011			8/20/20 21:39	R2B	B
Alkalinity, Total	68	2	mg/L	5	SM2320B-2011			8/20/20 21:39	R2B	I
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/25/20 03:21	JXL	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			8/27/20 04:00	JAM	A
Chloride	21.8		mg/L	2.0	EPA 300.0			8/20/20 10:18	MBW	B
Fluoride	0.20		mg/L	0.20	EPA 300.0			8/20/20 10:18	MBW	B
Nitrate-N	ND		mg/L	0.20	EPA 300.0			8/20/20 10:18	MBW	B
pH	7.86	1	pH_Units		S4500HB-11			8/20/20 21:39	R2B	B
Phenolics	0.006		mg/L	0.005	SW846 9066	8/26/20 06:53	C_D	8/26/20 10:35	VXF	F
Specific Conductance	281		umhos/cm	1	SW846 9050A			8/20/20 21:39	R2B	B
Sulfate	42.1		mg/L	2.0	EPA 300.0			8/20/20 10:18	MBW	B
Total Dissolved Solids	150		mg/L	5	S2540C-11			8/20/20 13:30	KXH	B
Total Organic Carbon (TOC)	ND		mg/L	0.50	SW846 9060A			8/25/20 03:13	PAG	D
Turbidity	11.9		NTU	0.10	SM2130B-2011			8/20/20 07:34	R2B	B

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ANALYTICAL RESULTS

Workorder: 3122419 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122419002** Date Collected: 8/19/2020 12:08 Matrix: Ground Water
 Sample ID: **FFMP031W** Date Received: 8/19/2020 15:33

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Calcium, Total	39.5		mg/L	0.11	SW846 6010C	8/25/20 18:25	SXC	8/26/20 14:45	SRT	J1
Iron, Total	3.2		mg/L	0.067	SW846 6010C	8/25/20 18:25	SXC	8/26/20 14:45	SRT	J1
Magnesium, Total	4.0		mg/L	0.11	SW846 6010C	8/25/20 18:25	SXC	8/26/20 14:45	SRT	J1
Manganese, Total	0.30		mg/L	0.0056	SW846 6010C	8/25/20 18:25	SXC	8/26/20 14:45	SRT	J1
Potassium, Total	1.2		mg/L	0.56	SW846 6010C	8/25/20 18:25	SXC	8/26/20 14:45	SRT	J1
Sodium, Total	10.7		mg/L	0.56	SW846 6010C	8/25/20 18:25	SXC	8/26/20 14:45	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	66.20		Feet		Field			8/19/20 12:08	BGS	C
Elev Top MW Casing above MSL	612.66		Feet		Field			8/19/20 12:08	BGS	C
Flow Rate	1.57		gal/min		Field			8/19/20 12:08	BGS	C
Ground Water Elevation	546.46		ft/MSL		Field			8/19/20 12:08	BGS	C
pH, Field (SM4500B)	7.78		pH_Units		Field			8/19/20 12:08	BGS	C
Sample Depth	130.00		Feet		Field			8/19/20 12:08	BGS	C
Specific Conductance, Field	325		umhos/cm	1	Field			8/19/20 12:08	BGS	C
Temperature	14.23		Deg. C		Field			8/19/20 12:08	BGS	C
Total Well Depth	142.70		Feet		Field			8/19/20 12:08	BGS	C
Volume in Water Column	112.46		Gallons		Field			8/19/20 12:08	BGS	C
Water Level After Purge	106.71		Feet		Field			8/19/20 12:08	BGS	C
Well Volumes Purged	0.98		Vol		Field			8/19/20 12:08	BGS	C



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ANALYTICAL RESULTS

Workorder: 3122419 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122419003**

Date Collected: 8/19/2020 12:52

Matrix: Ground Water

Sample ID: **FFMP002W**

Date Received: 8/19/2020 15:33

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/24/20 08:21	PDK	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			8/24/20 08:21	PDK	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/24/20 08:21	PDK	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/24/20 08:21	PDK	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/24/20 08:21	PDK	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/24/20 08:21	PDK	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/24/20 08:21	PDK	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/24/20 08:21	PDK	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/24/20 08:21	PDK	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/24/20 08:21	PDK	G
Toluene	ND		ug/L	1.0	SW846 8260B			8/24/20 08:21	PDK	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/24/20 08:21	PDK	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/24/20 08:21	PDK	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/24/20 08:21	PDK	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/24/20 08:21	PDK	G
<i>Surrogate Recoveries</i>	<i>Results</i>	<i>Flag</i>	<i>Units</i>	<i>Limits</i>	<i>Method</i>	<i>Prepared</i>	<i>By</i>	<i>Analyzed</i>	<i>By</i>	<i>Cntr</i>
1,2-Dichloroethane-d4 (S)	95.3		%	62 - 133	SW846 8260B			8/24/20 08:21	PDK	G
4-Bromofluorobenzene (S)	102		%	79 - 114	SW846 8260B			8/24/20 08:21	PDK	G
Dibromofluoromethane (S)	90.5		%	78 - 116	SW846 8260B			8/24/20 08:21	PDK	G
Toluene-d8 (S)	101		%	76 - 127	SW846 8260B			8/24/20 08:21	PDK	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	ND		mg/L	5	SM2320B-2011			8/20/20 21:39	R2B	B
Alkalinity, Total	ND	2	mg/L	5	SM2320B-2011			8/20/20 21:39	R2B	I
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/26/20 00:54	JXL	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			8/27/20 04:00	JAM	A
Chloride	16.1		mg/L	2.0	EPA 300.0			8/20/20 10:34	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			8/20/20 10:34	MBW	B
Nitrate-N	20.8	3	mg/L	0.50	EPA 300.0			8/22/20 06:33	MBW	B
pH	5.25	1	pH_Units		S4500HB-11			8/20/20 21:39	R2B	B
Phenolics	ND		mg/L	0.005	SW846 9066	8/26/20 06:53	C_D	8/26/20 10:35	VXF	F
Specific Conductance	266		umhos/cm	1	SW846 9050A			8/20/20 21:39	R2B	B
Sulfate	10.8		mg/L	2.0	EPA 300.0			8/20/20 10:34	MBW	B
Total Dissolved Solids	222		mg/L	5	S2540C-11			8/20/20 13:30	KXH	B
Total Organic Carbon (TOC)	0.53		mg/L	0.50	SW846 9060A			8/25/20 03:13	PAG	D
Turbidity	0.22		NTU	0.10	SM2130B-2011			8/20/20 07:34	R2B	B

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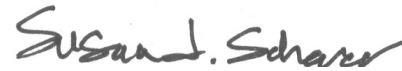
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ANALYTICAL RESULTS

Workorder: 3122419 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122419003** Date Collected: 8/19/2020 12:52 Matrix: Ground Water
 Sample ID: **FFMP002W** Date Received: 8/19/2020 15:33

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Calcium, Total	18.5		mg/L	0.11	SW846 6010C	8/25/20 18:25	SXC	8/26/20 14:49	SRT	J1
Iron, Total	ND		mg/L	0.067	SW846 6010C	8/25/20 18:25	SXC	8/26/20 14:49	SRT	J1
Magnesium, Total	7.9		mg/L	0.11	SW846 6010C	8/25/20 18:25	SXC	8/26/20 14:49	SRT	J1
Manganese, Total	0.22		mg/L	0.0056	SW846 6010C	8/25/20 18:25	SXC	8/26/20 14:49	SRT	J1
Potassium, Total	1.1		mg/L	0.56	SW846 6010C	8/25/20 18:25	SXC	8/26/20 14:49	SRT	J1
Sodium, Total	14.0		mg/L	0.56	SW846 6010C	8/25/20 18:25	SXC	8/26/20 14:49	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	64.38		Feet		Field			8/19/20 12:52	BGS	C
Elev Top MW Casing above MSL	613.20		Feet		Field			8/19/20 12:52	BGS	C
Flow Rate	1.11		gal/min		Field			8/19/20 12:52	BGS	C
Ground Water Elevation	548.82		ft/MSL		Field			8/19/20 12:52	BGS	C
pH, Field (SM4500B)	4.40		pH_Units		Field			8/19/20 12:52	BGS	C
Sample Depth	85.00		Feet		Field			8/19/20 12:52	BGS	C
Specific Conductance, Field	294		umhos/cm	1	Field			8/19/20 12:52	BGS	C
Temperature	12.56		Deg. C		Field			8/19/20 12:52	BGS	C
Total Well Depth	90.02		Feet		Field			8/19/20 12:52	BGS	C
Volume in Water Column	37.69		Gallons		Field			8/19/20 12:52	BGS	C
Water Level After Purge	76.90		Feet		Field			8/19/20 12:52	BGS	C
Well Volumes Purged	0.83		Vol		Field			8/19/20 12:52	BGS	C



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ANALYTICAL RESULTS

Workorder: 3122419 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122419004** Date Collected: 8/19/2020 14:15 Matrix: Ground Water
Sample ID: **FFMP032W** Date Received: 8/19/2020 15:33

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/24/20 08:44	PDK	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			8/24/20 08:44	PDK	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/24/20 08:44	PDK	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/24/20 08:44	PDK	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/24/20 08:44	PDK	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/24/20 08:44	PDK	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/24/20 08:44	PDK	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/24/20 08:44	PDK	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/24/20 08:44	PDK	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/24/20 08:44	PDK	G
Toluene	ND		ug/L	1.0	SW846 8260B			8/24/20 08:44	PDK	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/24/20 08:44	PDK	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/24/20 08:44	PDK	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/24/20 08:44	PDK	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/24/20 08:44	PDK	G
<i>Surrogate Recoveries</i>	<i>Results</i>	<i>Flag</i>	<i>Units</i>	<i>Limits</i>	<i>Method</i>	<i>Prepared</i>	<i>By</i>	<i>Analyzed</i>	<i>By</i>	<i>Cntr</i>
1,2-Dichloroethane-d4 (S)	95.7		%	62 - 133	SW846 8260B			8/24/20 08:44	PDK	G
4-Bromofluorobenzene (S)	105		%	79 - 114	SW846 8260B			8/24/20 08:44	PDK	G
Dibromofluoromethane (S)	93.5		%	78 - 116	SW846 8260B			8/24/20 08:44	PDK	G
Toluene-d8 (S)	102		%	76 - 127	SW846 8260B			8/24/20 08:44	PDK	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	68		mg/L	5	SM2320B-2011			8/20/20 21:39	R2B	B
Alkalinity, Total	68	2	mg/L	5	SM2320B-2011			8/20/20 21:39	R2B	I
Ammonia-N	0.737		mg/L	0.100	ASTM D6919-09			8/25/20 09:33	JXL	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			9/9/20 22:10	JAM	A
Chloride	16.9		mg/L	2.0	EPA 300.0			8/20/20 10:50	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			8/20/20 10:50	MBW	B
Nitrate-N	ND		mg/L	0.20	EPA 300.0			8/20/20 10:50	MBW	B
pH	7.48	1	pH_Units		S4500HB-11			8/20/20 21:39	R2B	B
Phenolics	ND		mg/L	0.005	SW846 9066	8/26/20 06:53	C_D	8/26/20 10:35	VXF	F
Specific Conductance	179		umhos/cm	1	SW846 9050A			8/20/20 21:39	R2B	B
Sulfate	ND		mg/L	2.0	EPA 300.0			8/20/20 10:50	MBW	B
Total Dissolved Solids	90		mg/L	5	S2540C-11			8/20/20 13:30	KXH	B
Total Organic Carbon (TOC)	ND		mg/L	0.50	SW846 9060A			8/25/20 03:13	PAG	D
Turbidity	105		NTU	0.10	SM2130B-2011			8/20/20 07:34	R2B	B

ALS Environmental Laboratory Locations Across North America

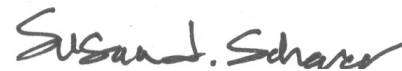
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ANALYTICAL RESULTS

Workorder: 3122419 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122419004** Date Collected: 8/19/2020 14:15 Matrix: Ground Water
 Sample ID: **FFMP032W** Date Received: 8/19/2020 15:33

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Calcium, Total	14.4		mg/L	0.11	SW846 6010C	8/25/20 18:25	SXC	8/26/20 14:52	SRT	J1
Iron, Total	9.7		mg/L	0.067	SW846 6010C	8/25/20 18:25	SXC	8/26/20 14:52	SRT	J1
Magnesium, Total	5.3		mg/L	0.11	SW846 6010C	8/25/20 18:25	SXC	8/26/20 14:52	SRT	J1
Manganese, Total	0.59		mg/L	0.0056	SW846 6010C	8/25/20 18:25	SXC	8/26/20 14:52	SRT	J1
Potassium, Total	1.3		mg/L	0.56	SW846 6010C	8/25/20 18:25	SXC	8/26/20 14:52	SRT	J1
Sodium, Total	13.6		mg/L	0.56	SW846 6010C	8/25/20 18:25	SXC	8/26/20 14:52	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	49.49		Feet		Field			8/19/20 14:15	BGS	C
Elev Top MW Casing above MSL	594.09		Feet		Field			8/19/20 14:15	BGS	C
Flow Rate	0.51		gal/min		Field			8/19/20 14:15	BGS	C
Ground Water Elevation	544.60		ft/MSL		Field			8/19/20 14:15	BGS	C
pH, Field (SM4500B)	6.68		pH_Units		Field			8/19/20 14:15	BGS	C
Sample Depth	62.00		Feet		Field			8/19/20 14:15	BGS	C
Specific Conductance, Field	220		umhos/cm	1	Field			8/19/20 14:15	BGS	C
Temperature	15.24		Deg. C		Field			8/19/20 14:15	BGS	C
Total Well Depth	77.60		Feet		Field			8/19/20 14:15	BGS	C
Volume in Water Column	41.32		Gallons		Field			8/19/20 14:15	BGS	C
Water Level After Purge	68.17		Feet		Field			8/19/20 14:15	BGS	C
Well Volumes Purged	0.45		Vol		Field			8/19/20 14:15	BGS	C



Ms. Susan J Scherer
 Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3122419 3rd QTR 2020 GWMP-FORM 19Q

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
3122419001	1	FFMP029W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3122419001	2	FFMP029W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO ₃ /L.				
3122419001	3	FFMP029W	SW846 9066	Phenolics
The QC sample type MS for method 420.4/9066 was outside the control limits for the analyte Phenolics. The % Recovery was reported as 85.7 and the control limits were 90 to 110.				
3122419002	1	FFMP031W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3122419002	2	FFMP031W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO ₃ /L.				
3122419003	1	FFMP002W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3122419003	2	FFMP002W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO ₃ /L.				
3122419003	3	FFMP002W	EPA 300.0	Nitrate-N
The sample was originally run within hold time, but required further analysis that exceeded hold time.				
3122419004	1	FFMP032W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3122419004	2	FFMP032W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO ₃ /L.				

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3122419 3rd QTR 2020 GWMP-FORM 19Q

Lab ID	Sample ID	Analysis Method	Prep Method	Leachate Method
3122419001	FFMP029W	ASTM D6919-09		
3122419001	FFMP029W	EPA 300.0		
3122419001	FFMP029W	EPA 410.4		
3122419001	FFMP029W	Field		
3122419001	FFMP029W	S2540C-11		
3122419001	FFMP029W	S4500HB-11		
3122419001	FFMP029W	SM2130B-2011		
3122419001	FFMP029W	SM2320B-2011		
3122419001	FFMP029W	SW846 6010C	SW846 3015	
3122419001	FFMP029W	SW846 8260B		
3122419001	FFMP029W	SW846 9050A		
3122419001	FFMP029W	SW846 9060A		
3122419001	FFMP029W	SW846 9066	420.4/9066	
3122419002	FFMP031W	ASTM D6919-09		
3122419002	FFMP031W	EPA 300.0		
3122419002	FFMP031W	EPA 410.4		
3122419002	FFMP031W	Field		
3122419002	FFMP031W	S2540C-11		
3122419002	FFMP031W	S4500HB-11		
3122419002	FFMP031W	SM2130B-2011		
3122419002	FFMP031W	SM2320B-2011		
3122419002	FFMP031W	SW846 6010C	SW846 3015	
3122419002	FFMP031W	SW846 8260B		
3122419002	FFMP031W	SW846 9050A		
3122419002	FFMP031W	SW846 9060A		
3122419002	FFMP031W	SW846 9066	420.4/9066	
3122419003	FFMP002W	ASTM D6919-09		
3122419003	FFMP002W	EPA 300.0		
3122419003	FFMP002W	EPA 410.4		
3122419003	FFMP002W	Field		
3122419003	FFMP002W	S2540C-11		
3122419003	FFMP002W	S4500HB-11		
3122419003	FFMP002W	SM2130B-2011		
3122419003	FFMP002W	SM2320B-2011		
3122419003	FFMP002W	SW846 6010C	SW846 3015	
3122419003	FFMP002W	SW846 8260B		
3122419003	FFMP002W	SW846 9050A		
3122419003	FFMP002W	SW846 9060A		
3122419003	FFMP002W	SW846 9066	420.4/9066	
3122419004	FFMP032W	ASTM D6919-09		
3122419004	FFMP032W	EPA 300.0		
3122419004	FFMP032W	EPA 410.4		
3122419004	FFMP032W	Field		
3122419004	FFMP032W	S2540C-11		
3122419004	FFMP032W	S4500HB-11		
3122419004	FFMP032W	SM2130B-2011		

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3122419 3rd QTR 2020 GWMP-FORM 19Q

Lab ID	Sample ID	Analysis Method	Prep Method	Leachate Method
3122419004	FFMP032W	SM2320B-2011		
3122419004	FFMP032W	SW846 6010C	SW846 3015	
3122419004	FFMP032W	SW846 8260B		
3122419004	FFMP032W	SW846 9050A		
3122419004	FFMP032W	SW846 9060A		
3122419004	FFMP032W	SW846 9066	420.4/9066	

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Generated by ALS
**CHAIN OF CUSTODY/
 REQUEST FOR ANALYSIS**
**ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT /
 SAMPLER. INSTRUCTIONS ON THE BACK.**

301 Fulfilling Mill Road • Middletown, PA 17057 • T: 717.944.5541 • F: 717.944.1430

Client Name: Lancaster County Solid Waste MA
 Address: 1299 Harrisburg Pike, P.O. Box 4424
 Lancaster, PA 17604

Contact: Dan Brown
 Phone#: (717) 735-0193

Project Name#: Frey Farm Quarterly (GWMP)

Bill To: Lancaster County Solid Waste MA

TAT Normal-Standard TAT is 10-12 business days.
 Rush-Subject to ALS approval and surcharges.

Date Required: _____ Approved By: _____

Email? Y mreider@LCSWMA.com

Fax? Y No.: (717) 397-9973

Sample Description/Location
 (as it will appear on the lab report)

Sample Date	Time
08/19/20	1031
08/19/20	1208
08/19/20	1252
08/19/20	1415

Matrix	TOC	VOC - Form 190	Field Measurements	Sample Depth for AUX Data	NH3-N, COD	Metals: Fe, Mn, Na, Ca, K, Mg	pH, Cl, Spc, F, SO4, TDS, NO3, Turb.	Alkalinity Bicarbonate
G GW	2	1	2	X	1	1	1	1
G GW	2	1	2	X	1	1	1	1
G GW	2	1	2	X	1	1	1	1
G GW	2	1	2	X	1	1	1	1

Project Comments:

LOGGED BY (signature): _____

REVIEWED BY (signature): _____

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
<i>[Signature]</i>	8/19/20	1533	<i>[Signature]</i>	9/10/20	1533
		4			
		6			
		8			
		10			

COC # _____
 1 of 1
 Receiving Lab) _____

3 1 2 2 4 1 9 *

No. of Coolers: _____ Y N Initial

Custody Seals Present? _____

(if present) Seals Intact? _____

Received on Ice? _____

COC Labels Complete/Accurate? _____

Cont. in Good Cond.? _____

Correct Containers? _____

Correct Sample Volumes? _____

Correct Preservation? _____

Headspace/Volatiles? _____

Courier/Tracking #: _____

Sample/COC Comments

ALS Field Services: Pickup Labor

Composite_Sampling Rental_Equipment

Other: _____

Standard CLP-like USACE

Special Processing USACE Navy

State Samples Collected In NY NJ PA NC

Reportable to PADEP? Yes No

Sample Disposal Lab Special

PWSID # _____

EDDS: Format Type _____

ALS ENVIRONMENTAL SHIPPING ADDRESS: 34 DOGWOOD LANE, MIDDLETOWN, PA 17057

**Matrix - AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

* G=Grab; C=Composite

Rev 8/04



Condition of Sample Receipt Form

Client: Lancaster County Solid Waste Work Order #: 2419 Initials: STC Date: 8/19/20

Were airbills / tracking numbers present and recorded?.....	<u>NONE</u>	YES	NO
Tracking number: _____			
Are Custody Seals on shipping containers intact?.....	<u>NONE</u>	YES	NO
Are Custody Seals on sample containers intact?.....	<u>NONE</u>	YES	NO
Is there a COC (Chain-of-Custody) present?.....	<u>YES</u>	YES	NO
Are the COC and bottle labels complete, legible and in agreement?.....	<u>YES</u>	YES	<u>NO</u>
5a. Does the COC contain sample locations?.....	<u>YES</u>	YES	NO
5b. Does the COC contain date and time of sample collection for all samples?.....	<u>YES</u>	YES	NO
5c. Does the COC contain sample collectors name?.....	YES	YES	<u>NO</u>
5d. Does the COC note the type(s) of preservation for all bottles?.....	<u>YES</u>	YES	NO
5e. Does the COC note the number of bottles submitted for each sample?.....	<u>YES</u>	YES	NO
5f. Does the COC note the type of sample, composite or grab?.....	<u>YES</u>	YES	NO
5g. Does the COC note the matrix of the sample(s)?.....	<u>YES</u>	YES	NO
Are all aqueous samples requiring preservation preserved correctly?.....	N/A	<u>YES</u>	NO
Were all samples placed in the proper containers for the requested analyses, with sufficient volume?.....		<u>YES</u>	NO
Are all samples within holding times for the requested analyses?.....		<u>YES</u>	NO
Were all sample containers received intact and headspace free when required? (not broken, leaking, frozen, etc.).....		<u>YES</u>	NO
0. Did we receive trip blanks (applies only for methods EPA 504, EPA 524.2 and 1631E (LL Hg)?.....	<u>N/A</u>	YES	NO
1. Were the samples received on ice?.....		<u>YES</u>	NO
2. Were sample temperatures measured at 0.0-6.0°C.....		YES	<u>NO</u>
3. Are the samples DW matrix ? If YES, fill out Reportable Drinking Water questions below.....		YES	<u>NO</u>
13a. Are the samples required for SDWA compliance reporting?.....	N/A	YES	NO
13b. Did the client provide a SDWA PWS ID#?.....	N/A	YES	NO
13c. Are all aqueous unpreserved SDWA samples pH 5-9?.....	N/A	YES	NO
13d. Did the client provide the SDWA sample location ID/Description?.....	N/A	YES	NO
13e. Did the client provide the SDWA sample type (D, E, R, C, P, S)?.....	N/A	YES	NO

Cooler #: _____
 Temperature (°C): 6.6
 Thermometer ID: 401
 Radiological (µCi): _____

COMMENTS (Required for all NO responses above and any sample non-conformance):

Final determination of correct preservation for analysis such as volatiles, microbiology, and oil and grease is made in the analytical department at the time of or following the analysis



September 1, 2020

Mr. Daniel Brown
Lancaster County Solid Waste Authority
1299 Hbg Pike, P.O. Box 4425
Lancaster, PA 17604

Certificate of Analysis

Project Name:	FREY FARM	Workorder:	3122826
Purchase Order:	PO1000126	Workorder ID:	3rd QTR 2020 GWMP-FORM 19Q

Dear Mr. Brown:

Enclosed are the analytical results for samples received by the laboratory on Thursday, August 20, 2020.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Ms. Susan J Scherer (Project Coordinator) at (717) 944-5541.

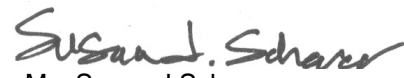
Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

This laboratory report may not be reproduced, except in full, without the written approval of ALS Environmental.

ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Ms. Ashley Gichuki , Ms. Jordan Gallagher , Mr. Jeff Musser

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.


Ms. Susan J Scherer
Project Coordinator

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SAMPLE SUMMARY

Workorder: 3122826 3rd QTR 2020 GWMP-FORM 19Q

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
3122826001	FFMP30RW	Ground Water	8/20/2020 11:57	8/20/2020 16:07	Mr. Brian G Shade
3122826002	FFMP04AW	Ground Water	8/20/2020 13:12	8/20/2020 16:07	Mr. Brian G Shade
3122826003	FFMP02SW	Ground Water	8/20/2020 13:38	8/20/2020 16:07	Mr. Brian G Shade
3122826004	FFMP02DW	Ground Water	8/20/2020 14:49	8/20/2020 16:07	Mr. Brian G Shade

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SAMPLE SUMMARY

Workorder: 3122826 3rd QTR 2020 GWMP-FORM 19Q

Notes

- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
- The Chain of Custody document is included as part of this report.
- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are performed in the laboratory and are therefore analyzed out of hold time.
- Method references listed on this report beginning with the prefix "S" followed by a method number (such as S2310B-97) refer to methods from "Standard Methods for the Examination of Water and Wastewater".
- For microbiological analyses, the "Prepared" value is the date/time into the incubator and the "Analyzed" value is the date/time out the incubator.
- An Analysis-Prep Method Cross Reference Table is included after Analytical Results & Qualifiers section in this report.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

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ANALYTICAL RESULTS

Workorder: 3122826 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122826001**
Sample ID: **FFMP30RW**

Date Collected: 8/20/2020 11:57 Matrix: Ground Water
Date Received: 8/20/2020 16:07

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/25/20 02:59	VLM	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			8/25/20 02:59	VLM	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/25/20 02:59	VLM	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/25/20 02:59	VLM	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 02:59	VLM	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 02:59	VLM	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 02:59	VLM	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/25/20 02:59	VLM	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/25/20 02:59	VLM	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 02:59	VLM	G
Toluene	ND		ug/L	1.0	SW846 8260B			8/25/20 02:59	VLM	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/25/20 02:59	VLM	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/25/20 02:59	VLM	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 02:59	VLM	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/25/20 02:59	VLM	G
<i>Surrogate Recoveries</i>	<i>Results</i>	<i>Flag</i>	<i>Units</i>	<i>Limits</i>	<i>Method</i>	<i>Prepared</i>	<i>By</i>	<i>Analyzed</i>	<i>By</i>	<i>Cntr</i>
1,2-Dichloroethane-d4 (S)	126		%	62 - 133	SW846 8260B			8/25/20 02:59	VLM	G
4-Bromofluorobenzene (S)	88.4		%	79 - 114	SW846 8260B			8/25/20 02:59	VLM	G
Dibromofluoromethane (S)	114		%	78 - 116	SW846 8260B			8/25/20 02:59	VLM	G
Toluene-d8 (S)	87.2		%	76 - 127	SW846 8260B			8/25/20 02:59	VLM	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	28		mg/L	5	SM2320B-2011			8/22/20 01:31	R2B	B
Alkalinity, Total	28	2	mg/L	5	SM2320B-2011			8/22/20 01:31	R2B	I
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/27/20 18:17	JXL	A
Chemical Oxygen Demand (COD)	61		mg/L	15	EPA 410.4			8/27/20 04:00	JAM	A
Chloride	191		mg/L	2.0	EPA 300.0			8/21/20 14:32	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			8/21/20 14:32	MBW	B
Nitrate-N	5.2		mg/L	0.20	EPA 300.0			8/21/20 14:32	MBW	B
pH	6.41	1	pH_Units		S4500HB-11			8/22/20 01:31	R2B	B
Phenolics	ND		mg/L	0.005	SW846 9066	8/26/20 06:53	C_D	8/26/20 10:35	VXF	F
Specific Conductance	802		umhos/cm	1	SW846 9050A			8/22/20 01:31	R2B	B
Sulfate	24.8		mg/L	2.0	EPA 300.0			8/21/20 14:32	MBW	B
Total Dissolved Solids	390		mg/L	5	S2540C-11			8/21/20 12:52	KXH	B
Total Organic Carbon (TOC)	0.93		mg/L	0.50	SW846 9060A			8/25/20 20:53	PAG	D
Turbidity	0.91		NTU	0.10	SM2130B-2011			8/21/20 05:14	R2B	B

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ANALYTICAL RESULTS

Workorder: 3122826 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122826001**

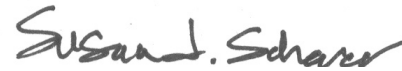
Date Collected: 8/20/2020 11:57

Matrix: Ground Water

Sample ID: **FFMP30RW**

Date Received: 8/20/2020 16:07

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Calcium, Total	37.2		mg/L	0.11	SW846 6010C	8/27/20 17:15	SXC	8/28/20 13:16	SRT	J1
Iron, Total	0.069		mg/L	0.067	SW846 6010C	8/27/20 17:15	SXC	8/28/20 13:16	SRT	J1
Magnesium, Total	16.2		mg/L	0.11	SW846 6010C	8/27/20 17:15	SXC	8/28/20 13:16	SRT	J1
Manganese, Total	2.2		mg/L	0.0056	SW846 6010C	8/27/20 17:15	SXC	8/28/20 13:16	SRT	J1
Potassium, Total	7.1		mg/L	0.56	SW846 6010C	8/27/20 17:15	SXC	8/28/20 13:16	SRT	J1
Sodium, Total	95.5		mg/L	0.56	SW846 6010C	8/27/20 17:15	SXC	8/28/20 13:16	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	36.88		Feet		Field			8/20/20 11:57	BGS	C
Elev Top MW Casing above MSL	562.30		Feet		Field			8/20/20 11:57	BGS	C
Flow Rate	1.63		gal/min		Field			8/20/20 11:57	BGS	C
Ground Water Elevation	525.42		ft/MSL		Field			8/20/20 11:57	BGS	C
pH, Field (SM4500B)	5.13		pH_Units		Field			8/20/20 11:57	BGS	C
Sample Depth	85.00		Feet		Field			8/20/20 11:57	BGS	C
Specific Conductance, Field	852		umhos/cm	1	Field			8/20/20 11:57	BGS	C
Temperature	10.36		Deg. C		Field			8/20/20 11:57	BGS	C
Total Well Depth	94.20		Feet		Field			8/20/20 11:57	BGS	C
Volume in Water Column	84.26		Gallons		Field			8/20/20 11:57	BGS	C
Water Level After Purge	54.93		Feet		Field			8/20/20 11:57	BGS	C
Well Volumes Purged	1.16		Vol		Field			8/20/20 11:57	BGS	C



Ms. Susan J Scherer

Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3122826 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122826002**

Date Collected: 8/20/2020 13:12

Matrix: Ground Water

Sample ID: **FFMP04AW**

Date Received: 8/20/2020 16:07

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/25/20 03:22	VLM	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			8/25/20 03:22	VLM	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/25/20 03:22	VLM	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/25/20 03:22	VLM	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 03:22	VLM	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 03:22	VLM	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 03:22	VLM	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/25/20 03:22	VLM	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/25/20 03:22	VLM	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 03:22	VLM	G
Toluene	ND		ug/L	1.0	SW846 8260B			8/25/20 03:22	VLM	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/25/20 03:22	VLM	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/25/20 03:22	VLM	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 03:22	VLM	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/25/20 03:22	VLM	G
<i>Surrogate Recoveries</i>	<i>Results</i>	<i>Flag</i>	<i>Units</i>	<i>Limits</i>	<i>Method</i>	<i>Prepared</i>	<i>By</i>	<i>Analyzed</i>	<i>By</i>	<i>Cntr</i>
1,2-Dichloroethane-d4 (S)	123		%	62 - 133	SW846 8260B			8/25/20 03:22	VLM	G
4-Bromofluorobenzene (S)	89.2		%	79 - 114	SW846 8260B			8/25/20 03:22	VLM	G
Dibromofluoromethane (S)	113		%	78 - 116	SW846 8260B			8/25/20 03:22	VLM	G
Toluene-d8 (S)	86.8		%	76 - 127	SW846 8260B			8/25/20 03:22	VLM	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	192		mg/L	5	SM2320B-2011			8/22/20 01:31	R2B	B
Alkalinity, Total	192	2	mg/L	5	SM2320B-2011			8/22/20 01:31	R2B	I
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/26/20 08:27	JXL	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			8/27/20 04:00	JAM	A
Chloride	300		mg/L	5.0	EPA 300.0			8/25/20 05:19	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			8/21/20 14:48	MBW	B
Nitrate-N	0.24		mg/L	0.20	EPA 300.0			8/21/20 14:48	MBW	B
pH	7.77	1	pH_Units		S4500HB-11			8/22/20 01:31	R2B	B
Phenolics	ND		mg/L	0.005	SW846 9066	8/26/20 06:53	C_D	8/26/20 10:35	VXF	F
Specific Conductance	1390		umhos/cm	1	SW846 9050A			8/22/20 01:31	R2B	B
Sulfate	45.1		mg/L	2.0	EPA 300.0			8/21/20 14:48	MBW	B
Total Dissolved Solids	830		mg/L	5	S2540C-11			8/21/20 12:52	KXH	B
Total Organic Carbon (TOC)	1.0		mg/L	0.50	SW846 9060A			8/25/20 20:53	PAG	D
Turbidity	0.46		NTU	0.10	SM2130B-2011			8/21/20 05:14	R2B	B

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ANALYTICAL RESULTS

Workorder: 3122826 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122826002** Date Collected: 8/20/2020 13:12 Matrix: Ground Water
 Sample ID: **FFMP04AW** Date Received: 8/20/2020 16:07

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Calcium, Total	34.9		mg/L	0.11	SW846 6010C	8/27/20 17:15	SXC	8/28/20 13:27	SRT	J1
Iron, Total	0.25		mg/L	0.067	SW846 6010C	8/27/20 17:15	SXC	8/28/20 13:27	SRT	J1
Magnesium, Total	10.1		mg/L	0.11	SW846 6010C	8/27/20 17:15	SXC	8/28/20 13:27	SRT	J1
Manganese, Total	0.11		mg/L	0.0056	SW846 6010C	8/27/20 17:15	SXC	8/28/20 13:27	SRT	J1
Potassium, Total	3.8		mg/L	0.56	SW846 6010C	8/27/20 17:15	SXC	8/28/20 13:27	SRT	J1
Sodium, Total	26.6		mg/L	0.56	SW846 6010C	8/27/20 17:15	SXC	8/28/20 13:27	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	35.78		Feet		Field			8/20/20 13:12	BGS	C
Elev Top MW Casing above MSL	560.72		Feet		Field			8/20/20 13:12	BGS	C
Flow Rate	1.63		gal/min		Field			8/20/20 13:12	BGS	C
Ground Water Elevation	524.94		ft/MSL		Field			8/20/20 13:12	BGS	C
pH, Field (SM4500B)	6.78		pH_Units		Field			8/20/20 13:12	BGS	C
Sample Depth	146.00		Feet		Field			8/20/20 13:12	BGS	C
Specific Conductance, Field	1472		umhos/cm	1	Field			8/20/20 13:12	BGS	C
Temperature	10.93		Deg. C		Field			8/20/20 13:12	BGS	C
Total Well Depth	148.50		Feet		Field			8/20/20 13:12	BGS	C
Volume in Water Column	165.70		Gallons		Field			8/20/20 13:12	BGS	C
Water Level After Purge	77.91		Feet		Field			8/20/20 13:12	BGS	C
Well Volumes Purged	0.59		Vol		Field			8/20/20 13:12	BGS	C



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ANALYTICAL RESULTS

Workorder: 3122826 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122826003**

Date Collected: 8/20/2020 13:38

Matrix: Ground Water

Sample ID: **FFMP02SW**

Date Received: 8/20/2020 16:07

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/25/20 03:46	VLM	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			8/25/20 03:46	VLM	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/25/20 03:46	VLM	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/25/20 03:46	VLM	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 03:46	VLM	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 03:46	VLM	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 03:46	VLM	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/25/20 03:46	VLM	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/25/20 03:46	VLM	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 03:46	VLM	G
Toluene	ND		ug/L	1.0	SW846 8260B			8/25/20 03:46	VLM	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/25/20 03:46	VLM	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/25/20 03:46	VLM	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 03:46	VLM	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/25/20 03:46	VLM	G
<i>Surrogate Recoveries</i>	<i>Results</i>	<i>Flag</i>	<i>Units</i>	<i>Limits</i>	<i>Method</i>	<i>Prepared</i>	<i>By</i>	<i>Analyzed</i>	<i>By</i>	<i>Cntr</i>
1,2-Dichloroethane-d4 (S)	126		%	62 - 133	SW846 8260B			8/25/20 03:46	VLM	G
4-Bromofluorobenzene (S)	89.6		%	79 - 114	SW846 8260B			8/25/20 03:46	VLM	G
Dibromofluoromethane (S)	115		%	78 - 116	SW846 8260B			8/25/20 03:46	VLM	G
Toluene-d8 (S)	86.4		%	76 - 127	SW846 8260B			8/25/20 03:46	VLM	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	18		mg/L	5	SM2320B-2011			8/22/20 01:31	R2B	B
Alkalinity, Total	18	2	mg/L	5	SM2320B-2011			8/22/20 01:31	R2B	I
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/27/20 18:45	JXL	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			8/27/20 04:00	JAM	A
Chloride	52.2		mg/L	2.0	EPA 300.0			8/21/20 06:41	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			8/21/20 06:41	MBW	B
Nitrate-N	10.8		mg/L	0.20	EPA 300.0			8/21/20 06:41	MBW	B
pH	6.33	1	pH_Units		S4500HB-11			8/22/20 01:31	R2B	B
Phenolics	ND		mg/L	0.005	SW846 9066	8/26/20 06:53	C_D	8/26/20 10:35	VXF	F
Specific Conductance	374		umhos/cm	1	SW846 9050A			8/22/20 01:31	R2B	B
Sulfate	25.8		mg/L	2.0	EPA 300.0			8/21/20 06:41	MBW	B
Total Dissolved Solids	152		mg/L	5	S2540C-11			8/21/20 12:52	KXH	B
Total Organic Carbon (TOC)	6.9		mg/L	0.50	SW846 9060A			8/25/20 20:53	PAG	D
Turbidity	47.6		NTU	0.10	SM2130B-2011			8/21/20 05:14	R2B	B

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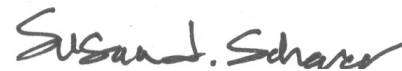
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ANALYTICAL RESULTS

Workorder: 3122826 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122826003** Date Collected: 8/20/2020 13:38 Matrix: Ground Water
Sample ID: **FFMP02SW** Date Received: 8/20/2020 16:07

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Calcium, Total	15.3		mg/L	0.11	SW846 6010C	8/27/20 17:15	SXC	8/28/20 13:34	SRT	J1
Iron, Total	1.0		mg/L	0.067	SW846 6010C	8/27/20 17:15	SXC	8/28/20 13:34	SRT	J1
Magnesium, Total	5.7		mg/L	0.11	SW846 6010C	8/27/20 17:15	SXC	8/28/20 13:34	SRT	J1
Manganese, Total	0.021		mg/L	0.0056	SW846 6010C	8/27/20 17:15	SXC	8/28/20 13:34	SRT	J1
Potassium, Total	6.1		mg/L	0.56	SW846 6010C	8/27/20 17:15	SXC	8/28/20 13:34	SRT	J1
Sodium, Total	42.6		mg/L	0.56	SW846 6010C	8/27/20 17:15	SXC	8/28/20 13:34	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	15.31		Feet		Field			8/20/20 13:38	BGS	C
Elev Top MW Casing above MSL	509.90		Feet		Field			8/20/20 13:38	BGS	C
Flow Rate	0.38		gal/min		Field			8/20/20 13:38	BGS	C
Ground Water Elevation	494.59		ft/MSL		Field			8/20/20 13:38	BGS	C
pH, Field (SM4500B)	5.44		pH_Units		Field			8/20/20 13:38	BGS	C
Sample Depth	18.00		Feet		Field			8/20/20 13:38	BGS	C
Specific Conductance, Field	426		umhos/cm	1	Field			8/20/20 13:38	BGS	C
Temperature	15.13		Deg. C		Field			8/20/20 13:38	BGS	C
Total Well Depth	22.70		Feet		Field			8/20/20 13:38	BGS	C
Volume in Water Column	4.80		Gallons		Field			8/20/20 13:38	BGS	C
Water Level After Purge	17.64		Feet		Field			8/20/20 13:38	BGS	C
Well Volumes Purged	0.48		Vol		Field			8/20/20 13:38	BGS	C



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ANALYTICAL RESULTS

Workorder: 3122826 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122826004**

Date Collected: 8/20/2020 14:49

Matrix: Ground Water

Sample ID: **FFMP02DW**

Date Received: 8/20/2020 16:07

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/25/20 04:10	VLM	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			8/25/20 04:10	VLM	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/25/20 04:10	VLM	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/25/20 04:10	VLM	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 04:10	VLM	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 04:10	VLM	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 04:10	VLM	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/25/20 04:10	VLM	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/25/20 04:10	VLM	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 04:10	VLM	G
Toluene	ND		ug/L	1.0	SW846 8260B			8/25/20 04:10	VLM	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/25/20 04:10	VLM	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/25/20 04:10	VLM	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 04:10	VLM	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/25/20 04:10	VLM	G
<i>Surrogate Recoveries</i>	<i>Results</i>	<i>Flag</i>	<i>Units</i>	<i>Limits</i>	<i>Method</i>	<i>Prepared</i>	<i>By</i>	<i>Analyzed</i>	<i>By</i>	<i>Cntr</i>
1,2-Dichloroethane-d4 (S)	120		%	62 - 133	SW846 8260B			8/25/20 04:10	VLM	G
4-Bromofluorobenzene (S)	88		%	79 - 114	SW846 8260B			8/25/20 04:10	VLM	G
Dibromofluoromethane (S)	111		%	78 - 116	SW846 8260B			8/25/20 04:10	VLM	G
Toluene-d8 (S)	86.8		%	76 - 127	SW846 8260B			8/25/20 04:10	VLM	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	109		mg/L	5	SM2320B-2011			8/22/20 01:31	R2B	B
Alkalinity, Total	109	2	mg/L	5	SM2320B-2011			8/22/20 01:31	R2B	I
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/26/20 07:59	JXL	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			8/27/20 04:00	JAM	A
Chloride	334		mg/L	5.0	EPA 300.0			8/25/20 05:35	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			8/21/20 06:57	MBW	B
Nitrate-N	7.9		mg/L	0.20	EPA 300.0			8/21/20 06:57	MBW	B
pH	8.06	1	pH_Units		S4500HB-11			8/22/20 01:31	R2B	B
Phenolics	ND		mg/L	0.005	SW846 9066	8/26/20 06:53	C_D	8/26/20 10:35	VXF	F
Specific Conductance	1390		umhos/cm	1	SW846 9050A			8/22/20 01:31	R2B	B
Sulfate	31.5		mg/L	2.0	EPA 300.0			8/21/20 06:57	MBW	B
Total Dissolved Solids	712		mg/L	5	S2540C-11			8/21/20 12:52	KXH	B
Total Organic Carbon (TOC)	0.81		mg/L	0.50	SW846 9060A			8/25/20 20:53	PAG	D
Turbidity	5.50		NTU	0.10	SM2130B-2011			8/21/20 05:14	R2B	B

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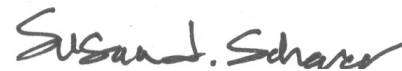
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ANALYTICAL RESULTS

Workorder: 3122826 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3122826004** Date Collected: 8/20/2020 14:49 Matrix: Ground Water
Sample ID: **FFMP02DW** Date Received: 8/20/2020 16:07

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Calcium, Total	127		mg/L	0.11	SW846 6010C	8/27/20 17:15	SXC	8/28/20 13:38	SRT	J1
Iron, Total	0.47		mg/L	0.067	SW846 6010C	8/27/20 17:15	SXC	8/28/20 13:38	SRT	J1
Magnesium, Total	20.0		mg/L	0.11	SW846 6010C	8/27/20 17:15	SXC	8/28/20 13:38	SRT	J1
Manganese, Total	0.46		mg/L	0.0056	SW846 6010C	8/27/20 17:15	SXC	8/28/20 13:38	SRT	J1
Potassium, Total	2.7		mg/L	0.56	SW846 6010C	8/27/20 17:15	SXC	8/28/20 13:38	SRT	J1
Sodium, Total	127		mg/L	0.56	SW846 6010C	8/27/20 17:15	SXC	8/28/20 13:38	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	19.93		Feet		Field			8/20/20 14:49	BGS	C
Elev Top MW Casing above MSL	509.60		Feet		Field			8/20/20 14:49	BGS	C
Flow Rate	1.62		gal/min		Field			8/20/20 14:49	BGS	C
Ground Water Elevation	489.67		ft/MSL		Field			8/20/20 14:49	BGS	C
pH, Field (SM4500B)	6.91		pH_Units		Field			8/20/20 14:49	BGS	C
Sample Depth	120.00		Feet		Field			8/20/20 14:49	BGS	C
Specific Conductance, Field	1473		umhos/cm	1	Field			8/20/20 14:49	BGS	C
Temperature	14.09		Deg. C		Field			8/20/20 14:49	BGS	C
Total Well Depth	153.00		Feet		Field			8/20/20 14:49	BGS	C
Volume in Water Column	195.61		Gallons		Field			8/20/20 14:49	BGS	C
Water Level After Purge	47.92		Feet		Field			8/20/20 14:49	BGS	C
Well Volumes Purged	0.50		Vol		Field			8/20/20 14:49	BGS	C



Ms. Susan J Scherer
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3122826 3rd QTR 2020 GWMP-FORM 19Q

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
3122826001	1	FFMP30RW	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3122826001	2	FFMP30RW	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3122826002	1	FFMP04AW	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3122826002	2	FFMP04AW	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3122826003	1	FFMP02SW	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3122826003	2	FFMP02SW	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3122826004	1	FFMP02DW	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3122826004	2	FFMP02DW	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3122826 3rd QTR 2020 GWMP-FORM 19Q

Lab ID	Sample ID	Analysis Method	Prep Method	Leachate Method
3122826001	FFMP30RW	ASTM D6919-09		
3122826001	FFMP30RW	EPA 300.0		
3122826001	FFMP30RW	EPA 410.4		
3122826001	FFMP30RW	Field		
3122826001	FFMP30RW	S2540C-11		
3122826001	FFMP30RW	S4500HB-11		
3122826001	FFMP30RW	SM2130B-2011		
3122826001	FFMP30RW	SM2320B-2011		
3122826001	FFMP30RW	SW846 6010C	SW846 3015	
3122826001	FFMP30RW	SW846 8260B		
3122826001	FFMP30RW	SW846 9050A		
3122826001	FFMP30RW	SW846 9060A		
3122826001	FFMP30RW	SW846 9066	420.4/9066	
3122826002	FFMP04AW	ASTM D6919-09		
3122826002	FFMP04AW	EPA 300.0		
3122826002	FFMP04AW	EPA 410.4		
3122826002	FFMP04AW	Field		
3122826002	FFMP04AW	S2540C-11		
3122826002	FFMP04AW	S4500HB-11		
3122826002	FFMP04AW	SM2130B-2011		
3122826002	FFMP04AW	SM2320B-2011		
3122826002	FFMP04AW	SW846 6010C	SW846 3015	
3122826002	FFMP04AW	SW846 8260B		
3122826002	FFMP04AW	SW846 9050A		
3122826002	FFMP04AW	SW846 9060A		
3122826002	FFMP04AW	SW846 9066	420.4/9066	
3122826003	FFMP02SW	ASTM D6919-09		
3122826003	FFMP02SW	EPA 300.0		
3122826003	FFMP02SW	EPA 410.4		
3122826003	FFMP02SW	Field		
3122826003	FFMP02SW	S2540C-11		
3122826003	FFMP02SW	S4500HB-11		
3122826003	FFMP02SW	SM2130B-2011		
3122826003	FFMP02SW	SM2320B-2011		
3122826003	FFMP02SW	SW846 6010C	SW846 3015	
3122826003	FFMP02SW	SW846 8260B		
3122826003	FFMP02SW	SW846 9050A		
3122826003	FFMP02SW	SW846 9060A		
3122826003	FFMP02SW	SW846 9066	420.4/9066	
3122826004	FFMP02DW	ASTM D6919-09		
3122826004	FFMP02DW	EPA 300.0		
3122826004	FFMP02DW	EPA 410.4		
3122826004	FFMP02DW	Field		
3122826004	FFMP02DW	S2540C-11		
3122826004	FFMP02DW	S4500HB-11		
3122826004	FFMP02DW	SM2130B-2011		

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3122826 3rd QTR 2020 GWMP-FORM 19Q

Lab ID	Sample ID	Analysis Method	Prep Method	Leachate Method
3122826004	FFMP02DW	SM2320B-2011		
3122826004	FFMP02DW	SW846 6010C	SW846 3015	
3122826004	FFMP02DW	SW846 8260B		
3122826004	FFMP02DW	SW846 9050A		
3122826004	FFMP02DW	SW846 9060A		
3122826004	FFMP02DW	SW846 9066	420.4/9066	

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Generated by ALS

**CHAIN OF CUSTODY/
REQUEST FOR ANALYSIS**

**ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT /
SAMPLER. INSTRUCTIONS ON THE BACK.**

301 Fulfilling Mill Road • Middletown, PA 17057 • 717.944.5541 • Fax: 717.944.1430

Client Name: Lancaster County Solid Waste MA
Address: 1299 Harnsburg Pike, P.O. Box 4424
Lancaster, PA 17604

Contact: Dan Brown
Phone#: (717) 735-0193
Project Name#: Frey Farm Quarterly (GWMP)
Bill To: Lancaster County Solid Waste MA

TAT Normal-Standard TAT is 10-12 business days.
 Rush-Subject to ALS approval and surcharges.
Date Required: _____ Approved By: _____
Email? Y mreider@LCSWMA.com
Fax? Y No.: (717) 397-9973

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	Matrix	Field Measurements	Sample Depth for AUX Data	Metals: Fe, Mn, Na, Ca, K, Mg	pH, Cl, SPC, F, SO4, TDS, NO3, Turb.	Alkalinity Bicarbonate
1. FFMP30RW	08/20/20	1157	G GW	2 1 2 X	1	1	1	1
2. FFMP04AW	08/20/20	1312	G GW	2 1 2 X	1	1	1	1
3. FFMP02SW	08/20/20	1338	G GW	2 1 2 X	1	1	1	1
4. FFMP02DW	08/20/20	1449	G GW	2 1 2 X	1	1	1	1
5								
6								
7								
8								
9								
10								



1 of 1
Receiving Lab

Cooler Temp: 5
Therm: 292
No. of Coolers: Y N Initial

Custody Seals Present?
(if present) Seals Intact?
Received on Ice?
COC(L)Labels Complete/Accurate?
Cont. In Good Cond.?
Correct Containers?
Correct Sample Volumes?
Correct Preservation?
HeadSpace/Volatiles?

Courier Tracking #: _____
Sample/COC Comments

ALS Field Services: Pickup Labor
 Composite_Sampling Rental_Equipment
 Other:

Special Processing: USACE Navy
State Samples Collected In: NY NJ PA NC
Reportable to PADEP? Yes No
Sample Disposal: Lab Special
PWSID # _____
EDDS: Format Type: _____

Deliverables	Date	Time	Received By / Company Name
1	8/20/20	1607	ALS
3			
5			
7			
9			

Project Comments: Relinquished By / Company Name
LOGGED BY (signature):
REVIEWED BY (signature):

* G=Grab; C=Composite **Matrix - AI=Air; DW=Drinking Water; GW=Groundwater; OL=Oil; Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater
ALS ENVIRONMENTAL SHIPPING ADDRESS: 34 DOGWOOD LANE, MIDDLETOWN, PA 17057





301 Fulling Mill Road
Middletown, PA 17057

P: (717) 944-5541
F: (717) 944-1430

Condition of Sample Receipt Form

Client: LCSW Work Order #: 2826 Initials: DN Date: 8/20

1. Were airbills / tracking numbers present and recorded?.....	<u>NONE</u>	YES	NO
Tracking number: _____			
2. Are Custody Seals on shipping containers intact?.....	<u>NONE</u>	YES	NO
3. Are Custody Seals on sample containers intact?.....	<u>NONE</u>	YES	NO
4. Is there a COC (Chain-of-Custody) present?.....		YES	NO
5. Are the COC and bottle labels complete, legible and in agreement?.....		YES	NO
5a. Does the COC contain sample locations?.....		YES	NO
5b. Does the COC contain date and time of sample collection for all samples?.....		YES	NO
5c. Does the COC contain sample collectors name?.....		YES	NO
5d. Does the COC note the type(s) of preservation for all bottles?.....		YES	NO
5e. Does the COC note the number of bottles submitted for each sample?.....		YES	NO
5f. Does the COC note the type of sample, composite or grab?.....		YES	NO
5g. Does the COC note the matrix of the sample(s)?.....		YES	NO
6. Are all aqueous samples requiring preservation preserved correctly? ¹	<u>N/A</u>	YES	NO
7. Were all samples placed in the proper containers for the requested analyses, with sufficient volume?.....		YES	NO
8. Are all samples within holding times for the requested analyses?.....		YES	NO
9. Were all sample containers received intact and headspace free when required? (not broken, leaking, frozen, etc.).....		YES	NO
10. Did we receive trip blanks (applies only for methods EPA 504, EPA 524.2 and 1631E (LL Hg)?.....	<u>N/A</u>	YES	NO
11. Were the samples received on ice?.....		YES	NO
12. Were sample temperatures measured at 0.0-6.0°C.....		YES	NO
13. Are the samples DW matrix ? If YES, fill out Reportable Drinking Water questions below.....		YES	<u>NO</u>
13a. Are the samples required for SDWA compliance reporting?.....	<u>N/A</u>	YES	NO
13b. Did the client provide a SDWA PWS ID#?.....	<u>N/A</u>	YES	NO
13c. Are all aqueous unpreserved SDWA samples pH 5-9?.....	<u>N/A</u>	YES	NO
13d. Did the client provide the SDWA sample location ID/Description?.....	<u>N/A</u>	YES	NO
13e. Did the client provide the SDWA sample type (D, E, R, C, P, S)?.....	<u>N/A</u>	YES	NO

Cooler #: _____
 Temperature (°C): 4
 Thermometer ID: 294
 Radiological (µCi): 8

COMMENTS (Required for all NO responses above and any sample non-conformance):

¹Final determination of correct preservation for analysis such as volatiles, microbiology, and oil and grease is made in the analytical department at the time of or following the analysis



September 9, 2020

Mr. Daniel Brown
Lancaster County Solid Waste Authority
1299 Hbg Pike, P.O. Box 4425
Lancaster, PA 17604

Certificate of Analysis

Project Name:	FREY FARM	Workorder:	3123266
Purchase Order:	PO1000126	Workorder ID:	3rd QTR 2020 GWMP-FORM 19Q

Dear Mr. Brown:

Enclosed are the analytical results for samples received by the laboratory on Friday, August 21, 2020.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Ms. Susan J Scherer (Project Coordinator) at (717) 944-5541.

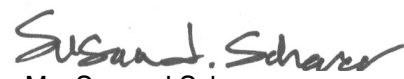
Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

This laboratory report may not be reproduced, except in full, without the written approval of ALS Environmental.

ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Ms. Ashley Gichuki , Ms. Jordan Gallagher , Mr. Jeff Musser

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.


Ms. Susan J Scherer
Project Coordinator

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SAMPLE SUMMARY

Workorder: 3123266 3rd QTR 2020 GWMP-FORM 19Q

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
3123266001	FFMP016W	Ground Water	8/21/2020 15:06	8/21/2020 17:30	Mr. Brian G Shade
3123266002	FIELD BLANK	Water	8/21/2020 15:29	8/21/2020 17:30	Mr. Brian G Shade
3123266003	TRIP BLANK	Water	8/21/2020 17:30	8/21/2020 17:30	Mr. Brian G Shade

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SAMPLE SUMMARY

Workorder: 3123266 3rd QTR 2020 GWMP-FORM 19Q

Notes

- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
- The Chain of Custody document is included as part of this report.
- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are performed in the laboratory and are therefore analyzed out of hold time.
- Method references listed on this report beginning with the prefix "S" followed by a method number (such as S2310B-97) refer to methods from "Standard Methods for the Examination of Water and Wastewater".
- For microbiological analyses, the "Prepared" value is the date/time into the incubator and the "Analyzed" value is the date/time out the incubator.
- An Analysis-Prep Method Cross Reference Table is included after Analytical Results & Qualifiers section in this report.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

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ANALYTICAL RESULTS

Workorder: 3123266 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3123266001** Date Collected: 8/21/2020 15:06 Matrix: Ground Water
Sample ID: **FFMP016W** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/26/20 04:12	PDK	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			8/26/20 04:12	PDK	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/26/20 04:12	PDK	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/26/20 04:12	PDK	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/26/20 04:12	PDK	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/26/20 04:12	PDK	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/26/20 04:12	PDK	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/26/20 04:12	PDK	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/26/20 04:12	PDK	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/26/20 04:12	PDK	G
Toluene	ND		ug/L	1.0	SW846 8260B			8/26/20 04:12	PDK	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/26/20 04:12	PDK	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/26/20 04:12	PDK	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/26/20 04:12	PDK	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/26/20 04:12	PDK	G
<i>Surrogate Recoveries</i>	<i>Results</i>	<i>Flag</i>	<i>Units</i>	<i>Limits</i>	<i>Method</i>	<i>Prepared</i>	<i>By</i>	<i>Analyzed</i>	<i>By</i>	<i>Cntr</i>
1,2-Dichloroethane-d4 (S)	93.8		%	62 - 133	SW846 8260B			8/26/20 04:12	PDK	G
4-Bromofluorobenzene (S)	104		%	79 - 114	SW846 8260B			8/26/20 04:12	PDK	G
Dibromofluoromethane (S)	93.1		%	78 - 116	SW846 8260B			8/26/20 04:12	PDK	G
Toluene-d8 (S)	100		%	76 - 127	SW846 8260B			8/26/20 04:12	PDK	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	30		mg/L	5	SM2320B-2011			8/25/20 20:33	R2B	B
Alkalinity, Total	30	2	mg/L	5	SM2320B-2011			8/25/20 20:33	R2B	I
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			9/1/20 08:01	JXL	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			8/31/20 11:50	AK	A
Chloride	129		mg/L	2.0	EPA 300.0			8/22/20 14:44	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			8/22/20 14:44	MBW	B
Nitrate-N	9.9		mg/L	0.20	EPA 300.0			8/22/20 14:44	MBW	B
pH	5.88	1	pH_Units		S4500HB-11			8/25/20 20:33	R2B	B
Phenolics	0.005		mg/L	0.005	SW846 9066	8/26/20 06:53	C_D	8/26/20 10:35	VXF	F
Specific Conductance	581		umhos/cm	1	SW846 9050A			8/25/20 20:33	R2B	B
Sulfate	30.8		mg/L	2.0	EPA 300.0			8/22/20 14:44	MBW	B
Total Dissolved Solids	432		mg/L	5	S2540C-11			8/26/20 11:06	KXH	B
Total Organic Carbon (TOC)	1.1		mg/L	0.50	SW846 9060A			8/26/20 00:58	PAG	D
Turbidity	0.12		NTU	0.10	SM2130B-2011			8/22/20 07:43	R2B	B

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ANALYTICAL RESULTS

Workorder: 3123266 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3123266001** Date Collected: 8/21/2020 15:06 Matrix: Ground Water
Sample ID: **FFMP016W** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Calcium, Total	43.6		mg/L	0.11	SW846 6010C	8/26/20 21:40	SXC	8/27/20 15:55	SRT	J1
Iron, Total	ND		mg/L	0.067	SW846 6010C	8/26/20 21:40	SXC	8/27/20 15:55	SRT	J1
Magnesium, Total	19.1		mg/L	0.11	SW846 6010C	8/26/20 21:40	SXC	8/27/20 15:55	SRT	J1
Manganese, Total	0.043		mg/L	0.0056	SW846 6010C	8/26/20 21:40	SXC	8/27/20 15:55	SRT	J1
Potassium, Total	3.7		mg/L	0.56	SW846 6010C	8/26/20 21:40	SXC	8/27/20 15:55	SRT	J1
Sodium, Total	42.4		mg/L	0.56	SW846 6010C	8/26/20 21:40	SXC	8/27/20 15:55	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	22.98		Feet		Field			8/21/20 15:06	BGS	C
Elev Top MW Casing above MSL	474.60		Feet		Field			8/21/20 15:06	BGS	C
Ground Water Elevation	451.62		ft/MSL		Field			8/21/20 15:06	BGS	C
pH, Field (SM4500B)	4.20		pH_Units		Field			8/21/20 15:06	BGS	C
Sample Depth	135.00		Feet		Field			8/21/20 15:06	BGS	C
Specific Conductance, Field	680		umhos/cm	1	Field			8/21/20 15:06	BGS	C
Temperature	10.60		Deg. C		Field			8/21/20 15:06	BGS	C
Total Well Depth	149.80		Feet		Field			8/21/20 15:06	BGS	C
Volume in Water Column	0.00		Gallons		Field			8/21/20 15:06	BGS	C


Ms. Susan J Scherer
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3123266 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3123266002** Date Collected: 8/21/2020 15:29 Matrix: Water
Sample ID: **FIELD BLANK** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/25/20 23:37	PDK	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			8/25/20 23:37	PDK	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/25/20 23:37	PDK	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/25/20 23:37	PDK	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 23:37	PDK	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 23:37	PDK	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 23:37	PDK	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/25/20 23:37	PDK	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/25/20 23:37	PDK	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 23:37	PDK	G
Toluene	ND		ug/L	1.0	SW846 8260B			8/25/20 23:37	PDK	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/25/20 23:37	PDK	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/25/20 23:37	PDK	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 23:37	PDK	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/25/20 23:37	PDK	G
<i>Surrogate Recoveries</i>	<i>Results</i>	<i>Flag</i>	<i>Units</i>	<i>Limits</i>	<i>Method</i>	<i>Prepared</i>	<i>By</i>	<i>Analyzed</i>	<i>By</i>	<i>Cntr</i>
1,2-Dichloroethane-d4 (S)	93.3		%	62 - 133	SW846 8260B			8/25/20 23:37	PDK	G
4-Bromofluorobenzene (S)	105		%	79 - 114	SW846 8260B			8/25/20 23:37	PDK	G
Dibromofluoromethane (S)	90.8		%	78 - 116	SW846 8260B			8/25/20 23:37	PDK	G
Toluene-d8 (S)	101		%	76 - 127	SW846 8260B			8/25/20 23:37	PDK	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	ND		mg/L	5	SM2320B-2011			8/25/20 20:33	R2B	B
Alkalinity, Total	ND	2	mg/L	5	SM2320B-2011			8/25/20 20:33	R2B	I
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/29/20 02:33	JXL	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			8/31/20 11:50	AK	A
Chloride	ND		mg/L	1.0	EPA 300.0			8/22/20 14:29	MBW	B
Fluoride	ND		mg/L	0.10	EPA 300.0			8/22/20 14:29	MBW	B
Nitrate-N	ND		mg/L	0.10	EPA 300.0			8/22/20 14:29	MBW	B
pH	5.56	1	pH_Units		S4500HB-11			8/25/20 20:33	R2B	B
Phenolics	ND		mg/L	0.005	SW846 9066	9/1/20 19:30	VXF	9/2/20 17:05	C_D	F
Specific Conductance	2		umhos/cm	1	SW846 9050A			8/25/20 20:33	R2B	B
Sulfate	ND		mg/L	1.0	EPA 300.0			8/22/20 14:29	MBW	B
Total Dissolved Solids	13		mg/L	5	S2540C-11			8/26/20 11:06	KXH	B
Total Organic Carbon (TOC)	ND		mg/L	0.50	SW846 9060A			8/26/20 00:58	PAG	D
Turbidity	0.24		NTU	0.10	SM2130B-2011			8/22/20 07:43	R2B	B

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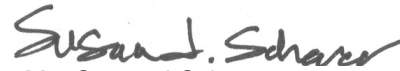
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ANALYTICAL RESULTS

Workorder: 3123266 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3123266002** Date Collected: 8/21/2020 15:29 Matrix: Water
 Sample ID: **FIELD BLANK** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Calcium, Total	0.24		mg/L	0.11	SW846 6010C	8/26/20 21:40	SXC	8/27/20 16:08	SRT	J1
Iron, Total	ND		mg/L	0.067	SW846 6010C	8/26/20 21:40	SXC	8/27/20 16:08	SRT	J1
Magnesium, Total	ND		mg/L	0.11	SW846 6010C	8/26/20 21:40	SXC	8/27/20 16:08	SRT	J1
Manganese, Total	ND		mg/L	0.0056	SW846 6010C	8/26/20 21:40	SXC	8/27/20 16:08	SRT	J1
Potassium, Total	ND		mg/L	0.56	SW846 6010C	8/26/20 21:40	SXC	8/27/20 16:08	SRT	J1
Sodium, Total	ND		mg/L	0.56	SW846 6010C	8/26/20 21:40	SXC	8/27/20 16:08	SRT	J1



Ms. Susan J Scherer
 Project Coordinator

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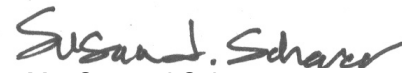
ANALYTICAL RESULTS

Workorder: 3123266 3rd QTR 2020 GWMP-FORM 19Q

Lab ID: **3123266003**
Sample ID: **TRIP BLANK**

Date Collected: 8/21/2020 17:30 Matrix: Water
Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/25/20 23:14	PDK	A
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			8/25/20 23:14	PDK	A
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/25/20 23:14	PDK	A
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/25/20 23:14	PDK	A
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 23:14	PDK	A
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 23:14	PDK	A
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 23:14	PDK	A
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/25/20 23:14	PDK	A
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/25/20 23:14	PDK	A
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 23:14	PDK	A
Toluene	ND		ug/L	1.0	SW846 8260B			8/25/20 23:14	PDK	A
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/25/20 23:14	PDK	A
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/25/20 23:14	PDK	A
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/25/20 23:14	PDK	A
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/25/20 23:14	PDK	A
<i>Surrogate Recoveries</i>	<i>Results</i>	<i>Flag</i>	<i>Units</i>	<i>Limits</i>	<i>Method</i>	<i>Prepared</i>	<i>By</i>	<i>Analyzed</i>	<i>By</i>	<i>Cntr</i>
1,2-Dichloroethane-d4 (S)	91.9		%	62 - 133	SW846 8260B			8/25/20 23:14	PDK	A
4-Bromofluorobenzene (S)	104		%	79 - 114	SW846 8260B			8/25/20 23:14	PDK	A
Dibromofluoromethane (S)	88.7		%	78 - 116	SW846 8260B			8/25/20 23:14	PDK	A
Toluene-d8 (S)	99.2		%	76 - 127	SW846 8260B			8/25/20 23:14	PDK	A



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ANALYTICAL RESULTS

Workorder: 3123266 3rd QTR 2020 GWMP-FORM 19Q

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
3123266001	1	FFMP016W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3123266001	2	FFMP016W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3123266002	1	FIELD BLANK	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3123266002	2	FIELD BLANK	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3123266 3rd QTR 2020 GWMP-FORM 19Q

Lab ID	Sample ID	Analysis Method	Prep Method	Leachate Method
3123266001	FFMP016W	ASTM D6919-09		
3123266001	FFMP016W	EPA 300.0		
3123266001	FFMP016W	EPA 410.4		
3123266001	FFMP016W	Field		
3123266001	FFMP016W	S2540C-11		
3123266001	FFMP016W	S4500HB-11		
3123266001	FFMP016W	SM2130B-2011		
3123266001	FFMP016W	SM2320B-2011		
3123266001	FFMP016W	SW846 6010C	SW846 3015	
3123266001	FFMP016W	SW846 8260B		
3123266001	FFMP016W	SW846 9050A		
3123266001	FFMP016W	SW846 9060A		
3123266001	FFMP016W	SW846 9066	420.4/9066	
3123266002	FIELD BLANK	ASTM D6919-09		
3123266002	FIELD BLANK	EPA 300.0		
3123266002	FIELD BLANK	EPA 410.4		
3123266002	FIELD BLANK	S2540C-11		
3123266002	FIELD BLANK	S4500HB-11		
3123266002	FIELD BLANK	SM2130B-2011		
3123266002	FIELD BLANK	SM2320B-2011		
3123266002	FIELD BLANK	SW846 6010C	SW846 3015	
3123266002	FIELD BLANK	SW846 8260B		
3123266002	FIELD BLANK	SW846 9050A		
3123266002	FIELD BLANK	SW846 9060A		
3123266002	FIELD BLANK	SW846 9066	420.4/9066	
3123266003	TRIP BLANK	SW846 8260B		

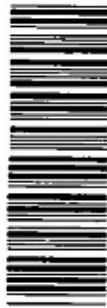
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**CHAIN OF CUSTODY/
 REQUEST FOR ANALYSIS**
**ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT /
 SAMPLER. INSTRUCTIONS ON THE BACK.**

1 of 1



* 3 1 2 3 2 6 6 *

3013 Fulling Mill Road • Middletown, PA 17057 • 717.944.5541 • Fax: 717.944.1430

Client Name: Lancaster County Solid Waste MA
 Address: 1299 Harrisburg Pike, P.O. Box 4424
 Lancaster, PA 17604

Contact: Dan Brown
 Phone#: (717) 735-0193
 Project Name/#: Frey Farm Quarterly (GWMP)
 Bill To: Lancaster County Solid Waste MA

TAT Normal-Standard TAT is 10-12 business days.
 Rush-Subject to ALS approval and surcharges.

Date Required: _____ Approved By: _____
 Email? Y N Email: mreider@LCSWMA.com
 Fax? Y N No.: (717) 397-9973

Container Type	AG	AW	CG	PL	PL	PL	PL	PL	PL
Container	40 ml	125 ml	40 ml	250 ml	125 ml	500 ml	500 ml	500 ml	500 ml
Preservable Site	HCl	H2SO4	HCl	H2SO4	HNO3	None	None	None	None

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	Matrix	TOC	O-H	VOC - Form 190	Field Measurements	Sample Depth for AUX Data	NH3-N, COD	Metals: Fe, Mn, Na, Ca, K, Mg	pH, Cl, SPC, F, SO4, TDS, NO3, Turb.	Alkalinity Bicarbonate
1. FFMP016W	08/21/20	1506	G GW	2	1	2	X	X	1	1	1	1
2. FIELD BLANK	08/21/20	1529	G GW	2	1	2			1	1	1	1
3. TRIP BLANK	08/21/20	1700	G GW	2		2						
4												
5												
6												
7												
8												
9												
10												

Project Comments:

Relinquished By / Company Name: *[Signature]*

Received By / Company Name: *[Signature]*

Date: 8/20/20 2
 Date: 8/21/20 1730

LOGGED BY (signature): _____
 REVIEWED BY (signature): _____

ALS Field Services: Pickup Labor
 Composite_Sampling Rental_Equipment
 Other:

Special Processing: USACE Navy
 State Samples Collected In: NY NJ PA NC

Reportable to PADEP? Yes No
 Sample Disposal: Lab Special
 PWSID # _____
 EDDS: Format Type: _____

ALS ENVIRONMENTAL SHIPPING ADDRESS: 34 DOGWOOD LANE, MIDDLETOWN, PA 17057





301 Fulling Mill Road
Middletown, PA 17057

P: (717) 944-5541

F: (717) 944-1430

Condition of Sample Receipt Form

Client: LCSWMA Work Order #: 3123266 Initials: DN Date: 8/21

- | | | | |
|--|---------------------------------------|--------------------------------------|-------------------------------------|
| 1. Were airbills / tracking numbers present and recorded?..... | <input checked="" type="radio"/> NONE | YES | NO |
| Tracking number: _____ | | | |
| 2. Are Custody Seals on shipping containers intact?..... | <input checked="" type="radio"/> NONE | YES | NO |
| 3. Are Custody Seals on sample containers intact?..... | <input checked="" type="radio"/> NONE | YES | NO |
| 4. Is there a COC (Chain-of-Custody) present?..... | | <input checked="" type="radio"/> YES | NO |
| 5. Are the COC and bottle labels complete, legible and in agreement?..... | | <input checked="" type="radio"/> YES | NO |
| 5a. Does the COC contain sample locations?..... | | <input checked="" type="radio"/> YES | NO |
| 5b. Does the COC contain date and time of sample collection for all samples?..... | | <input checked="" type="radio"/> YES | NO |
| 5c. Does the COC contain sample collectors name?..... | | <input checked="" type="radio"/> YES | NO |
| 5d. Does the COC note the type(s) of preservation for all bottles?..... | | <input checked="" type="radio"/> YES | NO |
| 5e. Does the COC note the number of bottles submitted for each sample?..... | | <input checked="" type="radio"/> YES | NO |
| 5f. Does the COC note the type of sample, composite or grab?..... | | <input checked="" type="radio"/> YES | NO |
| 5g. Does the COC note the matrix of the sample(s)?..... | | <input checked="" type="radio"/> YES | NO |
| 6. Are all aqueous samples requiring preservation preserved correctly? ¹ | N/A | <input checked="" type="radio"/> YES | NO |
| 7. Were all samples placed in the proper containers for the requested analyses, with sufficient volume?..... | | <input checked="" type="radio"/> YES | NO |
| 8. Are all samples within holding times for the requested analyses?..... | | <input checked="" type="radio"/> YES | NO |
| 9. Were all sample containers received intact and headspace free when required? (not broken, leaking, frozen, etc.)..... | | <input checked="" type="radio"/> YES | NO |
| 10. Did we receive trip blanks (applies only for methods EPA 504, EPA 524.2 and 1631E (LL Hg)?..... | N/A | <input checked="" type="radio"/> YES | <input checked="" type="radio"/> NO |
| 11. Were the samples received on ice?..... | | <input checked="" type="radio"/> YES | NO |
| 12. Were sample temperatures measured at 0.0-6.0°C..... | | <input checked="" type="radio"/> YES | <input checked="" type="radio"/> NO |
| <u>Temp > 60</u> | | | |
| 13. Are the samples DW matrix ? If YES, fill out Reportable Drinking Water questions below..... | | <input checked="" type="radio"/> YES | <input checked="" type="radio"/> NO |
| 13a. Are the samples required for SDWA compliance reporting?..... | N/A | YES | <input checked="" type="radio"/> NO |
| 13b. Did the client provide a SDWA PWS ID#?..... | N/A | YES | NO |
| 13c. Are all aqueous unpreserved SDWA samples pH 5-9?..... | N/A | YES | NO |
| 13d. Did the client provide the SDWA sample location ID/Description?..... | N/A | YES | NO |
| 13e. Did the client provide the SDWA sample type (D, E, R, C, P, S)?..... | N/A | YES | NO |

Cooler #: _____
 Temperature (°C): 9
 Thermometer ID: 294
 Radiological (µCi): _____

COMMENTS (Required for all NO responses above and any sample non-conformance):

¹Final determination of correct preservation for analysis such as volatiles, microbiology, and oil and grease is made in the analytical department at the time of or following the analysis

