

August 21, 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: Creswell Landfill (BWM Permit #100008)
Groundwater Monitoring; 2nd Quarter 2020

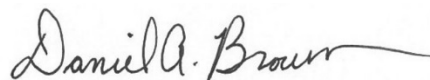
Dear Ms. Kinkaid:

Enclosed are the Form 19 reports for the sampling period completed at the above referenced facility. The laboratory results were provided to ARM Group on June 1, 2020 and were reviewed by ARM Group to evaluate the quality of the data and historic trends.

- This sampling event was for the “Annual” Form 19 parameters, all the thirteen (13) GWMP locations were sampled.
- Enclosed, on CD, is a data export .csv file that should be in the format compatible with your LandLinks software. Additionally, the CD includes a PDF file of all the Forms 19 and PDF files of the laboratory reports.

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

cc: LCSWMA: Environmental

ARM Group: Scott Wendling, Ryan Brandon, Jeremy Fleming

PA DEP: Randy Weiss



ARM Group LLC

Engineers and Scientists

August 19, 2020

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

Re: LCSWMA Creswell Landfill
Permit No. 100008
Manor Township, Lancaster County, Pennsylvania
Second Quarter 2020 Water Quality Data Review
ARM Project 190848

Dear Mr. Brown:

ARM Group LLC (ARM) has prepared this assessment at the request of the Lancaster County Solid Waste Management Authority (LCSWMA) to provide an evaluation of the Second Quarter 2020 water quality monitoring results for Creswell Landfill (CWLF). As part of this evaluation, ARM reviewed the historic and Second Quarter 2020 laboratory analytical results for the sampled upgradient and downgradient Form 19 groundwater monitoring wells and surface water monitoring points.

The groundwater and surface water samples collected by LCSWMA during the Second Quarter 2020 were analyzed for quarterly and annual Form 19 parameters. The following narrative provides a summary of noteworthy observations of the results for the Second Quarter 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 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, CWMP001W, using laboratory analytical results from the Fourth Quarter 1987 through the most recent quarter (Second 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 Rosner's Test 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-1. ARM identified 82 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 Second 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-1 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 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 Second 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. In these cases, ARM substituted the laboratory reporting detection limit for the statistical background standard.x

It should be noted that this sampling event includes Form 19 annual and Subtitle D parameters. The majority of the Form 19 annual and Subtitle D parameters have background populations less than 8 because of a historical lack of detections in MP-1.

The attached **Table 1** summarizes the background exceedances in the downgradient wells during the Second Quarter 2020. Background exceedances shown in **Table 1** denote a statistically significant increase of concentrations relative to those observed historically in the upgradient well MP-1. 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 Well Summary

- **MP-1** – Parameters above background in this well include total magnesium, total sodium, and total dissolved solids (TDS). Nickel was also detected in the Subtitle D parameter analysis but appears to be stable over time. Sodium levels appear to be slowly increasing over time, potentially because of road salt runoff from River Road. Magnesium and TDS concentrations appear to be generally stable over time. pH fluctuates over a range of approximately 1.97 units and appears to be trending slightly higher over time. All other Form 19 analytical parameters appear to be stable and within historical concentration ranges.
- **MP-2** – 1,1-dichloroethane, chloroethane, 1,4-dichlorobenzene, cobalt, and nickel were detected during this event, and are, therefore, above background levels.

Other parameters above background in MP-2 include alkalinity (bicarbonate and total), calcium (total and dissolved), chloride, magnesium (total and dissolved), manganese (total and dissolved), total potassium, sodium (total and dissolved), sulfate, specific conductance (SpC), sulfate, TDS, and total organic carbon (TOC). The majority of these parameters appear to be slowly increasing overtime with exception of the following:

- Chloride, sulfate, 1,1-dichloroethane, and chloroethane appear to be decreasing with respect to their historical maximum concentrations detected during earlier sampling events.
 - Concentrations of dissolved manganese, total potassium and total sodium appear to be generally stable.
 - pH appears to mimic the trend observed in the upgradient well at levels approximately 0.42 unit higher, on average, while fluctuating over a slightly wider range.
- **MP-3** – 1,1-dichloroethane, dissolved chromium, and nickel were detected during this event, and are, therefore, above background levels. 1,1-dichloroethane concentrations appear to be decreasing over time, apart from an apparently isolated elevated detection in 2018. Dissolved chromium and nickel do not appear to be increasing over time based on the limited number of observations of these parameters in the sampling record.

Other parameters above background in MP-3 include ammonia-N, alkalinity (bicarbonate and total), ammonia-N, calcium (total and dissolved), chemical oxygen demand (COD), chloride, sodium (total and dissolved), SpC, sulfate, and TDS.

Concentrations of alkalinity (bicarbonate and total), chloride, sodium, SpC, and TDS appear to be increasing over time with short-term fluctuations observed. The remaining parameters with noted exceedances generally appear to be stable. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.27 unit higher, on average.

- **MP-4** – Parameters above background in MP-4 include ammonia-N, alkalinity (bicarbonate and total), chemical oxygen demand (COD), chloride, and sulfate. Concentrations of alkalinity (bicarbonate and total) and chloride appear to be increasing slowly long-term with



short-term fluctuations. The remaining parameters with noted exceedances generally appear to be stable. pH appears to be trending slightly lower over time with a long-term average value approximately 0.59 unit higher than background.

- MP-5 – Nickel was detected during this event, and is, therefore, above background levels. However, the concentration does not appear to be increasing over time. Other parameters above background in this well include alkalinity (bicarbonate and total), chloride, sodium (total and dissolved), sulfate, and TDS. Concentrations of chloride and sodium (total and dissolved) generally appear to be increasing over time with short-term fluctuations. The remaining parameters with noted exceedances generally appear to be stable. pH appears to be stable over time with a long-term average value approximately 0.23 unit higher than background.
- MP-7 – Parameters above background in this well include alkalinity (bicarbonate and total), chloride, sodium (total and dissolved), SpC, sulfate, and TDS. All parameters generally appear to be increasing over time with short-term fluctuations. pH appears to closely mimic the trend observed in the upgradient well at levels approximately 0.19 unit higher, on average.
- MP-8 – Benzene, cobalt, nickel, chlorobenzene, chloroethane, 1,1-dichloroethane, 1,2-dichlorobenzene, and 1,4-dichlorobenzene, were detected in during this event, and are, therefore, above background levels. Other parameters above background in MP-8 include alkalinity (bicarbonate and total), ammonia-N, total barium, calcium (total and dissolved), iron (total and dissolved), total magnesium, manganese (total and dissolved), total potassium, total sodium, SpC, sulfate, TDS, and TOC.

Manganese (total and dissolved) levels appear to be slowly increasing over time. Concentrations of the other noted parameters generally appear to be steady long-term with minor fluctuations. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.74 unit higher, on average, while fluctuating over a slightly narrower range.

- MP-9 – Benzene, arsenic (total and dissolved), chlorobenzene, chloroethane, 1,1-dichloroethane, 1,2-dichlorobenzene, 1,4-dichlorobenzene, acetone, cobalt, and nickel were detected during this event, and are, therefore, above background levels.

Other parameters above background in MP-9 include alkalinity (bicarbonate and total), ammonia-N, barium (total and dissolved), calcium (total and dissolved), chloride, COD, iron (total and dissolved), magnesium (total and dissolved), manganese (total and dissolved), potassium (total and dissolved), sodium (total and dissolved), SpC, sulfate, TDS, and TOC. Calcium (total and dissolved), magnesium (total and dissolved), manganese (total and dissolved), potassium (total and dissolved), SpC, and TDS levels appear to be slowly increasing over time. Concentrations of the other noted parameters generally appear to be steady long-term with minor fluctuations. pH appears to be trending slightly lower over time with a long-term average value approximately 0.9 unit higher than background.



- MP-10 – Chromium (total and dissolved), total copper, and nickel were detected during this event, and are, therefore, above background levels.

Other parameters above background in MP-10 include alkalinity (bicarbonate and total), calcium (total and dissolved), chloride, magnesium (total and dissolved), total manganese, potassium (total and dissolved), sodium (total and dissolved), SpC, sulfate, TDS, and TOC. Concentrations of alkalinity (bicarbonate and total), chloride, magnesium, sodium, SpC, and sulfate generally appear to be stable with slight increasing trends and fluctuations correlating to seasonal changes. Calcium and TDS concentrations have generally remained stable over time while potassium and TOC concentrations continue to decrease over time. Fluctuations correlating to seasonal changes are apparent for these parameters. pH appears to mimic the trend observed in the upgradient well at levels approximately 1.25 units higher, on average.

- MP-12 – Total arsenic and nickel were detected during this event, and are, therefore, above background levels.

Other parameters above background in MP-12 include alkalinity (bicarbonate and total), calcium (total and dissolved), chloride, total iron, total manganese, SpC, sulfate, and TOC. Concentrations of chloride, iron, TOC, and turbidity appear to be stable to increasing over time, with iron displaying the widest range of fluctuations. Turbidity fluctuations appear to be seasonal. Concentrations of the other noted parameters generally appear to be stable long-term and are decreasing. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.66 units higher, on average.

- MP-16 – Cobalt was detected during this event, and is, therefore, above background levels.

Sulfate was detected above background in this well. However, sulfate concentrations appear to be stable long-term. pH appears to be stable over time with a long-term average value approximately 0.69 unit higher than background.

- MP-17S – Surface-water grab samples are taken from Mann’s Run at this location and analyzed for Form 19 parameters. Because of its upstream location relative to the majority of CWLF, this sampling point should be interpreted, to some extent, as a background evaluation point for evaluating downstream conditions in Mann’s Run (i.e., at MP-18S).

Nickel was detected during this event, and is, therefore, above background levels. Other parameters above statistical groundwater background levels at MP-17S include alkalinity (bicarbonate and total), calcium (total and dissolved), chloride, magnesium (total and dissolved), dissolved manganese, nitrate-N, potassium (total and dissolved), sodium (total and dissolved), SpC, sulfate, TDS, and TOC. The following parameters appear to be generally stable to decreasing over time; dissolved manganese, nitrate-N, potassium (total and dissolved), sodium (total and dissolved). Concentrations of the other noted parameters show a wide range of fluctuation in the historical results and appear to demonstrate slightly increasing trends. Nitrate-nitrogen and magnesium concentration fluctuations appear to be seasonal. pH appears to mimic the trend observed in the upgradient well at levels approximately 1.99 units higher, on average, while fluctuating over a slightly wider range.



- MP-18S – Surface-water grab samples are taken from Mann’s Run at this downstream location and analyzed for Form 19 parameters. Nickel was detected during this event, and is, therefore, above background levels. Other parameters above statistical groundwater background levels at MP-18S include alkalinity (bicarbonate and total), ammonia-N, calcium (total and dissolved), chloride, COD, magnesium (total and dissolved), potassium (total and dissolved), sodium (total and dissolved), SpC, sulfate, TDS, and TOC. Calcium (total and dissolved), potassium (total and dissolved), and COD levels appear to be decreasing over time. Ammonia-N, sulfate, and TOC levels appear to be generally stable long-term. Concentrations of the remaining parameters appear to be increasing over time. pH appears to mimic the trend observed in the upgradient well at levels approximately 2.57 units higher, on average.

Trend plots for the VOCs noted above (1,1-dichloroethane, benzene, chlorobenzene, chloroethane, 1,2-dichlorobenzene, and 1,4-dichlorobenzene) are included in **Attachment 3**. Parameters not noted above are either at or below background levels. Overall, the groundwater quality at CWLF appears to be improving, especially with respect to VOC concentrations. Some metal and ion concentrations (e.g., calcium, sodium, and chloride) appear to be increasing slowly in some wells over time, but these water quality changes are generally gradual and do not appear to be a cause for concern at this time.

Trip and Field Blank Analyses

No trip blank or field blank sample results were reported during the Second Quarter 2020 sampling event.



Closing

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

Sincerely,
ARM Group LLC



Jeremy Fleming
Project Geologist II



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

Enclosed: Table 1
Attachments 1-3



TABLE



Table 1. LCSWMA Creswell Landfill Form 19 Groundwater Monitoring Well Background Standard Comparisons - 2nd Quarter 2020

Parameter	Background Standard	Units	CWMP001W	CWMP002W	CWMP003W	CWMP004W	CWMP005W	CWMP007W	CWMP008W	CWMP009W	CWMP010W	CWMP012W	CWMP016W	CWMP017S	CWMP018S
<i>Quarterly Analytes</i>															
AMMONIA-NITROGEN	0.12	µg/L	<0.1	<0.1	0.48	0.31	<0.1	<0.1	4.89	22.1	<0.1	<0.1	<0.1	<0.1	<0.1
BICARBONATE	8.0	µg/L	7	89	34	29	23	23	365	515	147	89	6	590	395
CALCIUM, TOTAL	20.1	µg/L	15.1	52.5	23.2	20	16.4	17.3	61.2	140	24.9	30.4	4.8	79.3	67.4
CALCIUM, DISSOLVED	19.2	µg/L	14.1	51.5	22	18.8	14.9	16	25.3	144	26.1	31	4.8	72.8	63.4
COD (CHEMICAL OXYGEN DEMAND)	12.68*	µg/L	<15	<15	<15	<15	<15	<15	24	99	<15	<15	<15	<15	22
CHLORIDE	32.6	mg/L	27.7	107	60.6	42	71.3	62.3	31.8	491	109	34.5	2.4	619	401
FLUORIDE	0.20*	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5
IRON, TOTAL	3.74	µg/L	1.1	0.17	<0.05	<0.05	0.06	<0.05	27.4	37.2	0.39	80.1	0.11	0.29	0.25
IRON, DISSOLVED	0.13	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.64	35.4	0.06	<0.05	<0.05	0.12	<0.05
MAGNESIUM, TOTAL	12.49	mg/L	12.5	19.1	8.2	6.6	9.8	10	27.6	71.5	21.9	8.4	1.1	116	74.8
MAGNESIUM, DISSOLVED	12.42	mg/L	10.8	16.5	8	6.4	9.3	9.5	6.7	70.4	22.1	8.6	1.1	111	72.5
MANGANESE, TOTAL	0.126	µg/L	0.06	1.1	<0.0056	0.0083	0.07	0.0065	14.5	10.9	0.21	0.25	0.0076	0.09	<0.0056
MANGANESE, DISSOLVED	0.127	mg/L	0.04	1.1	<0.0056	0.009	0.06	0.006	0.06	11.3	0.02	0.11	0.0091	0.07	<0.0056
NITRATE-NITROGEN	23.56	µg/L	19.4	3.3	6.9	5.7	8.7	9.3	<0.2	<0.2	4.7	8.2	0.64	24.8	18.6
pH-FIELD	None***	mg/L	5.01	5.47	5.32	5.65	4.75	5.19	6.08	6.10	6.26	5.77	5.25	7.90	7.93
pH-LAB	None***	mg/L	6.18	6.02	6.33	6.74	6.42	6.32	6.86	7.19	7.77	6.76	6.62	8.46	8.75
POTASSIUM, TOTAL	2.88	mg/L	2.6	3.1	1.6	1.4	2.6	2.2	7.7	30.5	4.5	1.3	0.42	16.2	15.4
POTASSIUM, DISSOLVED	3.06	mg/L	2.3	2.7	1.5	1.3	2.4	2.2	2.1	30.8	4.7	1.4	0.41	15.9	15.0
SODIUM, TOTAL	15.61	µg/L	15.8	30.4	20.7	15.4	37.3	35.9	32.3	156	81	12.4	2.9	452	282
SODIUM, DISSOLVED	15.12	mg/L	13.4	28.3	20.5	14.9	34.4	33.3	10.5	156	81.8	12.7	2.9	448	279
SPEC. COND., FIELD	328	mg/L	287	618	363	292	373	379	836	2635	767	346	65	3369	2310
SPEC. COND., LAB	299	mg/L	265	574	342	263	358	355	723	2280	688	323	53	3190	2210
SULFATE	2.87	µmho/cm	2	21	5	5	5	21	7	6	25	5	11	63	35
ALKALINITY	7.0	µmho/cm	7	89	34	29	23	23	365	515	147	89	6	590	395
TDS (TOTAL DISSOLVED SOLIDS)	260	mg/L	276	356	244	198	302	310	458	1370	356	212	<25	1850	1220
TOC (TOTAL ORGANIC CARBON)	1.13	µg/L	<0.5	5	1	1	<0.5	<0.5	8	34	3	2	1	6	8
TOTAL PHENOLICS	0.005*	µg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
TURBIDITY	177	mg/L	14.7	0.14	0.15	<0.1	0.42	0.11	12.5	63.6	1.05	94.8	0.68	1.91	0.54
BENZENE	1*	µg/L	<1	<1	<1	<1	<1	<1	1.8	2.1	<1	<1	<1	<1	<1
1,2-DIBROMOETHANE (EDB) (ETHYLENE DIBROMIDE)	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-DICHLOROETHANE	1.0*	µg/L	<1	13.4	1.1	<1	<1	<1	3.2	1.7	<1	<1	<1	<1	<1
1,1-DICHLOROETHENE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-DICHLOROETHANE	1*	NTU	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
cis 1,2-DICHLOROETHENE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
trans 1,2-DICHLOROETHENE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
ETHYLBENZENE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
METHYLENE CHLORIDE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
TETRACHLOROETHENE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
TOLUENE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,1-TRICHLOROETHANE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
TRICHLOROETHENE	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
VINYL CHLORIDE	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
XYLENES (TOTAL)	3*	µg/L	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3

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.

Table 1. LCSWMA Creswell Landfill Form 19 Groundwater Monitoring Well Background Standard Comparisons - 2nd Quarter 2020

Parameter	Background Standard	Units	CWMP001W	CWMP002W	CWMP003W	CWMP004W	CWMP005W	CWMP007W	CWMP008W	CWMP009W	CWMP010W	CWMP012W	CWMP016W	CWMP017S	CWMP018S
<i>Annual Analytes</i>															
ARSENIC, TOTAL	0.0033*	mg/L	<0.0033	<0.0033	<0.0033	<0.0033	<0.0033	<0.0033	<0.0033	0.0036	<0.0033	0.0057	<0.0033	<0.0033	<0.0033
ARSENIC, DISSOLVED	0.0030*	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0036	<0.003	<0.003	<0.003	<0.003	<0.003
BARIUM, TOTAL	0.17	mg/L	0.070	0.050	0.010	0.020	0.050	0.040	0.13	0.73	0.03	0.09	0.01	0.02	0.03
BARIUM, DISSOLVED	0.19	mg/L	0.070	0.050	0.010	0.020	0.050	0.040	0.030	0.74	0.02	0.08	0.0091	0.02	0.03
CADMIUM, TOTAL	0.0011*	mg/L	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011
CADMIUM, DISSOLVED	0.0011*	mg/L	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011
CHROMIUM, TOTAL	0.0022*	mg/L	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	0.010	<0.0022	<0.0022	<0.0022	<0.0022
CHROMIUM, DISSOLVED	0.0022*	mg/L	<0.0022	<0.0022	0.0066	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	0.0067	<0.0022	<0.0022	<0.0022	<0.0022
COPPER, TOTAL	0.0056*	mg/L	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	0.0068	<0.0056	<0.0056	<0.0056	<0.0056
COPPER, DISSOLVED	0.0056*	mg/L	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056
LEAD-FLAMELESS, TOTAL	0.027	mg/L	0.003	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022
LEAD, DISSOLVED	0.0022*	mg/L	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022
MERCURY, TOTAL	0.0005*	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MERCURY, DISSOLVED	0.0005*	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
SELENIUM, TOTAL	0.0056*	µmho/cm	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056
SELENIUM, DISSOLVED	0.0056*	µmho/cm	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056
SILVER, TOTAL	0.0022*	mg/L	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022
SILVER, DISSOLVED	0.0022*	mg/L	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022
ZINC, TOTAL	0.103	mg/L	0.020	0.0080	0.0073	<0.0056	0.010	0.0068	<0.0056	0.0056	<0.0056	0.0072	<0.0056	0.060	0.010
ZINC, DISSOLVED	0.19	mg/L	0.010	0.0077	0.0080	<0.0056	0.0093	0.0059	0.0062	<0.0056	<0.0056	0.0056	<0.0056	0.060	0.010
BROMOFORM	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
BROMOMETHANE	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
CARBON TETRACHLORIDE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
CHLOROBENZENE	1*	µg/L	<1	<1	<1	<1	<1	<1	9.6	30.6	<1	<1	<1	<1	<1
CHLOROETHANE	1*	NTU	<1	31.2	<1	<1	<1	<1	6	13.8	<1	<1	<1	<1	<1
DIBROMOCHLOROMETHANE (CHLORODIBROMOMETHANE)	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
CHLOROMETHANE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
3-CHLORO-1-PROPENE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-DICHLOROBENZENE	1*	µg/L	<1	<1	<1	<1	<1	<1	1.6	3.2	<1	<1	<1	<1	<1
1,3-DICHLOROBENZENE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,4-DICHLOROBENZENE	1*	µg/L	<1	1.1	<1	<1	<1	<1	12.1	10.8	<1	<1	<1	<1	<1
DICHLORODIFLUOROMETHANE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-DICHLOROPROPANE	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
cis 1,3-DICHLOROPROPENE	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
trans 1,3-DICHLOROPROPENE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2-BUTANONE (MEK)	10*	mg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-METHYL-2-PENTANONE (MIBK)	5*	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,1,1,2-TETRACHLOROETHANE	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-TETRACHLOROETHANE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2-TRICHLOROETHANE	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
TRICHLOROFLUOROMETHANE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2,3-TRICHLOROPROPANE	2*	mg/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2

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.

Table 1. LCSWMA Creswell Landfill Form 19 Groundwater Monitoring Well Background Standard Comparisons - 2nd Quarter 2020

Parameter	Background Standard	Units	CWMP001W	CWMP002W	CWMP003W	CWMP004W	CWMP005W	CWMP007W	CWMP008W	CWMP009W	CWMP010W	CWMP012W	CWMP016W	CWMP017S	CWMP018S
<i>Subtitle D Analytes</i>															
ACETONE	10*	mg/L	<10	<10	<10	<10	<10	<10	<10	13.2	<10	<10	<10	<10	<10
ACRYLONITRILE	5*	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
BROMOCHLOROMETHANE (CHLOROBROMOMETHANE)	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
BROMODICHLOROMETHANE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
CARBON DISULFIDE	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
CHLOROFORM	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	7*	mg/L	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7
trans 1,4-DICHLORO-2-BUTENE	3*	µmho/cm	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
2-HEXANONE	5*	µmho/cm	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
DIBROMOMETHANE	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
IODOMETHANE	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
STYRENE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
VINYL ACETATE	5*	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
ANTIMONY	0.0022*	µg/L	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022
BERYLLIUM	0.0011*	mg/L	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011
COBALT	0.0056*	µg/L	<0.0056	0.020	<0.0056	<0.0056	<0.0056	<0.0056	0.020	0.040	<0.0056	<0.0056	0.0061	<0.0056	<0.0056
NICKEL	0.0056*	µg/L	0.0066	0.020	0.0081	<0.0056	0.0059	<0.0056	0.010	0.060	0.010	0.0095	<0.0056	0.010	0.010
THALLIUM	0.0011*	NTU	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011
VANADIUM	0.0022*	µg/L	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022

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.

ATTACHMENT 1

BACKGROUND UPPER PREDICTION LIMITS



LCSWMA Creswell Landfill			
2nd Quarter 2020 - Background Upper Prediction Limits (MP-1)			
Parameter	Distribution	Upper Prediction Limit	Unit
ammonia-nitrogen	No Distribution	0.12	mg/L
bicarbonate	No Distribution	8.02	mg/L
calcium, total	No Distribution	20.1	mg/L
calcium, dissolved	No Distribution	19.2	mg/L
cod (chemical oxygen demand)	Normal	11.85**	mg/L
chloride	No Distribution	32.6	mg/L
fluoride	NA	0.2*	mg/L
iron, total	Lognormal	3.74	mg/L
iron, dissolved	Lognormal	0.133	mg/L
magnesium, total	No Distribution	12.49	mg/L
magnesium, dissolved	No Distribution	12.42	mg/L
manganese, total	No Distribution	0.126	mg/L
manganese, dissolved	No Distribution	0.127	mg/L
nitrate-nitrogen	No Distribution	23.56	mg/L
ph-field	No Distribution	None***	S.U.
ph-lab	Normal	None***	S.U.
potassium, total	Normal	2.88	mg/L
potassium, dissolved	No Distribution	3.06	mg/L
sodium, total	Normal	15.61	mg/L
sodium, dissolved	Normal	15.12	mg/L
spec. cond., field	Normal	328	µmhos/cm
spec. cond., lab	No Distribution	299	µmhos/cm
sulfate	Lognormal	2.87	mg/L
total alkalinity	No Distribution	7.0	mg/L
tds (total dissolved solids)	Normal	260	mg/L
toc (total organic carbon)	Normal	1.13	mg/L
total phenolics	NA	0.005*	mg/L
turbidity	Lognormal	177	NTU
benzene	NA	1*	µg/L
1,2-dibromoethane (edb) (ethylene dibromide)	NA	1*	µg/L
1,1-dichloroethane	NA	1*	µg/L
1,1-dichloroethene	NA	1*	µg/L
1,2-dichloroethane	NA	1*	µg/L
cis 1,2-dichloroethene	NA	1*	µg/L
trans 1,2-dichloroethene	NA	1*	µg/L
ethylbenzene	NA	1*	µg/L
methylene chloride	NA	1*	µg/L
tetrachloroethene	NA	1*	µg/L
toluene	NA	1*	µg/L
1,1,1-trichloroethane	NA	1*	µg/L
trichloroethene	NA	1*	µg/L
vinyl chloride	NA	1*	µg/L
xylenes (total)	NA	3*	µg/L

LCSWMA Creswell Landfill			
2nd Quarter 2020 - Background Upper Prediction Limits (MP-1)			
Parameter	Distribution	Upper Prediction Limit	Unit
arsenic, total	NA	0.0033*	mg/L
arsenic, dissolved	NA	0.003*	mg/L
barium, total	No Distribution	0.17	mg/L
barium, dissolved	No Distribution	0.19	mg/L
cadmium, total	NA	0.0011*	mg/L
cadmium, dissolved	NA	0.0011*	mg/L
chromium, total	NA	0.0022*	mg/L
chromium, dissolved	NA	0.0022*	mg/L
copper, total	NA	0.0056*	mg/L
copper, dissolved	NA	0.0056*	mg/L
lead-flameless, total	Lognormal	0.027	mg/L
lead, dissolved	NA	0.0022*	mg/L
mercury, total	NA	0.0005*	mg/L
mercury, dissolved	NA	0.0005*	mg/L
selenium, total	NA	0.0056*	mg/L
selenium, dissolved	NA	0.0056*	mg/L
silver, total	NA	0.0022*	mg/L
silver, dissolved	NA	0.0022*	mg/L
zinc, total	Normal	0.103	mg/L
zinc, dissolved	No Distribution	0.19	mg/L
bromoform	NA	1*	µg/L
bromomethane	NA	1*	µg/L
carbon tetrachloride	NA	1*	µg/L
chlorobenzene	NA	1*	µg/L
chloroethane	NA	1*	µg/L
dibromochloromethane (chlorodibromomethane)	NA	1*	µg/L
chloromethane	NA	1*	µg/L
3-chloro-1-propene	NA	1*	µg/L
1,2-dichlorobenzene	NA	1*	µg/L
1,3-dichlorobenzene	NA	1*	µg/L
1,4-dichlorobenzene	NA	1*	µg/L
dichlorodifluoromethane	NA	1*	µg/L
1,2-dichloropropane	NA	1*	µg/L
cis 1,3-dichloropropene	NA	1*	µg/L
trans 1,3-dichloropropene	NA	1*	µg/L
2-butanone (mek)	NA	10*	µg/L
4-methyl-2-pentanone (mibk)	NA	5*	µg/L
1,1,1,2-tetrachloroethane	NA	1*	µg/L
1,1,2,2-tetrachloroethane	NA	1*	µg/L
1,1,2-trichloroethane	NA	1*	µg/L
trichlorofluoromethane	NA	1*	µg/L
1,2,3-trichloropropane	NA	1*	µg/L

LCSWMA Creswell Landfill 2nd Quarter 2020 - Background Upper Prediction Limits (MP-1)			
Parameter	Distribution	Upper Prediction Limit	Unit
acetone	NA	10*	µg/L
acrylonitrile	NA	5*	µg/L
bromochloromethane (chlorobromomethane)	NA	1*	µg/L
bromodichloromethane	NA	1*	µg/L
carbon disulfide	NA	1*	µg/L
chloroform	NA	1*	µg/L
1,2-dibromo-3-chloropropane (dbcp) (dibromochlorom	NA	7*	µg/L
trans 1,4-dichloro-2-butene	NA	3*	µg/L
2-hexanone	NA	5*	µg/L
dibromomethane	NA	1*	µg/L
iodomethane	NA	1*	µg/L
styrene	NA	1*	µg/L
vinyl acetate	NA	5*	µg/L
antimony	NA	0.0022*	mg/l
beryllium	NA	0.0011*	mg/l
cobalt	NA	0.0056*	mg/l
nickel	NA	0.0056*	mg/l
thallium	NA	0.0011*	mg/l
vanadium	NA	0.0022*	mg/l

Notes:

"NA" denotes parameter not detected or not enough detections in MP-1 over course of historical data to develop tolerance limits.

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

** COD background standard is lower than the current reporting limit.

*** 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 5.17/30/2020 2:56:05 PM										
4	From File	2Q20 CWMP001W UCL Input Table1.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	120							Number of Missing Observations	11		
15	Number of Distinct Observations	7										
16	Number of Detects	11							Number of Non-Detects	109		
17	Number of Distinct Detects	6							Number of Distinct Non-Detects	1		
18	Minimum Detect	0.11							Minimum Non-Detect	0.1		
19	Maximum Detect	0.46							Maximum Non-Detect	0.1		
20	Variance Detected	0.0107							Percent Non-Detects	90.83%		
21	Mean Detected	0.165							SD Detected	0.104		
22	Mean of Detected Logged Data	-1.908							SD of Detected Logged Data	0.434		
23												
24	Critical Values for Background Threshold Values (BTVs)											
25	Tolerance Factor K (For UTL)	1.897							d2max (for USL)	3.271		
26												
27	Normal GOF Test on Detects Only											
28	Shapiro Wilk Test Statistic	0.584							Shapiro Wilk GOF Test			
29	5% Shapiro Wilk Critical Value	0.85							Data Not Normal at 5% Significance Level			
30	Lilliefors Test Statistic	0.377							Lilliefors GOF Test			
31	5% Lilliefors Critical Value	0.251							Data Not Normal at 5% Significance Level			
32	Data Not Normal at 5% Significance Level											
33												
34	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
35	KM Mean	0.106							KM SD	0.0354		
36	95% UTL95% Coverage	0.173							95% KM UPL (t)	0.165		
37	90% KM Percentile (z)	0.151							95% KM Percentile (z)	0.164		
38	99% KM Percentile (z)	0.188							95% KM USL	0.222		
39												
40	DL/2 Substitution Background Statistics Assuming Normal Distribution											
41	Mean	0.0606							SD	0.045		
42	95% UTL95% Coverage	0.146							95% UPL (t)	0.135		
43	90% Percentile (z)	0.118							95% Percentile (z)	0.135		
44	99% Percentile (z)	0.165							95% USL	0.208		
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	1.517							Anderson-Darling GOF Test			
49	5% A-D Critical Value	0.732							Data Not Gamma Distributed at 5% Significance Level			
50	K-S Test Statistic	0.34							Kolmogorov-Smirnov GOF			
51	5% K-S Critical Value	0.256							Data Not Gamma Distributed at 5% Significance Level			
52	Data Not Gamma Distributed at 5% Significance Level											

A	B	C	D	E	F	G	H	I	J	K	L	
53												
54	Gamma Statistics on Detected Data Only											
55	k hat (MLE)			4.745		k star (bias corrected MLE)				3.512		
56	Theta hat (MLE)			0.0349		Theta star (bias corrected MLE)				0.0471		
57	nu hat (MLE)			104.4		nu star (bias corrected)				77.26		
58	MLE Mean (bias corrected)			0.165								
59	MLE Sd (bias corrected)			0.0883		95% Percentile of Chisquare (2kstar)				14.1		
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				0.0248		
68	Maximum			0.46		Median				0.01		
69	SD			0.0541		CV				2.185		
70	k hat (MLE)			0.922		k star (bias corrected MLE)				0.904		
71	Theta hat (MLE)			0.0269		Theta star (bias corrected MLE)				0.0274		
72	nu hat (MLE)			221.2		nu star (bias corrected)				217		
73	MLE Mean (bias corrected)			0.0248		MLE Sd (bias corrected)				0.0261		
74	95% Percentile of Chisquare (2kstar)			5.615		90% Percentile				0.0585		
75	95% Percentile			0.0769		99% Percentile				0.12		
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	
79	95% Approx. Gamma UTL with 95% Coverage			0.0796		0.0744		95% Approx. Gamma UPL			0.0678	
80	95% Gamma USL			0.178		0.178						
81												
82	Estimates of Gamma Parameters using KM Estimates											
83	Mean (KM)			0.106		SD (KM)				0.0354		
84	Variance (KM)			0.00125		SE of Mean (KM)				0.00339		
85	k hat (KM)			8.972		k star (KM)				8.753		
86	nu hat (KM)			2153		nu star (KM)				2101		
87	theta hat (KM)			0.0118		theta star (KM)				0.0121		
88	80% gamma percentile (KM)			0.134		90% gamma percentile (KM)				0.154		
89	95% gamma percentile (KM)			0.171		99% gamma percentile (KM)				0.207		
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	
94	95% Approx. Gamma UTL with 95% Coverage			0.151		0.149		95% Approx. Gamma UPL			0.145	
95	95% KM Gamma Percentile			0.144		0.142		95% Gamma USL			0.189	
96												
97	Lognormal GOF Test on Detected Observations Only											
98	Shapiro Wilk Test Statistic			0.714		Shapiro Wilk GOF Test						
99	5% Shapiro Wilk Critical Value			0.85		Data Not Lognormal at 5% Significance Level						
100	Lilliefors Test Statistic			0.308		Lilliefors GOF Test						
101	5% Lilliefors Critical Value			0.251		Data Not Lognormal at 5% Significance Level						
102	Data Not Lognormal at 5% Significance Level											
103												
104	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											

A	B	C	D	E	G	H	I	J	K	L
105			Mean in Original Scale	0.0347				Mean in Log Scale		-4.063
106			SD in Original Scale	0.0546				SD in Log Scale		1.196
107			95% UTL95% Coverage	0.166				95% BCA UTL95% Coverage		0.122
108			95% Bootstrap (%) UTL95% Coverage	0.15				95% UPL (t)		0.126
109			90% Percentile (z)	0.0797				95% Percentile (z)		0.123
110			99% Percentile (z)	0.278				95% USL		0.861
111										
112			Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution							
113			KM Mean of Logged Data	-2.266				95% KM UTL (Lognormal)95% Coverage		0.143
114			KM SD of Logged Data	0.169				95% KM UPL (Lognormal)		0.137
115			95% KM Percentile Lognormal (z)	0.137				95% KM USL (Lognormal)		0.18
116										
117			Background DL/2 Statistics Assuming Lognormal Distribution							
118			Mean in Original Scale	0.0606				Mean in Log Scale		-2.896
119			SD in Original Scale	0.045				SD in Log Scale		0.339
120			95% UTL95% Coverage	0.105				95% UPL (t)		0.0972
121			90% Percentile (z)	0.0853				95% Percentile (z)		0.0965
122			99% Percentile (z)	0.122				95% USL		0.168
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 do not follow a Discernible Distribution (0.05)							
127										
128			Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)							
129			Order of Statistic, r	117				95% UTL with95% Coverage		0.15
130			Approx, f used to compute achieved CC	1.539				Approximate Actual Confidence Coefficient achieved by UTL		0.856
131			Approximate Sample Size needed to achieve specified CC	153				95% UPL		0.12
132			95% USL	0.46				95% KM Chebyshev UPL		0.261
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	116				Number of Missing Observations		15
144			Number of Distinct Observations	21						
145			Number of Detects	74				Number of Non-Detects		42
146			Number of Distinct Detects	19				Number of Distinct Non-Detects		3
147			Minimum Detect	4.7				Minimum Non-Detect		5
148			Maximum Detect	9.5				Maximum Non-Detect		6.2
149			Variance Detected	1.305				Percent Non-Detects		36.21%
150			Mean Detected	6.307				SD Detected		1.142
151			Mean of Detected Logged Data	1.826				SD of Detected Logged Data		0.175
152										
153			Critical Values for Background Threshold Values (BTVs)							
154			Tolerance Factor K (For UTL)	1.901				d2max (for USL)		3.259
155										
156			Normal GOF Test on Detects Only							

A	B	C	D	E	F	G	H	I	J	K	L	
157	Shapiro Wilk Test Statistic			0.885	Normal GOF Test on Detected Observations Only							
158	5% Shapiro Wilk P Value			1.8100E-7	Data Not Normal at 5% Significance Level							
159	Lilliefors Test Statistic			0.254	Lilliefors GOF Test							
160	5% Lilliefors Critical Value			0.103	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			5.73	KM SD			1.189				
165	95% UTL95% Coverage			7.99	95% KM UPL (t)			7.709				
166	90% KM Percentile (z)			7.253	95% KM Percentile (z)			7.685				
167	99% KM Percentile (z)			8.495	95% KM USL			9.604				
168												
169	DL/2 Substitution Background Statistics Assuming Normal Distribution											
170	Mean			4.935	SD			2.044				
171	95% UTL95% Coverage			8.821	95% UPL (t)			8.338				
172	90% Percentile (z)			7.554	95% Percentile (z)			8.296				
173	99% Percentile (z)			9.689	95% USL			11.6				
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			2.857	Anderson-Darling GOF Test							
178	5% A-D Critical Value			0.749	Data Not Gamma Distributed at 5% Significance Level							
179	K-S Test Statistic			0.237	Kolmogorov-Smirnov GOF							
180	5% K-S Critical Value			0.103	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)			32.52	k star (bias corrected MLE)			31.21				
185	Theta hat (MLE)			0.194	Theta star (bias corrected MLE)			0.202				
186	nu hat (MLE)			4812	nu star (bias corrected)			4618				
187	MLE Mean (bias corrected)			6.307								
188	MLE Sd (bias corrected)			1.129	95% Percentile of Chisquare (2kstar)			81.85				
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			2.237	Mean			5.46				
197	Maximum			9.5	Median			5				
198	SD			1.505	CV			0.276				
199	k hat (MLE)			12.93	k star (bias corrected MLE)			12.6				
200	Theta hat (MLE)			0.422	Theta star (bias corrected MLE)			0.433				
201	nu hat (MLE)			3000	nu star (bias corrected)			2924				
202	MLE Mean (bias corrected)			5.46	MLE Sd (bias corrected)			1.538				
203	95% Percentile of Chisquare (2kstar)			37.9	90% Percentile			7.5				
204	95% Percentile			8.211	99% Percentile			9.658				
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			8.71	8.782	95% Approx. Gamma UPL			8.227	8.276		

A	B	C	D	E	F	G	H	I	J	K	L	
209	95% Gamma USL			11.85	12.15							
210												
211	Estimates of Gamma Parameters using KM Estimates											
212	Mean (KM)			5.73	SD (KM)			1.189				
213	Variance (KM)			1.413	SE of Mean (KM)			0.111				
214	k hat (KM)			23.24	k star (KM)			22.65				
215	nu hat (KM)			5392	nu star (KM)			5254				
216	theta hat (KM)			0.247	theta star (KM)			0.253				
217	80% gamma percentile (KM)			6.711	90% gamma percentile (KM)			7.317				
218	95% gamma percentile (KM)			7.844	99% gamma percentile (KM)			8.896				
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			8.056	8.067	95% Approx. Gamma UPL			7.727	7.731		
224	95% KM Gamma Percentile			7.699	7.702	95% Gamma USL			10.13	10.22		
225												
226	Lognormal GOF Test on Detected Observations Only											
227	Shapiro Wilk Approximate Test Statistic			0.898	Shapiro Wilk GOF Test							
228	5% Shapiro Wilk P Value			1.7060E-6	Data Not Lognormal at 5% Significance Level							
229	Lilliefors Test Statistic			0.226	Lilliefors GOF Test							
230	5% Lilliefors Critical Value			0.103	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			5.548	Mean in Log Scale			1.683				
235	SD in Original Scale			1.395	SD in Log Scale			0.249				
236	95% UTL95% Coverage			8.639	95% BCA UTL95% Coverage			8				
237	95% Bootstrap (%) UTL95% Coverage			8.225	95% UPL (t)			8.145				
238	90% Percentile (z)			7.403	95% Percentile (z)			8.104				
239	99% Percentile (z)			9.603	95% USL			12.12				
240												
241	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
242	KM Mean of Logged Data			1.726	95% KM UTL (Lognormal)95% Coverage			8.105				
243	KM SD of Logged Data			0.193	95% KM UPL (Lognormal)			7.745				
244	95% KM Percentile Lognormal (z)			7.714	95% KM USL (Lognormal)			10.53				
245												
246	Background DL/2 Statistics Assuming Lognormal Distribution											
247	Mean in Original Scale			4.935	Mean in Log Scale			1.499				
248	SD in Original Scale			2.044	SD in Log Scale			0.458				
249	95% UTL95% Coverage			10.7	95% UPL (t)			9.605				
250	90% Percentile (z)			8.056	95% Percentile (z)			9.516				
251	99% Percentile (z)			13	95% USL			19.94				
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			113	95% UTL with95% Coverage			8.1				
259	Approx, f used to compute achieved CC			1.487	Approximate Actual Confidence Coefficient achieved by UTL			0.837				
260	Approximate Sample Size needed to achieve specified CC			153	95% UPL			8.015				

A	B	C	D	E	F	G	H	I	J	K	L	
261	95% USL				9.5	95% KM Chebyshev UPL				10.93		
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			57	Number of Distinct Observations			29				
273					Number of Missing Observations			74				
274	Minimum			12	First Quartile			14				
275	Second Largest			20.1	Median			16.4				
276	Maximum			21	Third Quartile			17.4				
277	Mean			16.12	SD			2.237				
278	Coefficient of Variation			0.139	Skewness			0.244				
279	Mean of logged Data			2.77	SD of logged Data			0.139				
280												
281	Critical Values for Background Threshold Values (BTVs)											
282	Tolerance Factor K (For UTL)			2.028	d2max (for USL)			3.007				
283												
284	Normal GOF Test											
285	Shapiro Wilk Test Statistic			0.947	Normal GOF Test							
286	5% Shapiro Wilk P Value			0.027	Data Not Normal at 5% Significance Level							
287	Lilliefors Test Statistic			0.149	Lilliefors GOF Test							
288	5% Lilliefors Critical Value			0.117	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		20.65	90% Percentile (z)		18.98						
293	95% UPL (t)		19.89	95% Percentile (z)		19.8						
294	95% USL		22.84	99% Percentile (z)		21.32						
295												
296	Gamma GOF Test											
297	A-D Test Statistic			0.923	Anderson-Darling Gamma GOF Test							
298	5% A-D Critical Value			0.748	Data Not Gamma Distributed at 5% Significance Level							
299	K-S Test Statistic			0.138	Kolmogorov-Smirnov Gamma GOF Test							
300	5% K-S Critical Value			0.117	Data Not Gamma Distributed at 5% Significance Level							
301	Data Not Gamma Distributed at 5% Significance Level											
302												
303	Gamma Statistics											
304	k hat (MLE)		53.12	k star (bias corrected MLE)		50.33						
305	Theta hat (MLE)		0.303	Theta star (bias corrected MLE)		0.32						
306	nu hat (MLE)		6055	nu star (bias corrected)		5738						
307	MLE Mean (bias corrected)		16.12	MLE Sd (bias corrected)		2.272						
308												
309	Background Statistics Assuming Gamma Distribution											
310	95% Wilson Hilferty (WH) Approx. Gamma UPL		20.06	90% Percentile		19.09						
311	95% Hawkins Wixley (HW) Approx. Gamma UPL		20.09	95% Percentile		20.03						
312	95% WH Approx. Gamma UTL with 95% Coverage		20.96	99% Percentile		21.87						

A	B	C	D	E	F	G	H	I	J	K	L		
313	95% HW Approx. Gamma UTL with 95% Coverage			21									
314	95% WH USL			23.67	95% HW USL					23.8			
315													
316	Lognormal GOF Test												
317	Shapiro Wilk Test Statistic			0.951	Shapiro Wilk Lognormal GOF Test								
318	5% Shapiro Wilk P Value			0.0442	Data Not Lognormal at 5% Significance Level								
319	Lilliefors Test Statistic			0.131	Lilliefors Lognormal GOF Test								
320	5% Lilliefors Critical Value			0.117	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		21.15	90% Percentile (z)					19.07				
325	95% UPL (t)		20.17	95% Percentile (z)					20.05				
326	95% USL		24.22	99% Percentile (z)					22.04				
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		56	95% UTL with 95% Coverage					20.1				
333	Approx, f used to compute achieved CC			1.474	Approximate Actual Confidence Coefficient achieved by UTL					0.785			
334					Approximate Sample Size needed to achieve specified CC					93			
335	95% Percentile Bootstrap UTL with 95% Coverage		20.28	95% BCA Bootstrap UTL with 95% Coverage					20.28				
336	95% UPL		20.1	90% Percentile					19.32				
337	90% Chebyshev UPL		22.89	95% Percentile					19.78				
338	95% Chebyshev UPL		25.95	99% Percentile					20.5				
339	95% USL		21										
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			94	Number of Distinct Observations					43			
351					Number of Missing Observations					37			
352	Minimum			10.4	First Quartile					14			
353	Second Largest			20.1	Median					16.4			
354	Maximum			20.1	Third Quartile					17.4			
355	Mean			15.91	SD					2.217			
356	Coefficient of Variation			0.139	Skewness					-0.339			
357	Mean of logged Data			2.757	SD of logged Data					0.145			
358													
359	Critical Values for Background Threshold Values (BTVs)												
360	Tolerance Factor K (For UTL)			1.933	d2max (for USL)					3.188			
361													
362	Normal GOF Test												
363	Shapiro Wilk Test Statistic			0.948	Normal GOF Test								
364	5% Shapiro Wilk P Value			0.00267	Data Not Normal at 5% Significance Level								

A	B	C	D	E	F	G	H	I	J	K	L	
365	Lilliefors Test Statistic				0.12	Lilliefors GOF Test						
366	5% Lilliefors Critical Value				0.0916	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				20.19	90% Percentile (z)				18.75		
371	95% UPL (t)				19.61	95% Percentile (z)				19.55		
372	95% USL				22.97	99% Percentile (z)				21.06		
373												
374	Gamma GOF Test											
375	A-D Test Statistic				1.881	Anderson-Darling Gamma GOF Test						
376	5% A-D Critical Value				0.751	Data Not Gamma Distributed at 5% Significance Level						
377	K-S Test Statistic				0.136	Kolmogorov-Smirnov Gamma GOF Test						
378	5% K-S Critical Value				0.092	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)				49.47	k star (bias corrected MLE)				47.9		
383	Theta hat (MLE)				0.322	Theta star (bias corrected MLE)				0.332		
384	nu hat (MLE)				9301	nu star (bias corrected)				9006		
385	MLE Mean (bias corrected)				15.91	MLE Sd (bias corrected)				2.298		
386												
387	Background Statistics Assuming Gamma Distribution											
388	95% Wilson Hilferty (WH) Approx. Gamma UPL				19.89	90% Percentile				18.91		
389	95% Hawkins Wixley (HW) Approx. Gamma UPL				19.93	95% Percentile				19.87		
390	95% WH Approx. Gamma UTL with 95% Coverage				20.59	99% Percentile				21.74		
391	95% HW Approx. Gamma UTL with 95% Coverage				20.65							
392	95% WH USL				24.17	95% HW USL				24.36		
393												
394	Lognormal GOF Test											
395	Shapiro Wilk Test Statistic				0.933	Shapiro Wilk Lognormal GOF Test						
396	5% Shapiro Wilk P Value				9.7820E-5	Data Not Lognormal at 5% Significance Level						
397	Lilliefors Test Statistic				0.142	Lilliefors Lognormal GOF Test						
398	5% Lilliefors Critical Value				0.0916	Data Not Lognormal at 5% Significance Level						
399	Data Not Lognormal at 5% Significance Level											
400												
401	Background Statistics assuming Lognormal Distribution											
402	95% UTL with 95% Coverage				20.85	90% Percentile (z)				18.97		
403	95% UPL (t)				20.07	95% Percentile (z)				20		
404	95% USL				25.02	99% Percentile (z)				22.08		
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				92	95% UTL with 95% Coverage				19.4		
411	Approx, f used to compute achieved CC				1.614	Approximate Actual Confidence Coefficient achieved by UTL				0.855		
412						Approximate Sample Size needed to achieve specified CC				124		
413	95% Percentile Bootstrap UTL with 95% Coverage				19.52	95% BCA Bootstrap UTL with 95% Coverage				19.52		
414	95% UPL				19.2	90% Percentile				18.5		
415	90% Chebyshev UPL				22.59	95% Percentile				19.14		
416	95% Chebyshev UPL				25.62	99% Percentile				20.1		

A	B	C	D	E	F	G	H	I	J	K	L	
417	95% USL			20.1								
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			127	Number of Missing Observations			4				
429	Number of Distinct Observations			9								
430	Number of Detects			6	Number of Non-Detects			121				
431	Number of Distinct Detects			6	Number of Distinct Non-Detects			4				
432	Minimum Detect			5	Minimum Non-Detect			5				
433	Maximum Detect			31	Maximum Non-Detect			20				
434	Variance Detected			149.5	Percent Non-Detects			95.28%				
435	Mean Detected			17.67	SD Detected			12.23				
436	Mean of Detected Logged Data			2.61	SD of Detected Logged Data			0.838				
437												
438	Critical Values for Background Threshold Values (BTVs)											
439	Tolerance Factor K (For UTL)			1.889	d2max (for USL)			3.289				
440												
441	Normal GOF Test on Detects Only											
442	Shapiro Wilk Test Statistic			0.814	Shapiro Wilk GOF Test							
443	5% Shapiro Wilk Critical Value			0.788	Detected Data appear Normal at 5% Significance Level							
444	Lilliefors Test Statistic			0.261	Lilliefors GOF Test							
445	5% Lilliefors Critical Value			0.325	Detected Data appear Normal at 5% Significance Level							
446	Detected Data appear Normal at 5% Significance Level											
447												
448	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
449	KM Mean			5.761	KM SD			3.661				
450	95% UTL95% Coverage			12.68	95% KM UPL (t)			11.85				
451	90% KM Percentile (z)			10.45	95% KM Percentile (z)			11.78				
452	99% KM Percentile (z)			14.28	95% KM USL			17.8				
453												
454	DL/2 Substitution Background Statistics Assuming Normal Distribution											
455	Mean			8.528	SD			4.168				
456	95% UTL95% Coverage			16.4	95% UPL (t)			15.46				
457	90% Percentile (z)			13.87	95% Percentile (z)			15.38				
458	99% Percentile (z)			18.22	95% USL			22.24				
459	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
460												
461	Gamma GOF Tests on Detected Observations Only											
462	A-D Test Statistic			0.61	Anderson-Darling GOF Test							
463	5% A-D Critical Value			0.704	Detected data appear Gamma Distributed at 5% Significance Level							
464	K-S Test Statistic			0.294	Kolmogorov-Smirnov GOF							
465	5% K-S Critical Value			0.336	Detected data appear Gamma Distributed at 5% Significance Level							
466	Detected data appear Gamma Distributed at 5% Significance Level											
467												
468	Gamma Statistics on Detected Data Only											

A	B	C	D	E	F	G	H	I	J	K	L
469				k hat (MLE)	2.059					k star (bias corrected MLE)	1.141
470				Theta hat (MLE)	8.579					Theta star (bias corrected MLE)	15.49
471				nu hat (MLE)	24.71					nu star (bias corrected)	13.69
472				MLE Mean (bias corrected)	17.67						
473				MLE Sd (bias corrected)	16.54					95% Percentile of Chisquare (2kstar)	6.526
474											
475				Gamma ROS Statistics using Imputed Non-Detects							
476				GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
477				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)							
478				For such situations, GROS method may yield incorrect values of UCLs and BTVs							
479				This is especially true when the sample size is small.							
480				For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
481				Minimum	0.01					Mean	1.558
482				Maximum	31					Median	0.01
483				SD	5.02					CV	3.222
484				k hat (MLE)	0.186					k star (bias corrected MLE)	0.187
485				Theta hat (MLE)	8.393					Theta star (bias corrected MLE)	8.354
486				nu hat (MLE)	47.16					nu star (bias corrected)	47.37
487				MLE Mean (bias corrected)	1.558					MLE Sd (bias corrected)	3.608
488				95% Percentile of Chisquare (2kstar)	1.956					90% Percentile	4.706
489				95% Percentile	8.172					99% Percentile	17.83
490				The following statistics are computed using Gamma ROS Statistics on Imputed Data							
491				Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods							
492					WH	HW				WH	HW
493				95% Approx. Gamma UTL with 95% Coverage	5.671	4.904				95% Approx. Gamma UPL	4.324
494				95% Gamma USL	20.57	23.44					
495											
496				Estimates of Gamma Parameters using KM Estimates							
497				Mean (KM)	5.761					SD (KM)	3.661
498				Variance (KM)	13.4					SE of Mean (KM)	0.386
499				k hat (KM)	2.476					k star (KM)	2.423
500				nu hat (KM)	629					nu star (KM)	615.5
501				theta hat (KM)	2.326					theta star (KM)	2.378
502				80% gamma percentile (KM)	8.431					90% gamma percentile (KM)	10.72
503				95% gamma percentile (KM)	12.88					99% gamma percentile (KM)	17.61
504											
505				The following statistics are computed using gamma distribution and KM estimates							
506				Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods							
507					WH	HW				WH	HW
508				95% Approx. Gamma UTL with 95% Coverage	10.18	9.92				95% Approx. Gamma UPL	9.513
509				95% KM Gamma Percentile	9.459	9.224				95% Gamma USL	15.04
510											
511				Lognormal GOF Test on Detected Observations Only							
512				Shapiro Wilk Test Statistic	0.831					Shapiro Wilk GOF Test	
513				5% Shapiro Wilk Critical Value	0.788					Detected Data appear Lognormal at 5% Significance Level	
514				Lilliefors Test Statistic	0.28					Lilliefors GOF Test	
515				5% Lilliefors Critical Value	0.325					Detected Data appear Lognormal at 5% Significance Level	
516				Detected Data appear Lognormal at 5% Significance Level							
517											
518				Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects							
519				Mean in Original Scale	2.391					Mean in Log Scale	-0.101
520				SD in Original Scale	4.699					SD in Log Scale	1.393

A	B	C	D	E	F	G	H	I	J	K	L
521	95% UTL95% Coverage			12.56	95% BCA UTL95% Coverage			12.53			
522	95% Bootstrap (%) UTL95% Coverage			12.53	95% UPL (t)			9.177			
523	90% Percentile (z)			5.39	95% Percentile (z)			8.942			
524	99% Percentile (z)			23.11	95% USL			88.38			
525											
526	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution										
527	KM Mean of Logged Data			1.682	95% KM UTL (Lognormal)95% Coverage			9.217			
528	KM SD of Logged Data			0.285	95% KM UPL (Lognormal)			8.643			
529	95% KM Percentile Lognormal (z)			8.597	95% KM USL (Lognormal)			13.74			
530											
531	Background DL/2 Statistics Assuming Lognormal Distribution										
532	Mean in Original Scale			8.528	Mean in Log Scale			2.023			
533	SD in Original Scale			4.168	SD in Log Scale			0.526			
534	95% UTL95% Coverage			20.44	95% UPL (t)			18.15			
535	90% Percentile (z)			14.85	95% Percentile (z)			17.97			
536	99% Percentile (z)			25.72	95% USL			42.69			
537	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
538											
539	Nonparametric Distribution Free Background Statistics										
540	Data appear to follow a Discernible Distribution at 5% Significance Level										
541											
542	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
543	Order of Statistic, r		124	95% UTL with95% Coverage			20				
544	Approx, f used to compute achieved CC			1.632	Approximate Actual Confidence Coefficient achieved by UTL			0.884			
545	Approximate Sample Size needed to achieve specified CC			153	95% UPL			20			
546	95% USL			31	95% KM Chebyshev UPL			21.78			
547											
548	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
549	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
550	and consists of observations collected from clean unimpacted locations.										
551	The use of USL tends to provide a balance between false positives and false negatives provided the data										
552	represents a background data set and when many onsite observations need to be compared with the BTV.										
553											
554	CHLORIDE										
555											
556	General Statistics										
557	Total Number of Observations			129	Number of Missing Observations			2			
558	Number of Distinct Observations			63							
559	Number of Detects			126	Number of Non-Detects			3			
560	Number of Distinct Detects			62	Number of Distinct Non-Detects			3			
561	Minimum Detect			15	Minimum Non-Detect			18			
562	Maximum Detect			33.2	Maximum Non-Detect			41			
563	Variance Detected			20.11	Percent Non-Detects			2.326%			
564	Mean Detected			25.04	SD Detected			4.484			
565	Mean of Detected Logged Data			3.203	SD of Detected Logged Data			0.189			
566											
567	Critical Values for Background Threshold Values (BTVs)										
568	Tolerance Factor K (For UTL)			1.887	d2max (for USL)			3.294			
569											
570	Normal GOF Test on Detects Only										
571	Shapiro Wilk Test Statistic			0.955	Normal GOF Test on Detected Observations Only						
572	5% Shapiro Wilk P Value			0.00197	Data Not Normal at 5% Significance Level						

A	B	C	D	E	F	G	H	I	J	K	L	
573	Lilliefors Test Statistic				0.091	Lilliefors GOF Test						
574	5% Lilliefors Critical Value				0.0793	Data Not Normal at 5% Significance Level						
575	Data Not Normal at 5% Significance Level											
576												
577	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
578	KM Mean				24.92	KM SD				4.537		
579	95% UTL95% Coverage				33.48	95% KM UPL (t)				32.46		
580	90% KM Percentile (z)				30.73	95% KM Percentile (z)				32.38		
581	99% KM Percentile (z)				35.47	95% KM USL				39.86		
582												
583	DL/2 Substitution Background Statistics Assuming Normal Distribution											
584	Mean				24.77	SD				4.836		
585	95% UTL95% Coverage				33.89	95% UPL (t)				32.81		
586	90% Percentile (z)				30.96	95% Percentile (z)				32.72		
587	99% Percentile (z)				36.02	95% USL				40.7		
588	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
589												
590	Gamma GOF Tests on Detected Observations Only											
591	A-D Test Statistic				1.451	Anderson-Darling GOF Test						
592	5% A-D Critical Value				0.75	Data Not Gamma Distributed at 5% Significance Level						
593	K-S Test Statistic				0.116	Kolmogorov-Smirnov GOF						
594	5% K-S Critical Value				0.0825	Data Not Gamma Distributed at 5% Significance Level						
595	Data Not Gamma Distributed at 5% Significance Level											
596												
597	Gamma Statistics on Detected Data Only											
598	k hat (MLE)				29.41	k star (bias corrected MLE)				28.72		
599	Theta hat (MLE)				0.851	Theta star (bias corrected MLE)				0.872		
600	nu hat (MLE)				7412	nu star (bias corrected)				7237		
601	MLE Mean (bias corrected)				25.04							
602	MLE Sd (bias corrected)				4.672	95% Percentile of Chisquare (2kstar)				76.13		
603												
604	Gamma ROS Statistics using Imputed Non-Detects											
605	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
606	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)											
607	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
608	This is especially true when the sample size is small.											
609	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
610	Minimum				15	Mean				24.93		
611	Maximum				33.2	Median				25.3		
612	SD				4.506	CV				0.181		
613	k hat (MLE)				28.99	k star (bias corrected MLE)				28.32		
614	Theta hat (MLE)				0.86	Theta star (bias corrected MLE)				0.88		
615	nu hat (MLE)				7480	nu star (bias corrected)				7307		
616	MLE Mean (bias corrected)				24.93	MLE Sd (bias corrected)				4.685		
617	95% Percentile of Chisquare (2kstar)				75.22	90% Percentile				31.1		
618	95% Percentile				33.11	99% Percentile				37.11		
619	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
620	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
621					WH	HW					WH	HW
622	95% Approx. Gamma UTL with 95% Coverage				34.42	34.58	95% Approx. Gamma UPL				33.15	33.26
623	95% Gamma USL				43.19	43.78						
624												

A	B	C	D	E	F	G	H	I	J	K	L	
625	Estimates of Gamma Parameters using KM Estimates											
626	Mean (KM)			24.92	SD (KM)			4.537				
627	Variance (KM)			20.58	SE of Mean (KM)			0.403				
628	k hat (KM)			30.17	k star (KM)			29.47				
629	nu hat (KM)			7784	nu star (KM)			7604				
630	theta hat (KM)			0.826	theta star (KM)			0.845				
631	80% gamma percentile (KM)			28.68	90% gamma percentile (KM)			30.95				
632	95% gamma percentile (KM)			32.92	99% gamma percentile (KM)			36.82				
633												
634	The following statistics are computed using gamma distribution and KM estimates											
635	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
636				WH	HW				WH	HW		
637	95% Approx. Gamma UTL with 95% Coverage			34.49	34.65	95% Approx. Gamma UPL			33.2	33.32		
638	95% KM Gamma Percentile			33.1	33.21	95% Gamma USL			43.35	43.96		
639												
640	Lognormal GOF Test on Detected Observations Only											
641	Shapiro Wilk Approximate Test Statistic			0.935	Shapiro Wilk GOF Test							
642	5% Shapiro Wilk P Value			3.0285E-6	Data Not Lognormal at 5% Significance Level							
643	Lilliefors Test Statistic			0.13	Lilliefors GOF Test							
644	5% Lilliefors Critical Value			0.0793	Data Not Lognormal at 5% Significance Level							
645	Data Not Lognormal at 5% Significance Level											
646												
647	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
648	Mean in Original Scale			24.93	Mean in Log Scale			3.199				
649	SD in Original Scale			4.508	SD in Log Scale			0.191				
650	95% UTL95% Coverage			35.12	95% BCA UTL95% Coverage			32.72				
651	95% Bootstrap (%) UTL95% Coverage			32.8	95% UPL (t)			33.65				
652	90% Percentile (z)			31.29	95% Percentile (z)			33.53				
653	99% Percentile (z)			38.19	95% USL			45.93				
654												
655	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
656	KM Mean of Logged Data			3.198	95% KM UTL (Lognormal)95% Coverage			35.2				
657	KM SD of Logged Data			0.193	95% KM UPL (Lognormal)			33.72				
658	95% KM Percentile Lognormal (z)			33.6	95% KM USL (Lognormal)			46.16				
659												
660	Background DL/2 Statistics Assuming Lognormal Distribution											
661	Mean in Original Scale			24.77	Mean in Log Scale			3.187				
662	SD in Original Scale			4.836	SD in Log Scale			0.221				
663	95% UTL95% Coverage			36.73	95% UPL (t)			34.96				
664	90% Percentile (z)			32.14	95% Percentile (z)			34.82				
665	99% Percentile (z)			40.47	95% USL			50.1				
666	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
667												
668	Nonparametric Distribution Free Background Statistics											
669	Data do not follow a Discernible Distribution (0.05)											
670												
671	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
672	Order of Statistic, r			126	95% UTL with95% Coverage			33				
673	Approx, f used to compute achieved CC			1.658	Approximate Actual Confidence Coefficient achieved by UTL			0.891				
674	Approximate Sample Size needed to achieve specified CC			153	95% UPL			32.6				
675	95% USL			41	95% KM Chebyshev UPL			44.77				
676												

A	B	C	D	E	F	G	H	I	J	K	L	
677	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
678	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
679	and consists of observations collected from clean unimpacted locations.											
680	The use of USL tends to provide a balance between false positives and false negatives provided the data											
681	represents a background data set and when many onsite observations need to be compared with the BTV.											
682												
683	FLUORIDE											
684												
685	General Statistics											
686	Total Number of Observations	91							Number of Missing Observations	40		
687	Number of Distinct Observations	4										
688	Number of Detects	1							Number of Non-Detects	90		
689	Number of Distinct Detects	1							Number of Distinct Non-Detects	4		
690	Minimum Detect	0.1							Minimum Non-Detect	0.1		
691	Maximum Detect	0.1							Maximum Non-Detect	0.5		
692	Variance Detected	N/A							Percent Non-Detects	98.9%		
693	Mean Detected	0.1							SD Detected	N/A		
694	Mean of Detected Logged Data	-2.303							SD of Detected Logged Data	N/A		
695												
696	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!											
697	It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).											
698												
699	The data set for variable FLUORIDE was not processed!											
700												
701												
702	IRON, TOTAL											
703												
704	General Statistics											
705	Total Number of Observations	65							Number of Missing Observations	66		
706	Number of Distinct Observations	44										
707	Number of Detects	62							Number of Non-Detects	3		
708	Number of Distinct Detects	41							Number of Distinct Non-Detects	3		
709	Minimum Detect	0.06							Minimum Non-Detect	0.12		
710	Maximum Detect	3.5							Maximum Non-Detect	0.34		
711	Variance Detected	0.739							Percent Non-Detects	4.615%		
712	Mean Detected	1.155							SD Detected	0.859		
713	Mean of Detected Logged Data	-0.16							SD of Detected Logged Data	0.846		
714												
715	Critical Values for Background Threshold Values (BTVs)											
716	Tolerance Factor K (For UTL)	2							d2max (for USL)	3.057		
717												
718	Normal GOF Test on Detects Only											
719	Shapiro Wilk Test Statistic	0.881							Normal GOF Test on Detected Observations Only			
720	5% Shapiro Wilk P Value	1.8063E-6							Data Not Normal at 5% Significance Level			
721	Lilliefors Test Statistic	0.147							Lilliefors GOF Test			
722	5% Lilliefors Critical Value	0.112							Data Not Normal at 5% Significance Level			
723	Data Not Normal at 5% Significance Level											
724												
725	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
726	KM Mean	1.107							KM SD	0.86		
727	95% UTL/95% Coverage	2.828							95% KM UPL (t)	2.554		
728	90% KM Percentile (z)	2.21							95% KM Percentile (z)	2.522		

A	B	C	D	E	F	G	H	I	J	K	L
729	99% KM Percentile (z)			3.108	95% KM USL					3.736	
730											
731	DL/2 Substitution Background Statistics Assuming Normal Distribution										
732	Mean			1.106	SD					0.868	
733	95% UTL/95% Coverage			2.842	95% UPL (t)					2.566	
734	90% Percentile (z)			2.218	95% Percentile (z)					2.534	
735	99% Percentile (z)			3.125	95% USL					3.759	
736	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons										
737											
738	Gamma GOF Tests on Detected Observations Only										
739	A-D Test Statistic			0.521	Anderson-Darling GOF Test						
740	5% A-D Critical Value			0.765	Detected data appear Gamma Distributed at 5% Significance Level						
741	K-S Test Statistic			0.0779	Kolmogorov-Smirnov GOF						
742	5% K-S Critical Value			0.115	Detected data appear Gamma Distributed at 5% Significance Level						
743	Detected data appear Gamma Distributed at 5% Significance Level										
744											
745	Gamma Statistics on Detected Data Only										
746	k hat (MLE)			1.796	k star (bias corrected MLE)					1.719	
747	Theta hat (MLE)			0.643	Theta star (bias corrected MLE)					0.672	
748	nu hat (MLE)			222.6	nu star (bias corrected)					213.2	
749	MLE Mean (bias corrected)			1.155							
750	MLE Sd (bias corrected)			0.881	95% Percentile of Chisquare (2kstar)					8.563	
751											
752	Gamma ROS Statistics using Imputed Non-Detects										
753	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
754	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)										
755	For such situations, GROS method may yield incorrect values of UCLs and BTVs										
756	This is especially true when the sample size is small.										
757	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
758	Minimum			0.0334	Mean					1.105	
759	Maximum			3.5	Median					0.84	
760	SD			0.869	CV					0.787	
761	k hat (MLE)			1.444	k star (bias corrected MLE)					1.388	
762	Theta hat (MLE)			0.765	Theta star (bias corrected MLE)					0.796	
763	nu hat (MLE)			187.8	nu star (bias corrected)					180.4	
764	MLE Mean (bias corrected)			1.105	MLE Sd (bias corrected)					0.938	
765	95% Percentile of Chisquare (2kstar)			7.422	90% Percentile					2.347	
766	95% Percentile			2.955	99% Percentile					4.334	
767	The following statistics are computed using Gamma ROS Statistics on Imputed Data										
768	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
769				WH	HW				WH	HW	
770	95% Approx. Gamma UTL with 95% Coverage			3.562	3.831	95% Approx. Gamma UPL			2.964	3.12	
771	95% Gamma USL			6.113	7.085						
772											
773	Estimates of Gamma Parameters using KM Estimates										
774	Mean (KM)			1.107	SD (KM)					0.86	
775	Variance (KM)			0.74	SE of Mean (KM)					0.108	
776	k hat (KM)			1.658	k star (KM)					1.592	
777	nu hat (KM)			215.6	nu star (KM)					207	
778	theta hat (KM)			0.668	theta star (KM)					0.696	
779	80% gamma percentile (KM)			1.702	90% gamma percentile (KM)					2.275	
780	95% gamma percentile (KM)			2.828	99% gamma percentile (KM)					4.074	

A	B	C	D	E	F	G	H	I	J	K	L
781											
782	The following statistics are computed using gamma distribution and KM estimates										
783	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
784				WH	HW					WH	HW
785	95% Approx. Gamma UTL with 95% Coverage			3.455	3.672	95% Approx. Gamma UPL			2.888	3.011	
786	95% KM Gamma Percentile			2.827	2.94	95% Gamma USL			5.858	6.668	
787											
788	Lognormal GOF Test on Detected Observations Only										
789	Shapiro Wilk Approximate Test Statistic				0.959	Shapiro Wilk GOF Test					
790	5% Shapiro Wilk P Value				0.0898	Detected Data appear Lognormal at 5% Significance Level					
791	Lilliefors Test Statistic				0.0831	Lilliefors GOF Test					
792	5% Lilliefors Critical Value				0.112	Detected Data appear Lognormal at 5% Significance Level					
793	Detected Data appear Lognormal at 5% Significance Level										
794											
795	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects										
796	Mean in Original Scale				1.11	Mean in Log Scale				-0.234	
797	SD in Original Scale				0.864	SD in Log Scale				0.894	
798	95% UTL95% Coverage				4.731	95% BCA UTL95% Coverage				3.16	
799	95% Bootstrap (%) UTL95% Coverage				3.16	95% UPL (t)				3.56	
800	90% Percentile (z)				2.489	95% Percentile (z)				3.444	
801	99% Percentile (z)				6.334	95% USL				12.17	
802											
803	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution										
804	KM Mean of Logged Data				-0.255	95% KM UTL (Lognormal)95% Coverage				5.045	
805	KM SD of Logged Data				0.937	95% KM UPL (Lognormal)				3.744	
806	95% KM Percentile Lognormal (z)				3.617	95% KM USL (Lognormal)				13.58	
807											
808	Background DL/2 Statistics Assuming Lognormal Distribution										
809	Mean in Original Scale				1.106	Mean in Log Scale				-0.26	
810	SD in Original Scale				0.868	SD in Log Scale				0.95	
811	95% UTL95% Coverage				5.152	95% UPL (t)				3.808	
812	90% Percentile (z)				2.604	95% Percentile (z)				3.677	
813	99% Percentile (z)				7.023	95% USL				14.05	
814	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
815											
816	Nonparametric Distribution Free Background Statistics										
817	Data appear to follow a Discernible Distribution at 5% Significance Level										
818											
819	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
820	Order of Statistic, r				64	95% UTL with95% Coverage				3.2	
821	Approx, f used to compute achieved CC				1.684	Approximate Actual Confidence Coefficient achieved by UTL				0.842	
822	Approximate Sample Size needed to achieve specified CC				93	95% UPL				3	
823	95% USL				3.5	95% KM Chebyshev UPL				4.885	
824											
825	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
826	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
827	and consists of observations collected from clean unimpacted locations.										
828	The use of USL tends to provide a balance between false positives and false negatives provided the data										
829	represents a background data set and when many onsite observations need to be compared with the BTV.										
830											
831	IRON, DISSOLVED										
832											

A	B	C	D	E	F	G	H	I	J	K	L	
833	General Statistics											
834	Total Number of Observations			105	Number of Missing Observations				26			
835	Number of Distinct Observations			15								
836	Number of Detects			16	Number of Non-Detects				89			
837	Number of Distinct Detects			13	Number of Distinct Non-Detects				3			
838	Minimum Detect			0.06	Minimum Non-Detect				0.02			
839	Maximum Detect			1.2	Maximum Non-Detect				0.06			
840	Variance Detected			0.139	Percent Non-Detects				84.76%			
841	Mean Detected			0.344	SD Detected				0.373			
842	Mean of Detected Logged Data			-1.598	SD of Detected Logged Data				1.058			
843												
844	Critical Values for Background Threshold Values (BTVs)											
845	Tolerance Factor K (For UTL)			1.916	d2max (for USL)				3.226			
846												
847	Normal GOF Test on Detects Only											
848	Shapiro Wilk Test Statistic			0.767	Shapiro Wilk GOF Test							
849	5% Shapiro Wilk Critical Value			0.887	Data Not Normal at 5% Significance Level							
850	Lilliefors Test Statistic			0.27	Lilliefors GOF Test							
851	5% Lilliefors Critical Value			0.213	Data Not Normal at 5% Significance Level							
852	Data Not Normal at 5% Significance Level											
853												
854	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
855	KM Mean			0.0694	KM SD				0.183			
856	95% UTL95% Coverage			0.42	95% KM UPL (t)				0.375			
857	90% KM Percentile (z)			0.304	95% KM Percentile (z)				0.371			
858	99% KM Percentile (z)			0.495	95% KM USL				0.66			
859												
860	DL/2 Substitution Background Statistics Assuming Normal Distribution											
861	Mean			0.0775	SD				0.182			
862	95% UTL95% Coverage			0.426	95% UPL (t)				0.381			
863	90% Percentile (z)			0.31	95% Percentile (z)				0.377			
864	99% Percentile (z)			0.5	95% USL				0.664			
865	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
866												
867	Gamma GOF Tests on Detected Observations Only											
868	A-D Test Statistic			0.88	Anderson-Darling GOF Test							
869	5% A-D Critical Value			0.762	Data Not Gamma Distributed at 5% Significance Level							
870	K-S Test Statistic			0.243	Kolmogorov-Smirnov GOF							
871	5% K-S Critical Value			0.221	Data Not Gamma Distributed at 5% Significance Level							
872	Data Not Gamma Distributed at 5% Significance Level											
873												
874	Gamma Statistics on Detected Data Only											
875	k hat (MLE)			1.075	k star (bias corrected MLE)				0.915			
876	Theta hat (MLE)			0.32	Theta star (bias corrected MLE)				0.376			
877	nu hat (MLE)			34.4	nu star (bias corrected)				29.29			
878	MLE Mean (bias corrected)			0.344								
879	MLE Sd (bias corrected)			0.36	95% Percentile of Chisquare (2kstar)				5.659			
880												
881	Gamma ROS Statistics using Imputed Non-Detects											
882	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
883	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)											
884	For such situations, GROS method may yield incorrect values of UCLs and BTVs											

A	B	C	D	E	F	G	H	I	J	K	L
885	This is especially true when the sample size is small.										
886	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
887	Minimum	0.01							Mean	0.061	
888	Maximum	1.2							Median	0.01	
889	SD	0.186							CV	3.056	
890	k hat (MLE)	0.475							k star (bias corrected MLE)	0.467	
891	Theta hat (MLE)	0.128							Theta star (bias corrected MLE)	0.13	
892	nu hat (MLE)	99.66							nu star (bias corrected)	98.15	
893	MLE Mean (bias corrected)	0.061							MLE Sd (bias corrected)	0.0892	
894	95% Percentile of Chisquare (2kstar)	3.678							90% Percentile	0.167	
895	95% Percentile	0.24							99% Percentile	0.42	
896	The following statistics are computed using Gamma ROS Statistics on Imputed Data										
897	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
898			WH	HW					WH	HW	
899	95% Approx. Gamma UTL with 95% Coverage	0.223	0.201				95% Approx. Gamma UPL		0.179	0.159	
900	95% Gamma USL	0.574	0.578								
901											
902	Estimates of Gamma Parameters using KM Estimates										
903	Mean (KM)	0.0694							SD (KM)	0.183	
904	Variance (KM)	0.0335							SE of Mean (KM)	0.0185	
905	k hat (KM)	0.144							k star (KM)	0.146	
906	nu hat (KM)	30.2							nu star (KM)	30.67	
907	theta hat (KM)	0.483							theta star (KM)	0.475	
908	80% gamma percentile (KM)	0.0739							90% gamma percentile (KM)	0.205	
909	95% gamma percentile (KM)	0.384							99% gamma percentile (KM)	0.906	
910											
911	The following statistics are computed using gamma distribution and KM estimates										
912	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
913			WH	HW					WH	HW	
914	95% Approx. Gamma UTL with 95% Coverage	0.238	0.218				95% Approx. Gamma UPL		0.197	0.178	
915	95% KM Gamma Percentile	0.193	0.175				95% Gamma USL		0.554	0.548	
916											
917	Lognormal GOF Test on Detected Observations Only										
918	Shapiro Wilk Test Statistic	0.892					Shapiro Wilk GOF Test				
919	5% Shapiro Wilk Critical Value	0.887					Detected Data appear Lognormal at 5% Significance Level				
920	Lilliefors Test Statistic	0.198					Lilliefors GOF Test				
921	5% Lilliefors Critical Value	0.213					Detected Data appear Lognormal at 5% Significance Level				
922	Detected Data appear Lognormal at 5% Significance Level										
923											
924	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects										
925	Mean in Original Scale	0.058							Mean in Log Scale	-5.725	
926	SD in Original Scale	0.187							SD in Log Scale	2.624	
927	95% UTL95% Coverage	0.498							95% BCA UTL95% Coverage	0.67	
928	95% Bootstrap (%) UTL95% Coverage	0.67							95% UPL (t)	0.259	
929	90% Percentile (z)	0.0942							95% Percentile (z)	0.244	
930	99% Percentile (z)	1.461							95% USL	15.49	
931											
932	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution										
933	KM Mean of Logged Data	-3.559							95% KM UTL (Lognormal)95% Coverage	0.167	
934	KM SD of Logged Data	0.923							95% KM UPL (Lognormal)	0.133	
935	95% KM Percentile Lognormal (z)	0.13							95% KM USL (Lognormal)	0.558	
936											

A	B	C	D	E	F	G	H	I	J	K	L
937	Background DL/2 Statistics Assuming Lognormal Distribution										
938	Mean in Original Scale			0.0775	Mean in Log Scale			-3.235			
939	SD in Original Scale			0.182	SD in Log Scale			0.813			
940	95% UTL95% Coverage			0.187	95% UPL (t)			0.153			
941	90% Percentile (z)			0.112	95% Percentile (z)			0.15			
942	99% Percentile (z)			0.261	95% USL			0.541			
943	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
944											
945	Nonparametric Distribution Free Background Statistics										
946	Data appear to follow a Discernible Distribution at 5% Significance Level										
947											
948	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
949	Order of Statistic, r			103	95% UTL with95% Coverage			0.69			
950	Approx, f used to compute achieved CC			1.807	Approximate Actual Confidence Coefficient achieved by UTL			0.901			
951	Approximate Sample Size needed to achieve specified CC			124	95% UPL			0.453			
952	95% USL			1.2	95% KM Chebyshev UPL			0.871			
953											
954	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
955	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
956	and consists of observations collected from clean unimpacted locations.										
957	The use of USL tends to provide a balance between false positives and false negatives provided the data										
958	represents a background data set and when many onsite observations need to be compared with the BTV.										
959											
960	MAGNESIUM, TOTAL										
961											
962	General Statistics										
963	Total Number of Observations			41	Number of Distinct Observations			24			
964					Number of Missing Observations			90			
965	Minimum			8.9	First Quartile			10			
966	Second Largest			12.5	Median			11.1			
967	Maximum			12.5	Third Quartile			11.8			
968	Mean			11.04	SD			0.999			
969	Coefficient of Variation			0.0905	Skewness			-0.42			
970	Mean of logged Data			2.398	SD of logged Data			0.0927			
971											
972	Critical Values for Background Threshold Values (BTVs)										
973	Tolerance Factor K (For UTL)			2.11	d2max (for USL)			2.878			
974											
975	Normal GOF Test										
976	Shapiro Wilk Test Statistic			0.933	Shapiro Wilk GOF Test						
977	5% Shapiro Wilk Critical Value			0.941	Data Not Normal at 5% Significance Level						
978	Lilliefors Test Statistic			0.15	Lilliefors GOF Test						
979	5% Lilliefors Critical Value			0.137	Data Not Normal at 5% Significance Level						
980	Data Not Normal at 5% Significance Level										
981											
982	Background Statistics Assuming Normal Distribution										
983	95% UTL with 95% Coverage			13.15	90% Percentile (z)			12.32			
984	95% UPL (t)			12.75	95% Percentile (z)			12.69			
985	95% USL			13.92	99% Percentile (z)			13.37			
986											
987	Gamma GOF Test										
988	A-D Test Statistic			0.951	Anderson-Darling Gamma GOF Test						

A	B	C	D	E	F	G	H	I	J	K	L
989	5% A-D Critical Value			0.747	Data Not Gamma Distributed at 5% Significance Level						
990	K-S Test Statistic			0.157	Kolmogorov-Smirnov Gamma GOF Test						
991	5% K-S Critical Value			0.137	Data Not Gamma Distributed at 5% Significance Level						
992	Data Not Gamma Distributed at 5% Significance Level										
993											
994	Gamma Statistics										
995	k hat (MLE)			121.4	k star (bias corrected MLE)			112.5			
996	Theta hat (MLE)			0.091	Theta star (bias corrected MLE)			0.0981			
997	nu hat (MLE)			9956	nu star (bias corrected)			9229			
998	MLE Mean (bias corrected)			11.04	MLE Sd (bias corrected)			1.041			
999											
1000	Background Statistics Assuming Gamma Distribution										
1001	95% Wilson Hilferty (WH) Approx. Gamma UPL			12.83	90% Percentile			12.4			
1002	95% Hawkins Wixley (HW) Approx. Gamma UPL			12.84	95% Percentile			12.81			
1003	95% WH Approx. Gamma UTL with 95% Coverage			13.29	99% Percentile			13.61			
1004	95% HW Approx. Gamma UTL with 95% Coverage			13.31							
1005	95% WH USL			14.19	95% HW USL			14.23			
1006											
1007	Lognormal GOF Test										
1008	Shapiro Wilk Test Statistic			0.925	Shapiro Wilk Lognormal GOF Test						
1009	5% Shapiro Wilk Critical Value			0.941	Data Not Lognormal at 5% Significance Level						
1010	Lilliefors Test Statistic			0.156	Lilliefors Lognormal GOF Test						
1011	5% Lilliefors Critical Value			0.137	Data Not Lognormal at 5% Significance Level						
1012	Data Not Lognormal at 5% Significance Level										
1013											
1014	Background Statistics assuming Lognormal Distribution										
1015	95% UTL with 95% Coverage			13.38	90% Percentile (z)			12.39			
1016	95% UPL (t)			12.88	95% Percentile (z)			12.81			
1017	95% USL			14.36	99% Percentile (z)			13.65			
1018											
1019	Nonparametric Distribution Free Background Statistics										
1020	Data do not follow a Discernible Distribution (0.05)										
1021											
1022	Nonparametric Upper Limits for Background Threshold Values										
1023	Order of Statistic, r			41	95% UTL with 95% Coverage			12.5			
1024	Approx, f used to compute achieved CC			2.158	Approximate Actual Confidence Coefficient achieved by UTL			0.878			
1025					Approximate Sample Size needed to achieve specified CC			59			
1026	95% Percentile Bootstrap UTL with 95% Coverage			12.5	95% BCA Bootstrap UTL with 95% Coverage			12.5			
1027	95% UPL			12.49	90% Percentile			12.1			
1028	90% Chebyshev UPL			14.08	95% Percentile			12.4			
1029	95% Chebyshev UPL			15.45	99% Percentile			12.5			
1030	95% USL			12.5							
1031											
1032	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
1033	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
1034	and consists of observations collected from clean unimpacted locations.										
1035	The use of USL tends to provide a balance between false positives and false negatives provided the data										
1036	represents a background data set and when many onsite observations need to be compared with the BTV.										
1037											
1038	MAGNESIUM, DISSOLVED										
1039											
1040	General Statistics										

A	B	C	D	E	F	G	H	I	J	K	L
1041	Total Number of Observations				77	Number of Distinct Observations				34	
1042						Number of Missing Observations				54	
1043	Minimum			7.9	First Quartile			10.6			
1044	Second Largest			12.9	Median			11.1			
1045	Maximum			12.9	Third Quartile			11.5			
1046	Mean			10.94	SD			0.972			
1047	Coefficient of Variation			0.0888	Skewness			-0.837			
1048	Mean of logged Data			2.388	SD of logged Data			0.0934			
1049											
1050	Critical Values for Background Threshold Values (BTVs)										
1051	Tolerance Factor K (For UTL)			1.967	d2max (for USL)			3.118			
1052											
1053	Normal GOF Test										
1054	Shapiro Wilk Test Statistic			0.941	Normal GOF Test						
1055	5% Shapiro Wilk P Value			0.00243	Data Not Normal at 5% Significance Level						
1056	Lilliefors Test Statistic			0.144	Lilliefors GOF Test						
1057	5% Lilliefors Critical Value			0.101	Data Not Normal at 5% Significance Level						
1058	Data Not Normal at 5% Significance Level										
1059											
1060	Background Statistics Assuming Normal Distribution										
1061	95% UTL with 95% Coverage		12.85	90% Percentile (z)		12.18					
1062	95% UPL (t)		12.57	95% Percentile (z)		12.54					
1063	95% USL		13.97	99% Percentile (z)		13.2					
1064											
1065	Gamma GOF Test										
1066	A-D Test Statistic			1.913	Anderson-Darling Gamma GOF Test						
1067	5% A-D Critical Value			0.749	Data Not Gamma Distributed at 5% Significance Level						
1068	K-S Test Statistic			0.158	Kolmogorov-Smirnov Gamma GOF Test						
1069	5% K-S Critical Value			0.101	Data Not Gamma Distributed at 5% Significance Level						
1070	Data Not Gamma Distributed at 5% Significance Level										
1071											
1072	Gamma Statistics										
1073	k hat (MLE)		120.4	k star (bias corrected MLE)		115.8					
1074	Theta hat (MLE)		0.0908	Theta star (bias corrected MLE)		0.0945					
1075	nu hat (MLE)		18547	nu star (bias corrected)		17826					
1076	MLE Mean (bias corrected)		10.94	MLE Sd (bias corrected)		1.017					
1077											
1078	Background Statistics Assuming Gamma Distribution										
1079	95% Wilson Hilferty (WH) Approx. Gamma UPL		12.68	90% Percentile		12.26					
1080	95% Hawkins Wixley (HW) Approx. Gamma UPL		12.69	95% Percentile		12.66					
1081	95% WH Approx. Gamma UTL with 95% Coverage		13	99% Percentile		13.44					
1082	95% HW Approx. Gamma UTL with 95% Coverage		13.02								
1083	95% WH USL		14.34	95% HW USL		14.4					
1084											
1085	Lognormal GOF Test										
1086	Shapiro Wilk Test Statistic			0.911	Shapiro Wilk Lognormal GOF Test						
1087	5% Shapiro Wilk P Value			1.0804E-5	Data Not Lognormal at 5% Significance Level						
1088	Lilliefors Test Statistic			0.164	Lilliefors Lognormal GOF Test						
1089	5% Lilliefors Critical Value			0.101	Data Not Lognormal at 5% Significance Level						
1090	Data Not Lognormal at 5% Significance Level										
1091											
1092	Background Statistics assuming Lognormal Distribution										

A	B	C	D	E	F	G	H	I	J	K	L
1093		95% UTL with	95% Coverage		13.09					90% Percentile (z)	12.28
1094			95% UPL (t)		12.74					95% Percentile (z)	12.7
1095			95% USL		14.58					99% Percentile (z)	13.54
1096											
1097	Nonparametric Distribution Free Background Statistics										
1098	Data do not follow a Discernible Distribution (0.05)										
1099											
1100	Nonparametric Upper Limits for Background Threshold Values										
1101		Order of Statistic, r		76					95% UTL with	95% Coverage	12.9
1102		Approx, f used to compute achieved CC		2		Approximate Actual Confidence Coefficient achieved by UTL				0.903	
1103						Approximate Sample Size needed to achieve specified CC				93	
1104		95% Percentile Bootstrap UTL with	95% Coverage		12.9			95% BCA Bootstrap UTL with	95% Coverage		12.66
1105			95% UPL		12.42					90% Percentile	12
1106			90% Chebyshev UPL		13.87					95% Percentile	12.32
1107			95% Chebyshev UPL		15.2					99% Percentile	12.9
1108			95% USL		12.9						
1109											
1110	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
1111	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
1112	and consists of observations collected from clean unimpacted locations.										
1113	The use of USL tends to provide a balance between false positives and false negatives provided the data										
1114	represents a background data set and when many onsite observations need to be compared with the BTV.										
1115											
1116	MANGANESE, TOTAL										
1117											
1118	General Statistics										
1119		Total Number of Observations		68				Number of Missing Observations			63
1120		Number of Distinct Observations		12							
1121		Number of Detects		65				Number of Non-Detects			3
1122		Number of Distinct Detects		12				Number of Distinct Non-Detects			3
1123		Minimum Detect		0.03				Minimum Non-Detect			0.04
1124		Maximum Detect		0.15				Maximum Non-Detect			0.06
1125		Variance Detected		8.2822E-4				Percent Non-Detects			4.412%
1126		Mean Detected		0.0675				SD Detected			0.0288
1127		Mean of Detected Logged Data		-2.775				SD of Detected Logged Data			0.394
1128											
1129	Critical Values for Background Threshold Values (BTVs)										
1130		Tolerance Factor K (For UTL)		1.991				d2max (for USL)			3.073
1131											
1132	Normal GOF Test on Detects Only										
1133		Shapiro Wilk Test Statistic		0.869		Normal GOF Test on Detected Observations Only					
1134		5% Shapiro Wilk P Value		1.5226E-7		Data Not Normal at 5% Significance Level					
1135		Lilliefors Test Statistic		0.19		Lilliefors GOF Test					
1136		5% Lilliefors Critical Value		0.11		Data Not Normal at 5% Significance Level					
1137	Data Not Normal at 5% Significance Level										
1138											
1139	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
1140		KM Mean		0.0662				KM SD			0.0286
1141		95% UTL	95% Coverage		0.123			95% KM UPL (t)			0.114
1142		90% KM Percentile (z)			0.103			95% KM Percentile (z)			0.113
1143		99% KM Percentile (z)			0.133			95% KM USL			0.154
1144											

A	B	C	D	E	F	G	H	I	J	K	L
1145	DL/2 Substitution Background Statistics Assuming Normal Distribution										
1146	Mean		0.0657		SD		0.0295				
1147	95% UTL		95% Coverage		0.124		95% UPL (t)		0.115		
1148	90% Percentile (z)		0.103		95% Percentile (z)		0.114				
1149	99% Percentile (z)		0.134		95% USL		0.156				
1150	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons										
1151											
1152	Gamma GOF Tests on Detected Observations Only										
1153	A-D Test Statistic		1.768		Anderson-Darling GOF Test						
1154	5% A-D Critical Value		0.753		Data Not Gamma Distributed at 5% Significance Level						
1155	K-S Test Statistic		0.184		Kolmogorov-Smirnov GOF						
1156	5% K-S Critical Value		0.111		Data Not Gamma Distributed at 5% Significance Level						
1157	Data Not Gamma Distributed at 5% Significance Level										
1158											
1159	Gamma Statistics on Detected Data Only										
1160	k hat (MLE)		6.431		k star (bias corrected MLE)		6.144				
1161	Theta hat (MLE)		0.0105		Theta star (bias corrected MLE)		0.011				
1162	nu hat (MLE)		836		nu star (bias corrected)		798.7				
1163	MLE Mean (bias corrected)		0.0675								
1164	MLE Sd (bias corrected)		0.0272		95% Percentile of Chisquare (2kstar)		21.41				
1165											
1166	Gamma ROS Statistics using Imputed Non-Detects										
1167	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
1168	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)										
1169	For such situations, GROS method may yield incorrect values of UCLs and BTVs										
1170	This is especially true when the sample size is small.										
1171	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
1172	Minimum		0.0194		Mean		0.066				
1173	Maximum		0.15		Median		0.06				
1174	SD		0.0291		CV		0.441				
1175	k hat (MLE)		5.854		k star (bias corrected MLE)		5.606				
1176	Theta hat (MLE)		0.0113		Theta star (bias corrected MLE)		0.0118				
1177	nu hat (MLE)		796.2		nu star (bias corrected)		762.4				
1178	MLE Mean (bias corrected)		0.066		MLE Sd (bias corrected)		0.0279				
1179	95% Percentile of Chisquare (2kstar)		19.96		90% Percentile		0.103				
1180	95% Percentile		0.117		99% Percentile		0.147				
1181	The following statistics are computed using Gamma ROS Statistics on Imputed Data										
1182	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
1183			WH		HW		WH		HW		
1184	95% Approx. Gamma UTL with 95% Coverage		0.131		0.133		95% Approx. Gamma UPL		0.118 0.119		
1185	95% Gamma USL		0.184		0.19						
1186											
1187	Estimates of Gamma Parameters using KM Estimates										
1188	Mean (KM)		0.0662		SD (KM)		0.0286				
1189	Variance (KM)		8.2031E-4		SE of Mean (KM)		0.0035				
1190	k hat (KM)		5.343		k star (KM)		5.117				
1191	nu hat (KM)		726.7		nu star (KM)		696				
1192	theta hat (KM)		0.0124		theta star (KM)		0.0129				
1193	80% gamma percentile (KM)		0.0888		90% gamma percentile (KM)		0.105				
1194	95% gamma percentile (KM)		0.121		99% gamma percentile (KM)		0.152				
1195											
1196	The following statistics are computed using gamma distribution and KM estimates										

A	B	C	D	E	F	G	H	I	J	K	L
1197	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
1198				WH	HW					WH	HW
1199	95% Approx. Gamma UTL with 95% Coverage			0.129	0.13	95% Approx. Gamma UPL				0.116	0.117
1200	95% KM Gamma Percentile			0.115	0.116	95% Gamma USL				0.179	0.185
1201											
1202	Lognormal GOF Test on Detected Observations Only										
1203	Shapiro Wilk Approximate Test Statistic				0.934	Shapiro Wilk GOF Test					
1204	5% Shapiro Wilk P Value				0.00247	Data Not Lognormal at 5% Significance Level					
1205	Lilliefors Test Statistic				0.174	Lilliefors GOF Test					
1206	5% Lilliefors Critical Value				0.11	Data Not Lognormal at 5% Significance Level					
1207	Data Not Lognormal at 5% Significance Level										
1208											
1209	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects										
1210	Mean in Original Scale				0.0662	Mean in Log Scale				-2.799	
1211	SD in Original Scale				0.0289	SD in Log Scale				0.404	
1212	95% UTL95% Coverage				0.136	95% BCA UTL95% Coverage				0.143	
1213	95% Bootstrap (%) UTL95% Coverage				0.15	95% UPL (t)				0.12	
1214	90% Percentile (z)				0.102	95% Percentile (z)				0.118	
1215	99% Percentile (z)				0.156	95% USL				0.211	
1216											
1217	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution										
1218	KM Mean of Logged Data				-2.798	95% KM UTL (Lognormal)95% Coverage				0.135	
1219	KM SD of Logged Data				0.4	95% KM UPL (Lognormal)				0.119	
1220	95% KM Percentile Lognormal (z)				0.118	95% KM USL (Lognormal)				0.208	
1221											
1222	Background DL/2 Statistics Assuming Lognormal Distribution										
1223	Mean in Original Scale				0.0657	Mean in Log Scale				-2.816	
1224	SD in Original Scale				0.0295	SD in Log Scale				0.432	
1225	95% UTL95% Coverage				0.141	95% UPL (t)				0.124	
1226	90% Percentile (z)				0.104	95% Percentile (z)				0.122	
1227	99% Percentile (z)				0.163	95% USL				0.226	
1228	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
1229											
1230	Nonparametric Distribution Free Background Statistics										
1231	Data do not follow a Discernible Distribution (0.05)										
1232											
1233	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
1234	Order of Statistic, r				67	95% UTL with95% Coverage				0.15	
1235	Approx, f used to compute achieved CC				1.763	Approximate Actual Confidence Coefficient achieved by UTL				0.86	
1236	Approximate Sample Size needed to achieve specified CC				93	95% UPL				0.126	
1237	95% USL				0.15	95% KM Chebyshev UPL				0.192	
1238											
1239	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
1240	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
1241	and consists of observations collected from clean unimpacted locations.										
1242	The use of USL tends to provide a balance between false positives and false negatives provided the data										
1243	represents a background data set and when many onsite observations need to be compared with the BTV.										
1244											
1245	MANGANESE, DISSOLVED										
1246											
1247	General Statistics										
1248	Total Number of Observations				105	Number of Distinct Observations				15	

A	B	C	D	E	F	G	H	I	J	K	L
1249										Number of Missing Observations	26
1250				Minimum	0.03					First Quartile	0.05
1251				Second Largest	0.16					Median	0.06
1252				Maximum	0.17					Third Quartile	0.07
1253				Mean	0.0654					SD	0.0266
1254				Coefficient of Variation	0.407					Skewness	1.815
1255				Mean of logged Data	-2.792					SD of logged Data	0.347
1256											
1257				Critical Values for Background Threshold Values (BTVs)							
1258				Tolerance Factor K (For UTL)	1.916					d2max (for USL)	3.226
1259											
1260				Normal GOF Test							
1261				Shapiro Wilk Test Statistic	0.807					Normal GOF Test	
1262				5% Shapiro Wilk P Value	0					Data Not Normal at 5% Significance Level	
1263				Lilliefors Test Statistic	0.266					Lilliefors GOF Test	
1264				5% Lilliefors Critical Value	0.0867					Data Not Normal at 5% Significance Level	
1265				Data Not Normal at 5% Significance Level							
1266											
1267				Background Statistics Assuming Normal Distribution							
1268				95% UTL with 95% Coverage	0.116					90% Percentile (z)	0.0996
1269				95% UPL (t)	0.11					95% Percentile (z)	0.109
1270				95% USL	0.151					99% Percentile (z)	0.127
1271											
1272				Gamma GOF Test							
1273				A-D Test Statistic	4.063					Anderson-Darling Gamma GOF Test	
1274				5% A-D Critical Value	0.753					Data Not Gamma Distributed at 5% Significance Level	
1275				K-S Test Statistic	0.233					Kolmogorov-Smirnov Gamma GOF Test	
1276				5% K-S Critical Value	0.0882					Data Not Gamma Distributed at 5% Significance Level	
1277				Data Not Gamma Distributed at 5% Significance Level							
1278											
1279				Gamma Statistics							
1280				k hat (MLE)	7.822					k star (bias corrected MLE)	7.604
1281				Theta hat (MLE)	0.00837					Theta star (bias corrected MLE)	0.0086
1282				nu hat (MLE)	1643					nu star (bias corrected)	1597
1283				MLE Mean (bias corrected)	0.0654					MLE Sd (bias corrected)	0.0237
1284											
1285				Background Statistics Assuming Gamma Distribution							
1286				95% Wilson Hilferty (WH) Approx. Gamma UPL	0.109					90% Percentile	0.0971
1287				95% Hawkins Wixley (HW) Approx. Gamma UPL	0.109					95% Percentile	0.109
1288				95% WH Approx. Gamma UTL with 95% Coverage	0.117					99% Percentile	0.133
1289				95% HW Approx. Gamma UTL with 95% Coverage	0.118						
1290				95% WH USL	0.169					95% HW USL	0.172
1291											
1292				Lognormal GOF Test							
1293				Shapiro Wilk Test Statistic	0.919					Shapiro Wilk Lognormal GOF Test	
1294				5% Shapiro Wilk P Value	4.7463E-7					Data Not Lognormal at 5% Significance Level	
1295				Lilliefors Test Statistic	0.21					Lilliefors Lognormal GOF Test	
1296				5% Lilliefors Critical Value	0.0867					Data Not Lognormal at 5% Significance Level	
1297				Data Not Lognormal at 5% Significance Level							
1298											
1299				Background Statistics assuming Lognormal Distribution							
1300				95% UTL with 95% Coverage	0.119					90% Percentile (z)	0.0957

A	B	C	D	E	F	G	H	I	J	K	L
1301				95% UPL (t)	0.109					95% Percentile (z)	0.109
1302				95% USL	0.188					99% Percentile (z)	0.138
1303											
1304	Nonparametric Distribution Free Background Statistics										
1305	Data do not follow a Discernible Distribution (0.05)										
1306											
1307	Nonparametric Upper Limits for Background Threshold Values										
1308				Order of Statistic, r	103					95% UTL with 95% Coverage	0.15
1309				Approx, f used to compute achieved CC	1.807					Approximate Actual Confidence Coefficient achieved by UTL	0.901
1310										Approximate Sample Size needed to achieve specified CC	124
1311				95% Percentile Bootstrap UTL with 95% Coverage	0.148					95% BCA Bootstrap UTL with 95% Coverage	0.144
1312				95% UPL	0.127					90% Percentile	0.1
1313				90% Chebyshev UPL	0.146					95% Percentile	0.118
1314				95% Chebyshev UPL	0.182					99% Percentile	0.16
1315				95% USL	0.17						
1316											
1317	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
1318	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
1319	and consists of observations collected from clean unimpacted locations.										
1320	The use of USL tends to provide a balance between false positives and false negatives provided the data										
1321	represents a background data set and when many onsite observations need to be compared with the BTV.										
1322											
1323	NITRATE-NITROGEN										
1324											
1325	General Statistics										
1326				Total Number of Observations	127					Number of Missing Observations	4
1327				Number of Distinct Observations	48						
1328				Number of Detects	124					Number of Non-Detects	3
1329				Number of Distinct Detects	48					Number of Distinct Non-Detects	3
1330				Minimum Detect	13.6					Minimum Non-Detect	21
1331				Maximum Detect	24.9					Maximum Non-Detect	23
1332				Variance Detected	4.488					Percent Non-Detects	2.362%
1333				Mean Detected	20.63					SD Detected	2.118
1334				Mean of Detected Logged Data	3.021					SD of Detected Logged Data	0.108
1335											
1336	Critical Values for Background Threshold Values (BTVs)										
1337				Tolerance Factor K (For UTL)	1.889					d2max (for USL)	3.289
1338											
1339	Normal GOF Test on Detects Only										
1340				Shapiro Wilk Test Statistic	0.961					Normal GOF Test on Detected Observations Only	
1341				5% Shapiro Wilk P Value	0.0106					Data Not Normal at 5% Significance Level	
1342				Lilliefors Test Statistic	0.101					Lilliefors GOF Test	
1343				5% Lilliefors Critical Value	0.0799					Data Not Normal at 5% Significance Level	
1344	Data Not Normal at 5% Significance Level										
1345											
1346	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
1347				KM Mean	20.61					KM SD	2.11
1348				95% UTL95% Coverage	24.59					95% KM UPL (t)	24.12
1349				90% KM Percentile (z)	23.31					95% KM Percentile (z)	24.08
1350				99% KM Percentile (z)	25.52					95% KM USL	27.55
1351											
1352	DL/2 Substitution Background Statistics Assuming Normal Distribution										

A	B	C	D	E	F	G	H	I	J	K	L	
1353				Mean	20.4					SD	2.558	
1354				95% UTL/95% Coverage	25.24					95% UPL (t)	24.66	
1355				90% Percentile (z)	23.68					95% Percentile (z)	24.61	
1356				99% Percentile (z)	26.35					95% USL	28.82	
1357	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
1358												
1359	Gamma GOF Tests on Detected Observations Only											
1360				A-D Test Statistic	1.594					Anderson-Darling GOF Test		
1361				5% A-D Critical Value	0.75					Data Not Gamma Distributed at 5% Significance Level		
1362				K-S Test Statistic	0.113					Kolmogorov-Smirnov GOF		
1363				5% K-S Critical Value	0.083					Data Not Gamma Distributed at 5% Significance Level		
1364	Data Not Gamma Distributed at 5% Significance Level											
1365												
1366	Gamma Statistics on Detected Data Only											
1367				k hat (MLE)	89.94					k star (bias corrected MLE)	87.77	
1368				Theta hat (MLE)	0.229					Theta star (bias corrected MLE)	0.235	
1369				nu hat (MLE)	22305					nu star (bias corrected)	21767	
1370				MLE Mean (bias corrected)	20.63							
1371				MLE Sd (bias corrected)	2.202					95% Percentile of Chisquare (2kstar)	207.5	
1372												
1373	Gamma ROS Statistics using Imputed Non-Detects											
1374	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1375	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)											
1376	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1377	This is especially true when the sample size is small.											
1378	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1379				Minimum	13.6					Mean	20.61	
1380				Maximum	24.9					Median	21	
1381				SD	2.099					CV	0.102	
1382				k hat (MLE)	91.56					k star (bias corrected MLE)	89.4	
1383				Theta hat (MLE)	0.225					Theta star (bias corrected MLE)	0.231	
1384				nu hat (MLE)	23257					nu star (bias corrected)	22709	
1385				MLE Mean (bias corrected)	20.61					MLE Sd (bias corrected)	2.18	
1386				95% Percentile of Chisquare (2kstar)	211					90% Percentile	23.45	
1387				95% Percentile	24.32					99% Percentile	26.02	
1388	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
1389	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
1390					WH	HW				WH	HW	
1391				95% Approx. Gamma UTL with 95% Coverage	24.89	24.93				95% Approx. Gamma UPL	24.34	24.37
1392				95% Gamma USL	28.48	28.63						
1393												
1394	Estimates of Gamma Parameters using KM Estimates											
1395				Mean (KM)	20.61					SD (KM)	2.11	
1396				Variance (KM)	4.453					SE of Mean (KM)	0.19	
1397				k hat (KM)	95.36					k star (KM)	93.12	
1398				nu hat (KM)	24222					nu star (KM)	23652	
1399				theta hat (KM)	0.216					theta star (KM)	0.221	
1400				80% gamma percentile (KM)	22.38					90% gamma percentile (KM)	23.39	
1401				95% gamma percentile (KM)	24.24					99% gamma percentile (KM)	25.9	
1402												
1403	The following statistics are computed using gamma distribution and KM estimates											
1404	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											

A	B	C	D	E	F	G	H	I	J	K	L	
1405				WH	HW					WH	HW	
1406	95% Approx. Gamma UTL with 95% Coverage			24.91	24.95	95% Approx. Gamma UPL			24.36	24.39		
1407	95% KM Gamma Percentile			24.31	24.34	95% Gamma USL			28.53	28.68		
1408												
1409	Lognormal GOF Test on Detected Observations Only											
1410	Shapiro Wilk Approximate Test Statistic			0.938	Shapiro Wilk GOF Test							
1411	5% Shapiro Wilk P Value			1.1037E-5	Data Not Lognormal at 5% Significance Level							
1412	Lilliefors Test Statistic			0.118	Lilliefors GOF Test							
1413	5% Lilliefors Critical Value			0.0799	Data Not Lognormal at 5% Significance Level							
1414	Data Not Lognormal at 5% Significance Level											
1415												
1416	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
1417	Mean in Original Scale			20.61	Mean in Log Scale			3.02				
1418	SD in Original Scale			2.1	SD in Log Scale			0.107				
1419	95% UTL95% Coverage			25.08	95% BCA UTL95% Coverage			23.85				
1420	95% Bootstrap (%) UTL95% Coverage			24	95% UPL (t)			24.48				
1421	90% Percentile (z)			23.5	95% Percentile (z)			24.43				
1422	99% Percentile (z)			26.28	95% USL			29.12				
1423												
1424	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
1425	KM Mean of Logged Data			3.02	95% KM UTL (Lognormal)95% Coverage			25.11				
1426	KM SD of Logged Data			0.107	95% KM UPL (Lognormal)			24.5				
1427	95% KM Percentile Lognormal (z)			24.45	95% KM USL (Lognormal)			29.18				
1428												
1429	Background DL/2 Statistics Assuming Lognormal Distribution											
1430	Mean in Original Scale			20.4	Mean in Log Scale			3.007				
1431	SD in Original Scale			2.558	SD in Log Scale			0.143				
1432	95% UTL95% Coverage			26.49	95% UPL (t)			25.65				
1433	90% Percentile (z)			24.28	95% Percentile (z)			25.58				
1434	99% Percentile (z)			28.19	95% USL			32.35				
1435	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
1436												
1437	Nonparametric Distribution Free Background Statistics											
1438	Data do not follow a Discernible Distribution (0.05)											
1439												
1440	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
1441	Order of Statistic, r			124	95% UTL with95% Coverage			24				
1442	Approx, f used to compute achieved CC			1.632	Approximate Actual Confidence Coefficient achieved by UTL			0.884				
1443	Approximate Sample Size needed to achieve specified CC			153	95% UPL			23.56				
1444	95% USL			24.9	95% KM Chebyshev UPL			29.84				
1445												
1446	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1447	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1448	and consists of observations collected from clean unimpacted locations.											
1449	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1450	represents a background data set and when many onsite observations need to be compared with the BTV.											
1451												
1452	pH-FIELD											
1453												
1454	General Statistics											
1455	Total Number of Observations			117	Number of Missing Observations			14				
1456	Number of Distinct Observations			72								

A	B	C	D	E	F	G	H	I	J	K	L
1457	Number of Detects				113	Number of Non-Detects				4	
1458	Number of Distinct Detects				68	Number of Distinct Non-Detects				4	
1459	Minimum Detect				4.15	Minimum Non-Detect				4.75	
1460	Maximum Detect				6.27	Maximum Non-Detect				5.59	
1461	Variance Detected				0.109	Percent Non-Detects				3.419%	
1462	Mean Detected				5.057	SD Detected				0.33	
1463	Mean of Detected Logged Data				1.619	SD of Detected Logged Data				0.064	
1464											
1465	Critical Values for Background Threshold Values (BTVs)										
1466	Tolerance Factor K (For UTL)				1.9	d2max (for USL)				3.262	
1467											
1468	Normal GOF Test on Detects Only										
1469	Shapiro Wilk Test Statistic				0.916	Normal GOF Test on Detected Observations Only					
1470	5% Shapiro Wilk P Value				5.0092E-8	Data Not Normal at 5% Significance Level					
1471	Lilliefors Test Statistic				0.138	Lilliefors GOF Test					
1472	5% Lilliefors Critical Value				0.0837	Data Not Normal at 5% Significance Level					
1473	Data Not Normal at 5% Significance Level										
1474											
1475	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
1476	KM Mean				5.05	KM SD				0.329	
1477	95% UTL95% Coverage				5.676	95% KM UPL (t)				5.598	
1478	90% KM Percentile (z)				5.472	95% KM Percentile (z)				5.591	
1479	99% KM Percentile (z)				5.816	95% KM USL				6.124	
1480											
1481	DL/2 Substitution Background Statistics Assuming Normal Distribution										
1482	Mean				4.974	SD				0.549	
1483	95% UTL95% Coverage				6.017	95% UPL (t)				5.888	
1484	90% Percentile (z)				5.678	95% Percentile (z)				5.877	
1485	99% Percentile (z)				6.251	95% USL				6.765	
1486	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons										
1487											
1488	Gamma GOF Tests on Detected Observations Only										
1489	A-D Test Statistic				2.861	Anderson-Darling GOF Test					
1490	5% A-D Critical Value				0.75	Data Not Gamma Distributed at 5% Significance Level					
1491	K-S Test Statistic				0.128	Kolmogorov-Smirnov GOF					
1492	5% K-S Critical Value				0.0858	Data Not Gamma Distributed at 5% Significance Level					
1493	Data Not Gamma Distributed at 5% Significance Level										
1494											
1495	Gamma Statistics on Detected Data Only										
1496	k hat (MLE)				243.5	k star (bias corrected MLE)				237	
1497	Theta hat (MLE)				0.0208	Theta star (bias corrected MLE)				0.0213	
1498	nu hat (MLE)				55027	nu star (bias corrected)				53568	
1499	MLE Mean (bias corrected)				5.057						
1500	MLE Sd (bias corrected)				0.328	95% Percentile of Chisquare (2kstar)				525.8	
1501											
1502	Gamma ROS Statistics using Imputed Non-Detects										
1503	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
1504	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)										
1505	For such situations, GROS method may yield incorrect values of UCLs and BTVs										
1506	This is especially true when the sample size is small.										
1507	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
1508	Minimum				4.15	Mean				5.051	

A	B	C	D	E	F	G	H	I	J	K	L
1509	Maximum				6.27	Median				5.012	
1510	SD				0.328	CV				0.0649	
1511	k hat (MLE)				246.3	k star (bias corrected MLE)				240	
1512	Theta hat (MLE)				0.0205	Theta star (bias corrected MLE)				0.021	
1513	nu hat (MLE)				57629	nu star (bias corrected)				56153	
1514	MLE Mean (bias corrected)				5.051	MLE Sd (bias corrected)				0.326	
1515	95% Percentile of Chisquare (2kstar)				532	90% Percentile				5.473	
1516	95% Percentile				5.599	99% Percentile				5.84	
1517	The following statistics are computed using Gamma ROS Statistics on Imputed Data										
1518	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
1519			WH	HW					WH	HW	
1520	95% Approx. Gamma UTL with 95% Coverage			5.683	5.684	95% Approx. Gamma UPL			5.601	5.602	
1521	95% Gamma USL			6.172	6.18						
1522	Estimates of Gamma Parameters using KM Estimates										
1523											
1524	Mean (KM)				5.05	SD (KM)				0.329	
1525	Variance (KM)				0.108	SE of Mean (KM)				0.0308	
1526	k hat (KM)				235.2	k star (KM)				229.2	
1527	nu hat (KM)				55036	nu star (KM)				53626	
1528	theta hat (KM)				0.0215	theta star (KM)				0.022	
1529	80% gamma percentile (KM)				5.328	90% gamma percentile (KM)				5.482	
1530	95% gamma percentile (KM)				5.611	99% gamma percentile (KM)				5.858	
1531											
1532	The following statistics are computed using gamma distribution and KM estimates										
1533	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
1534			WH	HW					WH	HW	
1535	95% Approx. Gamma UTL with 95% Coverage			5.685	5.687	95% Approx. Gamma UPL			5.603	5.604	
1536	95% KM Gamma Percentile			5.596	5.597	95% Gamma USL			6.178	6.186	
1537											
1538	Lognormal GOF Test on Detected Observations Only										
1539	Shapiro Wilk Approximate Test Statistic				0.933	Shapiro Wilk GOF Test					
1540	5% Shapiro Wilk P Value				7.9332E-6	Data Not Lognormal at 5% Significance Level					
1541	Lilliefors Test Statistic				0.124	Lilliefors GOF Test					
1542	5% Lilliefors Critical Value				0.0837	Data Not Lognormal at 5% Significance Level					
1543	Data Not Lognormal at 5% Significance Level										
1544											
1545	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects										
1546	Mean in Original Scale				5.051	Mean in Log Scale				1.618	
1547	SD in Original Scale				0.328	SD in Log Scale				0.0636	
1548	95% UTL95% Coverage				5.688	95% BCA UTL95% Coverage				5.94	
1549	95% Bootstrap (%) UTL95% Coverage				5.944	95% UPL (t)				5.604	
1550	90% Percentile (z)				5.469	95% Percentile (z)				5.597	
1551	99% Percentile (z)				5.845	95% USL				6.203	
1552											
1553	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution										
1554	KM Mean of Logged Data				1.617	95% KM UTL (Lognormal)95% Coverage				5.692	
1555	KM SD of Logged Data				0.0641	95% KM UPL (Lognormal)				5.607	
1556	95% KM Percentile Lognormal (z)				5.599	95% KM USL (Lognormal)				6.211	
1557											
1558	Background DL/2 Statistics Assuming Lognormal Distribution										
1559	Mean in Original Scale				4.974	Mean in Log Scale				1.596	
1560	SD in Original Scale				0.549	SD in Log Scale				0.135	

A	B	C	D	E	F	G	H	I	J	K	L
1561			95% UTL95% Coverage		6.38					95% UPL (t)	6.18
1562			90% Percentile (z)		5.868					95% Percentile (z)	6.163
1563			99% Percentile (z)		6.758					95% USL	7.669
1564	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
1565											
1566	Nonparametric Distribution Free Background Statistics										
1567	Data do not follow a Discernible Distribution (0.05)										
1568											
1569	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
1570			Order of Statistic, r		114					95% UTL with95% Coverage	5.94
1571			Approx, f used to compute achieved CC		1.5					Approximate Actual Confidence Coefficient achieved by UTL	0.842
1572			Approximate Sample Size needed to achieve specified CC		153					95% UPL	5.638
1573			95% USL		6.27					95% KM Chebyshev UPL	6.491
1574											
1575	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
1576	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
1577	and consists of observations collected from clean unimpacted locations.										
1578	The use of USL tends to provide a balance between false positives and false negatives provided the data										
1579	represents a background data set and when many onsite observations need to be compared with the BTV.										
1580											
1581	pH-LAB										
1582											
1583	General Statistics										
1584			Total Number of Observations		125					Number of Missing Observations	6
1585			Number of Distinct Observations		77						
1586			Number of Detects		121					Number of Non-Detects	4
1587			Number of Distinct Detects		75					Number of Distinct Non-Detects	4
1588			Minimum Detect		4.43					Minimum Non-Detect	5.22
1589			Maximum Detect		7.08					Maximum Non-Detect	5.67
1590			Variance Detected		0.108					Percent Non-Detects	3.2%
1591			Mean Detected		5.63					SD Detected	0.329
1592			Mean of Detected Logged Data		1.727					SD of Detected Logged Data	0.0578
1593											
1594	Critical Values for Background Threshold Values (BTVs)										
1595			Tolerance Factor K (For UTL)		1.891					d2max (for USL)	3.284
1596											
1597	Normal GOF Test on Detects Only										
1598			Shapiro Wilk Test Statistic		0.961					Normal GOF Test on Detected Observations Only	
1599			5% Shapiro Wilk P Value		0.0125					Data Not Normal at 5% Significance Level	
1600			Lilliefors Test Statistic		0.074					Lilliefors GOF Test	
1601			5% Lilliefors Critical Value		0.0809					Detected Data appear Normal at 5% Significance Level	
1602	Detected Data appear Approximate Normal at 5% Significance Level										
1603											
1604	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
1605			KM Mean		5.617					KM SD	0.334
1606			95% UTL95% Coverage		6.249					95% KM UPL (t)	6.173
1607			90% KM Percentile (z)		6.045					95% KM Percentile (z)	6.166
1608			99% KM Percentile (z)		6.394					95% KM USL	6.714
1609											
1610	DL/2 Substitution Background Statistics Assuming Normal Distribution										
1611			Mean		5.536					SD	0.611
1612			95% UTL95% Coverage		6.693					95% UPL (t)	6.554

A	B	C	D	E	F	G	H	I	J	K	L	
1613			90% Percentile (z)	6.32					95% Percentile (z)	6.542		
1614			99% Percentile (z)	6.959					95% USL	7.544		
1615	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
1616												
1617	Gamma GOF Tests on Detected Observations Only											
1618			A-D Test Statistic	0.986			Anderson-Darling GOF Test					
1619			5% A-D Critical Value	0.75			Data Not Gamma Distributed at 5% Significance Level					
1620			K-S Test Statistic	0.0695			Kolmogorov-Smirnov GOF					
1621			5% K-S Critical Value	0.0838			Detected data appear Gamma Distributed at 5% Significance Level					
1622	Detected data follow Appr. Gamma Distribution at 5% Significance Level											
1623												
1624	Gamma Statistics on Detected Data Only											
1625			k hat (MLE)	300.6					k star (bias corrected MLE)	293.1		
1626			Theta hat (MLE)	0.0187					Theta star (bias corrected MLE)	0.0192		
1627			nu hat (MLE)	72738					nu star (bias corrected)	70936		
1628			MLE Mean (bias corrected)	5.63								
1629			MLE Sd (bias corrected)	0.329					95% Percentile of Chisquare (2kstar)	643.7		
1630												
1631	Gamma ROS Statistics using Imputed Non-Detects											
1632	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1633	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)											
1634	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1635	This is especially true when the sample size is small.											
1636	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1637			Minimum	4.43					Mean	5.616		
1638			Maximum	7.08					Median	5.57		
1639			SD	0.334					CV	0.0594		
1640			k hat (MLE)	290.1					k star (bias corrected MLE)	283.2		
1641			Theta hat (MLE)	0.0194					Theta star (bias corrected MLE)	0.0198		
1642			nu hat (MLE)	72534					nu star (bias corrected)	70795		
1643			MLE Mean (bias corrected)	5.616					MLE Sd (bias corrected)	0.334		
1644			95% Percentile of Chisquare (2kstar)	622.8					90% Percentile	6.048		
1645			95% Percentile	6.176					99% Percentile	6.422		
1646	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
1647	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
1648				WH	HW				WH	HW		
1649			95% Approx. Gamma UTL with 95% Coverage	6.259	6.261				95% Approx. Gamma UPL	6.179	6.18	
1650			95% Gamma USL	6.768	6.776							
1651												
1652	Estimates of Gamma Parameters using KM Estimates											
1653			Mean (KM)	5.617					SD (KM)	0.334		
1654			Variance (KM)	0.112					SE of Mean (KM)	0.0303		
1655			k hat (KM)	282.6					k star (KM)	275.8		
1656			nu hat (KM)	70649					nu star (KM)	68955		
1657			theta hat (KM)	0.0199					theta star (KM)	0.0204		
1658			80% gamma percentile (KM)	5.899					90% gamma percentile (KM)	6.054		
1659			95% gamma percentile (KM)	6.184					99% gamma percentile (KM)	6.433		
1660												
1661	The following statistics are computed using gamma distribution and KM estimates											
1662	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
1663				WH	HW				WH	HW		
1664			95% Approx. Gamma UTL with 95% Coverage	6.262	6.264				95% Approx. Gamma UPL	6.181	6.182	

A	B	C	D	E	F	G	H	I	J	K	L	
1665	95% KM Gamma Percentile			6.174	6.175	95% Gamma USL			6.772	6.781		
1666												
1667	Lognormal GOF Test on Detected Observations Only											
1668	Shapiro Wilk Approximate Test Statistic			0.969	Shapiro Wilk GOF Test							
1669	5% Shapiro Wilk P Value			0.0804	Detected Data appear Lognormal at 5% Significance Level							
1670	Lilliefors Test Statistic			0.0691	Lilliefors GOF Test							
1671	5% Lilliefors Critical Value			0.0809	Detected Data appear Lognormal at 5% Significance Level							
1672	Detected Data appear Lognormal at 5% Significance Level											
1673												
1674	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
1675	Mean in Original Scale			5.617	Mean in Log Scale			1.724				
1676	SD in Original Scale			0.333	SD in Log Scale			0.0587				
1677	95% UTL95% Coverage			6.266	95% BCA UTL95% Coverage			6.176				
1678	95% Bootstrap (%) UTL95% Coverage			6.176	95% UPL (t)			6.183				
1679	90% Percentile (z)			6.045	95% Percentile (z)			6.176				
1680	99% Percentile (z)			6.428	95% USL			6.8				
1681												
1682	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
1683	KM Mean of Logged Data			1.724	95% KM UTL (Lognormal)95% Coverage			6.27				
1684	KM SD of Logged Data			0.0591	95% KM UPL (Lognormal)			6.186				
1685	95% KM Percentile Lognormal (z)			6.179	95% KM USL (Lognormal)			6.807				
1686												
1687	Background DL/2 Statistics Assuming Lognormal Distribution											
1688	Mean in Original Scale			5.536	Mean in Log Scale			1.703				
1689	SD in Original Scale			0.611	SD in Log Scale			0.142				
1690	95% UTL95% Coverage			7.181	95% UPL (t)			6.953				
1691	90% Percentile (z)			6.586	95% Percentile (z)			6.935				
1692	99% Percentile (z)			7.639	95% USL			8.752				
1693	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
1694												
1695	Nonparametric Distribution Free Background Statistics											
1696	Data appear to follow a Discernible Distribution at 5% Significance Level											
1697												
1698	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
1699	Order of Statistic, r			122	95% UTL with95% Coverage			6.18				
1700	Approx, f used to compute achieved CC			1.605	Approximate Actual Confidence Coefficient achieved by UTL			0.876				
1701	Approximate Sample Size needed to achieve specified CC			153	95% UPL			6.107				
1702	95% USL			7.08	95% KM Chebyshev UPL			7.079				
1703												
1704	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1705	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1706	and consists of observations collected from clean unimpacted locations.											
1707	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1708	represents a background data set and when many onsite observations need to be compared with the BTV.											
1709												
1710	POTASSIUM, TOTAL											
1711												
1712	General Statistics											
1713	Total Number of Observations			44	Number of Distinct Observations			19				
1714					Number of Missing Observations			87				
1715	Minimum			1.7	First Quartile			2.185				
1716	Second Largest			2.9	Median			2.4				

A	B	C	D	E	F	G	H	I	J	K	L
1717	Maximum				3.1	Third Quartile				2.6	
1718	Mean				2.382	SD				0.293	
1719	Coefficient of Variation				0.123	Skewness				0.0615	
1720	Mean of logged Data				0.86	SD of logged Data				0.125	
1721											
1722	Critical Values for Background Threshold Values (BTVs)										
1723	Tolerance Factor K (For UTL)				2.091	d2max (for USL)				2.906	
1724											
1725	Normal GOF Test										
1726	Shapiro Wilk Test Statistic				0.985	Shapiro Wilk GOF Test					
1727	5% Shapiro Wilk Critical Value				0.944	Data appear Normal at 5% Significance Level					
1728	Lilliefors Test Statistic				0.0963	Lilliefors GOF Test					
1729	5% Lilliefors Critical Value				0.132	Data appear Normal at 5% Significance Level					
1730	Data appear Normal at 5% Significance Level										
1731											
1732	Background Statistics Assuming Normal Distribution										
1733	95% UTL with 95% Coverage		2.994		90% Percentile (z)		2.757				
1734	95% UPL (t)		2.88		95% Percentile (z)		2.864				
1735	95% USL		3.233		99% Percentile (z)		3.063				
1736											
1737	Gamma GOF Test										
1738	A-D Test Statistic				0.368	Anderson-Darling Gamma GOF Test					
1739	5% A-D Critical Value				0.747	Detected data appear Gamma Distributed at 5% Significance Level					
1740	K-S Test Statistic				0.109	Kolmogorov-Smirnov Gamma GOF Test					
1741	5% K-S Critical Value				0.133	Detected data appear Gamma Distributed at 5% Significance Level					
1742	Detected data appear Gamma Distributed at 5% Significance Level										
1743											
1744	Gamma Statistics										
1745	k hat (MLE)				66.79	k star (bias corrected MLE)				62.25	
1746	Theta hat (MLE)				0.0357	Theta star (bias corrected MLE)				0.0383	
1747	nu hat (MLE)				5877	nu star (bias corrected)				5478	
1748	MLE Mean (bias corrected)				2.382	MLE Sd (bias corrected)				0.302	
1749											
1750	Background Statistics Assuming Gamma Distribution										
1751	95% Wilson Hilferty (WH) Approx. Gamma UPL		2.905		90% Percentile		2.776				
1752	95% Hawkins Wixley (HW) Approx. Gamma UPL		2.909		95% Percentile		2.899				
1753	95% WH Approx. Gamma UTL with 95% Coverage		3.039		99% Percentile		3.14				
1754	95% HW Approx. Gamma UTL with 95% Coverage		3.046								
1755	95% WH USL		3.331		95% HW USL		3.346				
1756											
1757	Lognormal GOF Test										
1758	Shapiro Wilk Test Statistic				0.981	Shapiro Wilk Lognormal GOF Test					
1759	5% Shapiro Wilk Critical Value				0.944	Data appear Lognormal at 5% Significance Level					
1760	Lilliefors Test Statistic				0.116	Lilliefors Lognormal GOF Test					
1761	5% Lilliefors Critical Value				0.132	Data appear Lognormal at 5% Significance Level					
1762	Data appear Lognormal at 5% Significance Level										
1763											
1764	Background Statistics assuming Lognormal Distribution										
1765	95% UTL with 95% Coverage		3.068		90% Percentile (z)		2.773				
1766	95% UPL (t)		2.922		95% Percentile (z)		2.902				
1767	95% USL		3.396		99% Percentile (z)		3.159				
1768											

A	B	C	D	E	F	G	H	I	J	K	L
1769	Nonparametric Distribution Free Background Statistics										
1770	Data appear Normal at 5% Significance Level										
1771											
1772	Nonparametric Upper Limits for Background Threshold Values										
1773	Order of Statistic, r		44	95% UTL with 95% Coverage						3.1	
1774	Approx, f used to compute achieved CC		2.316	Approximate Actual Confidence Coefficient achieved by UTL						0.895	
1775				Approximate Sample Size needed to achieve specified CC						59	
1776	95% Percentile Bootstrap UTL with 95% Coverage		3.07	95% BCA Bootstrap UTL with 95% Coverage						2.9	
1777	95% UPL		2.875	90% Percentile						2.721	
1778	90% Chebyshev UPL		3.27	95% Percentile						2.8	
1779	95% Chebyshev UPL		3.673	99% Percentile						3.014	
1780	95% USL		3.1								
1781											
1782	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
1783	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
1784	and consists of observations collected from clean unimpacted locations.										
1785	The use of USL tends to provide a balance between false positives and false negatives provided the data										
1786	represents a background data set and when many onsite observations need to be compared with the BTV.										
1787											
1788	POTASSIUM, DISSOLVED										
1789											
1790	General Statistics										
1791	Total Number of Observations		72	Number of Distinct Observations						35	
1792				Number of Missing Observations						59	
1793	Minimum		1.7	First Quartile						2.238	
1794	Second Largest		3.1	Median						2.3	
1795	Maximum		3.14	Third Quartile						2.5	
1796	Mean		2.381	SD						0.274	
1797	Coefficient of Variation		0.115	Skewness						0.673	
1798	Mean of logged Data		0.861	SD of logged Data						0.113	
1799											
1800	Critical Values for Background Threshold Values (BTVs)										
1801	Tolerance Factor K (For UTL)		1.98	d2max (for USL)						3.094	
1802											
1803	Normal GOF Test										
1804	Shapiro Wilk Test Statistic		0.932	Normal GOF Test							
1805	5% Shapiro Wilk P Value		7.7522E-4	Data Not Normal at 5% Significance Level							
1806	Lilliefors Test Statistic		0.18	Lilliefors GOF Test							
1807	5% Lilliefors Critical Value		0.104	Data Not Normal at 5% Significance Level							
1808	Data Not Normal at 5% Significance Level										
1809											
1810	Background Statistics Assuming Normal Distribution										
1811	95% UTL with 95% Coverage		2.923	90% Percentile (z)						2.732	
1812	95% UPL (t)		2.84	95% Percentile (z)						2.831	
1813	95% USL		3.228	99% Percentile (z)						3.018	
1814											
1815	Gamma GOF Test										
1816	A-D Test Statistic		1.663	Anderson-Darling Gamma GOF Test							
1817	5% A-D Critical Value		0.749	Data Not Gamma Distributed at 5% Significance Level							
1818	K-S Test Statistic		0.165	Kolmogorov-Smirnov Gamma GOF Test							
1819	5% K-S Critical Value		0.105	Data Not Gamma Distributed at 5% Significance Level							
1820	Data Not Gamma Distributed at 5% Significance Level										

A	B	C	D	E	F	G	H	I	J	K	L
1821											
1822	Gamma Statistics										
1823	k hat (MLE)			78.73		k star (bias corrected MLE)			75.45		
1824	Theta hat (MLE)			0.0302		Theta star (bias corrected MLE)			0.0315		
1825	nu hat (MLE)			11336		nu star (bias corrected)			10865		
1826	MLE Mean (bias corrected)			2.381		MLE Sd (bias corrected)			0.274		
1827											
1828	Background Statistics Assuming Gamma Distribution										
1829	95% Wilson Hilferty (WH) Approx. Gamma UPL			2.852		90% Percentile			2.738		
1830	95% Hawkins Wixley (HW) Approx. Gamma UPL			2.854		95% Percentile			2.849		
1831	95% WH Approx. Gamma UTL with 95% Coverage			2.945		99% Percentile			3.064		
1832	95% HW Approx. Gamma UTL with 95% Coverage			2.948							
1833	95% WH USL			3.305		95% HW USL			3.318		
1834											
1835	Lognormal GOF Test										
1836	Shapiro Wilk Test Statistic			0.949		Shapiro Wilk Lognormal GOF Test					
1837	5% Shapiro Wilk P Value			0.0131		Data Not Lognormal at 5% Significance Level					
1838	Lilliefors Test Statistic			0.157		Lilliefors Lognormal GOF Test					
1839	5% Lilliefors Critical Value			0.104		Data Not Lognormal at 5% Significance Level					
1840	Data Not Lognormal at 5% Significance Level										
1841											
1842	Background Statistics assuming Lognormal Distribution										
1843	95% UTL with 95% Coverage			2.96		90% Percentile (z)			2.735		
1844	95% UPL (t)			2.86		95% Percentile (z)			2.85		
1845	95% USL			3.358		99% Percentile (z)			3.078		
1846											
1847	Nonparametric Distribution Free Background Statistics										
1848	Data do not follow a Discernible Distribution (0.05)										
1849											
1850	Nonparametric Upper Limits for Background Threshold Values										
1851	Order of Statistic, r			71		95% UTL with 95% Coverage			3.1		
1852	Approx, f used to compute achieved CC			1.868		Approximate Actual Confidence Coefficient achieved by UTL			0.881		
1853						Approximate Sample Size needed to achieve specified CC			93		
1854	95% Percentile Bootstrap UTL with 95% Coverage			3.1		95% BCA Bootstrap UTL with 95% Coverage			3.084		
1855	95% UPL			3.064		90% Percentile			2.7		
1856	90% Chebyshev UPL			3.208		95% Percentile			2.972		
1857	95% Chebyshev UPL			3.582		99% Percentile			3.112		
1858	95% USL			3.14							
1859											
1860	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
1861	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
1862	and consists of observations collected from clean unimpacted locations.										
1863	The use of USL tends to provide a balance between false positives and false negatives provided the data										
1864	represents a background data set and when many onsite observations need to be compared with the BTV.										
1865											
1866	SODIUM, TOTAL										
1867											
1868	General Statistics										
1869	Total Number of Observations			73		Number of Missing Observations			58		
1870	Number of Distinct Observations			30							
1871	Number of Detects			70		Number of Non-Detects			3		
1872	Number of Distinct Detects			30		Number of Distinct Non-Detects			1		

	A	B	C	D	E	F	G	H	I	J	K	L
1873				Minimum Detect	7.6					Minimum Non-Detect	11	
1874				Maximum Detect	16.4					Maximum Non-Detect	11	
1875				Variance Detected	2.798					Percent Non-Detects	4.11%	
1876				Mean Detected	12.75					SD Detected	1.673	
1877				Mean of Detected Logged Data	2.537					SD of Detected Logged Data	0.137	
1878												
1879	Critical Values for Background Threshold Values (BTVs)											
1880				Tolerance Factor K (For UTL)	1.977					d2max (for USL)	3.099	
1881												
1882	Normal GOF Test on Detects Only											
1883				Shapiro Wilk Test Statistic	0.966					Normal GOF Test on Detected Observations Only		
1884				5% Shapiro Wilk P Value	0.161					Detected Data appear Normal at 5% Significance Level		
1885				Lilliefors Test Statistic	0.14					Lilliefors GOF Test		
1886				5% Lilliefors Critical Value	0.106					Data Not Normal at 5% Significance Level		
1887	Detected Data appear Approximate Normal at 5% Significance Level											
1888												
1889	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
1890				KM Mean	12.6					KM SD	1.794	
1891				95% UTL95% Coverage	16.15					95% KM UPL (t)	15.61	
1892				90% KM Percentile (z)	14.9					95% KM Percentile (z)	15.55	
1893				99% KM Percentile (z)	16.78					95% KM USL	18.16	
1894												
1895	DL/2 Substitution Background Statistics Assuming Normal Distribution											
1896				Mean	12.46					SD	2.187	
1897				95% UTL95% Coverage	16.78					95% UPL (t)	16.13	
1898				90% Percentile (z)	15.26					95% Percentile (z)	16.05	
1899				99% Percentile (z)	17.55					95% USL	19.24	
1900	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
1901												
1902	Gamma GOF Tests on Detected Observations Only											
1903				A-D Test Statistic	0.903					Anderson-Darling GOF Test		
1904				5% A-D Critical Value	0.749					Data Not Gamma Distributed at 5% Significance Level		
1905				K-S Test Statistic	0.156					Kolmogorov-Smirnov GOF		
1906				5% K-S Critical Value	0.106					Data Not Gamma Distributed at 5% Significance Level		
1907	Data Not Gamma Distributed at 5% Significance Level											
1908												
1909	Gamma Statistics on Detected Data Only											
1910				k hat (MLE)	56.29					k star (bias corrected MLE)	53.88	
1911				Theta hat (MLE)	0.227					Theta star (bias corrected MLE)	0.237	
1912				nu hat (MLE)	7880					nu star (bias corrected)	7544	
1913				MLE Mean (bias corrected)	12.75							
1914				MLE Sd (bias corrected)	1.738					95% Percentile of Chisquare (2kstar)	133	
1915												
1916	Gamma ROS Statistics using Imputed Non-Detects											
1917	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1918	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)											
1919	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1920	This is especially true when the sample size is small.											
1921	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1922				Minimum	7.6					Mean	12.63	
1923				Maximum	16.4					Median	12.5	
1924				SD	1.745					CV	0.138	

A	B	C	D	E	F	G	H	I	J	K	L	
1925	k hat (MLE)				50.82	k star (bias corrected MLE)				48.74		
1926	Theta hat (MLE)				0.249	Theta star (bias corrected MLE)				0.259		
1927	nu hat (MLE)				7420	nu star (bias corrected)				7117		
1928	MLE Mean (bias corrected)				12.63	MLE Sd (bias corrected)				1.809		
1929	95% Percentile of Chisquare (2kstar)				121.5	90% Percentile				15		
1930	95% Percentile				15.75	99% Percentile				17.22		
1931	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
1932	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
1933					WH	HW					WH	HW
1934	95% Approx. Gamma UTL with 95% Coverage				16.4	16.45	95% Approx. Gamma UPL				15.77	15.8
1935	95% Gamma USL				18.9	19.04						
1936												
1937	Estimates of Gamma Parameters using KM Estimates											
1938	Mean (KM)				12.6	SD (KM)				1.794		
1939	Variance (KM)				3.217	SE of Mean (KM)				0.214		
1940	k hat (KM)				49.37	k star (KM)				47.35		
1941	nu hat (KM)				7209	nu star (KM)				6914		
1942	theta hat (KM)				0.255	theta star (KM)				0.266		
1943	80% gamma percentile (KM)				14.11	90% gamma percentile (KM)				15		
1944	95% gamma percentile (KM)				15.76	99% gamma percentile (KM)				17.25		
1945												
1946	The following statistics are computed using gamma distribution and KM estimates											
1947	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
1948					WH	HW					WH	HW
1949	95% Approx. Gamma UTL with 95% Coverage				16.53	16.59	95% Approx. Gamma UPL				15.87	15.91
1950	95% KM Gamma Percentile				15.8	15.84	95% Gamma USL				19.14	19.31
1951												
1952	Lognormal GOF Test on Detected Observations Only											
1953	Shapiro Wilk Approximate Test Statistic				0.945	Shapiro Wilk GOF Test						
1954	5% Shapiro Wilk P Value				0.00773	Data Not Lognormal at 5% Significance Level						
1955	Lilliefors Test Statistic				0.166	Lilliefors GOF Test						
1956	5% Lilliefors Critical Value				0.106	Data Not Lognormal at 5% Significance Level						
1957	Data Not Lognormal at 5% Significance Level											
1958												
1959	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
1960	Mean in Original Scale				12.63	Mean in Log Scale				2.526		
1961	SD in Original Scale				1.743	SD in Log Scale				0.143		
1962	95% UTL95% Coverage				16.61	95% BCA UTL95% Coverage				15.9		
1963	95% Bootstrap (%) UTL95% Coverage				15.9	95% UPL (t)				15.91		
1964	90% Percentile (z)				15.03	95% Percentile (z)				15.84		
1965	99% Percentile (z)				17.46	95% USL				19.51		
1966												
1967	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
1968	KM Mean of Logged Data				2.523	95% KM UTL (Lognormal)95% Coverage				16.79		
1969	KM SD of Logged Data				0.151	95% KM UPL (Lognormal)				16.05		
1970	95% KM Percentile Lognormal (z)				15.97	95% KM USL (Lognormal)				19.88		
1971												
1972	Background DL/2 Statistics Assuming Lognormal Distribution											
1973	Mean in Original Scale				12.46	Mean in Log Scale				2.503		
1974	SD in Original Scale				2.187	SD in Log Scale				0.213		
1975	95% UTL95% Coverage				18.63	95% UPL (t)				17.48		
1976	90% Percentile (z)				16.06	95% Percentile (z)				17.36		

A	B	C	D	E	F	G	H	I	J	K	L
1977	99% Percentile (z)			20.07	95% USL					23.67	
1978	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
1979											
1980	Nonparametric Distribution Free Background Statistics										
1981	Data appear to follow a Discernible Distribution at 5% Significance Level										
1982											
1983	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
1984	Order of Statistic, r			72	95% UTL with 95% Coverage					15.9	
1985	Approx. f used to compute achieved CC			1.895	Approximate Actual Confidence Coefficient achieved by UTL					0.885	
1986	Approximate Sample Size needed to achieve specified CC			93	95% UPL					15.8	
1987	95% USL			16.4	95% KM Chebyshev UPL					20.48	
1988											
1989	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
1990	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
1991	and consists of observations DL collected from clean unimpacted locations.										
1992	The use of USL tends to provide a balance between false positives and false negatives provided the data										
1993	represents a background data set and when many onsite observations need to be compared with the BTV.										
1994											
1995	SODIUM, DISSOLVED										
1996											
1997	General Statistics										
1998	Total Number of Observations			98	Number of Distinct Observations					36	
1999					Number of Missing Observations					33	
2000	Minimum			10.7	First Quartile					12.33	
2001	Second Largest			16	Median					13.05	
2002	Maximum			16.4	Third Quartile					13.95	
2003	Mean			13.11	SD					1.203	
2004	Coefficient of Variation			0.0918	Skewness					0.118	
2005	Mean of logged Data			2.569	SD of logged Data					0.0922	
2006											
2007	Critical Values for Background Threshold Values (BTVs)										
2008	Tolerance Factor K (For UTL)			1.927	d2max (for USL)					3.203	
2009											
2010	Normal GOF Test										
2011	Shapiro Wilk Test Statistic			0.967	Normal GOF Test						
2012	5% Shapiro Wilk P Value			0.0924	Data appear Normal at 5% Significance Level						
2013	Lilliefors Test Statistic			0.0866	Lilliefors GOF Test						
2014	5% Lilliefors Critical Value			0.0897	Data appear Normal at 5% Significance Level						
2015	Data appear Normal at 5% Significance Level										
2016											
2017	Background Statistics Assuming Normal Distribution										
2018	95% UTL with 95% Coverage			15.43	90% Percentile (z)					14.65	
2019	95% UPL (t)			15.12	95% Percentile (z)					15.09	
2020	95% USL			16.96	99% Percentile (z)					15.91	
2021											
2022	Gamma GOF Test										
2023	A-D Test Statistic			0.726	Anderson-Darling Gamma GOF Test						
2024	5% A-D Critical Value			0.75	Detected data appear Gamma Distributed at 5% Significance Level						
2025	K-S Test Statistic			0.0986	Kolmogorov-Smirnov Gamma GOF Test						
2026	5% K-S Critical Value			0.0901	Data Not Gamma Distributed at 5% Significance Level						
2027	Detected data follow Appr. Gamma Distribution at 5% Significance Level										
2028											

	A	B	C	D	E	F	G	H	I	J	K	L	
2029	Gamma Statistics												
2030					k hat (MLE)	119.5					k star (bias corrected MLE)	115.8	
2031					Theta hat (MLE)	0.11					Theta star (bias corrected MLE)	0.113	
2032					nu hat (MLE)	23415					nu star (bias corrected)	22699	
2033					MLE Mean (bias corrected)	13.11					MLE Sd (bias corrected)	1.218	
2034													
2035	Background Statistics Assuming Gamma Distribution												
2036					95% Wilson Hilferty (WH) Approx. Gamma UPL	15.18					90% Percentile	14.69	
2037					95% Hawkins Wixley (HW) Approx. Gamma UPL	15.19					95% Percentile	15.17	
2038					95% WH Approx. Gamma UTL with 95% Coverage	15.53					99% Percentile	16.11	
2039					95% HW Approx. Gamma UTL with 95% Coverage	15.54							
2040					95% WH USL	17.32					95% HW USL	17.37	
2041													
2042	Lognormal GOF Test												
2043					Shapiro Wilk Test Statistic	0.964							Shapiro Wilk Lognormal GOF Test
2044					5% Shapiro Wilk P Value	0.0485							Data Not Lognormal at 5% Significance Level
2045					Lilliefors Test Statistic	0.105							Lilliefors Lognormal GOF Test
2046					5% Lilliefors Critical Value	0.0897							Data Not Lognormal at 5% Significance Level
2047	Data Not Lognormal at 5% Significance Level												
2048													
2049	Background Statistics assuming Lognormal Distribution												
2050					95% UTL with 95% Coverage	15.59					90% Percentile (z)	14.69	
2051					95% UPL (t)	15.23					95% Percentile (z)	15.19	
2052					95% USL	17.54					99% Percentile (z)	16.18	
2053													
2054	Nonparametric Distribution Free Background Statistics												
2055	Data appear Normal at 5% Significance Level												
2056													
2057	Nonparametric Upper Limits for Background Threshold Values												
2058					Order of Statistic, r	96					95% UTL with 95% Coverage	15.8	
2059					Approx, f used to compute achieved CC	1.684					Approximate Actual Confidence Coefficient achieved by UTL	0.873	
2060											Approximate Sample Size needed to achieve specified CC	124	
2061					95% Percentile Bootstrap UTL with 95% Coverage	15.8					95% BCA Bootstrap UTL with 95% Coverage	15.8	
2062					95% UPL	15.21					90% Percentile	14.53	
2063					90% Chebyshev UPL	16.74					95% Percentile	15.03	
2064					95% Chebyshev UPL	18.38					99% Percentile	16.01	
2065					95% USL	16.4							
2066													
2067	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.												
2068	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers												
2069	and consists of observations collected from clean unimpacted locations.												
2070	The use of USL tends to provide a balance between false positives and false negatives provided the data												
2071	represents a background data set and when many onsite observations need to be compared with the BTV.												
2072													
2073	SPEC. COND., FIELD												
2074													
2075	General Statistics												
2076					Total Number of Observations	117					Number of Missing Observations	14	
2077					Number of Distinct Observations	70							
2078					Number of Detects	113					Number of Non-Detects	4	
2079					Number of Distinct Detects	70					Number of Distinct Non-Detects	4	
2080					Minimum Detect	173					Minimum Non-Detect	254	

A	B	C	D	E	F	G	H	I	J	K	L
2081	Maximum Detect				358	Maximum Non-Detect				266	
2082	Variance Detected				1021	Percent Non-Detects				3.419%	
2083	Mean Detected				275.5	SD Detected				31.96	
2084	Mean of Detected Logged Data				5.612	SD of Detected Logged Data				0.123	
2085											
2086	Critical Values for Background Threshold Values (BTVs)										
2087	Tolerance Factor K (For UTL)				1.9	d2max (for USL)				3.262	
2088											
2089	Normal GOF Test on Detects Only										
2090	Shapiro Wilk Test Statistic				0.971	Normal GOF Test on Detected Observations Only					
2091	5% Shapiro Wilk P Value				0.135	Detected Data appear Normal at 5% Significance Level					
2092	Lilliefors Test Statistic				0.0618	Lilliefors GOF Test					
2093	5% Lilliefors Critical Value				0.0837	Detected Data appear Normal at 5% Significance Level					
2094	Detected Data appear Normal at 5% Significance Level										
2095											
2096	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
2097	KM Mean				274.3	KM SD				32.29	
2098	95% UTL95% Coverage				335.6	95% KM UPL (t)				328	
2099	90% KM Percentile (z)				315.6	95% KM Percentile (z)				327.4	
2100	99% KM Percentile (z)				349.4	95% KM USL				379.6	
2101											
2102	DL/2 Substitution Background Statistics Assuming Normal Distribution										
2103	Mean				270.6	SD				41.09	
2104	95% UTL95% Coverage				348.6	95% UPL (t)				339	
2105	90% Percentile (z)				323.2	95% Percentile (z)				338.1	
2106	99% Percentile (z)				366.1	95% USL				404.6	
2107	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons										
2108											
2109	Gamma GOF Tests on Detected Observations Only										
2110	A-D Test Statistic				1.146	Anderson-Darling GOF Test					
2111	5% A-D Critical Value				0.75	Data Not Gamma Distributed at 5% Significance Level					
2112	K-S Test Statistic				0.0731	Kolmogorov-Smirnov GOF					
2113	5% K-S Critical Value				0.0859	Detected data appear Gamma Distributed at 5% Significance Level					
2114	Detected data follow Appr. Gamma Distribution at 5% Significance Level										
2115											
2116	Gamma Statistics on Detected Data Only										
2117	k hat (MLE)				70.03	k star (bias corrected MLE)				68.18	
2118	Theta hat (MLE)				3.934	Theta star (bias corrected MLE)				4.041	
2119	nu hat (MLE)				15827	nu star (bias corrected)				15408	
2120	MLE Mean (bias corrected)				275.5						
2121	MLE Sd (bias corrected)				33.37	95% Percentile of Chisquare (2kstar)				164.6	
2122											
2123	Gamma ROS Statistics using Imputed Non-Detects										
2124	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
2125	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)										
2126	For such situations, GROS method may yield incorrect values of UCLs and BTVs										
2127	This is especially true when the sample size is small.										
2128	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
2129	Minimum				173	Mean				274.4	
2130	Maximum				358	Median				276	
2131	SD				32.01	CV				0.117	
2132	k hat (MLE)				69.75	k star (bias corrected MLE)				67.97	

A	B	C	D	E	F	G	H	I	J	K	L	
2133	Theta hat (MLE)			3.934	Theta star (bias corrected MLE)			4.037				
2134	nu hat (MLE)			16322	nu star (bias corrected)			15905				
2135	MLE Mean (bias corrected)			274.4	MLE Sd (bias corrected)			33.28				
2136	95% Percentile of Chisquare (2kstar)			164.1	90% Percentile			317.8				
2137	95% Percentile			331.3	99% Percentile			357.7				
2138	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
2139	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
2140				WH	HW				WH	HW		
2141	95% Approx. Gamma UTL with 95% Coverage			340.5	341.3	95% Approx. Gamma UPL			331.6	332.2		
2142	95% Gamma USL			395	397.6							
2143												
2144	Estimates of Gamma Parameters using KM Estimates											
2145	Mean (KM)			274.3	SD (KM)			32.29				
2146	Variance (KM)			1042	SE of Mean (KM)			3.027				
2147	k hat (KM)			72.16	k star (KM)			70.31				
2148	nu hat (KM)			16885	nu star (KM)			16453				
2149	theta hat (KM)			3.801	theta star (KM)			3.9				
2150	80% gamma percentile (KM)			301.3	90% gamma percentile (KM)			316.9				
2151	95% gamma percentile (KM)			330.2	99% gamma percentile (KM)			356				
2152												
2153	The following statistics are computed using gamma distribution and KM estimates											
2154	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
2155				WH	HW				WH	HW		
2156	95% Approx. Gamma UTL with 95% Coverage			341.2	342	95% Approx. Gamma UPL			332.2	332.8		
2157	95% KM Gamma Percentile			331.4	332	95% Gamma USL			396.5	399.2		
2158												
2159	Lognormal GOF Test on Detected Observations Only											
2160	Shapiro Wilk Approximate Test Statistic			0.936	Shapiro Wilk GOF Test							
2161	5% Shapiro Wilk P Value			2.0380E-5	Data Not Lognormal at 5% Significance Level							
2162	Lilliefors Test Statistic			0.0811	Lilliefors GOF Test							
2163	5% Lilliefors Critical Value			0.0837	Detected Data appear Lognormal at 5% Significance Level							
2164	Detected Data appear Approximate Lognormal at 5% Significance Level											
2165												
2166	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
2167	Mean in Original Scale			274.3	Mean in Log Scale			5.607				
2168	SD in Original Scale			32.05	SD in Log Scale			0.123				
2169	95% UTL95% Coverage			344	95% BCA UTL95% Coverage			326.4				
2170	95% Bootstrap (%) UTL95% Coverage			329.8	95% UPL (t)			334.2				
2171	90% Percentile (z)			318.8	95% Percentile (z)			333.4				
2172	99% Percentile (z)			362.5	95% USL			406.6				
2173												
2174	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
2175	KM Mean of Logged Data			5.607	95% KM UTL (Lognormal)95% Coverage			344.9				
2176	KM SD of Logged Data			0.124	95% KM UPL (Lognormal)			334.9				
2177	95% KM Percentile Lognormal (z)			334.1	95% KM USL (Lognormal)			408.6				
2178												
2179	Background DL/2 Statistics Assuming Lognormal Distribution											
2180	Mean in Original Scale			270.6	Mean in Log Scale			5.586				
2181	SD in Original Scale			41.09	SD in Log Scale			0.181				
2182	95% UTL95% Coverage			376.4	95% UPL (t)			360.7				
2183	90% Percentile (z)			336.4	95% Percentile (z)			359.3				
2184	99% Percentile (z)			406.6	95% USL			481.7				

A	B	C	D	E	F	G	H	I	J	K	L	
2185	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
2186												
2187	Nonparametric Distribution Free Background Statistics											
2188	Data appear to follow a Discernible Distribution at 5% Significance Level											
2189												
2190	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
2191	Order of Statistic, r	114	95% UTL with 95% Coverage							329		
2192	Approx, f used to compute achieved CC	1.5	Approximate Actual Confidence Coefficient achieved by UTL							0.842		
2193	Approximate Sample Size needed to achieve specified CC	153	95% UPL							326.2		
2194	95% USL	358	95% KM Chebyshev UPL							415.6		
2195												
2196	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
2197	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
2198	and consists of observations collected from clean unimpacted locations.											
2199	The use of USL tends to provide a balance between false positives and false negatives provided the data											
2200	represents a background data set and when many onsite observations need to be compared with the BTV.											
2201												
2202	SPEC. COND., LAB											
2203												
2204	General Statistics											
2205	Total Number of Observations	125	Number of Missing Observations							6		
2206	Number of Distinct Observations	47										
2207	Number of Detects	122	Number of Non-Detects							3		
2208	Number of Distinct Detects	47	Number of Distinct Non-Detects							2		
2209	Minimum Detect	218	Minimum Non-Detect							260		
2210	Maximum Detect	310	Maximum Non-Detect							270		
2211	Variance Detected	300.5	Percent Non-Detects							2.4%		
2212	Mean Detected	271.9	SD Detected							17.34		
2213	Mean of Detected Logged Data	5.603	SD of Detected Logged Data							0.0651		
2214												
2215	Critical Values for Background Threshold Values (BTVs)											
2216	Tolerance Factor K (For UTL)	1.891	d2max (for USL)							3.284		
2217												
2218	Normal GOF Test on Detects Only											
2219	Shapiro Wilk Test Statistic	0.966	Normal GOF Test on Detected Observations Only									
2220	5% Shapiro Wilk P Value	0.0355	Data Not Normal at 5% Significance Level									
2221	Lilliefors Test Statistic	0.0941	Lilliefors GOF Test									
2222	5% Lilliefors Critical Value	0.0806	Data Not Normal at 5% Significance Level									
2223	Data Not Normal at 5% Significance Level											
2224												
2225	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
2226	KM Mean	271.4	KM SD							17.46		
2227	95% UTL 95% Coverage	304.4	95% KM UPL (t)							300.4		
2228	90% KM Percentile (z)	293.8	95% KM Percentile (z)							300.1		
2229	99% KM Percentile (z)	312	95% KM USL							328.7		
2230												
2231	DL/2 Substitution Background Statistics Assuming Normal Distribution											
2232	Mean	268.6	SD							27.32		
2233	95% UTL 95% Coverage	320.2	95% UPL (t)							314		
2234	90% Percentile (z)	303.6	95% Percentile (z)							313.5		
2235	99% Percentile (z)	332.1	95% USL							358.3		
2236	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											

A	B	C	D	E	F	G	H	I	J	K	L
2237											
2238	Gamma GOF Tests on Detected Observations Only										
2239	A-D Test Statistic			1.246	Anderson-Darling GOF Test						
2240	5% A-D Critical Value			0.75	Data Not Gamma Distributed at 5% Significance Level						
2241	K-S Test Statistic			0.103	Kolmogorov-Smirnov GOF						
2242	5% K-S Critical Value			0.0835	Data Not Gamma Distributed at 5% Significance Level						
2243	Data Not Gamma Distributed at 5% Significance Level										
2244											
2245	Gamma Statistics on Detected Data Only										
2246	k hat (MLE)			241.5	k star (bias corrected MLE)					235.5	
2247	Theta hat (MLE)			1.126	Theta star (bias corrected MLE)					1.154	
2248	nu hat (MLE)			58920	nu star (bias corrected)					57472	
2249	MLE Mean (bias corrected)			271.9							
2250	MLE Sd (bias corrected)			17.71	95% Percentile of Chisquare (2kstar)					522.7	
2251											
2252	Gamma ROS Statistics using Imputed Non-Detects										
2253	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
2254	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)										
2255	For such situations, GROS method may yield incorrect values of UCLs and BTVs										
2256	This is especially true when the sample size is small.										
2257	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
2258	Minimum			218	Mean					271.4	
2259	Maximum			310	Median					270	
2260	SD			17.38	CV					0.064	
2261	k hat (MLE)			240.1	k star (bias corrected MLE)					234.3	
2262	Theta hat (MLE)			1.131	Theta star (bias corrected MLE)					1.158	
2263	nu hat (MLE)			60024	nu star (bias corrected)					58585	
2264	MLE Mean (bias corrected)			271.4	MLE Sd (bias corrected)					17.73	
2265	95% Percentile of Chisquare (2kstar)			520.1	90% Percentile					294.4	
2266	95% Percentile			301.2	99% Percentile					314.4	
2267	The following statistics are computed using Gamma ROS Statistics on Imputed Data										
2268	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
2269		WH	HW			WH	HW				
2270	95% Approx. Gamma UTL with 95% Coverage	305.7	305.9		95% Approx. Gamma UPL	301.4	301.5				
2271	95% Gamma USL	333	333.6								
2272											
2273	Estimates of Gamma Parameters using KM Estimates										
2274	Mean (KM)			271.4	SD (KM)					17.46	
2275	Variance (KM)			304.9	SE of Mean (KM)					1.579	
2276	k hat (KM)			241.5	k star (KM)					235.7	
2277	nu hat (KM)			60384	nu star (KM)					58936	
2278	theta hat (KM)			1.124	theta star (KM)					1.151	
2279	80% gamma percentile (KM)			286.1	90% gamma percentile (KM)					294.3	
2280	95% gamma percentile (KM)			301.1	99% gamma percentile (KM)					314.2	
2281											
2282	The following statistics are computed using gamma distribution and KM estimates										
2283	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
2284		WH	HW			WH	HW				
2285	95% Approx. Gamma UTL with 95% Coverage	305.8	306		95% Approx. Gamma UPL	301.5	301.6				
2286	95% KM Gamma Percentile	301.1	301.3		95% Gamma USL	333.3	334				
2287											
2288	Lognormal GOF Test on Detected Observations Only										

A	B	C	D	E	F	G	H	I	J	K	L
2289	Shapiro Wilk Approximate Test Statistic			0.953	Shapiro Wilk GOF Test						
2290	5% Shapiro Wilk P Value			0.00142	Data Not Lognormal at 5% Significance Level						
2291	Lilliefors Test Statistic			0.108	Lilliefors GOF Test						
2292	5% Lilliefors Critical Value			0.0806	Data Not Lognormal at 5% Significance Level						
2293	Data Not Lognormal at 5% Significance Level										
2294											
2295	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects										
2296	Mean in Original Scale			271.4	Mean in Log Scale			5.602			
2297	SD in Original Scale			17.38	SD in Log Scale			0.0653			
2298	95% UTL95% Coverage			306.5	95% BCA UTL95% Coverage			303			
2299	95% Bootstrap (%) UTL95% Coverage			307	95% UPL (t)			301.9			
2300	90% Percentile (z)			294.5	95% Percentile (z)			301.6			
2301	99% Percentile (z)			315.3	95% USL			335.6			
2302											
2303	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution										
2304	KM Mean of Logged Data			5.601	95% KM UTL (Lognormal)95% Coverage			306.7			
2305	KM SD of Logged Data			0.0657	95% KM UPL (Lognormal)			302.1			
2306	95% KM Percentile Lognormal (z)			301.7	95% KM USL (Lognormal)			336			
2307											
2308	Background DL/2 Statistics Assuming Lognormal Distribution										
2309	Mean in Original Scale			268.6	Mean in Log Scale			5.586			
2310	SD in Original Scale			27.32	SD in Log Scale			0.127			
2311	95% UTL95% Coverage			339	95% UPL (t)			329.4			
2312	90% Percentile (z)			313.8	95% Percentile (z)			328.6			
2313	99% Percentile (z)			358.2	95% USL			404.5			
2314	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
2315											
2316	Nonparametric Distribution Free Background Statistics										
2317	Data do not follow a Discernible Distribution (0.05)										
2318											
2319	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
2320	Order of Statistic, r			122	95% UTL with95% Coverage			307			
2321	Approx, f used to compute achieved CC			1.605	Approximate Actual Confidence Coefficient achieved by UTL			0.876			
2322	Approximate Sample Size needed to achieve specified CC			153	95% UPL			299.1			
2323	95% USL			310	95% KM Chebyshev UPL			347.8			
2324											
2325	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
2326	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
2327	and consists of observations collected from clean unimpacted locations.										
2328	The use of USL tends to provide a balance between false positives and false negatives provided the data										
2329	represents a background data set and when many onsite observations need to be compared with the BTV.										
2330											
2331	SULFATE										
2332											
2333	General Statistics										
2334	Total Number of Observations			90	Number of Missing Observations			41			
2335	Number of Distinct Observations			17							
2336	Number of Detects			31	Number of Non-Detects			59			
2337	Number of Distinct Detects			17	Number of Distinct Non-Detects			2			
2338	Minimum Detect			1.1	Minimum Non-Detect			2			
2339	Maximum Detect			5	Maximum Non-Detect			5			
2340	Variance Detected			0.722	Percent Non-Detects			65.56%			

A	B	C	D	E	F	G	H	I	J	K	L
2341	Mean Detected				1.981	SD Detected				0.85	
2342	Mean of Detected Logged Data				0.617	SD of Detected Logged Data				0.349	
2343											
2344	Critical Values for Background Threshold Values (BTVs)										
2345	Tolerance Factor K (For UTL)				1.94	d2max (for USL)				3.173	
2346											
2347	Normal GOF Test on Detects Only										
2348	Shapiro Wilk Test Statistic				0.754	Shapiro Wilk GOF Test					
2349	5% Shapiro Wilk Critical Value				0.929	Data Not Normal at 5% Significance Level					
2350	Lilliefors Test Statistic				0.192	Lilliefors GOF Test					
2351	5% Lilliefors Critical Value				0.156	Data Not Normal at 5% Significance Level					
2352	Data Not Normal at 5% Significance Level										
2353											
2354	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
2355	KM Mean				1.814	KM SD				0.684	
2356	95% UTL95% Coverage				3.141	95% KM UPL (t)				2.957	
2357	90% KM Percentile (z)				2.69	95% KM Percentile (z)				2.939	
2358	99% KM Percentile (z)				3.405	95% KM USL				3.985	
2359											
2360	DL/2 Substitution Background Statistics Assuming Normal Distribution										
2361	Mean				2.171	SD				0.675	
2362	95% UTL95% Coverage				3.481	95% UPL (t)				3.299	
2363	90% Percentile (z)				3.036	95% Percentile (z)				3.281	
2364	99% Percentile (z)				3.741	95% USL				4.313	
2365	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons										
2366											
2367	Gamma GOF Tests on Detected Observations Only										
2368	A-D Test Statistic				1.169	Anderson-Darling GOF Test					
2369	5% A-D Critical Value				0.747	Data Not Gamma Distributed at 5% Significance Level					
2370	K-S Test Statistic				0.139	Kolmogorov-Smirnov GOF					
2371	5% K-S Critical Value				0.158	Detected data appear Gamma Distributed at 5% Significance Level					
2372	Detected data follow Appr. Gamma Distribution at 5% Significance Level										
2373											
2374	Gamma Statistics on Detected Data Only										
2375	k hat (MLE)				7.699	k star (bias corrected MLE)				6.975	
2376	Theta hat (MLE)				0.257	Theta star (bias corrected MLE)				0.284	
2377	nu hat (MLE)				477.3	nu star (bias corrected)				432.5	
2378	MLE Mean (bias corrected)				1.981						
2379	MLE Sd (bias corrected)				0.75	95% Percentile of Chisquare (2kstar)				23.62	
2380											
2381	Gamma ROS Statistics using Imputed Non-Detects										
2382	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
2383	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)										
2384	For such situations, GROS method may yield incorrect values of UCLs and BTVs										
2385	This is especially true when the sample size is small.										
2386	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
2387	Minimum				0.594	Mean				1.811	
2388	Maximum				5	Median				1.683	
2389	SD				0.724	CV				0.4	
2390	k hat (MLE)				7.212	k star (bias corrected MLE)				6.979	
2391	Theta hat (MLE)				0.251	Theta star (bias corrected MLE)				0.259	
2392	nu hat (MLE)				1298	nu star (bias corrected)				1256	

A	B	C	D	E	F	G	H	I	J	K	L	
2393	MLE Mean (bias corrected)				1.811	MLE Sd (bias corrected)				0.685		
2394	95% Percentile of Chisquare (2kstar)				23.63	90% Percentile				2.725		
2395	95% Percentile				3.065	99% Percentile				3.772		
2396	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
2397	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
2398			WH	HW					WH	HW		
2399	95% Approx. Gamma UTL with 95% Coverage				3.338	3.371	95% Approx. Gamma UPL				3.072	3.09
2400	95% Gamma USL				4.758	4.912						
2401												
2402	Estimates of Gamma Parameters using KM Estimates											
2403	Mean (KM)				1.814	SD (KM)				0.684		
2404	Variance (KM)				0.468	SE of Mean (KM)				0.105		
2405	k hat (KM)				7.027	k star (KM)				6.8		
2406	nu hat (KM)				1265	nu star (KM)				1224		
2407	theta hat (KM)				0.258	theta star (KM)				0.267		
2408	80% gamma percentile (KM)				2.358	90% gamma percentile (KM)				2.742		
2409	95% gamma percentile (KM)				3.088	99% gamma percentile (KM)				3.809		
2410												
2411	The following statistics are computed using gamma distribution and KM estimates											
2412	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
2413			WH	HW					WH	HW		
2414	95% Approx. Gamma UTL with 95% Coverage				3.098	3.099	95% Approx. Gamma UPL				2.88	2.875
2415	95% KM Gamma Percentile				2.859	2.853	95% Gamma USL				4.24	4.299
2416												
2417	Lognormal GOF Test on Detected Observations Only											
2418	Shapiro Wilk Test Statistic				0.904	Shapiro Wilk GOF Test						
2419	5% Shapiro Wilk Critical Value				0.929	Data Not Lognormal at 5% Significance Level						
2420	Lilliefors Test Statistic				0.144	Lilliefors GOF Test						
2421	5% Lilliefors Critical Value				0.156	Detected Data appear Lognormal at 5% Significance Level						
2422	Detected Data appear Approximate Lognormal at 5% Significance Level											
2423												
2424	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
2425	Mean in Original Scale				1.82	Mean in Log Scale				0.546		
2426	SD in Original Scale				0.66	SD in Log Scale				0.317		
2427	95% UTL95% Coverage				3.195	95% BCA UTL95% Coverage				3.204		
2428	95% Bootstrap (%) UTL95% Coverage				3.204	95% UPL (t)				2.933		
2429	90% Percentile (z)				2.592	95% Percentile (z)				2.909		
2430	99% Percentile (z)				3.611	95% USL				4.725		
2431												
2432	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
2433	KM Mean of Logged Data				0.543	95% KM UTL (Lognormal)95% Coverage				3.112		
2434	KM SD of Logged Data				0.305	95% KM UPL (Lognormal)				2.867		
2435	95% KM Percentile Lognormal (z)				2.844	95% KM USL (Lognormal)				4.535		
2436												
2437	Background DL/2 Statistics Assuming Lognormal Distribution											
2438	Mean in Original Scale				2.171	Mean in Log Scale				0.722		
2439	SD in Original Scale				0.675	SD in Log Scale				0.345		
2440	95% UTL95% Coverage				4.017	95% UPL (t)				3.662		
2441	90% Percentile (z)				3.201	95% Percentile (z)				3.628		
2442	99% Percentile (z)				4.589	95% USL				6.146		
2443	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
2444												

A	B	C	D	E	F	G	H	I	J	K	L
2445	Nonparametric Distribution Free Background Statistics										
2446	Data appear to follow a Discernible Distribution at 5% Significance Level										
2447											
2448	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
2449	Order of Statistic, r			88	95% UTL with 95% Coverage						5
2450	Approx, f used to compute achieved CC			1.544	Approximate Actual Confidence Coefficient achieved by UTL						0.834
2451	Approximate Sample Size needed to achieve specified CC			124	95% UPL						5
2452	95% USL			5	95% KM Chebyshev UPL						4.812
2453											
2454	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
2455	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
2456	and consists of observations collected from clean unimpacted locations.										
2457	The use of USL tends to provide a balance between false positives and false negatives provided the data										
2458	represents a background data set and when many onsite observations need to be compared with the BTV.										
2459											
2460	ALKALINITY										
2461											
2462	General Statistics										
2463	Total Number of Observations			70	Number of Missing Observations						61
2464	Number of Distinct Observations			5							
2465	Number of Detects			46	Number of Non-Detects						24
2466	Number of Distinct Detects			5	Number of Distinct Non-Detects						1
2467	Minimum Detect			5	Minimum Non-Detect						5
2468	Maximum Detect			8	Maximum Non-Detect						5
2469	Variance Detected			0.622	Percent Non-Detects						34.29%
2470	Mean Detected			5.876	SD Detected						0.789
2471	Mean of Detected Logged Data			1.762	SD of Detected Logged Data						0.132
2472											
2473	Critical Values for Background Threshold Values (BTVs)										
2474	Tolerance Factor K (For UTL)			1.985	d2max (for USL)						3.084
2475											
2476	Normal GOF Test on Detects Only										
2477	Shapiro Wilk Test Statistic			0.826	Shapiro Wilk GOF Test						
2478	5% Shapiro Wilk Critical Value			0.945	Data Not Normal at 5% Significance Level						
2479	Lilliefors Test Statistic			0.242	Lilliefors GOF Test						
2480	5% Lilliefors Critical Value			0.129	Data Not Normal at 5% Significance Level						
2481	Data Not Normal at 5% Significance Level										
2482											
2483	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
2484	KM Mean			5.576	KM SD						0.757
2485	95% UTL 95% Coverage			7.078	95% KM UPL (t)						6.846
2486	90% KM Percentile (z)			6.546	95% KM Percentile (z)						6.82
2487	99% KM Percentile (z)			7.336	95% KM USL						7.91
2488											
2489	DL/2 Substitution Background Statistics Assuming Normal Distribution										
2490	Mean			4.719	SD						1.735
2491	95% UTL 95% Coverage			8.163	95% UPL (t)						7.632
2492	90% Percentile (z)			6.942	95% Percentile (z)						7.573
2493	99% Percentile (z)			8.755	95% USL						10.07
2494	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons										
2495											
2496	Gamma GOF Tests on Detected Observations Only										

A	B	C	D	E	F	G	H	I	J	K	L	
2497	A-D Test Statistic				3.439	Anderson-Darling GOF Test						
2498	5% A-D Critical Value				0.747	Data Not Gamma Distributed at 5% Significance Level						
2499	K-S Test Statistic				0.233	Kolmogorov-Smirnov GOF						
2500	5% K-S Critical Value				0.13	Data Not Gamma Distributed at 5% Significance Level						
2501	Data Not Gamma Distributed at 5% Significance Level											
2502												
2503	Gamma Statistics on Detected Data Only											
2504	k hat (MLE)				58.49	k star (bias corrected MLE)				54.69		
2505	Theta hat (MLE)				0.1	Theta star (bias corrected MLE)				0.107		
2506	nu hat (MLE)				5381	nu star (bias corrected)				5032		
2507	MLE Mean (bias corrected)				5.876							
2508	MLE Sd (bias corrected)				0.795	95% Percentile of Chisquare (2kstar)				134.8		
2509												
2510	Gamma ROS Statistics using Imputed Non-Detects											
2511	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
2512	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)											
2513	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
2514	This is especially true when the sample size is small.											
2515	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
2516	Minimum				3.1	Mean				5.296		
2517	Maximum				8	Median				5		
2518	SD				1.063	CV				0.201		
2519	k hat (MLE)				24.84	k star (bias corrected MLE)				23.79		
2520	Theta hat (MLE)				0.213	Theta star (bias corrected MLE)				0.223		
2521	nu hat (MLE)				3478	nu star (bias corrected)				3330		
2522	MLE Mean (bias corrected)				5.296	MLE Sd (bias corrected)				1.086		
2523	95% Percentile of Chisquare (2kstar)				64.67	90% Percentile				6.727		
2524	95% Percentile				7.2	99% Percentile				8.144		
2525	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
2526	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
2527					WH	HW					WH	HW
2528	95% Approx. Gamma UTL with 95% Coverage				7.627	7.664	95% Approx. Gamma UPL				7.217	7.239
2529	95% Gamma USL				9.227	9.341						
2530												
2531	Estimates of Gamma Parameters using KM Estimates											
2532	Mean (KM)				5.576	SD (KM)				0.757		
2533	Variance (KM)				0.573	SE of Mean (KM)				0.0915		
2534	k hat (KM)				54.28	k star (KM)				51.97		
2535	nu hat (KM)				7600	nu star (KM)				7275		
2536	theta hat (KM)				0.103	theta star (KM)				0.107		
2537	80% gamma percentile (KM)				6.214	90% gamma percentile (KM)				6.587		
2538	95% gamma percentile (KM)				6.906	99% gamma percentile (KM)				7.531		
2539												
2540	The following statistics are computed using gamma distribution and KM estimates											
2541	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
2542					WH	HW					WH	HW
2543	95% Approx. Gamma UTL with 95% Coverage				7.109	7.114	95% Approx. Gamma UPL				6.85	6.851
2544	95% KM Gamma Percentile				6.822	6.822	95% Gamma USL				8.09	8.117
2545												
2546	Lognormal GOF Test on Detected Observations Only											
2547	Shapiro Wilk Test Statistic				0.825	Shapiro Wilk GOF Test						
2548	5% Shapiro Wilk Critical Value				0.945	Data Not Lognormal at 5% Significance Level						

A	B	C	D	E	F	G	H	I	J	K	L	
2549	Lilliefors Test Statistic				0.241	Lilliefors GOF Test						
2550	5% Lilliefors Critical Value				0.129	Data Not Lognormal at 5% Significance Level						
2551	Data Not Lognormal at 5% Significance Level											
2552												
2553	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
2554	Mean in Original Scale				5.341	Mean in Log Scale				1.658		
2555	SD in Original Scale				1.006	SD in Log Scale				0.188		
2556	95% UTL95% Coverage				7.62	95% BCA UTL95% Coverage				6.55		
2557	95% Bootstrap (%) UTL95% Coverage				7.3	95% UPL (t)				7.194		
2558	90% Percentile (z)				6.677	95% Percentile (z)				7.148		
2559	99% Percentile (z)				8.124	95% USL				9.366		
2560												
2561	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
2562	KM Mean of Logged Data				1.71	95% KM UTL (Lognormal)95% Coverage				7.129		
2563	KM SD of Logged Data				0.128	95% KM UPL (Lognormal)				6.855		
2564	95% KM Percentile Lognormal (z)				6.825	95% KM USL (Lognormal)				8.206		
2565												
2566	Background DL/2 Statistics Assuming Lognormal Distribution											
2567	Mean in Original Scale				4.719	Mean in Log Scale				1.472		
2568	SD in Original Scale				1.735	SD in Log Scale				0.418		
2569	95% UTL95% Coverage				10	95% UPL (t)				8.798		
2570	90% Percentile (z)				7.45	95% Percentile (z)				8.672		
2571	99% Percentile (z)				11.53	95% USL				15.83		
2572	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
2573												
2574	Nonparametric Distribution Free Background Statistics											
2575	Data do not follow a Discernible Distribution (0.05)											
2576												
2577	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
2578	Order of Statistic, r				69	95% UTL with95% Coverage				7.3		
2579	Approx, f used to compute achieved CC				1.816	Approximate Actual Confidence Coefficient achieved by UTL				0.871		
2580	Approximate Sample Size needed to achieve specified CC				93	95% UPL				7		
2581	95% USL				8	95% KM Chebyshev UPL				8.898		
2582												
2583	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
2584	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
2585	and consists of observations collected from clean unimpacted locations.											
2586	The use of USL tends to provide a balance between false positives and false negatives provided the data											
2587	represents a background data set and when many onsite observations need to be compared with the BTV.											
2588												
2589	TDS (TOTAL DISSOLVED SOLIDS)											
2590												
2591	General Statistics											
2592	Total Number of Observations				103	Number of Distinct Observations				64		
2593						Number of Missing Observations				28		
2594	Minimum				127	First Quartile				180.5		
2595	Second Largest				286	Median				200		
2596	Maximum				294	Third Quartile				228		
2597	Mean				203.2	SD				34.29		
2598	Coefficient of Variation				0.169	Skewness				0.291		
2599	Mean of logged Data				5.3	SD of logged Data				0.17		
2600												

A	B	C	D	E	F	G	H	I	J	K	L
2601	Critical Values for Background Threshold Values (BTVs)										
2602	Tolerance Factor K (For UTL)			1.919	d2max (for USL)						3.22
2603											
2604	Normal GOF Test										
2605	Shapiro Wilk Test Statistic			0.978	Normal GOF Test						
2606	5% Shapiro Wilk P Value			0.427	Data appear Normal at 5% Significance Level						
2607	Lilliefors Test Statistic			0.0865	Lilliefors GOF Test						
2608	5% Lilliefors Critical Value			0.0876	Data appear Normal at 5% Significance Level						
2609	Data appear Normal at 5% Significance Level										
2610											
2611	Background Statistics Assuming Normal Distribution										
2612	95% UTL with	95% Coverage	269	90% Percentile (z)						247.1	
2613	95% UPL (t)		260.4	95% Percentile (z)						259.6	
2614	95% USL		313.6	99% Percentile (z)						283	
2615											
2616	Gamma GOF Test										
2617	A-D Test Statistic			0.255	Anderson-Darling Gamma GOF Test						
2618	5% A-D Critical Value			0.75	Detected data appear Gamma Distributed at 5% Significance Level						
2619	K-S Test Statistic			0.0642	Kolmogorov-Smirnov Gamma GOF Test						
2620	5% K-S Critical Value			0.0884	Detected data appear Gamma Distributed at 5% Significance Level						
2621	Detected data appear Gamma Distributed at 5% Significance Level										
2622											
2623	Gamma Statistics										
2624	k hat (MLE)		35.33	k star (bias corrected MLE)						34.31	
2625	Theta hat (MLE)		5.75	Theta star (bias corrected MLE)						5.922	
2626	nu hat (MLE)		7279	nu star (bias corrected)						7068	
2627	MLE Mean (bias corrected)		203.2	MLE Sd (bias corrected)						34.69	
2628											
2629	Background Statistics Assuming Gamma Distribution										
2630	95% Wilson Hilferty (WH) Approx. Gamma UPL			263.7	90% Percentile						248.7
2631	95% Hawkins Wixley (HW) Approx. Gamma UPL			264.3	95% Percentile						263.4
2632	95% WH Approx. Gamma UTL with	95% Coverage	274.1	99% Percentile						292.5	
2633	95% HW Approx. Gamma UTL with	95% Coverage	274.9								
2634	95% WH USL		332.4	95% HW USL						335.5	
2635											
2636	Lognormal GOF Test										
2637	Shapiro Wilk Test Statistic			0.982	Shapiro Wilk Lognormal GOF Test						
2638	5% Shapiro Wilk P Value			0.62	Data appear Lognormal at 5% Significance Level						
2639	Lilliefors Test Statistic			0.0531	Lilliefors Lognormal GOF Test						
2640	5% Lilliefors Critical Value			0.0876	Data appear Lognormal at 5% Significance Level						
2641	Data appear Lognormal at 5% Significance Level										
2642											
2643	Background Statistics assuming Lognormal Distribution										
2644	95% UTL with	95% Coverage	277.7	90% Percentile (z)						249.2	
2645	95% UPL (t)		266.1	95% Percentile (z)						265.1	
2646	95% USL		346.6	99% Percentile (z)						297.7	
2647											
2648	Nonparametric Distribution Free Background Statistics										
2649	Data appear Normal at 5% Significance Level										
2650											
2651	Nonparametric Upper Limits for Background Threshold Values										
2652	Order of Statistic, r		101	95% UTL with 95% Coverage						276	

A	B	C	D	E	F	G	H	I	J	K	L
2653	Approx, f used to compute achieved CC				1.772	Approximate Actual Confidence Coefficient achieved by UTL				0.894	
2654						Approximate Sample Size needed to achieve specified CC				124	
2655	95% Percentile Bootstrap UTL with 95% Coverage			275.6	95% BCA Bootstrap UTL with 95% Coverage			275.4			
2656	95% UPL			268.2	90% Percentile			247.8			
2657	90% Chebyshev UPL			306.6	95% Percentile			260.9			
2658	95% Chebyshev UPL			353.4	99% Percentile			285.8			
2659	95% USL			294							
2660											
2661	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
2662	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
2663	and consists of observations collected from clean unimpacted locations.										
2664	The use of USL tends to provide a balance between false positives and false negatives provided the data										
2665	represents a background data set and when many onsite observations need to be compared with the BTV.										
2666											
2667	TOC (TOTAL ORGANIC CARBON)										
2668											
2669	General Statistics										
2670	Total Number of Observations				126	Number of Missing Observations				5	
2671	Number of Distinct Observations				16						
2672	Number of Detects				29	Number of Non-Detects				97	
2673	Number of Distinct Detects				16	Number of Distinct Non-Detects				3	
2674	Minimum Detect				0.5	Minimum Non-Detect				0.5	
2675	Maximum Detect				1.6	Maximum Non-Detect				1.5	
2676	Variance Detected				0.0885	Percent Non-Detects				76.98%	
2677	Mean Detected				1.032	SD Detected				0.297	
2678	Mean of Detected Logged Data				-0.0128	SD of Detected Logged Data				0.314	
2679											
2680	Critical Values for Background Threshold Values (BTVs)										
2681	Tolerance Factor K (For UTL)				1.89	d2max (for USL)				3.287	
2682											
2683	Normal GOF Test on Detects Only										
2684	Shapiro Wilk Test Statistic				0.962	Shapiro Wilk GOF Test					
2685	5% Shapiro Wilk Critical Value				0.926	Detected Data appear Normal at 5% Significance Level					
2686	Lilliefors Test Statistic				0.112	Lilliefors GOF Test					
2687	5% Lilliefors Critical Value				0.161	Detected Data appear Normal at 5% Significance Level					
2688	Detected Data appear Normal at 5% Significance Level										
2689											
2690	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
2691	KM Mean				0.7	KM SD				0.258	
2692	95% UTL95% Coverage				1.188	95% KM UPL (t)				1.129	
2693	90% KM Percentile (z)				1.031	95% KM Percentile (z)				1.124	
2694	99% KM Percentile (z)				1.3	95% KM USL				1.548	
2695											
2696	DL/2 Substitution Background Statistics Assuming Normal Distribution										
2697	Mean				0.611	SD				0.28	
2698	95% UTL95% Coverage				1.139	95% UPL (t)				1.076	
2699	90% Percentile (z)				0.969	95% Percentile (z)				1.071	
2700	99% Percentile (z)				1.261	95% USL				1.53	
2701	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons										
2702											
2703	Gamma GOF Tests on Detected Observations Only										
2704	A-D Test Statistic				0.581	Anderson-Darling GOF Test					

A	B	C	D	E	F	G	H	I	J	K	L
2705	5% A-D Critical Value			0.745	Detected data appear Gamma Distributed at 5% Significance Level						
2706	K-S Test Statistic			0.152	Kolmogorov-Smirnov GOF						
2707	5% K-S Critical Value			0.162	Detected data appear Gamma Distributed at 5% Significance Level						
2708	Detected data appear Gamma Distributed at 5% Significance Level										
2709											
2710	Gamma Statistics on Detected Data Only										
2711	k hat (MLE)			11.36	k star (bias corrected MLE)			10.21			
2712	Theta hat (MLE)			0.0909	Theta star (bias corrected MLE)			0.101			
2713	nu hat (MLE)			658.8	nu star (bias corrected)			592			
2714	MLE Mean (bias corrected)			1.032							
2715	MLE Sd (bias corrected)			0.323	95% Percentile of Chisquare (2kstar)			31.93			
2716											
2717	Gamma ROS Statistics using Imputed Non-Detects										
2718	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
2719	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)										
2720	For such situations, GROS method may yield incorrect values of UCLs and BTVs										
2721	This is especially true when the sample size is small.										
2722	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
2723	Minimum			0.01	Mean			0.632			
2724	Maximum			1.6	Median			0.599			
2725	SD			0.334	CV			0.529			
2726	k hat (MLE)			2.781	k star (bias corrected MLE)			2.72			
2727	Theta hat (MLE)			0.227	Theta star (bias corrected MLE)			0.232			
2728	nu hat (MLE)			700.9	nu star (bias corrected)			685.5			
2729	MLE Mean (bias corrected)			0.632	MLE Sd (bias corrected)			0.383			
2730	95% Percentile of Chisquare (2kstar)			11.75	90% Percentile			1.145			
2731	95% Percentile			1.364	99% Percentile			1.842			
2732	The following statistics are computed using Gamma ROS Statistics on Imputed Data										
2733	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
2734				WH	HW				WH	HW	
2735	95% Approx. Gamma UTL with 95% Coverage			1.508	1.588	95% Approx. Gamma UPL			1.362	1.42	
2736	95% Gamma USL			2.649	2.986						
2737											
2738	Estimates of Gamma Parameters using KM Estimates										
2739	Mean (KM)			0.7	SD (KM)			0.258			
2740	Variance (KM)			0.0666	SE of Mean (KM)			0.0341			
2741	k hat (KM)			7.353	k star (KM)			7.183			
2742	nu hat (KM)			1853	nu star (KM)			1810			
2743	theta hat (KM)			0.0952	theta star (KM)			0.0974			
2744	80% gamma percentile (KM)			0.905	90% gamma percentile (KM)			1.048			
2745	95% gamma percentile (KM)			1.177	99% gamma percentile (KM)			1.445			
2746											
2747	The following statistics are computed using gamma distribution and KM estimates										
2748	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
2749				WH	HW				WH	HW	
2750	95% Approx. Gamma UTL with 95% Coverage			1.197	1.2	95% Approx. Gamma UPL			1.124	1.124	
2751	95% KM Gamma Percentile			1.118	1.118	95% Gamma USL			1.722	1.756	
2752											
2753	Lognormal GOF Test on Detected Observations Only										
2754	Shapiro Wilk Test Statistic			0.936	Shapiro Wilk GOF Test						
2755	5% Shapiro Wilk Critical Value			0.926	Detected Data appear Lognormal at 5% Significance Level						
2756	Lilliefors Test Statistic			0.171	Lilliefors GOF Test						

A	B	C	D	E	F	G	H	I	J	K	L	
2757	5% Lilliefors Critical Value			0.161	Data Not Lognormal at 5% Significance Level							
2758	Detected Data appear Approximate Lognormal at 5% Significance Level											
2759												
2760	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
2761	Mean in Original Scale			0.668	Mean in Log Scale			-0.492				
2762	SD in Original Scale			0.29	SD in Log Scale			0.421				
2763	95% UTL95% Coverage			1.356	95% BCA UTL95% Coverage			1.2				
2764	95% Bootstrap (%) UTL95% Coverage			1.4	95% UPL (t)			1.233				
2765	90% Percentile (z)			1.05	95% Percentile (z)			1.223				
2766	99% Percentile (z)			1.63	95% USL			2.443				
2767												
2768	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
2769	KM Mean of Logged Data			-0.413	95% KM UTL (Lognormal)95% Coverage			1.21				
2770	KM SD of Logged Data			0.319	95% KM UPL (Lognormal)			1.126				
2771	95% KM Percentile Lognormal (z)			1.119	95% KM USL (Lognormal)			1.889				
2772												
2773	Background DL/2 Statistics Assuming Lognormal Distribution											
2774	Mean in Original Scale			0.611	Mean in Log Scale			-0.574				
2775	SD in Original Scale			0.28	SD in Log Scale			0.385				
2776	95% UTL95% Coverage			1.167	95% UPL (t)			1.069				
2777	90% Percentile (z)			0.923	95% Percentile (z)			1.062				
2778	99% Percentile (z)			1.381	95% USL			1.999				
2779	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
2780												
2781	Nonparametric Distribution Free Background Statistics											
2782	Data appear to follow a Discernible Distribution at 5% Significance Level											
2783												
2784	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
2785	Order of Statistic, r		123	95% UTL with95% Coverage			1.5					
2786	Approx, f used to compute achieved CC		1.618	Approximate Actual Confidence Coefficient achieved by UTL			0.88					
2787	Approximate Sample Size needed to achieve specified CC		153	95% UPL			1.4					
2788	95% USL		1.6	95% KM Chebyshev UPL			1.829					
2789												
2790	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
2791	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
2792	and consists of observations collected from clean unimpacted locations.											
2793	The use of USL tends to provide a balance between false positives and false negatives provided the data											
2794	represents a background data set and when many onsite observations need to be compared with the BTV.											
2795												
2796	TOTAL PHENOLICS											
2797												
2798	General Statistics											
2799	Total Number of Observations			127	Number of Missing Observations			4				
2800	Number of Distinct Observations			4								
2801	Number of Detects			2	Number of Non-Detects			125				
2802	Number of Distinct Detects			2	Number of Distinct Non-Detects			3				
2803	Minimum Detect			0.009	Minimum Non-Detect			0.005				
2804	Maximum Detect			0.01	Maximum Non-Detect			0.03				
2805	Variance Detected			5.0000E-7	Percent Non-Detects			98.43%				
2806	Mean Detected			0.0095	SD Detected			7.0711E-4				
2807	Mean of Detected Logged Data			-4.658	SD of Detected Logged Data			0.0745				
2808												

A	B	C	D	E	F	G	H	I	J	K	L		
2809	Warning: Data set has only 2 Detected Values.												
2810	This is not enough to compute meaningful or reliable statistics and estimates.												
2811													
2812													
2813	Critical Values for Background Threshold Values (BTVs)												
2814	Tolerance Factor K (For UTL)			1.889		d2max (for USL)			3.289				
2815													
2816	Normal GOF Test on Detects Only												
2817	Not Enough Data to Perform GOF Test												
2818													
2819	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution												
2820	KM Mean			0.00531		KM SD			0.00111				
2821	95% UTL95% Coverage			0.00741		95% KM UPL (t)			0.00716				
2822	90% KM Percentile (z)			0.00674		95% KM Percentile (z)			0.00714				
2823	99% KM Percentile (z)			0.0079		95% KM USL			0.00897				
2824													
2825	DL/2 Substitution Background Statistics Assuming Normal Distribution												
2826	Mean			0.0109		SD			0.00534				
2827	95% UTL95% Coverage			0.0209		95% UPL (t)			0.0197				
2828	90% Percentile (z)			0.0177		95% Percentile (z)			0.0196				
2829	99% Percentile (z)			0.0233		95% USL			0.0284				
2830	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons												
2831													
2832	Gamma GOF Tests on Detected Observations Only												
2833	Not Enough Data to Perform GOF Test												
2834													
2835	Gamma Statistics on Detected Data Only												
2836	k hat (MLE)			360.7		k star (bias corrected MLE)			N/A				
2837	Theta hat (MLE)			2.6340E-5		Theta star (bias corrected MLE)			N/A				
2838	nu hat (MLE)			1443		nu star (bias corrected)			N/A				
2839	MLE Mean (bias corrected)			N/A									
2840	MLE Sd (bias corrected)			N/A		95% Percentile of Chisquare (2kstar)			N/A				
2841													
2842	Estimates of Gamma Parameters using KM Estimates												
2843	Mean (KM)			0.00531		SD (KM)			0.00111				
2844	Variance (KM)			1.2401E-6		SE of Mean (KM)			3.1512E-4				
2845	k hat (KM)			22.72		k star (KM)			22.19				
2846	nu hat (KM)			5771		nu star (KM)			5636				
2847	theta hat (KM)			2.3362E-4		theta star (KM)			2.3921E-4				
2848	80% gamma percentile (KM)			0.00623		90% gamma percentile (KM)			0.00679				
2849	95% gamma percentile (KM)			0.00729		99% gamma percentile (KM)			0.00827				
2850													
2851	The following statistics are computed using gamma distribution and KM estimates												
2852	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods												
2853				WH		HW					WH		HW
2854	95% Approx. Gamma UTL with 95% Coverage			0.00719		0.00716		95% Approx. Gamma UPL			0.00693	0.00691	
2855	95% KM Gamma Percentile			0.00691		0.00689		95% Gamma USL			0.0089	0.00888	
2856													
2857	Lognormal GOF Test on Detected Observations Only												
2858	Not Enough Data to Perform GOF Test												
2859													
2860	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects												

A	B	C	D	E	G	H	I	J	K	L
2861			Mean in Original Scale	0.0069				Mean in Log Scale		-4.989
2862			SD in Original Scale	0.00108				SD in Log Scale		0.156
2863			95% UTL95% Coverage	0.00915				95% BCA UTL95% Coverage		0.0091
2864			95% Bootstrap (%) UTL95% Coverage	0.00914				95% UPL (t)		0.00883
2865			90% Percentile (z)	0.00832				95% Percentile (z)		0.00881
2866			99% Percentile (z)	0.0098				95% USL		0.0114
2867										
2868	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution									
2869			KM Mean of Logged Data	-5.254				95% KM UTL (Lognormal)95% Coverage		0.00707
2870			KM SD of Logged Data	0.16				95% KM UPL (Lognormal)		0.00682
2871			95% KM Percentile Lognormal (z)	0.0068				95% KM USL (Lognormal)		0.00885
2872										
2873	Background DL/2 Statistics Assuming Lognormal Distribution									
2874			Mean in Original Scale	0.0109				Mean in Log Scale		-4.712
2875			SD in Original Scale	0.00534				SD in Log Scale		0.69
2876			95% UTL95% Coverage	0.0331				95% UPL (t)		0.0283
2877			90% Percentile (z)	0.0218				95% Percentile (z)		0.0279
2878			99% Percentile (z)	0.0447				95% USL		0.0869
2879	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.									
2880										
2881	Nonparametric Distribution Free Background Statistics									
2882	Data do not follow a Discernible Distribution (0.05)									
2883										
2884	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)									
2885			Order of Statistic, r	124				95% UTL with95% Coverage		0.03
2886			Approx, f used to compute achieved CC	1.632				Approximate Actual Confidence Coefficient achieved by UTL		0.884
2887			Approximate Sample Size needed to achieve specified CC	153				95% UPL		0.03
2888			95% USL	0.03				95% KM Chebyshev UPL		0.0102
2889										
2890	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.									
2891	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers									
2892	and consists of observations collected from clean unimpacted locations.									
2893	The use of USL tends to provide a balance between false positives and false negatives provided the data									
2894	represents a background data set and when many onsite observations need to be compared with the BTV.									
2895										
2896	TURBIDITY									
2897										
2898	General Statistics									
2899			Total Number of Observations	109				Number of Missing Observations		22
2900			Number of Distinct Observations	105						
2901			Number of Detects	106				Number of Non-Detects		3
2902			Number of Distinct Detects	102				Number of Distinct Non-Detects		3
2903			Minimum Detect	1.23				Minimum Non-Detect		2.5
2904			Maximum Detect	169				Maximum Non-Detect		3.6
2905			Variance Detected	1692				Percent Non-Detects		2.752%
2906			Mean Detected	39.09				SD Detected		41.14
2907			Mean of Detected Logged Data	2.981				SD of Detected Logged Data		1.321
2908										
2909	Critical Values for Background Threshold Values (BTVs)									
2910			Tolerance Factor K (For UTL)	1.91				d2max (for USL)		3.239
2911										
2912	Normal GOF Test on Detects Only									

A	B	C	D	E	F	G	H	I	J	K	L
2913	Shapiro Wilk Test Statistic			0.815	Normal GOF Test on Detected Observations Only						
2914	5% Shapiro Wilk P Value			0	Data Not Normal at 5% Significance Level						
2915	Lilliefors Test Statistic			0.186	Lilliefors GOF Test						
2916	5% Lilliefors Critical Value			0.0863	Data Not Normal at 5% Significance Level						
2917	Data Not Normal at 5% Significance Level										
2918											
2919	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
2920	KM Mean			38.06	KM SD			40.84			
2921	95% UTL95% Coverage			116.1	95% KM UPL (t)			106.1			
2922	90% KM Percentile (z)			90.39	95% KM Percentile (z)			105.2			
2923	99% KM Percentile (z)			133.1	95% KM USL			170.3			
2924											
2925	DL/2 Substitution Background Statistics Assuming Normal Distribution										
2926	Mean			38.05	SD			41.03			
2927	95% UTL95% Coverage			116.4	95% UPL (t)			106.4			
2928	90% Percentile (z)			90.64	95% Percentile (z)			105.5			
2929	99% Percentile (z)			133.5	95% USL			170.9			
2930	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons										
2931											
2932	Gamma GOF Tests on Detected Observations Only										
2933	A-D Test Statistic			0.861	Anderson-Darling GOF Test						
2934	5% A-D Critical Value			0.79	Data Not Gamma Distributed at 5% Significance Level						
2935	K-S Test Statistic			0.0759	Kolmogorov-Smirnov GOF						
2936	5% K-S Critical Value			0.091	Detected data appear Gamma Distributed at 5% Significance Level						
2937	Detected data follow Appr. Gamma Distribution at 5% Significance Level										
2938											
2939	Gamma Statistics on Detected Data Only										
2940	k hat (MLE)			0.859	k star (bias corrected MLE)			0.841			
2941	Theta hat (MLE)			45.51	Theta star (bias corrected MLE)			46.48			
2942	nu hat (MLE)			182.1	nu star (bias corrected)			178.3			
2943	MLE Mean (bias corrected)			39.09							
2944	MLE Sd (bias corrected)			42.62	95% Percentile of Chisquare (2kstar)			5.359			
2945											
2946	Gamma ROS Statistics using Imputed Non-Detects										
2947	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
2948	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)										
2949	For such situations, GROS method may yield incorrect values of UCLs and BTVs										
2950	This is especially true when the sample size is small.										
2951	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
2952	Minimum			0.01	Mean			38.02			
2953	Maximum			169	Median			22.5			
2954	SD			41.06	CV			1.08			
2955	k hat (MLE)			0.748	k star (bias corrected MLE)			0.734			
2956	Theta hat (MLE)			50.8	Theta star (bias corrected MLE)			51.8			
2957	nu hat (MLE)			163.2	nu star (bias corrected)			160			
2958	MLE Mean (bias corrected)			38.02	MLE Sd (bias corrected)			44.38			
2959	95% Percentile of Chisquare (2kstar)			4.912	90% Percentile			94.37			
2960	95% Percentile			127.2	99% Percentile			205.3			
2961	The following statistics are computed using Gamma ROS Statistics on Imputed Data										
2962	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
2963				WH	HW				WH	HW	
2964	95% Approx. Gamma UTL with 95% Coverage			147.4	162.8	95% Approx. Gamma UPL			123.3	132.7	

A	B	C	D	E	F	G	H	I	J	K	L
2965	95% Gamma USL		335.2	426.2							
2966											
2967	Estimates of Gamma Parameters using KM Estimates										
2968	Mean (KM)			38.06				SD (KM)		40.84	
2969	Variance (KM)			1668				SE of Mean (KM)		3.93	
2970	k hat (KM)			0.869				k star (KM)		0.851	
2971	nu hat (KM)			189.4				nu star (KM)		185.5	
2972	theta hat (KM)			43.81				theta star (KM)		44.73	
2973	80% gamma percentile (KM)			61.98				90% gamma percentile (KM)		91.17	
2974	95% gamma percentile (KM)			120.8				99% gamma percentile (KM)		190.3	
2975											
2976	The following statistics are computed using gamma distribution and KM estimates										
2977	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
2978				WH	HW				WH	HW	
2979	95% Approx. Gamma UTL with 95% Coverage			143.2	155	95% Approx. Gamma UPL			120.2	127.1	
2980	95% KM Gamma Percentile			118.3	124.8	95% Gamma USL			321.1	395.4	
2981											
2982	Lognormal GOF Test on Detected Observations Only										
2983	Shapiro Wilk Approximate Test Statistic			0.94	Shapiro Wilk GOF Test						
2984	5% Shapiro Wilk P Value			1.5592E-4	Data Not Lognormal at 5% Significance Level						
2985	Lilliefors Test Statistic			0.0736	Lilliefors GOF Test						
2986	5% Lilliefors Critical Value			0.0863	Detected Data appear Lognormal at 5% Significance Level						
2987	Detected Data appear Approximate Lognormal at 5% Significance Level										
2988											
2989	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects										
2990	Mean in Original Scale			38.07				Mean in Log Scale		2.922	
2991	SD in Original Scale			41.01				SD in Log Scale		1.35	
2992	95% UTL95% Coverage			244.9				95% BCA UTL95% Coverage		141.6	
2993	95% Bootstrap (%) UTL95% Coverage			141.6				95% UPL (t)		176.2	
2994	90% Percentile (z)			104.8				95% Percentile (z)		171.1	
2995	99% Percentile (z)			429.5				95% USL		1472	
2996											
2997	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution										
2998	KM Mean of Logged Data			2.915	95% KM UTL (Lognormal)95% Coverage			246.1			
2999	KM SD of Logged Data			1.356	95% KM UPL (Lognormal)			176.8			
3000	95% KM Percentile Lognormal (z)			171.7	95% KM USL (Lognormal)			1491			
3001											
3002	Background DL/2 Statistics Assuming Lognormal Distribution										
3003	Mean in Original Scale			38.05				Mean in Log Scale		2.91	
3004	SD in Original Scale			41.03				SD in Log Scale		1.371	
3005	95% UTL95% Coverage			251.8				95% UPL (t)		180.3	
3006	90% Percentile (z)			106.3				95% Percentile (z)		174.9	
3007	99% Percentile (z)			445.3				95% USL		1555	
3008	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
3009											
3010	Nonparametric Distribution Free Background Statistics										
3011	Data appear to follow a Discernible Distribution at 5% Significance Level										
3012											
3013	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
3014	Order of Statistic, r			107	95% UTL with95% Coverage			144			
3015	Approx, f used to compute achieved CC			1.877	Approximate Actual Confidence Coefficient achieved by UTL			0.914			
3016	Approximate Sample Size needed to achieve specified CC			124	95% UPL			127			

A	B	C	D	E	F	G	H	I	J	K	L
3017	95% USL				169	95% KM Chebyshev UPL				216.9	
3018											
3019	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
3020	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
3021	and consists of observations collected from clean unimpacted locations.										
3022	The use of USL tends to provide a balance between false positives and false negatives provided the data										
3023	represents a background data set and when many onsite observations need to be compared with the BTV.										
3024											
3025	BENZENE										
3026											
3027	General Statistics										
3028	Total Number of Observations				131	Number of Missing Observations				0	
3029	Number of Distinct Observations				1						
3030	Number of Detects				0	Number of Non-Detects				131	
3031	Number of Distinct Detects				0	Number of Distinct Non-Detects				1	
3032	Minimum Detect				N/A	Minimum Non-Detect				1	
3033	Maximum Detect				N/A	Maximum Non-Detect				1	
3034	Variance Detected				N/A	Percent Non-Detects				100%	
3035	Mean Detected				N/A	SD Detected				N/A	
3036	Mean of Detected Logged Data				N/A	SD of Detected Logged Data				N/A	
3037											
3038	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
3039	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
3040	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
3041											
3042	The data set for variable BENZENE was not processed!										
3043											
3044											
3045	1,2-DIBROMOETHANE (EDB) (ETHYLENE DIBROMIDE)										
3046											
3047	General Statistics										
3048	Total Number of Observations				127	Number of Missing Observations				4	
3049	Number of Distinct Observations				1						
3050	Number of Detects				0	Number of Non-Detects				127	
3051	Number of Distinct Detects				0	Number of Distinct Non-Detects				1	
3052	Minimum Detect				N/A	Minimum Non-Detect				1	
3053	Maximum Detect				N/A	Maximum Non-Detect				1	
3054	Variance Detected				N/A	Percent Non-Detects				100%	
3055	Mean Detected				N/A	SD Detected				N/A	
3056	Mean of Detected Logged Data				N/A	SD of Detected Logged Data				N/A	
3057											
3058	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
3059	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
3060	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
3061											
3062	The data set for variable 1,2-DIBROMOETHANE (EDB) (ETHYLENE DIBROMIDE) was not processed!										
3063											
3064											
3065	1,1-DICHLOROETHANE										
3066											
3067	General Statistics										
3068	Total Number of Observations				131	Number of Missing Observations				0	

A	B	C	D	E	F	G	H	I	J	K	L
3069	Number of Distinct Observations			1							
3070	Number of Detects			0	Number of Non-Detects						131
3071	Number of Distinct Detects			0	Number of Distinct Non-Detects						1
3072	Minimum Detect			N/A	Minimum Non-Detect						1
3073	Maximum Detect			N/A	Maximum Non-Detect						1
3074	Variance Detected			N/A	Percent Non-Detects						100%
3075	Mean Detected			N/A	SD Detected						N/A
3076	Mean of Detected Logged Data			N/A	SD of Detected Logged Data						N/A
3077											
3078	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
3079	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
3080	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
3081											
3082	The data set for variable 1,1-DICHLOROETHANE was not processed!										
3083											
3084											
3085	1,1-DICHLOROETHENE										
3086											
3087	General Statistics										
3088	Total Number of Observations			131	Number of Missing Observations						0
3089	Number of Distinct Observations			1							
3090	Number of Detects			0	Number of Non-Detects						131
3091	Number of Distinct Detects			0	Number of Distinct Non-Detects						1
3092	Minimum Detect			N/A	Minimum Non-Detect						1
3093	Maximum Detect			N/A	Maximum Non-Detect						1
3094	Variance Detected			N/A	Percent Non-Detects						100%
3095	Mean Detected			N/A	SD Detected						N/A
3096	Mean of Detected Logged Data			N/A	SD of Detected Logged Data						N/A
3097											
3098	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
3099	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
3100	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
3101											
3102	The data set for variable 1,1-DICHLOROETHENE was not processed!										
3103											
3104											
3105	1,2-DICHLOROETHANE										
3106											
3107	General Statistics										
3108	Total Number of Observations			131	Number of Missing Observations						0
3109	Number of Distinct Observations			2							
3110	Number of Detects			0	Number of Non-Detects						131
3111	Number of Distinct Detects			0	Number of Distinct Non-Detects						2
3112	Minimum Detect			N/A	Minimum Non-Detect						1
3113	Maximum Detect			N/A	Maximum Non-Detect						2
3114	Variance Detected			N/A	Percent Non-Detects						100%
3115	Mean Detected			N/A	SD Detected						N/A
3116	Mean of Detected Logged Data			N/A	SD of Detected Logged Data						N/A
3117											
3118	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
3119	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
3120	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										

A	B	C	D	E	F	G	H	I	J	K	L	
3121												
3122	The data set for variable 1,2-DICHLOROETHANE was not processed!											
3123												
3124												
3125	cis 1,2-DICHLOROETHENE											
3126												
3127	General Statistics											
3128	Total Number of Observations	128							Number of Missing Observations	3		
3129	Number of Distinct Observations	2										
3130	Number of Detects	0							Number of Non-Detects	128		
3131	Number of Distinct Detects	0							Number of Distinct Non-Detects	2		
3132	Minimum Detect	N/A							Minimum Non-Detect	1		
3133	Maximum Detect	N/A							Maximum Non-Detect	2		
3134	Variance Detected	N/A							Percent Non-Detects	100%		
3135	Mean Detected	N/A							SD Detected	N/A		
3136	Mean of Detected Logged Data	N/A							SD of Detected Logged Data	N/A		
3137												
3138	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
3139	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
3140	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
3141												
3142	The data set for variable cis 1,2-DICHLOROETHENE was not processed!											
3143												
3144												
3145	trans 1,2-DICHLOROETHENE											
3146												
3147	General Statistics											
3148	Total Number of Observations	131							Number of Missing Observations	0		
3149	Number of Distinct Observations	1										
3150	Number of Detects	0							Number of Non-Detects	131		
3151	Number of Distinct Detects	0							Number of Distinct Non-Detects	1		
3152	Minimum Detect	N/A							Minimum Non-Detect	1		
3153	Maximum Detect	N/A							Maximum Non-Detect	1		
3154	Variance Detected	N/A							Percent Non-Detects	100%		
3155	Mean Detected	N/A							SD Detected	N/A		
3156	Mean of Detected Logged Data	N/A							SD of Detected Logged Data	N/A		
3157												
3158	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
3159	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
3160	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
3161												
3162	The data set for variable trans 1,2-DICHLOROETHENE was not processed!											
3163												
3164												
3165	ETHYLBENZENE											
3166												
3167	General Statistics											
3168	Total Number of Observations	131							Number of Missing Observations	0		
3169	Number of Distinct Observations	1										
3170	Number of Detects	0							Number of Non-Detects	131		
3171	Number of Distinct Detects	0							Number of Distinct Non-Detects	1		
3172	Minimum Detect	N/A							Minimum Non-Detect	1		

A	B	C	D	E	F	G	H	I	J	K	L	
3225	TOLUENE											
3226												
3227	General Statistics											
3228	Total Number of Observations	129						Number of Missing Observations	2			
3229	Number of Distinct Observations	1										
3230	Number of Detects	0						Number of Non-Detects	129			
3231	Number of Distinct Detects	0						Number of Distinct Non-Detects	1			
3232	Minimum Detect	N/A						Minimum Non-Detect	1			
3233	Maximum Detect	N/A						Maximum Non-Detect	1			
3234	Variance Detected	N/A						Percent Non-Detects	100%			
3235	Mean Detected	N/A						SD Detected	N/A			
3236	Mean of Detected Logged Data	N/A						SD of Detected Logged Data	N/A			
3237												
3238	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
3239	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
3240	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
3241												
3242	The data set for variable TOLUENE was not processed!											
3243												
3244												
3245	1,1,1-TRICHLOROETHANE											
3246												
3247	General Statistics											
3248	Total Number of Observations	131						Number of Missing Observations	0			
3249	Number of Distinct Observations	1										
3250	Number of Detects	0						Number of Non-Detects	131			
3251	Number of Distinct Detects	0						Number of Distinct Non-Detects	1			
3252	Minimum Detect	N/A						Minimum Non-Detect	1			
3253	Maximum Detect	N/A						Maximum Non-Detect	1			
3254	Variance Detected	N/A						Percent Non-Detects	100%			
3255	Mean Detected	N/A						SD Detected	N/A			
3256	Mean of Detected Logged Data	N/A						SD of Detected Logged Data	N/A			
3257												
3258	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
3259	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
3260	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
3261												
3262	The data set for variable 1,1,1-TRICHLOROETHANE was not processed!											
3263												
3264												
3265	TRICHLOROETHENE											
3266												
3267	General Statistics											
3268	Total Number of Observations	131						Number of Missing Observations	0			
3269	Number of Distinct Observations	1										
3270	Number of Detects	0						Number of Non-Detects	131			
3271	Number of Distinct Detects	0						Number of Distinct Non-Detects	1			
3272	Minimum Detect	N/A						Minimum Non-Detect	1			
3273	Maximum Detect	N/A						Maximum Non-Detect	1			
3274	Variance Detected	N/A						Percent Non-Detects	100%			
3275	Mean Detected	N/A						SD Detected	N/A			
3276	Mean of Detected Logged Data	N/A						SD of Detected Logged Data	N/A			

A	B	C	D	E	F	G	H	I	J	K	L	
3277												
3278	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
3279	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
3280	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
3281												
3282	The data set for variable TRICHLOROETHENE was not processed!											
3283												
3284												
3285	VINYL CHLORIDE											
3286												
3287	General Statistics											
3288	Total Number of Observations	126						Number of Missing Observations	5			
3289	Number of Distinct Observations	1										
3290	Number of Detects	0						Number of Non-Detects	126			
3291	Number of Distinct Detects	0						Number of Distinct Non-Detects	1			
3292	Minimum Detect	N/A						Minimum Non-Detect	1			
3293	Maximum Detect	N/A						Maximum Non-Detect	1			
3294	Variance Detected	N/A						Percent Non-Detects	100%			
3295	Mean Detected	N/A						SD Detected	N/A			
3296	Mean of Detected Logged Data	N/A						SD of Detected Logged Data	N/A			
3297												
3298	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
3299	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
3300	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
3301												
3302	The data set for variable VINYL CHLORIDE was not processed!											
3303												
3304												
3305	XYLENES (TOTAL)											
3306												
3307	General Statistics											
3308	Total Number of Observations	128						Number of Missing Observations	3			
3309	Number of Distinct Observations	4										
3310	Number of Detects	0						Number of Non-Detects	128			
3311	Number of Distinct Detects	0						Number of Distinct Non-Detects	4			
3312	Minimum Detect	N/A						Minimum Non-Detect	1			
3313	Maximum Detect	N/A						Maximum Non-Detect	5			
3314	Variance Detected	N/A						Percent Non-Detects	100%			
3315	Mean Detected	N/A						SD Detected	N/A			
3316	Mean of Detected Logged Data	N/A						SD of Detected Logged Data	N/A			
3317												
3318	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
3319	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
3320	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
3321												
3322	The data set for variable XYLENES (TOTAL) was not processed!											
3323												
3324												
3325	ARSENIC, TOTAL											
3326												
3327	General Statistics											
3328	Total Number of Observations	33						Number of Missing Observations	98			

A	B	C	D	E	F	G	H	I	J	K	L
3329	Number of Distinct Observations			5							
3330	Number of Detects			1	Number of Non-Detects						32
3331	Number of Distinct Detects			1	Number of Distinct Non-Detects						4
3332	Minimum Detect			0.004	Minimum Non-Detect						0.0033
3333	Maximum Detect			0.004	Maximum Non-Detect						0.009
3334	Variance Detected			N/A	Percent Non-Detects						96.97%
3335	Mean Detected			0.004	SD Detected						N/A
3336	Mean of Detected Logged Data			-5.521	SD of Detected Logged Data						N/A
3337											
3338	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!										
3339	It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).										
3340											
3341	The data set for variable ARSENIC, TOTAL was not processed!										
3342											
3343											
3344	ARSENIC, DISSOLVED										
3345											
3346	General Statistics										
3347	Total Number of Observations			33	Number of Missing Observations						98
3348	Number of Distinct Observations			4							
3349	Number of Detects			0	Number of Non-Detects						33
3350	Number of Distinct Detects			0	Number of Distinct Non-Detects						4
3351	Minimum Detect			N/A	Minimum Non-Detect						0.003
3352	Maximum Detect			N/A	Maximum Non-Detect						0.008
3353	Variance Detected			N/A	Percent Non-Detects						100%
3354	Mean Detected			N/A	SD Detected						N/A
3355	Mean of Detected Logged Data			N/A	SD of Detected Logged Data						N/A
3356											
3357	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
3358	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
3359	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
3360											
3361	The data set for variable ARSENIC, DISSOLVED was not processed!										
3362											
3363											
3364	BARIUM, TOTAL										
3365											
3366	General Statistics										
3367	Total Number of Observations			32	Number of Distinct Observations						8
3368					Number of Missing Observations						99
3369	Minimum			0.07	First Quartile						0.08
3370	Second Largest			0.17	Median						0.09
3371	Maximum			0.17	Third Quartile						0.1
3372	Mean			0.0947	SD						0.0246
3373	Coefficient of Variation			0.26	Skewness						1.976
3374	Mean of logged Data			-2.384	SD of logged Data						0.223
3375											
3376	Critical Values for Background Threshold Values (BTVs)										
3377	Tolerance Factor K (For UTL)			2.186	d2max (for USL)						2.773
3378											
3379	Normal GOF Test										
3380	Shapiro Wilk Test Statistic			0.752	Shapiro Wilk GOF Test						

A	B	C	D	E	F	G	H	I	J	K	L	
3381	5% Shapiro Wilk Critical Value			0.93	Data Not Normal at 5% Significance Level							
3382	Lilliefors Test Statistic			0.294	Lilliefors GOF Test							
3383	5% Lilliefors Critical Value			0.154	Data Not Normal at 5% Significance Level							
3384	Data Not Normal at 5% Significance Level											
3385												
3386	Background Statistics Assuming Normal Distribution											
3387	95% UTL with 95% Coverage			0.149	90% Percentile (z)							0.126
3388	95% UPL (t)			0.137	95% Percentile (z)							0.135
3389	95% USL			0.163	99% Percentile (z)							0.152
3390												
3391	Gamma GOF Test											
3392	A-D Test Statistic			2.171	Anderson-Darling Gamma GOF Test							
3393	5% A-D Critical Value			0.745	Data Not Gamma Distributed at 5% Significance Level							
3394	K-S Test Statistic			0.276	Kolmogorov-Smirnov Gamma GOF Test							
3395	5% K-S Critical Value			0.155	Data Not Gamma Distributed at 5% Significance Level							
3396	Data Not Gamma Distributed at 5% Significance Level											
3397												
3398	Gamma Statistics											
3399	k hat (MLE)			19.05	k star (bias corrected MLE)							17.29
3400	Theta hat (MLE)			0.00497	Theta star (bias corrected MLE)							0.00548
3401	nu hat (MLE)			1219	nu star (bias corrected)							1106
3402	MLE Mean (bias corrected)			0.0947	MLE Sd (bias corrected)							0.0228
3403												
3404	Background Statistics Assuming Gamma Distribution											
3405	95% Wilson Hilferty (WH) Approx. Gamma UPL			0.136	90% Percentile							0.125
3406	95% Hawkins Wixley (HW) Approx. Gamma UPL			0.136	95% Percentile							0.135
3407	95% WH Approx. Gamma UTL with 95% Coverage			0.149	99% Percentile							0.156
3408	95% HW Approx. Gamma UTL with 95% Coverage			0.149								
3409	95% WH USL			0.167	95% HW USL							0.168
3410												
3411	Lognormal GOF Test											
3412	Shapiro Wilk Test Statistic			0.836	Shapiro Wilk Lognormal GOF Test							
3413	5% Shapiro Wilk Critical Value			0.93	Data Not Lognormal at 5% Significance Level							
3414	Lilliefors Test Statistic			0.262	Lilliefors Lognormal GOF Test							
3415	5% Lilliefors Critical Value			0.154	Data Not Lognormal at 5% Significance Level							
3416	Data Not Lognormal at 5% Significance Level											
3417												
3418	Background Statistics assuming Lognormal Distribution											
3419	95% UTL with 95% Coverage			0.15	90% Percentile (z)							0.123
3420	95% UPL (t)			0.135	95% Percentile (z)							0.133
3421	95% USL			0.171	99% Percentile (z)							0.155
3422												
3423	Nonparametric Distribution Free Background Statistics											
3424	Data do not follow a Discernible Distribution (0.05)											
3425												
3426	Nonparametric Upper Limits for Background Threshold Values											
3427	Order of Statistic, r			32	95% UTL with 95% Coverage							0.17
3428	Approx, f used to compute achieved CC			1.684	Approximate Actual Confidence Coefficient achieved by UTL							0.806
3429					Approximate Sample Size needed to achieve specified CC							59
3430	95% Percentile Bootstrap UTL with 95% Coverage			0.17	95% BCA Bootstrap UTL with 95% Coverage							0.17
3431	95% UPL			0.17	90% Percentile							0.12
3432	90% Chebyshev UPL			0.17	95% Percentile							0.148

A	B	C	D	E	F	G	H	I	J	K	L		
3433			95% Chebyshev UPL		0.204					99% Percentile	0.17		
3434			95% USL		0.17								
3435													
3436	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.												
3437	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers												
3438	and consists of observations collected from clean unimpacted locations.												
3439	The use of USL tends to provide a balance between false positives and false negatives provided the data												
3440	represents a background data set and when many onsite observations need to be compared with the BTV.												
3441													
3442	BARIUM, DISSOLVED												
3443													
3444	General Statistics												
3445	Total Number of Observations				36	Number of Missing Observations				95			
3446	Number of Distinct Observations				11								
3447	Number of Detects				34	Number of Non-Detects				2			
3448	Number of Distinct Detects				9	Number of Distinct Non-Detects				2			
3449	Minimum Detect				0.04	Minimum Non-Detect				0.5			
3450	Maximum Detect				0.19	Maximum Non-Detect				500			
3451	Variance Detected				6.3173E-4	Percent Non-Detects				5.556%			
3452	Mean Detected				0.0847	SD Detected				0.0251			
3453	Mean of Detected Logged Data				-2.502	SD of Detected Logged Data				0.253			
3454													
3455	Critical Values for Background Threshold Values (BTVs)												
3456	Tolerance Factor K (For UTL)				2.148	d2max (for USL)				2.824			
3457													
3458	Normal GOF Test on Detects Only												
3459	Shapiro Wilk Test Statistic				0.714	Shapiro Wilk GOF Test							
3460	5% Shapiro Wilk Critical Value				0.933	Data Not Normal at 5% Significance Level							
3461	Lilliefors Test Statistic				0.339	Lilliefors GOF Test							
3462	5% Lilliefors Critical Value				0.15	Data Not Normal at 5% Significance Level							
3463	Data Not Normal at 5% Significance Level												
3464													
3465	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution												
3466	KM Mean				0.0847	KM SD				0.0248			
3467	95% UTL95% Coverage				0.138	95% KM UPL (t)				0.127			
3468	90% KM Percentile (z)				0.116	95% KM Percentile (z)				0.125			
3469	99% KM Percentile (z)				0.142	95% KM USL				0.155			
3470													
3471	DL/2 Substitution Background Statistics Assuming Normal Distribution												
3472	Mean				7.031	SD				41.65			
3473	95% UTL95% Coverage				96.52	95% UPL (t)				78.38			
3474	90% Percentile (z)				60.41	95% Percentile (z)				75.54			
3475	99% Percentile (z)				103.9	95% USL				124.6			
3476	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons												
3477													
3478	Gamma GOF Tests on Detected Observations Only												
3479	A-D Test Statistic				3.041	Anderson-Darling GOF Test							
3480	5% A-D Critical Value				0.747	Data Not Gamma Distributed at 5% Significance Level							
3481	K-S Test Statistic				0.318	Kolmogorov-Smirnov GOF							
3482	5% K-S Critical Value				0.151	Data Not Gamma Distributed at 5% Significance Level							
3483	Data Not Gamma Distributed at 5% Significance Level												
3484													

A	B	C	D	E	F	G	H	I	J	K	L
3485	Gamma Statistics on Detected Data Only										
3486	k hat (MLE)			15.02		k star (bias corrected MLE)			13.71		
3487	Theta hat (MLE)			0.00564		Theta star (bias corrected MLE)			0.00618		
3488	nu hat (MLE)			1021		nu star (bias corrected)			932.5		
3489	MLE Mean (bias corrected)			0.0847							
3490	MLE Sd (bias corrected)			0.0229		95% Percentile of Chisquare (2kstar)			40.64		
3491											
3492	Gamma ROS Statistics using Imputed Non-Detects										
3493	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
3494	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)										
3495	For such situations, GROS method may yield incorrect values of UCLs and BTVs										
3496	This is especially true when the sample size is small.										
3497	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
3498	Minimum			0.04		Mean			0.0846		
3499	Maximum			0.19		Median			0.08		
3500	SD			0.0244		CV			0.288		
3501	k hat (MLE)			15.89		k star (bias corrected MLE)			14.58		
3502	Theta hat (MLE)			0.00533		Theta star (bias corrected MLE)			0.0058		
3503	nu hat (MLE)			1144		nu star (bias corrected)			1050		
3504	MLE Mean (bias corrected)			0.0846		MLE Sd (bias corrected)			0.0222		
3505	95% Percentile of Chisquare (2kstar)			42.76		90% Percentile			0.114		
3506	95% Percentile			0.124		99% Percentile			0.144		
3507	The following statistics are computed using Gamma ROS Statistics on Imputed Data										
3508	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
3509				WH	HW				WH	HW	
3510	95% Approx. Gamma UTL with 95% Coverage			0.137	0.137	95% Approx. Gamma UPL			0.125	0.125	
3511	95% Gamma USL			0.158	0.159						
3512											
3513	Estimates of Gamma Parameters using KM Estimates										
3514	Mean (KM)			0.0847		SD (KM)			0.0248		
3515	Variance (KM)			6.1315E-4		SE of Mean (KM)			0.00431		
3516	k hat (KM)			11.7		k star (KM)			10.75		
3517	nu hat (KM)			842.5		nu star (KM)			773.7		
3518	theta hat (KM)			0.00724		theta star (KM)			0.00788		
3519	80% gamma percentile (KM)			0.105		90% gamma percentile (KM)			0.119		
3520	95% gamma percentile (KM)			0.131		99% gamma percentile (KM)			0.156		
3521											
3522	The following statistics are computed using gamma distribution and KM estimates										
3523	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
3524				WH	HW				WH	HW	
3525	95% Approx. Gamma UTL with 95% Coverage			0.138	0.138	95% Approx. Gamma UPL			0.125	0.125	
3526	95% KM Gamma Percentile			0.123	0.123	95% Gamma USL			0.159	0.161	
3527											
3528	Lognormal GOF Test on Detected Observations Only										
3529	Shapiro Wilk Test Statistic			0.83		Shapiro Wilk GOF Test					
3530	5% Shapiro Wilk Critical Value			0.933		Data Not Lognormal at 5% Significance Level					
3531	Lilliefors Test Statistic			0.302		Lilliefors GOF Test					
3532	5% Lilliefors Critical Value			0.15		Data Not Lognormal at 5% Significance Level					
3533	Data Not Lognormal at 5% Significance Level										
3534											
3535	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects										
3536	Mean in Original Scale			0.0846		Mean in Log Scale			-2.502		

A	B	C	D	E	F	G	H	I	J	K	L
3537			SD in Original Scale	0.0244						SD in Log Scale	0.246
3538			95% UTL95% Coverage	0.139						95% BCA UTL95% Coverage	0.19
3539			95% Bootstrap (%) UTL95% Coverage	0.19						95% UPL (t)	0.125
3540			90% Percentile (z)	0.112						95% Percentile (z)	0.123
3541			99% Percentile (z)	0.145						95% USL	0.164
3542											
3543	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution										
3544			KM Mean of Logged Data	-2.502						95% KM UTL (Lognormal)95% Coverage	0.14
3545			KM SD of Logged Data	0.25						95% KM UPL (Lognormal)	0.126
3546			95% KM Percentile Lognormal (z)	0.123						95% KM USL (Lognormal)	0.166
3547											
3548	Background DL/2 Statistics Assuming Lognormal Distribution										
3549			Mean in Original Scale	7.031						Mean in Log Scale	-2.248
3550			SD in Original Scale	41.65						SD in Log Scale	1.367
3551			95% UTL95% Coverage	1.992						95% UPL (t)	1.098
3552			90% Percentile (z)	0.609						95% Percentile (z)	1.001
3553			99% Percentile (z)	2.54						95% USL	5.014
3554	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
3555											
3556	Nonparametric Distribution Free Background Statistics										
3557	Data do not follow a Discernible Distribution (0.05)										
3558											
3559	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
3560			Order of Statistic, r	36						95% UTL with95% Coverage	500
3561			Approx, f used to compute achieved CC	1.895						Approximate Actual Confidence Coefficient achieved by UTL	0.842
3562			Approximate Sample Size needed to achieve specified CC	59						95% UPL	75.42
3563			95% USL	500						95% KM Chebyshev UPL	0.194
3564											
3565	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
3566	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
3567	and consists of observations collected from clean unimpacted locations.										
3568	The use of USL tends to provide a balance between false positives and false negatives provided the data										
3569	represents a background data set and when many onsite observations need to be compared with the BTV.										
3570											
3571	CADMIUM, TOTAL										
3572											
3573	General Statistics										
3574			Total Number of Observations	33						Number of Missing Observations	98
3575			Number of Distinct Observations	5							
3576			Number of Detects	1						Number of Non-Detects	32
3577			Number of Distinct Detects	1						Number of Distinct Non-Detects	4
3578			Minimum Detect	0.005						Minimum Non-Detect	0.001
3579			Maximum Detect	0.005						Maximum Non-Detect	0.0022
3580			Variance Detected	N/A						Percent Non-Detects	96.97%
3581			Mean Detected	0.005						SD Detected	N/A
3582			Mean of Detected Logged Data	-5.298						SD of Detected Logged Data	N/A
3583											
3584	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!										
3585	It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).										
3586											
3587	The data set for variable CADMIUM, TOTAL was not processed!										
3588											

	A	B	C	D	E	F	G	H	I	J	K	L
3589												
3590	CADMIUM, DISSOLVED											
3591												
3592	General Statistics											
3593	Total Number of Observations				34		Number of Missing Observations				97	
3594	Number of Distinct Observations				4							
3595	Number of Detects				0		Number of Non-Detects				34	
3596	Number of Distinct Detects				0		Number of Distinct Non-Detects				4	
3597	Minimum Detect				N/A		Minimum Non-Detect				0.001	
3598	Maximum Detect				N/A		Maximum Non-Detect				10	
3599	Variance Detected				N/A		Percent Non-Detects				100%	
3600	Mean Detected				N/A		SD Detected				N/A	
3601	Mean of Detected Logged Data				N/A		SD of Detected Logged Data				N/A	
3602												
3603	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
3604	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
3605	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
3606												
3607	The data set for variable CADMIUM, DISSOLVED was not processed!											
3608												
3609												
3610	CHROMIUM, TOTAL											
3611												
3612	General Statistics											
3613	Total Number of Observations				33		Number of Missing Observations				98	
3614	Number of Distinct Observations				7							
3615	Number of Detects				4		Number of Non-Detects				29	
3616	Number of Distinct Detects				4		Number of Distinct Non-Detects				4	
3617	Minimum Detect				0.0023		Minimum Non-Detect				0.0022	
3618	Maximum Detect				0.05		Maximum Non-Detect				0.01	
3619	Variance Detected				5.1698E-4		Percent Non-Detects				87.88%	
3620	Mean Detected				0.0163		SD Detected				0.0227	
3621	Mean of Detected Logged Data				-4.88		SD of Detected Logged Data				1.412	
3622												
3623	Critical Values for Background Threshold Values (BTVs)											
3624	Tolerance Factor K (For UTL)				2.176		d2max (for USL)				2.787	
3625												
3626	Normal GOF Test on Detects Only											
3627	Shapiro Wilk Test Statistic				0.744		Shapiro Wilk GOF Test					
3628	5% Shapiro Wilk Critical Value				0.748		Data Not Normal at 5% Significance Level					
3629	Lilliefors Test Statistic				0.359		Lilliefors GOF Test					
3630	5% Lilliefors Critical Value				0.375		Detected Data appear Normal at 5% Significance Level					
3631	Detected Data appear Approximate Normal at 5% Significance Level											
3632												
3633	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
3634	KM Mean				0.00407		KM SD				0.00823	
3635	95% UTL95% Coverage				0.022		95% KM UPL (t)				0.0182	
3636	90% KM Percentile (z)				0.0146		95% KM Percentile (z)				0.0176	
3637	99% KM Percentile (z)				0.0232		95% KM USL				0.027	
3638												
3639	DL/2 Substitution Background Statistics Assuming Normal Distribution											
3640	Mean				0.00561		SD				0.00813	

A	B	C	D	E	F	G	H	I	J	K	L	
3641	95% UTL95% Coverage			0.0233	95% UPL (t)			0.0196				
3642	90% Percentile (z)			0.016	95% Percentile (z)			0.019				
3643	99% Percentile (z)			0.0245	95% USL			0.0283				
3644	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
3645												
3646	Gamma GOF Tests on Detected Observations Only											
3647	A-D Test Statistic			0.431	Anderson-Darling GOF Test							
3648	5% A-D Critical Value			0.67	Detected data appear Gamma Distributed at 5% Significance Level							
3649	K-S Test Statistic			0.282	Kolmogorov-Smirnov GOF							
3650	5% K-S Critical Value			0.405	Detected data appear Gamma Distributed at 5% Significance Level							
3651	Detected data appear Gamma Distributed at 5% Significance Level											
3652												
3653	Gamma Statistics on Detected Data Only											
3654	k hat (MLE)			0.78	k star (bias corrected MLE)			0.362				
3655	Theta hat (MLE)			0.0209	Theta star (bias corrected MLE)			0.0451				
3656	nu hat (MLE)			6.242	nu star (bias corrected)			2.894				
3657	MLE Mean (bias corrected)			0.0163								
3658	MLE Sd (bias corrected)			0.0271	95% Percentile of Chisquare (2kstar)			3.111				
3659												
3660	Gamma ROS Statistics using Imputed Non-Detects											
3661	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
3662	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)											
3663	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
3664	This is especially true when the sample size is small.											
3665	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
3666	Minimum			0.0023	Mean			0.0109				
3667	Maximum			0.05	Median			0.01				
3668	SD			0.00728	CV			0.67				
3669	k hat (MLE)			4.806	k star (bias corrected MLE)			4.389				
3670	Theta hat (MLE)			0.00226	Theta star (bias corrected MLE)			0.00248				
3671	nu hat (MLE)			317.2	nu star (bias corrected)			289.7				
3672	MLE Mean (bias corrected)			0.0109	MLE Sd (bias corrected)			0.00519				
3673	95% Percentile of Chisquare (2kstar)			16.61	90% Percentile			0.0178				
3674	95% Percentile			0.0206	99% Percentile			0.0264				
3675	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
3676	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
3677				WH	HW				WH	HW		
3678	95% Approx. Gamma UTL with 95% Coverage			0.0242	0.0243	95% Approx. Gamma UPL			0.0205	0.0205		
3679	95% Gamma USL			0.0297	0.0302							
3680												
3681	Estimates of Gamma Parameters using KM Estimates											
3682	Mean (KM)			0.00407	SD (KM)			0.00823				
3683	Variance (KM)			6.7692E-5	SE of Mean (KM)			0.00166				
3684	k hat (KM)			0.245	k star (KM)			0.243				
3685	nu hat (KM)			16.17	nu star (KM)			16.04				
3686	theta hat (KM)			0.0166	theta star (KM)			0.0168				
3687	80% gamma percentile (KM)			0.00585	90% gamma percentile (KM)			0.0122				
3688	95% gamma percentile (KM)			0.0199	99% gamma percentile (KM)			0.0403				
3689												
3690	The following statistics are computed using gamma distribution and KM estimates											
3691	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
3692				WH	HW				WH	HW		

A	B	C	D	E	F	G	H	I	J	K	L
3693	95% Approx. Gamma UTL with 95% Coverage			0.0131	0.0121	95% Approx. Gamma UPL			0.0101	0.00933	
3694	95% KM Gamma Percentile			0.00969	0.00893	95% Gamma USL			0.0179	0.0168	
3695											
3696	Lognormal GOF Test on Detected Observations Only										
3697	Shapiro Wilk Test Statistic			0.903	Shapiro Wilk GOF Test						
3698	5% Shapiro Wilk Critical Value			0.748	Detected Data appear Lognormal at 5% Significance Level						
3699	Lilliefors Test Statistic			0.252	Lilliefors GOF Test						
3700	5% Lilliefors Critical Value			0.375	Detected Data appear Lognormal at 5% Significance Level						
3701	Detected Data appear Lognormal at 5% Significance Level										
3702											
3703	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects										
3704	Mean in Original Scale			0.00333	Mean in Log Scale			-6.849			
3705	SD in Original Scale			0.00868	SD in Log Scale			1.425			
3706	95% UTL95% Coverage			0.0236	95% BCA UTL95% Coverage			0.05			
3707	95% Bootstrap (%) UTL95% Coverage			0.05	95% UPL (t)			0.0123			
3708	90% Percentile (z)			0.00658	95% Percentile (z)			0.011			
3709	99% Percentile (z)			0.0292	95% USL			0.0562			
3710											
3711	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution										
3712	KM Mean of Logged Data			-5.903	95% KM UTL (Lognormal)95% Coverage			0.00965			
3713	KM SD of Logged Data			0.58	95% KM UPL (Lognormal)			0.00741			
3714	95% KM Percentile Lognormal (z)			0.00709	95% KM USL (Lognormal)			0.0138			
3715											
3716	Background DL/2 Statistics Assuming Lognormal Distribution										
3717	Mean in Original Scale			0.00561	Mean in Log Scale			-5.476			
3718	SD in Original Scale			0.00813	SD in Log Scale			0.632			
3719	95% UTL95% Coverage			0.0166	95% UPL (t)			0.0124			
3720	90% Percentile (z)			0.00941	95% Percentile (z)			0.0118			
3721	99% Percentile (z)			0.0182	95% USL			0.0243			
3722	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
3723											
3724	Nonparametric Distribution Free Background Statistics										
3725	Data appear to follow a Discernible Distribution at 5% Significance Level										
3726											
3727	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
3728	Order of Statistic, r			33	95% UTL with95% Coverage			0.05			
3729	Approx, f used to compute achieved CC			1.737	Approximate Actual Confidence Coefficient achieved by UTL			0.816			
3730	Approximate Sample Size needed to achieve specified CC			59	95% UPL			0.022			
3731	95% USL			0.05	95% KM Chebyshev UPL			0.0405			
3732											
3733	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
3734	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
3735	and consists of observations collected from clean unimpacted locations.										
3736	The use of USL tends to provide a balance between false positives and false negatives provided the data										
3737	represents a background data set and when many onsite observations need to be compared with the BTV.										
3738											
3739	CHROMIUM, DISSOLVED										
3740											
3741	General Statistics										
3742	Total Number of Observations			34	Number of Missing Observations			97			
3743	Number of Distinct Observations			5							
3744	Number of Detects			1	Number of Non-Detects			33			

	A	B	C	D	E	F	G	H	I	J	K	L
3745	Number of Distinct Detects				1	Number of Distinct Non-Detects				4		
3746	Minimum Detect				0.02	Minimum Non-Detect				0.0022		
3747	Maximum Detect				0.02	Maximum Non-Detect				50		
3748	Variance Detected				N/A	Percent Non-Detects				97.06%		
3749	Mean Detected				0.02	SD Detected				N/A		
3750	Mean of Detected Logged Data				-3.912	SD of Detected Logged Data				N/A		
3751												
3752	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!											
3753	It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).											
3754												
3755	The data set for variable CHROMIUM, DISSOLVED was not processed!											
3756												
3757												
3758	COPPER, TOTAL											
3759												
3760	General Statistics											
3761	Total Number of Observations				33	Number of Missing Observations				98		
3762	Number of Distinct Observations				4							
3763	Number of Detects				7	Number of Non-Detects				26		
3764	Number of Distinct Detects				3	Number of Distinct Non-Detects				3		
3765	Minimum Detect				0.0084	Minimum Non-Detect				0.0056		
3766	Maximum Detect				0.02	Maximum Non-Detect				0.02		
3767	Variance Detected				3.1985E-5	Percent Non-Detects				78.79%		
3768	Mean Detected				0.0155	SD Detected				0.00566		
3769	Mean of Detected Logged Data				-4.234	SD of Detected Logged Data				0.406		
3770												
3771	Critical Values for Background Threshold Values (BTVs)											
3772	Tolerance Factor K (For UTL)				2.176	d2max (for USL)				2.787		
3773												
3774	Normal GOF Test on Detects Only											
3775	Shapiro Wilk Test Statistic				0.709	Shapiro Wilk GOF Test						
3776	5% Shapiro Wilk Critical Value				0.803	Data Not Normal at 5% Significance Level						
3777	Lilliefors Test Statistic				0.359	Lilliefors GOF Test						
3778	5% Lilliefors Critical Value				0.304	Data Not Normal at 5% Significance Level						
3779	Data Not Normal at 5% Significance Level											
3780												
3781	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
3782	KM Mean				0.0085	KM SD				0.00458		
3783	95% UTL95% Coverage				0.0185	95% KM UPL (t)				0.0164		
3784	90% KM Percentile (z)				0.0144	95% KM Percentile (z)				0.016		
3785	99% KM Percentile (z)				0.0192	95% KM USL				0.0213		
3786												
3787	DL/2 Substitution Background Statistics Assuming Normal Distribution											
3788	Mean				0.0096	SD				0.00469		
3789	95% UTL95% Coverage				0.0198	95% UPL (t)				0.0177		
3790	90% Percentile (z)				0.0156	95% Percentile (z)				0.0173		
3791	99% Percentile (z)				0.0205	95% USL				0.0227		
3792	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
3793												
3794	Gamma GOF Tests on Detected Observations Only											
3795	A-D Test Statistic				1.097	Anderson-Darling GOF Test						
3796	5% A-D Critical Value				0.709	Data Not Gamma Distributed at 5% Significance Level						

A	B	C	D	E	F	G	H	I	J	K	L	
3797	K-S Test Statistic				0.377	Kolmogorov-Smirnov GOF						
3798	5% K-S Critical Value				0.312	Data Not Gamma Distributed at 5% Significance Level						
3799	Data Not Gamma Distributed at 5% Significance Level											
3800												
3801	Gamma Statistics on Detected Data Only											
3802	k hat (MLE)				7.721	k star (bias corrected MLE)				4.507		
3803	Theta hat (MLE)				0.00201	Theta star (bias corrected MLE)				0.00344		
3804	nu hat (MLE)				108.1	nu star (bias corrected)				63.1		
3805	MLE Mean (bias corrected)				0.0155							
3806	MLE Sd (bias corrected)				0.00729	95% Percentile of Chisquare (2kstar)				16.94		
3807												
3808	Gamma ROS Statistics using Imputed Non-Detects											
3809	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
3810	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)											
3811	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
3812	This is especially true when the sample size is small.											
3813	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
3814	Minimum				0.0084	Mean				0.0113		
3815	Maximum				0.02	Median				0.01		
3816	SD				0.00334	CV				0.296		
3817	k hat (MLE)				16.18	k star (bias corrected MLE)				14.73		
3818	Theta hat (MLE)				6.9860E-4	Theta star (bias corrected MLE)				7.6741E-4		
3819	nu hat (MLE)				1068	nu star (bias corrected)				971.9		
3820	MLE Mean (bias corrected)				0.0113	MLE Sd (bias corrected)				0.00294		
3821	95% Percentile of Chisquare (2kstar)				43.11	90% Percentile				0.0152		
3822	95% Percentile				0.0165	99% Percentile				0.0193		
3823	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
3824	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
3825					WH	HW					WH	HW
3826	95% Approx. Gamma UTL with 95% Coverage				0.0184	0.0183	95% Approx. Gamma UPL				0.0166	0.0166
3827	95% Gamma USL				0.0209	0.0209						
3828												
3829	Estimates of Gamma Parameters using KM Estimates											
3830	Mean (KM)				0.0085	SD (KM)				0.00458		
3831	Variance (KM)				2.0981E-5	SE of Mean (KM)				0.00101		
3832	k hat (KM)				3.446	k star (KM)				3.153		
3833	nu hat (KM)				227.4	nu star (KM)				208.1		
3834	theta hat (KM)				0.00247	theta star (KM)				0.0027		
3835	80% gamma percentile (KM)				0.0121	90% gamma percentile (KM)				0.0149		
3836	95% gamma percentile (KM)				0.0176	99% gamma percentile (KM)				0.0234		
3837												
3838	The following statistics are computed using gamma distribution and KM estimates											
3839	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
3840					WH	HW					WH	HW
3841	95% Approx. Gamma UTL with 95% Coverage				0.0187	0.0188	95% Approx. Gamma UPL				0.0159	0.0159
3842	95% KM Gamma Percentile				0.0155	0.0155	95% Gamma USL				0.023	0.0233
3843												
3844	Lognormal GOF Test on Detected Observations Only											
3845	Shapiro Wilk Test Statistic				0.728	Shapiro Wilk GOF Test						
3846	5% Shapiro Wilk Critical Value				0.803	Data Not Lognormal at 5% Significance Level						
3847	Lilliefors Test Statistic				0.358	Lilliefors GOF Test						
3848	5% Lilliefors Critical Value				0.304	Data Not Lognormal at 5% Significance Level						

A	B	C	D	E	F	G	H	I	J	K	L
3849	Data Not Lognormal at 5% Significance Level										
3850											
3851	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects										
3852	Mean in Original Scale	0.00788		Mean in Log Scale	-5.026						
3853	SD in Original Scale	0.00523		SD in Log Scale	0.604						
3854	95% UTL95% Coverage	0.0244		95% BCA UTL95% Coverage	0.02						
3855	95% Bootstrap (%) UTL95% Coverage	0.02		95% UPL (t)	0.0185						
3856	90% Percentile (z)	0.0142		95% Percentile (z)	0.0177						
3857	99% Percentile (z)	0.0267		95% USL	0.0353						
3858											
3859	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution										
3860	KM Mean of Logged Data	-4.872		95% KM UTL (Lognormal)95% Coverage	0.0192						
3861	KM SD of Logged Data	0.421		95% KM UPL (Lognormal)	0.0158						
3862	95% KM Percentile Lognormal (z)	0.0153		95% KM USL (Lognormal)	0.0248						
3863											
3864	Background DL/2 Statistics Assuming Lognormal Distribution										
3865	Mean in Original Scale	0.0096		Mean in Log Scale	-4.768						
3866	SD in Original Scale	0.00469		SD in Log Scale	0.525						
3867	95% UTL95% Coverage	0.0266		95% UPL (t)	0.021						
3868	90% Percentile (z)	0.0166		95% Percentile (z)	0.0201						
3869	99% Percentile (z)	0.0288		95% USL	0.0367						
3870	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
3871											
3872	Nonparametric Distribution Free Background Statistics										
3873	Data do not follow a Discernible Distribution (0.05)										
3874											
3875	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
3876	Order of Statistic, r	33		95% UTL with95% Coverage	0.02						
3877	Approx, f used to compute achieved CC	1.737		Approximate Actual Confidence Coefficient achieved by UTL	0.816						
3878	Approximate Sample Size needed to achieve specified CC	59		95% UPL	0.02						
3879	95% USL	0.02		95% KM Chebyshev UPL	0.0288						
3880											
3881	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
3882	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
3883	and consists of observations collected from clean unimpacted locations.										
3884	The use of USL tends to provide a balance between false positives and false negatives provided the data										
3885	represents a background data set and when many onsite observations need to be compared with the BTV.										
3886											
3887	COPPER, DISSOLVED										
3888											
3889	General Statistics										
3890	Total Number of Observations	34		Number of Missing Observations	97						
3891	Number of Distinct Observations	4									
3892	Number of Detects	3		Number of Non-Detects	31						
3893	Number of Distinct Detects	2		Number of Distinct Non-Detects	3						
3894	Minimum Detect	0.02		Minimum Non-Detect	0.0056						
3895	Maximum Detect	0.3		Maximum Non-Detect	0.02						
3896	Variance Detected	0.0261		Percent Non-Detects	91.18%						
3897	Mean Detected	0.113		SD Detected	0.162						
3898	Mean of Detected Logged Data	-3.009		SD of Detected Logged Data	1.563						
3899											
3900	Warning: Data set has only 3 Detected Values.										

A	B	C	D	E	F	G	H	I	J	K	L
3901	This is not enough to compute meaningful or reliable statistics and estimates.										
3902											
3903											
3904	Critical Values for Background Threshold Values (BTVs)										
3905	Tolerance Factor K (For UTL)			2.166		d2max (for USL)			2.799		
3906											
3907	Normal GOF Test on Detects Only										
3908	Shapiro Wilk Test Statistic			0.75		Shapiro Wilk GOF Test					
3909	5% Shapiro Wilk Critical Value			0.767		Data Not Normal at 5% Significance Level					
3910	Lilliefors Test Statistic			0.385		Lilliefors GOF Test					
3911	5% Lilliefors Critical Value			0.425		Detected Data appear Normal at 5% Significance Level					
3912	Detected Data appear Approximate Normal at 5% Significance Level										
3913											
3914	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
3915	KM Mean			0.0151		KM SD			0.0497		
3916	95% UTL95% Coverage			0.123		95% KM UPL (t)			0.1		
3917	90% KM Percentile (z)			0.0788		95% KM Percentile (z)			0.0969		
3918	99% KM Percentile (z)			0.131		95% KM USL			0.154		
3919											
3920	DL/2 Substitution Background Statistics Assuming Normal Distribution										
3921	Mean			0.0171		SD			0.0502		
3922	95% UTL95% Coverage			0.126		95% UPL (t)			0.103		
3923	90% Percentile (z)			0.0814		95% Percentile (z)			0.0996		
3924	99% Percentile (z)			0.134		95% USL			0.157		
3925	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons										
3926											
3927	Gamma GOF Tests on Detected Observations Only										
3928	Not Enough Data to Perform GOF Test										
3929											
3930	Gamma Statistics on Detected Data Only										
3931	k hat (MLE)			0.723		k star (bias corrected MLE)			N/A		
3932	Theta hat (MLE)			0.157		Theta star (bias corrected MLE)			N/A		
3933	nu hat (MLE)			4.339		nu star (bias corrected)			N/A		
3934	MLE Mean (bias corrected)			N/A							
3935	MLE Sd (bias corrected)			N/A		95% Percentile of Chisquare (2kstar)			N/A		
3936											
3937	Gamma ROS Statistics using Imputed Non-Detects										
3938	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
3939	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)										
3940	For such situations, GROS method may yield incorrect values of UCLs and BTVs										
3941	This is especially true when the sample size is small.										
3942	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
3943	Minimum			0.01		Mean			0.0191		
3944	Maximum			0.3		Median			0.01		
3945	SD			0.0497		CV			2.599		
3946	k hat (MLE)			1.123		k star (bias corrected MLE)			1.044		
3947	Theta hat (MLE)			0.017		Theta star (bias corrected MLE)			0.0183		
3948	nu hat (MLE)			76.37		nu star (bias corrected)			70.97		
3949	MLE Mean (bias corrected)			0.0191		MLE Sd (bias corrected)			0.0187		
3950	95% Percentile of Chisquare (2kstar)			6.159		90% Percentile			0.0436		
3951	95% Percentile			0.0564		99% Percentile			0.0862		
3952	The following statistics are computed using Gamma ROS Statistics on Imputed Data										

A	B	C	D	E	F	G	H	I	J	K	L		
3953	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods												
3954				WH	HW					WH	HW		
3955	95% Approx. Gamma UTL with 95% Coverage			0.065	0.0583	95% Approx. Gamma UPL				0.0493	0.0441		
3956	95% Gamma USL			0.0921	0.0837								
3957													
3958	Estimates of Gamma Parameters using KM Estimates												
3959	Mean (KM)			0.0151	SD (KM)				0.0497				
3960	Variance (KM)			0.00247	SE of Mean (KM)				0.0104				
3961	k hat (KM)			0.0923	k star (KM)				0.104				
3962	nu hat (KM)			6.28	nu star (KM)				7.059				
3963	theta hat (KM)			0.164	theta star (KM)				0.146				
3964	80% gamma percentile (KM)			0.0111	90% gamma percentile (KM)				0.0408				
3965	95% gamma percentile (KM)			0.0875	99% gamma percentile (KM)				0.235				
3966													
3967	The following statistics are computed using gamma distribution and KM estimates												
3968	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods												
3969				WH	HW					WH	HW		
3970	95% Approx. Gamma UTL with 95% Coverage			0.0557	0.0487	95% Approx. Gamma UPL				0.0406	0.0352		
3971	95% KM Gamma Percentile			0.0384	0.0333	95% Gamma USL				0.0827	0.0738		
3972													
3973	Lognormal GOF Test on Detected Observations Only												
3974	Shapiro Wilk Test Statistic			0.75	Shapiro Wilk GOF Test								
3975	5% Shapiro Wilk Critical Value			0.767	Data Not Lognormal at 5% Significance Level								
3976	Lilliefors Test Statistic			0.385	Lilliefors GOF Test								
3977	5% Lilliefors Critical Value			0.425	Detected Data appear Lognormal at 5% Significance Level								
3978	Detected Data appear Approximate Lognormal at 5% Significance Level												
3979													
3980	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects												
3981	Mean in Original Scale			0.0101	Mean in Log Scale				-12.7				
3982	SD in Original Scale			0.0514	SD in Log Scale				4.969				
3983	95% UTL95% Coverage			0.145	95% BCA UTL95% Coverage				0.118				
3984	95% Bootstrap (%) UTL95% Coverage			0.3	95% UPL (t)				0.0155				
3985	90% Percentile (z)			0.00178	95% Percentile (z)				0.0108				
3986	99% Percentile (z)			0.321	95% USL				3.365				
3987													
3988	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution												
3989	KM Mean of Logged Data			-4.993	95% KM UTL (Lognormal)95% Coverage				0.0326				
3990	KM SD of Logged Data			0.724	95% KM UPL (Lognormal)				0.0235				
3991	95% KM Percentile Lognormal (z)			0.0223	95% KM USL (Lognormal)				0.0515				
3992													
3993	Background DL/2 Statistics Assuming Lognormal Distribution												
3994	Mean in Original Scale			0.0171	Mean in Log Scale				-4.777				
3995	SD in Original Scale			0.0502	SD in Log Scale				0.814				
3996	95% UTL95% Coverage			0.0491	95% UPL (t)				0.034				
3997	90% Percentile (z)			0.0239	95% Percentile (z)				0.0321				
3998	99% Percentile (z)			0.0559	95% USL				0.0821				
3999	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.												
4000													
4001	Nonparametric Distribution Free Background Statistics												
4002	Data appear to follow a Discernible Distribution at 5% Significance Level												
4003													
4004	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)												

A	B	C	D	E	F	G	H	I	J	K	L
4005	Order of Statistic, r				34	95% UTL with 95% Coverage				0.3	
4006	Approx, f used to compute achieved CC				1.789	Approximate Actual Confidence Coefficient achieved by UTL				0.825	
4007	Approximate Sample Size needed to achieve specified CC				59	95% UPL				0.09	
4008	95% USL				0.3	95% KM Chebyshev UPL				0.235	
4009											
4010	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
4011	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
4012	and consists of observations collected from clean unimpacted locations.										
4013	The use of USL tends to provide a balance between false positives and false negatives provided the data										
4014	represents a background data set and when many onsite observations need to be compared with the BTV.										
4015											
4016	LEAD-FLAMELESS, TOTAL										
4017											
4018	General Statistics										
4019	Total Number of Observations				33	Number of Missing Observations				98	
4020	Number of Distinct Observations				12						
4021	Number of Detects				19	Number of Non-Detects				14	
4022	Number of Distinct Detects				10	Number of Distinct Non-Detects				2	
4023	Minimum Detect				0.0023	Minimum Non-Detect				0.006	
4024	Maximum Detect				0.05	Maximum Non-Detect				0.0067	
4025	Variance Detected				1.4642E-4	Percent Non-Detects				42.42%	
4026	Mean Detected				0.014	SD Detected				0.0121	
4027	Mean of Detected Logged Data				-4.54	SD of Detected Logged Data				0.739	
4028											
4029	Critical Values for Background Threshold Values (BTVs)										
4030	Tolerance Factor K (For UTL)				2.176	d2max (for USL)				2.787	
4031											
4032	Normal GOF Test on Detects Only										
4033	Shapiro Wilk Test Statistic				0.705	Shapiro Wilk GOF Test					
4034	5% Shapiro Wilk Critical Value				0.901	Data Not Normal at 5% Significance Level					
4035	Lilliefors Test Statistic				0.365	Lilliefors GOF Test					
4036	5% Lilliefors Critical Value				0.197	Data Not Normal at 5% Significance Level					
4037	Data Not Normal at 5% Significance Level										
4038											
4039	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
4040	KM Mean				0.00916	KM SD				0.0105	
4041	95% UTL 95% Coverage				0.0321	95% KM UPL (t)				0.0273	
4042	90% KM Percentile (z)				0.0227	95% KM Percentile (z)				0.0265	
4043	99% KM Percentile (z)				0.0337	95% KM USL				0.0385	
4044											
4045	DL/2 Substitution Background Statistics Assuming Normal Distribution										
4046	Mean				0.00932	SD				0.0106	
4047	95% UTL 95% Coverage				0.0324	95% UPL (t)				0.0276	
4048	90% Percentile (z)				0.0229	95% Percentile (z)				0.0268	
4049	99% Percentile (z)				0.034	95% USL				0.0389	
4050	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons										
4051											
4052	Gamma GOF Tests on Detected Observations Only										
4053	A-D Test Statistic				1.266	Anderson-Darling GOF Test					
4054	5% A-D Critical Value				0.752	Data Not Gamma Distributed at 5% Significance Level					
4055	K-S Test Statistic				0.318	Kolmogorov-Smirnov GOF					
4056	5% K-S Critical Value				0.201	Data Not Gamma Distributed at 5% Significance Level					

A	B	C	D	E	F	G	H	I	J	K	L
4057	Data Not Gamma Distributed at 5% Significance Level										
4058											
4059	Gamma Statistics on Detected Data Only										
4060	k hat (MLE)		2.014		k star (bias corrected MLE)				1.731		
4061	Theta hat (MLE)		0.00693		Theta star (bias corrected MLE)				0.00806		
4062	nu hat (MLE)		76.55		nu star (bias corrected)				65.79		
4063	MLE Mean (bias corrected)		0.014								
4064	MLE Sd (bias corrected)		0.0106		95% Percentile of Chisquare (2kstar)				8.603		
4065											
4066	Gamma ROS Statistics using Imputed Non-Detects										
4067	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
4068	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)										
4069	For such situations, GROS method may yield incorrect values of UCLs and BTVs										
4070	This is especially true when the sample size is small.										
4071	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
4072	Minimum		0.0023		Mean				0.0123		
4073	Maximum		0.05		Median				0.01		
4074	SD		0.00929		CV				0.757		
4075	k hat (MLE)		3.137		k star (bias corrected MLE)				2.872		
4076	Theta hat (MLE)		0.00391		Theta star (bias corrected MLE)				0.00428		
4077	nu hat (MLE)		207		nu star (bias corrected)				189.6		
4078	MLE Mean (bias corrected)		0.0123		MLE Sd (bias corrected)				0.00725		
4079	95% Percentile of Chisquare (2kstar)		12.21		90% Percentile				0.022		
4080	95% Percentile		0.0261		99% Percentile				0.035		
4081	The following statistics are computed using Gamma ROS Statistics on Imputed Data										
4082	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
4083			WH		HW				WH		HW
4084	95% Approx. Gamma UTL with 95% Coverage		0.0318		0.0322		95% Approx. Gamma UPL		0.0262		0.0262
4085	95% Gamma USL		0.0406		0.0418						
4086											
4087	Estimates of Gamma Parameters using KM Estimates										
4088	Mean (KM)		0.00916		SD (KM)				0.0105		
4089	Variance (KM)		1.1115E-4		SE of Mean (KM)				0.00189		
4090	k hat (KM)		0.755		k star (KM)				0.707		
4091	nu hat (KM)		49.83		nu star (KM)				46.63		
4092	theta hat (KM)		0.0121		theta star (KM)				0.013		
4093	80% gamma percentile (KM)		0.0151		90% gamma percentile (KM)				0.0229		
4094	95% gamma percentile (KM)		0.0311		99% gamma percentile (KM)				0.0505		
4095											
4096	The following statistics are computed using gamma distribution and KM estimates										
4097	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
4098			WH		HW				WH		HW
4099	95% Approx. Gamma UTL with 95% Coverage		0.0335		0.0345		95% Approx. Gamma UPL		0.0255		0.0257
4100	95% KM Gamma Percentile		0.0243		0.0244		95% Gamma USL		0.0466		0.0497
4101											
4102	Lognormal GOF Test on Detected Observations Only										
4103	Shapiro Wilk Test Statistic		0.904		Shapiro Wilk GOF Test						
4104	5% Shapiro Wilk Critical Value		0.901		Detected Data appear Lognormal at 5% Significance Level						
4105	Lilliefors Test Statistic		0.272		Lilliefors GOF Test						
4106	5% Lilliefors Critical Value		0.197		Data Not Lognormal at 5% Significance Level						
4107	Detected Data appear Approximate Lognormal at 5% Significance Level										
4108											

A	B	C	D	E	F	G	H	I	J	K	L
4109	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects										
4110	Mean in Original Scale			0.00927	Mean in Log Scale			-5.137			
4111	SD in Original Scale			0.0107	SD in Log Scale			0.954			
4112	95% UTL95% Coverage			0.0469	95% BCA UTL95% Coverage			0.044			
4113	95% Bootstrap (%) UTL95% Coverage			0.05	95% UPL (t)			0.0303			
4114	90% Percentile (z)			0.02	95% Percentile (z)			0.0282			
4115	99% Percentile (z)			0.0541	95% USL			0.0839			
4116											
4117	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution										
4118	KM Mean of Logged Data			-5.135	95% KM UTL (Lognormal)95% Coverage			0.0405			
4119	KM SD of Logged Data			0.886	95% KM UPL (Lognormal)			0.027			
4120	95% KM Percentile Lognormal (z)			0.0253	95% KM USL (Lognormal)			0.0696			
4121											
4122	Background DL/2 Statistics Assuming Lognormal Distribution										
4123	Mean in Original Scale			0.00932	Mean in Log Scale			-5.075			
4124	SD in Original Scale			0.0106	SD in Log Scale			0.841			
4125	95% UTL95% Coverage			0.039	95% UPL (t)			0.0266			
4126	90% Percentile (z)			0.0184	95% Percentile (z)			0.0249			
4127	99% Percentile (z)			0.0443	95% USL			0.0652			
4128	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
4129											
4130	Nonparametric Distribution Free Background Statistics										
4131	Data appear to follow a Discernible Distribution at 5% Significance Level										
4132											
4133	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
4134	Order of Statistic, r			33	95% UTL with95% Coverage			0.05			
4135	Approx, f used to compute achieved CC			1.737	Approximate Actual Confidence Coefficient achieved by UTL			0.816			
4136	Approximate Sample Size needed to achieve specified CC			59	95% UPL			0.043			
4137	95% USL			0.05	95% KM Chebyshev UPL			0.0558			
4138											
4139	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
4140	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
4141	and consists of observations collected from clean unimpacted locations.										
4142	The use of USL tends to provide a balance between false positives and false negatives provided the data										
4143	represents a background data set and when many onsite observations need to be compared with the BTV.										
4144											
4145	LEAD, DISSOLVED										
4146											
4147	General Statistics										
4148	Total Number of Observations			34	Number of Missing Observations			97			
4149	Number of Distinct Observations			2							
4150	Number of Detects			1	Number of Non-Detects			33			
4151	Number of Distinct Detects			1	Number of Distinct Non-Detects			2			
4152	Minimum Detect			0.006	Minimum Non-Detect			0.0022			
4153	Maximum Detect			0.006	Maximum Non-Detect			0.006			
4154	Variance Detected			N/A	Percent Non-Detects			97.06%			
4155	Mean Detected			0.006	SD Detected			N/A			
4156	Mean of Detected Logged Data			-5.116	SD of Detected Logged Data			N/A			
4157											
4158	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!										
4159	It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).										
4160											

A	B	C	D	E	F	G	H	I	J	K	L	
4161	The data set for variable LEAD, DISSOLVED was not processed!											
4162												
4163												
4164	MERCURY, TOTAL											
4165												
4166	General Statistics											
4167	Total Number of Observations	34	Number of Missing Observations						97			
4168	Number of Distinct Observations	3										
4169	Number of Detects	1	Number of Non-Detects						33			
4170	Number of Distinct Detects	1	Number of Distinct Non-Detects						2			
4171	Minimum Detect	0.001	Minimum Non-Detect						5.0000E-4			
4172	Maximum Detect	0.001	Maximum Non-Detect						0.5			
4173	Variance Detected	N/A	Percent Non-Detects						97.06%			
4174	Mean Detected	0.001	SD Detected						N/A			
4175	Mean of Detected Logged Data	-6.908	SD of Detected Logged Data						N/A			
4176												
4177	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!											
4178	It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).											
4179												
4180	The data set for variable MERCURY, TOTAL was not processed!											
4181												
4182												
4183	MERCURY, DISSOLVED											
4184												
4185	General Statistics											
4186	Total Number of Observations	34	Number of Missing Observations						97			
4187	Number of Distinct Observations	1										
4188	Number of Detects	0	Number of Non-Detects						34			
4189	Number of Distinct Detects	0	Number of Distinct Non-Detects						1			
4190	Minimum Detect	N/A	Minimum Non-Detect						5.0000E-4			
4191	Maximum Detect	N/A	Maximum Non-Detect						5.0000E-4			
4192	Variance Detected	N/A	Percent Non-Detects						100%			
4193	Mean Detected	N/A	SD Detected						N/A			
4194	Mean of Detected Logged Data	N/A	SD of Detected Logged Data						N/A			
4195												
4196	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
4197	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
4198	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
4199												
4200	The data set for variable MERCURY, DISSOLVED was not processed!											
4201												
4202												
4203	SELENIUM, TOTAL											
4204												
4205	General Statistics											
4206	Total Number of Observations	33	Number of Missing Observations						98			
4207	Number of Distinct Observations	4										
4208	Number of Detects	1	Number of Non-Detects						32			
4209	Number of Distinct Detects	1	Number of Distinct Non-Detects						3			
4210	Minimum Detect	0.004	Minimum Non-Detect						0.0056			
4211	Maximum Detect	0.004	Maximum Non-Detect						0.02			
4212	Variance Detected	N/A	Percent Non-Detects						96.97%			

A	B	C	D	E	F	G	H	I	J	K	L
4213	Mean Detected				0.004	SD Detected				N/A	
4214	Mean of Detected Logged Data				-5.521	SD of Detected Logged Data				N/A	
4215											
4216	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!										
4217	It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).										
4218											
4219	The data set for variable SELENIUM, TOTAL was not processed!										
4220											
4221											
4222	SELENIUM, DISSOLVED										
4223											
4224	General Statistics										
4225	Total Number of Observations				33	Number of Missing Observations				98	
4226	Number of Distinct Observations				3						
4227	Number of Detects				0	Number of Non-Detects				33	
4228	Number of Distinct Detects				0	Number of Distinct Non-Detects				3	
4229	Minimum Detect				N/A	Minimum Non-Detect				0.0056	
4230	Maximum Detect				N/A	Maximum Non-Detect				0.02	
4231	Variance Detected				N/A	Percent Non-Detects				100%	
4232	Mean Detected				N/A	SD Detected				N/A	
4233	Mean of Detected Logged Data				N/A	SD of Detected Logged Data				N/A	
4234											
4235	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
4236	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
4237	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
4238											
4239	The data set for variable SELENIUM, DISSOLVED was not processed!										
4240											
4241											
4242	SILVER, TOTAL										
4243											
4244	General Statistics										
4245	Total Number of Observations				33	Number of Missing Observations				98	
4246	Number of Distinct Observations				5						
4247	Number of Detects				2	Number of Non-Detects				31	
4248	Number of Distinct Detects				2	Number of Distinct Non-Detects				4	
4249	Minimum Detect				0.01	Minimum Non-Detect				0.0022	
4250	Maximum Detect				0.05	Maximum Non-Detect				0.01	
4251	Variance Detected				8.0000E-4	Percent Non-Detects				93.94%	
4252	Mean Detected				0.03	SD Detected				0.0283	
4253	Mean of Detected Logged Data				-3.8	SD of Detected Logged Data				1.138	
4254											
4255	Warning: Data set has only 2 Detected Values.										
4256	This is not enough to compute meaningful or reliable statistics and estimates.										
4257											
4258											
4259	Critical Values for Background Threshold Values (BTVs)										
4260	Tolerance Factor K (For UTL)				2.176	d2max (for USL)				2.787	
4261											
4262	Normal GOF Test on Detects Only										
4263	Not Enough Data to Perform GOF Test										
4264											

A	B	C	D	E	F	G	H	I	J	K	L
4265	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
4266	KM Mean			0.00388	KM SD			0.00826			
4267	95% UTL95% Coverage			0.0219	95% KM UPL (t)			0.0181			
4268	90% KM Percentile (z)			0.0145	95% KM Percentile (z)			0.0175			
4269	99% KM Percentile (z)			0.0231	95% KM USL			0.0269			
4270											
4271	DL/2 Substitution Background Statistics Assuming Normal Distribution										
4272	Mean			0.00535	SD			0.00824			
4273	95% UTL95% Coverage			0.0233	95% UPL (t)			0.0195			
4274	90% Percentile (z)			0.0159	95% Percentile (z)			0.0189			
4275	99% Percentile (z)			0.0245	95% USL			0.0283			
4276	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons										
4277											
4278	Gamma GOF Tests on Detected Observations Only										
4279	Not Enough Data to Perform GOF Test										
4280											
4281	Gamma Statistics on Detected Data Only										
4282	k hat (MLE)			1.851	k star (bias corrected MLE)			N/A			
4283	Theta hat (MLE)			0.0162	Theta star (bias corrected MLE)			N/A			
4284	nu hat (MLE)			7.402	nu star (bias corrected)			N/A			
4285	MLE Mean (bias corrected)			N/A							
4286	MLE Sd (bias corrected)			N/A			95% Percentile of Chisquare (2kstar)			N/A	
4287											
4288	Estimates of Gamma Parameters using KM Estimates										
4289	Mean (KM)			0.00388	SD (KM)			0.00826			
4290	Variance (KM)			6.8242E-5	SE of Mean (KM)			0.00203			
4291	k hat (KM)			0.221	k star (KM)			0.221			
4292	nu hat (KM)			14.6	nu star (KM)			14.6			
4293	theta hat (KM)			0.0176	theta star (KM)			0.0176			
4294	80% gamma percentile (KM)			0.00537	90% gamma percentile (KM)			0.0117			
4295	95% gamma percentile (KM)			0.0195	99% gamma percentile (KM)			0.0405			
4296											
4297	The following statistics are computed using gamma distribution and KM estimates										
4298	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
4299				WH	HW				WH	HW	
4300	95% Approx. Gamma UTL with 95% Coverage			0.0127	0.0117	95% Approx. Gamma UPL			0.00977	0.00895	
4301	95% KM Gamma Percentile			0.00933	0.00855	95% Gamma USL			0.0175	0.0163	
4302											
4303	Lognormal GOF Test on Detected Observations Only										
4304	Not Enough Data to Perform GOF Test										
4305											
4306	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects										
4307	Mean in Original Scale			0.00185	Mean in Log Scale			-13.76			
4308	SD in Original Scale			0.00882	SD in Log Scale			4.546			
4309	95% UTL95% Coverage			0.0208	95% BCA UTL95% Coverage			0.05			
4310	95% Bootstrap (%) UTL95% Coverage			0.05	95% UPL (t)			0.00261			
4311	90% Percentile (z)			3.5691E-4	95% Percentile (z)			0.00186			
4312	99% Percentile (z)			0.0413	95% USL			0.334			
4313											
4314	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution										
4315	KM Mean of Logged Data			-5.979	95% KM UTL (Lognormal)95% Coverage			0.0091			
4316	KM SD of Logged Data			0.588	95% KM UPL (Lognormal)			0.00695			

A	B	C	D	E	F	G	H	I	J	K	L
4317	95% KM Percentile Lognormal (z)			0.00666	95% KM USL (Lognormal)					0.013	
4318											
4319	Background DL/2 Statistics Assuming Lognormal Distribution										
4320	Mean in Original Scale			0.00535	Mean in Log Scale					-5.596	
4321	SD in Original Scale			0.00824	SD in Log Scale					0.745	
4322	95% UTL95% Coverage			0.0188	95% UPL (t)					0.0134	
4323	90% Percentile (z)			0.00965	95% Percentile (z)					0.0126	
4324	99% Percentile (z)			0.021	95% USL					0.0296	
4325	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
4326											
4327	Nonparametric Distribution Free Background Statistics										
4328	Data do not follow a Discernible Distribution (0.05)										
4329											
4330	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
4331	Order of Statistic, r			33	95% UTL with95% Coverage					0.05	
4332	Approx, f used to compute achieved CC			1.737	Approximate Actual Confidence Coefficient achieved by UTL					0.816	
4333	Approximate Sample Size needed to achieve specified CC			59	95% UPL					0.022	
4334	95% USL			0.05	95% KM Chebyshev UPL					0.0404	
4335											
4336	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
4337	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
4338	and consists of observations collected from clean unimpacted locations.										
4339	The use of USL tends to provide a balance between false positives and false negatives provided the data										
4340	represents a background data set and when many onsite observations need to be compared with the BTV.										
4341											
4342	SILVER, DISSOLVED										
4343											
4344	General Statistics										
4345	Total Number of Observations			33	Number of Missing Observations					98	
4346	Number of Distinct Observations			3							
4347	Number of Detects			0	Number of Non-Detects					33	
4348	Number of Distinct Detects			0	Number of Distinct Non-Detects					3	
4349	Minimum Detect			N/A	Minimum Non-Detect					0.0022	
4350	Maximum Detect			N/A	Maximum Non-Detect					0.01	
4351	Variance Detected			N/A	Percent Non-Detects					100%	
4352	Mean Detected			N/A	SD Detected					N/A	
4353	Mean of Detected Logged Data			N/A	SD of Detected Logged Data					N/A	
4354											
4355	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
4356	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
4357	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
4358											
4359	The data set for variable SILVER, DISSOLVED was not processed!										
4360											
4361											
4362	ZINC, TOTAL										
4363											
4364	General Statistics										
4365	Total Number of Observations			33	Number of Missing Observations					98	
4366	Number of Distinct Observations			10							
4367	Number of Detects			22	Number of Non-Detects					11	
4368	Number of Distinct Detects			10	Number of Distinct Non-Detects					1	

A	B	C	D	E	F	G	H	I	J	K	L
4369			Minimum Detect	0.02					Minimum Non-Detect	0.06	
4370			Maximum Detect	0.16					Maximum Non-Detect	0.06	
4371			Variance Detected	0.00145					Percent Non-Detects	33.33%	
4372			Mean Detected	0.0545					SD Detected	0.0381	
4373			Mean of Detected Logged Data	-3.129					SD of Detected Logged Data	0.679	
4374											
4375			Critical Values for Background Threshold Values (BTVs)								
4376			Tolerance Factor K (For UTL)	2.176					d2max (for USL)	2.787	
4377											
4378			Normal GOF Test on Detects Only								
4379			Shapiro Wilk Test Statistic	0.853					Shapiro Wilk GOF Test		
4380			5% Shapiro Wilk Critical Value	0.911					Data Not Normal at 5% Significance Level		
4381			Lilliefors Test Statistic	0.183					Lilliefors GOF Test		
4382			5% Lilliefors Critical Value	0.184					Detected Data appear Normal at 5% Significance Level		
4383			Detected Data appear Approximate Normal at 5% Significance Level								
4384											
4385			Kaplan Meier (KM) Background Statistics Assuming Normal Distribution								
4386			KM Mean	0.0461					KM SD	0.0333	
4387			95% UTL95% Coverage	0.119					95% KM UPL (t)	0.103	
4388			90% KM Percentile (z)	0.0888					95% KM Percentile (z)	0.101	
4389			99% KM Percentile (z)	0.124					95% KM USL	0.139	
4390											
4391			DL/2 Substitution Background Statistics Assuming Normal Distribution								
4392			Mean	0.0464					SD	0.0331	
4393			95% UTL95% Coverage	0.118					95% UPL (t)	0.103	
4394			90% Percentile (z)	0.0887					95% Percentile (z)	0.101	
4395			99% Percentile (z)	0.123					95% USL	0.138	
4396			DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons								
4397											
4398			Gamma GOF Tests on Detected Observations Only								
4399			A-D Test Statistic	0.746					Anderson-Darling GOF Test		
4400			5% A-D Critical Value	0.753					Detected data appear Gamma Distributed at 5% Significance Level		
4401			K-S Test Statistic	0.184					Kolmogorov-Smirnov GOF		
4402			5% K-S Critical Value	0.187					Detected data appear Gamma Distributed at 5% Significance Level		
4403			Detected data appear Gamma Distributed at 5% Significance Level								
4404											
4405			Gamma Statistics on Detected Data Only								
4406			k hat (MLE)	2.419					k star (bias corrected MLE)	2.12	
4407			Theta hat (MLE)	0.0225					Theta star (bias corrected MLE)	0.0257	
4408			nu hat (MLE)	106.4					nu star (bias corrected)	93.26	
4409			MLE Mean (bias corrected)	0.0545							
4410			MLE Sd (bias corrected)	0.0375					95% Percentile of Chisquare (2kstar)	9.873	
4411											
4412			Gamma ROS Statistics using Imputed Non-Detects								
4413			GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs								
4414			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)								
4415			For such situations, GROS method may yield incorrect values of UCLs and BTVs								
4416			This is especially true when the sample size is small.								
4417			For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates								
4418			Minimum	0.01					Mean	0.0462	
4419			Maximum	0.16					Median	0.0379	
4420			SD	0.0343					CV	0.743	

A	B	C	D	E	F	G	H	I	J	K	L		
4421	k hat (MLE)			2.261	k star (bias corrected MLE)			2.076					
4422	Theta hat (MLE)			0.0204	Theta star (bias corrected MLE)			0.0222					
4423	nu hat (MLE)			149.2	nu star (bias corrected)			137					
4424	MLE Mean (bias corrected)			0.0462	MLE Sd (bias corrected)			0.032					
4425	95% Percentile of Chisquare (2kstar)			9.732	90% Percentile			0.089					
4426	95% Percentile			0.108	99% Percentile			0.151					
4427	The following statistics are computed using Gamma ROS Statistics on Imputed Data												
4428	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods												
4429				WH	HW				WH	HW			
4430	95% Approx. Gamma UTL with 95% Coverage			0.137	0.142	95% Approx. Gamma UPL			0.11	0.112			
4431	95% Gamma USL			0.18	0.192								
4432													
4433	Estimates of Gamma Parameters using KM Estimates												
4434	Mean (KM)			0.0461	SD (KM)			0.0333					
4435	Variance (KM)			0.00111	SE of Mean (KM)			0.00615					
4436	k hat (KM)			1.913	k star (KM)			1.759					
4437	nu hat (KM)			126.2	nu star (KM)			116.1					
4438	theta hat (KM)			0.0241	theta star (KM)			0.0262					
4439	80% gamma percentile (KM)			0.0701	90% gamma percentile (KM)			0.0924					
4440	95% gamma percentile (KM)			0.114	99% gamma percentile (KM)			0.162					
4441													
4442	The following statistics are computed using gamma distribution and KM estimates												
4443	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods												
4444				WH	HW				WH	HW			
4445	95% Approx. Gamma UTL with 95% Coverage			0.129	0.132	95% Approx. Gamma UPL			0.104	0.105			
4446	95% KM Gamma Percentile			0.101	0.101	95% Gamma USL			0.167	0.175			
4447													
4448	Lognormal GOF Test on Detected Observations Only												
4449	Shapiro Wilk Test Statistic			0.902	Shapiro Wilk GOF Test								
4450	5% Shapiro Wilk Critical Value			0.911	Data Not Lognormal at 5% Significance Level								
4451	Lilliefors Test Statistic			0.193	Lilliefors GOF Test								
4452	5% Lilliefors Critical Value			0.184	Data Not Lognormal at 5% Significance Level								
4453	Data Not Lognormal at 5% Significance Level												
4454													
4455	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects												
4456	Mean in Original Scale			0.0465	Mean in Log Scale			-3.276					
4457	SD in Original Scale			0.0336	SD in Log Scale			0.635					
4458	95% UTL95% Coverage			0.15	95% BCA UTL95% Coverage			0.13					
4459	95% Bootstrap (%) UTL95% Coverage			0.16	95% UPL (t)			0.112					
4460	90% Percentile (z)			0.0852	95% Percentile (z)			0.107					
4461	99% Percentile (z)			0.165	95% USL			0.221					
4462													
4463	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution												
4464	KM Mean of Logged Data			-3.287	95% KM UTL (Lognormal)95% Coverage			0.145					
4465	KM SD of Logged Data			0.623	95% KM UPL (Lognormal)			0.109					
4466	95% KM Percentile Lognormal (z)			0.104	95% KM USL (Lognormal)			0.212					
4467													
4468	Background DL/2 Statistics Assuming Lognormal Distribution												
4469	Mean in Original Scale			0.0464	Mean in Log Scale			-3.255					
4470	SD in Original Scale			0.0331	SD in Log Scale			0.579					
4471	95% UTL95% Coverage			0.136	95% UPL (t)			0.104					
4472	90% Percentile (z)			0.081	95% Percentile (z)			0.1					

A	B	C	D	E	F	G	H	I	J	K	L
4473	99% Percentile (z)			0.148	95% USL					0.194	
4474	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
4475											
4476	Nonparametric Distribution Free Background Statistics										
4477	Data appear to follow a Discernible Distribution at 5% Significance Level										
4478											
4479	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
4480	Order of Statistic, r			33	95% UTL with 95% Coverage					0.16	
4481	Approx, f used to compute achieved CC			1.737	Approximate Actual Confidence Coefficient achieved by UTL					0.816	
4482	Approximate Sample Size needed to achieve specified CC			59	95% UPL					0.125	
4483	95% USL			0.16	95% KM Chebyshev UPL					0.194	
4484											
4485	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
4486	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
4487	and consists of observations DL collected from clean unimpacted locations.										
4488	The use of USL tends to provide a balance between false positives and false negatives provided the data										
4489	represents a background data set and when many onsite observations need to be compared with the BTV.										
4490											
4491	ZINC, DISSOLVED										
4492											
4493	General Statistics										
4494	Total Number of Observations			34	Number of Missing Observations					97	
4495	Number of Distinct Observations			7							
4496	Number of Detects			20	Number of Non-Detects					14	
4497	Number of Distinct Detects			7	Number of Distinct Non-Detects					2	
4498	Minimum Detect			0.01	Minimum Non-Detect					0.02	
4499	Maximum Detect			0.28	Maximum Non-Detect					0.06	
4500	Variance Detected			0.00449	Percent Non-Detects					41.18%	
4501	Mean Detected			0.059	SD Detected					0.067	
4502	Mean of Detected Logged Data			-3.341	SD of Detected Logged Data					1.025	
4503											
4504	Critical Values for Background Threshold Values (BTVs)										
4505	Tolerance Factor K (For UTL)			2.166	d2max (for USL)					2.799	
4506											
4507	Normal GOF Test on Detects Only										
4508	Shapiro Wilk Test Statistic			0.727	Shapiro Wilk GOF Test						
4509	5% Shapiro Wilk Critical Value			0.905	Data Not Normal at 5% Significance Level						
4510	Lilliefors Test Statistic			0.27	Lilliefors GOF Test						
4511	5% Lilliefors Critical Value			0.192	Data Not Normal at 5% Significance Level						
4512	Data Not Normal at 5% Significance Level										
4513											
4514	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
4515	KM Mean			0.0411	KM SD					0.0546	
4516	95% UTL 95% Coverage			0.159	95% KM UPL (t)					0.135	
4517	90% KM Percentile (z)			0.111	95% KM Percentile (z)					0.131	
4518	99% KM Percentile (z)			0.168	95% KM USL					0.194	
4519											
4520	DL/2 Substitution Background Statistics Assuming Normal Distribution										
4521	Mean			0.0465	SD					0.0532	
4522	95% UTL 95% Coverage			0.162	95% UPL (t)					0.138	
4523	90% Percentile (z)			0.115	95% Percentile (z)					0.134	
4524	99% Percentile (z)			0.17	95% USL					0.195	

A	B	C	D	E	F	G	H	I	J	K	L
4525	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons										
4526											
4527	Gamma GOF Tests on Detected Observations Only										
4528	A-D Test Statistic		1.03		Anderson-Darling GOF Test						
4529	5% A-D Critical Value		0.766		Data Not Gamma Distributed at 5% Significance Level						
4530	K-S Test Statistic		0.286		Kolmogorov-Smirnov GOF						
4531	5% K-S Critical Value		0.199		Data Not Gamma Distributed at 5% Significance Level						
4532	Data Not Gamma Distributed at 5% Significance Level										
4533											
4534	Gamma Statistics on Detected Data Only										
4535	k hat (MLE)		1.116		k star (bias corrected MLE)				0.982		
4536	Theta hat (MLE)		0.0528		Theta star (bias corrected MLE)				0.0601		
4537	nu hat (MLE)		44.66		nu star (bias corrected)				39.29		
4538	MLE Mean (bias corrected)		0.059								
4539	MLE Sd (bias corrected)		0.0595		95% Percentile of Chisquare (2kstar)				5.923		
4540											
4541	Gamma ROS Statistics using Imputed Non-Detects										
4542	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
4543	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)										
4544	For such situations, GROS method may yield incorrect values of UCLs and BTVs										
4545	This is especially true when the sample size is small.										
4546	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
4547	Minimum		0.01		Mean				0.0425		
4548	Maximum		0.28		Median				0.02		
4549	SD		0.0554		CV				1.304		
4550	k hat (MLE)		1.093		k star (bias corrected MLE)				1.017		
4551	Theta hat (MLE)		0.0388		Theta star (bias corrected MLE)				0.0418		
4552	nu hat (MLE)		74.36		nu star (bias corrected)				69.13		
4553	MLE Mean (bias corrected)		0.0425		MLE Sd (bias corrected)				0.0421		
4554	95% Percentile of Chisquare (2kstar)		6.056		90% Percentile				0.0973		
4555	95% Percentile		0.126		99% Percentile				0.194		
4556	The following statistics are computed using Gamma ROS Statistics on Imputed Data										
4557	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
4558			WH	HW				WH	HW		
4559	95% Approx. Gamma UTL with 95% Coverage		0.167	0.172	95% Approx. Gamma UPL			0.125	0.126		
4560	95% Gamma USL		0.24	0.257							
4561											
4562	Estimates of Gamma Parameters using KM Estimates										
4563	Mean (KM)		0.0411		SD (KM)				0.0546		
4564	Variance (KM)		0.00298		SE of Mean (KM)				0.00964		
4565	k hat (KM)		0.565		k star (KM)				0.535		
4566	nu hat (KM)		38.44		nu star (KM)				36.38		
4567	theta hat (KM)		0.0726		theta star (KM)				0.0767		
4568	80% gamma percentile (KM)		0.0676		90% gamma percentile (KM)				0.109		
4569	95% gamma percentile (KM)		0.154		99% gamma percentile (KM)				0.263		
4570											
4571	The following statistics are computed using gamma distribution and KM estimates										
4572	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
4573			WH	HW				WH	HW		
4574	95% Approx. Gamma UTL with 95% Coverage		0.156	0.159	95% Approx. Gamma UPL			0.118	0.117		
4575	95% KM Gamma Percentile		0.112	0.111	95% Gamma USL			0.223	0.236		
4576											

A	B	C	D	E	F	G	H	I	J	K	L	
4577	Lognormal GOF Test on Detected Observations Only											
4578	Shapiro Wilk Test Statistic			0.899	Shapiro Wilk GOF Test							
4579	5% Shapiro Wilk Critical Value			0.905	Data Not Lognormal at 5% Significance Level							
4580	Lilliefors Test Statistic			0.261	Lilliefors GOF Test							
4581	5% Lilliefors Critical Value			0.192	Data Not Lognormal at 5% Significance Level							
4582	Data Not Lognormal at 5% Significance Level											
4583												
4584	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
4585	Mean in Original Scale			0.0425	Mean in Log Scale			-3.674				
4586	SD in Original Scale			0.0551	SD in Log Scale			0.965				
4587	95% UTL95% Coverage			0.205	95% BCA UTL95% Coverage			0.202				
4588	95% Bootstrap (%) UTL95% Coverage			0.28	95% UPL (t)			0.133				
4589	90% Percentile (z)			0.0874	95% Percentile (z)			0.124				
4590	99% Percentile (z)			0.24	95% USL			0.378				
4591												
4592	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
4593	KM Mean of Logged Data			-3.707	95% KM UTL (Lognormal)95% Coverage			0.176				
4594	KM SD of Logged Data			0.91	95% KM UPL (Lognormal)			0.117				
4595	95% KM Percentile Lognormal (z)			0.11	95% KM USL (Lognormal)			0.313				
4596												
4597	Background DL/2 Statistics Assuming Lognormal Distribution											
4598	Mean in Original Scale			0.0465	Mean in Log Scale			-3.441				
4599	SD in Original Scale			0.0532	SD in Log Scale			0.809				
4600	95% UTL95% Coverage			0.185	95% UPL (t)			0.128				
4601	90% Percentile (z)			0.0902	95% Percentile (z)			0.121				
4602	99% Percentile (z)			0.21	95% USL			0.308				
4603	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
4604												
4605	Nonparametric Distribution Free Background Statistics											
4606	Data do not follow a Discernible Distribution (0.05)											
4607												
4608	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
4609	Order of Statistic, r			34	95% UTL with95% Coverage			0.28				
4610	Approx, f used to compute achieved CC			1.789	Approximate Actual Confidence Coefficient achieved by UTL			0.825				
4611	Approximate Sample Size needed to achieve specified CC			59	95% UPL			0.19				
4612	95% USL			0.28	95% KM Chebyshev UPL			0.283				
4613												
4614	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
4615	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
4616	and consists of observations collected from clean unimpacted locations.											
4617	The use of USL tends to provide a balance between false positives and false negatives provided the data											
4618	represents a background data set and when many onsite observations need to be compared with the BTV.											
4619												
4620	BROMOFORM											
4621												
4622	General Statistics											
4623	Total Number of Observations			81	Number of Missing Observations			50				
4624	Number of Distinct Observations			2								
4625	Number of Detects			1	Number of Non-Detects			80				
4626	Number of Distinct Detects			1	Number of Distinct Non-Detects			1				
4627	Minimum Detect			2	Minimum Non-Detect			1				
4628	Maximum Detect			2	Maximum Non-Detect			1				

A	B	C	D	E	F	G	H	I	J	K	L
4629			Variance Detected		N/A				Percent Non-Detects		98.77%
4630			Mean Detected		2				SD Detected		N/A
4631			Mean of Detected Logged Data		0.693				SD of Detected Logged Data		N/A
4632											
4633			Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!								
4634			It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).								
4635											
4636			The data set for variable BROMOFORM was not processed!								
4637											
4638											
4639			BROMOMETHANE								
4640											
4641			General Statistics								
4642			Total Number of Observations		81				Number of Missing Observations		50
4643			Number of Distinct Observations		3						
4644			Number of Detects		1				Number of Non-Detects		80
4645			Number of Distinct Detects		1				Number of Distinct Non-Detects		2
4646			Minimum Detect		5				Minimum Non-Detect		1
4647			Maximum Detect		5				Maximum Non-Detect		3
4648			Variance Detected		N/A				Percent Non-Detects		98.77%
4649			Mean Detected		5				SD Detected		N/A
4650			Mean of Detected Logged Data		1.609				SD of Detected Logged Data		N/A
4651											
4652			Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!								
4653			It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).								
4654											
4655			The data set for variable BROMOMETHANE was not processed!								
4656											
4657											
4658			CARBON TETRACHLORIDE								
4659											
4660			General Statistics								
4661			Total Number of Observations		81				Number of Missing Observations		50
4662			Number of Distinct Observations		1						
4663			Number of Detects		0				Number of Non-Detects		81
4664			Number of Distinct Detects		0				Number of Distinct Non-Detects		1
4665			Minimum Detect		N/A				Minimum Non-Detect		1
4666			Maximum Detect		N/A				Maximum Non-Detect		1
4667			Variance Detected		N/A				Percent Non-Detects		100%
4668			Mean Detected		N/A				SD Detected		N/A
4669			Mean of Detected Logged Data		N/A				SD of Detected Logged Data		N/A
4670											
4671			Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!								
4672			Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!								
4673			The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).								
4674											
4675			The data set for variable CARBON TETRACHLORIDE was not processed!								
4676											
4677											
4678			CHLOROBENZENE								
4679											
4680			General Statistics								

A	B	C	D	E	F	G	H	I	J	K	L
4681	Total Number of Observations			81	Number of Missing Observations			50			
4682	Number of Distinct Observations			2							
4683	Number of Detects			0	Number of Non-Detects			81			
4684	Number of Distinct Detects			0	Number of Distinct Non-Detects			2			
4685	Minimum Detect			N/A	Minimum Non-Detect			1			
4686	Maximum Detect			N/A	Maximum Non-Detect			2			
4687	Variance Detected			N/A	Percent Non-Detects			100%			
4688	Mean Detected			N/A	SD Detected			N/A			
4689	Mean of Detected Logged Data			N/A	SD of Detected Logged Data			N/A			
4690											
4691	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
4692	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
4693	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
4694											
4695	The data set for variable CHLOROBENZENE was not processed!										
4696											
4697											
4698	CHLOROETHANE										
4699											
4700	General Statistics										
4701	Total Number of Observations			81	Number of Missing Observations			50			
4702	Number of Distinct Observations			2							
4703	Number of Detects			0	Number of Non-Detects			81			
4704	Number of Distinct Detects			0	Number of Distinct Non-Detects			2			
4705	Minimum Detect			N/A	Minimum Non-Detect			1			
4706	Maximum Detect			N/A	Maximum Non-Detect			2			
4707	Variance Detected			N/A	Percent Non-Detects			100%			
4708	Mean Detected			N/A	SD Detected			N/A			
4709	Mean of Detected Logged Data			N/A	SD of Detected Logged Data			N/A			
4710											
4711	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
4712	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
4713	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
4714											
4715	The data set for variable CHLOROETHANE was not processed!										
4716											
4717											
4718	DIBROMOCHLOROMETHANE (CHLORODIBROMOMETHANE)										
4719											
4720	General Statistics										
4721	Total Number of Observations			81	Number of Missing Observations			50			
4722	Number of Distinct Observations			1							
4723	Number of Detects			0	Number of Non-Detects			81			
4724	Number of Distinct Detects			0	Number of Distinct Non-Detects			1			
4725	Minimum Detect			N/A	Minimum Non-Detect			1			
4726	Maximum Detect			N/A	Maximum Non-Detect			1			
4727	Variance Detected			N/A	Percent Non-Detects			100%			
4728	Mean Detected			N/A	SD Detected			N/A			
4729	Mean of Detected Logged Data			N/A	SD of Detected Logged Data			N/A			
4730											
4731	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
4732	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										

A	B	C	D	E	F	G	H	I	J	K	L	
4733	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
4734												
4735	The data set for variable DIBROMOCHLOROMETHANE (CHLORODIBROMOMETHANE) was not processed!											
4736												
4737												
4738	CHLOROMETHANE											
4739												
4740	General Statistics											
4741	Total Number of Observations	81							Number of Missing Observations	50		
4742	Number of Distinct Observations	4										
4743	Number of Detects	1							Number of Non-Detects	80		
4744	Number of Distinct Detects	1							Number of Distinct Non-Detects	3		
4745	Minimum Detect	5							Minimum Non-Detect	1		
4746	Maximum Detect	5							Maximum Non-Detect	3		
4747	Variance Detected	N/A							Percent Non-Detects	98.77%		
4748	Mean Detected	5							SD Detected	N/A		
4749	Mean of Detected Logged Data	1.609							SD of Detected Logged Data	N/A		
4750												
4751	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!											
4752	It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).											
4753												
4754	The data set for variable CHLOROMETHANE was not processed!											
4755												
4756												
4757	3-CHLORO-1-PROPENE											
4758												
4759	General Statistics											
4760	Total Number of Observations	65							Number of Missing Observations	66		
4761	Number of Distinct Observations	2										
4762	Number of Detects	0							Number of Non-Detects	65		
4763	Number of Distinct Detects	0							Number of Distinct Non-Detects	2		
4764	Minimum Detect	N/A							Minimum Non-Detect	1		
4765	Maximum Detect	N/A							Maximum Non-Detect	2		
4766	Variance Detected	N/A							Percent Non-Detects	100%		
4767	Mean Detected	N/A							SD Detected	N/A		
4768	Mean of Detected Logged Data	N/A							SD of Detected Logged Data	N/A		
4769												
4770	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
4771	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
4772	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
4773												
4774	The data set for variable 3-CHLORO-1-PROPENE was not processed!											
4775												
4776												
4777	1,2-DICHLOROBENZENE											
4778												
4779	General Statistics											
4780	Total Number of Observations	67							Number of Missing Observations	64		
4781	Number of Distinct Observations	2										
4782	Number of Detects	0							Number of Non-Detects	67		
4783	Number of Distinct Detects	0							Number of Distinct Non-Detects	2		
4784	Minimum Detect	N/A							Minimum Non-Detect	1		

A	B	C	D	E	F	G	H	I	J	K	L
4785				Maximum Detect	N/A				Maximum Non-Detect		2
4786				Variance Detected	N/A				Percent Non-Detects		100%
4787				Mean Detected	N/A				SD Detected		N/A
4788				Mean of Detected Logged Data	N/A				SD of Detected Logged Data		N/A
4789											
4790	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
4791	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
4792	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
4793											
4794	The data set for variable 1,2-DICHLOROBENZENE was not processed!										
4795											
4796											
4797	1,3-DICHLOROBENZENE										
4798											
4799	General Statistics										
4800				Total Number of Observations	65				Number of Missing Observations		66
4801				Number of Distinct Observations	2						
4802				Number of Detects	0				Number of Non-Detects		65
4803				Number of Distinct Detects	0				Number of Distinct Non-Detects		2
4804				Minimum Detect	N/A				Minimum Non-Detect		1
4805				Maximum Detect	N/A				Maximum Non-Detect		2
4806				Variance Detected	N/A				Percent Non-Detects		100%
4807				Mean Detected	N/A				SD Detected		N/A
4808				Mean of Detected Logged Data	N/A				SD of Detected Logged Data		N/A
4809											
4810	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
4811	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
4812	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
4813											
4814	The data set for variable 1,3-DICHLOROBENZENE was not processed!										
4815											
4816											
4817	1,4-DICHLOROBENZENE										
4818											
4819	General Statistics										
4820				Total Number of Observations	66				Number of Missing Observations		65
4821				Number of Distinct Observations	2						
4822				Number of Detects	0				Number of Non-Detects		66
4823				Number of Distinct Detects	0				Number of Distinct Non-Detects		2
4824				Minimum Detect	N/A				Minimum Non-Detect		1
4825				Maximum Detect	N/A				Maximum Non-Detect		2
4826				Variance Detected	N/A				Percent Non-Detects		100%
4827				Mean Detected	N/A				SD Detected		N/A
4828				Mean of Detected Logged Data	N/A				SD of Detected Logged Data		N/A
4829											
4830	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
4831	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
4832	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
4833											
4834	The data set for variable 1,4-DICHLOROBENZENE was not processed!										
4835											
4836											

A	B	C	D	E	F	G	H	I	J	K	L
4837	DICHLORODIFLUOROMETHANE										
4838											
4839	General Statistics										
4840	Total Number of Observations			66		Number of Missing Observations			65		
4841	Number of Distinct Observations			2							
4842	Number of Detects			0		Number of Non-Detects			66		
4843	Number of Distinct Detects			0		Number of Distinct Non-Detects			2		
4844	Minimum Detect			N/A		Minimum Non-Detect			1		
4845	Maximum Detect			N/A		Maximum Non-Detect			2		
4846	Variance Detected			N/A		Percent Non-Detects			100%		
4847	Mean Detected			N/A		SD Detected			N/A		
4848	Mean of Detected Logged Data			N/A		SD of Detected Logged Data			N/A		
4849											
4850	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
4851	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
4852	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
4853											
4854	The data set for variable DICHLORODIFLUOROMETHANE was not processed!										
4855											
4856											
4857	1,2-DICHLOROPROPANE										
4858											
4859	General Statistics										
4860	Total Number of Observations			81		Number of Missing Observations			50		
4861	Number of Distinct Observations			2							
4862	Number of Detects			0		Number of Non-Detects			81		
4863	Number of Distinct Detects			0		Number of Distinct Non-Detects			2		
4864	Minimum Detect			N/A		Minimum Non-Detect			1		
4865	Maximum Detect			N/A		Maximum Non-Detect			2		
4866	Variance Detected			N/A		Percent Non-Detects			100%		
4867	Mean Detected			N/A		SD Detected			N/A		
4868	Mean of Detected Logged Data			N/A		SD of Detected Logged Data			N/A		
4869											
4870	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
4871	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
4872	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
4873											
4874	The data set for variable 1,2-DICHLOROPROPANE was not processed!										
4875											
4876											
4877	cis 1,3-DICHLOROPROPENE										
4878											
4879	General Statistics										
4880	Total Number of Observations			73		Number of Missing Observations			58		
4881	Number of Distinct Observations			2							
4882	Number of Detects			0		Number of Non-Detects			73		
4883	Number of Distinct Detects			0		Number of Distinct Non-Detects			2		
4884	Minimum Detect			N/A		Minimum Non-Detect			1		
4885	Maximum Detect			N/A		Maximum Non-Detect			2		
4886	Variance Detected			N/A		Percent Non-Detects			100%		
4887	Mean Detected			N/A		SD Detected			N/A		
4888	Mean of Detected Logged Data			N/A		SD of Detected Logged Data			N/A		

A	B	C	D	E	F	G	H	I	J	K	L	
4889												
4890	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
4891	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
4892	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
4893												
4894	The data set for variable cis 1,3-DICHLOROPROPENE was not processed!											
4895												
4896												
4897	trans 1,3-DICHLOROPROPENE											
4898												
4899	General Statistics											
4900	Total Number of Observations	72						Number of Missing Observations	59			
4901	Number of Distinct Observations	2										
4902	Number of Detects	0						Number of Non-Detects	72			
4903	Number of Distinct Detects	0						Number of Distinct Non-Detects	2			
4904	Minimum Detect	N/A						Minimum Non-Detect	1			
4905	Maximum Detect	N/A						Maximum Non-Detect	2			
4906	Variance Detected	N/A						Percent Non-Detects	100%			
4907	Mean Detected	N/A						SD Detected	N/A			
4908	Mean of Detected Logged Data	N/A						SD of Detected Logged Data	N/A			
4909												
4910	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
4911	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
4912	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
4913												
4914	The data set for variable trans 1,3-DICHLOROPROPENE was not processed!											
4915												
4916												
4917	2-BUTANONE (MEK)											
4918												
4919	General Statistics											
4920	Total Number of Observations	66						Number of Missing Observations	65			
4921	Number of Distinct Observations	1										
4922	Number of Detects	0						Number of Non-Detects	66			
4923	Number of Distinct Detects	0						Number of Distinct Non-Detects	1			
4924	Minimum Detect	N/A						Minimum Non-Detect	10			
4925	Maximum Detect	N/A						Maximum Non-Detect	10			
4926	Variance Detected	N/A						Percent Non-Detects	100%			
4927	Mean Detected	N/A						SD Detected	N/A			
4928	Mean of Detected Logged Data	N/A						SD of Detected Logged Data	N/A			
4929												
4930	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
4931	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
4932	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
4933												
4934	The data set for variable 2-BUTANONE (MEK) was not processed!											
4935												
4936												
4937	4-METHYL-2-PENTANONE (MIBK)											
4938												
4939	General Statistics											
4940	Total Number of Observations	66						Number of Missing Observations	65			

A	B	C	D	E	F	G	H	I	J	K	L
4941	Number of Distinct Observations			1							
4942	Number of Detects			0	Number of Non-Detects						66
4943	Number of Distinct Detects			0	Number of Distinct Non-Detects						1
4944	Minimum Detect			N/A	Minimum Non-Detect						5
4945	Maximum Detect			N/A	Maximum Non-Detect						5
4946	Variance Detected			N/A	Percent Non-Detects						100%
4947	Mean Detected			N/A	SD Detected						N/A
4948	Mean of Detected Logged Data			N/A	SD of Detected Logged Data						N/A
4949											
4950	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
4951	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
4952	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
4953											
4954	The data set for variable 4-METHYL-2-PENTANONE (MIBK) was not processed!										
4955											
4956											
4957	1,1,1,2-TETRACHLOROETHANE										
4958											
4959	General Statistics										
4960	Total Number of Observations			67	Number of Missing Observations						64
4961	Number of Distinct Observations			1							
4962	Number of Detects			0	Number of Non-Detects						67
4963	Number of Distinct Detects			0	Number of Distinct Non-Detects						1
4964	Minimum Detect			N/A	Minimum Non-Detect						1
4965	Maximum Detect			N/A	Maximum Non-Detect						1
4966	Variance Detected			N/A	Percent Non-Detects						100%
4967	Mean Detected			N/A	SD Detected						N/A
4968	Mean of Detected Logged Data			N/A	SD of Detected Logged Data						N/A
4969											
4970	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
4971	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
4972	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
4973											
4974	The data set for variable 1,1,1,2-TETRACHLOROETHANE was not processed!										
4975											
4976											
4977	1,1,2,2-TETRACHLOROETHANE										
4978											
4979	General Statistics										
4980	Total Number of Observations			81	Number of Missing Observations						50
4981	Number of Distinct Observations			2							
4982	Number of Detects			1	Number of Non-Detects						80
4983	Number of Distinct Detects			1	Number of Distinct Non-Detects						1
4984	Minimum Detect			2	Minimum Non-Detect						1
4985	Maximum Detect			2	Maximum Non-Detect						1
4986	Variance Detected			N/A	Percent Non-Detects						98.77%
4987	Mean Detected			2	SD Detected						N/A
4988	Mean of Detected Logged Data			0.693	SD of Detected Logged Data						N/A
4989											
4990	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!										
4991	It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).										
4992											

A	B	C	D	E	F	G	H	I	J	K	L	
4993	The data set for variable 1,1,2,2-TETRACHLOROETHANE was not processed!											
4994												
4995												
4996	1,1,2-TRICHLOROETHANE											
4997												
4998	General Statistics											
4999	Total Number of Observations	81							Number of Missing Observations	50		
5000	Number of Distinct Observations	1										
5001	Number of Detects	0							Number of Non-Detects	81		
5002	Number of Distinct Detects	0							Number of Distinct Non-Detects	1		
5003	Minimum Detect	N/A							Minimum Non-Detect	1		
5004	Maximum Detect	N/A							Maximum Non-Detect	1		
5005	Variance Detected	N/A							Percent Non-Detects	100%		
5006	Mean Detected	N/A							SD Detected	N/A		
5007	Mean of Detected Logged Data	N/A							SD of Detected Logged Data	N/A		
5008												
5009	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
5010	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
5011	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
5012												
5013	The data set for variable 1,1,2-TRICHLOROETHANE was not processed!											
5014												
5015												
5016	TRICHLOROFLUOROMETHANE											
5017												
5018	General Statistics											
5019	Total Number of Observations	79							Number of Missing Observations	52		
5020	Number of Distinct Observations	1										
5021	Number of Detects	0							Number of Non-Detects	79		
5022	Number of Distinct Detects	0							Number of Distinct Non-Detects	1		
5023	Minimum Detect	N/A							Minimum Non-Detect	1		
5024	Maximum Detect	N/A							Maximum Non-Detect	1		
5025	Variance Detected	N/A							Percent Non-Detects	100%		
5026	Mean Detected	N/A							SD Detected	N/A		
5027	Mean of Detected Logged Data	N/A							SD of Detected Logged Data	N/A		
5028												
5029	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
5030	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
5031	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
5032												
5033	The data set for variable TRICHLOROFLUOROMETHANE was not processed!											
5034												
5035												
5036	1,2,3-TRICHLOROPROPANE											
5037												
5038	General Statistics											
5039	Total Number of Observations	67							Number of Missing Observations	64		
5040	Number of Distinct Observations	2										
5041	Number of Detects	0							Number of Non-Detects	67		
5042	Number of Distinct Detects	0							Number of Distinct Non-Detects	2		
5043	Minimum Detect	N/A							Minimum Non-Detect	1		
5044	Maximum Detect	N/A							Maximum Non-Detect	2		

A	B	C	D	E	F	G	H	I	J	K	L
5045			Variance Detected		N/A				Percent Non-Detects		100%
5046			Mean Detected		N/A				SD Detected		N/A
5047			Mean of Detected Logged Data		N/A				SD of Detected Logged Data		N/A
5048											
5049			Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!								
5050			Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!								
5051			The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).								
5052											
5053			The data set for variable 1,2,3-TRICHLOROPROPANE was not processed!								
5054											
5055											
5056	ACETONE										
5057											
5058			General Statistics								
5059			Total Number of Observations		49				Number of Missing Observations		82
5060			Number of Distinct Observations		2						
5061			Number of Detects		0				Number of Non-Detects		49
5062			Number of Distinct Detects		0				Number of Distinct Non-Detects		2
5063			Minimum Detect		N/A				Minimum Non-Detect		10
5064			Maximum Detect		N/A				Maximum Non-Detect		20
5065			Variance Detected		N/A				Percent Non-Detects		100%
5066			Mean Detected		N/A				SD Detected		N/A
5067			Mean of Detected Logged Data		N/A				SD of Detected Logged Data		N/A
5068											
5069			Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!								
5070			Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!								
5071			The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).								
5072											
5073			The data set for variable ACETONE was not processed!								
5074											
5075											
5076	ACRYLONITRILE										
5077											
5078			General Statistics								
5079			Total Number of Observations		49				Number of Missing Observations		82
5080			Number of Distinct Observations		1						
5081			Number of Detects		0				Number of Non-Detects		49
5082			Number of Distinct Detects		0				Number of Distinct Non-Detects		1
5083			Minimum Detect		N/A				Minimum Non-Detect		5
5084			Maximum Detect		N/A				Maximum Non-Detect		5
5085			Variance Detected		N/A				Percent Non-Detects		100%
5086			Mean Detected		N/A				SD Detected		N/A
5087			Mean of Detected Logged Data		N/A				SD of Detected Logged Data		N/A
5088											
5089			Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!								
5090			Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!								
5091			The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).								
5092											
5093			The data set for variable ACRYLONITRILE was not processed!								
5094											
5095											
5096	BROMOCHLOROMETHANE (CHLOROBROMOMETHANE)										

A	B	C	D	E	F	G	H	I	J	K	L	
5097												
5098	General Statistics											
5099	Total Number of Observations			49	Number of Missing Observations			82				
5100	Number of Distinct Observations			2								
5101	Number of Detects			0	Number of Non-Detects			49				
5102	Number of Distinct Detects			0	Number of Distinct Non-Detects			2				
5103	Minimum Detect			N/A	Minimum Non-Detect			1				
5104	Maximum Detect			N/A	Maximum Non-Detect			5				
5105	Variance Detected			N/A	Percent Non-Detects			100%				
5106	Mean Detected			N/A	SD Detected			N/A				
5107	Mean of Detected Logged Data			N/A	SD of Detected Logged Data			N/A				
5108												
5109	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
5110	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
5111	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
5112												
5113	The data set for variable BROMOCHLOROMETHANE (CHLOROBROMOMETHANE) was not processed!											
5114												
5115												
5116	BROMODICHLOROMETHANE											
5117												
5118	General Statistics											
5119	Total Number of Observations			66	Number of Missing Observations			65				
5120	Number of Distinct Observations			1								
5121	Number of Detects			0	Number of Non-Detects			66				
5122	Number of Distinct Detects			0	Number of Distinct Non-Detects			1				
5123	Minimum Detect			N/A	Minimum Non-Detect			1				
5124	Maximum Detect			N/A	Maximum Non-Detect			1				
5125	Variance Detected			N/A	Percent Non-Detects			100%				
5126	Mean Detected			N/A	SD Detected			N/A				
5127	Mean of Detected Logged Data			N/A	SD of Detected Logged Data			N/A				
5128												
5129	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
5130	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
5131	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
5132												
5133	The data set for variable BROMODICHLOROMETHANE was not processed!											
5134												
5135												
5136	CARBON DISULFIDE											
5137												
5138	General Statistics											
5139	Total Number of Observations			49	Number of Missing Observations			82				
5140	Number of Distinct Observations			2								
5141	Number of Detects			0	Number of Non-Detects			49				
5142	Number of Distinct Detects			0	Number of Distinct Non-Detects			2				
5143	Minimum Detect			N/A	Minimum Non-Detect			1				
5144	Maximum Detect			N/A	Maximum Non-Detect			5				
5145	Variance Detected			N/A	Percent Non-Detects			100%				
5146	Mean Detected			N/A	SD Detected			N/A				
5147	Mean of Detected Logged Data			N/A	SD of Detected Logged Data			N/A				
5148												

A	B	C	D	E	F	G	H	I	J	K	L	
5149	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
5150	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
5151	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
5152												
5153	The data set for variable CARBON DISULFIDE was not processed!											
5154												
5155												
5156	CHLOROFORM											
5157												
5158	General Statistics											
5159	Total Number of Observations	66							Number of Missing Observations	65		
5160	Number of Distinct Observations	1										
5161	Number of Detects	0							Number of Non-Detects	66		
5162	Number of Distinct Detects	0							Number of Distinct Non-Detects	1		
5163	Minimum Detect	N/A							Minimum Non-Detect	1		
5164	Maximum Detect	N/A							Maximum Non-Detect	1		
5165	Variance Detected	N/A							Percent Non-Detects	100%		
5166	Mean Detected	N/A							SD Detected	N/A		
5167	Mean of Detected Logged Data	N/A							SD of Detected Logged Data	N/A		
5168												
5169	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
5170	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
5171	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
5172												
5173	The data set for variable CHLOROFORM was not processed!											
5174												
5175												
5176	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)											
5177												
5178	General Statistics											
5179	Total Number of Observations	49							Number of Missing Observations	82		
5180	Number of Distinct Observations	4										
5181	Number of Detects	0							Number of Non-Detects	49		
5182	Number of Distinct Detects	0							Number of Distinct Non-Detects	4		
5183	Minimum Detect	N/A							Minimum Non-Detect	0.1		
5184	Maximum Detect	N/A							Maximum Non-Detect	7		
5185	Variance Detected	N/A							Percent Non-Detects	100%		
5186	Mean Detected	N/A							SD Detected	N/A		
5187	Mean of Detected Logged Data	N/A							SD of Detected Logged Data	N/A		
5188												
5189	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
5190	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
5191	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
5192												
5193	The data set for variable 1,2-DIBROMO-3-CHLOROPROPANE (DBCP) was not processed!											
5194												
5195												
5196	trans 1,4-DICHLORO-2-BUTENE											
5197												
5198	General Statistics											
5199	Total Number of Observations	49							Number of Missing Observations	82		
5200	Number of Distinct Observations	4										

A	B	C	D	E	F	G	H	I	J	K	L
5201	Number of Detects			0	Number of Non-Detects			49			
5202	Number of Distinct Detects			0	Number of Distinct Non-Detects			4			
5203	Minimum Detect			N/A	Minimum Non-Detect			2			
5204	Maximum Detect			N/A	Maximum Non-Detect			10			
5205	Variance Detected			N/A	Percent Non-Detects			100%			
5206	Mean Detected			N/A	SD Detected			N/A			
5207	Mean of Detected Logged Data			N/A	SD of Detected Logged Data			N/A			
5208											
5209	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
5210	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
5211	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
5212											
5213	The data set for variable trans 1,4-DICHLORO-2-BUTENE was not processed!										
5214											
5215											
5216	2-HEXANONE										
5217											
5218	General Statistics										
5219	Total Number of Observations			49	Number of Missing Observations			82			
5220	Number of Distinct Observations			2							
5221	Number of Detects			0	Number of Non-Detects			49			
5222	Number of Distinct Detects			0	Number of Distinct Non-Detects			2			
5223	Minimum Detect			N/A	Minimum Non-Detect			5			
5224	Maximum Detect			N/A	Maximum Non-Detect			10			
5225	Variance Detected			N/A	Percent Non-Detects			100%			
5226	Mean Detected			N/A	SD Detected			N/A			
5227	Mean of Detected Logged Data			N/A	SD of Detected Logged Data			N/A			
5228											
5229	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
5230	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
5231	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
5232											
5233	The data set for variable 2-HEXANONE was not processed!										
5234											
5235											
5236	DIBROMOMETHANE										
5237											
5238	General Statistics										
5239	Total Number of Observations			49	Number of Missing Observations			82			
5240	Number of Distinct Observations			2							
5241	Number of Detects			0	Number of Non-Detects			49			
5242	Number of Distinct Detects			0	Number of Distinct Non-Detects			2			
5243	Minimum Detect			N/A	Minimum Non-Detect			1			
5244	Maximum Detect			N/A	Maximum Non-Detect			5			
5245	Variance Detected			N/A	Percent Non-Detects			100%			
5246	Mean Detected			N/A	SD Detected			N/A			
5247	Mean of Detected Logged Data			N/A	SD of Detected Logged Data			N/A			
5248											
5249	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
5250	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
5251	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
5252											

A	B	C	D	E	F	G	H	I	J	K	L	
5253	The data set for variable DIBROMOMETHANE was not processed!											
5254												
5255												
5256	IODOMETHANE											
5257												
5258	General Statistics											
5259	Total Number of Observations	49							Number of Missing Observations	82		
5260	Number of Distinct Observations	2										
5261	Number of Detects	0							Number of Non-Detects	49		
5262	Number of Distinct Detects	0							Number of Distinct Non-Detects	2		
5263	Minimum Detect	N/A							Minimum Non-Detect	1		
5264	Maximum Detect	N/A							Maximum Non-Detect	5		
5265	Variance Detected	N/A							Percent Non-Detects	100%		
5266	Mean Detected	N/A							SD Detected	N/A		
5267	Mean of Detected Logged Data	N/A							SD of Detected Logged Data	N/A		
5268												
5269	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
5270	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
5271	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
5272												
5273	The data set for variable IODOMETHANE was not processed!											
5274												
5275												
5276	STYRENE											
5277												
5278	General Statistics											
5279	Total Number of Observations	50							Number of Missing Observations	81		
5280	Number of Distinct Observations	2										
5281	Number of Detects	0							Number of Non-Detects	50		
5282	Number of Distinct Detects	0							Number of Distinct Non-Detects	2		
5283	Minimum Detect	N/A							Minimum Non-Detect	1		
5284	Maximum Detect	N/A							Maximum Non-Detect	5		
5285	Variance Detected	N/A							Percent Non-Detects	100%		
5286	Mean Detected	N/A							SD Detected	N/A		
5287	Mean of Detected Logged Data	N/A							SD of Detected Logged Data	N/A		
5288												
5289	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
5290	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
5291	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
5292												
5293	The data set for variable STYRENE was not processed!											
5294												
5295												
5296	VINYL ACETATE											
5297												
5298	General Statistics											
5299	Total Number of Observations	49							Number of Missing Observations	82		
5300	Number of Distinct Observations	1										
5301	Number of Detects	0							Number of Non-Detects	49		
5302	Number of Distinct Detects	0							Number of Distinct Non-Detects	1		
5303	Minimum Detect	N/A							Minimum Non-Detect	5		
5304	Maximum Detect	N/A							Maximum Non-Detect	5		

A	B	C	D	E	F	G	H	I	J	K	L
5305			Variance Detected	N/A					Percent Non-Detects	100%	
5306			Mean Detected	N/A					SD Detected	N/A	
5307			Mean of Detected Logged Data	N/A					SD of Detected Logged Data	N/A	
5308											
5309	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
5310	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
5311	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
5312											
5313	The data set for variable VINYL ACETATE was not processed!										
5314											
5315											
5316	ANTIMONY										
5317											
5318	General Statistics										
5319		Total Number of Observations	4						Number of Missing Observations	127	
5320		Number of Distinct Observations	1								
5321		Number of Detects	0						Number of Non-Detects	4	
5322		Number of Distinct Detects	0						Number of Distinct Non-Detects	1	
5323		Minimum Detect	N/A						Minimum Non-Detect	0.0022	
5324		Maximum Detect	N/A						Maximum Non-Detect	0.0022	
5325		Variance Detected	N/A						Percent Non-Detects	100%	
5326		Mean Detected	N/A						SD Detected	N/A	
5327		Mean of Detected Logged Data	N/A						SD of Detected Logged Data	N/A	
5328											
5329	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
5330	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
5331	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
5332											
5333	The data set for variable ANTIMONY was not processed!										
5334											
5335											
5336	BERYLLIUM										
5337											
5338	General Statistics										
5339		Total Number of Observations	4						Number of Missing Observations	127	
5340		Number of Distinct Observations	1								
5341		Number of Detects	0						Number of Non-Detects	4	
5342		Number of Distinct Detects	0						Number of Distinct Non-Detects	1	
5343		Minimum Detect	N/A						Minimum Non-Detect	0.0011	
5344		Maximum Detect	N/A						Maximum Non-Detect	0.0011	
5345		Variance Detected	N/A						Percent Non-Detects	100%	
5346		Mean Detected	N/A						SD Detected	N/A	
5347		Mean of Detected Logged Data	N/A						SD of Detected Logged Data	N/A	
5348											
5349	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
5350	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
5351	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
5352											
5353	The data set for variable BERYLLIUM was not processed!										
5354											
5355											
5356	COBALT										

A	B	C	D	E	F	G	H	I	J	K	L
5357											
5358	General Statistics										
5359	Total Number of Observations			6	Number of Missing Observations			125			
5360	Number of Distinct Observations			2							
5361	Number of Detects			0	Number of Non-Detects			6			
5362	Number of Distinct Detects			0	Number of Distinct Non-Detects			2			
5363	Minimum Detect			N/A	Minimum Non-Detect			0.0056			
5364	Maximum Detect			N/A	Maximum Non-Detect			0.006			
5365	Variance Detected			N/A	Percent Non-Detects			100%			
5366	Mean Detected			N/A	SD Detected			N/A			
5367	Mean of Detected Logged Data			N/A	SD of Detected Logged Data			N/A			
5368											
5369	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
5370	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
5371	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
5372											
5373	The data set for variable COBALT was not processed!										
5374											
5375											
5376	NICKEL										
5377											
5378	General Statistics										
5379	Total Number of Observations			4	Number of Distinct Observations			4			
5380					Number of Missing Observations			127			
5381	Minimum			0.0065	First Quartile			0.00658			
5382	Second Largest			0.008	Median			0.0073			
5383	Maximum			0.0087	Third Quartile			0.00818			
5384	Mean			0.00745	SD			0.00108			
5385	Coefficient of Variation			0.145	Skewness			0.344			
5386	Mean of logged Data			-4.907	SD of logged Data			0.144			
5387											
5388	Critical Values for Background Threshold Values (BTVs)										
5389	Tolerance Factor K (For UTL)			5.144	d2max (for USL)			1.462			
5390											
5391	Normal GOF Test										
5392	Shapiro Wilk Test Statistic			0.874	Shapiro Wilk GOF Test						
5393	5% Shapiro Wilk Critical Value			0.748	Data appear Normal at 5% Significance Level						
5394	Lilliefors Test Statistic			0.285	Lilliefors GOF Test						
5395	5% Lilliefors Critical Value			0.375	Data appear Normal at 5% Significance Level						
5396	Data appear Normal at 5% Significance Level										
5397											
5398	Background Statistics Assuming Normal Distribution										
5399	95% UTL with 95% Coverage		0.013	90% Percentile (z)		0.00883					
5400	95% UPL (t)		0.0103	95% Percentile (z)		0.00922					
5401	95% USL		0.00903	99% Percentile (z)		0.00996					
5402											
5403	Gamma GOF Test										
5404	A-D Test Statistic			0.431	Anderson-Darling Gamma GOF Test						
5405	5% A-D Critical Value			0.656	Detected data appear Gamma Distributed at 5% Significance Level						
5406	K-S Test Statistic			0.318	Kolmogorov-Smirnov Gamma GOF Test						
5407	5% K-S Critical Value			0.394	Detected data appear Gamma Distributed at 5% Significance Level						
5408	Detected data appear Gamma Distributed at 5% Significance Level										

A	B	C	D	E	F	G	H	I	J	K	L
5409											
5410	Gamma Statistics										
5411	k hat (MLE)			64.23		k star (bias corrected MLE)			16.22		
5412	Theta hat (MLE)			1.1599E-4		Theta star (bias corrected MLE)			4.5920E-4		
5413	nu hat (MLE)			513.8		nu star (bias corrected)			129.8		
5414	MLE Mean (bias corrected)			0.00745		MLE Sd (bias corrected)			0.00185		
5415											
5416	Background Statistics Assuming Gamma Distribution										
5417	95% Wilson Hilferty (WH) Approx. Gamma UPL			0.0106		90% Percentile			0.0099		
5418	95% Hawkins Wixley (HW) Approx. Gamma UPL			0.0106		95% Percentile			0.0107		
5419	95% WH Approx. Gamma UTL with 95% Coverage			0.0144		99% Percentile			0.0124		
5420	95% HW Approx. Gamma UTL with 95% Coverage			0.0146							
5421	95% WH USL			0.00909		95% HW USL			0.0091		
5422											
5423	Lognormal GOF Test										
5424	Shapiro Wilk Test Statistic			0.87		Shapiro Wilk Lognormal GOF Test					
5425	5% Shapiro Wilk Critical Value			0.748		Data appear Lognormal at 5% Significance Level					
5426	Lilliefors Test Statistic			0.284		Lilliefors Lognormal GOF Test					
5427	5% Lilliefors Critical Value			0.375		Data appear Lognormal at 5% Significance Level					
5428	Data appear Lognormal at 5% Significance Level										
5429											
5430	Background Statistics assuming Lognormal Distribution										
5431	95% UTL with 95% Coverage			0.0155		90% Percentile (z)			0.00889		
5432	95% UPL (t)			0.0108		95% Percentile (z)			0.00937		
5433	95% USL			0.00912		99% Percentile (z)			0.0103		
5434											
5435	Nonparametric Distribution Free Background Statistics										
5436	Data appear Normal at 5% Significance Level										
5437											
5438	Nonparametric Upper Limits for Background Threshold Values										
5439	Order of Statistic, r			4		95% UTL with 95% Coverage			0.0087		
5440	Approx, f used to compute achieved CC			0.211		Approximate Actual Confidence Coefficient achieved by UTL			0.185		
5441						Approximate Sample Size needed to achieve specified CC			59		
5442	95% Percentile Bootstrap UTL with 95% Coverage			N/A		95% BCA Bootstrap UTL with 95% Coverage			N/A		
5443	95% UPL			0.0087		90% Percentile			0.00849		
5444	90% Chebyshev UPL			0.0111		95% Percentile			0.0086		
5445	95% Chebyshev UPL			0.0127		99% Percentile			0.00868		
5446	95% USL			0.0087							
5447											
5448	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
5449	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
5450	and consists of observations collected from clean unimpacted locations.										
5451	The use of USL tends to provide a balance between false positives and false negatives provided the data										
5452	represents a background data set and when many onsite observations need to be compared with the BTV.										
5453											
5454	THALLIUM										
5455											
5456	General Statistics										
5457	Total Number of Observations			4		Number of Missing Observations			127		
5458	Number of Distinct Observations			1							
5459	Number of Detects			0		Number of Non-Detects			4		
5460	Number of Distinct Detects			0		Number of Distinct Non-Detects			1		

	A	B	C	D	E	F	G	H	I	J	K	L
5461					Minimum Detect	N/A					Minimum Non-Detect	0.0011
5462					Maximum Detect	N/A					Maximum Non-Detect	0.0011
5463					Variance Detected	N/A					Percent Non-Detects	100%
5464					Mean Detected	N/A					SD Detected	N/A
5465					Mean of Detected Logged Data	N/A					SD of Detected Logged Data	N/A
5466												
5467	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
5468	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
5469	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
5470												
5471	The data set for variable THALLIUM was not processed!											
5472												
5473												
5474	VANADIUM											
5475												
5476	General Statistics											
5477					Total Number of Observations	4					Number of Missing Observations	127
5478					Number of Distinct Observations	1						
5479					Number of Detects	0					Number of Non-Detects	4
5480					Number of Distinct Detects	0					Number of Distinct Non-Detects	1
5481					Minimum Detect	N/A					Minimum Non-Detect	0.0022
5482					Maximum Detect	N/A					Maximum Non-Detect	0.0022
5483					Variance Detected	N/A					Percent Non-Detects	100%
5484					Mean Detected	N/A					SD Detected	N/A
5485					Mean of Detected Logged Data	N/A					SD of Detected Logged Data	N/A
5486												
5487	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
5488	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
5489	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
5490												
5491	The data set for variable VANADIUM was not processed!											
5492												
5493												

ATTACHMENT 3

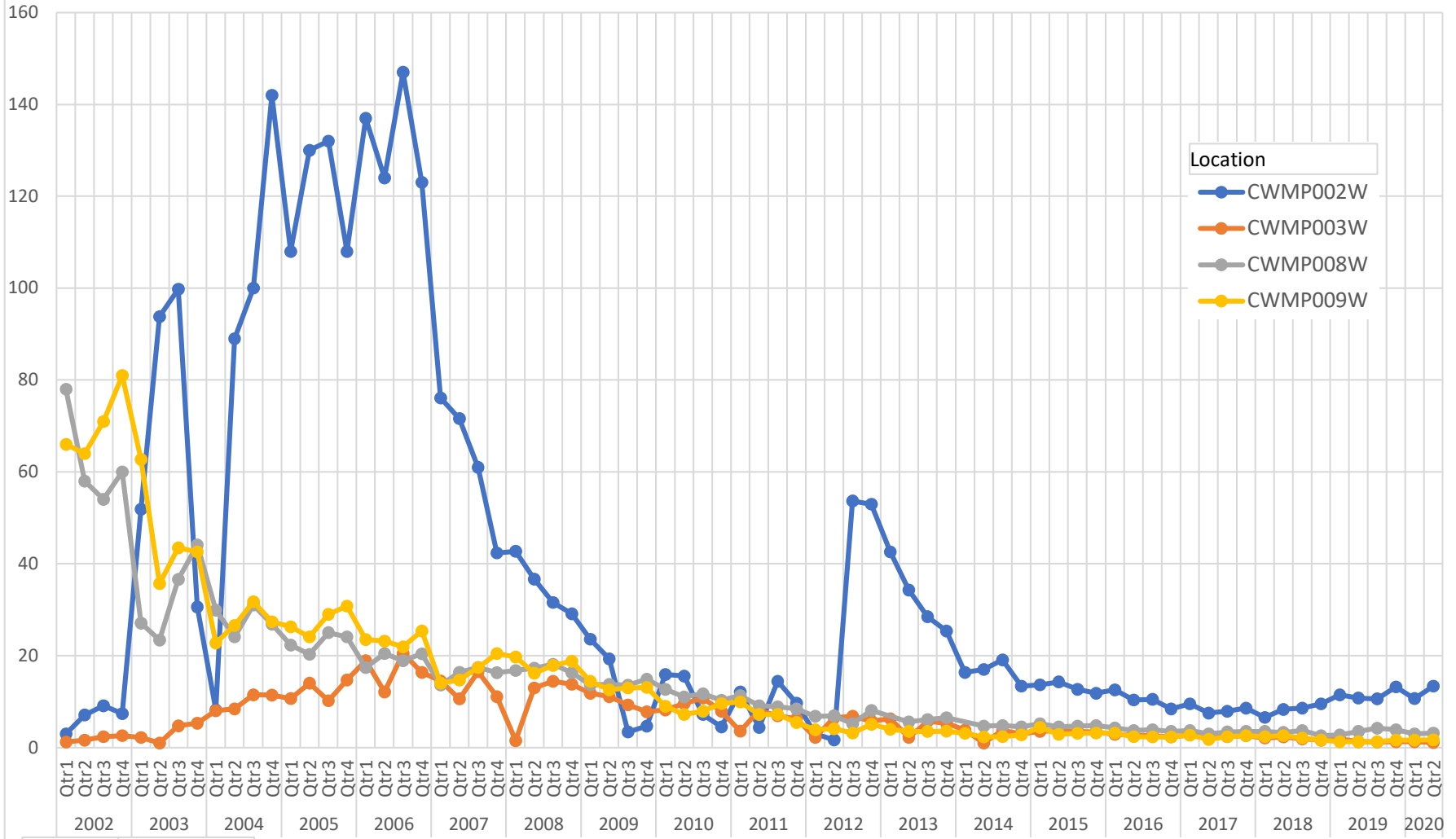
VOC TREND PLOTS



Parameter

1,1-DICHLOROETHANE

Max of Result

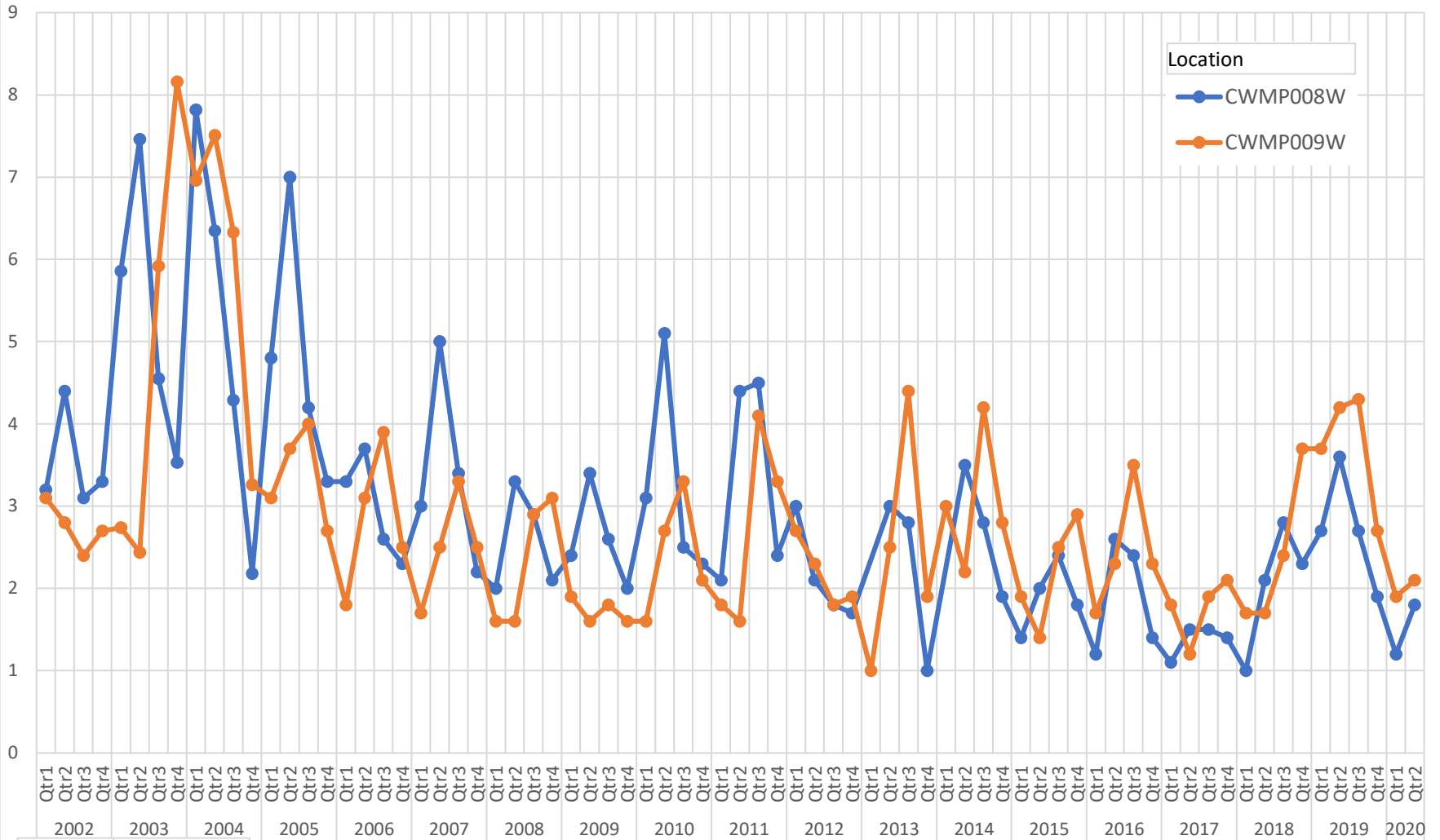


Years Sample Date

Parameter

BENZENE

Max of Result



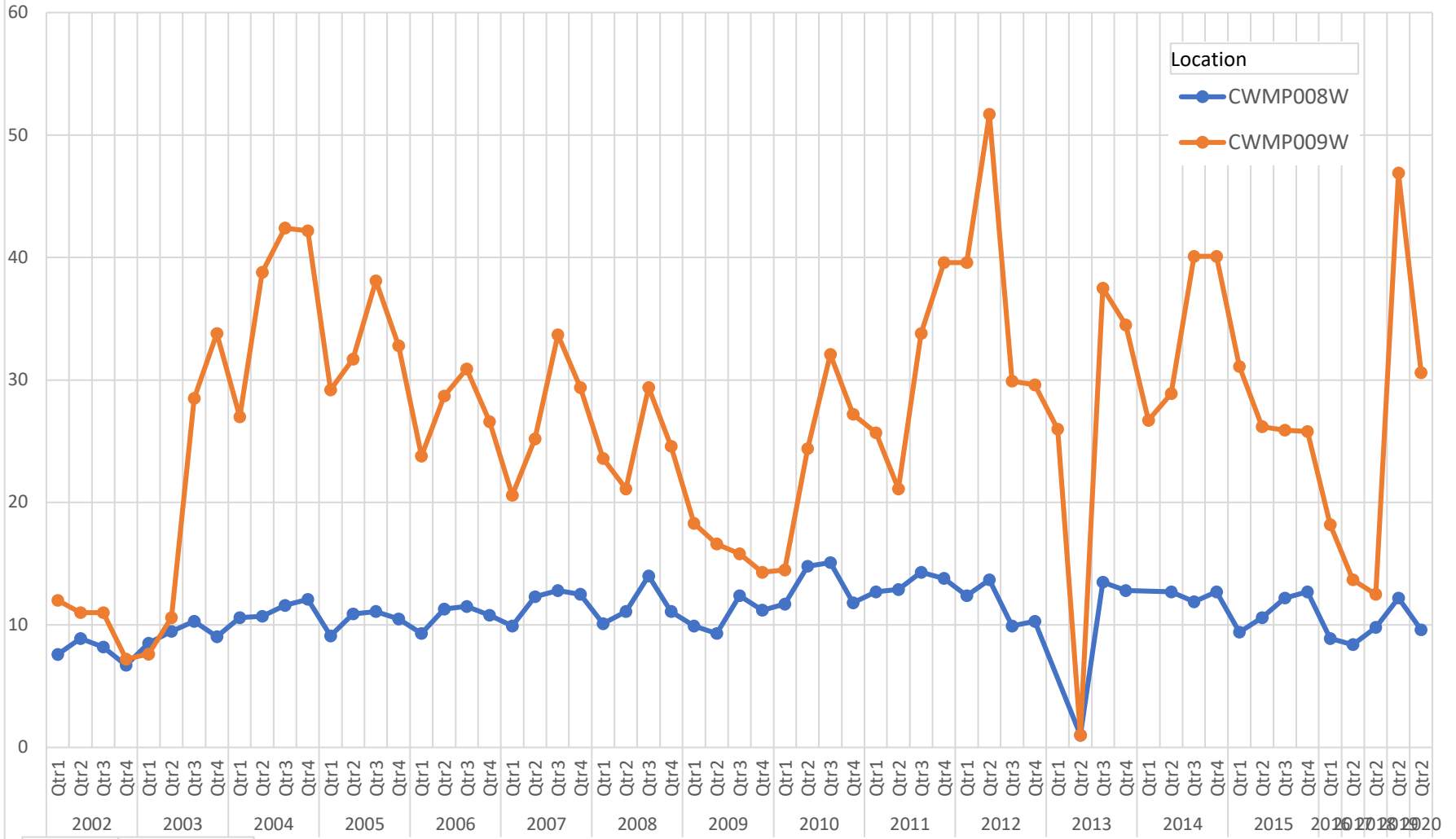
Years

Sample Date

Parameter

CHLOROBENZENE

Max of Result



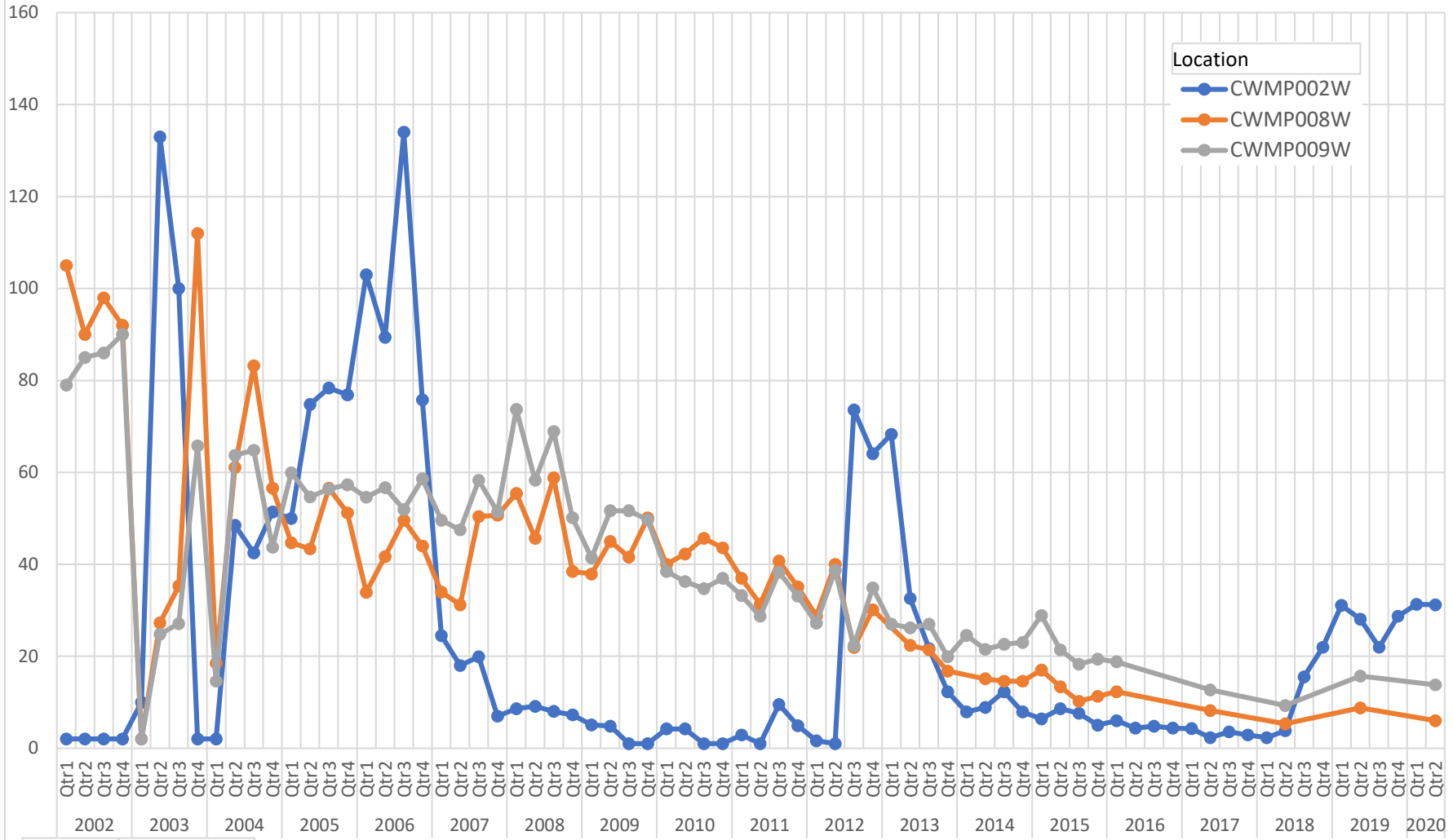
Years

Sample Date

Parameter

CHLOROETHANE

Max of Result

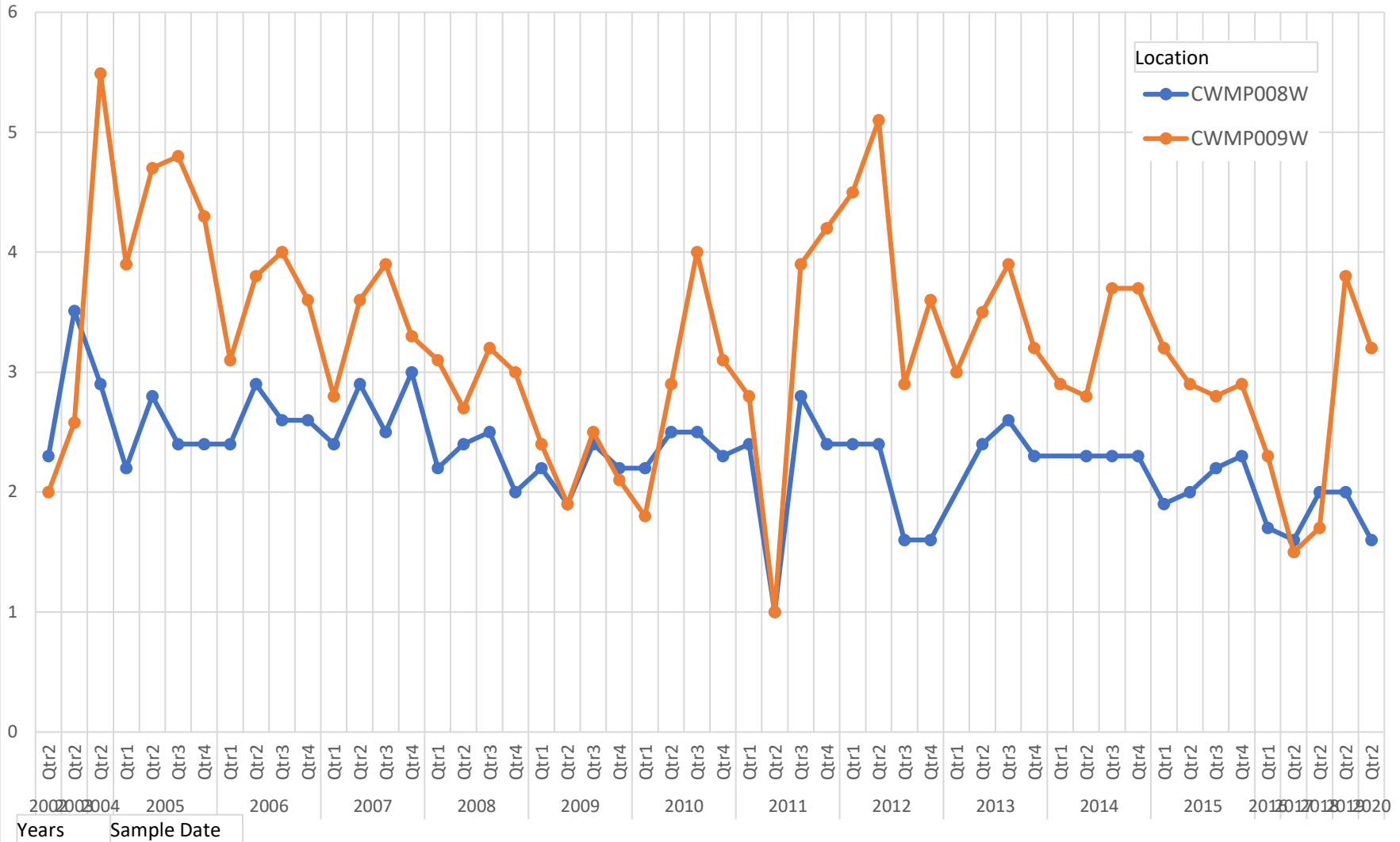


Years Sample Date

Parameter

1,2-DICHLOROBEZENE

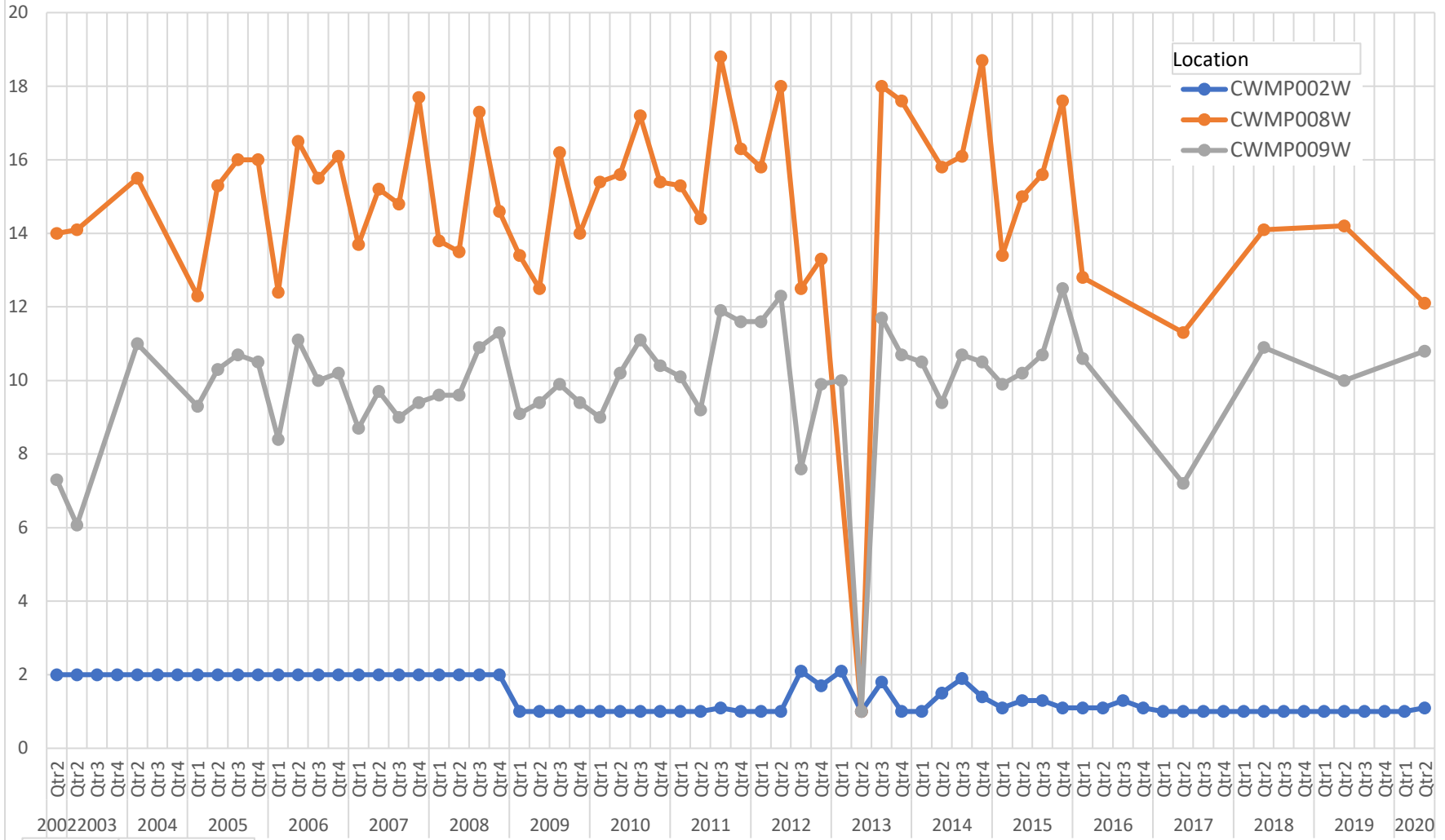
Max of Result



Parameter

1,4-DICHLOROBEZENE

Max of Result



Years

Sample Date



ARM Group LLC

Engineers and Scientists

August 19, 2020

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

Re: LCSWMA Creswell Landfill
Permit No. 100008
Manor Township, Lancaster County, Pennsylvania
Second Quarter 2020 Water Quality Data Review
ARM Project 190848

Dear Mr. Brown:

ARM Group LLC (ARM) has prepared this assessment at the request of the Lancaster County Solid Waste Management Authority (LCSWMA) to provide an evaluation of the Second Quarter 2020 water quality monitoring results for Creswell Landfill (CWLF). As part of this evaluation, ARM reviewed the historic and Second Quarter 2020 laboratory analytical results for the sampled upgradient and downgradient Form 19 groundwater monitoring wells and surface water monitoring points.

The groundwater and surface water samples collected by LCSWMA during the Second Quarter 2020 were analyzed for quarterly and annual Form 19 parameters. The following narrative provides a summary of noteworthy observations of the results for the Second Quarter 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 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, CWMP001W, using laboratory analytical results from the Fourth Quarter 1987 through the most recent quarter (Second 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 Rosner's Test 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-1. ARM identified 82 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 Second 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-1 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 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 Second 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. In these cases, ARM substituted the laboratory reporting detection limit for the statistical background standard.x

It should be noted that this sampling event includes Form 19 annual and Subtitle D parameters. The majority of the Form 19 annual and Subtitle D parameters have background populations less than 8 because of a historical lack of detections in MP-1.

The attached **Table 1** summarizes the background exceedances in the downgradient wells during the Second Quarter 2020. Background exceedances shown in **Table 1** denote a statistically significant increase of concentrations relative to those observed historically in the upgradient well MP-1. 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 Well Summary

- **MP-1** – Parameters above background in this well include total magnesium, total sodium, and total dissolved solids (TDS). Nickel was also detected in the Subtitle D parameter analysis but appears to be stable over time. Sodium levels appear to be slowly increasing over time, potentially because of road salt runoff from River Road. Magnesium and TDS concentrations appear to be generally stable over time. pH fluctuates over a range of approximately 1.97 units and appears to be trending slightly higher over time. All other Form 19 analytical parameters appear to be stable and within historical concentration ranges.
- **MP-2** – 1,1-dichloroethane, chloroethane, 1,4-dichlorobenzene, cobalt, and nickel were detected during this event, and are, therefore, above background levels.

Other parameters above background in MP-2 include alkalinity (bicarbonate and total), calcium (total and dissolved), chloride, magnesium (total and dissolved), manganese (total and dissolved), total potassium, sodium (total and dissolved), sulfate, specific conductance (SpC), sulfate, TDS, and total organic carbon (TOC). The majority of these parameters appear to be slowly increasing overtime with exception of the following:

- Chloride, sulfate, 1,1-dichloroethane, and chloroethane appear to be decreasing with respect to their historical maximum concentrations detected during earlier sampling events.
 - Concentrations of dissolved manganese, total potassium and total sodium appear to be generally stable.
 - pH appears to mimic the trend observed in the upgradient well at levels approximately 0.42 unit higher, on average, while fluctuating over a slightly wider range.
- **MP-3** – 1,1-dichloroethane, dissolved chromium, and nickel were detected during this event, and are, therefore, above background levels. 1,1-dichloroethane concentrations appear to be decreasing over time, apart from an apparently isolated elevated detection in 2018. Dissolved chromium and nickel do not appear to be increasing over time based on the limited number of observations of these parameters in the sampling record.

Other parameters above background in MP-3 include ammonia-N, alkalinity (bicarbonate and total), ammonia-N, calcium (total and dissolved), chemical oxygen demand (COD), chloride, sodium (total and dissolved), SpC, sulfate, and TDS.

Concentrations of alkalinity (bicarbonate and total), chloride, sodium, SpC, and TDS appear to be increasing over time with short-term fluctuations observed. The remaining parameters with noted exceedances generally appear to be stable. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.27 unit higher, on average.

- **MP-4** – Parameters above background in MP-4 include ammonia-N, alkalinity (bicarbonate and total), chemical oxygen demand (COD), chloride, and sulfate. Concentrations of alkalinity (bicarbonate and total) and chloride appear to be increasing slowly long-term with



short-term fluctuations. The remaining parameters with noted exceedances generally appear to be stable. pH appears to be trending slightly lower over time with a long-term average value approximately 0.59 unit higher than background.

- MP-5 – Nickel was detected during this event, and is, therefore, above background levels. However, the concentration does not appear to be increasing over time. Other parameters above background in this well include alkalinity (bicarbonate and total), chloride, sodium (total and dissolved), sulfate, and TDS. Concentrations of chloride and sodium (total and dissolved) generally appear to be increasing over time with short-term fluctuations. The remaining parameters with noted exceedances generally appear to be stable. pH appears to be stable over time with a long-term average value approximately 0.23 unit higher than background.
- MP-7 – Parameters above background in this well include alkalinity (bicarbonate and total), chloride, sodium (total and dissolved), SpC, sulfate, and TDS. All parameters generally appear to be increasing over time with short-term fluctuations. pH appears to closely mimic the trend observed in the upgradient well at levels approximately 0.19 unit higher, on average.
- MP-8 – Benzene, cobalt, nickel, chlorobenzene, chloroethane, 1,1-dichloroethane, 1,2-dichlorobenzene, and 1,4-dichlorobenzene, were detected in during this event, and are, therefore, above background levels. Other parameters above background in MP-8 include alkalinity (bicarbonate and total), ammonia-N, total barium, calcium (total and dissolved), iron (total and dissolved), total magnesium, manganese (total and dissolved), total potassium, total sodium, SpC, sulfate, TDS, and TOC.

Manganese (total and dissolved) levels appear to be slowly increasing over time. Concentrations of the other noted parameters generally appear to be steady long-term with minor fluctuations. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.74 unit higher, on average, while fluctuating over a slightly narrower range.

- MP-9 – Benzene, arsenic (total and dissolved), chlorobenzene, chloroethane, 1,1-dichloroethane, 1,2-dichlorobenzene, 1,4-dichlorobenzene, acetone, cobalt, and nickel were detected during this event, and are, therefore, above background levels.

Other parameters above background in MP-9 include alkalinity (bicarbonate and total), ammonia-N, barium (total and dissolved), calcium (total and dissolved), chloride, COD, iron (total and dissolved), magnesium (total and dissolved), manganese (total and dissolved), potassium (total and dissolved), sodium (total and dissolved), SpC, sulfate, TDS, and TOC. Calcium (total and dissolved), magnesium (total and dissolved), manganese (total and dissolved), potassium (total and dissolved), SpC, and TDS levels appear to be slowly increasing over time. Concentrations of the other noted parameters generally appear to be steady long-term with minor fluctuations. pH appears to be trending slightly lower over time with a long-term average value approximately 0.9 unit higher than background.



- MP-10 – Chromium (total and dissolved), total copper, and nickel were detected during this event, and are, therefore, above background levels.

Other parameters above background in MP-10 include alkalinity (bicarbonate and total), calcium (total and dissolved), chloride, magnesium (total and dissolved), total manganese, potassium (total and dissolved), sodium (total and dissolved), SpC, sulfate, TDS, and TOC. Concentrations of alkalinity (bicarbonate and total), chloride, magnesium, sodium, SpC, and sulfate generally appear to be stable with slight increasing trends and fluctuations correlating to seasonal changes. Calcium and TDS concentrations have generally remained stable over time while potassium and TOC concentrations continue to decrease over time. Fluctuations correlating to seasonal changes are apparent for these parameters. pH appears to mimic the trend observed in the upgradient well at levels approximately 1.25 units higher, on average.

- MP-12 – Total arsenic and nickel were detected during this event, and are, therefore, above background levels.

Other parameters above background in MP-12 include alkalinity (bicarbonate and total), calcium (total and dissolved), chloride, total iron, total manganese, SpC, sulfate, and TOC. Concentrations of chloride, iron, TOC, and turbidity appear to be stable to increasing over time, with iron displaying the widest range of fluctuations. Turbidity fluctuations appear to be seasonal. Concentrations of the other noted parameters generally appear to be stable long-term and are decreasing. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.66 units higher, on average.

- MP-16 – Cobalt was detected during this event, and is, therefore, above background levels.

Sulfate was detected above background in this well. However, sulfate concentrations appear to be stable long-term. pH appears to be stable over time with a long-term average value approximately 0.69 unit higher than background.

- MP-17S – Surface-water grab samples are taken from Mann’s Run at this location and analyzed for Form 19 parameters. Because of its upstream location relative to the majority of CWLF, this sampling point should be interpreted, to some extent, as a background evaluation point for evaluating downstream conditions in Mann’s Run (i.e., at MP-18S).

Nickel was detected during this event, and is, therefore, above background levels. Other parameters above statistical groundwater background levels at MP-17S include alkalinity (bicarbonate and total), calcium (total and dissolved), chloride, magnesium (total and dissolved), dissolved manganese, nitrate-N, potassium (total and dissolved), sodium (total and dissolved), SpC, sulfate, TDS, and TOC. The following parameters appear to be generally stable to decreasing over time; dissolved manganese, nitrate-N, potassium (total and dissolved), sodium (total and dissolved). Concentrations of the other noted parameters show a wide range of fluctuation in the historical results and appear to demonstrate slightly increasing trends. Nitrate-nitrogen and magnesium concentration fluctuations appear to be seasonal. pH appears to mimic the trend observed in the upgradient well at levels approximately 1.99 units higher, on average, while fluctuating over a slightly wider range.



- **MP-18S** – Surface-water grab samples are taken from Mann’s Run at this downstream location and analyzed for Form 19 parameters. Nickel was detected during this event, and is, therefore, above background levels. Other parameters above statistical groundwater background levels at MP-18S include alkalinity (bicarbonate and total), ammonia-N, calcium (total and dissolved), chloride, COD, magnesium (total and dissolved), potassium (total and dissolved), sodium (total and dissolved), SpC, sulfate, TDS, and TOC. Calcium (total and dissolved), potassium (total and dissolved), and COD levels appear to be decreasing over time. Ammonia-N, sulfate, and TOC levels appear to be generally stable long-term. Concentrations of the remaining parameters appear to be increasing over time. pH appears to mimic the trend observed in the upgradient well at levels approximately 2.57 units higher, on average.

Trend plots for the VOCs noted above (1,1-dichloroethane, benzene, chlorobenzene, chloroethane, 1,2-dichlorobenzene, and 1,4-dichlorobenzene) are included in **Attachment 3**. Parameters not noted above are either at or below background levels. Overall, the groundwater quality at CWLF appears to be improving, especially with respect to VOC concentrations. Some metal and ion concentrations (e.g., calcium, sodium, and chloride) appear to be increasing slowly in some wells over time, but these water quality changes are generally gradual and do not appear to be a cause for concern at this time.

Trip and Field Blank Analyses

No trip blank or field blank sample results were reported during the Second Quarter 2020 sampling event.



Closing

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

Sincerely,
ARM Group LLC



Jeremy Fleming
Project Geologist II



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

Enclosed: Table 1
Attachments 1-3



TABLE



Table 1. LCSWMA Creswell Landfill Form 19 Groundwater Monitoring Well Background Standard Comparisons - 2nd Quarter 2020

Parameter	Background Standard	Units	CWMP001W	CWMP002W	CWMP003W	CWMP004W	CWMP005W	CWMP007W	CWMP008W	CWMP009W	CWMP010W	CWMP012W	CWMP016W	CWMP017S	CWMP018S
<i>Quarterly Analytes</i>															
AMMONIA-NITROGEN	0.12	µg/L	<0.1	<0.1	0.48	0.31	<0.1	<0.1	4.89	22.1	<0.1	<0.1	<0.1	<0.1	<0.1
BICARBONATE	8.0	µg/L	7	89	34	29	23	23	365	515	147	89	6	590	395
CALCIUM, TOTAL	20.1	µg/L	15.1	52.5	23.2	20	16.4	17.3	61.2	140	24.9	30.4	4.8	79.3	67.4
CALCIUM, DISSOLVED	19.2	µg/L	14.1	51.5	22	18.8	14.9	16	25.3	144	26.1	31	4.8	72.8	63.4
COD (CHEMICAL OXYGEN DEMAND)	12.68*	µg/L	<15	<15	<15	<15	<15	<15	24	99	<15	<15	<15	<15	22
CHLORIDE	32.6	mg/L	27.7	107	60.6	42	71.3	62.3	31.8	491	109	34.5	2.4	619	401
FLUORIDE	0.20*	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5
IRON, TOTAL	3.74	µg/L	1.1	0.17	<0.05	<0.05	0.06	<0.05	27.4	37.2	0.39	80.1	0.11	0.29	0.25
IRON, DISSOLVED	0.13	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.64	35.4	0.06	<0.05	<0.05	0.12	<0.05
MAGNESIUM, TOTAL	12.49	mg/L	12.5	19.1	8.2	6.6	9.8	10	27.6	71.5	21.9	8.4	1.1	116	74.8
MAGNESIUM, DISSOLVED	12.42	mg/L	10.8	16.5	8	6.4	9.3	9.5	6.7	70.4	22.1	8.6	1.1	111	72.5
MANGANESE, TOTAL	0.126	µg/L	0.06	1.1	<0.0056	0.0083	0.07	0.0065	14.5	10.9	0.21	0.25	0.0076	0.09	<0.0056
MANGANESE, DISSOLVED	0.127	mg/L	0.04	1.1	<0.0056	0.009	0.06	0.006	0.06	11.3	0.02	0.11	0.0091	0.07	<0.0056
NITRATE-NITROGEN	23.56	µg/L	19.4	3.3	6.9	5.7	8.7	9.3	<0.2	<0.2	4.7	8.2	0.64	24.8	18.6
pH-FIELD	None***	mg/L	5.01	5.47	5.32	5.65	4.75	5.19	6.08	6.10	6.26	5.77	5.25	7.90	7.93
pH-LAB	None***	mg/L	6.18	6.02	6.33	6.74	6.42	6.32	6.86	7.19	7.77	6.76	6.62	8.46	8.75
POTASSIUM, TOTAL	2.88	mg/L	2.6	3.1	1.6	1.4	2.6	2.2	7.7	30.5	4.5	1.3	0.42	16.2	15.4
POTASSIUM, DISSOLVED	3.06	mg/L	2.3	2.7	1.5	1.3	2.4	2.2	2.1	30.8	4.7	1.4	0.41	15.9	15.0
SODIUM, TOTAL	15.61	µg/L	15.8	30.4	20.7	15.4	37.3	35.9	32.3	156	81	12.4	2.9	452	282
SODIUM, DISSOLVED	15.12	mg/L	13.4	28.3	20.5	14.9	34.4	33.3	10.5	156	81.8	12.7	2.9	448	279
SPEC. COND., FIELD	328	mg/L	287	618	363	292	373	379	836	2635	767	346	65	3369	2310
SPEC. COND., LAB	299	mg/L	265	574	342	263	358	355	723	2280	688	323	53	3190	2210
SULFATE	2.87	µmho/cm	2	21	5	5	5	21	7	6	25	5	11	63	35
ALKALINITY	7.0	µmho/cm	7	89	34	29	23	23	365	515	147	89	6	590	395
TDS (TOTAL DISSOLVED SOLIDS)	260	mg/L	276	356	244	198	302	310	458	1370	356	212	<25	1850	1220
TOC (TOTAL ORGANIC CARBON)	1.13	µg/L	<0.5	5	1	1	<0.5	<0.5	8	34	3	2	1	6	8
TOTAL PHENOLICS	0.005*	µg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
TURBIDITY	177	mg/L	14.7	0.14	0.15	<0.1	0.42	0.11	12.5	63.6	1.05	94.8	0.68	1.91	0.54
BENZENE	1*	µg/L	<1	<1	<1	<1	<1	<1	1.8	2.1	<1	<1	<1	<1	<1
1,2-DIBROMOETHANE (EDB) (ETHYLENE DIBROMIDE)	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-DICHLOROETHANE	1.0*	µg/L	<1	13.4	1.1	<1	<1	<1	3.2	1.7	<1	<1	<1	<1	<1
1,1-DICHLOROETHENE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-DICHLOROETHANE	1*	NTU	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
cis 1,2-DICHLOROETHENE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
trans 1,2-DICHLOROETHENE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
ETHYLBENZENE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
METHYLENE CHLORIDE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
TETRACHLOROETHENE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
TOLUENE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,1-TRICHLOROETHANE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
TRICHLOROETHENE	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
VINYL CHLORIDE	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
XYLENES (TOTAL)	3*	µg/L	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3

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.

Table 1. LCSWMA Creswell Landfill Form 19 Groundwater Monitoring Well Background Standard Comparisons - 2nd Quarter 2020

Parameter	Background Standard	Units	CWMP001W	CWMP002W	CWMP003W	CWMP004W	CWMP005W	CWMP007W	CWMP008W	CWMP009W	CWMP010W	CWMP012W	CWMP016W	CWMP017S	CWMP018S
<i>Annual Analytes</i>															
ARSENIC, TOTAL	0.0033*	mg/L	<0.0033	<0.0033	<0.0033	<0.0033	<0.0033	<0.0033	<0.0033	0.0036	<0.0033	0.0057	<0.0033	<0.0033	<0.0033
ARSENIC, DISSOLVED	0.0030*	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0036	<0.003	<0.003	<0.003	<0.003	<0.003
BARIUM, TOTAL	0.17	mg/L	0.070	0.050	0.010	0.020	0.050	0.040	0.13	0.73	0.03	0.09	0.01	0.02	0.03
BARIUM, DISSOLVED	0.19	mg/L	0.070	0.050	0.010	0.020	0.050	0.040	0.030	0.74	0.02	0.08	0.0091	0.02	0.03
CADMIUM, TOTAL	0.0011*	mg/L	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011
CADMIUM, DISSOLVED	0.0011*	mg/L	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011
CHROMIUM, TOTAL	0.0022*	mg/L	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	0.010	<0.0022	<0.0022	<0.0022	<0.0022
CHROMIUM, DISSOLVED	0.0022*	mg/L	<0.0022	<0.0022	0.0066	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	0.0067	<0.0022	<0.0022	<0.0022	<0.0022
COPPER, TOTAL	0.0056*	mg/L	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	0.0068	<0.0056	<0.0056	<0.0056	<0.0056
COPPER, DISSOLVED	0.0056*	mg/L	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056
LEAD-FLAMELESS, TOTAL	0.027	mg/L	0.003	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022
LEAD, DISSOLVED	0.0022*	mg/L	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022
MERCURY, TOTAL	0.0005*	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MERCURY, DISSOLVED	0.0005*	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
SELENIUM, TOTAL	0.0056*	µmho/cm	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056
SELENIUM, DISSOLVED	0.0056*	µmho/cm	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056
SILVER, TOTAL	0.0022*	mg/L	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022
SILVER, DISSOLVED	0.0022*	mg/L	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022
ZINC, TOTAL	0.103	mg/L	0.020	0.0080	0.0073	<0.0056	0.010	0.0068	<0.0056	0.0056	<0.0056	0.0072	<0.0056	0.060	0.010
ZINC, DISSOLVED	0.19	mg/L	0.010	0.0077	0.0080	<0.0056	0.0093	0.0059	0.0062	<0.0056	<0.0056	0.0056	<0.0056	0.060	0.010
BROMOFORM	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
BROMOMETHANE	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
CARBON TETRACHLORIDE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
CHLOROETHANE	1*	µg/L	<1	<1	<1	<1	<1	<1	9.6	30.6	<1	<1	<1	<1	<1
CHLOROETHANE	1*	NTU	<1	31.2	<1	<1	<1	<1	6	13.8	<1	<1	<1	<1	<1
DIBROMOCHLOROMETHANE (CHLORODIBROMOMETHANE)	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
CHLOROMETHANE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
3-CHLORO-1-PROPENE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-DICHLOROENZENE	1*	µg/L	<1	<1	<1	<1	<1	<1	1.6	3.2	<1	<1	<1	<1	<1
1,3-DICHLOROENZENE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,4-DICHLOROENZENE	1*	µg/L	<1	1.1	<1	<1	<1	<1	12.1	10.8	<1	<1	<1	<1	<1
DICHLORODIFLUOROMETHANE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-DICHLOROPROPANE	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
cis 1,3-DICHLOROPROPENE	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
trans 1,3-DICHLOROPROPENE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2-BUTANONE (MEK)	10*	mg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-METHYL-2-PENTANONE (MIBK)	5*	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,1,1,2-TETRACHLOROETHANE	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-TETRACHLOROETHANE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2-TRICHLOROETHANE	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
TRICHLOROFLUOROMETHANE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2,3-TRICHLOROPROPANE	2*	mg/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2

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.

Table 1. LCSWMA Creswell Landfill Form 19 Groundwater Monitoring Well Background Standard Comparisons - 2nd Quarter 2020

Parameter	Background Standard	Units	CWMP001W	CWMP002W	CWMP003W	CWMP004W	CWMP005W	CWMP007W	CWMP008W	CWMP009W	CWMP010W	CWMP012W	CWMP016W	CWMP017S	CWMP018S
<i>Subtitle D Analytes</i>															
ACETONE	10*	mg/L	<10	<10	<10	<10	<10	<10	<10	13.2	<10	<10	<10	<10	<10
ACRYLONITRILE	5*	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
BROMOCHLOROMETHANE (CHLOROBROMOMETHANE)	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
BROMODICHLOROMETHANE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
CARBON DISULFIDE	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
CHLOROFORM	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	7*	mg/L	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7
trans 1,4-DICHLORO-2-BUTENE	3*	µmho/cm	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
2-HEXANONE	5*	µmho/cm	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
DIBROMOMETHANE	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
IODOMETHANE	1*	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
STYRENE	1*	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
VINYL ACETATE	5*	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
ANTIMONY	0.0022*	µg/L	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022
BERYLLIUM	0.0011*	mg/L	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011
COBALT	0.0056*	µg/L	<0.0056	0.020	<0.0056	<0.0056	<0.0056	<0.0056	0.020	0.040	<0.0056	<0.0056	0.0061	<0.0056	<0.0056
NICKEL	0.0056*	µg/L	0.0066	0.020	0.0081	<0.0056	0.0059	<0.0056	0.010	0.060	0.010	0.0095	<0.0056	0.010	0.010
THALLIUM	0.0011*	NTU	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011
VANADIUM	0.0022*	µg/L	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022

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.

ATTACHMENT 1

BACKGROUND UPPER PREDICTION LIMITS



LCSWMA Creswell Landfill			
2nd Quarter 2020 - Background Upper Prediction Limits (MP-1)			
Parameter	Distribution	Upper Prediction Limit	Unit
ammonia-nitrogen	No Distribution	0.12	mg/L
bicarbonate	No Distribution	8.02	mg/L
calcium, total	No Distribution	20.1	mg/L
calcium, dissolved	No Distribution	19.2	mg/L
cod (chemical oxygen demand)	Normal	11.85**	mg/L
chloride	No Distribution	32.6	mg/L
fluoride	NA	0.2*	mg/L
iron, total	Lognormal	3.74	mg/L
iron, dissolved	Lognormal	0.133	mg/L
magnesium, total	No Distribution	12.49	mg/L
magnesium, dissolved	No Distribution	12.42	mg/L
manganese, total	No Distribution	0.126	mg/L
manganese, dissolved	No Distribution	0.127	mg/L
nitrate-nitrogen	No Distribution	23.56	mg/L
ph-field	No Distribution	None***	S.U.
ph-lab	Normal	None***	S.U.
potassium, total	Normal	2.88	mg/L
potassium, dissolved	No Distribution	3.06	mg/L
sodium, total	Normal	15.61	mg/L
sodium, dissolved	Normal	15.12	mg/L
spec. cond., field	Normal	328	µmhos/cm
spec. cond., lab	No Distribution	299	µmhos/cm
sulfate	Lognormal	2.87	mg/L
total alkalinity	No Distribution	7.0	mg/L
tds (total dissolved solids)	Normal	260	mg/L
toc (total organic carbon)	Normal	1.13	mg/L
total phenolics	NA	0.005*	mg/L
turbidity	Lognormal	177	NTU
benzene	NA	1*	µg/L
1,2-dibromoethane (edb) (ethylene dibromide)	NA	1*	µg/L
1,1-dichloroethane	NA	1*	µg/L
1,1-dichloroethene	NA	1*	µg/L
1,2-dichloroethane	NA	1*	µg/L
cis 1,2-dichloroethene	NA	1*	µg/L
trans 1,2-dichloroethene	NA	1*	µg/L
ethylbenzene	NA	1*	µg/L
methylene chloride	NA	1*	µg/L
tetrachloroethene	NA	1*	µg/L
toluene	NA	1*	µg/L
1,1,1-trichloroethane	NA	1*	µg/L
trichloroethene	NA	1*	µg/L
vinyl chloride	NA	1*	µg/L
xylenes (total)	NA	3*	µg/L

LCSWMA Creswell Landfill			
2nd Quarter 2020 - Background Upper Prediction Limits (MP-1)			
Parameter	Distribution	Upper Prediction Limit	Unit
arsenic, total	NA	0.0033*	mg/L
arsenic, dissolved	NA	0.003*	mg/L
barium, total	No Distribution	0.17	mg/L
barium, dissolved	No Distribution	0.19	mg/L
cadmium, total	NA	0.0011*	mg/L
cadmium, dissolved	NA	0.0011*	mg/L
chromium, total	NA	0.0022*	mg/L
chromium, dissolved	NA	0.0022*	mg/L
copper, total	NA	0.0056*	mg/L
copper, dissolved	NA	0.0056*	mg/L
lead-flameless, total	Lognormal	0.027	mg/L
lead, dissolved	NA	0.0022*	mg/L
mercury, total	NA	0.0005*	mg/L
mercury, dissolved	NA	0.0005*	mg/L
selenium, total	NA	0.0056*	mg/L
selenium, dissolved	NA	0.0056*	mg/L
silver, total	NA	0.0022*	mg/L
silver, dissolved	NA	0.0022*	mg/L
zinc, total	Normal	0.103	mg/L
zinc, dissolved	No Distribution	0.19	mg/L
bromoform	NA	1*	µg/L
bromomethane	NA	1*	µg/L
carbon tetrachloride	NA	1*	µg/L
chlorobenzene	NA	1*	µg/L
chloroethane	NA	1*	µg/L
dibromochloromethane (chlorodibromomethane)	NA	1*	µg/L
chloromethane	NA	1*	µg/L
3-chloro-1-propene	NA	1*	µg/L
1,2-dichlorobenzene	NA	1*	µg/L
1,3-dichlorobenzene	NA	1*	µg/L
1,4-dichlorobenzene	NA	1*	µg/L
dichlorodifluoromethane	NA	1*	µg/L
1,2-dichloropropane	NA	1*	µg/L
cis 1,3-dichloropropene	NA	1*	µg/L
trans 1,3-dichloropropene	NA	1*	µg/L
2-butanone (mek)	NA	10*	µg/L
4-methyl-2-pentanone (mibk)	NA	5*	µg/L
1,1,1,2-tetrachloroethane	NA	1*	µg/L
1,1,2,2-tetrachloroethane	NA	1*	µg/L
1,1,2-trichloroethane	NA	1*	µg/L
trichlorofluoromethane	NA	1*	µg/L
1,2,3-trichloropropane	NA	1*	µg/L

LCSWMA Creswell Landfill			
2nd Quarter 2020 - Background Upper Prediction Limits (MP-1)			
Parameter	Distribution	Upper Prediction Limit	Unit
acetone	NA	10*	µg/L
acrylonitrile	NA	5*	µg/L
bromochloromethane (chlorobromomethane)	NA	1*	µg/L
bromodichloromethane	NA	1*	µg/L
carbon disulfide	NA	1*	µg/L
chloroform	NA	1*	µg/L
1,2-dibromo-3-chloropropane (dbcp) (dibromochlorom	NA	7*	µg/L
trans 1,4-dichloro-2-butene	NA	3*	µg/L
2-hexanone	NA	5*	µg/L
dibromomethane	NA	1*	µg/L
iodomethane	NA	1*	µg/L
styrene	NA	1*	µg/L
vinyl acetate	NA	5*	µg/L
antimony	NA	0.0022*	mg/l
beryllium	NA	0.0011*	mg/l
cobalt	NA	0.0056*	mg/l
nickel	NA	0.0056*	mg/l
thallium	NA	0.0011*	mg/l
vanadium	NA	0.0022*	mg/l

Notes:

"NA" denotes parameter not detected or not enough detections in MP-1 over course of historical data to develop tolerance limits.

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

** COD background standard is lower than the current reporting limit.

*** 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 5.17/30/2020 2:56:05 PM										
4	From File	2Q20 CWMP001W UCL Input Table1.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	120							Number of Missing Observations	11		
15	Number of Distinct Observations	7										
16	Number of Detects	11							Number of Non-Detects	109		
17	Number of Distinct Detects	6							Number of Distinct Non-Detects	1		
18	Minimum Detect	0.11							Minimum Non-Detect	0.1		
19	Maximum Detect	0.46							Maximum Non-Detect	0.1		
20	Variance Detected	0.0107							Percent Non-Detects	90.83%		
21	Mean Detected	0.165							SD Detected	0.104		
22	Mean of Detected Logged Data	-1.908							SD of Detected Logged Data	0.434		
23												
24	Critical Values for Background Threshold Values (BTVs)											
25	Tolerance Factor K (For UTL)	1.897							d2max (for USL)	3.271		
26												
27	Normal GOF Test on Detects Only											
28	Shapiro Wilk Test Statistic	0.584							Shapiro Wilk GOF Test			
29	5% Shapiro Wilk Critical Value	0.85							Data Not Normal at 5% Significance Level			
30	Lilliefors Test Statistic	0.377							Lilliefors GOF Test			
31	5% Lilliefors Critical Value	0.251							Data Not Normal at 5% Significance Level			
32	Data Not Normal at 5% Significance Level											
33												
34	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
35	KM Mean	0.106							KM SD	0.0354		
36	95% UTL95% Coverage	0.173							95% KM UPL (t)	0.165		
37	90% KM Percentile (z)	0.151							95% KM Percentile (z)	0.164		
38	99% KM Percentile (z)	0.188							95% KM USL	0.222		
39												
40	DL/2 Substitution Background Statistics Assuming Normal Distribution											
41	Mean	0.0606							SD	0.045		
42	95% UTL95% Coverage	0.146							95% UPL (t)	0.135		
43	90% Percentile (z)	0.118							95% Percentile (z)	0.135		
44	99% Percentile (z)	0.165							95% USL	0.208		
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	1.517							Anderson-Darling GOF Test			
49	5% A-D Critical Value	0.732							Data Not Gamma Distributed at 5% Significance Level			
50	K-S Test Statistic	0.34							Kolmogorov-Smirnov GOF			
51	5% K-S Critical Value	0.256							Data Not Gamma Distributed at 5% Significance Level			
52	Data Not Gamma Distributed at 5% Significance Level											

A	B	C	D	E	F	G	H	I	J	K	L	
53												
54	Gamma Statistics on Detected Data Only											
55	k hat (MLE)			4.745		k star (bias corrected MLE)				3.512		
56	Theta hat (MLE)			0.0349		Theta star (bias corrected MLE)				0.0471		
57	nu hat (MLE)			104.4		nu star (bias corrected)				77.26		
58	MLE Mean (bias corrected)			0.165								
59	MLE Sd (bias corrected)			0.0883		95% Percentile of Chisquare (2kstar)				14.1		
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				0.0248		
68	Maximum			0.46		Median				0.01		
69	SD			0.0541		CV				2.185		
70	k hat (MLE)			0.922		k star (bias corrected MLE)				0.904		
71	Theta hat (MLE)			0.0269		Theta star (bias corrected MLE)				0.0274		
72	nu hat (MLE)			221.2		nu star (bias corrected)				217		
73	MLE Mean (bias corrected)			0.0248		MLE Sd (bias corrected)				0.0261		
74	95% Percentile of Chisquare (2kstar)			5.615		90% Percentile				0.0585		
75	95% Percentile			0.0769		99% Percentile				0.12		
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	
79	95% Approx. Gamma UTL with 95% Coverage			0.0796		0.0744		95% Approx. Gamma UPL			0.0678	
80	95% Gamma USL			0.178		0.178						
81												
82	Estimates of Gamma Parameters using KM Estimates											
83	Mean (KM)			0.106		SD (KM)				0.0354		
84	Variance (KM)			0.00125		SE of Mean (KM)				0.00339		
85	k hat (KM)			8.972		k star (KM)				8.753		
86	nu hat (KM)			2153		nu star (KM)				2101		
87	theta hat (KM)			0.0118		theta star (KM)				0.0121		
88	80% gamma percentile (KM)			0.134		90% gamma percentile (KM)				0.154		
89	95% gamma percentile (KM)			0.171		99% gamma percentile (KM)				0.207		
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	
94	95% Approx. Gamma UTL with 95% Coverage			0.151		0.149		95% Approx. Gamma UPL			0.145	
95	95% KM Gamma Percentile			0.144		0.142		95% Gamma USL			0.189	
96												
97	Lognormal GOF Test on Detected Observations Only											
98	Shapiro Wilk Test Statistic			0.714		Shapiro Wilk GOF Test						
99	5% Shapiro Wilk Critical Value			0.85		Data Not Lognormal at 5% Significance Level						
100	Lilliefors Test Statistic			0.308		Lilliefors GOF Test						
101	5% Lilliefors Critical Value			0.251		Data Not Lognormal at 5% Significance Level						
102	Data Not Lognormal at 5% Significance Level											
103												
104	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											

A	B	C	D	E	G	H	I	J	K	L
105			Mean in Original Scale	0.0347				Mean in Log Scale		-4.063
106			SD in Original Scale	0.0546				SD in Log Scale		1.196
107			95% UTL95% Coverage	0.166				95% BCA UTL95% Coverage		0.122
108			95% Bootstrap (%) UTL95% Coverage	0.15				95% UPL (t)		0.126
109			90% Percentile (z)	0.0797				95% Percentile (z)		0.123
110			99% Percentile (z)	0.278				95% USL		0.861
111										
112			Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution							
113			KM Mean of Logged Data	-2.266				95% KM UTL (Lognormal)95% Coverage		0.143
114			KM SD of Logged Data	0.169				95% KM UPL (Lognormal)		0.137
115			95% KM Percentile Lognormal (z)	0.137				95% KM USL (Lognormal)		0.18
116										
117			Background DL/2 Statistics Assuming Lognormal Distribution							
118			Mean in Original Scale	0.0606				Mean in Log Scale		-2.896
119			SD in Original Scale	0.045				SD in Log Scale		0.339
120			95% UTL95% Coverage	0.105				95% UPL (t)		0.0972
121			90% Percentile (z)	0.0853				95% Percentile (z)		0.0965
122			99% Percentile (z)	0.122				95% USL		0.168
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 do not follow a Discernible Distribution (0.05)							
127										
128			Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)							
129			Order of Statistic, r	117				95% UTL with95% Coverage		0.15
130			Approx, f used to compute achieved CC	1.539				Approximate Actual Confidence Coefficient achieved by UTL		0.856
131			Approximate Sample Size needed to achieve specified CC	153				95% UPL		0.12
132			95% USL	0.46				95% KM Chebyshev UPL		0.261
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	116				Number of Missing Observations		15
144			Number of Distinct Observations	21						
145			Number of Detects	74				Number of Non-Detects		42
146			Number of Distinct Detects	19				Number of Distinct Non-Detects		3
147			Minimum Detect	4.7				Minimum Non-Detect		5
148			Maximum Detect	9.5				Maximum Non-Detect		6.2
149			Variance Detected	1.305				Percent Non-Detects		36.21%
150			Mean Detected	6.307				SD Detected		1.142
151			Mean of Detected Logged Data	1.826				SD of Detected Logged Data		0.175
152										
153			Critical Values for Background Threshold Values (BTVs)							
154			Tolerance Factor K (For UTL)	1.901				d2max (for USL)		3.259
155										
156			Normal GOF Test on Detects Only							

A	B	C	D	E	F	G	H	I	J	K	L	
157	Shapiro Wilk Test Statistic			0.885	Normal GOF Test on Detected Observations Only							
158	5% Shapiro Wilk P Value			1.8100E-7	Data Not Normal at 5% Significance Level							
159	Lilliefors Test Statistic			0.254	Lilliefors GOF Test							
160	5% Lilliefors Critical Value			0.103	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			5.73	KM SD			1.189				
165	95% UTL95% Coverage			7.99	95% KM UPL (t)			7.709				
166	90% KM Percentile (z)			7.253	95% KM Percentile (z)			7.685				
167	99% KM Percentile (z)			8.495	95% KM USL			9.604				
168												
169	DL/2 Substitution Background Statistics Assuming Normal Distribution											
170	Mean			4.935	SD			2.044				
171	95% UTL95% Coverage			8.821	95% UPL (t)			8.338				
172	90% Percentile (z)			7.554	95% Percentile (z)			8.296				
173	99% Percentile (z)			9.689	95% USL			11.6				
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			2.857	Anderson-Darling GOF Test							
178	5% A-D Critical Value			0.749	Data Not Gamma Distributed at 5% Significance Level							
179	K-S Test Statistic			0.237	Kolmogorov-Smirnov GOF							
180	5% K-S Critical Value			0.103	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)			32.52	k star (bias corrected MLE)			31.21				
185	Theta hat (MLE)			0.194	Theta star (bias corrected MLE)			0.202				
186	nu hat (MLE)			4812	nu star (bias corrected)			4618				
187	MLE Mean (bias corrected)			6.307								
188	MLE Sd (bias corrected)			1.129	95% Percentile of Chisquare (2kstar)			81.85				
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			2.237	Mean			5.46				
197	Maximum			9.5	Median			5				
198	SD			1.505	CV			0.276				
199	k hat (MLE)			12.93	k star (bias corrected MLE)			12.6				
200	Theta hat (MLE)			0.422	Theta star (bias corrected MLE)			0.433				
201	nu hat (MLE)			3000	nu star (bias corrected)			2924				
202	MLE Mean (bias corrected)			5.46	MLE Sd (bias corrected)			1.538				
203	95% Percentile of Chisquare (2kstar)			37.9	90% Percentile			7.5				
204	95% Percentile			8.211	99% Percentile			9.658				
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			8.71	8.782	95% Approx. Gamma UPL			8.227			8.276

A	B	C	D	E	F	G	H	I	J	K	L	
209	95% Gamma USL			11.85	12.15							
210												
211	Estimates of Gamma Parameters using KM Estimates											
212	Mean (KM)			5.73	SD (KM)			1.189				
213	Variance (KM)			1.413	SE of Mean (KM)			0.111				
214	k hat (KM)			23.24	k star (KM)			22.65				
215	nu hat (KM)			5392	nu star (KM)			5254				
216	theta hat (KM)			0.247	theta star (KM)			0.253				
217	80% gamma percentile (KM)			6.711	90% gamma percentile (KM)			7.317				
218	95% gamma percentile (KM)			7.844	99% gamma percentile (KM)			8.896				
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			8.056	8.067	95% Approx. Gamma UPL			7.727	7.731		
224	95% KM Gamma Percentile			7.699	7.702	95% Gamma USL			10.13	10.22		
225												
226	Lognormal GOF Test on Detected Observations Only											
227	Shapiro Wilk Approximate Test Statistic			0.898	Shapiro Wilk GOF Test							
228	5% Shapiro Wilk P Value			1.7060E-6	Data Not Lognormal at 5% Significance Level							
229	Lilliefors Test Statistic			0.226	Lilliefors GOF Test							
230	5% Lilliefors Critical Value			0.103	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			5.548	Mean in Log Scale			1.683				
235	SD in Original Scale			1.395	SD in Log Scale			0.249				
236	95% UTL95% Coverage			8.639	95% BCA UTL95% Coverage			8				
237	95% Bootstrap (%) UTL95% Coverage			8.225	95% UPL (t)			8.145				
238	90% Percentile (z)			7.403	95% Percentile (z)			8.104				
239	99% Percentile (z)			9.603	95% USL			12.12				
240												
241	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
242	KM Mean of Logged Data			1.726	95% KM UTL (Lognormal)95% Coverage			8.105				
243	KM SD of Logged Data			0.193	95% KM UPL (Lognormal)			7.745				
244	95% KM Percentile Lognormal (z)			7.714	95% KM USL (Lognormal)			10.53				
245												
246	Background DL/2 Statistics Assuming Lognormal Distribution											
247	Mean in Original Scale			4.935	Mean in Log Scale			1.499				
248	SD in Original Scale			2.044	SD in Log Scale			0.458				
249	95% UTL95% Coverage			10.7	95% UPL (t)			9.605				
250	90% Percentile (z)			8.056	95% Percentile (z)			9.516				
251	99% Percentile (z)			13	95% USL			19.94				
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			113	95% UTL with95% Coverage			8.1				
259	Approx, f used to compute achieved CC			1.487	Approximate Actual Confidence Coefficient achieved by UTL			0.837				
260	Approximate Sample Size needed to achieve specified CC			153	95% UPL			8.015				

A	B	C	D	E	F	G	H	I	J	K	L
261	95% USL				9.5	95% KM Chebyshev UPL				10.93	
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				57	Number of Distinct Observations				29	
273						Number of Missing Observations				74	
274	Minimum				12	First Quartile				14	
275	Second Largest				20.1	Median				16.4	
276	Maximum				21	Third Quartile				17.4	
277	Mean				16.12	SD				2.237	
278	Coefficient of Variation				0.139	Skewness				0.244	
279	Mean of logged Data				2.77	SD of logged Data				0.139	
280											
281	Critical Values for Background Threshold Values (BTVs)										
282	Tolerance Factor K (For UTL)				2.028	d2max (for USL)				3.007	
283											
284	Normal GOF Test										
285	Shapiro Wilk Test Statistic				0.947	Normal GOF Test					
286	5% Shapiro Wilk P Value				0.027	Data Not Normal at 5% Significance Level					
287	Lilliefors Test Statistic				0.149	Lilliefors GOF Test					
288	5% Lilliefors Critical Value				0.117	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				20.65	90% Percentile (z)				18.98	
293	95% UPL (t)				19.89	95% Percentile (z)				19.8	
294	95% USL				22.84	99% Percentile (z)				21.32	
295											
296	Gamma GOF Test										
297	A-D Test Statistic				0.923	Anderson-Darling Gamma GOF Test					
298	5% A-D Critical Value				0.748	Data Not Gamma Distributed at 5% Significance Level					
299	K-S Test Statistic				0.138	Kolmogorov-Smirnov Gamma GOF Test					
300	5% K-S Critical Value				0.117	Data Not Gamma Distributed at 5% Significance Level					
301	Data Not Gamma Distributed at 5% Significance Level										
302											
303	Gamma Statistics										
304	k hat (MLE)				53.12	k star (bias corrected MLE)				50.33	
305	Theta hat (MLE)				0.303	Theta star (bias corrected MLE)				0.32	
306	nu hat (MLE)				6055	nu star (bias corrected)				5738	
307	MLE Mean (bias corrected)				16.12	MLE Sd (bias corrected)				2.272	
308											
309	Background Statistics Assuming Gamma Distribution										
310	95% Wilson Hilferty (WH) Approx. Gamma UPL				20.06	90% Percentile				19.09	
311	95% Hawkins Wixley (HW) Approx. Gamma UPL				20.09	95% Percentile				20.03	
312	95% WH Approx. Gamma UTL with 95% Coverage				20.96	99% Percentile				21.87	

A	B	C	D	E	F	G	H	I	J	K	L
313	95% HW Approx. Gamma UTL with 95% Coverage			21							
314	95% WH USL			23.67						95% HW USL	23.8
315											
316	Lognormal GOF Test										
317	Shapiro Wilk Test Statistic			0.951	Shapiro Wilk Lognormal GOF Test						
318	5% Shapiro Wilk P Value			0.0442	Data Not Lognormal at 5% Significance Level						
319	Lilliefors Test Statistic			0.131	Lilliefors Lognormal GOF Test						
320	5% Lilliefors Critical Value			0.117	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		21.15						90% Percentile (z)	19.07	
325	95% UPL (t)		20.17						95% Percentile (z)	20.05	
326	95% USL		24.22						99% Percentile (z)	22.04	
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		56						95% UTL with 95% Coverage	20.1	
333	Approx, f used to compute achieved CC			1.474	Approximate Actual Confidence Coefficient achieved by UTL					0.785	
334					Approximate Sample Size needed to achieve specified CC					93	
335	95% Percentile Bootstrap UTL with 95% Coverage		20.28	95% BCA Bootstrap UTL with 95% Coverage					20.28		
336	95% UPL		20.1	90% Percentile					19.32		
337	90% Chebyshev UPL		22.89	95% Percentile					19.78		
338	95% Chebyshev UPL		25.95	99% Percentile					20.5		
339	95% USL		21								
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		94	Number of Distinct Observations					43		
351				Number of Missing Observations					37		
352	Minimum		10.4	First Quartile					14		
353	Second Largest		20.1	Median					16.4		
354	Maximum		20.1	Third Quartile					17.4		
355	Mean		15.91	SD					2.217		
356	Coefficient of Variation		0.139	Skewness					-0.339		
357	Mean of logged Data		2.757	SD of logged Data					0.145		
358											
359	Critical Values for Background Threshold Values (BTVs)										
360	Tolerance Factor K (For UTL)		1.933	d2max (for USL)					3.188		
361											
362	Normal GOF Test										
363	Shapiro Wilk Test Statistic		0.948	Normal GOF Test							
364	5% Shapiro Wilk P Value		0.00267	Data Not Normal at 5% Significance Level							

A	B	C	D	E	F	G	H	I	J	K	L	
365	Lilliefors Test Statistic				0.12	Lilliefors GOF Test						
366	5% Lilliefors Critical Value				0.0916	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				20.19	90% Percentile (z)				18.75		
371	95% UPL (t)				19.61	95% Percentile (z)				19.55		
372	95% USL				22.97	99% Percentile (z)				21.06		
373												
374	Gamma GOF Test											
375	A-D Test Statistic				1.881	Anderson-Darling Gamma GOF Test						
376	5% A-D Critical Value				0.751	Data Not Gamma Distributed at 5% Significance Level						
377	K-S Test Statistic				0.136	Kolmogorov-Smirnov Gamma GOF Test						
378	5% K-S Critical Value				0.092	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)				49.47	k star (bias corrected MLE)				47.9		
383	Theta hat (MLE)				0.322	Theta star (bias corrected MLE)				0.332		
384	nu hat (MLE)				9301	nu star (bias corrected)				9006		
385	MLE Mean (bias corrected)				15.91	MLE Sd (bias corrected)				2.298		
386												
387	Background Statistics Assuming Gamma Distribution											
388	95% Wilson Hilferty (WH) Approx. Gamma UPL				19.89	90% Percentile				18.91		
389	95% Hawkins Wixley (HW) Approx. Gamma UPL				19.93	95% Percentile				19.87		
390	95% WH Approx. Gamma UTL with 95% Coverage				20.59	99% Percentile				21.74		
391	95% HW Approx. Gamma UTL with 95% Coverage				20.65							
392	95% WH USL				24.17	95% HW USL				24.36		
393												
394	Lognormal GOF Test											
395	Shapiro Wilk Test Statistic				0.933	Shapiro Wilk Lognormal GOF Test						
396	5% Shapiro Wilk P Value				9.7820E-5	Data Not Lognormal at 5% Significance Level						
397	Lilliefors Test Statistic				0.142	Lilliefors Lognormal GOF Test						
398	5% Lilliefors Critical Value				0.0916	Data Not Lognormal at 5% Significance Level						
399	Data Not Lognormal at 5% Significance Level											
400												
401	Background Statistics assuming Lognormal Distribution											
402	95% UTL with 95% Coverage				20.85	90% Percentile (z)				18.97		
403	95% UPL (t)				20.07	95% Percentile (z)				20		
404	95% USL				25.02	99% Percentile (z)				22.08		
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				92	95% UTL with 95% Coverage				19.4		
411	Approx, f used to compute achieved CC				1.614	Approximate Actual Confidence Coefficient achieved by UTL				0.855		
412						Approximate Sample Size needed to achieve specified CC				124		
413	95% Percentile Bootstrap UTL with 95% Coverage				19.52	95% BCA Bootstrap UTL with 95% Coverage				19.52		
414	95% UPL				19.2	90% Percentile				18.5		
415	90% Chebyshev UPL				22.59	95% Percentile				19.14		
416	95% Chebyshev UPL				25.62	99% Percentile				20.1		

A	B	C	D	E	F	G	H	I	J	K	L	
417	95% USL			20.1								
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			127	Number of Missing Observations			4				
429	Number of Distinct Observations			9								
430	Number of Detects			6	Number of Non-Detects			121				
431	Number of Distinct Detects			6	Number of Distinct Non-Detects			4				
432	Minimum Detect			5	Minimum Non-Detect			5				
433	Maximum Detect			31	Maximum Non-Detect			20				
434	Variance Detected			149.5	Percent Non-Detects			95.28%				
435	Mean Detected			17.67	SD Detected			12.23				
436	Mean of Detected Logged Data			2.61	SD of Detected Logged Data			0.838				
437												
438	Critical Values for Background Threshold Values (BTVs)											
439	Tolerance Factor K (For UTL)			1.889	d2max (for USL)			3.289				
440												
441	Normal GOF Test on Detects Only											
442	Shapiro Wilk Test Statistic			0.814	Shapiro Wilk GOF Test							
443	5% Shapiro Wilk Critical Value			0.788	Detected Data appear Normal at 5% Significance Level							
444	Lilliefors Test Statistic			0.261	Lilliefors GOF Test							
445	5% Lilliefors Critical Value			0.325	Detected Data appear Normal at 5% Significance Level							
446	Detected Data appear Normal at 5% Significance Level											
447												
448	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
449	KM Mean			5.761	KM SD			3.661				
450	95% UTL95% Coverage			12.68	95% KM UPL (t)			11.85				
451	90% KM Percentile (z)			10.45	95% KM Percentile (z)			11.78				
452	99% KM Percentile (z)			14.28	95% KM USL			17.8				
453												
454	DL/2 Substitution Background Statistics Assuming Normal Distribution											
455	Mean			8.528	SD			4.168				
456	95% UTL95% Coverage			16.4	95% UPL (t)			15.46				
457	90% Percentile (z)			13.87	95% Percentile (z)			15.38				
458	99% Percentile (z)			18.22	95% USL			22.24				
459	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
460												
461	Gamma GOF Tests on Detected Observations Only											
462	A-D Test Statistic			0.61	Anderson-Darling GOF Test							
463	5% A-D Critical Value			0.704	Detected data appear Gamma Distributed at 5% Significance Level							
464	K-S Test Statistic			0.294	Kolmogorov-Smirnov GOF							
465	5% K-S Critical Value			0.336	Detected data appear Gamma Distributed at 5% Significance Level							
466	Detected data appear Gamma Distributed at 5% Significance Level											
467												
468	Gamma Statistics on Detected Data Only											

A	B	C	D	E	F	G	H	I	J	K	L	
469				k hat (MLE)	2.059					k star (bias corrected MLE)	1.141	
470				Theta hat (MLE)	8.579					Theta star (bias corrected MLE)	15.49	
471				nu hat (MLE)	24.71					nu star (bias corrected)	13.69	
472				MLE Mean (bias corrected)	17.67							
473				MLE Sd (bias corrected)	16.54					95% Percentile of Chisquare (2kstar)	6.526	
474												
475	Gamma ROS Statistics using Imputed Non-Detects											
476	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
477	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)											
478	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
479	This is especially true when the sample size is small.											
480	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
481				Minimum	0.01					Mean	1.558	
482				Maximum	31					Median	0.01	
483				SD	5.02					CV	3.222	
484				k hat (MLE)	0.186					k star (bias corrected MLE)	0.187	
485				Theta hat (MLE)	8.393					Theta star (bias corrected MLE)	8.354	
486				nu hat (MLE)	47.16					nu star (bias corrected)	47.37	
487				MLE Mean (bias corrected)	1.558					MLE Sd (bias corrected)	3.608	
488				95% Percentile of Chisquare (2kstar)	1.956					90% Percentile	4.706	
489				95% Percentile	8.172					99% Percentile	17.83	
490	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
491	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
492					WH	HW				WH	HW	
493				95% Approx. Gamma UTL with 95% Coverage	5.671	4.904				95% Approx. Gamma UPL	4.324	3.558
494				95% Gamma USL	20.57	23.44						
495												
496	Estimates of Gamma Parameters using KM Estimates											
497				Mean (KM)	5.761					SD (KM)	3.661	
498				Variance (KM)	13.4					SE of Mean (KM)	0.386	
499				k hat (KM)	2.476					k star (KM)	2.423	
500				nu hat (KM)	629					nu star (KM)	615.5	
501				theta hat (KM)	2.326					theta star (KM)	2.378	
502				80% gamma percentile (KM)	8.431					90% gamma percentile (KM)	10.72	
503				95% gamma percentile (KM)	12.88					99% gamma percentile (KM)	17.61	
504												
505	The following statistics are computed using gamma distribution and KM estimates											
506	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
507					WH	HW				WH	HW	
508				95% Approx. Gamma UTL with 95% Coverage	10.18	9.92				95% Approx. Gamma UPL	9.513	9.276
509				95% KM Gamma Percentile	9.459	9.224				95% Gamma USL	15.04	14.7
510												
511	Lognormal GOF Test on Detected Observations Only											
512				Shapiro Wilk Test Statistic	0.831					Shapiro Wilk GOF Test		
513				5% Shapiro Wilk Critical Value	0.788					Detected Data appear Lognormal at 5% Significance Level		
514				Lilliefors Test Statistic	0.28					Lilliefors GOF Test		
515				5% Lilliefors Critical Value	0.325					Detected Data appear Lognormal at 5% Significance Level		
516	Detected Data appear Lognormal at 5% Significance Level											
517												
518	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
519				Mean in Original Scale	2.391					Mean in Log Scale	-0.101	
520				SD in Original Scale	4.699					SD in Log Scale	1.393	

A	B	C	D	E	F	G	H	I	J	K	L
521	95% UTL95% Coverage			12.56	95% BCA UTL95% Coverage			12.53			
522	95% Bootstrap (%) UTL95% Coverage			12.53	95% UPL (t)			9.177			
523	90% Percentile (z)			5.39	95% Percentile (z)			8.942			
524	99% Percentile (z)			23.11	95% USL			88.38			
525											
526	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution										
527	KM Mean of Logged Data			1.682	95% KM UTL (Lognormal)95% Coverage			9.217			
528	KM SD of Logged Data			0.285	95% KM UPL (Lognormal)			8.643			
529	95% KM Percentile Lognormal (z)			8.597	95% KM USL (Lognormal)			13.74			
530											
531	Background DL/2 Statistics Assuming Lognormal Distribution										
532	Mean in Original Scale			8.528	Mean in Log Scale			2.023			
533	SD in Original Scale			4.168	SD in Log Scale			0.526			
534	95% UTL95% Coverage			20.44	95% UPL (t)			18.15			
535	90% Percentile (z)			14.85	95% Percentile (z)			17.97			
536	99% Percentile (z)			25.72	95% USL			42.69			
537	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
538											
539	Nonparametric Distribution Free Background Statistics										
540	Data appear to follow a Discernible Distribution at 5% Significance Level										
541											
542	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
543	Order of Statistic, r		124	95% UTL with95% Coverage			20				
544	Approx, f used to compute achieved CC			1.632	Approximate Actual Confidence Coefficient achieved by UTL			0.884			
545	Approximate Sample Size needed to achieve specified CC			153	95% UPL			20			
546	95% USL			31	95% KM Chebyshev UPL			21.78			
547											
548	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
549	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
550	and consists of observations collected from clean unimpacted locations.										
551	The use of USL tends to provide a balance between false positives and false negatives provided the data										
552	represents a background data set and when many onsite observations need to be compared with the BTV.										
553											
554	CHLORIDE										
555											
556	General Statistics										
557	Total Number of Observations			129	Number of Missing Observations			2			
558	Number of Distinct Observations			63							
559	Number of Detects			126	Number of Non-Detects			3			
560	Number of Distinct Detects			62	Number of Distinct Non-Detects			3			
561	Minimum Detect			15	Minimum Non-Detect			18			
562	Maximum Detect			33.2	Maximum Non-Detect			41			
563	Variance Detected			20.11	Percent Non-Detects			2.326%			
564	Mean Detected			25.04	SD Detected			4.484			
565	Mean of Detected Logged Data			3.203	SD of Detected Logged Data			0.189			
566											
567	Critical Values for Background Threshold Values (BTVs)										
568	Tolerance Factor K (For UTL)			1.887	d2max (for USL)			3.294			
569											
570	Normal GOF Test on Detects Only										
571	Shapiro Wilk Test Statistic			0.955	Normal GOF Test on Detected Observations Only						
572	5% Shapiro Wilk P Value			0.00197	Data Not Normal at 5% Significance Level						

A	B	C	D	E	F	G	H	I	J	K	L	
573	Lilliefors Test Statistic			0.091	Lilliefors GOF Test							
574	5% Lilliefors Critical Value			0.0793	Data Not Normal at 5% Significance Level							
575	Data Not Normal at 5% Significance Level											
576												
577	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
578	KM Mean			24.92	KM SD			4.537				
579	95% UTL95% Coverage			33.48	95% KM UPL (t)			32.46				
580	90% KM Percentile (z)			30.73	95% KM Percentile (z)			32.38				
581	99% KM Percentile (z)			35.47	95% KM USL			39.86				
582												
583	DL/2 Substitution Background Statistics Assuming Normal Distribution											
584	Mean			24.77	SD			4.836				
585	95% UTL95% Coverage			33.89	95% UPL (t)			32.81				
586	90% Percentile (z)			30.96	95% Percentile (z)			32.72				
587	99% Percentile (z)			36.02	95% USL			40.7				
588	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
589												
590	Gamma GOF Tests on Detected Observations Only											
591	A-D Test Statistic			1.451	Anderson-Darling GOF Test							
592	5% A-D Critical Value			0.75	Data Not Gamma Distributed at 5% Significance Level							
593	K-S Test Statistic			0.116	Kolmogorov-Smirnov GOF							
594	5% K-S Critical Value			0.0825	Data Not Gamma Distributed at 5% Significance Level							
595	Data Not Gamma Distributed at 5% Significance Level											
596												
597	Gamma Statistics on Detected Data Only											
598	k hat (MLE)			29.41	k star (bias corrected MLE)			28.72				
599	Theta hat (MLE)			0.851	Theta star (bias corrected MLE)			0.872				
600	nu hat (MLE)			7412	nu star (bias corrected)			7237				
601	MLE Mean (bias corrected)			25.04								
602	MLE Sd (bias corrected)			4.672	95% Percentile of Chisquare (2kstar)			76.13				
603												
604	Gamma ROS Statistics using Imputed Non-Detects											
605	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
606	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)											
607	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
608	This is especially true when the sample size is small.											
609	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
610	Minimum			15	Mean			24.93				
611	Maximum			33.2	Median			25.3				
612	SD			4.506	CV			0.181				
613	k hat (MLE)			28.99	k star (bias corrected MLE)			28.32				
614	Theta hat (MLE)			0.86	Theta star (bias corrected MLE)			0.88				
615	nu hat (MLE)			7480	nu star (bias corrected)			7307				
616	MLE Mean (bias corrected)			24.93	MLE Sd (bias corrected)			4.685				
617	95% Percentile of Chisquare (2kstar)			75.22	90% Percentile			31.1				
618	95% Percentile			33.11	99% Percentile			37.11				
619	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
620	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
621				WH	HW				WH	HW		
622	95% Approx. Gamma UTL with 95% Coverage			34.42	34.58	95% Approx. Gamma UPL			33.15	33.26		
623	95% Gamma USL			43.19	43.78							
624												

A	B	C	D	E	F	G	H	I	J	K	L	
625	Estimates of Gamma Parameters using KM Estimates											
626	Mean (KM)			24.92	SD (KM)			4.537				
627	Variance (KM)			20.58	SE of Mean (KM)			0.403				
628	k hat (KM)			30.17	k star (KM)			29.47				
629	nu hat (KM)			7784	nu star (KM)			7604				
630	theta hat (KM)			0.826	theta star (KM)			0.845				
631	80% gamma percentile (KM)			28.68	90% gamma percentile (KM)			30.95				
632	95% gamma percentile (KM)			32.92	99% gamma percentile (KM)			36.82				
633												
634	The following statistics are computed using gamma distribution and KM estimates											
635	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
636				WH	HW				WH	HW		
637	95% Approx. Gamma UTL with 95% Coverage			34.49	34.65	95% Approx. Gamma UPL			33.2	33.32		
638	95% KM Gamma Percentile			33.1	33.21	95% Gamma USL			43.35	43.96		
639												
640	Lognormal GOF Test on Detected Observations Only											
641	Shapiro Wilk Approximate Test Statistic			0.935	Shapiro Wilk GOF Test							
642	5% Shapiro Wilk P Value			3.0285E-6	Data Not Lognormal at 5% Significance Level							
643	Lilliefors Test Statistic			0.13	Lilliefors GOF Test							
644	5% Lilliefors Critical Value			0.0793	Data Not Lognormal at 5% Significance Level							
645	Data Not Lognormal at 5% Significance Level											
646												
647	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
648	Mean in Original Scale			24.93	Mean in Log Scale			3.199				
649	SD in Original Scale			4.508	SD in Log Scale			0.191				
650	95% UTL95% Coverage			35.12	95% BCA UTL95% Coverage			32.72				
651	95% Bootstrap (%) UTL95% Coverage			32.8	95% UPL (t)			33.65				
652	90% Percentile (z)			31.29	95% Percentile (z)			33.53				
653	99% Percentile (z)			38.19	95% USL			45.93				
654												
655	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
656	KM Mean of Logged Data			3.198	95% KM UTL (Lognormal)95% Coverage			35.2				
657	KM SD of Logged Data			0.193	95% KM UPL (Lognormal)			33.72				
658	95% KM Percentile Lognormal (z)			33.6	95% KM USL (Lognormal)			46.16				
659												
660	Background DL/2 Statistics Assuming Lognormal Distribution											
661	Mean in Original Scale			24.77	Mean in Log Scale			3.187				
662	SD in Original Scale			4.836	SD in Log Scale			0.221				
663	95% UTL95% Coverage			36.73	95% UPL (t)			34.96				
664	90% Percentile (z)			32.14	95% Percentile (z)			34.82				
665	99% Percentile (z)			40.47	95% USL			50.1				
666	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
667												
668	Nonparametric Distribution Free Background Statistics											
669	Data do not follow a Discernible Distribution (0.05)											
670												
671	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
672	Order of Statistic, r			126	95% UTL with95% Coverage			33				
673	Approx, f used to compute achieved CC			1.658	Approximate Actual Confidence Coefficient achieved by UTL			0.891				
674	Approximate Sample Size needed to achieve specified CC			153	95% UPL			32.6				
675	95% USL			41	95% KM Chebyshev UPL			44.77				
676												

A	B	C	D	E	F	G	H	I	J	K	L	
677	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
678	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
679	and consists of observations collected from clean unimpacted locations.											
680	The use of USL tends to provide a balance between false positives and false negatives provided the data											
681	represents a background data set and when many onsite observations need to be compared with the BTV.											
682												
683	FLUORIDE											
684												
685	General Statistics											
686	Total Number of Observations	91							Number of Missing Observations	40		
687	Number of Distinct Observations	4										
688	Number of Detects	1							Number of Non-Detects	90		
689	Number of Distinct Detects	1							Number of Distinct Non-Detects	4		
690	Minimum Detect	0.1							Minimum Non-Detect	0.1		
691	Maximum Detect	0.1							Maximum Non-Detect	0.5		
692	Variance Detected	N/A							Percent Non-Detects	98.9%		
693	Mean Detected	0.1							SD Detected	N/A		
694	Mean of Detected Logged Data	-2.303							SD of Detected Logged Data	N/A		
695												
696	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!											
697	It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).											
698												
699	The data set for variable FLUORIDE was not processed!											
700												
701												
702	IRON, TOTAL											
703												
704	General Statistics											
705	Total Number of Observations	65							Number of Missing Observations	66		
706	Number of Distinct Observations	44										
707	Number of Detects	62							Number of Non-Detects	3		
708	Number of Distinct Detects	41							Number of Distinct Non-Detects	3		
709	Minimum Detect	0.06							Minimum Non-Detect	0.12		
710	Maximum Detect	3.5							Maximum Non-Detect	0.34		
711	Variance Detected	0.739							Percent Non-Detects	4.615%		
712	Mean Detected	1.155							SD Detected	0.859		
713	Mean of Detected Logged Data	-0.16							SD of Detected Logged Data	0.846		
714												
715	Critical Values for Background Threshold Values (BTVs)											
716	Tolerance Factor K (For UTL)	2							d2max (for USL)	3.057		
717												
718	Normal GOF Test on Detects Only											
719	Shapiro Wilk Test Statistic	0.881							Normal GOF Test on Detected Observations Only			
720	5% Shapiro Wilk P Value	1.8063E-6							Data Not Normal at 5% Significance Level			
721	Lilliefors Test Statistic	0.147							Lilliefors GOF Test			
722	5% Lilliefors Critical Value	0.112							Data Not Normal at 5% Significance Level			
723	Data Not Normal at 5% Significance Level											
724												
725	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
726	KM Mean	1.107							KM SD	0.86		
727	95% UTL/95% Coverage	2.828							95% KM UPL (t)	2.554		
728	90% KM Percentile (z)	2.21							95% KM Percentile (z)	2.522		

A	B	C	D	E	F	G	H	I	J	K	L
729	99% KM Percentile (z)			3.108	95% KM USL					3.736	
730											
731	DL/2 Substitution Background Statistics Assuming Normal Distribution										
732	Mean			1.106	SD					0.868	
733	95% UTL/95% Coverage			2.842	95% UPL (t)					2.566	
734	90% Percentile (z)			2.218	95% Percentile (z)					2.534	
735	99% Percentile (z)			3.125	95% USL					3.759	
736	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons										
737											
738	Gamma GOF Tests on Detected Observations Only										
739	A-D Test Statistic			0.521	Anderson-Darling GOF Test						
740	5% A-D Critical Value			0.765	Detected data appear Gamma Distributed at 5% Significance Level						
741	K-S Test Statistic			0.0779	Kolmogorov-Smirnov GOF						
742	5% K-S Critical Value			0.115	Detected data appear Gamma Distributed at 5% Significance Level						
743	Detected data appear Gamma Distributed at 5% Significance Level										
744											
745	Gamma Statistics on Detected Data Only										
746	k hat (MLE)			1.796	k star (bias corrected MLE)					1.719	
747	Theta hat (MLE)			0.643	Theta star (bias corrected MLE)					0.672	
748	nu hat (MLE)			222.6	nu star (bias corrected)					213.2	
749	MLE Mean (bias corrected)			1.155							
750	MLE Sd (bias corrected)			0.881	95% Percentile of Chisquare (2kstar)					8.563	
751											
752	Gamma ROS Statistics using Imputed Non-Detects										
753	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
754	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)										
755	For such situations, GROS method may yield incorrect values of UCLs and BTVs										
756	This is especially true when the sample size is small.										
757	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
758	Minimum			0.0334	Mean					1.105	
759	Maximum			3.5	Median					0.84	
760	SD			0.869	CV					0.787	
761	k hat (MLE)			1.444	k star (bias corrected MLE)					1.388	
762	Theta hat (MLE)			0.765	Theta star (bias corrected MLE)					0.796	
763	nu hat (MLE)			187.8	nu star (bias corrected)					180.4	
764	MLE Mean (bias corrected)			1.105	MLE Sd (bias corrected)					0.938	
765	95% Percentile of Chisquare (2kstar)			7.422	90% Percentile					2.347	
766	95% Percentile			2.955	99% Percentile					4.334	
767	The following statistics are computed using Gamma ROS Statistics on Imputed Data										
768	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
769				WH	HW				WH	HW	
770	95% Approx. Gamma UTL with 95% Coverage			3.562	3.831	95% Approx. Gamma UPL			2.964	3.12	
771	95% Gamma USL			6.113	7.085						
772											
773	Estimates of Gamma Parameters using KM Estimates										
774	Mean (KM)			1.107	SD (KM)					0.86	
775	Variance (KM)			0.74	SE of Mean (KM)					0.108	
776	k hat (KM)			1.658	k star (KM)					1.592	
777	nu hat (KM)			215.6	nu star (KM)					207	
778	theta hat (KM)			0.668	theta star (KM)					0.696	
779	80% gamma percentile (KM)			1.702	90% gamma percentile (KM)					2.275	
780	95% gamma percentile (KM)			2.828	99% gamma percentile (KM)					4.074	

A	B	C	D	E	F	G	H	I	J	K	L	
781												
782	The following statistics are computed using gamma distribution and KM estimates											
783	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
784				WH	HW					WH	HW	
785	95% Approx. Gamma UTL with 95% Coverage			3.455	3.672	95% Approx. Gamma UPL			2.888	3.011		
786	95% KM Gamma Percentile			2.827	2.94	95% Gamma USL			5.858	6.668		
787												
788	Lognormal GOF Test on Detected Observations Only											
789	Shapiro Wilk Approximate Test Statistic				0.959	Shapiro Wilk GOF Test						
790	5% Shapiro Wilk P Value				0.0898	Detected Data appear Lognormal at 5% Significance Level						
791	Lilliefors Test Statistic				0.0831	Lilliefors GOF Test						
792	5% Lilliefors Critical Value				0.112	Detected Data appear Lognormal at 5% Significance Level						
793	Detected Data appear Lognormal at 5% Significance Level											
794												
795	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
796	Mean in Original Scale				1.11	Mean in Log Scale				-0.234		
797	SD in Original Scale				0.864	SD in Log Scale				0.894		
798	95% UTL95% Coverage				4.731	95% BCA UTL95% Coverage				3.16		
799	95% Bootstrap (%) UTL95% Coverage				3.16	95% UPL (t)				3.56		
800	90% Percentile (z)				2.489	95% Percentile (z)				3.444		
801	99% Percentile (z)				6.334	95% USL				12.17		
802												
803	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
804	KM Mean of Logged Data				-0.255	95% KM UTL (Lognormal)95% Coverage				5.045		
805	KM SD of Logged Data				0.937	95% KM UPL (Lognormal)				3.744		
806	95% KM Percentile Lognormal (z)				3.617	95% KM USL (Lognormal)				13.58		
807												
808	Background DL/2 Statistics Assuming Lognormal Distribution											
809	Mean in Original Scale				1.106	Mean in Log Scale				-0.26		
810	SD in Original Scale				0.868	SD in Log Scale				0.95		
811	95% UTL95% Coverage				5.152	95% UPL (t)				3.808		
812	90% Percentile (z)				2.604	95% Percentile (z)				3.677		
813	99% Percentile (z)				7.023	95% USL				14.05		
814	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
815												
816	Nonparametric Distribution Free Background Statistics											
817	Data appear to follow a Discernible Distribution at 5% Significance Level											
818												
819	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
820	Order of Statistic, r				64	95% UTL with95% Coverage				3.2		
821	Approx, f used to compute achieved CC				1.684	Approximate Actual Confidence Coefficient achieved by UTL				0.842		
822	Approximate Sample Size needed to achieve specified CC				93	95% UPL				3		
823	95% USL				3.5	95% KM Chebyshev UPL				4.885		
824												
825	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
826	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
827	and consists of observations collected from clean unimpacted locations.											
828	The use of USL tends to provide a balance between false positives and false negatives provided the data											
829	represents a background data set and when many onsite observations need to be compared with the BTV.											
830												
831	IRON, DISSOLVED											
832												

A	B	C	D	E	F	G	H	I	J	K	L	
833	General Statistics											
834	Total Number of Observations			105	Number of Missing Observations				26			
835	Number of Distinct Observations			15								
836	Number of Detects			16	Number of Non-Detects				89			
837	Number of Distinct Detects			13	Number of Distinct Non-Detects				3			
838	Minimum Detect			0.06	Minimum Non-Detect				0.02			
839	Maximum Detect			1.2	Maximum Non-Detect				0.06			
840	Variance Detected			0.139	Percent Non-Detects				84.76%			
841	Mean Detected			0.344	SD Detected				0.373			
842	Mean of Detected Logged Data			-1.598	SD of Detected Logged Data				1.058			
843												
844	Critical Values for Background Threshold Values (BTVs)											
845	Tolerance Factor K (For UTL)			1.916	d2max (for USL)				3.226			
846												
847	Normal GOF Test on Detects Only											
848	Shapiro Wilk Test Statistic			0.767	Shapiro Wilk GOF Test							
849	5% Shapiro Wilk Critical Value			0.887	Data Not Normal at 5% Significance Level							
850	Lilliefors Test Statistic			0.27	Lilliefors GOF Test							
851	5% Lilliefors Critical Value			0.213	Data Not Normal at 5% Significance Level							
852	Data Not Normal at 5% Significance Level											
853												
854	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
855	KM Mean			0.0694	KM SD				0.183			
856	95% UTL95% Coverage			0.42	95% KM UPL (t)				0.375			
857	90% KM Percentile (z)			0.304	95% KM Percentile (z)				0.371			
858	99% KM Percentile (z)			0.495	95% KM USL				0.66			
859												
860	DL/2 Substitution Background Statistics Assuming Normal Distribution											
861	Mean			0.0775	SD				0.182			
862	95% UTL95% Coverage			0.426	95% UPL (t)				0.381			
863	90% Percentile (z)			0.31	95% Percentile (z)				0.377			
864	99% Percentile (z)			0.5	95% USL				0.664			
865	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
866												
867	Gamma GOF Tests on Detected Observations Only											
868	A-D Test Statistic			0.88	Anderson-Darling GOF Test							
869	5% A-D Critical Value			0.762	Data Not Gamma Distributed at 5% Significance Level							
870	K-S Test Statistic			0.243	Kolmogorov-Smirnov GOF							
871	5% K-S Critical Value			0.221	Data Not Gamma Distributed at 5% Significance Level							
872	Data Not Gamma Distributed at 5% Significance Level											
873												
874	Gamma Statistics on Detected Data Only											
875	k hat (MLE)			1.075	k star (bias corrected MLE)				0.915			
876	Theta hat (MLE)			0.32	Theta star (bias corrected MLE)				0.376			
877	nu hat (MLE)			34.4	nu star (bias corrected)				29.29			
878	MLE Mean (bias corrected)			0.344								
879	MLE Sd (bias corrected)			0.36	95% Percentile of Chisquare (2kstar)				5.659			
880												
881	Gamma ROS Statistics using Imputed Non-Detects											
882	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
883	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)											
884	For such situations, GROS method may yield incorrect values of UCLs and BTVs											

A	B	C	D	E	F	G	H	I	J	K	L
885	This is especially true when the sample size is small.										
886	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
887	Minimum	0.01							Mean	0.061	
888	Maximum	1.2							Median	0.01	
889	SD	0.186							CV	3.056	
890	k hat (MLE)	0.475							k star (bias corrected MLE)	0.467	
891	Theta hat (MLE)	0.128							Theta star (bias corrected MLE)	0.13	
892	nu hat (MLE)	99.66							nu star (bias corrected)	98.15	
893	MLE Mean (bias corrected)	0.061							MLE Sd (bias corrected)	0.0892	
894	95% Percentile of Chisquare (2kstar)	3.678							90% Percentile	0.167	
895	95% Percentile	0.24							99% Percentile	0.42	
896	The following statistics are computed using Gamma ROS Statistics on Imputed Data										
897	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
898			WH	HW					WH	HW	
899	95% Approx. Gamma UTL with 95% Coverage	0.223	0.201				95% Approx. Gamma UPL		0.179	0.159	
900	95% Gamma USL	0.574	0.578								
901											
902	Estimates of Gamma Parameters using KM Estimates										
903	Mean (KM)	0.0694							SD (KM)	0.183	
904	Variance (KM)	0.0335							SE of Mean (KM)	0.0185	
905	k hat (KM)	0.144							k star (KM)	0.146	
906	nu hat (KM)	30.2							nu star (KM)	30.67	
907	theta hat (KM)	0.483							theta star (KM)	0.475	
908	80% gamma percentile (KM)	0.0739							90% gamma percentile (KM)	0.205	
909	95% gamma percentile (KM)	0.384							99% gamma percentile (KM)	0.906	
910											
911	The following statistics are computed using gamma distribution and KM estimates										
912	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
913			WH	HW					WH	HW	
914	95% Approx. Gamma UTL with 95% Coverage	0.238	0.218				95% Approx. Gamma UPL		0.197	0.178	
915	95% KM Gamma Percentile	0.193	0.175				95% Gamma USL		0.554	0.548	
916											
917	Lognormal GOF Test on Detected Observations Only										
918	Shapiro Wilk Test Statistic	0.892					Shapiro Wilk GOF Test				
919	5% Shapiro Wilk Critical Value	0.887					Detected Data appear Lognormal at 5% Significance Level				
920	Lilliefors Test Statistic	0.198					Lilliefors GOF Test				
921	5% Lilliefors Critical Value	0.213					Detected Data appear Lognormal at 5% Significance Level				
922	Detected Data appear Lognormal at 5% Significance Level										
923											
924	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects										
925	Mean in Original Scale	0.058							Mean in Log Scale	-5.725	
926	SD in Original Scale	0.187							SD in Log Scale	2.624	
927	95% UTL95% Coverage	0.498							95% BCA UTL95% Coverage	0.67	
928	95% Bootstrap (%) UTL95% Coverage	0.67							95% UPL (t)	0.259	
929	90% Percentile (z)	0.0942							95% Percentile (z)	0.244	
930	99% Percentile (z)	1.461							95% USL	15.49	
931											
932	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution										
933	KM Mean of Logged Data	-3.559							95% KM UTL (Lognormal)95% Coverage	0.167	
934	KM SD of Logged Data	0.923							95% KM UPL (Lognormal)	0.133	
935	95% KM Percentile Lognormal (z)	0.13							95% KM USL (Lognormal)	0.558	
936											

A	B	C	D	E	F	G	H	I	J	K	L
937	Background DL/2 Statistics Assuming Lognormal Distribution										
938	Mean in Original Scale			0.0775	Mean in Log Scale			-3.235			
939	SD in Original Scale			0.182	SD in Log Scale			0.813			
940	95% UTL95% Coverage			0.187	95% UPL (t)			0.153			
941	90% Percentile (z)			0.112	95% Percentile (z)			0.15			
942	99% Percentile (z)			0.261	95% USL			0.541			
943	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
944											
945	Nonparametric Distribution Free Background Statistics										
946	Data appear to follow a Discernible Distribution at 5% Significance Level										
947											
948	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
949	Order of Statistic, r			103	95% UTL with95% Coverage			0.69			
950	Approx, f used to compute achieved CC			1.807	Approximate Actual Confidence Coefficient achieved by UTL			0.901			
951	Approximate Sample Size needed to achieve specified CC			124	95% UPL			0.453			
952	95% USL			1.2	95% KM Chebyshev UPL			0.871			
953											
954	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
955	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
956	and consists of observations collected from clean unimpacted locations.										
957	The use of USL tends to provide a balance between false positives and false negatives provided the data										
958	represents a background data set and when many onsite observations need to be compared with the BTV.										
959											
960	MAGNESIUM, TOTAL										
961											
962	General Statistics										
963	Total Number of Observations			41	Number of Distinct Observations			24			
964					Number of Missing Observations			90			
965	Minimum			8.9	First Quartile			10			
966	Second Largest			12.5	Median			11.1			
967	Maximum			12.5	Third Quartile			11.8			
968	Mean			11.04	SD			0.999			
969	Coefficient of Variation			0.0905	Skewness			-0.42			
970	Mean of logged Data			2.398	SD of logged Data			0.0927			
971											
972	Critical Values for Background Threshold Values (BTVs)										
973	Tolerance Factor K (For UTL)			2.11	d2max (for USL)			2.878			
974											
975	Normal GOF Test										
976	Shapiro Wilk Test Statistic			0.933	Shapiro Wilk GOF Test						
977	5% Shapiro Wilk Critical Value			0.941	Data Not Normal at 5% Significance Level						
978	Lilliefors Test Statistic			0.15	Lilliefors GOF Test						
979	5% Lilliefors Critical Value			0.137	Data Not Normal at 5% Significance Level						
980	Data Not Normal at 5% Significance Level										
981											
982	Background Statistics Assuming Normal Distribution										
983	95% UTL with 95% Coverage			13.15	90% Percentile (z)			12.32			
984	95% UPL (t)			12.75	95% Percentile (z)			12.69			
985	95% USL			13.92	99% Percentile (z)			13.37			
986											
987	Gamma GOF Test										
988	A-D Test Statistic			0.951	Anderson-Darling Gamma GOF Test						

A	B	C	D	E	F	G	H	I	J	K	L
989	5% A-D Critical Value			0.747	Data Not Gamma Distributed at 5% Significance Level						
990	K-S Test Statistic			0.157	Kolmogorov-Smirnov Gamma GOF Test						
991	5% K-S Critical Value			0.137	Data Not Gamma Distributed at 5% Significance Level						
992	Data Not Gamma Distributed at 5% Significance Level										
993											
994	Gamma Statistics										
995	k hat (MLE)			121.4	k star (bias corrected MLE)			112.5			
996	Theta hat (MLE)			0.091	Theta star (bias corrected MLE)			0.0981			
997	nu hat (MLE)			9956	nu star (bias corrected)			9229			
998	MLE Mean (bias corrected)			11.04	MLE Sd (bias corrected)			1.041			
999											
1000	Background Statistics Assuming Gamma Distribution										
1001	95% Wilson Hilferty (WH) Approx. Gamma UPL			12.83	90% Percentile			12.4			
1002	95% Hawkins Wixley (HW) Approx. Gamma UPL			12.84	95% Percentile			12.81			
1003	95% WH Approx. Gamma UTL with 95% Coverage			13.29	99% Percentile			13.61			
1004	95% HW Approx. Gamma UTL with 95% Coverage			13.31							
1005	95% WH USL			14.19	95% HW USL			14.23			
1006											
1007	Lognormal GOF Test										
1008	Shapiro Wilk Test Statistic			0.925	Shapiro Wilk Lognormal GOF Test						
1009	5% Shapiro Wilk Critical Value			0.941	Data Not Lognormal at 5% Significance Level						
1010	Lilliefors Test Statistic			0.156	Lilliefors Lognormal GOF Test						
1011	5% Lilliefors Critical Value			0.137	Data Not Lognormal at 5% Significance Level						
1012	Data Not Lognormal at 5% Significance Level										
1013											
1014	Background Statistics assuming Lognormal Distribution										
1015	95% UTL with 95% Coverage			13.38	90% Percentile (z)			12.39			
1016	95% UPL (t)			12.88	95% Percentile (z)			12.81			
1017	95% USL			14.36	99% Percentile (z)			13.65			
1018											
1019	Nonparametric Distribution Free Background Statistics										
1020	Data do not follow a Discernible Distribution (0.05)										
1021											
1022	Nonparametric Upper Limits for Background Threshold Values										
1023	Order of Statistic, r			41	95% UTL with 95% Coverage			12.5			
1024	Approx, f used to compute achieved CC			2.158	Approximate Actual Confidence Coefficient achieved by UTL			0.878			
1025					Approximate Sample Size needed to achieve specified CC			59			
1026	95% Percentile Bootstrap UTL with 95% Coverage			12.5	95% BCA Bootstrap UTL with 95% Coverage			12.5			
1027	95% UPL			12.49	90% Percentile			12.1			
1028	90% Chebyshev UPL			14.08	95% Percentile			12.4			
1029	95% Chebyshev UPL			15.45	99% Percentile			12.5			
1030	95% USL			12.5							
1031											
1032	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
1033	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
1034	and consists of observations collected from clean unimpacted locations.										
1035	The use of USL tends to provide a balance between false positives and false negatives provided the data										
1036	represents a background data set and when many onsite observations need to be compared with the BTV.										
1037											
1038	MAGNESIUM, DISSOLVED										
1039											
1040	General Statistics										

A	B	C	D	E	F	G	H	I	J	K	L
1041	Total Number of Observations				77	Number of Distinct Observations				34	
1042						Number of Missing Observations				54	
1043	Minimum			7.9	First Quartile			10.6			
1044	Second Largest			12.9	Median			11.1			
1045	Maximum			12.9	Third Quartile			11.5			
1046	Mean			10.94	SD			0.972			
1047	Coefficient of Variation			0.0888	Skewness			-0.837			
1048	Mean of logged Data			2.388	SD of logged Data			0.0934			
1049											
1050	Critical Values for Background Threshold Values (BTVs)										
1051	Tolerance Factor K (For UTL)			1.967	d2max (for USL)			3.118			
1052											
1053	Normal GOF Test										
1054	Shapiro Wilk Test Statistic			0.941	Normal GOF Test						
1055	5% Shapiro Wilk P Value			0.00243	Data Not Normal at 5% Significance Level						
1056	Lilliefors Test Statistic			0.144	Lilliefors GOF Test						
1057	5% Lilliefors Critical Value			0.101	Data Not Normal at 5% Significance Level						
1058	Data Not Normal at 5% Significance Level										
1059											
1060	Background Statistics Assuming Normal Distribution										
1061	95% UTL with 95% Coverage		12.85	90% Percentile (z)		12.18					
1062	95% UPL (t)		12.57	95% Percentile (z)		12.54					
1063	95% USL		13.97	99% Percentile (z)		13.2					
1064											
1065	Gamma GOF Test										
1066	A-D Test Statistic			1.913	Anderson-Darling Gamma GOF Test						
1067	5% A-D Critical Value			0.749	Data Not Gamma Distributed at 5% Significance Level						
1068	K-S Test Statistic			0.158	Kolmogorov-Smirnov Gamma GOF Test						
1069	5% K-S Critical Value			0.101	Data Not Gamma Distributed at 5% Significance Level						
1070	Data Not Gamma Distributed at 5% Significance Level										
1071											
1072	Gamma Statistics										
1073	k hat (MLE)		120.4	k star (bias corrected MLE)		115.8					
1074	Theta hat (MLE)		0.0908	Theta star (bias corrected MLE)		0.0945					
1075	nu hat (MLE)		18547	nu star (bias corrected)		17826					
1076	MLE Mean (bias corrected)		10.94	MLE Sd (bias corrected)		1.017					
1077											
1078	Background Statistics Assuming Gamma Distribution										
1079	95% Wilson Hilferty (WH) Approx. Gamma UPL		12.68	90% Percentile		12.26					
1080	95% Hawkins Wixley (HW) Approx. Gamma UPL		12.69	95% Percentile		12.66					
1081	95% WH Approx. Gamma UTL with 95% Coverage		13	99% Percentile		13.44					
1082	95% HW Approx. Gamma UTL with 95% Coverage		13.02								
1083	95% WH USL		14.34	95% HW USL		14.4					
1084											
1085	Lognormal GOF Test										
1086	Shapiro Wilk Test Statistic			0.911	Shapiro Wilk Lognormal GOF Test						
1087	5% Shapiro Wilk P Value			1.0804E-5	Data Not Lognormal at 5% Significance Level						
1088	Lilliefors Test Statistic			0.164	Lilliefors Lognormal GOF Test						
1089	5% Lilliefors Critical Value			0.101	Data Not Lognormal at 5% Significance Level						
1090	Data Not Lognormal at 5% Significance Level										
1091											
1092	Background Statistics assuming Lognormal Distribution										

A	B	C	D	E	F	G	H	I	J	K	L
1093		95% UTL with	95% Coverage		13.09					90% Percentile (z)	12.28
1094			95% UPL (t)		12.74					95% Percentile (z)	12.7
1095			95% USL		14.58					99% Percentile (z)	13.54
1096											
1097	Nonparametric Distribution Free Background Statistics										
1098	Data do not follow a Discernible Distribution (0.05)										
1099											
1100	Nonparametric Upper Limits for Background Threshold Values										
1101		Order of Statistic, r		76					95% UTL with	95% Coverage	12.9
1102		Approx, f used to compute achieved CC		2		Approximate Actual Confidence Coefficient achieved by UTL				0.903	
1103						Approximate Sample Size needed to achieve specified CC				93	
1104		95% Percentile Bootstrap UTL with	95% Coverage		12.9			95% BCA Bootstrap UTL with	95% Coverage		12.66
1105			95% UPL		12.42				90% Percentile		12
1106			90% Chebyshev UPL		13.87				95% Percentile		12.32
1107			95% Chebyshev UPL		15.2				99% Percentile		12.9
1108			95% USL		12.9						
1109											
1110	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
1111	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
1112	and consists of observations collected from clean unimpacted locations.										
1113	The use of USL tends to provide a balance between false positives and false negatives provided the data										
1114	represents a background data set and when many onsite observations need to be compared with the BTV.										
1115											
1116	MANGANESE, TOTAL										
1117											
1118	General Statistics										
1119		Total Number of Observations		68				Number of Missing Observations			63
1120		Number of Distinct Observations		12							
1121		Number of Detects		65				Number of Non-Detects			3
1122		Number of Distinct Detects		12				Number of Distinct Non-Detects			3
1123		Minimum Detect		0.03				Minimum Non-Detect			0.04
1124		Maximum Detect		0.15				Maximum Non-Detect			0.06
1125		Variance Detected		8.2822E-4				Percent Non-Detects			4.412%
1126		Mean Detected		0.0675				SD Detected			0.0288
1127		Mean of Detected Logged Data		-2.775				SD of Detected Logged Data			0.394
1128											
1129	Critical Values for Background Threshold Values (BTVs)										
1130		Tolerance Factor K (For UTL)		1.991				d2max (for USL)			3.073
1131											
1132	Normal GOF Test on Detects Only										
1133		Shapiro Wilk Test Statistic		0.869		Normal GOF Test on Detected Observations Only					
1134		5% Shapiro Wilk P Value		1.5226E-7		Data Not Normal at 5% Significance Level					
1135		Lilliefors Test Statistic		0.19		Lilliefors GOF Test					
1136		5% Lilliefors Critical Value		0.11		Data Not Normal at 5% Significance Level					
1137	Data Not Normal at 5% Significance Level										
1138											
1139	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
1140		KM Mean		0.0662				KM SD			0.0286
1141		95% UTL	95% Coverage		0.123			95% KM UPL (t)			0.114
1142		90% KM Percentile (z)		0.103				95% KM Percentile (z)			0.113
1143		99% KM Percentile (z)		0.133				95% KM USL			0.154
1144											

A	B	C	D	E	F	G	H	I	J	K	L
1145	DL/2 Substitution Background Statistics Assuming Normal Distribution										
1146	Mean		0.0657	SD		0.0295					
1147	95% UTL95% Coverage		0.124	95% UPL (t)		0.115					
1148	90% Percentile (z)		0.103	95% Percentile (z)		0.114					
1149	99% Percentile (z)		0.134	95% USL		0.156					
1150	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons										
1151											
1152	Gamma GOF Tests on Detected Observations Only										
1153	A-D Test Statistic		1.768	Anderson-Darling GOF Test							
1154	5% A-D Critical Value		0.753	Data Not Gamma Distributed at 5% Significance Level							
1155	K-S Test Statistic		0.184	Kolmogorov-Smirnov GOF							
1156	5% K-S Critical Value		0.111	Data Not Gamma Distributed at 5% Significance Level							
1157	Data Not Gamma Distributed at 5% Significance Level										
1158											
1159	Gamma Statistics on Detected Data Only										
1160	k hat (MLE)		6.431	k star (bias corrected MLE)		6.144					
1161	Theta hat (MLE)		0.0105	Theta star (bias corrected MLE)		0.011					
1162	nu hat (MLE)		836	nu star (bias corrected)		798.7					
1163	MLE Mean (bias corrected)		0.0675								
1164	MLE Sd (bias corrected)		0.0272	95% Percentile of Chisquare (2kstar)		21.41					
1165											
1166	Gamma ROS Statistics using Imputed Non-Detects										
1167	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
1168	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)										
1169	For such situations, GROS method may yield incorrect values of UCLs and BTVs										
1170	This is especially true when the sample size is small.										
1171	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
1172	Minimum		0.0194	Mean		0.066					
1173	Maximum		0.15	Median		0.06					
1174	SD		0.0291	CV		0.441					
1175	k hat (MLE)		5.854	k star (bias corrected MLE)		5.606					
1176	Theta hat (MLE)		0.0113	Theta star (bias corrected MLE)		0.0118					
1177	nu hat (MLE)		796.2	nu star (bias corrected)		762.4					
1178	MLE Mean (bias corrected)		0.066	MLE Sd (bias corrected)		0.0279					
1179	95% Percentile of Chisquare (2kstar)		19.96	90% Percentile		0.103					
1180	95% Percentile		0.117	99% Percentile		0.147					
1181	The following statistics are computed using Gamma ROS Statistics on Imputed Data										
1182	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
1183			WH	HW			WH	HW			
1184	95% Approx. Gamma UTL with 95% Coverage		0.131	0.133	95% Approx. Gamma UPL		0.118	0.119			
1185	95% Gamma USL		0.184	0.19							
1186											
1187	Estimates of Gamma Parameters using KM Estimates										
1188	Mean (KM)		0.0662	SD (KM)		0.0286					
1189	Variance (KM)		8.2031E-4	SE of Mean (KM)		0.0035					
1190	k hat (KM)		5.343	k star (KM)		5.117					
1191	nu hat (KM)		726.7	nu star (KM)		696					
1192	theta hat (KM)		0.0124	theta star (KM)		0.0129					
1193	80% gamma percentile (KM)		0.0888	90% gamma percentile (KM)		0.105					
1194	95% gamma percentile (KM)		0.121	99% gamma percentile (KM)		0.152					
1195											
1196	The following statistics are computed using gamma distribution and KM estimates										

A	B	C	D	E	F	G	H	I	J	K	L
1197	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
1198				WH	HW					WH	HW
1199	95% Approx. Gamma UTL with 95% Coverage			0.129	0.13	95% Approx. Gamma UPL				0.116	0.117
1200	95% KM Gamma Percentile			0.115	0.116	95% Gamma USL				0.179	0.185
1201											
1202	Lognormal GOF Test on Detected Observations Only										
1203	Shapiro Wilk Approximate Test Statistic				0.934	Shapiro Wilk GOF Test					
1204	5% Shapiro Wilk P Value				0.00247	Data Not Lognormal at 5% Significance Level					
1205	Lilliefors Test Statistic				0.174	Lilliefors GOF Test					
1206	5% Lilliefors Critical Value				0.11	Data Not Lognormal at 5% Significance Level					
1207	Data Not Lognormal at 5% Significance Level										
1208											
1209	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects										
1210	Mean in Original Scale				0.0662	Mean in Log Scale				-2.799	
1211	SD in Original Scale				0.0289	SD in Log Scale				0.404	
1212	95% UTL95% Coverage				0.136	95% BCA UTL95% Coverage				0.143	
1213	95% Bootstrap (%) UTL95% Coverage				0.15	95% UPL (t)				0.12	
1214	90% Percentile (z)				0.102	95% Percentile (z)				0.118	
1215	99% Percentile (z)				0.156	95% USL				0.211	
1216											
1217	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution										
1218	KM Mean of Logged Data				-2.798	95% KM UTL (Lognormal)95% Coverage				0.135	
1219	KM SD of Logged Data				0.4	95% KM UPL (Lognormal)				0.119	
1220	95% KM Percentile Lognormal (z)				0.118	95% KM USL (Lognormal)				0.208	
1221											
1222	Background DL/2 Statistics Assuming Lognormal Distribution										
1223	Mean in Original Scale				0.0657	Mean in Log Scale				-2.816	
1224	SD in Original Scale				0.0295	SD in Log Scale				0.432	
1225	95% UTL95% Coverage				0.141	95% UPL (t)				0.124	
1226	90% Percentile (z)				0.104	95% Percentile (z)				0.122	
1227	99% Percentile (z)				0.163	95% USL				0.226	
1228	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
1229											
1230	Nonparametric Distribution Free Background Statistics										
1231	Data do not follow a Discernible Distribution (0.05)										
1232											
1233	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
1234	Order of Statistic, r				67	95% UTL with95% Coverage				0.15	
1235	Approx, f used to compute achieved CC				1.763	Approximate Actual Confidence Coefficient achieved by UTL				0.86	
1236	Approximate Sample Size needed to achieve specified CC				93	95% UPL				0.126	
1237	95% USL				0.15	95% KM Chebyshev UPL				0.192	
1238											
1239	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
1240	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
1241	and consists of observations collected from clean unimpacted locations.										
1242	The use of USL tends to provide a balance between false positives and false negatives provided the data										
1243	represents a background data set and when many onsite observations need to be compared with the BTV.										
1244											
1245	MANGANESE, DISSOLVED										
1246											
1247	General Statistics										
1248	Total Number of Observations				105	Number of Distinct Observations				15	

A	B	C	D	E	F	G	H	I	J	K	L
1249										Number of Missing Observations	26
1250				Minimum	0.03					First Quartile	0.05
1251				Second Largest	0.16					Median	0.06
1252				Maximum	0.17					Third Quartile	0.07
1253				Mean	0.0654					SD	0.0266
1254				Coefficient of Variation	0.407					Skewness	1.815
1255				Mean of logged Data	-2.792					SD of logged Data	0.347
1256											
1257				Critical Values for Background Threshold Values (BTVs)							
1258				Tolerance Factor K (For UTL)	1.916					d2max (for USL)	3.226
1259											
1260				Normal GOF Test							
1261				Shapiro Wilk Test Statistic	0.807					Normal GOF Test	
1262				5% Shapiro Wilk P Value	0					Data Not Normal at 5% Significance Level	
1263				Lilliefors Test Statistic	0.266					Lilliefors GOF Test	
1264				5% Lilliefors Critical Value	0.0867					Data Not Normal at 5% Significance Level	
1265				Data Not Normal at 5% Significance Level							
1266											
1267				Background Statistics Assuming Normal Distribution							
1268				95% UTL with 95% Coverage	0.116					90% Percentile (z)	0.0996
1269				95% UPL (t)	0.11					95% Percentile (z)	0.109
1270				95% USL	0.151					99% Percentile (z)	0.127
1271											
1272				Gamma GOF Test							
1273				A-D Test Statistic	4.063					Anderson-Darling Gamma GOF Test	
1274				5% A-D Critical Value	0.753					Data Not Gamma Distributed at 5% Significance Level	
1275				K-S Test Statistic	0.233					Kolmogorov-Smirnov Gamma GOF Test	
1276				5% K-S Critical Value	0.0882					Data Not Gamma Distributed at 5% Significance Level	
1277				Data Not Gamma Distributed at 5% Significance Level							
1278											
1279				Gamma Statistics							
1280				k hat (MLE)	7.822					k star (bias corrected MLE)	7.604
1281				Theta hat (MLE)	0.00837					Theta star (bias corrected MLE)	0.0086
1282				nu hat (MLE)	1643					nu star (bias corrected)	1597
1283				MLE Mean (bias corrected)	0.0654					MLE Sd (bias corrected)	0.0237
1284											
1285				Background Statistics Assuming Gamma Distribution							
1286				95% Wilson Hilferty (WH) Approx. Gamma UPL	0.109					90% Percentile	0.0971
1287				95% Hawkins Wixley (HW) Approx. Gamma UPL	0.109					95% Percentile	0.109
1288				95% WH Approx. Gamma UTL with 95% Coverage	0.117					99% Percentile	0.133
1289				95% HW Approx. Gamma UTL with 95% Coverage	0.118						
1290				95% WH USL	0.169					95% HW USL	0.172
1291											
1292				Lognormal GOF Test							
1293				Shapiro Wilk Test Statistic	0.919					Shapiro Wilk Lognormal GOF Test	
1294				5% Shapiro Wilk P Value	4.7463E-7					Data Not Lognormal at 5% Significance Level	
1295				Lilliefors Test Statistic	0.21					Lilliefors Lognormal GOF Test	
1296				5% Lilliefors Critical Value	0.0867					Data Not Lognormal at 5% Significance Level	
1297				Data Not Lognormal at 5% Significance Level							
1298											
1299				Background Statistics assuming Lognormal Distribution							
1300				95% UTL with 95% Coverage	0.119					90% Percentile (z)	0.0957

A	B	C	D	E	F	G	H	I	J	K	L
1301				95% UPL (t)	0.109					95% Percentile (z)	0.109
1302				95% USL	0.188					99% Percentile (z)	0.138
1303											
1304	Nonparametric Distribution Free Background Statistics										
1305	Data do not follow a Discernible Distribution (0.05)										
1306											
1307	Nonparametric Upper Limits for Background Threshold Values										
1308				Order of Statistic, r	103					95% UTL with 95% Coverage	0.15
1309				Approx, f used to compute achieved CC	1.807					Approximate Actual Confidence Coefficient achieved by UTL	0.901
1310										Approximate Sample Size needed to achieve specified CC	124
1311				95% Percentile Bootstrap UTL with 95% Coverage	0.148					95% BCA Bootstrap UTL with 95% Coverage	0.144
1312				95% UPL	0.127					90% Percentile	0.1
1313				90% Chebyshev UPL	0.146					95% Percentile	0.118
1314				95% Chebyshev UPL	0.182					99% Percentile	0.16
1315				95% USL	0.17						
1316											
1317	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
1318	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
1319	and consists of observations collected from clean unimpacted locations.										
1320	The use of USL tends to provide a balance between false positives and false negatives provided the data										
1321	represents a background data set and when many onsite observations need to be compared with the BTV.										
1322											
1323	NITRATE-NITROGEN										
1324											
1325	General Statistics										
1326				Total Number of Observations	127					Number of Missing Observations	4
1327				Number of Distinct Observations	48						
1328				Number of Detects	124					Number of Non-Detects	3
1329				Number of Distinct Detects	48					Number of Distinct Non-Detects	3
1330				Minimum Detect	13.6					Minimum Non-Detect	21
1331				Maximum Detect	24.9					Maximum Non-Detect	23
1332				Variance Detected	4.488					Percent Non-Detects	2.362%
1333				Mean Detected	20.63					SD Detected	2.118
1334				Mean of Detected Logged Data	3.021					SD of Detected Logged Data	0.108
1335											
1336	Critical Values for Background Threshold Values (BTVs)										
1337				Tolerance Factor K (For UTL)	1.889					d2max (for USL)	3.289
1338											
1339	Normal GOF Test on Detects Only										
1340				Shapiro Wilk Test Statistic	0.961					Normal GOF Test on Detected Observations Only	
1341				5% Shapiro Wilk P Value	0.0106					Data Not Normal at 5% Significance Level	
1342				Lilliefors Test Statistic	0.101					Lilliefors GOF Test	
1343				5% Lilliefors Critical Value	0.0799					Data Not Normal at 5% Significance Level	
1344	Data Not Normal at 5% Significance Level										
1345											
1346	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
1347				KM Mean	20.61					KM SD	2.11
1348				95% UTL95% Coverage	24.59					95% KM UPL (t)	24.12
1349				90% KM Percentile (z)	23.31					95% KM Percentile (z)	24.08
1350				99% KM Percentile (z)	25.52					95% KM USL	27.55
1351											
1352	DL/2 Substitution Background Statistics Assuming Normal Distribution										

A	B	C	D	E	F	G	H	I	J	K	L	
1353				Mean	20.4					SD	2.558	
1354				95% UTL/95% Coverage	25.24					95% UPL (t)	24.66	
1355				90% Percentile (z)	23.68					95% Percentile (z)	24.61	
1356				99% Percentile (z)	26.35					95% USL	28.82	
1357	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
1358												
1359	Gamma GOF Tests on Detected Observations Only											
1360				A-D Test Statistic	1.594					Anderson-Darling GOF Test		
1361				5% A-D Critical Value	0.75					Data Not Gamma Distributed at 5% Significance Level		
1362				K-S Test Statistic	0.113					Kolmogorov-Smirnov GOF		
1363				5% K-S Critical Value	0.083					Data Not Gamma Distributed at 5% Significance Level		
1364	Data Not Gamma Distributed at 5% Significance Level											
1365												
1366	Gamma Statistics on Detected Data Only											
1367				k hat (MLE)	89.94					k star (bias corrected MLE)	87.77	
1368				Theta hat (MLE)	0.229					Theta star (bias corrected MLE)	0.235	
1369				nu hat (MLE)	22305					nu star (bias corrected)	21767	
1370				MLE Mean (bias corrected)	20.63							
1371				MLE Sd (bias corrected)	2.202					95% Percentile of Chisquare (2kstar)	207.5	
1372												
1373	Gamma ROS Statistics using Imputed Non-Detects											
1374	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1375	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)											
1376	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1377	This is especially true when the sample size is small.											
1378	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1379				Minimum	13.6					Mean	20.61	
1380				Maximum	24.9					Median	21	
1381				SD	2.099					CV	0.102	
1382				k hat (MLE)	91.56					k star (bias corrected MLE)	89.4	
1383				Theta hat (MLE)	0.225					Theta star (bias corrected MLE)	0.231	
1384				nu hat (MLE)	23257					nu star (bias corrected)	22709	
1385				MLE Mean (bias corrected)	20.61					MLE Sd (bias corrected)	2.18	
1386				95% Percentile of Chisquare (2kstar)	211					90% Percentile	23.45	
1387				95% Percentile	24.32					99% Percentile	26.02	
1388	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
1389	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
1390					WH	HW				WH	HW	
1391				95% Approx. Gamma UTL with 95% Coverage	24.89	24.93				95% Approx. Gamma UPL	24.34	24.37
1392				95% Gamma USL	28.48	28.63						
1393												
1394	Estimates of Gamma Parameters using KM Estimates											
1395				Mean (KM)	20.61					SD (KM)	2.11	
1396				Variance (KM)	4.453					SE of Mean (KM)	0.19	
1397				k hat (KM)	95.36					k star (KM)	93.12	
1398				nu hat (KM)	24222					nu star (KM)	23652	
1399				theta hat (KM)	0.216					theta star (KM)	0.221	
1400				80% gamma percentile (KM)	22.38					90% gamma percentile (KM)	23.39	
1401				95% gamma percentile (KM)	24.24					99% gamma percentile (KM)	25.9	
1402												
1403	The following statistics are computed using gamma distribution and KM estimates											
1404	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											

A	B	C	D	E	F	G	H	I	J	K	L	
1405				WH	HW					WH	HW	
1406	95% Approx. Gamma UTL with 95% Coverage			24.91	24.95	95% Approx. Gamma UPL			24.36	24.39		
1407	95% KM Gamma Percentile			24.31	24.34	95% Gamma USL			28.53	28.68		
1408												
1409	Lognormal GOF Test on Detected Observations Only											
1410	Shapiro Wilk Approximate Test Statistic			0.938	Shapiro Wilk GOF Test							
1411	5% Shapiro Wilk P Value			1.1037E-5	Data Not Lognormal at 5% Significance Level							
1412	Lilliefors Test Statistic			0.118	Lilliefors GOF Test							
1413	5% Lilliefors Critical Value			0.0799	Data Not Lognormal at 5% Significance Level							
1414	Data Not Lognormal at 5% Significance Level											
1415												
1416	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
1417	Mean in Original Scale			20.61	Mean in Log Scale			3.02				
1418	SD in Original Scale			2.1	SD in Log Scale			0.107				
1419	95% UTL95% Coverage			25.08	95% BCA UTL95% Coverage			23.85				
1420	95% Bootstrap (%) UTL95% Coverage			24	95% UPL (t)			24.48				
1421	90% Percentile (z)			23.5	95% Percentile (z)			24.43				
1422	99% Percentile (z)			26.28	95% USL			29.12				
1423												
1424	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
1425	KM Mean of Logged Data			3.02	95% KM UTL (Lognormal)95% Coverage			25.11				
1426	KM SD of Logged Data			0.107	95% KM UPL (Lognormal)			24.5				
1427	95% KM Percentile Lognormal (z)			24.45	95% KM USL (Lognormal)			29.18				
1428												
1429	Background DL/2 Statistics Assuming Lognormal Distribution											
1430	Mean in Original Scale			20.4	Mean in Log Scale			3.007				
1431	SD in Original Scale			2.558	SD in Log Scale			0.143				
1432	95% UTL95% Coverage			26.49	95% UPL (t)			25.65				
1433	90% Percentile (z)			24.28	95% Percentile (z)			25.58				
1434	99% Percentile (z)			28.19	95% USL			32.35				
1435	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
1436												
1437	Nonparametric Distribution Free Background Statistics											
1438	Data do not follow a Discernible Distribution (0.05)											
1439												
1440	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
1441	Order of Statistic, r			124	95% UTL with95% Coverage			24				
1442	Approx, f used to compute achieved CC			1.632	Approximate Actual Confidence Coefficient achieved by UTL			0.884				
1443	Approximate Sample Size needed to achieve specified CC			153	95% UPL			23.56				
1444	95% USL			24.9	95% KM Chebyshev UPL			29.84				
1445												
1446	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1447	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1448	and consists of observations collected from clean unimpacted locations.											
1449	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1450	represents a background data set and when many onsite observations need to be compared with the BTV.											
1451												
1452	pH-FIELD											
1453												
1454	General Statistics											
1455	Total Number of Observations			117	Number of Missing Observations			14				
1456	Number of Distinct Observations			72								

A	B	C	D	E	F	G	H	I	J	K	L
1457	Number of Detects			113	Number of Non-Detects			4			
1458	Number of Distinct Detects			68	Number of Distinct Non-Detects			4			
1459	Minimum Detect			4.15	Minimum Non-Detect			4.75			
1460	Maximum Detect			6.27	Maximum Non-Detect			5.59			
1461	Variance Detected			0.109	Percent Non-Detects			3.419%			
1462	Mean Detected			5.057	SD Detected			0.33			
1463	Mean of Detected Logged Data			1.619	SD of Detected Logged Data			0.064			
1464											
1465	Critical Values for Background Threshold Values (BTVs)										
1466	Tolerance Factor K (For UTL)			1.9	d2max (for USL)			3.262			
1467											
1468	Normal GOF Test on Detects Only										
1469	Shapiro Wilk Test Statistic			0.916	Normal GOF Test on Detected Observations Only						
1470	5% Shapiro Wilk P Value			5.0092E-8	Data Not Normal at 5% Significance Level						
1471	Lilliefors Test Statistic			0.138	Lilliefors GOF Test						
1472	5% Lilliefors Critical Value			0.0837	Data Not Normal at 5% Significance Level						
1473	Data Not Normal at 5% Significance Level										
1474											
1475	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
1476	KM Mean			5.05	KM SD			0.329			
1477	95% UTL95% Coverage			5.676	95% KM UPL (t)			5.598			
1478	90% KM Percentile (z)			5.472	95% KM Percentile (z)			5.591			
1479	99% KM Percentile (z)			5.816	95% KM USL			6.124			
1480											
1481	DL/2 Substitution Background Statistics Assuming Normal Distribution										
1482	Mean			4.974	SD			0.549			
1483	95% UTL95% Coverage			6.017	95% UPL (t)			5.888			
1484	90% Percentile (z)			5.678	95% Percentile (z)			5.877			
1485	99% Percentile (z)			6.251	95% USL			6.765			
1486	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons										
1487											
1488	Gamma GOF Tests on Detected Observations Only										
1489	A-D Test Statistic			2.861	Anderson-Darling GOF Test						
1490	5% A-D Critical Value			0.75	Data Not Gamma Distributed at 5% Significance Level						
1491	K-S Test Statistic			0.128	Kolmogorov-Smirnov GOF						
1492	5% K-S Critical Value			0.0858	Data Not Gamma Distributed at 5% Significance Level						
1493	Data Not Gamma Distributed at 5% Significance Level										
1494											
1495	Gamma Statistics on Detected Data Only										
1496	k hat (MLE)			243.5	k star (bias corrected MLE)			237			
1497	Theta hat (MLE)			0.0208	Theta star (bias corrected MLE)			0.0213			
1498	nu hat (MLE)			55027	nu star (bias corrected)			53568			
1499	MLE Mean (bias corrected)			5.057							
1500	MLE Sd (bias corrected)			0.328	95% Percentile of Chisquare (2kstar)			525.8			
1501											
1502	Gamma ROS Statistics using Imputed Non-Detects										
1503	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
1504	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)										
1505	For such situations, GROS method may yield incorrect values of UCLs and BTVs										
1506	This is especially true when the sample size is small.										
1507	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
1508	Minimum			4.15	Mean			5.051			

A	B	C	D	E	F	G	H	I	J	K	L
1509	Maximum				6.27	Median				5.012	
1510	SD				0.328	CV				0.0649	
1511	k hat (MLE)				246.3	k star (bias corrected MLE)				240	
1512	Theta hat (MLE)				0.0205	Theta star (bias corrected MLE)				0.021	
1513	nu hat (MLE)				57629	nu star (bias corrected)				56153	
1514	MLE Mean (bias corrected)				5.051	MLE Sd (bias corrected)				0.326	
1515	95% Percentile of Chisquare (2kstar)				532	90% Percentile				5.473	
1516	95% Percentile				5.599	99% Percentile				5.84	
1517	The following statistics are computed using Gamma ROS Statistics on Imputed Data										
1518	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
1519			WH	HW					WH	HW	
1520	95% Approx. Gamma UTL with 95% Coverage			5.683	5.684	95% Approx. Gamma UPL			5.601	5.602	
1521	95% Gamma USL			6.172	6.18						
1522	Estimates of Gamma Parameters using KM Estimates										
1523											
1524	Mean (KM)				5.05	SD (KM)				0.329	
1525	Variance (KM)				0.108	SE of Mean (KM)				0.0308	
1526	k hat (KM)				235.2	k star (KM)				229.2	
1527	nu hat (KM)				55036	nu star (KM)				53626	
1528	theta hat (KM)				0.0215	theta star (KM)				0.022	
1529	80% gamma percentile (KM)				5.328	90% gamma percentile (KM)				5.482	
1530	95% gamma percentile (KM)				5.611	99% gamma percentile (KM)				5.858	
1531											
1532	The following statistics are computed using gamma distribution and KM estimates										
1533	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
1534			WH	HW					WH	HW	
1535	95% Approx. Gamma UTL with 95% Coverage			5.685	5.687	95% Approx. Gamma UPL			5.603	5.604	
1536	95% KM Gamma Percentile			5.596	5.597	95% Gamma USL			6.178	6.186	
1537											
1538	Lognormal GOF Test on Detected Observations Only										
1539	Shapiro Wilk Approximate Test Statistic				0.933	Shapiro Wilk GOF Test					
1540	5% Shapiro Wilk P Value				7.9332E-6	Data Not Lognormal at 5% Significance Level					
1541	Lilliefors Test Statistic				0.124	Lilliefors GOF Test					
1542	5% Lilliefors Critical Value				0.0837	Data Not Lognormal at 5% Significance Level					
1543	Data Not Lognormal at 5% Significance Level										
1544											
1545	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects										
1546	Mean in Original Scale				5.051	Mean in Log Scale				1.618	
1547	SD in Original Scale				0.328	SD in Log Scale				0.0636	
1548	95% UTL95% Coverage				5.688	95% BCA UTL95% Coverage				5.94	
1549	95% Bootstrap (%) UTL95% Coverage				5.944	95% UPL (t)				5.604	
1550	90% Percentile (z)				5.469	95% Percentile (z)				5.597	
1551	99% Percentile (z)				5.845	95% USL				6.203	
1552											
1553	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution										
1554	KM Mean of Logged Data				1.617	95% KM UTL (Lognormal)95% Coverage				5.692	
1555	KM SD of Logged Data				0.0641	95% KM UPL (Lognormal)				5.607	
1556	95% KM Percentile Lognormal (z)				5.599	95% KM USL (Lognormal)				6.211	
1557											
1558	Background DL/2 Statistics Assuming Lognormal Distribution										
1559	Mean in Original Scale				4.974	Mean in Log Scale				1.596	
1560	SD in Original Scale				0.549	SD in Log Scale				0.135	

A	B	C	D	E	F	G	H	I	J	K	L
1561			95% UTL95% Coverage		6.38					95% UPL (t)	6.18
1562			90% Percentile (z)		5.868					95% Percentile (z)	6.163
1563			99% Percentile (z)		6.758					95% USL	7.669
1564	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
1565											
1566	Nonparametric Distribution Free Background Statistics										
1567	Data do not follow a Discernible Distribution (0.05)										
1568											
1569	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
1570			Order of Statistic, r		114					95% UTL with95% Coverage	5.94
1571			Approx, f used to compute achieved CC		1.5					Approximate Actual Confidence Coefficient achieved by UTL	0.842
1572			Approximate Sample Size needed to achieve specified CC		153					95% UPL	5.638
1573			95% USL		6.27					95% KM Chebyshev UPL	6.491
1574											
1575	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
1576	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
1577	and consists of observations collected from clean unimpacted locations.										
1578	The use of USL tends to provide a balance between false positives and false negatives provided the data										
1579	represents a background data set and when many onsite observations need to be compared with the BTV.										
1580											
1581	pH-LAB										
1582											
1583	General Statistics										
1584			Total Number of Observations		125					Number of Missing Observations	6
1585			Number of Distinct Observations		77						
1586			Number of Detects		121					Number of Non-Detects	4
1587			Number of Distinct Detects		75					Number of Distinct Non-Detects	4
1588			Minimum Detect		4.43					Minimum Non-Detect	5.22
1589			Maximum Detect		7.08					Maximum Non-Detect	5.67
1590			Variance Detected		0.108					Percent Non-Detects	3.2%
1591			Mean Detected		5.63					SD Detected	0.329
1592			Mean of Detected Logged Data		1.727					SD of Detected Logged Data	0.0578
1593											
1594	Critical Values for Background Threshold Values (BTVs)										
1595			Tolerance Factor K (For UTL)		1.891					d2max (for USL)	3.284
1596											
1597	Normal GOF Test on Detects Only										
1598			Shapiro Wilk Test Statistic		0.961					Normal GOF Test on Detected Observations Only	
1599			5% Shapiro Wilk P Value		0.0125					Data Not Normal at 5% Significance Level	
1600			Lilliefors Test Statistic		0.074					Lilliefors GOF Test	
1601			5% Lilliefors Critical Value		0.0809					Detected Data appear Normal at 5% Significance Level	
1602	Detected Data appear Approximate Normal at 5% Significance Level										
1603											
1604	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
1605			KM Mean		5.617					KM SD	0.334
1606			95% UTL95% Coverage		6.249					95% KM UPL (t)	6.173
1607			90% KM Percentile (z)		6.045					95% KM Percentile (z)	6.166
1608			99% KM Percentile (z)		6.394					95% KM USL	6.714
1609											
1610	DL/2 Substitution Background Statistics Assuming Normal Distribution										
1611			Mean		5.536					SD	0.611
1612			95% UTL95% Coverage		6.693					95% UPL (t)	6.554

A	B	C	D	E	F	G	H	I	J	K	L	
1613			90% Percentile (z)	6.32					95% Percentile (z)	6.542		
1614			99% Percentile (z)	6.959					95% USL	7.544		
1615	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
1616												
1617	Gamma GOF Tests on Detected Observations Only											
1618			A-D Test Statistic	0.986			Anderson-Darling GOF Test					
1619			5% A-D Critical Value	0.75			Data Not Gamma Distributed at 5% Significance Level					
1620			K-S Test Statistic	0.0695			Kolmogorov-Smirnov GOF					
1621			5% K-S Critical Value	0.0838			Detected data appear Gamma Distributed at 5% Significance Level					
1622	Detected data follow Appr. Gamma Distribution at 5% Significance Level											
1623												
1624	Gamma Statistics on Detected Data Only											
1625			k hat (MLE)	300.6					k star (bias corrected MLE)	293.1		
1626			Theta hat (MLE)	0.0187					Theta star (bias corrected MLE)	0.0192		
1627			nu hat (MLE)	72738					nu star (bias corrected)	70936		
1628			MLE Mean (bias corrected)	5.63								
1629			MLE Sd (bias corrected)	0.329					95% Percentile of Chisquare (2kstar)	643.7		
1630												
1631	Gamma ROS Statistics using Imputed Non-Detects											
1632	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1633	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)											
1634	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1635	This is especially true when the sample size is small.											
1636	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1637			Minimum	4.43					Mean	5.616		
1638			Maximum	7.08					Median	5.57		
1639			SD	0.334					CV	0.0594		
1640			k hat (MLE)	290.1					k star (bias corrected MLE)	283.2		
1641			Theta hat (MLE)	0.0194					Theta star (bias corrected MLE)	0.0198		
1642			nu hat (MLE)	72534					nu star (bias corrected)	70795		
1643			MLE Mean (bias corrected)	5.616					MLE Sd (bias corrected)	0.334		
1644			95% Percentile of Chisquare (2kstar)	622.8					90% Percentile	6.048		
1645			95% Percentile	6.176					99% Percentile	6.422		
1646	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
1647	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
1648				WH	HW				WH	HW		
1649			95% Approx. Gamma UTL with 95% Coverage	6.259	6.261				95% Approx. Gamma UPL	6.179	6.18	
1650			95% Gamma USL	6.768	6.776							
1651												
1652	Estimates of Gamma Parameters using KM Estimates											
1653			Mean (KM)	5.617					SD (KM)	0.334		
1654			Variance (KM)	0.112					SE of Mean (KM)	0.0303		
1655			k hat (KM)	282.6					k star (KM)	275.8		
1656			nu hat (KM)	70649					nu star (KM)	68955		
1657			theta hat (KM)	0.0199					theta star (KM)	0.0204		
1658			80% gamma percentile (KM)	5.899					90% gamma percentile (KM)	6.054		
1659			95% gamma percentile (KM)	6.184					99% gamma percentile (KM)	6.433		
1660												
1661	The following statistics are computed using gamma distribution and KM estimates											
1662	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
1663				WH	HW				WH	HW		
1664			95% Approx. Gamma UTL with 95% Coverage	6.262	6.264				95% Approx. Gamma UPL	6.181	6.182	

A	B	C	D	E	F	G	H	I	J	K	L	
1665	95% KM Gamma Percentile			6.174	6.175	95% Gamma USL			6.772	6.781		
1666												
1667	Lognormal GOF Test on Detected Observations Only											
1668	Shapiro Wilk Approximate Test Statistic			0.969	Shapiro Wilk GOF Test							
1669	5% Shapiro Wilk P Value			0.0804	Detected Data appear Lognormal at 5% Significance Level							
1670	Lilliefors Test Statistic			0.0691	Lilliefors GOF Test							
1671	5% Lilliefors Critical Value			0.0809	Detected Data appear Lognormal at 5% Significance Level							
1672	Detected Data appear Lognormal at 5% Significance Level											
1673												
1674	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
1675	Mean in Original Scale			5.617	Mean in Log Scale			1.724				
1676	SD in Original Scale			0.333	SD in Log Scale			0.0587				
1677	95% UTL95% Coverage			6.266	95% BCA UTL95% Coverage			6.176				
1678	95% Bootstrap (%) UTL95% Coverage			6.176	95% UPL (t)			6.183				
1679	90% Percentile (z)			6.045	95% Percentile (z)			6.176				
1680	99% Percentile (z)			6.428	95% USL			6.8				
1681												
1682	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
1683	KM Mean of Logged Data			1.724	95% KM UTL (Lognormal)95% Coverage			6.27				
1684	KM SD of Logged Data			0.0591	95% KM UPL (Lognormal)			6.186				
1685	95% KM Percentile Lognormal (z)			6.179	95% KM USL (Lognormal)			6.807				
1686												
1687	Background DL/2 Statistics Assuming Lognormal Distribution											
1688	Mean in Original Scale			5.536	Mean in Log Scale			1.703				
1689	SD in Original Scale			0.611	SD in Log Scale			0.142				
1690	95% UTL95% Coverage			7.181	95% UPL (t)			6.953				
1691	90% Percentile (z)			6.586	95% Percentile (z)			6.935				
1692	99% Percentile (z)			7.639	95% USL			8.752				
1693	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
1694												
1695	Nonparametric Distribution Free Background Statistics											
1696	Data appear to follow a Discernible Distribution at 5% Significance Level											
1697												
1698	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
1699	Order of Statistic, r			122	95% UTL with95% Coverage			6.18				
1700	Approx, f used to compute achieved CC			1.605	Approximate Actual Confidence Coefficient achieved by UTL			0.876				
1701	Approximate Sample Size needed to achieve specified CC			153	95% UPL			6.107				
1702	95% USL			7.08	95% KM Chebyshev UPL			7.079				
1703												
1704	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1705	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1706	and consists of observations collected from clean unimpacted locations.											
1707	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1708	represents a background data set and when many onsite observations need to be compared with the BTV.											
1709												
1710	POTASSIUM, TOTAL											
1711												
1712	General Statistics											
1713	Total Number of Observations			44	Number of Distinct Observations			19				
1714					Number of Missing Observations			87				
1715	Minimum			1.7	First Quartile			2.185				
1716	Second Largest			2.9	Median			2.4				

A	B	C	D	E	F	G	H	I	J	K	L
1717	Maximum				3.1	Third Quartile				2.6	
1718	Mean				2.382	SD				0.293	
1719	Coefficient of Variation				0.123	Skewness				0.0615	
1720	Mean of logged Data				0.86	SD of logged Data				0.125	
1721											
1722	Critical Values for Background Threshold Values (BTVs)										
1723	Tolerance Factor K (For UTL)				2.091	d2max (for USL)				2.906	
1724											
1725	Normal GOF Test										
1726	Shapiro Wilk Test Statistic				0.985	Shapiro Wilk GOF Test					
1727	5% Shapiro Wilk Critical Value				0.944	Data appear Normal at 5% Significance Level					
1728	Lilliefors Test Statistic				0.0963	Lilliefors GOF Test					
1729	5% Lilliefors Critical Value				0.132	Data appear Normal at 5% Significance Level					
1730	Data appear Normal at 5% Significance Level										
1731											
1732	Background Statistics Assuming Normal Distribution										
1733	95% UTL with 95% Coverage		2.994		90% Percentile (z)				2.757		
1734	95% UPL (t)		2.88		95% Percentile (z)				2.864		
1735	95% USL		3.233		99% Percentile (z)				3.063		
1736											
1737	Gamma GOF Test										
1738	A-D Test Statistic				0.368	Anderson-Darling Gamma GOF Test					
1739	5% A-D Critical Value				0.747	Detected data appear Gamma Distributed at 5% Significance Level					
1740	K-S Test Statistic				0.109	Kolmogorov-Smirnov Gamma GOF Test					
1741	5% K-S Critical Value				0.133	Detected data appear Gamma Distributed at 5% Significance Level					
1742	Detected data appear Gamma Distributed at 5% Significance Level										
1743											
1744	Gamma Statistics										
1745	k hat (MLE)				66.79	k star (bias corrected MLE)				62.25	
1746	Theta hat (MLE)				0.0357	Theta star (bias corrected MLE)				0.0383	
1747	nu hat (MLE)				5877	nu star (bias corrected)				5478	
1748	MLE Mean (bias corrected)				2.382	MLE Sd (bias corrected)				0.302	
1749											
1750	Background Statistics Assuming Gamma Distribution										
1751	95% Wilson Hilferty (WH) Approx. Gamma UPL		2.905		90% Percentile				2.776		
1752	95% Hawkins Wixley (HW) Approx. Gamma UPL		2.909		95% Percentile				2.899		
1753	95% WH Approx. Gamma UTL with 95% Coverage		3.039		99% Percentile				3.14		
1754	95% HW Approx. Gamma UTL with 95% Coverage		3.046								
1755	95% WH USL		3.331		95% HW USL				3.346		
1756											
1757	Lognormal GOF Test										
1758	Shapiro Wilk Test Statistic				0.981	Shapiro Wilk Lognormal GOF Test					
1759	5% Shapiro Wilk Critical Value				0.944	Data appear Lognormal at 5% Significance Level					
1760	Lilliefors Test Statistic				0.116	Lilliefors Lognormal GOF Test					
1761	5% Lilliefors Critical Value				0.132	Data appear Lognormal at 5% Significance Level					
1762	Data appear Lognormal at 5% Significance Level										
1763											
1764	Background Statistics assuming Lognormal Distribution										
1765	95% UTL with 95% Coverage		3.068		90% Percentile (z)				2.773		
1766	95% UPL (t)		2.922		95% Percentile (z)				2.902		
1767	95% USL		3.396		99% Percentile (z)				3.159		
1768											

A	B	C	D	E	F	G	H	I	J	K	L	
1769	Nonparametric Distribution Free Background Statistics											
1770	Data appear Normal at 5% Significance Level											
1771												
1772	Nonparametric Upper Limits for Background Threshold Values											
1773	Order of Statistic, r	44	95% UTL with 95% Coverage						3.1			
1774	Approx, f used to compute achieved CC	2.316	Approximate Actual Confidence Coefficient achieved by UTL						0.895			
1775							Approximate Sample Size needed to achieve specified CC			59		
1776	95% Percentile Bootstrap UTL with 95% Coverage	3.07	95% BCA Bootstrap UTL with 95% Coverage						2.9			
1777	95% UPL	2.875	90% Percentile						2.721			
1778	90% Chebyshev UPL	3.27	95% Percentile						2.8			
1779	95% Chebyshev UPL	3.673	99% Percentile						3.014			
1780	95% USL	3.1										
1781												
1782	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1783	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1784	and consists of observations collected from clean unimpacted locations.											
1785	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1786	represents a background data set and when many onsite observations need to be compared with the BTV.											
1787												
1788	POTASSIUM, DISSOLVED											
1789												
1790	General Statistics											
1791	Total Number of Observations	72	Number of Distinct Observations						35			
1792							Number of Missing Observations			59		
1793	Minimum	1.7	First Quartile						2.238			
1794	Second Largest	3.1	Median						2.3			
1795	Maximum	3.14	Third Quartile						2.5			
1796	Mean	2.381	SD						0.274			
1797	Coefficient of Variation	0.115	Skewness						0.673			
1798	Mean of logged Data	0.861	SD of logged Data						0.113			
1799												
1800	Critical Values for Background Threshold Values (BTVs)											
1801	Tolerance Factor K (For UTL)	1.98	d2max (for USL)						3.094			
1802												
1803	Normal GOF Test											
1804	Shapiro Wilk Test Statistic	0.932	Normal GOF Test									
1805	5% Shapiro Wilk P Value	7.7522E-4	Data Not Normal at 5% Significance Level									
1806	Lilliefors Test Statistic	0.18	Lilliefors GOF Test									
1807	5% Lilliefors Critical Value	0.104	Data Not Normal at 5% Significance Level									
1808	Data Not Normal at 5% Significance Level											
1809												
1810	Background Statistics Assuming Normal Distribution											
1811	95% UTL with 95% Coverage	2.923	90% Percentile (z)						2.732			
1812	95% UPL (t)	2.84	95% Percentile (z)						2.831			
1813	95% USL	3.228	99% Percentile (z)						3.018			
1814												
1815	Gamma GOF Test											
1816	A-D Test Statistic	1.663	Anderson-Darling Gamma GOF Test									
1817	5% A-D Critical Value	0.749	Data Not Gamma Distributed at 5% Significance Level									
1818	K-S Test Statistic	0.165	Kolmogorov-Smirnov Gamma GOF Test									
1819	5% K-S Critical Value	0.105	Data Not Gamma Distributed at 5% Significance Level									
1820	Data Not Gamma Distributed at 5% Significance Level											

A	B	C	D	E	F	G	H	I	J	K	L
1821											
1822	Gamma Statistics										
1823	k hat (MLE)			78.73		k star (bias corrected MLE)			75.45		
1824	Theta hat (MLE)			0.0302		Theta star (bias corrected MLE)			0.0315		
1825	nu hat (MLE)			11336		nu star (bias corrected)			10865		
1826	MLE Mean (bias corrected)			2.381		MLE Sd (bias corrected)			0.274		
1827											
1828	Background Statistics Assuming Gamma Distribution										
1829	95% Wilson Hilferty (WH) Approx. Gamma UPL			2.852		90% Percentile			2.738		
1830	95% Hawkins Wixley (HW) Approx. Gamma UPL			2.854		95% Percentile			2.849		
1831	95% WH Approx. Gamma UTL with 95% Coverage			2.945		99% Percentile			3.064		
1832	95% HW Approx. Gamma UTL with 95% Coverage			2.948							
1833	95% WH USL			3.305		95% HW USL			3.318		
1834											
1835	Lognormal GOF Test										
1836	Shapiro Wilk Test Statistic			0.949		Shapiro Wilk Lognormal GOF Test					
1837	5% Shapiro Wilk P Value			0.0131		Data Not Lognormal at 5% Significance Level					
1838	Lilliefors Test Statistic			0.157		Lilliefors Lognormal GOF Test					
1839	5% Lilliefors Critical Value			0.104		Data Not Lognormal at 5% Significance Level					
1840	Data Not Lognormal at 5% Significance Level										
1841											
1842	Background Statistics assuming Lognormal Distribution										
1843	95% UTL with 95% Coverage			2.96		90% Percentile (z)			2.735		
1844	95% UPL (t)			2.86		95% Percentile (z)			2.85		
1845	95% USL			3.358		99% Percentile (z)			3.078		
1846											
1847	Nonparametric Distribution Free Background Statistics										
1848	Data do not follow a Discernible Distribution (0.05)										
1849											
1850	Nonparametric Upper Limits for Background Threshold Values										
1851	Order of Statistic, r			71		95% UTL with 95% Coverage			3.1		
1852	Approx, f used to compute achieved CC			1.868		Approximate Actual Confidence Coefficient achieved by UTL			0.881		
1853						Approximate Sample Size needed to achieve specified CC			93		
1854	95% Percentile Bootstrap UTL with 95% Coverage			3.1		95% BCA Bootstrap UTL with 95% Coverage			3.084		
1855	95% UPL			3.064		90% Percentile			2.7		
1856	90% Chebyshev UPL			3.208		95% Percentile			2.972		
1857	95% Chebyshev UPL			3.582		99% Percentile			3.112		
1858	95% USL			3.14							
1859											
1860	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
1861	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
1862	and consists of observations collected from clean unimpacted locations.										
1863	The use of USL tends to provide a balance between false positives and false negatives provided the data										
1864	represents a background data set and when many onsite observations need to be compared with the BTV.										
1865											
1866	SODIUM, TOTAL										
1867											
1868	General Statistics										
1869	Total Number of Observations			73		Number of Missing Observations			58		
1870	Number of Distinct Observations			30							
1871	Number of Detects			70		Number of Non-Detects			3		
1872	Number of Distinct Detects			30		Number of Distinct Non-Detects			1		

	A	B	C	D	E	F	G	H	I	J	K	L
1873				Minimum Detect	7.6					Minimum Non-Detect	11	
1874				Maximum Detect	16.4					Maximum Non-Detect	11	
1875				Variance Detected	2.798					Percent Non-Detects	4.11%	
1876				Mean Detected	12.75					SD Detected	1.673	
1877				Mean of Detected Logged Data	2.537					SD of Detected Logged Data	0.137	
1878												
1879	Critical Values for Background Threshold Values (BTVs)											
1880				Tolerance Factor K (For UTL)	1.977					d2max (for USL)	3.099	
1881												
1882	Normal GOF Test on Detects Only											
1883				Shapiro Wilk Test Statistic	0.966					Normal GOF Test on Detected Observations Only		
1884				5% Shapiro Wilk P Value	0.161					Detected Data appear Normal at 5% Significance Level		
1885				Lilliefors Test Statistic	0.14					Lilliefors GOF Test		
1886				5% Lilliefors Critical Value	0.106					Data Not Normal at 5% Significance Level		
1887	Detected Data appear Approximate Normal at 5% Significance Level											
1888												
1889	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
1890				KM Mean	12.6					KM SD	1.794	
1891				95% UTL95% Coverage	16.15					95% KM UPL (t)	15.61	
1892				90% KM Percentile (z)	14.9					95% KM Percentile (z)	15.55	
1893				99% KM Percentile (z)	16.78					95% KM USL	18.16	
1894												
1895	DL/2 Substitution Background Statistics Assuming Normal Distribution											
1896				Mean	12.46					SD	2.187	
1897				95% UTL95% Coverage	16.78					95% UPL (t)	16.13	
1898				90% Percentile (z)	15.26					95% Percentile (z)	16.05	
1899				99% Percentile (z)	17.55					95% USL	19.24	
1900	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
1901												
1902	Gamma GOF Tests on Detected Observations Only											
1903				A-D Test Statistic	0.903					Anderson-Darling GOF Test		
1904				5% A-D Critical Value	0.749					Data Not Gamma Distributed at 5% Significance Level		
1905				K-S Test Statistic	0.156					Kolmogorov-Smirnov GOF		
1906				5% K-S Critical Value	0.106					Data Not Gamma Distributed at 5% Significance Level		
1907	Data Not Gamma Distributed at 5% Significance Level											
1908												
1909	Gamma Statistics on Detected Data Only											
1910				k hat (MLE)	56.29					k star (bias corrected MLE)	53.88	
1911				Theta hat (MLE)	0.227					Theta star (bias corrected MLE)	0.237	
1912				nu hat (MLE)	7880					nu star (bias corrected)	7544	
1913				MLE Mean (bias corrected)	12.75							
1914				MLE Sd (bias corrected)	1.738					95% Percentile of Chisquare (2kstar)	133	
1915												
1916	Gamma ROS Statistics using Imputed Non-Detects											
1917	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1918	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)											
1919	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1920	This is especially true when the sample size is small.											
1921	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1922				Minimum	7.6					Mean	12.63	
1923				Maximum	16.4					Median	12.5	
1924				SD	1.745					CV	0.138	

A	B	C	D	E	F	G	H	I	J	K	L	
1925	k hat (MLE)				50.82	k star (bias corrected MLE)				48.74		
1926	Theta hat (MLE)				0.249	Theta star (bias corrected MLE)				0.259		
1927	nu hat (MLE)				7420	nu star (bias corrected)				7117		
1928	MLE Mean (bias corrected)				12.63	MLE Sd (bias corrected)				1.809		
1929	95% Percentile of Chisquare (2kstar)				121.5	90% Percentile				15		
1930	95% Percentile				15.75	99% Percentile				17.22		
1931	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
1932	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
1933					WH	HW					WH	HW
1934	95% Approx. Gamma UTL with 95% Coverage				16.4	16.45	95% Approx. Gamma UPL				15.77	15.8
1935	95% Gamma USL				18.9	19.04						
1936												
1937	Estimates of Gamma Parameters using KM Estimates											
1938	Mean (KM)				12.6	SD (KM)				1.794		
1939	Variance (KM)				3.217	SE of Mean (KM)				0.214		
1940	k hat (KM)				49.37	k star (KM)				47.35		
1941	nu hat (KM)				7209	nu star (KM)				6914		
1942	theta hat (KM)				0.255	theta star (KM)				0.266		
1943	80% gamma percentile (KM)				14.11	90% gamma percentile (KM)				15		
1944	95% gamma percentile (KM)				15.76	99% gamma percentile (KM)				17.25		
1945												
1946	The following statistics are computed using gamma distribution and KM estimates											
1947	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
1948					WH	HW					WH	HW
1949	95% Approx. Gamma UTL with 95% Coverage				16.53	16.59	95% Approx. Gamma UPL				15.87	15.91
1950	95% KM Gamma Percentile				15.8	15.84	95% Gamma USL				19.14	19.31
1951												
1952	Lognormal GOF Test on Detected Observations Only											
1953	Shapiro Wilk Approximate Test Statistic				0.945	Shapiro Wilk GOF Test						
1954	5% Shapiro Wilk P Value				0.00773	Data Not Lognormal at 5% Significance Level						
1955	Lilliefors Test Statistic				0.166	Lilliefors GOF Test						
1956	5% Lilliefors Critical Value				0.106	Data Not Lognormal at 5% Significance Level						
1957	Data Not Lognormal at 5% Significance Level											
1958												
1959	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
1960	Mean in Original Scale				12.63	Mean in Log Scale				2.526		
1961	SD in Original Scale				1.743	SD in Log Scale				0.143		
1962	95% UTL95% Coverage				16.61	95% BCA UTL95% Coverage				15.9		
1963	95% Bootstrap (%) UTL95% Coverage				15.9	95% UPL (t)				15.91		
1964	90% Percentile (z)				15.03	95% Percentile (z)				15.84		
1965	99% Percentile (z)				17.46	95% USL				19.51		
1966												
1967	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
1968	KM Mean of Logged Data				2.523	95% KM UTL (Lognormal)95% Coverage				16.79		
1969	KM SD of Logged Data				0.151	95% KM UPL (Lognormal)				16.05		
1970	95% KM Percentile Lognormal (z)				15.97	95% KM USL (Lognormal)				19.88		
1971												
1972	Background DL/2 Statistics Assuming Lognormal Distribution											
1973	Mean in Original Scale				12.46	Mean in Log Scale				2.503		
1974	SD in Original Scale				2.187	SD in Log Scale				0.213		
1975	95% UTL95% Coverage				18.63	95% UPL (t)				17.48		
1976	90% Percentile (z)				16.06	95% Percentile (z)				17.36		

A	B	C	D	E	F	G	H	I	J	K	L
1977	99% Percentile (z)			20.07	95% USL					23.67	
1978	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
1979											
1980	Nonparametric Distribution Free Background Statistics										
1981	Data appear to follow a Discernible Distribution at 5% Significance Level										
1982											
1983	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
1984	Order of Statistic, r			72	95% UTL with 95% Coverage					15.9	
1985	Approx. f used to compute achieved CC			1.895	Approximate Actual Confidence Coefficient achieved by UTL					0.885	
1986	Approximate Sample Size needed to achieve specified CC			93	95% UPL					15.8	
1987	95% USL			16.4	95% KM Chebyshev UPL					20.48	
1988											
1989	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
1990	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
1991	and consists of observations DL collected from clean unimpacted locations.										
1992	The use of USL tends to provide a balance between false positives and false negatives provided the data										
1993	represents a background data set and when many onsite observations need to be compared with the BTV.										
1994											
1995	SODIUM, DISSOLVED										
1996											
1997	General Statistics										
1998	Total Number of Observations			98	Number of Distinct Observations					36	
1999					Number of Missing Observations					33	
2000	Minimum			10.7	First Quartile					12.33	
2001	Second Largest			16	Median					13.05	
2002	Maximum			16.4	Third Quartile					13.95	
2003	Mean			13.11	SD					1.203	
2004	Coefficient of Variation			0.0918	Skewness					0.118	
2005	Mean of logged Data			2.569	SD of logged Data					0.0922	
2006											
2007	Critical Values for Background Threshold Values (BTVs)										
2008	Tolerance Factor K (For UTL)			1.927	d2max (for USL)					3.203	
2009											
2010	Normal GOF Test										
2011	Shapiro Wilk Test Statistic			0.967	Normal GOF Test						
2012	5% Shapiro Wilk P Value			0.0924	Data appear Normal at 5% Significance Level						
2013	Lilliefors Test Statistic			0.0866	Lilliefors GOF Test						
2014	5% Lilliefors Critical Value			0.0897	Data appear Normal at 5% Significance Level						
2015	Data appear Normal at 5% Significance Level										
2016											
2017	Background Statistics Assuming Normal Distribution										
2018	95% UTL with 95% Coverage			15.43	90% Percentile (z)					14.65	
2019	95% UPL (t)			15.12	95% Percentile (z)					15.09	
2020	95% USL			16.96	99% Percentile (z)					15.91	
2021											
2022	Gamma GOF Test										
2023	A-D Test Statistic			0.726	Anderson-Darling Gamma GOF Test						
2024	5% A-D Critical Value			0.75	Detected data appear Gamma Distributed at 5% Significance Level						
2025	K-S Test Statistic			0.0986	Kolmogorov-Smirnov Gamma GOF Test						
2026	5% K-S Critical Value			0.0901	Data Not Gamma Distributed at 5% Significance Level						
2027	Detected data follow Appr. Gamma Distribution at 5% Significance Level										
2028											

	A	B	C	D	E	F	G	H	I	J	K	L	
2029	Gamma Statistics												
2030					k hat (MLE)	119.5					k star (bias corrected MLE)	115.8	
2031					Theta hat (MLE)	0.11					Theta star (bias corrected MLE)	0.113	
2032					nu hat (MLE)	23415					nu star (bias corrected)	22699	
2033					MLE Mean (bias corrected)	13.11					MLE Sd (bias corrected)	1.218	
2034													
2035	Background Statistics Assuming Gamma Distribution												
2036	95% Wilson Hilferty (WH) Approx. Gamma UPL					15.18					90% Percentile	14.69	
2037	95% Hawkins Wixley (HW) Approx. Gamma UPL					15.19					95% Percentile	15.17	
2038	95% WH Approx. Gamma UTL with 95% Coverage					15.53					99% Percentile	16.11	
2039	95% HW Approx. Gamma UTL with 95% Coverage					15.54							
2040	95% WH USL					17.32					95% HW USL	17.37	
2041													
2042	Lognormal GOF Test												
2043	Shapiro Wilk Test Statistic					0.964					Shapiro Wilk Lognormal GOF Test		
2044	5% Shapiro Wilk P Value					0.0485					Data Not Lognormal at 5% Significance Level		
2045	Lilliefors Test Statistic					0.105					Lilliefors Lognormal GOF Test		
2046	5% Lilliefors Critical Value					0.0897					Data Not Lognormal at 5% Significance Level		
2047	Data Not Lognormal at 5% Significance Level												
2048													
2049	Background Statistics assuming Lognormal Distribution												
2050	95% UTL with 95% Coverage					15.59					90% Percentile (z)	14.69	
2051	95% UPL (t)					15.23					95% Percentile (z)	15.19	
2052	95% USL					17.54					99% Percentile (z)	16.18	
2053													
2054	Nonparametric Distribution Free Background Statistics												
2055	Data appear Normal at 5% Significance Level												
2056													
2057	Nonparametric Upper Limits for Background Threshold Values												
2058	Order of Statistic, r					96					95% UTL with 95% Coverage	15.8	
2059	Approx, f used to compute achieved CC					1.684	Approximate Actual Confidence Coefficient achieved by UTL				0.873		
2060							Approximate Sample Size needed to achieve specified CC				124		
2061	95% Percentile Bootstrap UTL with 95% Coverage					15.8	95% BCA Bootstrap UTL with 95% Coverage				15.8		
2062	95% UPL					15.21	90% Percentile				14.53		
2063	90% Chebyshev UPL					16.74	95% Percentile				15.03		
2064	95% Chebyshev UPL					18.38	99% Percentile				16.01		
2065	95% USL					16.4							
2066													
2067	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.												
2068	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers												
2069	and consists of observations collected from clean unimpacted locations.												
2070	The use of USL tends to provide a balance between false positives and false negatives provided the data												
2071	represents a background data set and when many onsite observations need to be compared with the BTV.												
2072													
2073	SPEC. COND., FIELD												
2074													
2075	General Statistics												
2076	Total Number of Observations					117	Number of Missing Observations				14		
2077	Number of Distinct Observations					70							
2078	Number of Detects					113	Number of Non-Detects				4		
2079	Number of Distinct Detects					70	Number of Distinct Non-Detects				4		
2080	Minimum Detect					173	Minimum Non-Detect				254		

A	B	C	D	E	F	G	H	I	J	K	L
2081				Maximum Detect	358				Maximum Non-Detect		266
2082				Variance Detected	1021				Percent Non-Detects		3.419%
2083				Mean Detected	275.5				SD Detected		31.96
2084				Mean of Detected Logged Data	5.612				SD of Detected Logged Data		0.123
2085											
2086	Critical Values for Background Threshold Values (BTVs)										
2087				Tolerance Factor K (For UTL)	1.9				d2max (for USL)		3.262
2088											
2089	Normal GOF Test on Detects Only										
2090				Shapiro Wilk Test Statistic	0.971				Normal GOF Test on Detected Observations Only		
2091				5% Shapiro Wilk P Value	0.135				Detected Data appear Normal at 5% Significance Level		
2092				Lilliefors Test Statistic	0.0618				Lilliefors GOF Test		
2093				5% Lilliefors Critical Value	0.0837				Detected Data appear Normal at 5% Significance Level		
2094	Detected Data appear Normal at 5% Significance Level										
2095											
2096	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
2097				KM Mean	274.3				KM SD		32.29
2098				95% UTL95% Coverage	335.6				95% KM UPL (t)		328
2099				90% KM Percentile (z)	315.6				95% KM Percentile (z)		327.4
2100				99% KM Percentile (z)	349.4				95% KM USL		379.6
2101											
2102	DL/2 Substitution Background Statistics Assuming Normal Distribution										
2103				Mean	270.6				SD		41.09
2104				95% UTL95% Coverage	348.6				95% UPL (t)		339
2105				90% Percentile (z)	323.2				95% Percentile (z)		338.1
2106				99% Percentile (z)	366.1				95% USL		404.6
2107	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons										
2108											
2109	Gamma GOF Tests on Detected Observations Only										
2110				A-D Test Statistic	1.146				Anderson-Darling GOF Test		
2111				5% A-D Critical Value	0.75				Data Not Gamma Distributed at 5% Significance Level		
2112				K-S Test Statistic	0.0731				Kolmogorov-Smirnov GOF		
2113				5% K-S Critical Value	0.0859				Detected data appear Gamma Distributed at 5% Significance Level		
2114	Detected data follow Appr. Gamma Distribution at 5% Significance Level										
2115											
2116	Gamma Statistics on Detected Data Only										
2117				k hat (MLE)	70.03				k star (bias corrected MLE)		68.18
2118				Theta hat (MLE)	3.934				Theta star (bias corrected MLE)		4.041
2119				nu hat (MLE)	15827				nu star (bias corrected)		15408
2120				MLE Mean (bias corrected)	275.5						
2121				MLE Sd (bias corrected)	33.37				95% Percentile of Chisquare (2kstar)		164.6
2122											
2123	Gamma ROS Statistics using Imputed Non-Detects										
2124	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
2125	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)										
2126	For such situations, GROS method may yield incorrect values of UCLs and BTVs										
2127	This is especially true when the sample size is small.										
2128	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
2129				Minimum	173				Mean		274.4
2130				Maximum	358				Median		276
2131				SD	32.01				CV		0.117
2132				k hat (MLE)	69.75				k star (bias corrected MLE)		67.97

A	B	C	D	E	F	G	H	I	J	K	L	
2133	Theta hat (MLE)			3.934	Theta star (bias corrected MLE)			4.037				
2134	nu hat (MLE)			16322	nu star (bias corrected)			15905				
2135	MLE Mean (bias corrected)			274.4	MLE Sd (bias corrected)			33.28				
2136	95% Percentile of Chisquare (2kstar)			164.1	90% Percentile			317.8				
2137	95% Percentile			331.3	99% Percentile			357.7				
2138	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
2139	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
2140				WH	HW				WH	HW		
2141	95% Approx. Gamma UTL with 95% Coverage			340.5	341.3	95% Approx. Gamma UPL			331.6	332.2		
2142	95% Gamma USL			395	397.6							
2143												
2144	Estimates of Gamma Parameters using KM Estimates											
2145	Mean (KM)			274.3	SD (KM)			32.29				
2146	Variance (KM)			1042	SE of Mean (KM)			3.027				
2147	k hat (KM)			72.16	k star (KM)			70.31				
2148	nu hat (KM)			16885	nu star (KM)			16453				
2149	theta hat (KM)			3.801	theta star (KM)			3.9				
2150	80% gamma percentile (KM)			301.3	90% gamma percentile (KM)			316.9				
2151	95% gamma percentile (KM)			330.2	99% gamma percentile (KM)			356				
2152												
2153	The following statistics are computed using gamma distribution and KM estimates											
2154	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
2155				WH	HW				WH	HW		
2156	95% Approx. Gamma UTL with 95% Coverage			341.2	342	95% Approx. Gamma UPL			332.2	332.8		
2157	95% KM Gamma Percentile			331.4	332	95% Gamma USL			396.5	399.2		
2158												
2159	Lognormal GOF Test on Detected Observations Only											
2160	Shapiro Wilk Approximate Test Statistic			0.936	Shapiro Wilk GOF Test							
2161	5% Shapiro Wilk P Value			2.0380E-5	Data Not Lognormal at 5% Significance Level							
2162	Lilliefors Test Statistic			0.0811	Lilliefors GOF Test							
2163	5% Lilliefors Critical Value			0.0837	Detected Data appear Lognormal at 5% Significance Level							
2164	Detected Data appear Approximate Lognormal at 5% Significance Level											
2165												
2166	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
2167	Mean in Original Scale			274.3	Mean in Log Scale			5.607				
2168	SD in Original Scale			32.05	SD in Log Scale			0.123				
2169	95% UTL95% Coverage			344	95% BCA UTL95% Coverage			326.4				
2170	95% Bootstrap (%) UTL95% Coverage			329.8	95% UPL (t)			334.2				
2171	90% Percentile (z)			318.8	95% Percentile (z)			333.4				
2172	99% Percentile (z)			362.5	95% USL			406.6				
2173												
2174	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
2175	KM Mean of Logged Data			5.607	95% KM UTL (Lognormal)95% Coverage			344.9				
2176	KM SD of Logged Data			0.124	95% KM UPL (Lognormal)			334.9				
2177	95% KM Percentile Lognormal (z)			334.1	95% KM USL (Lognormal)			408.6				
2178												
2179	Background DL/2 Statistics Assuming Lognormal Distribution											
2180	Mean in Original Scale			270.6	Mean in Log Scale			5.586				
2181	SD in Original Scale			41.09	SD in Log Scale			0.181				
2182	95% UTL95% Coverage			376.4	95% UPL (t)			360.7				
2183	90% Percentile (z)			336.4	95% Percentile (z)			359.3				
2184	99% Percentile (z)			406.6	95% USL			481.7				

A	B	C	D	E	F	G	H	I	J	K	L	
2185	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
2186												
2187	Nonparametric Distribution Free Background Statistics											
2188	Data appear to follow a Discernible Distribution at 5% Significance Level											
2189												
2190	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
2191	Order of Statistic, r	114	95% UTL with 95% Coverage							329		
2192	Approx, f used to compute achieved CC	1.5	Approximate Actual Confidence Coefficient achieved by UTL							0.842		
2193	Approximate Sample Size needed to achieve specified CC	153	95% UPL							326.2		
2194	95% USL	358	95% KM Chebyshev UPL							415.6		
2195												
2196	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
2197	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
2198	and consists of observations collected from clean unimpacted locations.											
2199	The use of USL tends to provide a balance between false positives and false negatives provided the data											
2200	represents a background data set and when many onsite observations need to be compared with the BTV.											
2201												
2202	SPEC. COND., LAB											
2203												
2204	General Statistics											
2205	Total Number of Observations	125	Number of Missing Observations							6		
2206	Number of Distinct Observations	47										
2207	Number of Detects	122	Number of Non-Detects							3		
2208	Number of Distinct Detects	47	Number of Distinct Non-Detects							2		
2209	Minimum Detect	218	Minimum Non-Detect							260		
2210	Maximum Detect	310	Maximum Non-Detect							270		
2211	Variance Detected	300.5	Percent Non-Detects							2.4%		
2212	Mean Detected	271.9	SD Detected							17.34		
2213	Mean of Detected Logged Data	5.603	SD of Detected Logged Data							0.0651		
2214												
2215	Critical Values for Background Threshold Values (BTVs)											
2216	Tolerance Factor K (For UTL)	1.891	d2max (for USL)							3.284		
2217												
2218	Normal GOF Test on Detects Only											
2219	Shapiro Wilk Test Statistic	0.966	Normal GOF Test on Detected Observations Only									
2220	5% Shapiro Wilk P Value	0.0355	Data Not Normal at 5% Significance Level									
2221	Lilliefors Test Statistic	0.0941	Lilliefors GOF Test									
2222	5% Lilliefors Critical Value	0.0806	Data Not Normal at 5% Significance Level									
2223	Data Not Normal at 5% Significance Level											
2224												
2225	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
2226	KM Mean	271.4	KM SD							17.46		
2227	95% UTL 95% Coverage	304.4	95% KM UPL (t)							300.4		
2228	90% KM Percentile (z)	293.8	95% KM Percentile (z)							300.1		
2229	99% KM Percentile (z)	312	95% KM USL							328.7		
2230												
2231	DL/2 Substitution Background Statistics Assuming Normal Distribution											
2232	Mean	268.6	SD							27.32		
2233	95% UTL 95% Coverage	320.2	95% UPL (t)							314		
2234	90% Percentile (z)	303.6	95% Percentile (z)							313.5		
2235	99% Percentile (z)	332.1	95% USL							358.3		
2236	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											

A	B	C	D	E	F	G	H	I	J	K	L
2237											
2238	Gamma GOF Tests on Detected Observations Only										
2239	A-D Test Statistic			1.246	Anderson-Darling GOF Test						
2240	5% A-D Critical Value			0.75	Data Not Gamma Distributed at 5% Significance Level						
2241	K-S Test Statistic			0.103	Kolmogorov-Smirnov GOF						
2242	5% K-S Critical Value			0.0835	Data Not Gamma Distributed at 5% Significance Level						
2243	Data Not Gamma Distributed at 5% Significance Level										
2244											
2245	Gamma Statistics on Detected Data Only										
2246	k hat (MLE)			241.5	k star (bias corrected MLE)					235.5	
2247	Theta hat (MLE)			1.126	Theta star (bias corrected MLE)					1.154	
2248	nu hat (MLE)			58920	nu star (bias corrected)					57472	
2249	MLE Mean (bias corrected)			271.9							
2250	MLE Sd (bias corrected)			17.71	95% Percentile of Chisquare (2kstar)					522.7	
2251											
2252	Gamma ROS Statistics using Imputed Non-Detects										
2253	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
2254	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)										
2255	For such situations, GROS method may yield incorrect values of UCLs and BTVs										
2256	This is especially true when the sample size is small.										
2257	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
2258	Minimum			218	Mean					271.4	
2259	Maximum			310	Median					270	
2260	SD			17.38	CV					0.064	
2261	k hat (MLE)			240.1	k star (bias corrected MLE)					234.3	
2262	Theta hat (MLE)			1.131	Theta star (bias corrected MLE)					1.158	
2263	nu hat (MLE)			60024	nu star (bias corrected)					58585	
2264	MLE Mean (bias corrected)			271.4	MLE Sd (bias corrected)					17.73	
2265	95% Percentile of Chisquare (2kstar)			520.1	90% Percentile					294.4	
2266	95% Percentile			301.2	99% Percentile					314.4	
2267	The following statistics are computed using Gamma ROS Statistics on Imputed Data										
2268	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
2269		WH	HW			WH	HW				
2270	95% Approx. Gamma UTL with 95% Coverage	305.7	305.9		95% Approx. Gamma UPL	301.4	301.5				
2271	95% Gamma USL	333	333.6								
2272											
2273	Estimates of Gamma Parameters using KM Estimates										
2274	Mean (KM)			271.4	SD (KM)					17.46	
2275	Variance (KM)			304.9	SE of Mean (KM)					1.579	
2276	k hat (KM)			241.5	k star (KM)					235.7	
2277	nu hat (KM)			60384	nu star (KM)					58936	
2278	theta hat (KM)			1.124	theta star (KM)					1.151	
2279	80% gamma percentile (KM)			286.1	90% gamma percentile (KM)					294.3	
2280	95% gamma percentile (KM)			301.1	99% gamma percentile (KM)					314.2	
2281											
2282	The following statistics are computed using gamma distribution and KM estimates										
2283	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
2284		WH	HW			WH	HW				
2285	95% Approx. Gamma UTL with 95% Coverage	305.8	306		95% Approx. Gamma UPL	301.5	301.6				
2286	95% KM Gamma Percentile	301.1	301.3		95% Gamma USL	333.3	334				
2287											
2288	Lognormal GOF Test on Detected Observations Only										

A	B	C	D	E	F	G	H	I	J	K	L	
2289	Shapiro Wilk Approximate Test Statistic				0.953	Shapiro Wilk GOF Test						
2290	5% Shapiro Wilk P Value				0.00142	Data Not Lognormal at 5% Significance Level						
2291	Lilliefors Test Statistic				0.108	Lilliefors GOF Test						
2292	5% Lilliefors Critical Value				0.0806	Data Not Lognormal at 5% Significance Level						
2293	Data Not Lognormal at 5% Significance Level											
2294												
2295	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
2296	Mean in Original Scale				271.4	Mean in Log Scale				5.602		
2297	SD in Original Scale				17.38	SD in Log Scale				0.0653		
2298	95% UTL95% Coverage				306.5	95% BCA UTL95% Coverage				303		
2299	95% Bootstrap (%) UTL95% Coverage				307	95% UPL (t)				301.9		
2300	90% Percentile (z)				294.5	95% Percentile (z)				301.6		
2301	99% Percentile (z)				315.3	95% USL				335.6		
2302												
2303	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
2304	KM Mean of Logged Data				5.601	95% KM UTL (Lognormal)95% Coverage				306.7		
2305	KM SD of Logged Data				0.0657	95% KM UPL (Lognormal)				302.1		
2306	95% KM Percentile Lognormal (z)				301.7	95% KM USL (Lognormal)				336		
2307												
2308	Background DL/2 Statistics Assuming Lognormal Distribution											
2309	Mean in Original Scale				268.6	Mean in Log Scale				5.586		
2310	SD in Original Scale				27.32	SD in Log Scale				0.127		
2311	95% UTL95% Coverage				339	95% UPL (t)				329.4		
2312	90% Percentile (z)				313.8	95% Percentile (z)				328.6		
2313	99% Percentile (z)				358.2	95% USL				404.5		
2314	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
2315												
2316	Nonparametric Distribution Free Background Statistics											
2317	Data do not follow a Discernible Distribution (0.05)											
2318												
2319	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
2320	Order of Statistic, r				122	95% UTL with95% Coverage				307		
2321	Approx, f used to compute achieved CC				1.605	Approximate Actual Confidence Coefficient achieved by UTL				0.876		
2322	Approximate Sample Size needed to achieve specified CC				153	95% UPL				299.1		
2323	95% USL				310	95% KM Chebyshev UPL				347.8		
2324												
2325	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
2326	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
2327	and consists of observations collected from clean unimpacted locations.											
2328	The use of USL tends to provide a balance between false positives and false negatives provided the data											
2329	represents a background data set and when many onsite observations need to be compared with the BTV.											
2330												
2331	SULFATE											
2332												
2333	General Statistics											
2334	Total Number of Observations				90	Number of Missing Observations				41		
2335	Number of Distinct Observations				17							
2336	Number of Detects				31	Number of Non-Detects				59		
2337	Number of Distinct Detects				17	Number of Distinct Non-Detects				2		
2338	Minimum Detect				1.1	Minimum Non-Detect				2		
2339	Maximum Detect				5	Maximum Non-Detect				5		
2340	Variance Detected				0.722	Percent Non-Detects				65.56%		

A	B	C	D	E	F	G	H	I	J	K	L
2341	Mean Detected				1.981	SD Detected				0.85	
2342	Mean of Detected Logged Data				0.617	SD of Detected Logged Data				0.349	
2343											
2344	Critical Values for Background Threshold Values (BTVs)										
2345	Tolerance Factor K (For UTL)				1.94	d2max (for USL)				3.173	
2346											
2347	Normal GOF Test on Detects Only										
2348	Shapiro Wilk Test Statistic				0.754	Shapiro Wilk GOF Test					
2349	5% Shapiro Wilk Critical Value				0.929	Data Not Normal at 5% Significance Level					
2350	Lilliefors Test Statistic				0.192	Lilliefors GOF Test					
2351	5% Lilliefors Critical Value				0.156	Data Not Normal at 5% Significance Level					
2352	Data Not Normal at 5% Significance Level										
2353											
2354	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
2355	KM Mean				1.814	KM SD				0.684	
2356	95% UTL95% Coverage				3.141	95% KM UPL (t)				2.957	
2357	90% KM Percentile (z)				2.69	95% KM Percentile (z)				2.939	
2358	99% KM Percentile (z)				3.405	95% KM USL				3.985	
2359											
2360	DL/2 Substitution Background Statistics Assuming Normal Distribution										
2361	Mean				2.171	SD				0.675	
2362	95% UTL95% Coverage				3.481	95% UPL (t)				3.299	
2363	90% Percentile (z)				3.036	95% Percentile (z)				3.281	
2364	99% Percentile (z)				3.741	95% USL				4.313	
2365	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons										
2366											
2367	Gamma GOF Tests on Detected Observations Only										
2368	A-D Test Statistic				1.169	Anderson-Darling GOF Test					
2369	5% A-D Critical Value				0.747	Data Not Gamma Distributed at 5% Significance Level					
2370	K-S Test Statistic				0.139	Kolmogorov-Smirnov GOF					
2371	5% K-S Critical Value				0.158	Detected data appear Gamma Distributed at 5% Significance Level					
2372	Detected data follow Appr. Gamma Distribution at 5% Significance Level										
2373											
2374	Gamma Statistics on Detected Data Only										
2375	k hat (MLE)				7.699	k star (bias corrected MLE)				6.975	
2376	Theta hat (MLE)				0.257	Theta star (bias corrected MLE)				0.284	
2377	nu hat (MLE)				477.3	nu star (bias corrected)				432.5	
2378	MLE Mean (bias corrected)				1.981						
2379	MLE Sd (bias corrected)				0.75	95% Percentile of Chisquare (2kstar)				23.62	
2380											
2381	Gamma ROS Statistics using Imputed Non-Detects										
2382	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
2383	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)										
2384	For such situations, GROS method may yield incorrect values of UCLs and BTVs										
2385	This is especially true when the sample size is small.										
2386	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
2387	Minimum				0.594	Mean				1.811	
2388	Maximum				5	Median				1.683	
2389	SD				0.724	CV				0.4	
2390	k hat (MLE)				7.212	k star (bias corrected MLE)				6.979	
2391	Theta hat (MLE)				0.251	Theta star (bias corrected MLE)				0.259	
2392	nu hat (MLE)				1298	nu star (bias corrected)				1256	

A	B	C	D	E	F	G	H	I	J	K	L	
2393	MLE Mean (bias corrected)				1.811	MLE Sd (bias corrected)				0.685		
2394	95% Percentile of Chisquare (2kstar)				23.63	90% Percentile				2.725		
2395	95% Percentile				3.065	99% Percentile				3.772		
2396	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
2397	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
2398			WH	HW					WH	HW		
2399	95% Approx. Gamma UTL with 95% Coverage				3.338	3.371	95% Approx. Gamma UPL				3.072 3.09	
2400	95% Gamma USL				4.758	4.912						
2401												
2402	Estimates of Gamma Parameters using KM Estimates											
2403	Mean (KM)				1.814	SD (KM)				0.684		
2404	Variance (KM)				0.468	SE of Mean (KM)				0.105		
2405	k hat (KM)				7.027	k star (KM)				6.8		
2406	nu hat (KM)				1265	nu star (KM)				1224		
2407	theta hat (KM)				0.258	theta star (KM)				0.267		
2408	80% gamma percentile (KM)				2.358	90% gamma percentile (KM)				2.742		
2409	95% gamma percentile (KM)				3.088	99% gamma percentile (KM)				3.809		
2410												
2411	The following statistics are computed using gamma distribution and KM estimates											
2412	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
2413			WH	HW					WH	HW		
2414	95% Approx. Gamma UTL with 95% Coverage				3.098	3.099	95% Approx. Gamma UPL				2.88 2.875	
2415	95% KM Gamma Percentile				2.859	2.853	95% Gamma USL				4.24 4.299	
2416												
2417	Lognormal GOF Test on Detected Observations Only											
2418	Shapiro Wilk Test Statistic				0.904	Shapiro Wilk GOF Test						
2419	5% Shapiro Wilk Critical Value				0.929	Data Not Lognormal at 5% Significance Level						
2420	Lilliefors Test Statistic				0.144	Lilliefors GOF Test						
2421	5% Lilliefors Critical Value				0.156	Detected Data appear Lognormal at 5% Significance Level						
2422	Detected Data appear Approximate Lognormal at 5% Significance Level											
2423												
2424	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
2425	Mean in Original Scale				1.82	Mean in Log Scale				0.546		
2426	SD in Original Scale				0.66	SD in Log Scale				0.317		
2427	95% UTL95% Coverage				3.195	95% BCA UTL95% Coverage				3.204		
2428	95% Bootstrap (%) UTL95% Coverage				3.204	95% UPL (t)				2.933		
2429	90% Percentile (z)				2.592	95% Percentile (z)				2.909		
2430	99% Percentile (z)				3.611	95% USL				4.725		
2431												
2432	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
2433	KM Mean of Logged Data				0.543	95% KM UTL (Lognormal)95% Coverage				3.112		
2434	KM SD of Logged Data				0.305	95% KM UPL (Lognormal)				2.867		
2435	95% KM Percentile Lognormal (z)				2.844	95% KM USL (Lognormal)				4.535		
2436												
2437	Background DL/2 Statistics Assuming Lognormal Distribution											
2438	Mean in Original Scale				2.171	Mean in Log Scale				0.722		
2439	SD in Original Scale				0.675	SD in Log Scale				0.345		
2440	95% UTL95% Coverage				4.017	95% UPL (t)				3.662		
2441	90% Percentile (z)				3.201	95% Percentile (z)				3.628		
2442	99% Percentile (z)				4.589	95% USL				6.146		
2443	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
2444												

A	B	C	D	E	F	G	H	I	J	K	L
2445	Nonparametric Distribution Free Background Statistics										
2446	Data appear to follow a Discernible Distribution at 5% Significance Level										
2447											
2448	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
2449	Order of Statistic, r			88		95% UTL with 95% Coverage				5	
2450	Approx, f used to compute achieved CC			1.544		Approximate Actual Confidence Coefficient achieved by UTL				0.834	
2451	Approximate Sample Size needed to achieve specified CC			124		95% UPL				5	
2452	95% USL			5		95% KM Chebyshev UPL				4.812	
2453											
2454	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
2455	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
2456	and consists of observations collected from clean unimpacted locations.										
2457	The use of USL tends to provide a balance between false positives and false negatives provided the data										
2458	represents a background data set and when many onsite observations need to be compared with the BTV.										
2459											
2460	ALKALINITY										
2461											
2462	General Statistics										
2463	Total Number of Observations			70		Number of Missing Observations				61	
2464	Number of Distinct Observations			5							
2465	Number of Detects			46		Number of Non-Detects				24	
2466	Number of Distinct Detects			5		Number of Distinct Non-Detects				1	
2467	Minimum Detect			5		Minimum Non-Detect				5	
2468	Maximum Detect			8		Maximum Non-Detect				5	
2469	Variance Detected			0.622		Percent Non-Detects				34.29%	
2470	Mean Detected			5.876		SD Detected				0.789	
2471	Mean of Detected Logged Data			1.762		SD of Detected Logged Data				0.132	
2472											
2473	Critical Values for Background Threshold Values (BTVs)										
2474	Tolerance Factor K (For UTL)			1.985		d2max (for USL)				3.084	
2475											
2476	Normal GOF Test on Detects Only										
2477	Shapiro Wilk Test Statistic			0.826		Shapiro Wilk GOF Test					
2478	5% Shapiro Wilk Critical Value			0.945		Data Not Normal at 5% Significance Level					
2479	Lilliefors Test Statistic			0.242		Lilliefors GOF Test					
2480	5% Lilliefors Critical Value			0.129		Data Not Normal at 5% Significance Level					
2481	Data Not Normal at 5% Significance Level										
2482											
2483	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
2484	KM Mean			5.576		KM SD				0.757	
2485	95% UTL 95% Coverage			7.078		95% KM UPL (t)				6.846	
2486	90% KM Percentile (z)			6.546		95% KM Percentile (z)				6.82	
2487	99% KM Percentile (z)			7.336		95% KM USL				7.91	
2488											
2489	DL/2 Substitution Background Statistics Assuming Normal Distribution										
2490	Mean			4.719		SD				1.735	
2491	95% UTL 95% Coverage			8.163		95% UPL (t)				7.632	
2492	90% Percentile (z)			6.942		95% Percentile (z)				7.573	
2493	99% Percentile (z)			8.755		95% USL				10.07	
2494	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons										
2495											
2496	Gamma GOF Tests on Detected Observations Only										

A	B	C	D	E	F	G	H	I	J	K	L	
2497	A-D Test Statistic				3.439	Anderson-Darling GOF Test						
2498	5% A-D Critical Value				0.747	Data Not Gamma Distributed at 5% Significance Level						
2499	K-S Test Statistic				0.233	Kolmogorov-Smirnov GOF						
2500	5% K-S Critical Value				0.13	Data Not Gamma Distributed at 5% Significance Level						
2501	Data Not Gamma Distributed at 5% Significance Level											
2502												
2503	Gamma Statistics on Detected Data Only											
2504	k hat (MLE)				58.49	k star (bias corrected MLE)				54.69		
2505	Theta hat (MLE)				0.1	Theta star (bias corrected MLE)				0.107		
2506	nu hat (MLE)				5381	nu star (bias corrected)				5032		
2507	MLE Mean (bias corrected)				5.876							
2508	MLE Sd (bias corrected)				0.795	95% Percentile of Chisquare (2kstar)				134.8		
2509												
2510	Gamma ROS Statistics using Imputed Non-Detects											
2511	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
2512	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)											
2513	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
2514	This is especially true when the sample size is small.											
2515	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
2516	Minimum				3.1	Mean				5.296		
2517	Maximum				8	Median				5		
2518	SD				1.063	CV				0.201		
2519	k hat (MLE)				24.84	k star (bias corrected MLE)				23.79		
2520	Theta hat (MLE)				0.213	Theta star (bias corrected MLE)				0.223		
2521	nu hat (MLE)				3478	nu star (bias corrected)				3330		
2522	MLE Mean (bias corrected)				5.296	MLE Sd (bias corrected)				1.086		
2523	95% Percentile of Chisquare (2kstar)				64.67	90% Percentile				6.727		
2524	95% Percentile				7.2	99% Percentile				8.144		
2525	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
2526	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
2527					WH	HW					WH	HW
2528	95% Approx. Gamma UTL with 95% Coverage				7.627	7.664	95% Approx. Gamma UPL				7.217	7.239
2529	95% Gamma USL				9.227	9.341						
2530												
2531	Estimates of Gamma Parameters using KM Estimates											
2532	Mean (KM)				5.576	SD (KM)				0.757		
2533	Variance (KM)				0.573	SE of Mean (KM)				0.0915		
2534	k hat (KM)				54.28	k star (KM)				51.97		
2535	nu hat (KM)				7600	nu star (KM)				7275		
2536	theta hat (KM)				0.103	theta star (KM)				0.107		
2537	80% gamma percentile (KM)				6.214	90% gamma percentile (KM)				6.587		
2538	95% gamma percentile (KM)				6.906	99% gamma percentile (KM)				7.531		
2539												
2540	The following statistics are computed using gamma distribution and KM estimates											
2541	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
2542					WH	HW					WH	HW
2543	95% Approx. Gamma UTL with 95% Coverage				7.109	7.114	95% Approx. Gamma UPL				6.85	6.851
2544	95% KM Gamma Percentile				6.822	6.822	95% Gamma USL				8.09	8.117
2545												
2546	Lognormal GOF Test on Detected Observations Only											
2547	Shapiro Wilk Test Statistic				0.825	Shapiro Wilk GOF Test						
2548	5% Shapiro Wilk Critical Value				0.945	Data Not Lognormal at 5% Significance Level						

A	B	C	D	E	F	G	H	I	J	K	L	
2549	Lilliefors Test Statistic				0.241	Lilliefors GOF Test						
2550	5% Lilliefors Critical Value				0.129	Data Not Lognormal at 5% Significance Level						
2551	Data Not Lognormal at 5% Significance Level											
2552												
2553	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
2554	Mean in Original Scale				5.341	Mean in Log Scale				1.658		
2555	SD in Original Scale				1.006	SD in Log Scale				0.188		
2556	95% UTL95% Coverage				7.62	95% BCA UTL95% Coverage				6.55		
2557	95% Bootstrap (%) UTL95% Coverage				7.3	95% UPL (t)				7.194		
2558	90% Percentile (z)				6.677	95% Percentile (z)				7.148		
2559	99% Percentile (z)				8.124	95% USL				9.366		
2560												
2561	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
2562	KM Mean of Logged Data				1.71	95% KM UTL (Lognormal)95% Coverage				7.129		
2563	KM SD of Logged Data				0.128	95% KM UPL (Lognormal)				6.855		
2564	95% KM Percentile Lognormal (z)				6.825	95% KM USL (Lognormal)				8.206		
2565												
2566	Background DL/2 Statistics Assuming Lognormal Distribution											
2567	Mean in Original Scale				4.719	Mean in Log Scale				1.472		
2568	SD in Original Scale				1.735	SD in Log Scale				0.418		
2569	95% UTL95% Coverage				10	95% UPL (t)				8.798		
2570	90% Percentile (z)				7.45	95% Percentile (z)				8.672		
2571	99% Percentile (z)				11.53	95% USL				15.83		
2572	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
2573												
2574	Nonparametric Distribution Free Background Statistics											
2575	Data do not follow a Discernible Distribution (0.05)											
2576												
2577	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
2578	Order of Statistic, r				69	95% UTL with95% Coverage				7.3		
2579	Approx, f used to compute achieved CC				1.816	Approximate Actual Confidence Coefficient achieved by UTL				0.871		
2580	Approximate Sample Size needed to achieve specified CC				93	95% UPL				7		
2581	95% USL				8	95% KM Chebyshev UPL				8.898		
2582												
2583	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
2584	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
2585	and consists of observations collected from clean unimpacted locations.											
2586	The use of USL tends to provide a balance between false positives and false negatives provided the data											
2587	represents a background data set and when many onsite observations need to be compared with the BTV.											
2588												
2589	TDS (TOTAL DISSOLVED SOLIDS)											
2590												
2591	General Statistics											
2592	Total Number of Observations				103	Number of Distinct Observations				64		
2593						Number of Missing Observations				28		
2594	Minimum				127	First Quartile				180.5		
2595	Second Largest				286	Median				200		
2596	Maximum				294	Third Quartile				228		
2597	Mean				203.2	SD				34.29		
2598	Coefficient of Variation				0.169	Skewness				0.291		
2599	Mean of logged Data				5.3	SD of logged Data				0.17		
2600												

A	B	C	D	E	F	G	H	I	J	K	L
2601	Critical Values for Background Threshold Values (BTVs)										
2602	Tolerance Factor K (For UTL)			1.919	d2max (for USL)						3.22
2603											
2604	Normal GOF Test										
2605	Shapiro Wilk Test Statistic			0.978	Normal GOF Test						
2606	5% Shapiro Wilk P Value			0.427	Data appear Normal at 5% Significance Level						
2607	Lilliefors Test Statistic			0.0865	Lilliefors GOF Test						
2608	5% Lilliefors Critical Value			0.0876	Data appear Normal at 5% Significance Level						
2609	Data appear Normal at 5% Significance Level										
2610											
2611	Background Statistics Assuming Normal Distribution										
2612	95% UTL with	95% Coverage	269	90% Percentile (z)						247.1	
2613	95% UPL (t)		260.4	95% Percentile (z)						259.6	
2614	95% USL		313.6	99% Percentile (z)						283	
2615											
2616	Gamma GOF Test										
2617	A-D Test Statistic			0.255	Anderson-Darling Gamma GOF Test						
2618	5% A-D Critical Value			0.75	Detected data appear Gamma Distributed at 5% Significance Level						
2619	K-S Test Statistic			0.0642	Kolmogorov-Smirnov Gamma GOF Test						
2620	5% K-S Critical Value			0.0884	Detected data appear Gamma Distributed at 5% Significance Level						
2621	Detected data appear Gamma Distributed at 5% Significance Level										
2622											
2623	Gamma Statistics										
2624	k hat (MLE)		35.33	k star (bias corrected MLE)						34.31	
2625	Theta hat (MLE)		5.75	Theta star (bias corrected MLE)						5.922	
2626	nu hat (MLE)		7279	nu star (bias corrected)						7068	
2627	MLE Mean (bias corrected)		203.2	MLE Sd (bias corrected)						34.69	
2628											
2629	Background Statistics Assuming Gamma Distribution										
2630	95% Wilson Hilferty (WH) Approx. Gamma UPL			263.7	90% Percentile						248.7
2631	95% Hawkins Wixley (HW) Approx. Gamma UPL			264.3	95% Percentile						263.4
2632	95% WH Approx. Gamma UTL with	95% Coverage	274.1	99% Percentile						292.5	
2633	95% HW Approx. Gamma UTL with	95% Coverage	274.9								
2634	95% WH USL		332.4	95% HW USL						335.5	
2635											
2636	Lognormal GOF Test										
2637	Shapiro Wilk Test Statistic			0.982	Shapiro Wilk Lognormal GOF Test						
2638	5% Shapiro Wilk P Value			0.62	Data appear Lognormal at 5% Significance Level						
2639	Lilliefors Test Statistic			0.0531	Lilliefors Lognormal GOF Test						
2640	5% Lilliefors Critical Value			0.0876	Data appear Lognormal at 5% Significance Level						
2641	Data appear Lognormal at 5% Significance Level										
2642											
2643	Background Statistics assuming Lognormal Distribution										
2644	95% UTL with	95% Coverage	277.7	90% Percentile (z)						249.2	
2645	95% UPL (t)		266.1	95% Percentile (z)						265.1	
2646	95% USL		346.6	99% Percentile (z)						297.7	
2647											
2648	Nonparametric Distribution Free Background Statistics										
2649	Data appear Normal at 5% Significance Level										
2650											
2651	Nonparametric Upper Limits for Background Threshold Values										
2652	Order of Statistic, r		101	95% UTL with 95% Coverage						276	

A	B	C	D	E	F	G	H	I	J	K	L
2653	Approx, f used to compute achieved CC				1.772	Approximate Actual Confidence Coefficient achieved by UTL				0.894	
2654						Approximate Sample Size needed to achieve specified CC				124	
2655	95% Percentile Bootstrap UTL with 95% Coverage			275.6	95% BCA Bootstrap UTL with 95% Coverage			275.4			
2656	95% UPL			268.2	90% Percentile			247.8			
2657	90% Chebyshev UPL			306.6	95% Percentile			260.9			
2658	95% Chebyshev UPL			353.4	99% Percentile			285.8			
2659	95% USL			294							
2660											
2661	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
2662	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
2663	and consists of observations collected from clean unimpacted locations.										
2664	The use of USL tends to provide a balance between false positives and false negatives provided the data										
2665	represents a background data set and when many onsite observations need to be compared with the BTV.										
2666											
2667	TOC (TOTAL ORGANIC CARBON)										
2668											
2669	General Statistics										
2670	Total Number of Observations				126	Number of Missing Observations				5	
2671	Number of Distinct Observations				16						
2672	Number of Detects				29	Number of Non-Detects				97	
2673	Number of Distinct Detects				16	Number of Distinct Non-Detects				3	
2674	Minimum Detect				0.5	Minimum Non-Detect				0.5	
2675	Maximum Detect				1.6	Maximum Non-Detect				1.5	
2676	Variance Detected				0.0885	Percent Non-Detects				76.98%	
2677	Mean Detected				1.032	SD Detected				0.297	
2678	Mean of Detected Logged Data				-0.0128	SD of Detected Logged Data				0.314	
2679											
2680	Critical Values for Background Threshold Values (BTVs)										
2681	Tolerance Factor K (For UTL)				1.89	d2max (for USL)				3.287	
2682											
2683	Normal GOF Test on Detects Only										
2684	Shapiro Wilk Test Statistic				0.962	Shapiro Wilk GOF Test					
2685	5% Shapiro Wilk Critical Value				0.926	Detected Data appear Normal at 5% Significance Level					
2686	Lilliefors Test Statistic				0.112	Lilliefors GOF Test					
2687	5% Lilliefors Critical Value				0.161	Detected Data appear Normal at 5% Significance Level					
2688	Detected Data appear Normal at 5% Significance Level										
2689											
2690	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
2691	KM Mean				0.7	KM SD				0.258	
2692	95% UTL95% Coverage				1.188	95% KM UPL (t)				1.129	
2693	90% KM Percentile (z)				1.031	95% KM Percentile (z)				1.124	
2694	99% KM Percentile (z)				1.3	95% KM USL				1.548	
2695											
2696	DL/2 Substitution Background Statistics Assuming Normal Distribution										
2697	Mean				0.611	SD				0.28	
2698	95% UTL95% Coverage				1.139	95% UPL (t)				1.076	
2699	90% Percentile (z)				0.969	95% Percentile (z)				1.071	
2700	99% Percentile (z)				1.261	95% USL				1.53	
2701	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons										
2702											
2703	Gamma GOF Tests on Detected Observations Only										
2704	A-D Test Statistic				0.581	Anderson-Darling GOF Test					

A	B	C	D	E	F	G	H	I	J	K	L
2705	5% A-D Critical Value			0.745	Detected data appear Gamma Distributed at 5% Significance Level						
2706	K-S Test Statistic			0.152	Kolmogorov-Smirnov GOF						
2707	5% K-S Critical Value			0.162	Detected data appear Gamma Distributed at 5% Significance Level						
2708	Detected data appear Gamma Distributed at 5% Significance Level										
2709											
2710	Gamma Statistics on Detected Data Only										
2711	k hat (MLE)			11.36	k star (bias corrected MLE)			10.21			
2712	Theta hat (MLE)			0.0909	Theta star (bias corrected MLE)			0.101			
2713	nu hat (MLE)			658.8	nu star (bias corrected)			592			
2714	MLE Mean (bias corrected)			1.032							
2715	MLE Sd (bias corrected)			0.323	95% Percentile of Chisquare (2kstar)			31.93			
2716											
2717	Gamma ROS Statistics using Imputed Non-Detects										
2718	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
2719	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)										
2720	For such situations, GROS method may yield incorrect values of UCLs and BTVs										
2721	This is especially true when the sample size is small.										
2722	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
2723	Minimum			0.01	Mean			0.632			
2724	Maximum			1.6	Median			0.599			
2725	SD			0.334	CV			0.529			
2726	k hat (MLE)			2.781	k star (bias corrected MLE)			2.72			
2727	Theta hat (MLE)			0.227	Theta star (bias corrected MLE)			0.232			
2728	nu hat (MLE)			700.9	nu star (bias corrected)			685.5			
2729	MLE Mean (bias corrected)			0.632	MLE Sd (bias corrected)			0.383			
2730	95% Percentile of Chisquare (2kstar)			11.75	90% Percentile			1.145			
2731	95% Percentile			1.364	99% Percentile			1.842			
2732	The following statistics are computed using Gamma ROS Statistics on Imputed Data										
2733	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
2734				WH	HW				WH	HW	
2735	95% Approx. Gamma UTL with 95% Coverage			1.508	1.588	95% Approx. Gamma UPL			1.362	1.42	
2736	95% Gamma USL			2.649	2.986						
2737											
2738	Estimates of Gamma Parameters using KM Estimates										
2739	Mean (KM)			0.7	SD (KM)			0.258			
2740	Variance (KM)			0.0666	SE of Mean (KM)			0.0341			
2741	k hat (KM)			7.353	k star (KM)			7.183			
2742	nu hat (KM)			1853	nu star (KM)			1810			
2743	theta hat (KM)			0.0952	theta star (KM)			0.0974			
2744	80% gamma percentile (KM)			0.905	90% gamma percentile (KM)			1.048			
2745	95% gamma percentile (KM)			1.177	99% gamma percentile (KM)			1.445			
2746											
2747	The following statistics are computed using gamma distribution and KM estimates										
2748	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
2749				WH	HW				WH	HW	
2750	95% Approx. Gamma UTL with 95% Coverage			1.197	1.2	95% Approx. Gamma UPL			1.124	1.124	
2751	95% KM Gamma Percentile			1.118	1.118	95% Gamma USL			1.722	1.756	
2752											
2753	Lognormal GOF Test on Detected Observations Only										
2754	Shapiro Wilk Test Statistic			0.936	Shapiro Wilk GOF Test						
2755	5% Shapiro Wilk Critical Value			0.926	Detected Data appear Lognormal at 5% Significance Level						
2756	Lilliefors Test Statistic			0.171	Lilliefors GOF Test						

A	B	C	D	E	F	G	H	I	J	K	L	
2757	5% Lilliefors Critical Value			0.161	Data Not Lognormal at 5% Significance Level							
2758	Detected Data appear Approximate Lognormal at 5% Significance Level											
2759												
2760	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
2761	Mean in Original Scale			0.668	Mean in Log Scale			-0.492				
2762	SD in Original Scale			0.29	SD in Log Scale			0.421				
2763	95% UTL95% Coverage			1.356	95% BCA UTL95% Coverage			1.2				
2764	95% Bootstrap (%) UTL95% Coverage			1.4	95% UPL (t)			1.233				
2765	90% Percentile (z)			1.05	95% Percentile (z)			1.223				
2766	99% Percentile (z)			1.63	95% USL			2.443				
2767												
2768	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
2769	KM Mean of Logged Data			-0.413	95% KM UTL (Lognormal)95% Coverage			1.21				
2770	KM SD of Logged Data			0.319	95% KM UPL (Lognormal)			1.126				
2771	95% KM Percentile Lognormal (z)			1.119	95% KM USL (Lognormal)			1.889				
2772												
2773	Background DL/2 Statistics Assuming Lognormal Distribution											
2774	Mean in Original Scale			0.611	Mean in Log Scale			-0.574				
2775	SD in Original Scale			0.28	SD in Log Scale			0.385				
2776	95% UTL95% Coverage			1.167	95% UPL (t)			1.069				
2777	90% Percentile (z)			0.923	95% Percentile (z)			1.062				
2778	99% Percentile (z)			1.381	95% USL			1.999				
2779	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
2780												
2781	Nonparametric Distribution Free Background Statistics											
2782	Data appear to follow a Discernible Distribution at 5% Significance Level											
2783												
2784	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
2785	Order of Statistic, r			123	95% UTL with95% Coverage			1.5				
2786	Approx, f used to compute achieved CC			1.618	Approximate Actual Confidence Coefficient achieved by UTL			0.88				
2787	Approximate Sample Size needed to achieve specified CC			153	95% UPL			1.4				
2788	95% USL			1.6	95% KM Chebyshev UPL			1.829				
2789												
2790	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
2791	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
2792	and consists of observations collected from clean unimpacted locations.											
2793	The use of USL tends to provide a balance between false positives and false negatives provided the data											
2794	represents a background data set and when many onsite observations need to be compared with the BTV.											
2795												
2796	TOTAL PHENOLICS											
2797												
2798	General Statistics											
2799	Total Number of Observations			127	Number of Missing Observations			4				
2800	Number of Distinct Observations			4								
2801	Number of Detects			2	Number of Non-Detects			125				
2802	Number of Distinct Detects			2	Number of Distinct Non-Detects			3				
2803	Minimum Detect			0.009	Minimum Non-Detect			0.005				
2804	Maximum Detect			0.01	Maximum Non-Detect			0.03				
2805	Variance Detected			5.0000E-7	Percent Non-Detects			98.43%				
2806	Mean Detected			0.0095	SD Detected			7.0711E-4				
2807	Mean of Detected Logged Data			-4.658	SD of Detected Logged Data			0.0745				
2808												

A	B	C	D	E	F	G	H	I	J	K	L		
2809	Warning: Data set has only 2 Detected Values.												
2810	This is not enough to compute meaningful or reliable statistics and estimates.												
2811													
2812													
2813	Critical Values for Background Threshold Values (BTVs)												
2814	Tolerance Factor K (For UTL)			1.889		d2max (for USL)			3.289				
2815													
2816	Normal GOF Test on Detects Only												
2817	Not Enough Data to Perform GOF Test												
2818													
2819	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution												
2820	KM Mean			0.00531		KM SD			0.00111				
2821	95% UTL95% Coverage			0.00741		95% KM UPL (t)			0.00716				
2822	90% KM Percentile (z)			0.00674		95% KM Percentile (z)			0.00714				
2823	99% KM Percentile (z)			0.0079		95% KM USL			0.00897				
2824													
2825	DL/2 Substitution Background Statistics Assuming Normal Distribution												
2826	Mean			0.0109		SD			0.00534				
2827	95% UTL95% Coverage			0.0209		95% UPL (t)			0.0197				
2828	90% Percentile (z)			0.0177		95% Percentile (z)			0.0196				
2829	99% Percentile (z)			0.0233		95% USL			0.0284				
2830	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons												
2831													
2832	Gamma GOF Tests on Detected Observations Only												
2833	Not Enough Data to Perform GOF Test												
2834													
2835	Gamma Statistics on Detected Data Only												
2836	k hat (MLE)			360.7		k star (bias corrected MLE)			N/A				
2837	Theta hat (MLE)			2.6340E-5		Theta star (bias corrected MLE)			N/A				
2838	nu hat (MLE)			1443		nu star (bias corrected)			N/A				
2839	MLE Mean (bias corrected)			N/A									
2840	MLE Sd (bias corrected)			N/A		95% Percentile of Chisquare (2kstar)			N/A				
2841													
2842	Estimates of Gamma Parameters using KM Estimates												
2843	Mean (KM)			0.00531		SD (KM)			0.00111				
2844	Variance (KM)			1.2401E-6		SE of Mean (KM)			3.1512E-4				
2845	k hat (KM)			22.72		k star (KM)			22.19				
2846	nu hat (KM)			5771		nu star (KM)			5636				
2847	theta hat (KM)			2.3362E-4		theta star (KM)			2.3921E-4				
2848	80% gamma percentile (KM)			0.00623		90% gamma percentile (KM)			0.00679				
2849	95% gamma percentile (KM)			0.00729		99% gamma percentile (KM)			0.00827				
2850													
2851	The following statistics are computed using gamma distribution and KM estimates												
2852	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods												
2853				WH		HW					WH		HW
2854	95% Approx. Gamma UTL with 95% Coverage			0.00719		0.00716		95% Approx. Gamma UPL			0.00693	0.00691	
2855	95% KM Gamma Percentile			0.00691		0.00689		95% Gamma USL			0.0089	0.00888	
2856													
2857	Lognormal GOF Test on Detected Observations Only												
2858	Not Enough Data to Perform GOF Test												
2859													
2860	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects												

A	B	C	D	E	G	H	I	J	K	L
2861			Mean in Original Scale	0.0069				Mean in Log Scale		-4.989
2862			SD in Original Scale	0.00108				SD in Log Scale		0.156
2863			95% UTL95% Coverage	0.00915				95% BCA UTL95% Coverage		0.0091
2864			95% Bootstrap (%) UTL95% Coverage	0.00914				95% UPL (t)		0.00883
2865			90% Percentile (z)	0.00832				95% Percentile (z)		0.00881
2866			99% Percentile (z)	0.0098				95% USL		0.0114
2867										
2868	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution									
2869			KM Mean of Logged Data	-5.254				95% KM UTL (Lognormal)95% Coverage		0.00707
2870			KM SD of Logged Data	0.16				95% KM UPL (Lognormal)		0.00682
2871			95% KM Percentile Lognormal (z)	0.0068				95% KM USL (Lognormal)		0.00885
2872										
2873	Background DL/2 Statistics Assuming Lognormal Distribution									
2874			Mean in Original Scale	0.0109				Mean in Log Scale		-4.712
2875			SD in Original Scale	0.00534				SD in Log Scale		0.69
2876			95% UTL95% Coverage	0.0331				95% UPL (t)		0.0283
2877			90% Percentile (z)	0.0218				95% Percentile (z)		0.0279
2878			99% Percentile (z)	0.0447				95% USL		0.0869
2879	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.									
2880										
2881	Nonparametric Distribution Free Background Statistics									
2882	Data do not follow a Discernible Distribution (0.05)									
2883										
2884	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)									
2885			Order of Statistic, r	124				95% UTL with95% Coverage		0.03
2886			Approx, f used to compute achieved CC	1.632				Approximate Actual Confidence Coefficient achieved by UTL		0.884
2887			Approximate Sample Size needed to achieve specified CC	153				95% UPL		0.03
2888			95% USL	0.03				95% KM Chebyshev UPL		0.0102
2889										
2890	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.									
2891	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers									
2892	and consists of observations collected from clean unimpacted locations.									
2893	The use of USL tends to provide a balance between false positives and false negatives provided the data									
2894	represents a background data set and when many onsite observations need to be compared with the BTV.									
2895										
2896	TURBIDITY									
2897										
2898	General Statistics									
2899			Total Number of Observations	109				Number of Missing Observations		22
2900			Number of Distinct Observations	105						
2901			Number of Detects	106				Number of Non-Detects		3
2902			Number of Distinct Detects	102				Number of Distinct Non-Detects		3
2903			Minimum Detect	1.23				Minimum Non-Detect		2.5
2904			Maximum Detect	169				Maximum Non-Detect		3.6
2905			Variance Detected	1692				Percent Non-Detects		2.752%
2906			Mean Detected	39.09				SD Detected		41.14
2907			Mean of Detected Logged Data	2.981				SD of Detected Logged Data		1.321
2908										
2909	Critical Values for Background Threshold Values (BTVs)									
2910			Tolerance Factor K (For UTL)	1.91				d2max (for USL)		3.239
2911										
2912	Normal GOF Test on Detects Only									

A	B	C	D	E	F	G	H	I	J	K	L
2913	Shapiro Wilk Test Statistic			0.815	Normal GOF Test on Detected Observations Only						
2914	5% Shapiro Wilk P Value			0	Data Not Normal at 5% Significance Level						
2915	Lilliefors Test Statistic			0.186	Lilliefors GOF Test						
2916	5% Lilliefors Critical Value			0.0863	Data Not Normal at 5% Significance Level						
2917	Data Not Normal at 5% Significance Level										
2918											
2919	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
2920	KM Mean			38.06	KM SD			40.84			
2921	95% UTL95% Coverage			116.1	95% KM UPL (t)			106.1			
2922	90% KM Percentile (z)			90.39	95% KM Percentile (z)			105.2			
2923	99% KM Percentile (z)			133.1	95% KM USL			170.3			
2924											
2925	DL/2 Substitution Background Statistics Assuming Normal Distribution										
2926	Mean			38.05	SD			41.03			
2927	95% UTL95% Coverage			116.4	95% UPL (t)			106.4			
2928	90% Percentile (z)			90.64	95% Percentile (z)			105.5			
2929	99% Percentile (z)			133.5	95% USL			170.9			
2930	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons										
2931											
2932	Gamma GOF Tests on Detected Observations Only										
2933	A-D Test Statistic			0.861	Anderson-Darling GOF Test						
2934	5% A-D Critical Value			0.79	Data Not Gamma Distributed at 5% Significance Level						
2935	K-S Test Statistic			0.0759	Kolmogorov-Smirnov GOF						
2936	5% K-S Critical Value			0.091	Detected data appear Gamma Distributed at 5% Significance Level						
2937	Detected data follow Appr. Gamma Distribution at 5% Significance Level										
2938											
2939	Gamma Statistics on Detected Data Only										
2940	k hat (MLE)			0.859	k star (bias corrected MLE)			0.841			
2941	Theta hat (MLE)			45.51	Theta star (bias corrected MLE)			46.48			
2942	nu hat (MLE)			182.1	nu star (bias corrected)			178.3			
2943	MLE Mean (bias corrected)			39.09							
2944	MLE Sd (bias corrected)			42.62	95% Percentile of Chisquare (2kstar)			5.359			
2945											
2946	Gamma ROS Statistics using Imputed Non-Detects										
2947	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
2948	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)										
2949	For such situations, GROS method may yield incorrect values of UCLs and BTVs										
2950	This is especially true when the sample size is small.										
2951	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
2952	Minimum			0.01	Mean			38.02			
2953	Maximum			169	Median			22.5			
2954	SD			41.06	CV			1.08			
2955	k hat (MLE)			0.748	k star (bias corrected MLE)			0.734			
2956	Theta hat (MLE)			50.8	Theta star (bias corrected MLE)			51.8			
2957	nu hat (MLE)			163.2	nu star (bias corrected)			160			
2958	MLE Mean (bias corrected)			38.02	MLE Sd (bias corrected)			44.38			
2959	95% Percentile of Chisquare (2kstar)			4.912	90% Percentile			94.37			
2960	95% Percentile			127.2	99% Percentile			205.3			
2961	The following statistics are computed using Gamma ROS Statistics on Imputed Data										
2962	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
2963				WH	HW				WH	HW	
2964	95% Approx. Gamma UTL with 95% Coverage			147.4	162.8	95% Approx. Gamma UPL			123.3	132.7	

A	B	C	D	E	F	G	H	I	J	K	L	
2965	95% Gamma USL		335.2	426.2								
2966												
2967	Estimates of Gamma Parameters using KM Estimates											
2968	Mean (KM)			38.06				SD (KM)		40.84		
2969	Variance (KM)			1668				SE of Mean (KM)		3.93		
2970	k hat (KM)			0.869				k star (KM)		0.851		
2971	nu hat (KM)			189.4				nu star (KM)		185.5		
2972	theta hat (KM)			43.81				theta star (KM)		44.73		
2973	80% gamma percentile (KM)			61.98				90% gamma percentile (KM)		91.17		
2974	95% gamma percentile (KM)			120.8				99% gamma percentile (KM)		190.3		
2975												
2976	The following statistics are computed using gamma distribution and KM estimates											
2977	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
2978				WH	HW				WH	HW		
2979	95% Approx. Gamma UTL with 95% Coverage			143.2	155	95% Approx. Gamma UPL			120.2	127.1		
2980	95% KM Gamma Percentile			118.3	124.8	95% Gamma USL			321.1	395.4		
2981												
2982	Lognormal GOF Test on Detected Observations Only											
2983	Shapiro Wilk Approximate Test Statistic			0.94	Shapiro Wilk GOF Test							
2984	5% Shapiro Wilk P Value			1.5592E-4	Data Not Lognormal at 5% Significance Level							
2985	Lilliefors Test Statistic			0.0736	Lilliefors GOF Test							
2986	5% Lilliefors Critical Value			0.0863	Detected Data appear Lognormal at 5% Significance Level							
2987	Detected Data appear Approximate Lognormal at 5% Significance Level											
2988												
2989	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
2990	Mean in Original Scale			38.07				Mean in Log Scale		2.922		
2991	SD in Original Scale			41.01				SD in Log Scale		1.35		
2992	95% UTL95% Coverage			244.9				95% BCA UTL95% Coverage		141.6		
2993	95% Bootstrap (%) UTL95% Coverage			141.6				95% UPL (t)		176.2		
2994	90% Percentile (z)			104.8				95% Percentile (z)		171.1		
2995	99% Percentile (z)			429.5				95% USL		1472		
2996												
2997	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
2998	KM Mean of Logged Data			2.915	95% KM UTL (Lognormal)95% Coverage			246.1				
2999	KM SD of Logged Data			1.356	95% KM UPL (Lognormal)			176.8				
3000	95% KM Percentile Lognormal (z)			171.7	95% KM USL (Lognormal)			1491				
3001												
3002	Background DL/2 Statistics Assuming Lognormal Distribution											
3003	Mean in Original Scale			38.05				Mean in Log Scale		2.91		
3004	SD in Original Scale			41.03				SD in Log Scale		1.371		
3005	95% UTL95% Coverage			251.8				95% UPL (t)		180.3		
3006	90% Percentile (z)			106.3				95% Percentile (z)		174.9		
3007	99% Percentile (z)			445.3				95% USL		1555		
3008	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
3009												
3010	Nonparametric Distribution Free Background Statistics											
3011	Data appear to follow a Discernible Distribution at 5% Significance Level											
3012												
3013	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
3014	Order of Statistic, r			107	95% UTL with95% Coverage			144				
3015	Approx, f used to compute achieved CC			1.877	Approximate Actual Confidence Coefficient achieved by UTL			0.914				
3016	Approximate Sample Size needed to achieve specified CC			124	95% UPL			127				

A	B	C	D	E	F	G	H	I	J	K	L
3017	95% USL				169	95% KM Chebyshev UPL					216.9
3018											
3019	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
3020	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
3021	and consists of observations collected from clean unimpacted locations.										
3022	The use of USL tends to provide a balance between false positives and false negatives provided the data										
3023	represents a background data set and when many onsite observations need to be compared with the BTV.										
3024											
3025	BENZENE										
3026											
3027	General Statistics										
3028	Total Number of Observations				131	Number of Missing Observations					0
3029	Number of Distinct Observations				1						
3030	Number of Detects				0	Number of Non-Detects					131
3031	Number of Distinct Detects				0	Number of Distinct Non-Detects					1
3032	Minimum Detect				N/A	Minimum Non-Detect					1
3033	Maximum Detect				N/A	Maximum Non-Detect					1
3034	Variance Detected				N/A	Percent Non-Detects					100%
3035	Mean Detected				N/A	SD Detected					N/A
3036	Mean of Detected Logged Data				N/A	SD of Detected Logged Data					N/A
3037											
3038	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
3039	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
3040	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
3041											
3042	The data set for variable BENZENE was not processed!										
3043											
3044											
3045	1,2-DIBROMOETHANE (EDB) (ETHYLENE DIBROMIDE)										
3046											
3047	General Statistics										
3048	Total Number of Observations				127	Number of Missing Observations					4
3049	Number of Distinct Observations				1						
3050	Number of Detects				0	Number of Non-Detects					127
3051	Number of Distinct Detects				0	Number of Distinct Non-Detects					1
3052	Minimum Detect				N/A	Minimum Non-Detect					1
3053	Maximum Detect				N/A	Maximum Non-Detect					1
3054	Variance Detected				N/A	Percent Non-Detects					100%
3055	Mean Detected				N/A	SD Detected					N/A
3056	Mean of Detected Logged Data				N/A	SD of Detected Logged Data					N/A
3057											
3058	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
3059	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
3060	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
3061											
3062	The data set for variable 1,2-DIBROMOETHANE (EDB) (ETHYLENE DIBROMIDE) was not processed!										
3063											
3064											
3065	1,1-DICHLOROETHANE										
3066											
3067	General Statistics										
3068	Total Number of Observations				131	Number of Missing Observations					0

A	B	C	D	E	F	G	H	I	J	K	L
3069	Number of Distinct Observations			1							
3070	Number of Detects			0	Number of Non-Detects						131
3071	Number of Distinct Detects			0	Number of Distinct Non-Detects						1
3072	Minimum Detect			N/A	Minimum Non-Detect						1
3073	Maximum Detect			N/A	Maximum Non-Detect						1
3074	Variance Detected			N/A	Percent Non-Detects						100%
3075	Mean Detected			N/A	SD Detected						N/A
3076	Mean of Detected Logged Data			N/A	SD of Detected Logged Data						N/A
3077											
3078	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
3079	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
3080	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
3081											
3082	The data set for variable 1,1-DICHLOROETHANE was not processed!										
3083											
3084											
3085	1,1-DICHLOROETHENE										
3086											
3087	General Statistics										
3088	Total Number of Observations			131	Number of Missing Observations						0
3089	Number of Distinct Observations			1							
3090	Number of Detects			0	Number of Non-Detects						131
3091	Number of Distinct Detects			0	Number of Distinct Non-Detects						1
3092	Minimum Detect			N/A	Minimum Non-Detect						1
3093	Maximum Detect			N/A	Maximum Non-Detect						1
3094	Variance Detected			N/A	Percent Non-Detects						100%
3095	Mean Detected			N/A	SD Detected						N/A
3096	Mean of Detected Logged Data			N/A	SD of Detected Logged Data						N/A
3097											
3098	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
3099	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
3100	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
3101											
3102	The data set for variable 1,1-DICHLOROETHENE was not processed!										
3103											
3104											
3105	1,2-DICHLOROETHANE										
3106											
3107	General Statistics										
3108	Total Number of Observations			131	Number of Missing Observations						0
3109	Number of Distinct Observations			2							
3110	Number of Detects			0	Number of Non-Detects						131
3111	Number of Distinct Detects			0	Number of Distinct Non-Detects						2
3112	Minimum Detect			N/A	Minimum Non-Detect						1
3113	Maximum Detect			N/A	Maximum Non-Detect						2
3114	Variance Detected			N/A	Percent Non-Detects						100%
3115	Mean Detected			N/A	SD Detected						N/A
3116	Mean of Detected Logged Data			N/A	SD of Detected Logged Data						N/A
3117											
3118	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
3119	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
3120	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										

A	B	C	D	E	F	G	H	I	J	K	L	
3121												
3122	The data set for variable 1,2-DICHLOROETHANE was not processed!											
3123												
3124												
3125	cis 1,2-DICHLOROETHENE											
3126												
3127	General Statistics											
3128	Total Number of Observations	128							Number of Missing Observations	3		
3129	Number of Distinct Observations	2										
3130	Number of Detects	0							Number of Non-Detects	128		
3131	Number of Distinct Detects	0							Number of Distinct Non-Detects	2		
3132	Minimum Detect	N/A							Minimum Non-Detect	1		
3133	Maximum Detect	N/A							Maximum Non-Detect	2		
3134	Variance Detected	N/A							Percent Non-Detects	100%		
3135	Mean Detected	N/A							SD Detected	N/A		
3136	Mean of Detected Logged Data	N/A							SD of Detected Logged Data	N/A		
3137												
3138	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
3139	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
3140	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
3141												
3142	The data set for variable cis 1,2-DICHLOROETHENE was not processed!											
3143												
3144												
3145	trans 1,2-DICHLOROETHENE											
3146												
3147	General Statistics											
3148	Total Number of Observations	131							Number of Missing Observations	0		
3149	Number of Distinct Observations	1										
3150	Number of Detects	0							Number of Non-Detects	131		
3151	Number of Distinct Detects	0							Number of Distinct Non-Detects	1		
3152	Minimum Detect	N/A							Minimum Non-Detect	1		
3153	Maximum Detect	N/A							Maximum Non-Detect	1		
3154	Variance Detected	N/A							Percent Non-Detects	100%		
3155	Mean Detected	N/A							SD Detected	N/A		
3156	Mean of Detected Logged Data	N/A							SD of Detected Logged Data	N/A		
3157												
3158	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
3159	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
3160	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
3161												
3162	The data set for variable trans 1,2-DICHLOROETHENE was not processed!											
3163												
3164												
3165	ETHYLBENZENE											
3166												
3167	General Statistics											
3168	Total Number of Observations	131							Number of Missing Observations	0		
3169	Number of Distinct Observations	1										
3170	Number of Detects	0							Number of Non-Detects	131		
3171	Number of Distinct Detects	0							Number of Distinct Non-Detects	1		
3172	Minimum Detect	N/A							Minimum Non-Detect	1		

A	B	C	D	E	F	G	H	I	J	K	L	
3225	TOLUENE											
3226												
3227	General Statistics											
3228	Total Number of Observations			129	Number of Missing Observations					2		
3229	Number of Distinct Observations			1								
3230	Number of Detects			0	Number of Non-Detects					129		
3231	Number of Distinct Detects			0	Number of Distinct Non-Detects					1		
3232	Minimum Detect			N/A	Minimum Non-Detect					1		
3233	Maximum Detect			N/A	Maximum Non-Detect					1		
3234	Variance Detected			N/A	Percent Non-Detects					100%		
3235	Mean Detected			N/A	SD Detected					N/A		
3236	Mean of Detected Logged Data			N/A	SD of Detected Logged Data					N/A		
3237												
3238	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
3239	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
3240	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
3241												
3242	The data set for variable TOLUENE was not processed!											
3243												
3244												
3245	1,1,1-TRICHLOROETHANE											
3246												
3247	General Statistics											
3248	Total Number of Observations			131	Number of Missing Observations					0		
3249	Number of Distinct Observations			1								
3250	Number of Detects			0	Number of Non-Detects					131		
3251	Number of Distinct Detects			0	Number of Distinct Non-Detects					1		
3252	Minimum Detect			N/A	Minimum Non-Detect					1		
3253	Maximum Detect			N/A	Maximum Non-Detect					1		
3254	Variance Detected			N/A	Percent Non-Detects					100%		
3255	Mean Detected			N/A	SD Detected					N/A		
3256	Mean of Detected Logged Data			N/A	SD of Detected Logged Data					N/A		
3257												
3258	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
3259	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
3260	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
3261												
3262	The data set for variable 1,1,1-TRICHLOROETHANE was not processed!											
3263												
3264												
3265	TRICHLOROETHENE											
3266												
3267	General Statistics											
3268	Total Number of Observations			131	Number of Missing Observations					0		
3269	Number of Distinct Observations			1								
3270	Number of Detects			0	Number of Non-Detects					131		
3271	Number of Distinct Detects			0	Number of Distinct Non-Detects					1		
3272	Minimum Detect			N/A	Minimum Non-Detect					1		
3273	Maximum Detect			N/A	Maximum Non-Detect					1		
3274	Variance Detected			N/A	Percent Non-Detects					100%		
3275	Mean Detected			N/A	SD Detected					N/A		
3276	Mean of Detected Logged Data			N/A	SD of Detected Logged Data					N/A		

A	B	C	D	E	F	G	H	I	J	K	L	
3277												
3278	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
3279	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
3280	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
3281												
3282	The data set for variable TRICHLOROETHENE was not processed!											
3283												
3284												
3285	VINYL CHLORIDE											
3286												
3287	General Statistics											
3288	Total Number of Observations	126						Number of Missing Observations	5			
3289	Number of Distinct Observations	1										
3290	Number of Detects	0						Number of Non-Detects	126			
3291	Number of Distinct Detects	0						Number of Distinct Non-Detects	1			
3292	Minimum Detect	N/A						Minimum Non-Detect	1			
3293	Maximum Detect	N/A						Maximum Non-Detect	1			
3294	Variance Detected	N/A						Percent Non-Detects	100%			
3295	Mean Detected	N/A						SD Detected	N/A			
3296	Mean of Detected Logged Data	N/A						SD of Detected Logged Data	N/A			
3297												
3298	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
3299	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
3300	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
3301												
3302	The data set for variable VINYL CHLORIDE was not processed!											
3303												
3304												
3305	XYLENES (TOTAL)											
3306												
3307	General Statistics											
3308	Total Number of Observations	128						Number of Missing Observations	3			
3309	Number of Distinct Observations	4										
3310	Number of Detects	0						Number of Non-Detects	128			
3311	Number of Distinct Detects	0						Number of Distinct Non-Detects	4			
3312	Minimum Detect	N/A						Minimum Non-Detect	1			
3313	Maximum Detect	N/A						Maximum Non-Detect	5			
3314	Variance Detected	N/A						Percent Non-Detects	100%			
3315	Mean Detected	N/A						SD Detected	N/A			
3316	Mean of Detected Logged Data	N/A						SD of Detected Logged Data	N/A			
3317												
3318	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
3319	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
3320	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
3321												
3322	The data set for variable XYLENES (TOTAL) was not processed!											
3323												
3324												
3325	ARSENIC, TOTAL											
3326												
3327	General Statistics											
3328	Total Number of Observations	33						Number of Missing Observations	98			

A	B	C	D	E	F	G	H	I	J	K	L
3329	Number of Distinct Observations			5							
3330	Number of Detects			1	Number of Non-Detects						32
3331	Number of Distinct Detects			1	Number of Distinct Non-Detects						4
3332	Minimum Detect			0.004	Minimum Non-Detect						0.0033
3333	Maximum Detect			0.004	Maximum Non-Detect						0.009
3334	Variance Detected			N/A	Percent Non-Detects						96.97%
3335	Mean Detected			0.004	SD Detected						N/A
3336	Mean of Detected Logged Data			-5.521	SD of Detected Logged Data						N/A
3337											
3338	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!										
3339	It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).										
3340											
3341	The data set for variable ARSENIC, TOTAL was not processed!										
3342											
3343											
3344	ARSENIC, DISSOLVED										
3345											
3346	General Statistics										
3347	Total Number of Observations			33	Number of Missing Observations						98
3348	Number of Distinct Observations			4							
3349	Number of Detects			0	Number of Non-Detects						33
3350	Number of Distinct Detects			0	Number of Distinct Non-Detects						4
3351	Minimum Detect			N/A	Minimum Non-Detect						0.003
3352	Maximum Detect			N/A	Maximum Non-Detect						0.008
3353	Variance Detected			N/A	Percent Non-Detects						100%
3354	Mean Detected			N/A	SD Detected						N/A
3355	Mean of Detected Logged Data			N/A	SD of Detected Logged Data						N/A
3356											
3357	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
3358	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
3359	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
3360											
3361	The data set for variable ARSENIC, DISSOLVED was not processed!										
3362											
3363											
3364	BARIUM, TOTAL										
3365											
3366	General Statistics										
3367	Total Number of Observations			32	Number of Distinct Observations						8
3368					Number of Missing Observations						99
3369	Minimum			0.07	First Quartile						0.08
3370	Second Largest			0.17	Median						0.09
3371	Maximum			0.17	Third Quartile						0.1
3372	Mean			0.0947	SD						0.0246
3373	Coefficient of Variation			0.26	Skewness						1.976
3374	Mean of logged Data			-2.384	SD of logged Data						0.223
3375											
3376	Critical Values for Background Threshold Values (BTVs)										
3377	Tolerance Factor K (For UTL)			2.186	d2max (for USL)						2.773
3378											
3379	Normal GOF Test										
3380	Shapiro Wilk Test Statistic			0.752	Shapiro Wilk GOF Test						

A	B	C	D	E	F	G	H	I	J	K	L	
3381	5% Shapiro Wilk Critical Value			0.93	Data Not Normal at 5% Significance Level							
3382	Lilliefors Test Statistic			0.294	Lilliefors GOF Test							
3383	5% Lilliefors Critical Value			0.154	Data Not Normal at 5% Significance Level							
3384	Data Not Normal at 5% Significance Level											
3385												
3386	Background Statistics Assuming Normal Distribution											
3387	95% UTL with 95% Coverage			0.149	90% Percentile (z)							0.126
3388	95% UPL (t)			0.137	95% Percentile (z)							0.135
3389	95% USL			0.163	99% Percentile (z)							0.152
3390												
3391	Gamma GOF Test											
3392	A-D Test Statistic			2.171	Anderson-Darling Gamma GOF Test							
3393	5% A-D Critical Value			0.745	Data Not Gamma Distributed at 5% Significance Level							
3394	K-S Test Statistic			0.276	Kolmogorov-Smirnov Gamma GOF Test							
3395	5% K-S Critical Value			0.155	Data Not Gamma Distributed at 5% Significance Level							
3396	Data Not Gamma Distributed at 5% Significance Level											
3397												
3398	Gamma Statistics											
3399	k hat (MLE)			19.05	k star (bias corrected MLE)							17.29
3400	Theta hat (MLE)			0.00497	Theta star (bias corrected MLE)							0.00548
3401	nu hat (MLE)			1219	nu star (bias corrected)							1106
3402	MLE Mean (bias corrected)			0.0947	MLE Sd (bias corrected)							0.0228
3403												
3404	Background Statistics Assuming Gamma Distribution											
3405	95% Wilson Hilferty (WH) Approx. Gamma UPL			0.136	90% Percentile							0.125
3406	95% Hawkins Wixley (HW) Approx. Gamma UPL			0.136	95% Percentile							0.135
3407	95% WH Approx. Gamma UTL with 95% Coverage			0.149	99% Percentile							0.156
3408	95% HW Approx. Gamma UTL with 95% Coverage			0.149								
3409	95% WH USL			0.167	95% HW USL							0.168
3410												
3411	Lognormal GOF Test											
3412	Shapiro Wilk Test Statistic			0.836	Shapiro Wilk Lognormal GOF Test							
3413	5% Shapiro Wilk Critical Value			0.93	Data Not Lognormal at 5% Significance Level							
3414	Lilliefors Test Statistic			0.262	Lilliefors Lognormal GOF Test							
3415	5% Lilliefors Critical Value			0.154	Data Not Lognormal at 5% Significance Level							
3416	Data Not Lognormal at 5% Significance Level											
3417												
3418	Background Statistics assuming Lognormal Distribution											
3419	95% UTL with 95% Coverage			0.15	90% Percentile (z)							0.123
3420	95% UPL (t)			0.135	95% Percentile (z)							0.133
3421	95% USL			0.171	99% Percentile (z)							0.155
3422												
3423	Nonparametric Distribution Free Background Statistics											
3424	Data do not follow a Discernible Distribution (0.05)											
3425												
3426	Nonparametric Upper Limits for Background Threshold Values											
3427	Order of Statistic, r			32	95% UTL with 95% Coverage							0.17
3428	Approx, f used to compute achieved CC			1.684	Approximate Actual Confidence Coefficient achieved by UTL							0.806
3429					Approximate Sample Size needed to achieve specified CC							59
3430	95% Percentile Bootstrap UTL with 95% Coverage			0.17	95% BCA Bootstrap UTL with 95% Coverage							0.17
3431	95% UPL			0.17	90% Percentile							0.12
3432	90% Chebyshev UPL			0.17	95% Percentile							0.148

A	B	C	D	E	F	G	H	I	J	K	L	
3485	Gamma Statistics on Detected Data Only											
3486	k hat (MLE)			15.02	k star (bias corrected MLE)			13.71				
3487	Theta hat (MLE)			0.00564	Theta star (bias corrected MLE)			0.00618				
3488	nu hat (MLE)			1021	nu star (bias corrected)			932.5				
3489	MLE Mean (bias corrected)			0.0847								
3490	MLE Sd (bias corrected)			0.0229	95% Percentile of Chisquare (2kstar)			40.64				
3491												
3492	Gamma ROS Statistics using Imputed Non-Detects											
3493	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
3494	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)											
3495	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
3496	This is especially true when the sample size is small.											
3497	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
3498	Minimum			0.04	Mean			0.0846				
3499	Maximum			0.19	Median			0.08				
3500	SD			0.0244	CV			0.288				
3501	k hat (MLE)			15.89	k star (bias corrected MLE)			14.58				
3502	Theta hat (MLE)			0.00533	Theta star (bias corrected MLE)			0.0058				
3503	nu hat (MLE)			1144	nu star (bias corrected)			1050				
3504	MLE Mean (bias corrected)			0.0846	MLE Sd (bias corrected)			0.0222				
3505	95% Percentile of Chisquare (2kstar)			42.76	90% Percentile			0.114				
3506	95% Percentile			0.124	99% Percentile			0.144				
3507	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
3508	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
3509				WH	HW				WH	HW		
3510	95% Approx. Gamma UTL with 95% Coverage			0.137	0.137	95% Approx. Gamma UPL			0.125	0.125		
3511	95% Gamma USL			0.158	0.159							
3512												
3513	Estimates of Gamma Parameters using KM Estimates											
3514	Mean (KM)			0.0847	SD (KM)			0.0248				
3515	Variance (KM)			6.1315E-4	SE of Mean (KM)			0.00431				
3516	k hat (KM)			11.7	k star (KM)			10.75				
3517	nu hat (KM)			842.5	nu star (KM)			773.7				
3518	theta hat (KM)			0.00724	theta star (KM)			0.00788				
3519	80% gamma percentile (KM)			0.105	90% gamma percentile (KM)			0.119				
3520	95% gamma percentile (KM)			0.131	99% gamma percentile (KM)			0.156				
3521												
3522	The following statistics are computed using gamma distribution and KM estimates											
3523	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
3524				WH	HW				WH	HW		
3525	95% Approx. Gamma UTL with 95% Coverage			0.138	0.138	95% Approx. Gamma UPL			0.125	0.125		
3526	95% KM Gamma Percentile			0.123	0.123	95% Gamma USL			0.159	0.161		
3527												
3528	Lognormal GOF Test on Detected Observations Only											
3529	Shapiro Wilk Test Statistic			0.83	Shapiro Wilk GOF Test							
3530	5% Shapiro Wilk Critical Value			0.933	Data Not Lognormal at 5% Significance Level							
3531	Lilliefors Test Statistic			0.302	Lilliefors GOF Test							
3532	5% Lilliefors Critical Value			0.15	Data Not Lognormal at 5% Significance Level							
3533	Data Not Lognormal at 5% Significance Level											
3534												
3535	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
3536	Mean in Original Scale			0.0846	Mean in Log Scale			-2.502				

A	B	C	D	E	F	G	H	I	J	K	L
3537			SD in Original Scale	0.0244						SD in Log Scale	0.246
3538			95% UTL95% Coverage	0.139						95% BCA UTL95% Coverage	0.19
3539			95% Bootstrap (%) UTL95% Coverage	0.19						95% UPL (t)	0.125
3540			90% Percentile (z)	0.112						95% Percentile (z)	0.123
3541			99% Percentile (z)	0.145						95% USL	0.164
3542											
3543	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution										
3544			KM Mean of Logged Data	-2.502						95% KM UTL (Lognormal)95% Coverage	0.14
3545			KM SD of Logged Data	0.25						95% KM UPL (Lognormal)	0.126
3546			95% KM Percentile Lognormal (z)	0.123						95% KM USL (Lognormal)	0.166
3547											
3548	Background DL/2 Statistics Assuming Lognormal Distribution										
3549			Mean in Original Scale	7.031						Mean in Log Scale	-2.248
3550			SD in Original Scale	41.65						SD in Log Scale	1.367
3551			95% UTL95% Coverage	1.992						95% UPL (t)	1.098
3552			90% Percentile (z)	0.609						95% Percentile (z)	1.001
3553			99% Percentile (z)	2.54						95% USL	5.014
3554	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
3555											
3556	Nonparametric Distribution Free Background Statistics										
3557	Data do not follow a Discernible Distribution (0.05)										
3558											
3559	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
3560			Order of Statistic, r	36						95% UTL with95% Coverage	500
3561			Approx, f used to compute achieved CC	1.895						Approximate Actual Confidence Coefficient achieved by UTL	0.842
3562			Approximate Sample Size needed to achieve specified CC	59						95% UPL	75.42
3563			95% USL	500						95% KM Chebyshev UPL	0.194
3564											
3565	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
3566	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
3567	and consists of observations collected from clean unimpacted locations.										
3568	The use of USL tends to provide a balance between false positives and false negatives provided the data										
3569	represents a background data set and when many onsite observations need to be compared with the BTV.										
3570											
3571	CADMIUM, TOTAL										
3572											
3573	General Statistics										
3574			Total Number of Observations	33						Number of Missing Observations	98
3575			Number of Distinct Observations	5							
3576			Number of Detects	1						Number of Non-Detects	32
3577			Number of Distinct Detects	1						Number of Distinct Non-Detects	4
3578			Minimum Detect	0.005						Minimum Non-Detect	0.001
3579			Maximum Detect	0.005						Maximum Non-Detect	0.0022
3580			Variance Detected	N/A						Percent Non-Detects	96.97%
3581			Mean Detected	0.005						SD Detected	N/A
3582			Mean of Detected Logged Data	-5.298						SD of Detected Logged Data	N/A
3583											
3584	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!										
3585	It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).										
3586											
3587	The data set for variable CADMIUM, TOTAL was not processed!										
3588											

	A	B	C	D	E	F	G	H	I	J	K	L		
3589														
3590	CADMIUM, DISSOLVED													
3591														
3592	General Statistics													
3593	Total Number of Observations				34		Number of Missing Observations				97			
3594	Number of Distinct Observations				4									
3595	Number of Detects				0		Number of Non-Detects				34			
3596	Number of Distinct Detects				0		Number of Distinct Non-Detects				4			
3597	Minimum Detect				N/A		Minimum Non-Detect				0.001			
3598	Maximum Detect				N/A		Maximum Non-Detect				10			
3599	Variance Detected				N/A		Percent Non-Detects				100%			
3600	Mean Detected				N/A		SD Detected				N/A			
3601	Mean of Detected Logged Data				N/A		SD of Detected Logged Data				N/A			
3602														
3603	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!													
3604	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!													
3605	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).													
3606														
3607	The data set for variable CADMIUM, DISSOLVED was not processed!													
3608														
3609														
3610	CHROMIUM, TOTAL													
3611														
3612	General Statistics													
3613	Total Number of Observations				33		Number of Missing Observations				98			
3614	Number of Distinct Observations				7									
3615	Number of Detects				4		Number of Non-Detects				29			
3616	Number of Distinct Detects				4		Number of Distinct Non-Detects				4			
3617	Minimum Detect				0.0023		Minimum Non-Detect				0.0022			
3618	Maximum Detect				0.05		Maximum Non-Detect				0.01			
3619	Variance Detected				5.1698E-4		Percent Non-Detects				87.88%			
3620	Mean Detected				0.0163		SD Detected				0.0227			
3621	Mean of Detected Logged Data				-4.88		SD of Detected Logged Data				1.412			
3622														
3623	Critical Values for Background Threshold Values (BTVs)													
3624	Tolerance Factor K (For UTL)				2.176		d2max (for USL)				2.787			
3625														
3626	Normal GOF Test on Detects Only													
3627	Shapiro Wilk Test Statistic				0.744		Shapiro Wilk GOF Test							
3628	5% Shapiro Wilk Critical Value				0.748		Data Not Normal at 5% Significance Level							
3629	Lilliefors Test Statistic				0.359		Lilliefors GOF Test							
3630	5% Lilliefors Critical Value				0.375		Detected Data appear Normal at 5% Significance Level							
3631	Detected Data appear Approximate Normal at 5% Significance Level													
3632														
3633	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution													
3634	KM Mean				0.00407		KM SD				0.00823			
3635	95% UTL95% Coverage				0.022		95% KM UPL (t)				0.0182			
3636	90% KM Percentile (z)				0.0146		95% KM Percentile (z)				0.0176			
3637	99% KM Percentile (z)				0.0232		95% KM USL				0.027			
3638														
3639	DL/2 Substitution Background Statistics Assuming Normal Distribution													
3640	Mean				0.00561		SD				0.00813			

	A	B	C	D	E	F	G	H	I	J	K	L
3641	95% UTL95% Coverage				0.0233	95% UPL (t)				0.0196		
3642	90% Percentile (z)				0.016	95% Percentile (z)				0.019		
3643	99% Percentile (z)				0.0245	95% USL				0.0283		
3644	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
3645												
3646	Gamma GOF Tests on Detected Observations Only											
3647	A-D Test Statistic				0.431	Anderson-Darling GOF Test						
3648	5% A-D Critical Value				0.67	Detected data appear Gamma Distributed at 5% Significance Level						
3649	K-S Test Statistic				0.282	Kolmogorov-Smirnov GOF						
3650	5% K-S Critical Value				0.405	Detected data appear Gamma Distributed at 5% Significance Level						
3651	Detected data appear Gamma Distributed at 5% Significance Level											
3652												
3653	Gamma Statistics on Detected Data Only											
3654	k hat (MLE)				0.78	k star (bias corrected MLE)				0.362		
3655	Theta hat (MLE)				0.0209	Theta star (bias corrected MLE)				0.0451		
3656	nu hat (MLE)				6.242	nu star (bias corrected)				2.894		
3657	MLE Mean (bias corrected)				0.0163							
3658	MLE Sd (bias corrected)				0.0271	95% Percentile of Chisquare (2kstar)				3.111		
3659												
3660	Gamma ROS Statistics using Imputed Non-Detects											
3661	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
3662	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)											
3663	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
3664	This is especially true when the sample size is small.											
3665	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
3666	Minimum				0.0023	Mean				0.0109		
3667	Maximum				0.05	Median				0.01		
3668	SD				0.00728	CV				0.67		
3669	k hat (MLE)				4.806	k star (bias corrected MLE)				4.389		
3670	Theta hat (MLE)				0.00226	Theta star (bias corrected MLE)				0.00248		
3671	nu hat (MLE)				317.2	nu star (bias corrected)				289.7		
3672	MLE Mean (bias corrected)				0.0109	MLE Sd (bias corrected)				0.00519		
3673	95% Percentile of Chisquare (2kstar)				16.61	90% Percentile				0.0178		
3674	95% Percentile				0.0206	99% Percentile				0.0264		
3675	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
3676	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
3677					WH	HW					WH	HW
3678	95% Approx. Gamma UTL with 95% Coverage				0.0242	0.0243	95% Approx. Gamma UPL				0.0205	0.0205
3679	95% Gamma USL				0.0297	0.0302						
3680												
3681	Estimates of Gamma Parameters using KM Estimates											
3682	Mean (KM)				0.00407	SD (KM)				0.00823		
3683	Variance (KM)				6.7692E-5	SE of Mean (KM)				0.00166		
3684	k hat (KM)				0.245	k star (KM)				0.243		
3685	nu hat (KM)				16.17	nu star (KM)				16.04		
3686	theta hat (KM)				0.0166	theta star (KM)				0.0168		
3687	80% gamma percentile (KM)				0.00585	90% gamma percentile (KM)				0.0122		
3688	95% gamma percentile (KM)				0.0199	99% gamma percentile (KM)				0.0403		
3689												
3690	The following statistics are computed using gamma distribution and KM estimates											
3691	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
3692					WH	HW					WH	HW

A	B	C	D	E	F	G	H	I	J	K	L
3693	95% Approx. Gamma UTL with 95% Coverage			0.0131	0.0121	95% Approx. Gamma UPL			0.0101	0.00933	
3694	95% KM Gamma Percentile			0.00969	0.00893	95% Gamma USL			0.0179	0.0168	
3695											
3696	Lognormal GOF Test on Detected Observations Only										
3697	Shapiro Wilk Test Statistic			0.903	Shapiro Wilk GOF Test						
3698	5% Shapiro Wilk Critical Value			0.748	Detected Data appear Lognormal at 5% Significance Level						
3699	Lilliefors Test Statistic			0.252	Lilliefors GOF Test						
3700	5% Lilliefors Critical Value			0.375	Detected Data appear Lognormal at 5% Significance Level						
3701	Detected Data appear Lognormal at 5% Significance Level										
3702											
3703	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects										
3704	Mean in Original Scale			0.00333	Mean in Log Scale			-6.849			
3705	SD in Original Scale			0.00868	SD in Log Scale			1.425			
3706	95% UTL95% Coverage			0.0236	95% BCA UTL95% Coverage			0.05			
3707	95% Bootstrap (%) UTL95% Coverage			0.05	95% UPL (t)			0.0123			
3708	90% Percentile (z)			0.00658	95% Percentile (z)			0.011			
3709	99% Percentile (z)			0.0292	95% USL			0.0562			
3710											
3711	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution										
3712	KM Mean of Logged Data			-5.903	95% KM UTL (Lognormal)95% Coverage			0.00965			
3713	KM SD of Logged Data			0.58	95% KM UPL (Lognormal)			0.00741			
3714	95% KM Percentile Lognormal (z)			0.00709	95% KM USL (Lognormal)			0.0138			
3715											
3716	Background DL/2 Statistics Assuming Lognormal Distribution										
3717	Mean in Original Scale			0.00561	Mean in Log Scale			-5.476			
3718	SD in Original Scale			0.00813	SD in Log Scale			0.632			
3719	95% UTL95% Coverage			0.0166	95% UPL (t)			0.0124			
3720	90% Percentile (z)			0.00941	95% Percentile (z)			0.0118			
3721	99% Percentile (z)			0.0182	95% USL			0.0243			
3722	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
3723											
3724	Nonparametric Distribution Free Background Statistics										
3725	Data appear to follow a Discernible Distribution at 5% Significance Level										
3726											
3727	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
3728	Order of Statistic, r			33	95% UTL with95% Coverage			0.05			
3729	Approx, f used to compute achieved CC			1.737	Approximate Actual Confidence Coefficient achieved by UTL			0.816			
3730	Approximate Sample Size needed to achieve specified CC			59	95% UPL			0.022			
3731	95% USL			0.05	95% KM Chebyshev UPL			0.0405			
3732											
3733	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
3734	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
3735	and consists of observations collected from clean unimpacted locations.										
3736	The use of USL tends to provide a balance between false positives and false negatives provided the data										
3737	represents a background data set and when many onsite observations need to be compared with the BTV.										
3738											
3739	CHROMIUM, DISSOLVED										
3740											
3741	General Statistics										
3742	Total Number of Observations			34	Number of Missing Observations			97			
3743	Number of Distinct Observations			5							
3744	Number of Detects			1	Number of Non-Detects			33			

A	B	C	D	E	F	G	H	I	J	K	L
3745	Number of Distinct Detects				1	Number of Distinct Non-Detects				4	
3746	Minimum Detect				0.02	Minimum Non-Detect				0.0022	
3747	Maximum Detect				0.02	Maximum Non-Detect				50	
3748	Variance Detected				N/A	Percent Non-Detects				97.06%	
3749	Mean Detected				0.02	SD Detected				N/A	
3750	Mean of Detected Logged Data				-3.912	SD of Detected Logged Data				N/A	
3751											
3752	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!										
3753	It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).										
3754											
3755	The data set for variable CHROMIUM, DISSOLVED was not processed!										
3756											
3757											
3758	COPPER, TOTAL										
3759											
3760	General Statistics										
3761	Total Number of Observations				33	Number of Missing Observations				98	
3762	Number of Distinct Observations				4						
3763	Number of Detects				7	Number of Non-Detects				26	
3764	Number of Distinct Detects				3	Number of Distinct Non-Detects				3	
3765	Minimum Detect				0.0084	Minimum Non-Detect				0.0056	
3766	Maximum Detect				0.02	Maximum Non-Detect				0.02	
3767	Variance Detected				3.1985E-5	Percent Non-Detects				78.79%	
3768	Mean Detected				0.0155	SD Detected				0.00566	
3769	Mean of Detected Logged Data				-4.234	SD of Detected Logged Data				0.406	
3770											
3771	Critical Values for Background Threshold Values (BTVs)										
3772	Tolerance Factor K (For UTL)				2.176	d2max (for USL)				2.787	
3773											
3774	Normal GOF Test on Detects Only										
3775	Shapiro Wilk Test Statistic				0.709	Shapiro Wilk GOF Test					
3776	5% Shapiro Wilk Critical Value				0.803	Data Not Normal at 5% Significance Level					
3777	Lilliefors Test Statistic				0.359	Lilliefors GOF Test					
3778	5% Lilliefors Critical Value				0.304	Data Not Normal at 5% Significance Level					
3779	Data Not Normal at 5% Significance Level										
3780											
3781	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
3782	KM Mean				0.0085	KM SD				0.00458	
3783	95% UTL95% Coverage				0.0185	95% KM UPL (t)				0.0164	
3784	90% KM Percentile (z)				0.0144	95% KM Percentile (z)				0.016	
3785	99% KM Percentile (z)				0.0192	95% KM USL				0.0213	
3786											
3787	DL/2 Substitution Background Statistics Assuming Normal Distribution										
3788	Mean				0.0096	SD				0.00469	
3789	95% UTL95% Coverage				0.0198	95% UPL (t)				0.0177	
3790	90% Percentile (z)				0.0156	95% Percentile (z)				0.0173	
3791	99% Percentile (z)				0.0205	95% USL				0.0227	
3792	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons										
3793											
3794	Gamma GOF Tests on Detected Observations Only										
3795	A-D Test Statistic				1.097	Anderson-Darling GOF Test					
3796	5% A-D Critical Value				0.709	Data Not Gamma Distributed at 5% Significance Level					

A	B	C	D	E	F	G	H	I	J	K	L	
3797	K-S Test Statistic				0.377	Kolmogorov-Smirnov GOF						
3798	5% K-S Critical Value				0.312	Data Not Gamma Distributed at 5% Significance Level						
3799	Data Not Gamma Distributed at 5% Significance Level											
3800												
3801	Gamma Statistics on Detected Data Only											
3802	k hat (MLE)				7.721	k star (bias corrected MLE)				4.507		
3803	Theta hat (MLE)				0.00201	Theta star (bias corrected MLE)				0.00344		
3804	nu hat (MLE)				108.1	nu star (bias corrected)				63.1		
3805	MLE Mean (bias corrected)				0.0155							
3806	MLE Sd (bias corrected)				0.00729	95% Percentile of Chisquare (2kstar)				16.94		
3807												
3808	Gamma ROS Statistics using Imputed Non-Detects											
3809	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
3810	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)											
3811	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
3812	This is especially true when the sample size is small.											
3813	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
3814	Minimum				0.0084	Mean				0.0113		
3815	Maximum				0.02	Median				0.01		
3816	SD				0.00334	CV				0.296		
3817	k hat (MLE)				16.18	k star (bias corrected MLE)				14.73		
3818	Theta hat (MLE)				6.9860E-4	Theta star (bias corrected MLE)				7.6741E-4		
3819	nu hat (MLE)				1068	nu star (bias corrected)				971.9		
3820	MLE Mean (bias corrected)				0.0113	MLE Sd (bias corrected)				0.00294		
3821	95% Percentile of Chisquare (2kstar)				43.11	90% Percentile				0.0152		
3822	95% Percentile				0.0165	99% Percentile				0.0193		
3823	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
3824	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
3825					WH	HW					WH	HW
3826	95% Approx. Gamma UTL with 95% Coverage				0.0184	0.0183	95% Approx. Gamma UPL				0.0166	0.0166
3827	95% Gamma USL				0.0209	0.0209						
3828												
3829	Estimates of Gamma Parameters using KM Estimates											
3830	Mean (KM)				0.0085	SD (KM)				0.00458		
3831	Variance (KM)				2.0981E-5	SE of Mean (KM)				0.00101		
3832	k hat (KM)				3.446	k star (KM)				3.153		
3833	nu hat (KM)				227.4	nu star (KM)				208.1		
3834	theta hat (KM)				0.00247	theta star (KM)				0.0027		
3835	80% gamma percentile (KM)				0.0121	90% gamma percentile (KM)				0.0149		
3836	95% gamma percentile (KM)				0.0176	99% gamma percentile (KM)				0.0234		
3837												
3838	The following statistics are computed using gamma distribution and KM estimates											
3839	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
3840					WH	HW					WH	HW
3841	95% Approx. Gamma UTL with 95% Coverage				0.0187	0.0188	95% Approx. Gamma UPL				0.0159	0.0159
3842	95% KM Gamma Percentile				0.0155	0.0155	95% Gamma USL				0.023	0.0233
3843												
3844	Lognormal GOF Test on Detected Observations Only											
3845	Shapiro Wilk Test Statistic				0.728	Shapiro Wilk GOF Test						
3846	5% Shapiro Wilk Critical Value				0.803	Data Not Lognormal at 5% Significance Level						
3847	Lilliefors Test Statistic				0.358	Lilliefors GOF Test						
3848	5% Lilliefors Critical Value				0.304	Data Not Lognormal at 5% Significance Level						

A	B	C	D	E	F	G	H	I	J	K	L
3849	Data Not Lognormal at 5% Significance Level										
3850											
3851	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects										
3852	Mean in Original Scale	0.00788		Mean in Log Scale	-5.026						
3853	SD in Original Scale	0.00523		SD in Log Scale	0.604						
3854	95% UTL95% Coverage	0.0244		95% BCA UTL95% Coverage	0.02						
3855	95% Bootstrap (%) UTL95% Coverage	0.02		95% UPL (t)	0.0185						
3856	90% Percentile (z)	0.0142		95% Percentile (z)	0.0177						
3857	99% Percentile (z)	0.0267		95% USL	0.0353						
3858											
3859	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution										
3860	KM Mean of Logged Data	-4.872		95% KM UTL (Lognormal)95% Coverage	0.0192						
3861	KM SD of Logged Data	0.421		95% KM UPL (Lognormal)	0.0158						
3862	95% KM Percentile Lognormal (z)	0.0153		95% KM USL (Lognormal)	0.0248						
3863											
3864	Background DL/2 Statistics Assuming Lognormal Distribution										
3865	Mean in Original Scale	0.0096		Mean in Log Scale	-4.768						
3866	SD in Original Scale	0.00469		SD in Log Scale	0.525						
3867	95% UTL95% Coverage	0.0266		95% UPL (t)	0.021						
3868	90% Percentile (z)	0.0166		95% Percentile (z)	0.0201						
3869	99% Percentile (z)	0.0288		95% USL	0.0367						
3870	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
3871											
3872	Nonparametric Distribution Free Background Statistics										
3873	Data do not follow a Discernible Distribution (0.05)										
3874											
3875	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
3876	Order of Statistic, r	33		95% UTL with95% Coverage	0.02						
3877	Approx, f used to compute achieved CC	1.737		Approximate Actual Confidence Coefficient achieved by UTL	0.816						
3878	Approximate Sample Size needed to achieve specified CC	59		95% UPL	0.02						
3879	95% USL	0.02		95% KM Chebyshev UPL	0.0288						
3880											
3881	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
3882	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
3883	and consists of observations collected from clean unimpacted locations.										
3884	The use of USL tends to provide a balance between false positives and false negatives provided the data										
3885	represents a background data set and when many onsite observations need to be compared with the BTV.										
3886											
3887	COPPER, DISSOLVED										
3888											
3889	General Statistics										
3890	Total Number of Observations	34		Number of Missing Observations	97						
3891	Number of Distinct Observations	4									
3892	Number of Detects	3		Number of Non-Detects	31						
3893	Number of Distinct Detects	2		Number of Distinct Non-Detects	3						
3894	Minimum Detect	0.02		Minimum Non-Detect	0.0056						
3895	Maximum Detect	0.3		Maximum Non-Detect	0.02						
3896	Variance Detected	0.0261		Percent Non-Detects	91.18%						
3897	Mean Detected	0.113		SD Detected	0.162						
3898	Mean of Detected Logged Data	-3.009		SD of Detected Logged Data	1.563						
3899											
3900	Warning: Data set has only 3 Detected Values.										

A	B	C	D	E	F	G	H	I	J	K	L
3901	This is not enough to compute meaningful or reliable statistics and estimates.										
3902											
3903											
3904	Critical Values for Background Threshold Values (BTVs)										
3905	Tolerance Factor K (For UTL)			2.166		d2max (for USL)			2.799		
3906											
3907	Normal GOF Test on Detects Only										
3908	Shapiro Wilk Test Statistic			0.75		Shapiro Wilk GOF Test					
3909	5% Shapiro Wilk Critical Value			0.767		Data Not Normal at 5% Significance Level					
3910	Lilliefors Test Statistic			0.385		Lilliefors GOF Test					
3911	5% Lilliefors Critical Value			0.425		Detected Data appear Normal at 5% Significance Level					
3912	Detected Data appear Approximate Normal at 5% Significance Level										
3913											
3914	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
3915	KM Mean			0.0151		KM SD			0.0497		
3916	95% UTL95% Coverage			0.123		95% KM UPL (t)			0.1		
3917	90% KM Percentile (z)			0.0788		95% KM Percentile (z)			0.0969		
3918	99% KM Percentile (z)			0.131		95% KM USL			0.154		
3919											
3920	DL/2 Substitution Background Statistics Assuming Normal Distribution										
3921	Mean			0.0171		SD			0.0502		
3922	95% UTL95% Coverage			0.126		95% UPL (t)			0.103		
3923	90% Percentile (z)			0.0814		95% Percentile (z)			0.0996		
3924	99% Percentile (z)			0.134		95% USL			0.157		
3925	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons										
3926											
3927	Gamma GOF Tests on Detected Observations Only										
3928	Not Enough Data to Perform GOF Test										
3929											
3930	Gamma Statistics on Detected Data Only										
3931	k hat (MLE)			0.723		k star (bias corrected MLE)			N/A		
3932	Theta hat (MLE)			0.157		Theta star (bias corrected MLE)			N/A		
3933	nu hat (MLE)			4.339		nu star (bias corrected)			N/A		
3934	MLE Mean (bias corrected)			N/A							
3935	MLE Sd (bias corrected)			N/A		95% Percentile of Chisquare (2kstar)			N/A		
3936											
3937	Gamma ROS Statistics using Imputed Non-Detects										
3938	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
3939	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)										
3940	For such situations, GROS method may yield incorrect values of UCLs and BTVs										
3941	This is especially true when the sample size is small.										
3942	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
3943	Minimum			0.01		Mean			0.0191		
3944	Maximum			0.3		Median			0.01		
3945	SD			0.0497		CV			2.599		
3946	k hat (MLE)			1.123		k star (bias corrected MLE)			1.044		
3947	Theta hat (MLE)			0.017		Theta star (bias corrected MLE)			0.0183		
3948	nu hat (MLE)			76.37		nu star (bias corrected)			70.97		
3949	MLE Mean (bias corrected)			0.0191		MLE Sd (bias corrected)			0.0187		
3950	95% Percentile of Chisquare (2kstar)			6.159		90% Percentile			0.0436		
3951	95% Percentile			0.0564		99% Percentile			0.0862		
3952	The following statistics are computed using Gamma ROS Statistics on Imputed Data										

A	B	C	D	E	F	G	H	I	J	K	L
3953	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
3954				WH	HW					WH	HW
3955	95% Approx. Gamma UTL with 95% Coverage			0.065	0.0583	95% Approx. Gamma UPL				0.0493	0.0441
3956	95% Gamma USL			0.0921	0.0837						
3957											
3958	Estimates of Gamma Parameters using KM Estimates										
3959	Mean (KM)			0.0151	SD (KM)				0.0497		
3960	Variance (KM)			0.00247	SE of Mean (KM)				0.0104		
3961	k hat (KM)			0.0923	k star (KM)				0.104		
3962	nu hat (KM)			6.28	nu star (KM)				7.059		
3963	theta hat (KM)			0.164	theta star (KM)				0.146		
3964	80% gamma percentile (KM)			0.0111	90% gamma percentile (KM)				0.0408		
3965	95% gamma percentile (KM)			0.0875	99% gamma percentile (KM)				0.235		
3966											
3967	The following statistics are computed using gamma distribution and KM estimates										
3968	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
3969				WH	HW					WH	HW
3970	95% Approx. Gamma UTL with 95% Coverage			0.0557	0.0487	95% Approx. Gamma UPL				0.0406	0.0352
3971	95% KM Gamma Percentile			0.0384	0.0333	95% Gamma USL				0.0827	0.0738
3972											
3973	Lognormal GOF Test on Detected Observations Only										
3974	Shapiro Wilk Test Statistic			0.75	Shapiro Wilk GOF Test						
3975	5% Shapiro Wilk Critical Value			0.767	Data Not Lognormal at 5% Significance Level						
3976	Lilliefors Test Statistic			0.385	Lilliefors GOF Test						
3977	5% Lilliefors Critical Value			0.425	Detected Data appear Lognormal at 5% Significance Level						
3978	Detected Data appear Approximate Lognormal at 5% Significance Level										
3979											
3980	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects										
3981	Mean in Original Scale			0.0101	Mean in Log Scale				-12.7		
3982	SD in Original Scale			0.0514	SD in Log Scale				4.969		
3983	95% UTL95% Coverage			0.145	95% BCA UTL95% Coverage				0.118		
3984	95% Bootstrap (%) UTL95% Coverage			0.3	95% UPL (t)				0.0155		
3985	90% Percentile (z)			0.00178	95% Percentile (z)				0.0108		
3986	99% Percentile (z)			0.321	95% USL				3.365		
3987											
3988	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution										
3989	KM Mean of Logged Data			-4.993	95% KM UTL (Lognormal)95% Coverage				0.0326		
3990	KM SD of Logged Data			0.724	95% KM UPL (Lognormal)				0.0235		
3991	95% KM Percentile Lognormal (z)			0.0223	95% KM USL (Lognormal)				0.0515		
3992											
3993	Background DL/2 Statistics Assuming Lognormal Distribution										
3994	Mean in Original Scale			0.0171	Mean in Log Scale				-4.777		
3995	SD in Original Scale			0.0502	SD in Log Scale				0.814		
3996	95% UTL95% Coverage			0.0491	95% UPL (t)				0.034		
3997	90% Percentile (z)			0.0239	95% Percentile (z)				0.0321		
3998	99% Percentile (z)			0.0559	95% USL				0.0821		
3999	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
4000											
4001	Nonparametric Distribution Free Background Statistics										
4002	Data appear to follow a Discernible Distribution at 5% Significance Level										
4003											
4004	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										

A	B	C	D	E	F	G	H	I	J	K	L
4005	Order of Statistic, r				34	95% UTL with 95% Coverage				0.3	
4006	Approx, f used to compute achieved CC				1.789	Approximate Actual Confidence Coefficient achieved by UTL				0.825	
4007	Approximate Sample Size needed to achieve specified CC				59	95% UPL				0.09	
4008	95% USL				0.3	95% KM Chebyshev UPL				0.235	
4009											
4010	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
4011	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
4012	and consists of observations collected from clean unimpacted locations.										
4013	The use of USL tends to provide a balance between false positives and false negatives provided the data										
4014	represents a background data set and when many onsite observations need to be compared with the BTV.										
4015											
4016	LEAD-FLAMELESS, TOTAL										
4017											
4018	General Statistics										
4019	Total Number of Observations				33	Number of Missing Observations				98	
4020	Number of Distinct Observations				12						
4021	Number of Detects				19	Number of Non-Detects				14	
4022	Number of Distinct Detects				10	Number of Distinct Non-Detects				2	
4023	Minimum Detect				0.0023	Minimum Non-Detect				0.006	
4024	Maximum Detect				0.05	Maximum Non-Detect				0.0067	
4025	Variance Detected				1.4642E-4	Percent Non-Detects				42.42%	
4026	Mean Detected				0.014	SD Detected				0.0121	
4027	Mean of Detected Logged Data				-4.54	SD of Detected Logged Data				0.739	
4028											
4029	Critical Values for Background Threshold Values (BTVs)										
4030	Tolerance Factor K (For UTL)				2.176	d2max (for USL)				2.787	
4031											
4032	Normal GOF Test on Detects Only										
4033	Shapiro Wilk Test Statistic				0.705	Shapiro Wilk GOF Test					
4034	5% Shapiro Wilk Critical Value				0.901	Data Not Normal at 5% Significance Level					
4035	Lilliefors Test Statistic				0.365	Lilliefors GOF Test					
4036	5% Lilliefors Critical Value				0.197	Data Not Normal at 5% Significance Level					
4037	Data Not Normal at 5% Significance Level										
4038											
4039	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
4040	KM Mean				0.00916	KM SD				0.0105	
4041	95% UTL 95% Coverage				0.0321	95% KM UPL (t)				0.0273	
4042	90% KM Percentile (z)				0.0227	95% KM Percentile (z)				0.0265	
4043	99% KM Percentile (z)				0.0337	95% KM USL				0.0385	
4044											
4045	DL/2 Substitution Background Statistics Assuming Normal Distribution										
4046	Mean				0.00932	SD				0.0106	
4047	95% UTL 95% Coverage				0.0324	95% UPL (t)				0.0276	
4048	90% Percentile (z)				0.0229	95% Percentile (z)				0.0268	
4049	99% Percentile (z)				0.034	95% USL				0.0389	
4050	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons										
4051											
4052	Gamma GOF Tests on Detected Observations Only										
4053	A-D Test Statistic				1.266	Anderson-Darling GOF Test					
4054	5% A-D Critical Value				0.752	Data Not Gamma Distributed at 5% Significance Level					
4055	K-S Test Statistic				0.318	Kolmogorov-Smirnov GOF					
4056	5% K-S Critical Value				0.201	Data Not Gamma Distributed at 5% Significance Level					

A	B	C	D	E	F	G	H	I	J	K	L
4057	Data Not Gamma Distributed at 5% Significance Level										
4058											
4059	Gamma Statistics on Detected Data Only										
4060	k hat (MLE)		2.014		k star (bias corrected MLE)				1.731		
4061	Theta hat (MLE)		0.00693		Theta star (bias corrected MLE)				0.00806		
4062	nu hat (MLE)		76.55		nu star (bias corrected)				65.79		
4063	MLE Mean (bias corrected)		0.014								
4064	MLE Sd (bias corrected)		0.0106		95% Percentile of Chisquare (2kstar)				8.603		
4065											
4066	Gamma ROS Statistics using Imputed Non-Detects										
4067	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
4068	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)										
4069	For such situations, GROS method may yield incorrect values of UCLs and BTVs										
4070	This is especially true when the sample size is small.										
4071	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
4072	Minimum		0.0023		Mean				0.0123		
4073	Maximum		0.05		Median				0.01		
4074	SD		0.00929		CV				0.757		
4075	k hat (MLE)		3.137		k star (bias corrected MLE)				2.872		
4076	Theta hat (MLE)		0.00391		Theta star (bias corrected MLE)				0.00428		
4077	nu hat (MLE)		207		nu star (bias corrected)				189.6		
4078	MLE Mean (bias corrected)		0.0123		MLE Sd (bias corrected)				0.00725		
4079	95% Percentile of Chisquare (2kstar)		12.21		90% Percentile				0.022		
4080	95% Percentile		0.0261		99% Percentile				0.035		
4081	The following statistics are computed using Gamma ROS Statistics on Imputed Data										
4082	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
4083			WH		HW				WH		HW
4084	95% Approx. Gamma UTL with 95% Coverage		0.0318		0.0322		95% Approx. Gamma UPL		0.0262		0.0262
4085	95% Gamma USL		0.0406		0.0418						
4086											
4087	Estimates of Gamma Parameters using KM Estimates										
4088	Mean (KM)		0.00916		SD (KM)				0.0105		
4089	Variance (KM)		1.1115E-4		SE of Mean (KM)				0.00189		
4090	k hat (KM)		0.755		k star (KM)				0.707		
4091	nu hat (KM)		49.83		nu star (KM)				46.63		
4092	theta hat (KM)		0.0121		theta star (KM)				0.013		
4093	80% gamma percentile (KM)		0.0151		90% gamma percentile (KM)				0.0229		
4094	95% gamma percentile (KM)		0.0311		99% gamma percentile (KM)				0.0505		
4095											
4096	The following statistics are computed using gamma distribution and KM estimates										
4097	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
4098			WH		HW				WH		HW
4099	95% Approx. Gamma UTL with 95% Coverage		0.0335		0.0345		95% Approx. Gamma UPL		0.0255		0.0257
4100	95% KM Gamma Percentile		0.0243		0.0244		95% Gamma USL		0.0466		0.0497
4101											
4102	Lognormal GOF Test on Detected Observations Only										
4103	Shapiro Wilk Test Statistic		0.904		Shapiro Wilk GOF Test						
4104	5% Shapiro Wilk Critical Value		0.901		Detected Data appear Lognormal at 5% Significance Level						
4105	Lilliefors Test Statistic		0.272		Lilliefors GOF Test						
4106	5% Lilliefors Critical Value		0.197		Data Not Lognormal at 5% Significance Level						
4107	Detected Data appear Approximate Lognormal at 5% Significance Level										
4108											

A	B	C	D	E	F	G	H	I	J	K	L
4109	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects										
4110	Mean in Original Scale			0.00927	Mean in Log Scale			-5.137			
4111	SD in Original Scale			0.0107	SD in Log Scale			0.954			
4112	95% UTL95% Coverage			0.0469	95% BCA UTL95% Coverage			0.044			
4113	95% Bootstrap (%) UTL95% Coverage			0.05	95% UPL (t)			0.0303			
4114	90% Percentile (z)			0.02	95% Percentile (z)			0.0282			
4115	99% Percentile (z)			0.0541	95% USL			0.0839			
4116											
4117	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution										
4118	KM Mean of Logged Data			-5.135	95% KM UTL (Lognormal)95% Coverage			0.0405			
4119	KM SD of Logged Data			0.886	95% KM UPL (Lognormal)			0.027			
4120	95% KM Percentile Lognormal (z)			0.0253	95% KM USL (Lognormal)			0.0696			
4121											
4122	Background DL/2 Statistics Assuming Lognormal Distribution										
4123	Mean in Original Scale			0.00932	Mean in Log Scale			-5.075			
4124	SD in Original Scale			0.0106	SD in Log Scale			0.841			
4125	95% UTL95% Coverage			0.039	95% UPL (t)			0.0266			
4126	90% Percentile (z)			0.0184	95% Percentile (z)			0.0249			
4127	99% Percentile (z)			0.0443	95% USL			0.0652			
4128	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
4129											
4130	Nonparametric Distribution Free Background Statistics										
4131	Data appear to follow a Discernible Distribution at 5% Significance Level										
4132											
4133	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
4134	Order of Statistic, r			33	95% UTL with95% Coverage			0.05			
4135	Approx, f used to compute achieved CC			1.737	Approximate Actual Confidence Coefficient achieved by UTL			0.816			
4136	Approximate Sample Size needed to achieve specified CC			59	95% UPL			0.043			
4137	95% USL			0.05	95% KM Chebyshev UPL			0.0558			
4138											
4139	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
4140	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
4141	and consists of observations collected from clean unimpacted locations.										
4142	The use of USL tends to provide a balance between false positives and false negatives provided the data										
4143	represents a background data set and when many onsite observations need to be compared with the BTV.										
4144											
4145	LEAD, DISSOLVED										
4146											
4147	General Statistics										
4148	Total Number of Observations			34	Number of Missing Observations			97			
4149	Number of Distinct Observations			2							
4150	Number of Detects			1	Number of Non-Detects			33			
4151	Number of Distinct Detects			1	Number of Distinct Non-Detects			2			
4152	Minimum Detect			0.006	Minimum Non-Detect			0.0022			
4153	Maximum Detect			0.006	Maximum Non-Detect			0.006			
4154	Variance Detected			N/A	Percent Non-Detects			97.06%			
4155	Mean Detected			0.006	SD Detected			N/A			
4156	Mean of Detected Logged Data			-5.116	SD of Detected Logged Data			N/A			
4157											
4158	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!										
4159	It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).										
4160											

A	B	C	D	E	F	G	H	I	J	K	L	
4161	The data set for variable LEAD, DISSOLVED was not processed!											
4162												
4163												
4164	MERCURY, TOTAL											
4165												
4166	General Statistics											
4167	Total Number of Observations	34							Number of Missing Observations	97		
4168	Number of Distinct Observations	3										
4169	Number of Detects	1							Number of Non-Detects	33		
4170	Number of Distinct Detects	1							Number of Distinct Non-Detects	2		
4171	Minimum Detect	0.001							Minimum Non-Detect	5.0000E-4		
4172	Maximum Detect	0.001							Maximum Non-Detect	0.5		
4173	Variance Detected	N/A							Percent Non-Detects	97.06%		
4174	Mean Detected	0.001							SD Detected	N/A		
4175	Mean of Detected Logged Data	-6.908							SD of Detected Logged Data	N/A		
4176												
4177	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!											
4178	It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).											
4179												
4180	The data set for variable MERCURY, TOTAL was not processed!											
4181												
4182												
4183	MERCURY, DISSOLVED											
4184												
4185	General Statistics											
4186	Total Number of Observations	34							Number of Missing Observations	97		
4187	Number of Distinct Observations	1										
4188	Number of Detects	0							Number of Non-Detects	34		
4189	Number of Distinct Detects	0							Number of Distinct Non-Detects	1		
4190	Minimum Detect	N/A							Minimum Non-Detect	5.0000E-4		
4191	Maximum Detect	N/A							Maximum Non-Detect	5.0000E-4		
4192	Variance Detected	N/A							Percent Non-Detects	100%		
4193	Mean Detected	N/A							SD Detected	N/A		
4194	Mean of Detected Logged Data	N/A							SD of Detected Logged Data	N/A		
4195												
4196	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
4197	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
4198	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
4199												
4200	The data set for variable MERCURY, DISSOLVED was not processed!											
4201												
4202												
4203	SELENIUM, TOTAL											
4204												
4205	General Statistics											
4206	Total Number of Observations	33							Number of Missing Observations	98		
4207	Number of Distinct Observations	4										
4208	Number of Detects	1							Number of Non-Detects	32		
4209	Number of Distinct Detects	1							Number of Distinct Non-Detects	3		
4210	Minimum Detect	0.004							Minimum Non-Detect	0.0056		
4211	Maximum Detect	0.004							Maximum Non-Detect	0.02		
4212	Variance Detected	N/A							Percent Non-Detects	96.97%		

A	B	C	D	E	F	G	H	I	J	K	L
4213	Mean Detected			0.004	SD Detected			N/A			
4214	Mean of Detected Logged Data			-5.521	SD of Detected Logged Data			N/A			
4215											
4216	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!										
4217	It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).										
4218											
4219	The data set for variable SELENIUM, TOTAL was not processed!										
4220											
4221											
4222	SELENIUM, DISSOLVED										
4223											
4224	General Statistics										
4225	Total Number of Observations			33	Number of Missing Observations			98			
4226	Number of Distinct Observations			3							
4227	Number of Detects			0	Number of Non-Detects			33			
4228	Number of Distinct Detects			0	Number of Distinct Non-Detects			3			
4229	Minimum Detect			N/A	Minimum Non-Detect			0.0056			
4230	Maximum Detect			N/A	Maximum Non-Detect			0.02			
4231	Variance Detected			N/A	Percent Non-Detects			100%			
4232	Mean Detected			N/A	SD Detected			N/A			
4233	Mean of Detected Logged Data			N/A	SD of Detected Logged Data			N/A			
4234											
4235	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
4236	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
4237	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
4238											
4239	The data set for variable SELENIUM, DISSOLVED was not processed!										
4240											
4241											
4242	SILVER, TOTAL										
4243											
4244	General Statistics										
4245	Total Number of Observations			33	Number of Missing Observations			98			
4246	Number of Distinct Observations			5							
4247	Number of Detects			2	Number of Non-Detects			31			
4248	Number of Distinct Detects			2	Number of Distinct Non-Detects			4			
4249	Minimum Detect			0.01	Minimum Non-Detect			0.0022			
4250	Maximum Detect			0.05	Maximum Non-Detect			0.01			
4251	Variance Detected			8.0000E-4	Percent Non-Detects			93.94%			
4252	Mean Detected			0.03	SD Detected			0.0283			
4253	Mean of Detected Logged Data			-3.8	SD of Detected Logged Data			1.138			
4254											
4255	Warning: Data set has only 2 Detected Values.										
4256	This is not enough to compute meaningful or reliable statistics and estimates.										
4257											
4258											
4259	Critical Values for Background Threshold Values (BTVs)										
4260	Tolerance Factor K (For UTL)			2.176	d2max (for USL)			2.787			
4261											
4262	Normal GOF Test on Detects Only										
4263	Not Enough Data to Perform GOF Test										
4264											

A	B	C	D	E	F	G	H	I	J	K	L
4265	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
4266	KM Mean			0.00388	KM SD			0.00826			
4267	95% UTL95% Coverage			0.0219	95% KM UPL (t)			0.0181			
4268	90% KM Percentile (z)			0.0145	95% KM Percentile (z)			0.0175			
4269	99% KM Percentile (z)			0.0231	95% KM USL			0.0269			
4270											
4271	DL/2 Substitution Background Statistics Assuming Normal Distribution										
4272	Mean			0.00535	SD			0.00824			
4273	95% UTL95% Coverage			0.0233	95% UPL (t)			0.0195			
4274	90% Percentile (z)			0.0159	95% Percentile (z)			0.0189			
4275	99% Percentile (z)			0.0245	95% USL			0.0283			
4276	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons										
4277											
4278	Gamma GOF Tests on Detected Observations Only										
4279	Not Enough Data to Perform GOF Test										
4280											
4281	Gamma Statistics on Detected Data Only										
4282	k hat (MLE)			1.851	k star (bias corrected MLE)			N/A			
4283	Theta hat (MLE)			0.0162	Theta star (bias corrected MLE)			N/A			
4284	nu hat (MLE)			7.402	nu star (bias corrected)			N/A			
4285	MLE Mean (bias corrected)			N/A							
4286	MLE Sd (bias corrected)			N/A	95% Percentile of Chisquare (2kstar)			N/A			
4287											
4288	Estimates of Gamma Parameters using KM Estimates										
4289	Mean (KM)			0.00388	SD (KM)			0.00826			
4290	Variance (KM)			6.8242E-5	SE of Mean (KM)			0.00203			
4291	k hat (KM)			0.221	k star (KM)			0.221			
4292	nu hat (KM)			14.6	nu star (KM)			14.6			
4293	theta hat (KM)			0.0176	theta star (KM)			0.0176			
4294	80% gamma percentile (KM)			0.00537	90% gamma percentile (KM)			0.0117			
4295	95% gamma percentile (KM)			0.0195	99% gamma percentile (KM)			0.0405			
4296											
4297	The following statistics are computed using gamma distribution and KM estimates										
4298	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods										
4299				WH	HW				WH	HW	
4300	95% Approx. Gamma UTL with 95% Coverage			0.0127	0.0117	95% Approx. Gamma UPL			0.00977	0.00895	
4301	95% KM Gamma Percentile			0.00933	0.00855	95% Gamma USL			0.0175	0.0163	
4302											
4303	Lognormal GOF Test on Detected Observations Only										
4304	Not Enough Data to Perform GOF Test										
4305											
4306	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects										
4307	Mean in Original Scale			0.00185	Mean in Log Scale			-13.76			
4308	SD in Original Scale			0.00882	SD in Log Scale			4.546			
4309	95% UTL95% Coverage			0.0208	95% BCA UTL95% Coverage			0.05			
4310	95% Bootstrap (%) UTL95% Coverage			0.05	95% UPL (t)			0.00261			
4311	90% Percentile (z)			3.5691E-4	95% Percentile (z)			0.00186			
4312	99% Percentile (z)			0.0413	95% USL			0.334			
4313											
4314	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution										
4315	KM Mean of Logged Data			-5.979	95% KM UTL (Lognormal)95% Coverage			0.0091			
4316	KM SD of Logged Data			0.588	95% KM UPL (Lognormal)			0.00695			

A	B	C	D	E	F	G	H	I	J	K	L
4317	95% KM Percentile Lognormal (z)				0.00666	95% KM USL (Lognormal)				0.013	
4318											
4319	Background DL/2 Statistics Assuming Lognormal Distribution										
4320	Mean in Original Scale			0.00535	Mean in Log Scale			-5.596			
4321	SD in Original Scale			0.00824	SD in Log Scale			0.745			
4322	95% UTL95% Coverage			0.0188	95% UPL (t)			0.0134			
4323	90% Percentile (z)			0.00965	95% Percentile (z)			0.0126			
4324	99% Percentile (z)			0.021	95% USL			0.0296			
4325	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
4326											
4327	Nonparametric Distribution Free Background Statistics										
4328	Data do not follow a Discernible Distribution (0.05)										
4329											
4330	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
4331	Order of Statistic, r		33	95% UTL with95% Coverage				0.05			
4332	Approx, f used to compute achieved CC		1.737	Approximate Actual Confidence Coefficient achieved by UTL				0.816			
4333	Approximate Sample Size needed to achieve specified CC		59	95% UPL				0.022			
4334	95% USL		0.05	95% KM Chebyshev UPL				0.0404			
4335											
4336	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
4337	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
4338	and consists of observations collected from clean unimpacted locations.										
4339	The use of USL tends to provide a balance between false positives and false negatives provided the data										
4340	represents a background data set and when many onsite observations need to be compared with the BTV.										
4341											
4342	SILVER, DISSOLVED										
4343											
4344	General Statistics										
4345	Total Number of Observations		33	Number of Missing Observations				98			
4346	Number of Distinct Observations		3								
4347	Number of Detects		0	Number of Non-Detects				33			
4348	Number of Distinct Detects		0	Number of Distinct Non-Detects				3			
4349	Minimum Detect		N/A	Minimum Non-Detect				0.0022			
4350	Maximum Detect		N/A	Maximum Non-Detect				0.01			
4351	Variance Detected		N/A	Percent Non-Detects				100%			
4352	Mean Detected		N/A	SD Detected				N/A			
4353	Mean of Detected Logged Data		N/A	SD of Detected Logged Data				N/A			
4354											
4355	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
4356	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
4357	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
4358											
4359	The data set for variable SILVER, DISSOLVED was not processed!										
4360											
4361											
4362	ZINC, TOTAL										
4363											
4364	General Statistics										
4365	Total Number of Observations		33	Number of Missing Observations				98			
4366	Number of Distinct Observations		10								
4367	Number of Detects		22	Number of Non-Detects				11			
4368	Number of Distinct Detects		10	Number of Distinct Non-Detects				1			

A	B	C	D	E	F	G	H	I	J	K	L
4369			Minimum Detect	0.02					Minimum Non-Detect	0.06	
4370			Maximum Detect	0.16					Maximum Non-Detect	0.06	
4371			Variance Detected	0.00145					Percent Non-Detects	33.33%	
4372			Mean Detected	0.0545					SD Detected	0.0381	
4373			Mean of Detected Logged Data	-3.129					SD of Detected Logged Data	0.679	
4374											
4375			Critical Values for Background Threshold Values (BTVs)								
4376			Tolerance Factor K (For UTL)	2.176					d2max (for USL)	2.787	
4377											
4378			Normal GOF Test on Detects Only								
4379			Shapiro Wilk Test Statistic	0.853					Shapiro Wilk GOF Test		
4380			5% Shapiro Wilk Critical Value	0.911					Data Not Normal at 5% Significance Level		
4381			Lilliefors Test Statistic	0.183					Lilliefors GOF Test		
4382			5% Lilliefors Critical Value	0.184					Detected Data appear Normal at 5% Significance Level		
4383			Detected Data appear Approximate Normal at 5% Significance Level								
4384											
4385			Kaplan Meier (KM) Background Statistics Assuming Normal Distribution								
4386			KM Mean	0.0461					KM SD	0.0333	
4387			95% UTL95% Coverage	0.119					95% KM UPL (t)	0.103	
4388			90% KM Percentile (z)	0.0888					95% KM Percentile (z)	0.101	
4389			99% KM Percentile (z)	0.124					95% KM USL	0.139	
4390											
4391			DL/2 Substitution Background Statistics Assuming Normal Distribution								
4392			Mean	0.0464					SD	0.0331	
4393			95% UTL95% Coverage	0.118					95% UPL (t)	0.103	
4394			90% Percentile (z)	0.0887					95% Percentile (z)	0.101	
4395			99% Percentile (z)	0.123					95% USL	0.138	
4396			DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons								
4397											
4398			Gamma GOF Tests on Detected Observations Only								
4399			A-D Test Statistic	0.746					Anderson-Darling GOF Test		
4400			5% A-D Critical Value	0.753					Detected data appear Gamma Distributed at 5% Significance Level		
4401			K-S Test Statistic	0.184					Kolmogorov-Smirnov GOF		
4402			5% K-S Critical Value	0.187					Detected data appear Gamma Distributed at 5% Significance Level		
4403			Detected data appear Gamma Distributed at 5% Significance Level								
4404											
4405			Gamma Statistics on Detected Data Only								
4406			k hat (MLE)	2.419					k star (bias corrected MLE)	2.12	
4407			Theta hat (MLE)	0.0225					Theta star (bias corrected MLE)	0.0257	
4408			nu hat (MLE)	106.4					nu star (bias corrected)	93.26	
4409			MLE Mean (bias corrected)	0.0545							
4410			MLE Sd (bias corrected)	0.0375					95% Percentile of Chisquare (2kstar)	9.873	
4411											
4412			Gamma ROS Statistics using Imputed Non-Detects								
4413			GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs								
4414			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)								
4415			For such situations, GROS method may yield incorrect values of UCLs and BTVs								
4416			This is especially true when the sample size is small.								
4417			For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates								
4418			Minimum	0.01					Mean	0.0462	
4419			Maximum	0.16					Median	0.0379	
4420			SD	0.0343					CV	0.743	

A	B	C	D	E	F	G	H	I	J	K	L		
4421	k hat (MLE)			2.261	k star (bias corrected MLE)			2.076					
4422	Theta hat (MLE)			0.0204	Theta star (bias corrected MLE)			0.0222					
4423	nu hat (MLE)			149.2	nu star (bias corrected)			137					
4424	MLE Mean (bias corrected)			0.0462	MLE Sd (bias corrected)			0.032					
4425	95% Percentile of Chisquare (2kstar)			9.732	90% Percentile			0.089					
4426	95% Percentile			0.108	99% Percentile			0.151					
4427	The following statistics are computed using Gamma ROS Statistics on Imputed Data												
4428	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods												
4429				WH	HW				WH	HW			
4430	95% Approx. Gamma UTL with 95% Coverage			0.137	0.142	95% Approx. Gamma UPL			0.11	0.112			
4431	95% Gamma USL			0.18	0.192								
4432													
4433	Estimates of Gamma Parameters using KM Estimates												
4434	Mean (KM)			0.0461	SD (KM)			0.0333					
4435	Variance (KM)			0.00111	SE of Mean (KM)			0.00615					
4436	k hat (KM)			1.913	k star (KM)			1.759					
4437	nu hat (KM)			126.2	nu star (KM)			116.1					
4438	theta hat (KM)			0.0241	theta star (KM)			0.0262					
4439	80% gamma percentile (KM)			0.0701	90% gamma percentile (KM)			0.0924					
4440	95% gamma percentile (KM)			0.114	99% gamma percentile (KM)			0.162					
4441													
4442	The following statistics are computed using gamma distribution and KM estimates												
4443	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods												
4444				WH	HW				WH	HW			
4445	95% Approx. Gamma UTL with 95% Coverage			0.129	0.132	95% Approx. Gamma UPL			0.104	0.105			
4446	95% KM Gamma Percentile			0.101	0.101	95% Gamma USL			0.167	0.175			
4447													
4448	Lognormal GOF Test on Detected Observations Only												
4449	Shapiro Wilk Test Statistic			0.902	Shapiro Wilk GOF Test								
4450	5% Shapiro Wilk Critical Value			0.911	Data Not Lognormal at 5% Significance Level								
4451	Lilliefors Test Statistic			0.193	Lilliefors GOF Test								
4452	5% Lilliefors Critical Value			0.184	Data Not Lognormal at 5% Significance Level								
4453	Data Not Lognormal at 5% Significance Level												
4454													
4455	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects												
4456	Mean in Original Scale			0.0465	Mean in Log Scale			-3.276					
4457	SD in Original Scale			0.0336	SD in Log Scale			0.635					
4458	95% UTL95% Coverage			0.15	95% BCA UTL95% Coverage			0.13					
4459	95% Bootstrap (%) UTL95% Coverage			0.16	95% UPL (t)			0.112					
4460	90% Percentile (z)			0.0852	95% Percentile (z)			0.107					
4461	99% Percentile (z)			0.165	95% USL			0.221					
4462													
4463	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution												
4464	KM Mean of Logged Data			-3.287	95% KM UTL (Lognormal)95% Coverage			0.145					
4465	KM SD of Logged Data			0.623	95% KM UPL (Lognormal)			0.109					
4466	95% KM Percentile Lognormal (z)			0.104	95% KM USL (Lognormal)			0.212					
4467													
4468	Background DL/2 Statistics Assuming Lognormal Distribution												
4469	Mean in Original Scale			0.0464	Mean in Log Scale			-3.255					
4470	SD in Original Scale			0.0331	SD in Log Scale			0.579					
4471	95% UTL95% Coverage			0.136	95% UPL (t)			0.104					
4472	90% Percentile (z)			0.081	95% Percentile (z)			0.1					

A	B	C	D	E	F	G	H	I	J	K	L
4473	99% Percentile (z)			0.148	95% USL					0.194	
4474	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.										
4475											
4476	Nonparametric Distribution Free Background Statistics										
4477	Data appear to follow a Discernible Distribution at 5% Significance Level										
4478											
4479	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)										
4480	Order of Statistic, r			33	95% UTL with 95% Coverage					0.16	
4481	Approx, f used to compute achieved CC			1.737	Approximate Actual Confidence Coefficient achieved by UTL					0.816	
4482	Approximate Sample Size needed to achieve specified CC			59	95% UPL					0.125	
4483	95% USL			0.16	95% KM Chebyshev UPL					0.194	
4484											
4485	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
4486	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
4487	and consists of observations collected from clean unimpacted locations.										
4488	The use of USL tends to provide a balance between false positives and false negatives provided the data										
4489	represents a background data set and when many onsite observations need to be compared with the BTV.										
4490											
4491	ZINC, DISSOLVED										
4492											
4493	General Statistics										
4494	Total Number of Observations			34	Number of Missing Observations					97	
4495	Number of Distinct Observations			7							
4496	Number of Detects			20	Number of Non-Detects					14	
4497	Number of Distinct Detects			7	Number of Distinct Non-Detects					2	
4498	Minimum Detect			0.01	Minimum Non-Detect					0.02	
4499	Maximum Detect			0.28	Maximum Non-Detect					0.06	
4500	Variance Detected			0.00449	Percent Non-Detects					41.18%	
4501	Mean Detected			0.059	SD Detected					0.067	
4502	Mean of Detected Logged Data			-3.341	SD of Detected Logged Data					1.025	
4503											
4504	Critical Values for Background Threshold Values (BTVs)										
4505	Tolerance Factor K (For UTL)			2.166	d2max (for USL)					2.799	
4506											
4507	Normal GOF Test on Detects Only										
4508	Shapiro Wilk Test Statistic			0.727	Shapiro Wilk GOF Test						
4509	5% Shapiro Wilk Critical Value			0.905	Data Not Normal at 5% Significance Level						
4510	Lilliefors Test Statistic			0.27	Lilliefors GOF Test						
4511	5% Lilliefors Critical Value			0.192	Data Not Normal at 5% Significance Level						
4512	Data Not Normal at 5% Significance Level										
4513											
4514	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution										
4515	KM Mean			0.0411	KM SD					0.0546	
4516	95% UTL 95% Coverage			0.159	95% KM UPL (t)					0.135	
4517	90% KM Percentile (z)			0.111	95% KM Percentile (z)					0.131	
4518	99% KM Percentile (z)			0.168	95% KM USL					0.194	
4519											
4520	DL/2 Substitution Background Statistics Assuming Normal Distribution										
4521	Mean			0.0465	SD					0.0532	
4522	95% UTL 95% Coverage			0.162	95% UPL (t)					0.138	
4523	90% Percentile (z)			0.115	95% Percentile (z)					0.134	
4524	99% Percentile (z)			0.17	95% USL					0.195	

A	B	C	D	E	F	G	H	I	J	K	L	
4525	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
4526												
4527	Gamma GOF Tests on Detected Observations Only											
4528	A-D Test Statistic			1.03	Anderson-Darling GOF Test							
4529	5% A-D Critical Value			0.766	Data Not Gamma Distributed at 5% Significance Level							
4530	K-S Test Statistic			0.286	Kolmogorov-Smirnov GOF							
4531	5% K-S Critical Value			0.199	Data Not Gamma Distributed at 5% Significance Level							
4532	Data Not Gamma Distributed at 5% Significance Level											
4533												
4534	Gamma Statistics on Detected Data Only											
4535	k hat (MLE)			1.116	k star (bias corrected MLE)			0.982				
4536	Theta hat (MLE)			0.0528	Theta star (bias corrected MLE)			0.0601				
4537	nu hat (MLE)			44.66	nu star (bias corrected)			39.29				
4538	MLE Mean (bias corrected)			0.059								
4539	MLE Sd (bias corrected)			0.0595	95% Percentile of Chisquare (2kstar)			5.923				
4540												
4541	Gamma ROS Statistics using Imputed Non-Detects											
4542	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
4543	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)											
4544	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
4545	This is especially true when the sample size is small.											
4546	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
4547	Minimum			0.01	Mean			0.0425				
4548	Maximum			0.28	Median			0.02				
4549	SD			0.0554	CV			1.304				
4550	k hat (MLE)			1.093	k star (bias corrected MLE)			1.017				
4551	Theta hat (MLE)			0.0388	Theta star (bias corrected MLE)			0.0418				
4552	nu hat (MLE)			74.36	nu star (bias corrected)			69.13				
4553	MLE Mean (bias corrected)			0.0425	MLE Sd (bias corrected)			0.0421				
4554	95% Percentile of Chisquare (2kstar)			6.056	90% Percentile			0.0973				
4555	95% Percentile			0.126	99% Percentile			0.194				
4556	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
4557	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
4558				WH	HW				WH	HW		
4559	95% Approx. Gamma UTL with 95% Coverage			0.167	0.172	95% Approx. Gamma UPL			0.125	0.126		
4560	95% Gamma USL			0.24	0.257							
4561												
4562	Estimates of Gamma Parameters using KM Estimates											
4563	Mean (KM)			0.0411	SD (KM)			0.0546				
4564	Variance (KM)			0.00298	SE of Mean (KM)			0.00964				
4565	k hat (KM)			0.565	k star (KM)			0.535				
4566	nu hat (KM)			38.44	nu star (KM)			36.38				
4567	theta hat (KM)			0.0726	theta star (KM)			0.0767				
4568	80% gamma percentile (KM)			0.0676	90% gamma percentile (KM)			0.109				
4569	95% gamma percentile (KM)			0.154	99% gamma percentile (KM)			0.263				
4570												
4571	The following statistics are computed using gamma distribution and KM estimates											
4572	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
4573				WH	HW				WH	HW		
4574	95% Approx. Gamma UTL with 95% Coverage			0.156	0.159	95% Approx. Gamma UPL			0.118	0.117		
4575	95% KM Gamma Percentile			0.112	0.111	95% Gamma USL			0.223	0.236		
4576												

A	B	C	D	E	F	G	H	I	J	K	L	
4577	Lognormal GOF Test on Detected Observations Only											
4578	Shapiro Wilk Test Statistic			0.899	Shapiro Wilk GOF Test							
4579	5% Shapiro Wilk Critical Value			0.905	Data Not Lognormal at 5% Significance Level							
4580	Lilliefors Test Statistic			0.261	Lilliefors GOF Test							
4581	5% Lilliefors Critical Value			0.192	Data Not Lognormal at 5% Significance Level							
4582	Data Not Lognormal at 5% Significance Level											
4583												
4584	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
4585	Mean in Original Scale			0.0425	Mean in Log Scale			-3.674				
4586	SD in Original Scale			0.0551	SD in Log Scale			0.965				
4587	95% UTL95% Coverage			0.205	95% BCA UTL95% Coverage			0.202				
4588	95% Bootstrap (%) UTL95% Coverage			0.28	95% UPL (t)			0.133				
4589	90% Percentile (z)			0.0874	95% Percentile (z)			0.124				
4590	99% Percentile (z)			0.24	95% USL			0.378				
4591												
4592	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
4593	KM Mean of Logged Data			-3.707	95% KM UTL (Lognormal)95% Coverage			0.176				
4594	KM SD of Logged Data			0.91	95% KM UPL (Lognormal)			0.117				
4595	95% KM Percentile Lognormal (z)			0.11	95% KM USL (Lognormal)			0.313				
4596												
4597	Background DL/2 Statistics Assuming Lognormal Distribution											
4598	Mean in Original Scale			0.0465	Mean in Log Scale			-3.441				
4599	SD in Original Scale			0.0532	SD in Log Scale			0.809				
4600	95% UTL95% Coverage			0.185	95% UPL (t)			0.128				
4601	90% Percentile (z)			0.0902	95% Percentile (z)			0.121				
4602	99% Percentile (z)			0.21	95% USL			0.308				
4603	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
4604												
4605	Nonparametric Distribution Free Background Statistics											
4606	Data do not follow a Discernible Distribution (0.05)											
4607												
4608	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
4609	Order of Statistic, r			34	95% UTL with95% Coverage			0.28				
4610	Approx, f used to compute achieved CC			1.789	Approximate Actual Confidence Coefficient achieved by UTL			0.825				
4611	Approximate Sample Size needed to achieve specified CC			59	95% UPL			0.19				
4612	95% USL			0.28	95% KM Chebyshev UPL			0.283				
4613												
4614	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
4615	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
4616	and consists of observations collected from clean unimpacted locations.											
4617	The use of USL tends to provide a balance between false positives and false negatives provided the data											
4618	represents a background data set and when many onsite observations need to be compared with the BTV.											
4619												
4620	BROMOFORM											
4621												
4622	General Statistics											
4623	Total Number of Observations			81	Number of Missing Observations			50				
4624	Number of Distinct Observations			2								
4625	Number of Detects			1	Number of Non-Detects			80				
4626	Number of Distinct Detects			1	Number of Distinct Non-Detects			1				
4627	Minimum Detect			2	Minimum Non-Detect			1				
4628	Maximum Detect			2	Maximum Non-Detect			1				

A	B	C	D	E	F	G	H	I	J	K	L
4629			Variance Detected		N/A				Percent Non-Detects		98.77%
4630			Mean Detected		2				SD Detected		N/A
4631			Mean of Detected Logged Data		0.693				SD of Detected Logged Data		N/A
4632											
4633			Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!								
4634			It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).								
4635											
4636			The data set for variable BROMOFORM was not processed!								
4637											
4638											
4639			BROMOMETHANE								
4640											
4641			General Statistics								
4642			Total Number of Observations		81				Number of Missing Observations		50
4643			Number of Distinct Observations		3						
4644			Number of Detects		1				Number of Non-Detects		80
4645			Number of Distinct Detects		1				Number of Distinct Non-Detects		2
4646			Minimum Detect		5				Minimum Non-Detect		1
4647			Maximum Detect		5				Maximum Non-Detect		3
4648			Variance Detected		N/A				Percent Non-Detects		98.77%
4649			Mean Detected		5				SD Detected		N/A
4650			Mean of Detected Logged Data		1.609				SD of Detected Logged Data		N/A
4651											
4652			Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!								
4653			It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).								
4654											
4655			The data set for variable BROMOMETHANE was not processed!								
4656											
4657											
4658			CARBON TETRACHLORIDE								
4659											
4660			General Statistics								
4661			Total Number of Observations		81				Number of Missing Observations		50
4662			Number of Distinct Observations		1						
4663			Number of Detects		0				Number of Non-Detects		81
4664			Number of Distinct Detects		0				Number of Distinct Non-Detects		1
4665			Minimum Detect		N/A				Minimum Non-Detect		1
4666			Maximum Detect		N/A				Maximum Non-Detect		1
4667			Variance Detected		N/A				Percent Non-Detects		100%
4668			Mean Detected		N/A				SD Detected		N/A
4669			Mean of Detected Logged Data		N/A				SD of Detected Logged Data		N/A
4670											
4671			Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!								
4672			Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!								
4673			The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).								
4674											
4675			The data set for variable CARBON TETRACHLORIDE was not processed!								
4676											
4677											
4678			CHLOROBENZENE								
4679											
4680			General Statistics								

A	B	C	D	E	F	G	H	I	J	K	L
4681	Total Number of Observations			81	Number of Missing Observations			50			
4682	Number of Distinct Observations			2							
4683	Number of Detects			0	Number of Non-Detects			81			
4684	Number of Distinct Detects			0	Number of Distinct Non-Detects			2			
4685	Minimum Detect			N/A	Minimum Non-Detect			1			
4686	Maximum Detect			N/A	Maximum Non-Detect			2			
4687	Variance Detected			N/A	Percent Non-Detects			100%			
4688	Mean Detected			N/A	SD Detected			N/A			
4689	Mean of Detected Logged Data			N/A	SD of Detected Logged Data			N/A			
4690											
4691	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
4692	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
4693	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
4694											
4695	The data set for variable CHLOROBENZENE was not processed!										
4696											
4697											
4698	CHLOROETHANE										
4699											
4700	General Statistics										
4701	Total Number of Observations			81	Number of Missing Observations			50			
4702	Number of Distinct Observations			2							
4703	Number of Detects			0	Number of Non-Detects			81			
4704	Number of Distinct Detects			0	Number of Distinct Non-Detects			2			
4705	Minimum Detect			N/A	Minimum Non-Detect			1			
4706	Maximum Detect			N/A	Maximum Non-Detect			2			
4707	Variance Detected			N/A	Percent Non-Detects			100%			
4708	Mean Detected			N/A	SD Detected			N/A			
4709	Mean of Detected Logged Data			N/A	SD of Detected Logged Data			N/A			
4710											
4711	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
4712	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
4713	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
4714											
4715	The data set for variable CHLOROETHANE was not processed!										
4716											
4717											
4718	DIBROMOCHLOROMETHANE (CHLORODIBROMOMETHANE)										
4719											
4720	General Statistics										
4721	Total Number of Observations			81	Number of Missing Observations			50			
4722	Number of Distinct Observations			1							
4723	Number of Detects			0	Number of Non-Detects			81			
4724	Number of Distinct Detects			0	Number of Distinct Non-Detects			1			
4725	Minimum Detect			N/A	Minimum Non-Detect			1			
4726	Maximum Detect			N/A	Maximum Non-Detect			1			
4727	Variance Detected			N/A	Percent Non-Detects			100%			
4728	Mean Detected			N/A	SD Detected			N/A			
4729	Mean of Detected Logged Data			N/A	SD of Detected Logged Data			N/A			
4730											
4731	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
4732	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										

A	B	C	D	E	F	G	H	I	J	K	L	
4733	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
4734												
4735	The data set for variable DIBROMOCHLOROMETHANE (CHLORODIBROMOMETHANE) was not processed!											
4736												
4737												
4738	CHLOROMETHANE											
4739												
4740	General Statistics											
4741	Total Number of Observations	81							Number of Missing Observations	50		
4742	Number of Distinct Observations	4										
4743	Number of Detects	1							Number of Non-Detects	80		
4744	Number of Distinct Detects	1							Number of Distinct Non-Detects	3		
4745	Minimum Detect	5							Minimum Non-Detect	1		
4746	Maximum Detect	5							Maximum Non-Detect	3		
4747	Variance Detected	N/A							Percent Non-Detects	98.77%		
4748	Mean Detected	5							SD Detected	N/A		
4749	Mean of Detected Logged Data	1.609							SD of Detected Logged Data	N/A		
4750												
4751	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!											
4752	It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).											
4753												
4754	The data set for variable CHLOROMETHANE was not processed!											
4755												
4756												
4757	3-CHLORO-1-PROPENE											
4758												
4759	General Statistics											
4760	Total Number of Observations	65							Number of Missing Observations	66		
4761	Number of Distinct Observations	2										
4762	Number of Detects	0							Number of Non-Detects	65		
4763	Number of Distinct Detects	0							Number of Distinct Non-Detects	2		
4764	Minimum Detect	N/A							Minimum Non-Detect	1		
4765	Maximum Detect	N/A							Maximum Non-Detect	2		
4766	Variance Detected	N/A							Percent Non-Detects	100%		
4767	Mean Detected	N/A							SD Detected	N/A		
4768	Mean of Detected Logged Data	N/A							SD of Detected Logged Data	N/A		
4769												
4770	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
4771	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
4772	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
4773												
4774	The data set for variable 3-CHLORO-1-PROPENE was not processed!											
4775												
4776												
4777	1,2-DICHLOROBENZENE											
4778												
4779	General Statistics											
4780	Total Number of Observations	67							Number of Missing Observations	64		
4781	Number of Distinct Observations	2										
4782	Number of Detects	0							Number of Non-Detects	67		
4783	Number of Distinct Detects	0							Number of Distinct Non-Detects	2		
4784	Minimum Detect	N/A							Minimum Non-Detect	1		

A	B	C	D	E	F	G	H	I	J	K	L
4785				Maximum Detect	N/A				Maximum Non-Detect		2
4786				Variance Detected	N/A				Percent Non-Detects		100%
4787				Mean Detected	N/A				SD Detected		N/A
4788				Mean of Detected Logged Data	N/A				SD of Detected Logged Data		N/A
4789											
4790	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
4791	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
4792	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
4793											
4794	The data set for variable 1,2-DICHLOROBENZENE was not processed!										
4795											
4796											
4797	1,3-DICHLOROBENZENE										
4798											
4799	General Statistics										
4800				Total Number of Observations	65				Number of Missing Observations		66
4801				Number of Distinct Observations	2						
4802				Number of Detects	0				Number of Non-Detects		65
4803				Number of Distinct Detects	0				Number of Distinct Non-Detects		2
4804				Minimum Detect	N/A				Minimum Non-Detect		1
4805				Maximum Detect	N/A				Maximum Non-Detect		2
4806				Variance Detected	N/A				Percent Non-Detects		100%
4807				Mean Detected	N/A				SD Detected		N/A
4808				Mean of Detected Logged Data	N/A				SD of Detected Logged Data		N/A
4809											
4810	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
4811	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
4812	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
4813											
4814	The data set for variable 1,3-DICHLOROBENZENE was not processed!										
4815											
4816											
4817	1,4-DICHLOROBENZENE										
4818											
4819	General Statistics										
4820				Total Number of Observations	66				Number of Missing Observations		65
4821				Number of Distinct Observations	2						
4822				Number of Detects	0				Number of Non-Detects		66
4823				Number of Distinct Detects	0				Number of Distinct Non-Detects		2
4824				Minimum Detect	N/A				Minimum Non-Detect		1
4825				Maximum Detect	N/A				Maximum Non-Detect		2
4826				Variance Detected	N/A				Percent Non-Detects		100%
4827				Mean Detected	N/A				SD Detected		N/A
4828				Mean of Detected Logged Data	N/A				SD of Detected Logged Data		N/A
4829											
4830	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
4831	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
4832	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
4833											
4834	The data set for variable 1,4-DICHLOROBENZENE was not processed!										
4835											
4836											

A	B	C	D	E	F	G	H	I	J	K	L
4837	DICHLORODIFLUOROMETHANE										
4838											
4839	General Statistics										
4840	Total Number of Observations			66		Number of Missing Observations			65		
4841	Number of Distinct Observations			2							
4842	Number of Detects			0		Number of Non-Detects			66		
4843	Number of Distinct Detects			0		Number of Distinct Non-Detects			2		
4844	Minimum Detect			N/A		Minimum Non-Detect			1		
4845	Maximum Detect			N/A		Maximum Non-Detect			2		
4846	Variance Detected			N/A		Percent Non-Detects			100%		
4847	Mean Detected			N/A		SD Detected			N/A		
4848	Mean of Detected Logged Data			N/A		SD of Detected Logged Data			N/A		
4849											
4850	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
4851	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
4852	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
4853											
4854	The data set for variable DICHLORODIFLUOROMETHANE was not processed!										
4855											
4856											
4857	1,2-DICHLOROPROPANE										
4858											
4859	General Statistics										
4860	Total Number of Observations			81		Number of Missing Observations			50		
4861	Number of Distinct Observations			2							
4862	Number of Detects			0		Number of Non-Detects			81		
4863	Number of Distinct Detects			0		Number of Distinct Non-Detects			2		
4864	Minimum Detect			N/A		Minimum Non-Detect			1		
4865	Maximum Detect			N/A		Maximum Non-Detect			2		
4866	Variance Detected			N/A		Percent Non-Detects			100%		
4867	Mean Detected			N/A		SD Detected			N/A		
4868	Mean of Detected Logged Data			N/A		SD of Detected Logged Data			N/A		
4869											
4870	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
4871	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
4872	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
4873											
4874	The data set for variable 1,2-DICHLOROPROPANE was not processed!										
4875											
4876											
4877	cis 1,3-DICHLOROPROPENE										
4878											
4879	General Statistics										
4880	Total Number of Observations			73		Number of Missing Observations			58		
4881	Number of Distinct Observations			2							
4882	Number of Detects			0		Number of Non-Detects			73		
4883	Number of Distinct Detects			0		Number of Distinct Non-Detects			2		
4884	Minimum Detect			N/A		Minimum Non-Detect			1		
4885	Maximum Detect			N/A		Maximum Non-Detect			2		
4886	Variance Detected			N/A		Percent Non-Detects			100%		
4887	Mean Detected			N/A		SD Detected			N/A		
4888	Mean of Detected Logged Data			N/A		SD of Detected Logged Data			N/A		

A	B	C	D	E	F	G	H	I	J	K	L	
4889												
4890	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
4891	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
4892	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
4893												
4894	The data set for variable cis 1,3-DICHLOROPROPENE was not processed!											
4895												
4896												
4897	trans 1,3-DICHLOROPROPENE											
4898												
4899	General Statistics											
4900	Total Number of Observations	72						Number of Missing Observations	59			
4901	Number of Distinct Observations	2										
4902	Number of Detects	0						Number of Non-Detects	72			
4903	Number of Distinct Detects	0						Number of Distinct Non-Detects	2			
4904	Minimum Detect	N/A						Minimum Non-Detect	1			
4905	Maximum Detect	N/A						Maximum Non-Detect	2			
4906	Variance Detected	N/A						Percent Non-Detects	100%			
4907	Mean Detected	N/A						SD Detected	N/A			
4908	Mean of Detected Logged Data	N/A						SD of Detected Logged Data	N/A			
4909												
4910	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
4911	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
4912	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
4913												
4914	The data set for variable trans 1,3-DICHLOROPROPENE was not processed!											
4915												
4916												
4917	2-BUTANONE (MEK)											
4918												
4919	General Statistics											
4920	Total Number of Observations	66						Number of Missing Observations	65			
4921	Number of Distinct Observations	1										
4922	Number of Detects	0						Number of Non-Detects	66			
4923	Number of Distinct Detects	0						Number of Distinct Non-Detects	1			
4924	Minimum Detect	N/A						Minimum Non-Detect	10			
4925	Maximum Detect	N/A						Maximum Non-Detect	10			
4926	Variance Detected	N/A						Percent Non-Detects	100%			
4927	Mean Detected	N/A						SD Detected	N/A			
4928	Mean of Detected Logged Data	N/A						SD of Detected Logged Data	N/A			
4929												
4930	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
4931	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
4932	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
4933												
4934	The data set for variable 2-BUTANONE (MEK) was not processed!											
4935												
4936												
4937	4-METHYL-2-PENTANONE (MIBK)											
4938												
4939	General Statistics											
4940	Total Number of Observations	66						Number of Missing Observations	65			

A	B	C	D	E	F	G	H	I	J	K	L
4941	Number of Distinct Observations				1						
4942	Number of Detects				0	Number of Non-Detects					66
4943	Number of Distinct Detects				0	Number of Distinct Non-Detects					1
4944	Minimum Detect				N/A	Minimum Non-Detect					5
4945	Maximum Detect				N/A	Maximum Non-Detect					5
4946	Variance Detected				N/A	Percent Non-Detects					100%
4947	Mean Detected				N/A	SD Detected					N/A
4948	Mean of Detected Logged Data				N/A	SD of Detected Logged Data					N/A
4949											
4950	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
4951	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
4952	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
4953											
4954	The data set for variable 4-METHYL-2-PENTANONE (MIBK) was not processed!										
4955											
4956											
4957	1,1,1,2-TETRACHLOROETHANE										
4958											
4959	General Statistics										
4960	Total Number of Observations				67	Number of Missing Observations					64
4961	Number of Distinct Observations				1						
4962	Number of Detects				0	Number of Non-Detects					67
4963	Number of Distinct Detects				0	Number of Distinct Non-Detects					1
4964	Minimum Detect				N/A	Minimum Non-Detect					1
4965	Maximum Detect				N/A	Maximum Non-Detect					1
4966	Variance Detected				N/A	Percent Non-Detects					100%
4967	Mean Detected				N/A	SD Detected					N/A
4968	Mean of Detected Logged Data				N/A	SD of Detected Logged Data					N/A
4969											
4970	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
4971	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
4972	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
4973											
4974	The data set for variable 1,1,1,2-TETRACHLOROETHANE was not processed!										
4975											
4976											
4977	1,1,2,2-TETRACHLOROETHANE										
4978											
4979	General Statistics										
4980	Total Number of Observations				81	Number of Missing Observations					50
4981	Number of Distinct Observations				2						
4982	Number of Detects				1	Number of Non-Detects					80
4983	Number of Distinct Detects				1	Number of Distinct Non-Detects					1
4984	Minimum Detect				2	Minimum Non-Detect					1
4985	Maximum Detect				2	Maximum Non-Detect					1
4986	Variance Detected				N/A	Percent Non-Detects					98.77%
4987	Mean Detected				2	SD Detected					N/A
4988	Mean of Detected Logged Data				0.693	SD of Detected Logged Data					N/A
4989											
4990	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!										
4991	It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).										
4992											

A	B	C	D	E	F	G	H	I	J	K	L	
4993	The data set for variable 1,1,2,2-TETRACHLOROETHANE was not processed!											
4994												
4995												
4996	1,1,2-TRICHLOROETHANE											
4997												
4998	General Statistics											
4999	Total Number of Observations	81	Number of Missing Observations						50			
5000	Number of Distinct Observations	1										
5001	Number of Detects	0	Number of Non-Detects						81			
5002	Number of Distinct Detects	0	Number of Distinct Non-Detects						1			
5003	Minimum Detect	N/A	Minimum Non-Detect						1			
5004	Maximum Detect	N/A	Maximum Non-Detect						1			
5005	Variance Detected	N/A	Percent Non-Detects						100%			
5006	Mean Detected	N/A	SD Detected						N/A			
5007	Mean of Detected Logged Data	N/A	SD of Detected Logged Data						N/A			
5008												
5009	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
5010	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
5011	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
5012												
5013	The data set for variable 1,1,2-TRICHLOROETHANE was not processed!											
5014												
5015												
5016	TRICHLOROFLUOROMETHANE											
5017												
5018	General Statistics											
5019	Total Number of Observations	79	Number of Missing Observations						52			
5020	Number of Distinct Observations	1										
5021	Number of Detects	0	Number of Non-Detects						79			
5022	Number of Distinct Detects	0	Number of Distinct Non-Detects						1			
5023	Minimum Detect	N/A	Minimum Non-Detect						1			
5024	Maximum Detect	N/A	Maximum Non-Detect						1			
5025	Variance Detected	N/A	Percent Non-Detects						100%			
5026	Mean Detected	N/A	SD Detected						N/A			
5027	Mean of Detected Logged Data	N/A	SD of Detected Logged Data						N/A			
5028												
5029	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
5030	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
5031	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
5032												
5033	The data set for variable TRICHLOROFLUOROMETHANE was not processed!											
5034												
5035												
5036	1,2,3-TRICHLOROPROPANE											
5037												
5038	General Statistics											
5039	Total Number of Observations	67	Number of Missing Observations						64			
5040	Number of Distinct Observations	2										
5041	Number of Detects	0	Number of Non-Detects						67			
5042	Number of Distinct Detects	0	Number of Distinct Non-Detects						2			
5043	Minimum Detect	N/A	Minimum Non-Detect						1			
5044	Maximum Detect	N/A	Maximum Non-Detect						2			

A	B	C	D	E	F	G	H	I	J	K	L
5045			Variance Detected		N/A				Percent Non-Detects		100%
5046			Mean Detected		N/A				SD Detected		N/A
5047			Mean of Detected Logged Data		N/A				SD of Detected Logged Data		N/A
5048											
5049	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
5050	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
5051	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
5052											
5053	The data set for variable 1,2,3-TRICHLOROPROPANE was not processed!										
5054											
5055											
5056	ACETONE										
5057											
5058	General Statistics										
5059		Total Number of Observations	49						Number of Missing Observations		82
5060		Number of Distinct Observations	2								
5061		Number of Detects	0						Number of Non-Detects		49
5062		Number of Distinct Detects	0						Number of Distinct Non-Detects		2
5063		Minimum Detect	N/A						Minimum Non-Detect		10
5064		Maximum Detect	N/A						Maximum Non-Detect		20
5065		Variance Detected	N/A						Percent Non-Detects		100%
5066		Mean Detected	N/A						SD Detected		N/A
5067		Mean of Detected Logged Data	N/A						SD of Detected Logged Data		N/A
5068											
5069	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
5070	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
5071	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
5072											
5073	The data set for variable ACETONE was not processed!										
5074											
5075											
5076	ACRYLONITRILE										
5077											
5078	General Statistics										
5079		Total Number of Observations	49						Number of Missing Observations		82
5080		Number of Distinct Observations	1								
5081		Number of Detects	0						Number of Non-Detects		49
5082		Number of Distinct Detects	0						Number of Distinct Non-Detects		1
5083		Minimum Detect	N/A						Minimum Non-Detect		5
5084		Maximum Detect	N/A						Maximum Non-Detect		5
5085		Variance Detected	N/A						Percent Non-Detects		100%
5086		Mean Detected	N/A						SD Detected		N/A
5087		Mean of Detected Logged Data	N/A						SD of Detected Logged Data		N/A
5088											
5089	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
5090	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
5091	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
5092											
5093	The data set for variable ACRYLONITRILE was not processed!										
5094											
5095											
5096	BROMOCHLOROMETHANE (CHLOROBROMOMETHANE)										

A	B	C	D	E	F	G	H	I	J	K	L
5097											
5098	General Statistics										
5099	Total Number of Observations			49	Number of Missing Observations			82			
5100	Number of Distinct Observations			2							
5101	Number of Detects			0	Number of Non-Detects			49			
5102	Number of Distinct Detects			0	Number of Distinct Non-Detects			2			
5103	Minimum Detect			N/A	Minimum Non-Detect			1			
5104	Maximum Detect			N/A	Maximum Non-Detect			5			
5105	Variance Detected			N/A	Percent Non-Detects			100%			
5106	Mean Detected			N/A	SD Detected			N/A			
5107	Mean of Detected Logged Data			N/A	SD of Detected Logged Data			N/A			
5108											
5109	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
5110	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
5111	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
5112											
5113	The data set for variable BROMOCHLOROMETHANE (CHLOROBROMOMETHANE) was not processed!										
5114											
5115											
5116	BROMODICHLOROMETHANE										
5117											
5118	General Statistics										
5119	Total Number of Observations			66	Number of Missing Observations			65			
5120	Number of Distinct Observations			1							
5121	Number of Detects			0	Number of Non-Detects			66			
5122	Number of Distinct Detects			0	Number of Distinct Non-Detects			1			
5123	Minimum Detect			N/A	Minimum Non-Detect			1			
5124	Maximum Detect			N/A	Maximum Non-Detect			1			
5125	Variance Detected			N/A	Percent Non-Detects			100%			
5126	Mean Detected			N/A	SD Detected			N/A			
5127	Mean of Detected Logged Data			N/A	SD of Detected Logged Data			N/A			
5128											
5129	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
5130	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
5131	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
5132											
5133	The data set for variable BROMODICHLOROMETHANE was not processed!										
5134											
5135											
5136	CARBON DISULFIDE										
5137											
5138	General Statistics										
5139	Total Number of Observations			49	Number of Missing Observations			82			
5140	Number of Distinct Observations			2							
5141	Number of Detects			0	Number of Non-Detects			49			
5142	Number of Distinct Detects			0	Number of Distinct Non-Detects			2			
5143	Minimum Detect			N/A	Minimum Non-Detect			1			
5144	Maximum Detect			N/A	Maximum Non-Detect			5			
5145	Variance Detected			N/A	Percent Non-Detects			100%			
5146	Mean Detected			N/A	SD Detected			N/A			
5147	Mean of Detected Logged Data			N/A	SD of Detected Logged Data			N/A			
5148											

A	B	C	D	E	F	G	H	I	J	K	L	
5149	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
5150	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
5151	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
5152												
5153	The data set for variable CARBON DISULFIDE was not processed!											
5154												
5155												
5156	CHLOROFORM											
5157												
5158	General Statistics											
5159	Total Number of Observations	66							Number of Missing Observations	65		
5160	Number of Distinct Observations	1										
5161	Number of Detects	0							Number of Non-Detects	66		
5162	Number of Distinct Detects	0							Number of Distinct Non-Detects	1		
5163	Minimum Detect	N/A							Minimum Non-Detect	1		
5164	Maximum Detect	N/A							Maximum Non-Detect	1		
5165	Variance Detected	N/A							Percent Non-Detects	100%		
5166	Mean Detected	N/A							SD Detected	N/A		
5167	Mean of Detected Logged Data	N/A							SD of Detected Logged Data	N/A		
5168												
5169	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
5170	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
5171	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
5172												
5173	The data set for variable CHLOROFORM was not processed!											
5174												
5175												
5176	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)											
5177												
5178	General Statistics											
5179	Total Number of Observations	49							Number of Missing Observations	82		
5180	Number of Distinct Observations	4										
5181	Number of Detects	0							Number of Non-Detects	49		
5182	Number of Distinct Detects	0							Number of Distinct Non-Detects	4		
5183	Minimum Detect	N/A							Minimum Non-Detect	0.1		
5184	Maximum Detect	N/A							Maximum Non-Detect	7		
5185	Variance Detected	N/A							Percent Non-Detects	100%		
5186	Mean Detected	N/A							SD Detected	N/A		
5187	Mean of Detected Logged Data	N/A							SD of Detected Logged Data	N/A		
5188												
5189	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
5190	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
5191	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
5192												
5193	The data set for variable 1,2-DIBROMO-3-CHLOROPROPANE (DBCP) was not processed!											
5194												
5195												
5196	trans 1,4-DICHLORO-2-BUTENE											
5197												
5198	General Statistics											
5199	Total Number of Observations	49							Number of Missing Observations	82		
5200	Number of Distinct Observations	4										

A	B	C	D	E	F	G	H	I	J	K	L
5201	Number of Detects			0	Number of Non-Detects			49			
5202	Number of Distinct Detects			0	Number of Distinct Non-Detects			4			
5203	Minimum Detect			N/A	Minimum Non-Detect			2			
5204	Maximum Detect			N/A	Maximum Non-Detect			10			
5205	Variance Detected			N/A	Percent Non-Detects			100%			
5206	Mean Detected			N/A	SD Detected			N/A			
5207	Mean of Detected Logged Data			N/A	SD of Detected Logged Data			N/A			
5208											
5209	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
5210	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
5211	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
5212											
5213	The data set for variable trans 1,4-DICHLORO-2-BUTENE was not processed!										
5214											
5215											
5216	2-HEXANONE										
5217											
5218	General Statistics										
5219	Total Number of Observations			49	Number of Missing Observations			82			
5220	Number of Distinct Observations			2							
5221	Number of Detects			0	Number of Non-Detects			49			
5222	Number of Distinct Detects			0	Number of Distinct Non-Detects			2			
5223	Minimum Detect			N/A	Minimum Non-Detect			5			
5224	Maximum Detect			N/A	Maximum Non-Detect			10			
5225	Variance Detected			N/A	Percent Non-Detects			100%			
5226	Mean Detected			N/A	SD Detected			N/A			
5227	Mean of Detected Logged Data			N/A	SD of Detected Logged Data			N/A			
5228											
5229	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
5230	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
5231	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
5232											
5233	The data set for variable 2-HEXANONE was not processed!										
5234											
5235											
5236	DIBROMOMETHANE										
5237											
5238	General Statistics										
5239	Total Number of Observations			49	Number of Missing Observations			82			
5240	Number of Distinct Observations			2							
5241	Number of Detects			0	Number of Non-Detects			49			
5242	Number of Distinct Detects			0	Number of Distinct Non-Detects			2			
5243	Minimum Detect			N/A	Minimum Non-Detect			1			
5244	Maximum Detect			N/A	Maximum Non-Detect			5			
5245	Variance Detected			N/A	Percent Non-Detects			100%			
5246	Mean Detected			N/A	SD Detected			N/A			
5247	Mean of Detected Logged Data			N/A	SD of Detected Logged Data			N/A			
5248											
5249	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
5250	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
5251	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
5252											

A	B	C	D	E	F	G	H	I	J	K	L	
5253	The data set for variable DIBROMOMETHANE was not processed!											
5254												
5255												
5256	IODOMETHANE											
5257												
5258	General Statistics											
5259	Total Number of Observations	49							Number of Missing Observations	82		
5260	Number of Distinct Observations	2										
5261	Number of Detects	0							Number of Non-Detects	49		
5262	Number of Distinct Detects	0							Number of Distinct Non-Detects	2		
5263	Minimum Detect	N/A							Minimum Non-Detect	1		
5264	Maximum Detect	N/A							Maximum Non-Detect	5		
5265	Variance Detected	N/A							Percent Non-Detects	100%		
5266	Mean Detected	N/A							SD Detected	N/A		
5267	Mean of Detected Logged Data	N/A							SD of Detected Logged Data	N/A		
5268												
5269	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
5270	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
5271	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
5272												
5273	The data set for variable IODOMETHANE was not processed!											
5274												
5275												
5276	STYRENE											
5277												
5278	General Statistics											
5279	Total Number of Observations	50							Number of Missing Observations	81		
5280	Number of Distinct Observations	2										
5281	Number of Detects	0							Number of Non-Detects	50		
5282	Number of Distinct Detects	0							Number of Distinct Non-Detects	2		
5283	Minimum Detect	N/A							Minimum Non-Detect	1		
5284	Maximum Detect	N/A							Maximum Non-Detect	5		
5285	Variance Detected	N/A							Percent Non-Detects	100%		
5286	Mean Detected	N/A							SD Detected	N/A		
5287	Mean of Detected Logged Data	N/A							SD of Detected Logged Data	N/A		
5288												
5289	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
5290	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
5291	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
5292												
5293	The data set for variable STYRENE was not processed!											
5294												
5295												
5296	VINYL ACETATE											
5297												
5298	General Statistics											
5299	Total Number of Observations	49							Number of Missing Observations	82		
5300	Number of Distinct Observations	1										
5301	Number of Detects	0							Number of Non-Detects	49		
5302	Number of Distinct Detects	0							Number of Distinct Non-Detects	1		
5303	Minimum Detect	N/A							Minimum Non-Detect	5		
5304	Maximum Detect	N/A							Maximum Non-Detect	5		

A	B	C	D	E	F	G	H	I	J	K	L
5305			Variance Detected	N/A					Percent Non-Detects	100%	
5306			Mean Detected	N/A					SD Detected	N/A	
5307			Mean of Detected Logged Data	N/A					SD of Detected Logged Data	N/A	
5308											
5309			Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!								
5310			Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!								
5311			The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).								
5312											
5313			The data set for variable VINYL ACETATE was not processed!								
5314											
5315											
5316	ANTIMONY										
5317											
5318			General Statistics								
5319			Total Number of Observations	4					Number of Missing Observations	127	
5320			Number of Distinct Observations	1							
5321			Number of Detects	0					Number of Non-Detects	4	
5322			Number of Distinct Detects	0					Number of Distinct Non-Detects	1	
5323			Minimum Detect	N/A					Minimum Non-Detect	0.0022	
5324			Maximum Detect	N/A					Maximum Non-Detect	0.0022	
5325			Variance Detected	N/A					Percent Non-Detects	100%	
5326			Mean Detected	N/A					SD Detected	N/A	
5327			Mean of Detected Logged Data	N/A					SD of Detected Logged Data	N/A	
5328											
5329			Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!								
5330			Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!								
5331			The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).								
5332											
5333			The data set for variable ANTIMONY was not processed!								
5334											
5335											
5336	BERYLLIUM										
5337											
5338			General Statistics								
5339			Total Number of Observations	4					Number of Missing Observations	127	
5340			Number of Distinct Observations	1							
5341			Number of Detects	0					Number of Non-Detects	4	
5342			Number of Distinct Detects	0					Number of Distinct Non-Detects	1	
5343			Minimum Detect	N/A					Minimum Non-Detect	0.0011	
5344			Maximum Detect	N/A					Maximum Non-Detect	0.0011	
5345			Variance Detected	N/A					Percent Non-Detects	100%	
5346			Mean Detected	N/A					SD Detected	N/A	
5347			Mean of Detected Logged Data	N/A					SD of Detected Logged Data	N/A	
5348											
5349			Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!								
5350			Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!								
5351			The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).								
5352											
5353			The data set for variable BERYLLIUM was not processed!								
5354											
5355											
5356	COBALT										

A	B	C	D	E	F	G	H	I	J	K	L
5357											
5358	General Statistics										
5359	Total Number of Observations			6		Number of Missing Observations			125		
5360	Number of Distinct Observations			2							
5361	Number of Detects			0		Number of Non-Detects			6		
5362	Number of Distinct Detects			0		Number of Distinct Non-Detects			2		
5363	Minimum Detect			N/A		Minimum Non-Detect			0.0056		
5364	Maximum Detect			N/A		Maximum Non-Detect			0.006		
5365	Variance Detected			N/A		Percent Non-Detects			100%		
5366	Mean Detected			N/A		SD Detected			N/A		
5367	Mean of Detected Logged Data			N/A		SD of Detected Logged Data			N/A		
5368											
5369	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!										
5370	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!										
5371	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).										
5372											
5373	The data set for variable COBALT was not processed!										
5374											
5375											
5376	NICKEL										
5377											
5378	General Statistics										
5379	Total Number of Observations			4		Number of Distinct Observations			4		
5380						Number of Missing Observations			127		
5381	Minimum			0.0065		First Quartile			0.00658		
5382	Second Largest			0.008		Median			0.0073		
5383	Maximum			0.0087		Third Quartile			0.00818		
5384	Mean			0.00745		SD			0.00108		
5385	Coefficient of Variation			0.145		Skewness			0.344		
5386	Mean of logged Data			-4.907		SD of logged Data			0.144		
5387											
5388	Critical Values for Background Threshold Values (BTVs)										
5389	Tolerance Factor K (For UTL)			5.144		d2max (for USL)			1.462		
5390											
5391	Normal GOF Test										
5392	Shapiro Wilk Test Statistic			0.874		Shapiro Wilk GOF Test					
5393	5% Shapiro Wilk Critical Value			0.748		Data appear Normal at 5% Significance Level					
5394	Lilliefors Test Statistic			0.285		Lilliefors GOF Test					
5395	5% Lilliefors Critical Value			0.375		Data appear Normal at 5% Significance Level					
5396	Data appear Normal at 5% Significance Level										
5397											
5398	Background Statistics Assuming Normal Distribution										
5399	95% UTL with 95% Coverage		0.013		90% Percentile (z)		0.00883				
5400	95% UPL (t)		0.0103		95% Percentile (z)		0.00922				
5401	95% USL		0.00903		99% Percentile (z)		0.00996				
5402											
5403	Gamma GOF Test										
5404	A-D Test Statistic			0.431		Anderson-Darling Gamma GOF Test					
5405	5% A-D Critical Value			0.656		Detected data appear Gamma Distributed at 5% Significance Level					
5406	K-S Test Statistic			0.318		Kolmogorov-Smirnov Gamma GOF Test					
5407	5% K-S Critical Value			0.394		Detected data appear Gamma Distributed at 5% Significance Level					
5408	Detected data appear Gamma Distributed at 5% Significance Level										

A	B	C	D	E	F	G	H	I	J	K	L
5409											
5410	Gamma Statistics										
5411	k hat (MLE)			64.23		k star (bias corrected MLE)			16.22		
5412	Theta hat (MLE)			1.1599E-4		Theta star (bias corrected MLE)			4.5920E-4		
5413	nu hat (MLE)			513.8		nu star (bias corrected)			129.8		
5414	MLE Mean (bias corrected)			0.00745		MLE Sd (bias corrected)			0.00185		
5415											
5416	Background Statistics Assuming Gamma Distribution										
5417	95% Wilson Hilferty (WH) Approx. Gamma UPL			0.0106		90% Percentile			0.0099		
5418	95% Hawkins Wixley (HW) Approx. Gamma UPL			0.0106		95% Percentile			0.0107		
5419	95% WH Approx. Gamma UTL with 95% Coverage			0.0144		99% Percentile			0.0124		
5420	95% HW Approx. Gamma UTL with 95% Coverage			0.0146							
5421	95% WH USL			0.00909		95% HW USL			0.0091		
5422											
5423	Lognormal GOF Test										
5424	Shapiro Wilk Test Statistic			0.87		Shapiro Wilk Lognormal GOF Test					
5425	5% Shapiro Wilk Critical Value			0.748		Data appear Lognormal at 5% Significance Level					
5426	Lilliefors Test Statistic			0.284		Lilliefors Lognormal GOF Test					
5427	5% Lilliefors Critical Value			0.375		Data appear Lognormal at 5% Significance Level					
5428	Data appear Lognormal at 5% Significance Level										
5429											
5430	Background Statistics assuming Lognormal Distribution										
5431	95% UTL with 95% Coverage			0.0155		90% Percentile (z)			0.00889		
5432	95% UPL (t)			0.0108		95% Percentile (z)			0.00937		
5433	95% USL			0.00912		99% Percentile (z)			0.0103		
5434											
5435	Nonparametric Distribution Free Background Statistics										
5436	Data appear Normal at 5% Significance Level										
5437											
5438	Nonparametric Upper Limits for Background Threshold Values										
5439	Order of Statistic, r			4		95% UTL with 95% Coverage			0.0087		
5440	Approx, f used to compute achieved CC			0.211		Approximate Actual Confidence Coefficient achieved by UTL			0.185		
5441						Approximate Sample Size needed to achieve specified CC			59		
5442	95% Percentile Bootstrap UTL with 95% Coverage			N/A		95% BCA Bootstrap UTL with 95% Coverage			N/A		
5443	95% UPL			0.0087		90% Percentile			0.00849		
5444	90% Chebyshev UPL			0.0111		95% Percentile			0.0086		
5445	95% Chebyshev UPL			0.0127		99% Percentile			0.00868		
5446	95% USL			0.0087							
5447											
5448	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.										
5449	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers										
5450	and consists of observations collected from clean unimpacted locations.										
5451	The use of USL tends to provide a balance between false positives and false negatives provided the data										
5452	represents a background data set and when many onsite observations need to be compared with the BTV.										
5453											
5454	THALLIUM										
5455											
5456	General Statistics										
5457	Total Number of Observations			4		Number of Missing Observations			127		
5458	Number of Distinct Observations			1							
5459	Number of Detects			0		Number of Non-Detects			4		
5460	Number of Distinct Detects			0		Number of Distinct Non-Detects			1		

	A	B	C	D	E	F	G	H	I	J	K	L
5461					Minimum Detect	N/A					Minimum Non-Detect	0.0011
5462					Maximum Detect	N/A					Maximum Non-Detect	0.0011
5463					Variance Detected	N/A					Percent Non-Detects	100%
5464					Mean Detected	N/A					SD Detected	N/A
5465					Mean of Detected Logged Data	N/A					SD of Detected Logged Data	N/A
5466												
5467	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
5468	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
5469	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
5470												
5471	The data set for variable THALLIUM was not processed!											
5472												
5473												
5474	VANADIUM											
5475												
5476	General Statistics											
5477				Total Number of Observations	4					Number of Missing Observations	127	
5478				Number of Distinct Observations	1							
5479				Number of Detects	0					Number of Non-Detects	4	
5480				Number of Distinct Detects	0					Number of Distinct Non-Detects	1	
5481				Minimum Detect	N/A					Minimum Non-Detect	0.0022	
5482				Maximum Detect	N/A					Maximum Non-Detect	0.0022	
5483				Variance Detected	N/A					Percent Non-Detects	100%	
5484				Mean Detected	N/A					SD Detected	N/A	
5485				Mean of Detected Logged Data	N/A					SD of Detected Logged Data	N/A	
5486												
5487	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
5488	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
5489	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
5490												
5491	The data set for variable VANADIUM was not processed!											
5492												
5493												

ATTACHMENT 3

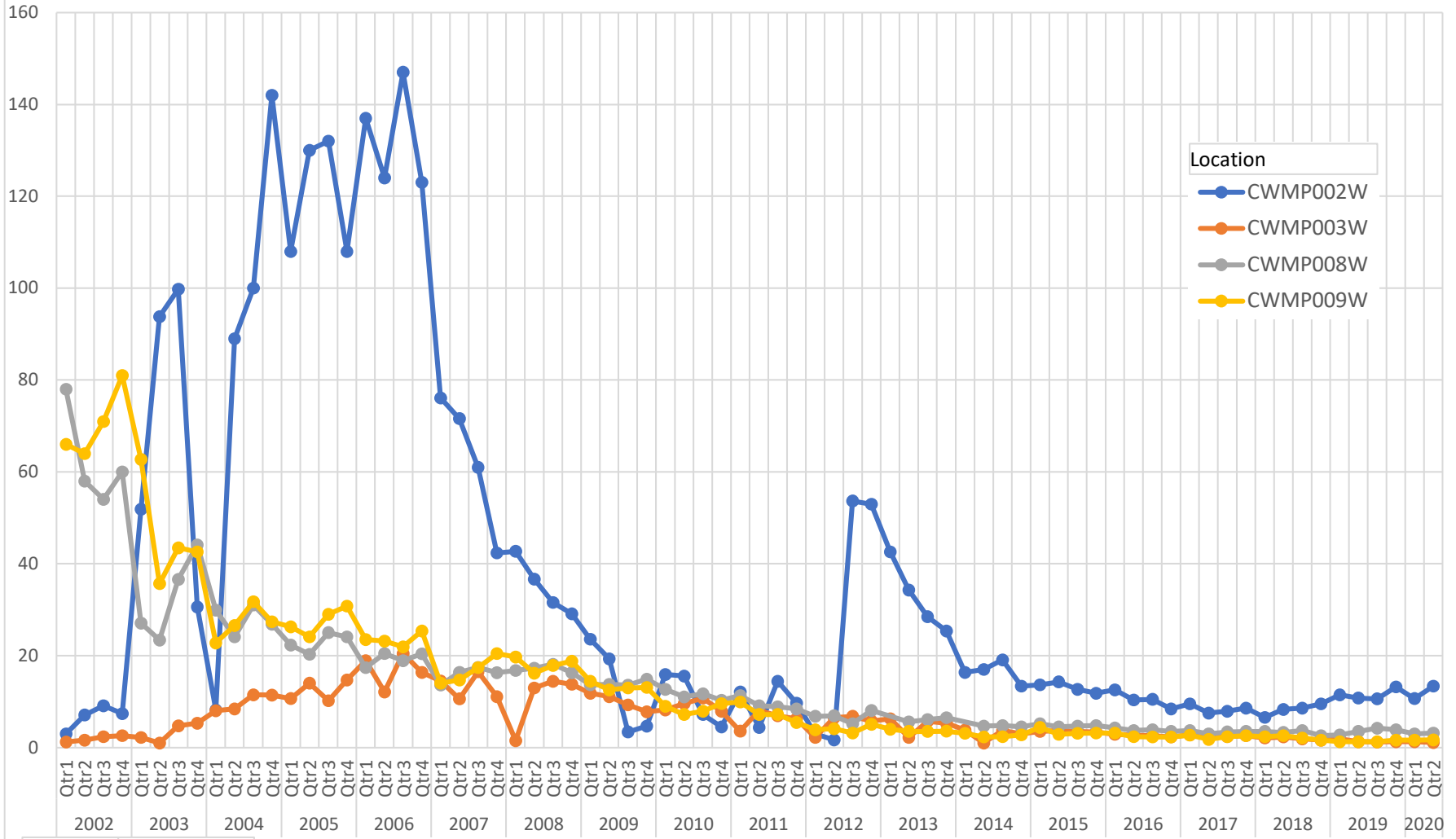
VOC TREND PLOTS



Parameter

1,1-DICHLOROETHANE

Max of Result



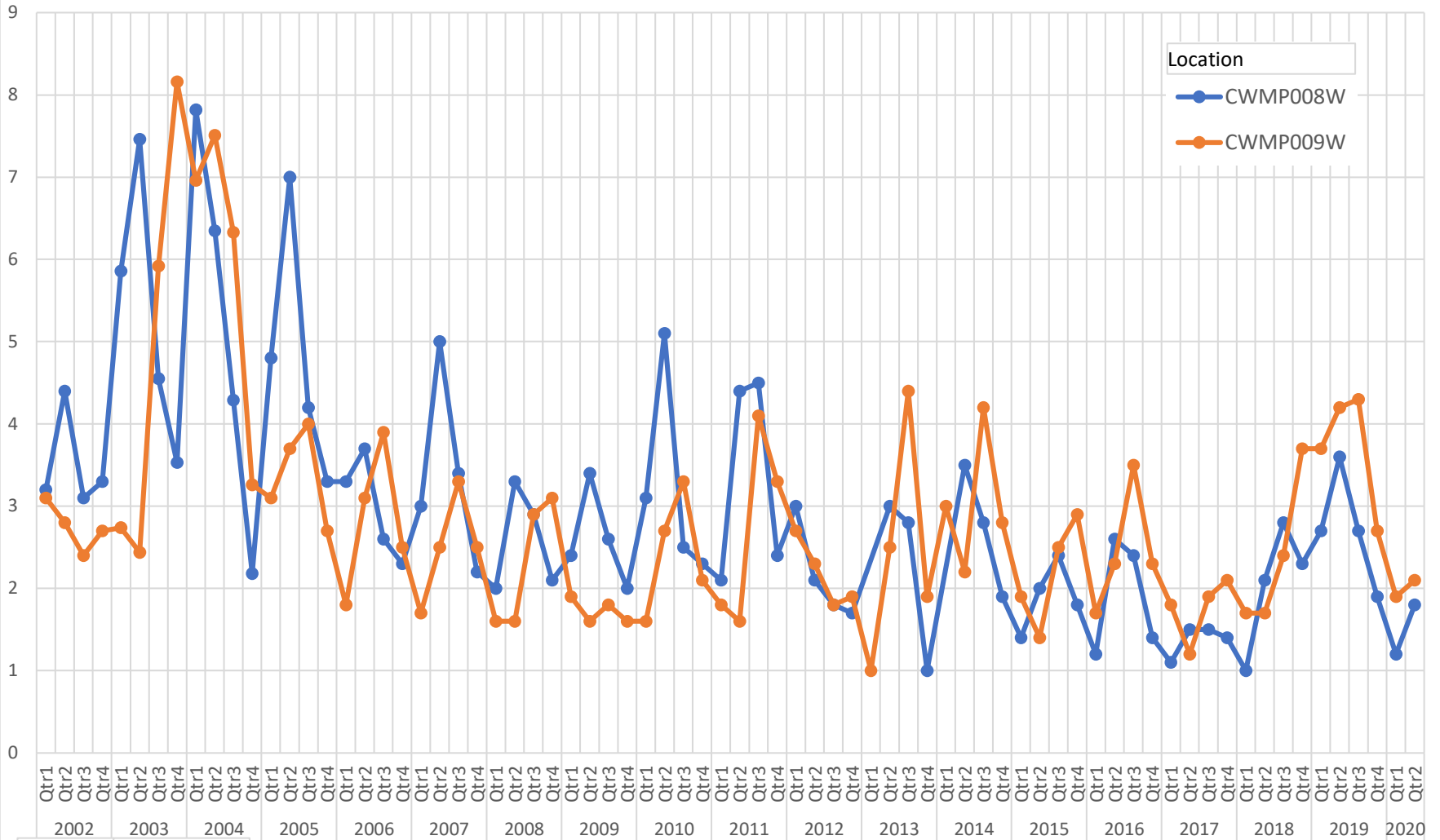
Years

Sample Date

Parameter

BENZENE

Max of Result



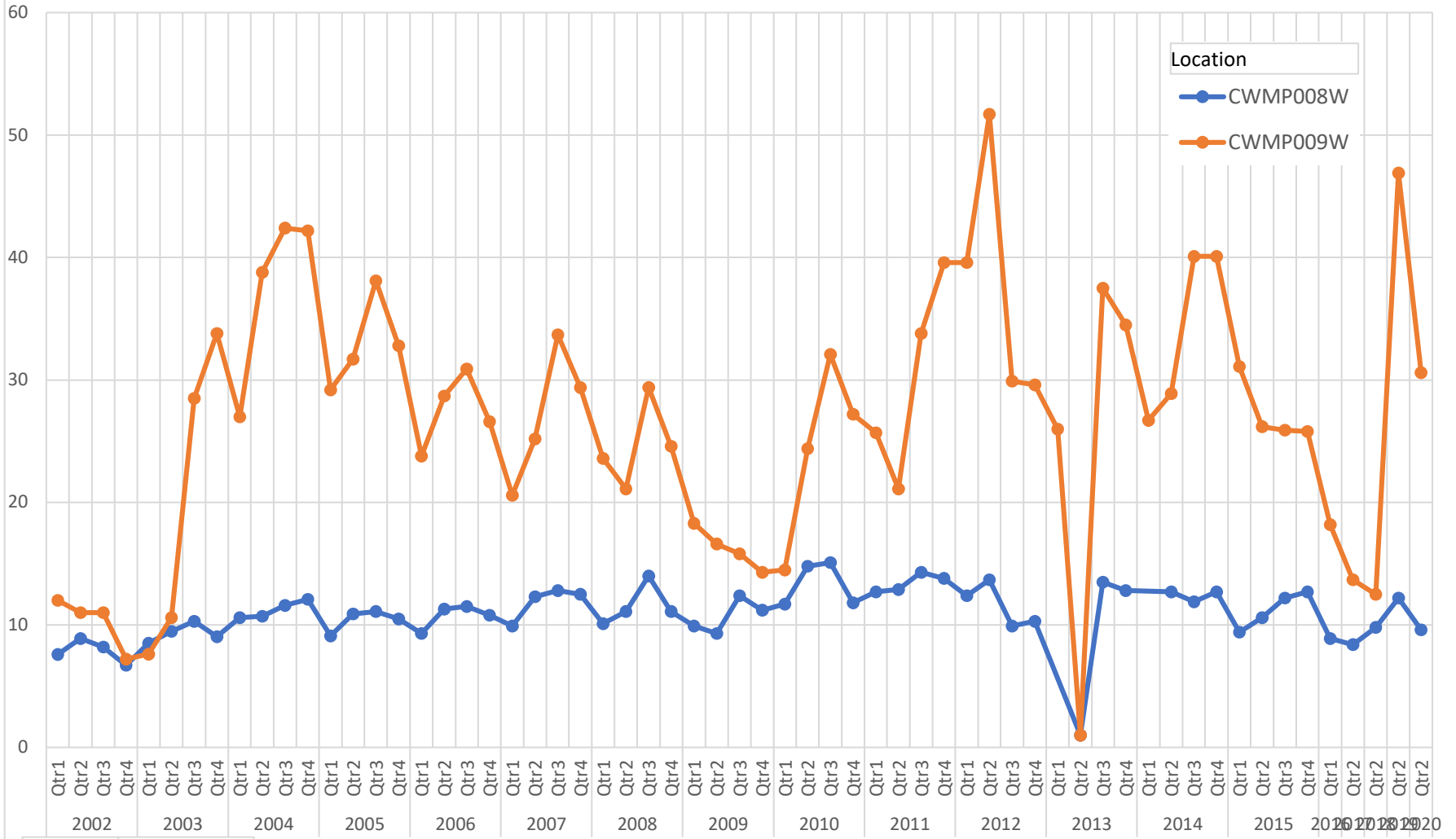
Years

Sample Date

Parameter

CHLOROBENZENE

Max of Result



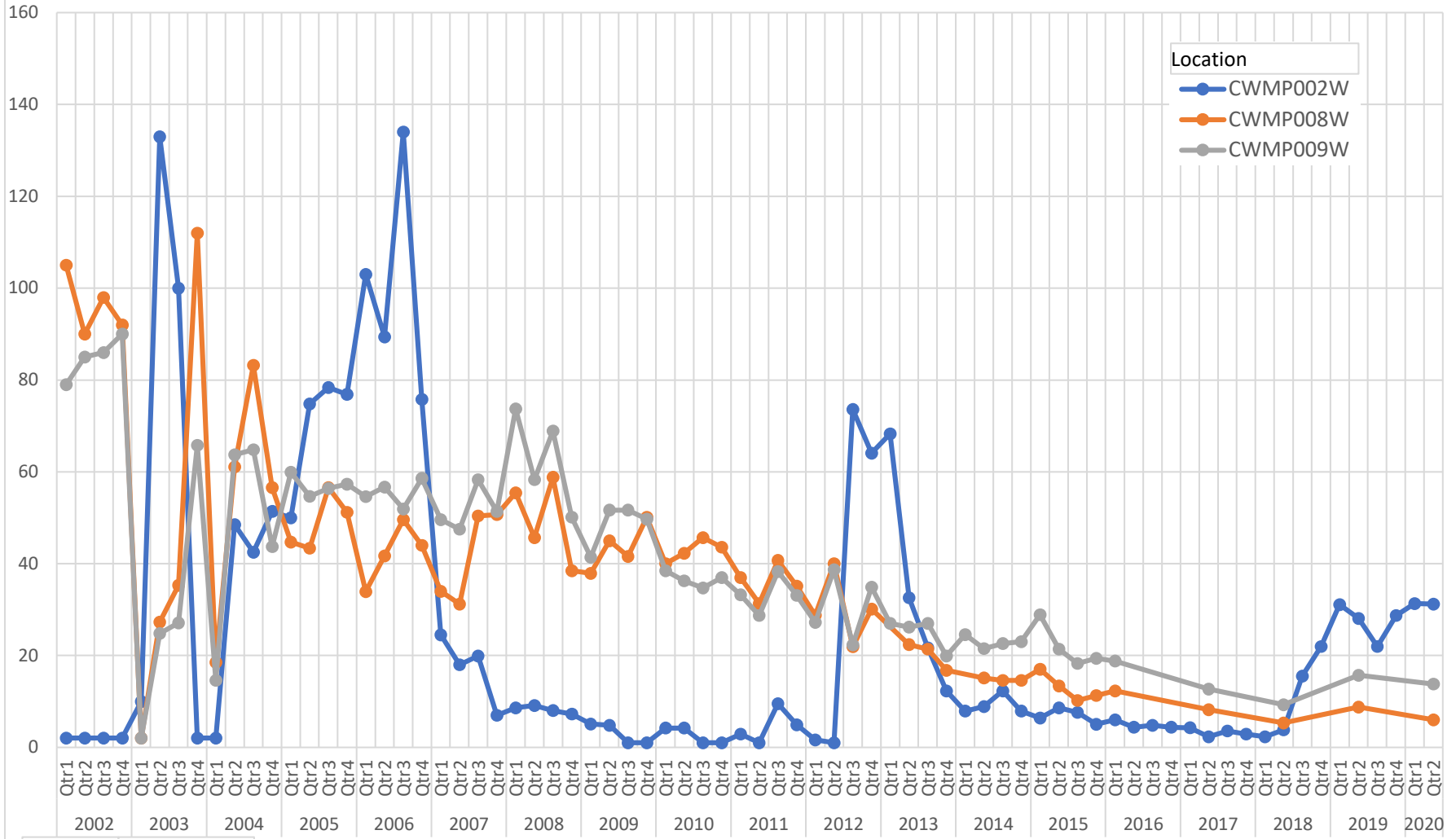
Years

Sample Date

Parameter

CHLOROETHANE

Max of Result

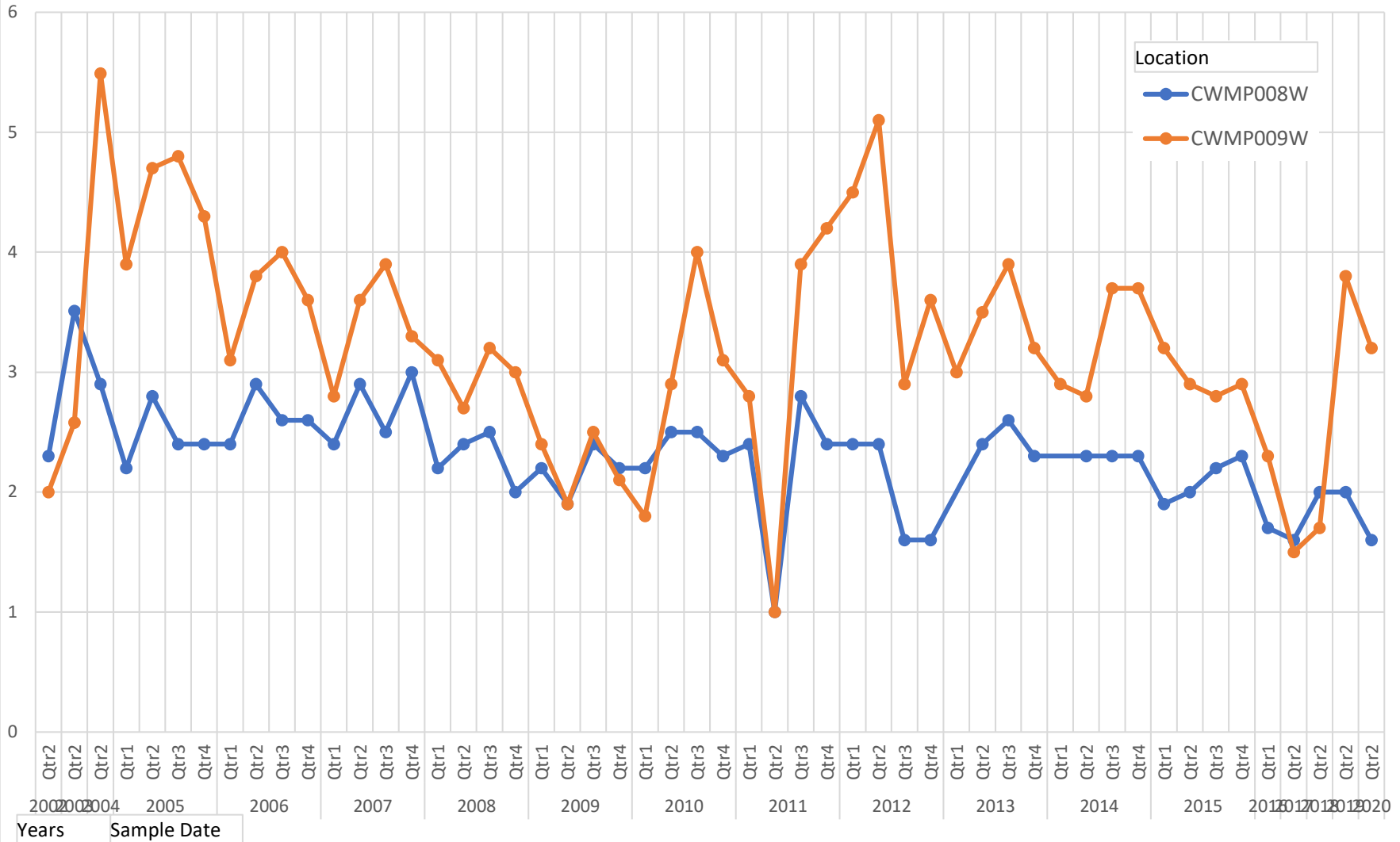


Years Sample Date

Parameter

1,2-DICHLOROBENZENE

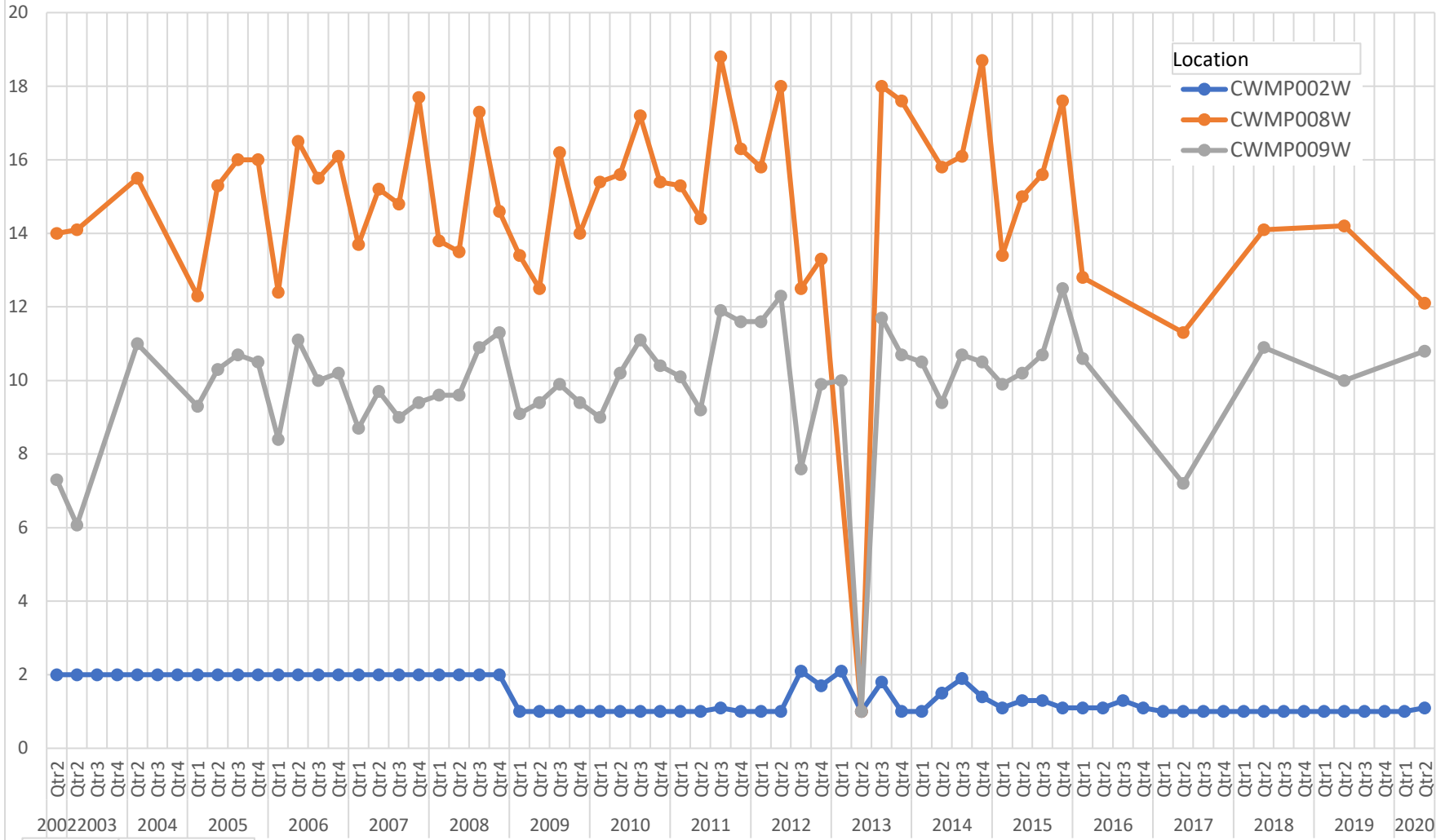
Max of Result



Parameter

1,4-DICHLOROBEZENE

Max of Result



Years

Sample Date



**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT**

Date Prepared/Revised
06/01/2020

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: Creswell Landfill

Facility ID (as issued by DEP): 100008

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: CWMP007W Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 24.53 " Longitude: 76 ° 26 ' 33.28 "

Depth to Water Level: 5.25 ft Measured from: Land Surface TOC

Casing Stickup: 1.50 ft Elevation of Water Level: 448.15 ft./MSL

Sampling Depth: 33 ft Volume of Water Column: 45.90 gal

Total Well Depth: 36.5 ft Sampling Method: Pumped Bailed Grab

Well Purged: Yes No Well Volumes Purged: 2.5

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

Spring Flow Rate: gpm

Sample Date (mm/dd/yy): 4/20/2020 Sample Collection Time: 11:09

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): 3097998001 Final Lab Analysis Completion Date: 4/29/2020

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

Comments: _____

I.D. No 100008

Monitoring Point No. CWMP007W

Sample Date 4/20/2020

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	ASTM D6919-09
BICARBONATE	23	SM20 2321
CALCIUM, TOTAL	17.3	SW846 6010C
CALCIUM, DISSOLVED	16	SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	62.3	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	56 ND	SW846 6010C
IRON, DISSOLVED (ug/l)	56 ND	SW846 6010C
MAGNESIUM, TOTAL	10	SW846 6010C
MAGNESIUM, DISSOLVED	9.5	SW846 6010C
MANGANESE, TOTAL (ug/l)	6.5	SW846 6010C
MANGANESE, DISSOLVED (ug/l)	6	SW846 6010C
NITRATE-NITROGEN	9.3	EPA 300
pH-FIELD (SU)	5.19	FIELD
pH-LAB (SU)	6.32	SM4500B
POTASSIUM, TOTAL	2.2	SW846 6010C
POTASSIUM, DISSOLVED	2.2	6SW846 010C
SODIUM, TOTAL	35.9	SW846 6010C
SODIUM, DISSOLVED	33.3	SW 846 6010C
SPEC. COND., FIELD (umhos/cm)	379	FIELD
SPEC. COND., LAB (umhos/cm)	355	EPA 120.1
SULFATE	21.3	EPA 300
ALKALINITY	23	SM20 2320B
TDS (TOTAL DISSOLVED SOLIDS)	310	SM20 2540C
TOC (TOTAL ORGANIC CARBON)	0.5 ND	SM20 5310B
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.11	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. 100008

Monitoring Point No. CWMP007W

Sample Date 4/20/2020

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 (EDB) (ETHYLENE D	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.

I.D. No. 100008

Monitoring Point No. CWMP007W

Sample Date 4/20/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES**

- 1-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ARSENIC, TOTAL	3.3 ND	SW846 6010C
ARSENIC, DISSOLVED	3 ND	SW846 6010C
BARIUM, TOTAL	45	SW846 6010C
BARIUM, DISSOLVED	45	SW846 6010C
CADMIUM, TOTAL	1.1 ND	SW846 6010C
CADMIUM, DISSOLVED	1.1 ND	SW846 6010C
CHROMIUM, TOTAL	2.2 ND	SW846 6010C
CHROMIUM, DISSOLVED	2.2 ND	SW846 6010C
COPPER, TOTAL	5.6 ND	SW846 6010C
COPPER, DISSOLVED	5.6 ND	SW846 6010C
LEAD-FLAMELESS, TOTAL	2.2 ND	SW846 6010C
LEAD, DISSOLVED	2.2 ND	SW846 6010C
MERCURY, TOTAL	0.5 ND	SW846 7470A
MERCURY, DISSOLVED	0.5 ND	SW846 7470A
SELENIUM, TOTAL	5.6 ND	SW846 6010C
SELENIUM, DISSOLVED	5.6 ND	SW846 6010C
SILVER, TOTAL	2.2 ND	SW846 6010C
SILVER, DISSOLVED	2.2 ND	SW846 6010C
ZINC, TOTAL	6.8	SW846 6010C
ZINC, DISSOLVED	5.9	SW846 6010C

^T Please indicate detection limit if analyte is not detected.

I.D. No 100008

Monitoring Point No. CWMP007W

Sample Date 4/20/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BROMOFORM	1 ND	SW846 8260B
BROMOMETHANE	1 ND	SW846 8260B
CARBON TETRACHLORIDE	1 ND	SW846 8260B
CHLOROENZENE	1 ND	SW846 8260B
CHLOROETHANE	1 ND	SW846 8260B
DIBROMOCHLOROMETHANE (CHLORODIBROMOMET	1 ND	SW846 8260B
CHLOROMETHANE	1 ND	SW846 8260B
3-CHLORO-1-PROPENE	1 ND	SW846 8260B
1,2-DICHLOROENZENE	1 ND	SW846 8260B
1,3-DICHLOROENZENE	1 ND	SW846 8260B
1,4-DICHLOROENZENE	1 ND	SW846 8260B
DICHLORODIFLUOROMETHANE	1 ND	SW846 8260B
1,2-DICHLOROPROPANE	1 ND	SW846 8260B
cis 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
trans 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
2-BUTANONE (MEK)	10 ND	SW846 8260B
4-METHYL-2-PENTANONE (MIBK)	5 ND	SW846 8260B
1,1,1,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROFLUOROMETHANE	1 ND	SW846 8260B
1,2,3-TRICHLOROPROPANE	2 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

I.D. No	100008
Monitoring Point No.	CWMP007W
Sample Date	4/20/2020

FORM 19
ANNUAL WATER QUALITY ANALYSES

SUBTITLE D - Detection Zone Add-On List - When the MCL of any VOC is exceeded in the detection zone Form 50 monitoring, the following analytes must be monitored annually in the groundwater monitoring wells.

ORGANICS AND METALS (Enter all data in ug/l)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ACETONE	10 ND	SW846 8260B
ACRYLONITRILE	5 ND	SW846 8260B
BROMOCHLOROMETHANE) CHLOROBROMOMETHAN	1 ND	SW846 8260B
BROMODICHLOROMETHANE	1 ND	SW846 8260B
CARBON DISULFIDE	1 ND	SW846 8260B
CHLOROFORM	1 ND	SW846 8260B
1,2-DIBROMO-3-CHLOROPROPANE (DBCP) (DIBROMO	7 ND	SW846 8260B
trans 1,4-DICHLORO-2-BUTENE	3 ND	SW846 8260B
2-HEXANONE	5 ND	SW846 8260B
DIBROMOMETHANE	1 ND	SW846 8260B
IODOMETHANE	1 ND	SW846 8260B
STYRENE	1 ND	SW846 8260B
VINYL ACETATE	5 ND	SW846 8260B
ANTIMONY	2.2 ND	EPA 200.8
BERYLLIUM	1.1 ND	EPA 200.8
COBALT	5.6 ND	SW846 6010C
NICKEL	5.6 ND	SW846 6010C
THALLIUM	1.1 ND	EPA 200.8
VANADIUM	2.2 ND	SW846 6010C

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
06/01/2020

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: Creswell Landfill

Facility ID (as issued by DEP): 100008

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: CWMP001W Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 27.43 " Longitude: 76 ° 26 ' 14.4 "

Depth to Water Level: 28.39 ft Measured from: Land Surface TOC

Casing Stickup: 1.23 ft Elevation of Water Level: 486.74 ft./MSL

Sampling Depth: 57 ft Volume of Water Column: 55.68 gal

Total Well Depth: 66.3 ft Sampling Method: Pumped Bailed Grab

Well Purged: Yes No Well Volumes Purged: 1.9

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

Spring Flow Rate: gpm

Sample Date (mm/dd/yy): 4/20/2020 Sample Collection Time: 12:27

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): 3097998002 Final Lab Analysis Completion Date: 4/29/2020

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

Comments:

I.D. No 100008

Monitoring Point No. CWMP001W

Sample Date 4/20/2020

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	ASTM D6919-09
BICARBONATE	7	SM20 2321
CALCIUM, TOTAL	15.1	SW846 6010C
CALCIUM, DISSOLVED	14.1	SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	27.7	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	1100	SW846 6010C
IRON, DISSOLVED (ug/l)	56 ND	SW846 6010C
MAGNESIUM, TOTAL	12.5	SW846 6010C
MAGNESIUM, DISSOLVED	10.8	SW846 6010C
MANGANESE, TOTAL (ug/l)	61	SW846 6010C
MANGANESE, DISSOLVED (ug/l)	47	SW846 6010C
NITRATE-NITROGEN	19.4	EPA 300
pH-FIELD (SU)	5.01	FIELD
pH-LAB (SU)	6.18	SM4500B
POTASSIUM, TOTAL	2.6	SW846 6010C
POTASSIUM, DISSOLVED	2.3	6SW846 010C
SODIUM, TOTAL	15.8	SW846 6010C
SODIUM, DISSOLVED	13.4	SW 846 6010C
SPEC. COND., FIELD (umhos/cm)	287	FIELD
SPEC. COND., LAB (umhos/cm)	265	EPA 120.1
SULFATE	2.2	EPA 300
ALKALINITY	7	SM20 2320B
TDS (TOTAL DISSOLVED SOLIDS)	276	SM20 2540C
TOC (TOTAL ORGANIC CARBON)	0.5 ND	SM20 5310B
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	14.7	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. 100008

Monitoring Point No. CWMP001W

Sample Date 4/20/2020

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 (EDB) (ETHYLENE D	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.

I.D. No. 100008

Monitoring Point No. CWMP001W

Sample Date 4/20/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES**

- 1-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ARSENIC, TOTAL	3.3 ND	SW846 6010C
ARSENIC, DISSOLVED	3 ND	SW846 6010C
BARIUM, TOTAL	76	SW846 6010C
BARIUM, DISSOLVED	79	SW846 6010C
CADMIUM, TOTAL	1.1 ND	SW846 6010C
CADMIUM, DISSOLVED	1.1 ND	SW846 6010C
CHROMIUM, TOTAL	2.2 ND	SW846 6010C
CHROMIUM, DISSOLVED	2.2 ND	SW846 6010C
COPPER, TOTAL	5.6 ND	SW846 6010C
COPPER, DISSOLVED	5.6 ND	SW846 6010C
LEAD-FLAMELESS, TOTAL	3	SW846 6010C
LEAD, DISSOLVED	2.2 ND	SW846 6010C
MERCURY, TOTAL	0.5 ND	SW846 7470A
MERCURY, DISSOLVED	0.5 ND	SW846 7470A
SELENIUM, TOTAL	5.6 ND	SW846 6010C
SELENIUM, DISSOLVED	5.6 ND	SW846 6010C
SILVER, TOTAL	2.2 ND	SW846 6010C
SILVER, DISSOLVED	2.2 ND	SW846 6010C
ZINC, TOTAL	20	SW846 6010C
ZINC, DISSOLVED	18	SW846 6010C

^T Please indicate detection limit if analyte is not detected.

I.D. No 100008

Monitoring Point No. CWMP001W

Sample Date 4/20/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BROMOFORM	1 ND	SW846 8260B
BROMOMETHANE	1 ND	SW846 8260B
CARBON TETRACHLORIDE	1 ND	SW846 8260B
CHLOROENZENE	1 ND	SW846 8260B
CHLOROETHANE	1 ND	SW846 8260B
DIBROMOCHLOROMETHANE (CHLORODIBROMOMET	1 ND	SW846 8260B
CHLOROMETHANE	1 ND	SW846 8260B
3-CHLORO-1-PROPENE	1 ND	SW846 8260B
1,2-DICHLOROENZENE	1 ND	SW846 8260B
1,3-DICHLOROENZENE	1 ND	SW846 8260B
1,4-DICHLOROENZENE	1 ND	SW846 8260B
DICHLORODIFLUOROMETHANE	1 ND	SW846 8260B
1,2-DICHLOROPROPANE	1 ND	SW846 8260B
cis 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
trans 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
2-BUTANONE (MEK)	10 ND	SW846 8260B
4-METHYL-2-PENTANONE (MIBK)	5 ND	SW846 8260B
1,1,1,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROFLUOROMETHANE	1 ND	SW846 8260B
1,2,3-TRICHLOROPROPANE	2 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

I.D. No	100008
Monitoring Point No.	CWMP001W
Sample Date	4/20/2020

FORM 19
ANNUAL WATER QUALITY ANALYSES

SUBTITLE D - Detection Zone Add-On List - When the MCL of any VOC is exceeded in the detection zone Form 50 monitoring, the following analytes must be monitored annually in the groundwater monitoring wells.

ORGANICS AND METALS (Enter all data in ug/l)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ACETONE	10 ND	SW846 8260B
ACRYLONITRILE	5 ND	SW846 8260B
BROMOCHLOROMETHANE) CHLOROBROMOMETHAN	1 ND	SW846 8260B
BROMODICHLOROMETHANE	1 ND	SW846 8260B
CARBON DISULFIDE	1 ND	SW846 8260B
CHLOROFORM	1 ND	SW846 8260B
1,2-DIBROMO-3-CHLOROPROPANE (DBCP) (DIBROMO	7 ND	SW846 8260B
trans 1,4-DICHLORO-2-BUTENE	3 ND	SW846 8260B
2-HEXANONE	5 ND	SW846 8260B
DIBROMOMETHANE	1 ND	SW846 8260B
IODOMETHANE	1 ND	SW846 8260B
STYRENE	1 ND	SW846 8260B
VINYL ACETATE	5 ND	SW846 8260B
ANTIMONY	2.2 ND	EPA 200.8
BERYLLIUM	1.1 ND	EPA 200.8
COBALT	5.6 ND	SW846 6010C
NICKEL	6.6	SW846 6010C
THALLIUM	1.1 ND	EPA 200.8
VANADIUM	2.2 ND	SW846 6010C

T Please indicate detection limit if analyte is not detected.



**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT**

Date Prepared/Revised
06/01/2020

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: Creswell Landfill

Facility ID (as issued by DEP): 100008

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: CWMP005W Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 11.17 " Longitude: 76 ° 26 ' 7.08 "

Depth to Water Level: 40.72 ft Measured from: Land Surface TOC

Casing Stickup: -0.37 ft Elevation of Water Level: 472.71 ft./MSL

Sampling Depth: 130 ft Volume of Water Column: 145.81 gal

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

Well Purged: Yes No Well Volumes Purged: 2.4

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

Spring Flow Rate: gpm

Sample Date (mm/dd/yy): 4/20/2020 Sample Collection Time: 14:07

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): 3097998003 Final Lab Analysis Completion Date: 4/29/2020

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

Comments: _____

I.D. No 100008

Monitoring Point No. CWMP005W

Sample Date 4/20/2020

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	ASTM D6919-09
BICARBONATE	23	SM20 2321
CALCIUM, TOTAL	16.4	SW846 6010C
CALCIUM, DISSOLVED	14.9	SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	71.3	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	66	SW846 6010C
IRON, DISSOLVED (ug/l)	56 ND	SW846 6010C
MAGNESIUM, TOTAL	9.8	SW846 6010C
MAGNESIUM, DISSOLVED	9.3	SW846 6010C
MANGANESE, TOTAL (ug/l)	70	SW846 6010C
MANGANESE, DISSOLVED (ug/l)	66	SW846 6010C
NITRATE-NITROGEN	8.7	EPA 300
pH-FIELD (SU)	4.75	FIELD
pH-LAB (SU)	6.42	SM4500B
POTASSIUM, TOTAL	2.6	SW846 6010C
POTASSIUM, DISSOLVED	2.4	6SW846 010C
SODIUM, TOTAL	37.3	SW846 6010C
SODIUM, DISSOLVED	34.4	SW 846 6010C
SPEC. COND., FIELD (umhos/cm)	373	FIELD
SPEC. COND., LAB (umhos/cm)	358	EPA 120.1
SULFATE	4.7	EPA 300
ALKALINITY	23	SM20 2320B
TDS (TOTAL DISSOLVED SOLIDS)	302	SM20 2540C
TOC (TOTAL ORGANIC CARBON)	0.5 ND	SM20 5310B
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.42	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. 100008

Monitoring Point No. CWMP005W

Sample Date 4/20/2020

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 (EDB) (ETHYLENE D	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.

I.D. No. 100008

Monitoring Point No. CWMP005W

Sample Date 4/20/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES**

- 1-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ARSENIC, TOTAL	3.3 ND	SW846 6010C
ARSENIC, DISSOLVED	3 ND	SW846 6010C
BARIUM, TOTAL	52	SW846 6010C
BARIUM, DISSOLVED	52	SW846 6010C
CADMIUM, TOTAL	1.1 ND	SW846 6010C
CADMIUM, DISSOLVED	1.1 ND	SW846 6010C
CHROMIUM, TOTAL	2.2 ND	SW846 6010C
CHROMIUM, DISSOLVED	2.2 ND	SW846 6010C
COPPER, TOTAL	5.6 ND	SW846 6010C
COPPER, DISSOLVED	5.6 ND	SW846 6010C
LEAD-FLAMELESS, TOTAL	2.2 ND	SW846 6010C
LEAD, DISSOLVED	2.2 ND	SW846 6010C
MERCURY, TOTAL	0.5 ND	SW846 7470A
MERCURY, DISSOLVED	0.5 ND	SW846 7470A
SELENIUM, TOTAL	5.6 ND	SW846 6010C
SELENIUM, DISSOLVED	5.6 ND	SW846 6010C
SILVER, TOTAL	2.2 ND	SW846 6010C
SILVER, DISSOLVED	2.2 ND	SW846 6010C
ZINC, TOTAL	11	SW846 6010C
ZINC, DISSOLVED	9.3	SW846 6010C

^T Please indicate detection limit if analyte is not detected.

I.D. No 100008

Monitoring Point No. CWMP005W

Sample Date 4/20/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE ^T	ANALYSIS METHOD NUMBER
BROMOFORM	1 ND	SW846 8260B
BROMOMETHANE	1 ND	SW846 8260B
CARBON TETRACHLORIDE	1 ND	SW846 8260B
CHLOROENZENE	1 ND	SW846 8260B
CHLOROETHANE	1 ND	SW846 8260B
DIBROMOCHLOROMETHANE (CHLORODIBROMOMET	1 ND	SW846 8260B
CHLOROMETHANE	1 ND	SW846 8260B
3-CHLORO-1-PROPENE	1 ND	SW846 8260B
1,2-DICHLOROENZENE	1 ND	SW846 8260B
1,3-DICHLOROENZENE	1 ND	SW846 8260B
1,4-DICHLOROENZENE	1 ND	SW846 8260B
DICHLORODIFLUOROMETHANE	1 ND	SW846 8260B
1,2-DICHLOROPROPANE	1 ND	SW846 8260B
cis 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
trans 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
2-BUTANONE (MEK)	10 ND	SW846 8260B
4-METHYL-2-PENTANONE (MIBK)	5 ND	SW846 8260B
1,1,1,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROFLUOROMETHANE	1 ND	SW846 8260B
1,2,3-TRICHLOROPROPANE	2 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

I.D. No	100008
Monitoring Point No.	CWMP005W
Sample Date	4/20/2020

FORM 19
ANNUAL WATER QUALITY ANALYSES

SUBTITLE D - Detection Zone Add-On List - When the MCL of any VOC is exceeded in the detection zone Form 50 monitoring, the following analytes must be monitored annually in the groundwater monitoring wells.

ORGANICS AND METALS (Enter all data in ug/l)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ACETONE	10 ND	SW846 8260B
ACRYLONITRILE	5 ND	SW846 8260B
BROMOCHLOROMETHANE) CHLOROBROMOMETHAN	1 ND	SW846 8260B
BROMODICHLOROMETHANE	1 ND	SW846 8260B
CARBON DISULFIDE	1 ND	SW846 8260B
CHLOROFORM	1 ND	SW846 8260B
1,2-DIBROMO-3-CHLOROPROPANE (DBCP) (DIBROMO	7 ND	SW846 8260B
trans 1,4-DICHLORO-2-BUTENE	3 ND	SW846 8260B
2-HEXANONE	5 ND	SW846 8260B
DIBROMOMETHANE	1 ND	SW846 8260B
IODOMETHANE	1 ND	SW846 8260B
STYRENE	1 ND	SW846 8260B
VINYL ACETATE	5 ND	SW846 8260B
ANTIMONY	2.2 ND	EPA 200.8
BERYLLIUM	1.1 ND	EPA 200.8
COBALT	5.6 ND	SW846 6010C
NICKEL	5.9	SW846 6010C
THALLIUM	1.1 ND	EPA 200.8
VANADIUM	2.2 ND	SW846 6010C

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
06/01/2020

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: Creswell Landfill

Facility ID (as issued by DEP): 100008

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: CWMP002W Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County

Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 19.97 " Longitude: 76 ° 26 ' 12.3 "

Depth to Water Level: 61.16 ft Measured from: Land Surface TOC

Casing Stickup: -1.19 ft Elevation of Water Level: 464.65 ft./MSL

Sampling Depth: 85 ft Volume of Water Column: 57.04 gal

Total Well Depth: 100 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): 4/21/2020 Sample Collection Time: 13:15

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): 3098214001 Final Lab Analysis Completion Date: 4/29/2020

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

Comments: _____

I.D. No 100008

Monitoring Point No. CWMP002W

Sample Date 4/21/2020

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	ASTM D6919-09
BICARBONATE	89	SM20 2321
CALCIUM, TOTAL	52.5	SW846 6010C
CALCIUM, DISSOLVED	51.5	SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	107	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	170	SW846 6010C
IRON, DISSOLVED (ug/l)	56 ND	SW846 6010C
MAGNESIUM, TOTAL	19.1	SW846 6010C
MAGNESIUM, DISSOLVED	16.5	SW846 6010C
MANGANESE, TOTAL (ug/l)	1100	SW846 6010C
MANGANESE, DISSOLVED (ug/l)	1100	SW846 6010C
NITRATE-NITROGEN	3.3	EPA 300
pH-FIELD (SU)	5.47	FIELD
pH-LAB (SU)	6.02	SM4500B
POTASSIUM, TOTAL	3.1	SW846 6010C
POTASSIUM, DISSOLVED	2.7	6SW846 010C
SODIUM, TOTAL	30.4	SW846 6010C
SODIUM, DISSOLVED	28.3	SW 846 6010C
SPEC. COND., FIELD (umhos/cm)	618	FIELD
SPEC. COND., LAB (umhos/cm)	574	EPA 120.1
SULFATE	21	EPA 300
ALKALINITY	89	SM20 2320B
TDS (TOTAL DISSOLVED SOLIDS)	356	SM20 2540C
TOC (TOTAL ORGANIC CARBON)	4.9	SM20 5310B
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.14	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. 100008

Monitoring Point No. CWMP002W

Sample Date 4/21/2020

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 (EDB) (ETHYLENE D	1 ND	SW846 8260B
1,1-DICHLOROETHANE	13.4	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.

I.D. No. 100008

Monitoring Point No. CWMP002W

Sample Date 4/21/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES**

- 1-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ARSENIC, TOTAL	3.3 ND	SW846 6010C
ARSENIC, DISSOLVED	3 ND	SW846 6010C
BARIUM, TOTAL	50	SW846 6010C
BARIUM, DISSOLVED	56	SW846 6010C
CADMIUM, TOTAL	1.1 ND	SW846 6010C
CADMIUM, DISSOLVED	1.1 ND	SW846 6010C
CHROMIUM, TOTAL	2.2 ND	SW846 6010C
CHROMIUM, DISSOLVED	2.2 ND	SW846 6010C
COPPER, TOTAL	5.6 ND	SW846 6010C
COPPER, DISSOLVED	5.6 ND	SW846 6010C
LEAD-FLAMELESS, TOTAL	2.2 ND	SW846 6010C
LEAD, DISSOLVED	2.2 ND	SW846 6010C
MERCURY, TOTAL	0.5 ND	SW846 7470A
MERCURY, DISSOLVED	0.5 ND	SW846 7470A
SELENIUM, TOTAL	5.6 ND	SW846 6010C
SELENIUM, DISSOLVED	5.6 ND	SW846 6010C
SILVER, TOTAL	2.2 ND	SW846 6010C
SILVER, DISSOLVED	2.2 ND	SW846 6010C
ZINC, TOTAL	8	SW846 6010C
ZINC, DISSOLVED	7.7	SW846 6010C

^T Please indicate detection limit if analyte is not detected.

I.D. No 100008

Monitoring Point No. CWMP002W

Sample Date 4/21/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BROMOFORM	1 ND	SW846 8260B
BROMOMETHANE	1 ND	SW846 8260B
CARBON TETRACHLORIDE	1 ND	SW846 8260B
CHLOROENZENE	1 ND	SW846 8260B
CHLOROETHANE	31.2	SW846 8260B
DIBROMOCHLOROMETHANE (CHLORODIBROMOMET	1 ND	SW846 8260B
CHLOROMETHANE	1 ND	SW846 8260B
3-CHLORO-1-PROPENE	1 ND	SW846 8260B
1,2-DICHLOROENZENE	1 ND	SW846 8260B
1,3-DICHLOROENZENE	1 ND	SW846 8260B
1,4-DICHLOROENZENE	1.1	SW846 8260B
DICHLORODIFLUOROMETHANE	1 ND	SW846 8260B
1,2-DICHLOROPROPANE	1 ND	SW846 8260B
cis 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
trans 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
2-BUTANONE (MEK)	10 ND	SW846 8260B
4-METHYL-2-PENTANONE (MIBK)	5 ND	SW846 8260B
1,1,1,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROFLUOROMETHANE	1 ND	SW846 8260B
1,2,3-TRICHLOROPROPANE	2 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

I.D. No 100008

Monitoring Point No. CWMP002W

Sample Date 4/21/2020

FORM 19
ANNUAL WATER QUALITY ANALYSES

SUBTITLE D - Detection Zone Add-On List - When the MCL of any VOC is exceeded in the detection zone Form 50 monitoring, the following analytes must be monitored annually in the groundwater monitoring wells.

ORGANICS AND METALS (Enter all data in ug/l)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ACETONE	10 ND	SW846 8260B
ACRYLONITRILE	5 ND	SW846 8260B
BROMOCHLOROMETHANE) CHLOROBROMOMETHAN	1 ND	SW846 8260B
BROMODICHLOROMETHANE	1 ND	SW846 8260B
CARBON DISULFIDE	1 ND	SW846 8260B
CHLOROFORM	1 ND	SW846 8260B
1,2-DIBROMO-3-CHLOROPROPANE (DBCP) (DIBROMO	7 ND	SW846 8260B
trans 1,4-DICHLORO-2-BUTENE	3 ND	SW846 8260B
2-HEXANONE	5 ND	SW846 8260B
DIBROMOMETHANE	1 ND	SW846 8260B
IODOMETHANE	1 ND	SW846 8260B
STYRENE	1 ND	SW846 8260B
VINYL ACETATE	5 ND	SW846 8260B
ANTIMONY	2.2 ND	EPA 200.8
BERYLLIUM	1.1 ND	EPA 200.8
COBALT	24	SW846 6010C
NICKEL	27	SW846 6010C
THALLIUM	1.1 ND	EPA 200.8
VANADIUM	2.2 ND	SW846 6010C

T Please indicate detection limit if analyte is not detected.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT**



Date Prepared/Revised
06/01/2020

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: Creswell Landfill

Facility ID (as issued by DEP): 100008

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: CWMP016W Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County Municipality: Manor Township

Sampling Point: Latitude: 39 ° 56 ' 55.57 " Longitude: 76 ° 26 ' 50.59 "

Depth to Water Level: 8.18 ft Measured from: Land Surface TOC

Casing Stickup: 2.53 ft Elevation of Water Level: 303.79 ft./MSL

Sampling Depth: 71 ft Volume of Water Column: _____ gal

Total Well Depth: 78.03 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): 4/22/2020 Sample Collection Time: 11:37

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): 3098414001 Final Lab Analysis Completion Date: 4/29/2020

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

Comments: _____

I.D. No 100008

Monitoring Point No. CWMP016W

Sample Date 4/22/2020

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	ASTM D6919-09
BICARBONATE	6	SM20 2321
CALCIUM, TOTAL	4.8	SW846 6010C
CALCIUM, DISSOLVED	4.8	SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	2.4	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	110	SW846 6010C
IRON, DISSOLVED (ug/l)	56 ND	SW846 6010C
MAGNESIUM, TOTAL	1.1	SW846 6010C
MAGNESIUM, DISSOLVED	1.1	SW846 6010C
MANGANESE, TOTAL (ug/l)	7.6	SW846 6010C
MANGANESE, DISSOLVED (ug/l)	9.1	SW846 6010C
NITRATE-NITROGEN	0.64	EPA 300
pH-FIELD (SU)	5.25	FIELD
pH-LAB (SU)	6.62	SM4500B
POTASSIUM, TOTAL	0.42	SW846 6010C
POTASSIUM, DISSOLVED	0.41	6SW846 010C
SODIUM, TOTAL	2.9	SW846 6010C
SODIUM, DISSOLVED	2.9	SW 846 6010C
SPEC. COND., FIELD (umhos/cm)	65	FIELD
SPEC. COND., LAB (umhos/cm)	53	EPA 120.1
SULFATE	11	EPA 300
ALKALINITY	6	SM20 2320B
TDS (TOTAL DISSOLVED SOLIDS)	25 ND	SM20 2540C
TOC (TOTAL ORGANIC CARBON)	0.51	SM20 5310B
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.68	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. 100008

Monitoring Point No. CWMP016W

Sample Date 4/22/2020

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 (EDB) (ETHYLENE D	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.

I.D. No. 100008

Monitoring Point No. CWMP016W

Sample Date 4/22/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES**

- 1-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ARSENIC, TOTAL	3.3 ND	SW846 6010C
ARSENIC, DISSOLVED	3 ND	SW846 6010C
BARIUM, TOTAL	14	SW846 6010C
BARIUM, DISSOLVED	9.1	SW846 6010C
CADMIUM, TOTAL	1.1 ND	SW846 6010C
CADMIUM, DISSOLVED	1.1 ND	SW846 6010C
CHROMIUM, TOTAL	2.2 ND	SW846 6010C
CHROMIUM, DISSOLVED	2.2 ND	SW846 6010C
COPPER, TOTAL	5.6 ND	SW846 6010C
COPPER, DISSOLVED	5.6 ND	SW846 6010C
LEAD-FLAMELESS, TOTAL	2.2 ND	SW846 6010C
LEAD, DISSOLVED	2.2 ND	SW846 6010C
MERCURY, TOTAL	0.5 ND	SW846 7470A
MERCURY, DISSOLVED	0.5 ND	SW846 7470A
SELENIUM, TOTAL	5.6 ND	SW846 6010C
SELENIUM, DISSOLVED	5.6 ND	SW846 6010C
SILVER, TOTAL	2.2 ND	SW846 6010C
SILVER, DISSOLVED	2.2 ND	SW846 6010C
ZINC, TOTAL	5.6 ND	SW846 6010C
ZINC, DISSOLVED	5.6 ND	SW846 6010C

^T Please indicate detection limit if analyte is not detected.

I.D. No 100008

Monitoring Point No. CWMP016W

Sample Date 4/22/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE ^T	ANALYSIS METHOD NUMBER
BROMOFORM	1 ND	SW846 8260B
BROMOMETHANE	1 ND	SW846 8260B
CARBON TETRACHLORIDE	1 ND	SW846 8260B
CHLOROENZENE	1 ND	SW846 8260B
CHLOROETHANE	1 ND	SW846 8260B
DIBROMOCHLOROMETHANE (CHLORODIBROMOMET	1 ND	SW846 8260B
CHLOROMETHANE	1 ND	SW846 8260B
3-CHLORO-1-PROPENE	1 ND	SW846 8260B
1,2-DICHLOROENZENE	1 ND	SW846 8260B
1,3-DICHLOROENZENE	1 ND	SW846 8260B
1,4-DICHLOROENZENE	1 ND	SW846 8260B
DICHLORODIFLUOROMETHANE	1 ND	SW846 8260B
1,2-DICHLOROPROPANE	1 ND	SW846 8260B
cis 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
trans 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
2-BUTANONE (MEK)	10 ND	SW846 8260B
4-METHYL-2-PENTANONE (MIBK)	5 ND	SW846 8260B
1,1,1,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROFLUOROMETHANE	1 ND	SW846 8260B
1,2,3-TRICHLOROPROPANE	2 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

I.D. No	100008
Monitoring Point No.	CWMP016W
Sample Date	4/22/2020

FORM 19
ANNUAL WATER QUALITY ANALYSES

SUBTITLE D - Detection Zone Add-On List - When the MCL of any VOC is exceeded in the detection zone Form 50 monitoring, the following analytes must be monitored annually in the groundwater monitoring wells.

ORGANICS AND METALS (Enter all data in ug/l)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ACETONE	10 ND	SW846 8260B
ACRYLONITRILE	5 ND	SW846 8260B
BROMOCHLOROMETHANE) CHLOROBROMOMETHAN	1 ND	SW846 8260B
BROMODICHLOROMETHANE	1 ND	SW846 8260B
CARBON DISULFIDE	1 ND	SW846 8260B
CHLOROFORM	1 ND	SW846 8260B
1,2-DIBROMO-3-CHLOROPROPANE (DBCP) (DIBROMO	7 ND	SW846 8260B
trans 1,4-DICHLORO-2-BUTENE	3 ND	SW846 8260B
2-HEXANONE	5 ND	SW846 8260B
DIBROMOMETHANE	1 ND	SW846 8260B
IODOMETHANE	1 ND	SW846 8260B
STYRENE	1 ND	SW846 8260B
VINYL ACETATE	5 ND	SW846 8260B
ANTIMONY	2.2 ND	EPA 200.8
BERYLLIUM	1.1 ND	EPA 200.8
COBALT	6.1	SW846 6010C
NICKEL	5.6 ND	SW846 6010C
THALLIUM	1.1 ND	EPA 200.8
VANADIUM	2.2 ND	SW846 6010C

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
06/01/2020

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: Creswell Landfill

Facility ID (as issued by DEP): 100008

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: CWMP010W Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County

Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 2.38 " Longitude: 76 ° 26 ' 57.92 "

Depth to Water Level: 8.49 ft Measured from: Land Surface TOC

Casing Stickup: 2.10 ft Elevation of Water Level: 352.41 ft./MSL

Sampling Depth: 17 ft Volume of Water Column: 7.25 gal

Total Well Depth: 19.6 ft Sampling Method: Pumped Bailed Grab

Well Purged: Yes No Well Volumes Purged: 1.7

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

Spring Flow Rate: gpm

Sample Date (mm/dd/yy): 4/22/2020 Sample Collection Time: 12:05

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): 3098414002 Final Lab Analysis Completion Date: 4/29/2020

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

Comments:

I.D. No 100008

Monitoring Point No. CWMP010W

Sample Date 4/22/2020

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	ASTM D6919-09
BICARBONATE	147	SM20 2321
CALCIUM, TOTAL	24.9	SW846 6010C
CALCIUM, DISSOLVED	26.1	SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	109	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	390	SW846 6010C
IRON, DISSOLVED (ug/l)	61	SW846 6010C
MAGNESIUM, TOTAL	21.9	SW846 6010C
MAGNESIUM, DISSOLVED	22.1	SW846 6010C
MANGANESE, TOTAL (ug/l)	210	SW846 6010C
MANGANESE, DISSOLVED (ug/l)	27	SW846 6010C
NITRATE-NITROGEN	4.7	EPA 300
pH-FIELD (SU)	6.26	FIELD
pH-LAB (SU)	7.77	SM4500B
POTASSIUM, TOTAL	4.5	SW846 6010C
POTASSIUM, DISSOLVED	4.7	6SW846 010C
SODIUM, TOTAL	81	SW846 6010C
SODIUM, DISSOLVED	81.8	SW 846 6010C
SPEC. COND., FIELD (umhos/cm)	767	FIELD
SPEC. COND., LAB (umhos/cm)	688	EPA 120.1
SULFATE	25.3	EPA 300
ALKALINITY	147	SM20 2320B
TDS (TOTAL DISSOLVED SOLIDS)	356	SM20 2540C
TOC (TOTAL ORGANIC CARBON)	2.8	SM20 5310B
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	1.05	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. 100008

Monitoring Point No. CWMP010W

Sample Date 4/22/2020

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 (EDB) (ETHYLENE D	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.

I.D. No. 100008

Monitoring Point No. CWMP010W

Sample Date 4/22/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES**

- 1-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ARSENIC, TOTAL	3.3 ND	SW846 6010C
ARSENIC, DISSOLVED	3 ND	SW846 6010C
BARIUM, TOTAL	31	SW846 6010C
BARIUM, DISSOLVED	29	SW846 6010C
CADMIUM, TOTAL	1.1 ND	SW846 6010C
CADMIUM, DISSOLVED	1.1 ND	SW846 6010C
CHROMIUM, TOTAL	10	SW846 6010C
CHROMIUM, DISSOLVED	6.7	SW846 6010C
COPPER, TOTAL	6.8	SW846 6010C
COPPER, DISSOLVED	5.6 ND	SW846 6010C
LEAD-FLAMELESS, TOTAL	2.2 ND	SW846 6010C
LEAD, DISSOLVED	2.2 ND	SW846 6010C
MERCURY, TOTAL	0.5 ND	SW846 7470A
MERCURY, DISSOLVED	0.5 ND	SW846 7470A
SELENIUM, TOTAL	5.6 ND	SW846 6010C
SELENIUM, DISSOLVED	5.6 ND	SW846 6010C
SILVER, TOTAL	2.2 ND	SW846 6010C
SILVER, DISSOLVED	2.2 ND	SW846 6010C
ZINC, TOTAL	5.6 ND	SW846 6010C
ZINC, DISSOLVED	5.6 ND	SW846 6010C

^T Please indicate detection limit if analyte is not detected.

I.D. No 100008

Monitoring Point No. CWMP010W

Sample Date 4/22/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BROMOFORM	1 ND	SW846 8260B
BROMOMETHANE	1 ND	SW846 8260B
CARBON TETRACHLORIDE	1 ND	SW846 8260B
CHLOROENZENE	1 ND	SW846 8260B
CHLOROETHANE	1 ND	SW846 8260B
DIBROMOCHLOROMETHANE (CHLORODIBROMOMET	1 ND	SW846 8260B
CHLOROMETHANE	1 ND	SW846 8260B
3-CHLORO-1-PROPENE	1 ND	SW846 8260B
1,2-DICHLOROENZENE	1 ND	SW846 8260B
1,3-DICHLOROENZENE	1 ND	SW846 8260B
1,4-DICHLOROENZENE	1 ND	SW846 8260B
DICHLORODIFLUOROMETHANE	1 ND	SW846 8260B
1,2-DICHLOROPROPANE	1 ND	SW846 8260B
cis 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
trans 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
2-BUTANONE (MEK)	10 ND	SW846 8260B
4-METHYL-2-PENTANONE (MIBK)	5 ND	SW846 8260B
1,1,1,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROFLUOROMETHANE	1 ND	SW846 8260B
1,2,3-TRICHLOROPROPANE	2 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

I.D. No	100008
Monitoring Point No.	CWMP010W
Sample Date	4/22/2020

FORM 19
ANNUAL WATER QUALITY ANALYSES

SUBTITLE D - Detection Zone Add-On List - When the MCL of any VOC is exceeded in the detection zone Form 50 monitoring, the following analytes must be monitored annually in the groundwater monitoring wells.

ORGANICS AND METALS (Enter all data in ug/l)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ACETONE	10 ND	SW846 8260B
ACRYLONITRILE	5 ND	SW846 8260B
BROMOCHLOROMETHANE) CHLOROBROMOMETHAN	1 ND	SW846 8260B
BROMODICHLOROMETHANE	1 ND	SW846 8260B
CARBON DISULFIDE	1 ND	SW846 8260B
CHLOROFORM	1 ND	SW846 8260B
1,2-DIBROMO-3-CHLOROPROPANE (DBCP) (DIBROMO	7 ND	SW846 8260B
trans 1,4-DICHLORO-2-BUTENE	3 ND	SW846 8260B
2-HEXANONE	5 ND	SW846 8260B
DIBROMOMETHANE	1 ND	SW846 8260B
IODOMETHANE	1 ND	SW846 8260B
STYRENE	1 ND	SW846 8260B
VINYL ACETATE	5 ND	SW846 8260B
ANTIMONY	2.2 ND	EPA 200.8
BERYLLIUM	1.1 ND	EPA 200.8
COBALT	5.6 ND	SW846 6010C
NICKEL	19	SW846 6010C
THALLIUM	1.1 ND	EPA 200.8
VANADIUM	2.2 ND	SW846 6010C

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
06/01/2020

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: Creswell Landfill

Facility ID (as issued by DEP): 100008

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: CWMP009W Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County

Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 10.82 " Longitude: 76 ° 26 ' 55.8 "

Depth to Water Level: 8.99 ft Measured from: Land Surface TOC

Casing Stickup: 2.70 ft Elevation of Water Level: 395.21 ft./MSL

Sampling Depth: 16 ft Volume of Water Column: 6.99 gal

Total Well Depth: 19.7 ft Sampling Method: Pumped Bailed Grab

Well Purged: Yes No Well Volumes Purged: 4.7

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

Spring Flow Rate: gpm

Sample Date (mm/dd/yy): 4/22/2020 Sample Collection Time: 12:36

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): 3098414003 Final Lab Analysis Completion Date: 4/29/2020

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

Comments:

I.D. No 100008

Monitoring Point No. CWMP009W

Sample Date 4/22/2020

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	22.1	ASTM D6919-09
BICARBONATE	515	SM20 2321
CALCIUM, TOTAL	140	SW846 6010C
CALCIUM, DISSOLVED	144	SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	99	EPA 410.4
CHLORIDE	491	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	37200	SW846 6010C
IRON, DISSOLVED (ug/l)	35400	SW846 6010C
MAGNESIUM, TOTAL	71.5	SW846 6010C
MAGNESIUM, DISSOLVED	70.4	SW846 6010C
MANGANESE, TOTAL (ug/l)	10900	SW846 6010C
MANGANESE, DISSOLVED (ug/l)	11300	SW846 6010C
NITRATE-NITROGEN	0.2 ND	EPA 300
pH-FIELD (SU)	6.1	FIELD
pH-LAB (SU)	7.19	SM4500B
POTASSIUM, TOTAL	30.5	SW846 6010C
POTASSIUM, DISSOLVED	30.8	6SW846 010C
SODIUM, TOTAL	156	SW846 6010C
SODIUM, DISSOLVED	156	SW 846 6010C
SPEC. COND., FIELD (umhos/cm)	2635	FIELD
SPEC. COND., LAB (umhos/cm)	2280	EPA 120.1
SULFATE	5.9	EPA 300
ALKALINITY	515	SM20 2320B
TDS (TOTAL DISSOLVED SOLIDS)	1370	SM20 2540C
TOC (TOTAL ORGANIC CARBON)	34.1	SM20 5310B
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	63.6	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. 100008

Monitoring Point No. CWMP009W

Sample Date 4/22/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-Q. Organics (Enter all data in ug/l)

ANALYTE	VALUE ^T	ANALYSIS METHOD NUMBER
BENZENE	2.1	SW846 8260B
1,2-DIBROMOETHANE (EDB) (ETHYLENE D	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1.7	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.

I.D. No. 100008

Monitoring Point No. CWMP009W

Sample Date 4/22/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES**

- 1-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ARSENIC, TOTAL	3.6	SW846 6010C
ARSENIC, DISSOLVED	3.6	SW846 6010C
BARIUM, TOTAL	730	SW846 6010C
BARIUM, DISSOLVED	740	SW846 6010C
CADMIUM, TOTAL	1.1 ND	SW846 6010C
CADMIUM, DISSOLVED	1.1 ND	SW846 6010C
CHROMIUM, TOTAL	2.2 ND	SW846 6010C
CHROMIUM, DISSOLVED	2.2 ND	SW846 6010C
COPPER, TOTAL	5.6 ND	SW846 6010C
COPPER, DISSOLVED	5.6 ND	SW846 6010C
LEAD-FLAMELESS, TOTAL	2.2 ND	SW846 6010C
LEAD, DISSOLVED	2.2 ND	SW846 6010C
MERCURY, TOTAL	0.5 ND	SW846 7470A
MERCURY, DISSOLVED	0.5 ND	SW846 7470A
SELENIUM, TOTAL	5.6 ND	SW846 6010C
SELENIUM, DISSOLVED	5.6 ND	SW846 6010C
SILVER, TOTAL	2.2 ND	SW846 6010C
SILVER, DISSOLVED	2.2 ND	SW846 6010C
ZINC, TOTAL	5.6	SW846 6010C
ZINC, DISSOLVED	5.6 ND	SW846 6010C

^T Please indicate detection limit if analyte is not detected.

I.D. No 100008

Monitoring Point No. CWMP009W

Sample Date 4/22/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE ^T	ANALYSIS METHOD NUMBER
BROMOFORM	1 ND	SW846 8260B
BROMOMETHANE	1 ND	SW846 8260B
CARBON TETRACHLORIDE	1 ND	SW846 8260B
CHLOROENZENE	30.6	SW846 8260B
CHLOROETHANE	13.8	SW846 8260B
DIBROMOCHLOROMETHANE (CHLORODIBROMOMET	1 ND	SW846 8260B
CHLOROMETHANE	1 ND	SW846 8260B
3-CHLORO-1-PROPENE	1 ND	SW846 8260B
1,2-DICHLOROENZENE	3.2	SW846 8260B
1,3-DICHLOROENZENE	1 ND	SW846 8260B
1,4-DICHLOROENZENE	10.8	SW846 8260B
DICHLORODIFLUOROMETHANE	1 ND	SW846 8260B
1,2-DICHLOROPROPANE	1 ND	SW846 8260B
cis 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
trans 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
2-BUTANONE (MEK)	10 ND	SW846 8260B
4-METHYL-2-PENTANONE (MIBK)	5 ND	SW846 8260B
1,1,1,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROFLUOROMETHANE	1 ND	SW846 8260B
1,2,3-TRICHLOROPROPANE	2 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

I.D. No 100008

Monitoring Point No. CWMP009W

Sample Date 4/22/2020

FORM 19
ANNUAL WATER QUALITY ANALYSES

SUBTITLE D - Detection Zone Add-On List - When the MCL of any VOC is exceeded in the detection zone Form 50 monitoring, the following analytes must be monitored annually in the groundwater monitoring wells.

ORGANICS AND METALS (Enter all data in ug/l)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ACETONE	13.2	SW846 8260B
ACRYLONITRILE	5 ND	SW846 8260B
BROMOCHLOROMETHANE) CHLOROBROMOMETHAN	1 ND	SW846 8260B
BROMODICHLOROMETHANE	1 ND	SW846 8260B
CARBON DISULFIDE	1 ND	SW846 8260B
CHLOROFORM	1 ND	SW846 8260B
1,2-DIBROMO-3-CHLOROPROPANE (DBCP) (DIBROMO	7 ND	SW846 8260B
trans 1,4-DICHLORO-2-BUTENE	3 ND	SW846 8260B
2-HEXANONE	5 ND	SW846 8260B
DIBROMOMETHANE	1 ND	SW846 8260B
IODOMETHANE	1 ND	SW846 8260B
STYRENE	1 ND	SW846 8260B
VINYL ACETATE	5 ND	SW846 8260B
ANTIMONY	2.2 ND	EPA 200.8
BERYLLIUM	1.1 ND	EPA 200.8
COBALT	49	SW846 6010C
NICKEL	61	SW846 6010C
THALLIUM	1.1 ND	EPA 200.8
VANADIUM	2.2 ND	SW846 6010C

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
06/01/2020

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: Creswell Landfill

Facility ID (as issued by DEP): 100008

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: CWMP008W Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County

Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 16.97 " Longitude: 76 ° 26 ' 47.58 "

Depth to Water Level: 2.49 ft Measured from: Land Surface TOC

Casing Stickup: 2.80 ft Elevation of Water Level: 419.81 ft./MSL

Sampling Depth: 19 ft Volume of Water Column: 3.31 gal

Total Well Depth: 22.8 ft Sampling Method: Pumped Bailed Grab

Well Purged: Yes No Well Volumes Purged: 5.4

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

Spring Flow Rate: gpm

Sample Date (mm/dd/yy): 4/22/2020 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): 3098414004 Final Lab Analysis Completion Date: 4/29/2020

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

Comments: _____

I.D. No 100008

Monitoring Point No. CWMP008W

Sample Date 4/22/2020

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	4.89	ASTM D6919-09
BICARBONATE	365	SM20 2321
CALCIUM, TOTAL	61.2	SW846 6010C
CALCIUM, DISSOLVED	25.3	SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	24	EPA 410.4
CHLORIDE	31.8	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	27400	SW846 6010C
IRON, DISSOLVED (ug/l)	640	SW846 6010C
MAGNESIUM, TOTAL	27.6	SW846 6010C
MAGNESIUM, DISSOLVED	6.7	SW846 6010C
MANGANESE, TOTAL (ug/l)	14500	SW846 6010C
MANGANESE, DISSOLVED (ug/l)	61	SW846 6010C
NITRATE-NITROGEN	0.2 ND	EPA 300
pH-FIELD (SU)	6.08	FIELD
pH-LAB (SU)	6.86	SM4500B
POTASSIUM, TOTAL	7.7	SW846 6010C
POTASSIUM, DISSOLVED	2.1	6SW846 010C
SODIUM, TOTAL	32.3	SW846 6010C
SODIUM, DISSOLVED	10.5	SW 846 6010C
SPEC. COND., FIELD (umhos/cm)	836	FIELD
SPEC. COND., LAB (umhos/cm)	723	EPA 120.1
SULFATE	6.8	EPA 300
ALKALINITY	365	SM20 2320B
TDS (TOTAL DISSOLVED SOLIDS)	458	SM20 2540C
TOC (TOTAL ORGANIC CARBON)	7.8	SM20 5310B
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	12.5	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. 100008

Monitoring Point No. CWMP008W

Sample Date 4/22/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-Q. Organics (Enter all data in ug/l)

ANALYTE	VALUE ^T	ANALYSIS METHOD NUMBER
BENZENE	1.8	SW846 8260B
1,2-DIBROMOETHANE (EDB) (ETHYLENE D	1 ND	SW846 8260B
1,1-DICHLOROETHANE	3.2	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.

I.D. No. 100008

Monitoring Point No. CWMP008W

Sample Date 4/22/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES**

- 1-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ARSENIC, TOTAL	3.3 ND	SW846 6010C
ARSENIC, DISSOLVED	3 ND	SW846 6010C
BARIUM, TOTAL	130	SW846 6010C
BARIUM, DISSOLVED	33	SW846 6010C
CADMIUM, TOTAL	1.1 ND	SW846 6010C
CADMIUM, DISSOLVED	1.1 ND	SW846 6010C
CHROMIUM, TOTAL	2.2 ND	SW846 6010C
CHROMIUM, DISSOLVED	2.2 ND	SW846 6010C
COPPER, TOTAL	5.6 ND	SW846 6010C
COPPER, DISSOLVED	5.6 ND	SW846 6010C
LEAD-FLAMELESS, TOTAL	2.2 ND	SW846 6010C
LEAD, DISSOLVED	2.2 ND	SW846 6010C
MERCURY, TOTAL	0.5 ND	SW846 7470A
MERCURY, DISSOLVED	0.5 ND	SW846 7470A
SELENIUM, TOTAL	5.6 ND	SW846 6010C
SELENIUM, DISSOLVED	5.6 ND	SW846 6010C
SILVER, TOTAL	2.2 ND	SW846 6010C
SILVER, DISSOLVED	2.2 ND	SW846 6010C
ZINC, TOTAL	5.6 ND	SW846 6010C
ZINC, DISSOLVED	6.2	SW846 6010C

^T Please indicate detection limit if analyte is not detected.

I.D. No 100008

Monitoring Point No. CWMP008W

Sample Date 4/22/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BROMOFORM	1 ND	SW846 8260B
BROMOMETHANE	1 ND	SW846 8260B
CARBON TETRACHLORIDE	1 ND	SW846 8260B
CHLOROENZENE	9.6	SW846 8260B
CHLOROETHANE	6	SW846 8260B
DIBROMOCHLOROMETHANE (CHLORODIBROMOMET	1 ND	SW846 8260B
CHLOROMETHANE	1 ND	SW846 8260B
3-CHLORO-1-PROPENE	1 ND	SW846 8260B
1,2-DICHLOROENZENE	1.6	SW846 8260B
1,3-DICHLOROENZENE	1 ND	SW846 8260B
1,4-DICHLOROENZENE	12.1	SW846 8260B
DICHLORODIFLUOROMETHANE	1 ND	SW846 8260B
1,2-DICHLOROPROPANE	1 ND	SW846 8260B
cis 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
trans 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
2-BUTANONE (MEK)	10 ND	SW846 8260B
4-METHYL-2-PENTANONE (MIBK)	5 ND	SW846 8260B
1,1,1,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROFLUOROMETHANE	1 ND	SW846 8260B
1,2,3-TRICHLOROPROPANE	2 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

I.D. No 100008

Monitoring Point No. CWMP008W

Sample Date 4/22/2020

FORM 19
ANNUAL WATER QUALITY ANALYSES

SUBTITLE D - Detection Zone Add-On List - When the MCL of any VOC is exceeded in the detection zone Form 50 monitoring, the following analytes must be monitored annually in the groundwater monitoring wells.

ORGANICS AND METALS (Enter all data in ug/l)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ACETONE	10 ND	SW846 8260B
ACRYLONITRILE	5 ND	SW846 8260B
BROMOCHLOROMETHANE) CHLOROBROMOMETHAN	1 ND	SW846 8260B
BROMODICHLOROMETHANE	1 ND	SW846 8260B
CARBON DISULFIDE	1 ND	SW846 8260B
CHLOROFORM	1 ND	SW846 8260B
1,2-DIBROMO-3-CHLOROPROPANE (DBCP) (DIBROMO	7 ND	SW846 8260B
trans 1,4-DICHLORO-2-BUTENE	3 ND	SW846 8260B
2-HEXANONE	5 ND	SW846 8260B
DIBROMOMETHANE	1 ND	SW846 8260B
IODOMETHANE	1 ND	SW846 8260B
STYRENE	1 ND	SW846 8260B
VINYL ACETATE	5 ND	SW846 8260B
ANTIMONY	2.2 ND	EPA 200.8
BERYLLIUM	1.1 ND	EPA 200.8
COBALT	28	SW846 6010C
NICKEL	17	SW846 6010C
THALLIUM	1.1 ND	EPA 200.8
VANADIUM	2.2 ND	SW846 6010C

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
06/01/2020

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: Creswell Landfill

Facility ID (as issued by DEP): 100008

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: CWMP012W Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County

Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 1.48 " Longitude: 76 ° 26 ' 36.02 "

Depth to Water Level: 62.22 ft Measured from: Land Surface TOC

Casing Stickup: 1.90 ft Elevation of Water Level: 320.48 ft./MSL

Sampling Depth: 0 ft Volume of Water Column: 58.28 gal

Total Well Depth: 101.9 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): 4/23/2020 Sample Collection Time: 9:26

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): 3098689001 Final Lab Analysis Completion Date: 5/1/2020

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

Comments: _____

I.D. No 100008

Monitoring Point No. CWMP012W

Sample Date 4/23/2020

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	ASTM D6919-09
BICARBONATE	89	SM20 2321
CALCIUM, TOTAL	30.4	SW846 6010C
CALCIUM, DISSOLVED	31	SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	34.5	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	80100	SW846 6010C
IRON, DISSOLVED (ug/l)	56 ND	SW846 6010C
MAGNESIUM, TOTAL	8.4	SW846 6010C
MAGNESIUM, DISSOLVED	8.6	SW846 6010C
MANGANESE, TOTAL (ug/l)	250	SW846 6010C
MANGANESE, DISSOLVED (ug/l)	110	SW846 6010C
NITRATE-NITROGEN	8.2	EPA 300
pH-FIELD (SU)	5.77	FIELD
pH-LAB (SU)	6.76	SM4500B
POTASSIUM, TOTAL	1.3	SW846 6010C
POTASSIUM, DISSOLVED	1.4	6SW846 010C
SODIUM, TOTAL	12.4	SW846 6010C
SODIUM, DISSOLVED	12.7	SW 846 6010C
SPEC. COND., FIELD (umhos/cm)	346	FIELD
SPEC. COND., LAB (umhos/cm)	323	EPA 120.1
SULFATE	4.5	EPA 300
ALKALINITY	89	SM20 2320B
TDS (TOTAL DISSOLVED SOLIDS)	212	SM20 2540C
TOC (TOTAL ORGANIC CARBON)	1.7	SM20 5310B
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	94.8	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. 100008

Monitoring Point No. CWMP012W

Sample Date 4/23/2020

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 (EDB) (ETHYLENE D	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.

I.D. No. 100008

Monitoring Point No. CWMP012W

Sample Date 4/23/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES**

- 1-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ARSENIC, TOTAL	5.7	SW846 6010C
ARSENIC, DISSOLVED	3 ND	SW846 6010C
BARIUM, TOTAL	93	SW846 6010C
BARIUM, DISSOLVED	89	SW846 6010C
CADMIUM, TOTAL	1.1 ND	SW846 6010C
CADMIUM, DISSOLVED	1.1 ND	SW846 6010C
CHROMIUM, TOTAL	2.2 ND	SW846 6010C
CHROMIUM, DISSOLVED	2.2 ND	SW846 6010C
COPPER, TOTAL	5.6 ND	SW846 6010C
COPPER, DISSOLVED	5.6 ND	SW846 6010C
LEAD-FLAMELESS, TOTAL	2.2 ND	SW846 6010C
LEAD, DISSOLVED	2.2 ND	SW846 6010C
MERCURY, TOTAL	0.5 ND	SW846 7470A
MERCURY, DISSOLVED	0.5 ND	SW846 7470A
SELENIUM, TOTAL	5.6 ND	SW846 6010C
SELENIUM, DISSOLVED	5.6 ND	SW846 6010C
SILVER, TOTAL	2.2 ND	SW846 6010C
SILVER, DISSOLVED	2.2 ND	SW846 6010C
ZINC, TOTAL	7.2	SW846 6010C
ZINC, DISSOLVED	5.6	SW846 6010C

^T Please indicate detection limit if analyte is not detected.

I.D. No 100008

Monitoring Point No. CWMP012W

Sample Date 4/23/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE ^T	ANALYSIS METHOD NUMBER
BROMOFORM	1 ND	SW846 8260B
BROMOMETHANE	1 ND	SW846 8260B
CARBON TETRACHLORIDE	1 ND	SW846 8260B
CHLOROENZENE	1 ND	SW846 8260B
CHLOROETHANE	1 ND	SW846 8260B
DIBROMOCHLOROMETHANE (CHLORODIBROMOMET	1 ND	SW846 8260B
CHLOROMETHANE	1 ND	SW846 8260B
3-CHLORO-1-PROPENE	1 ND	SW846 8260B
1,2-DICHLOROENZENE	1 ND	SW846 8260B
1,3-DICHLOROENZENE	1 ND	SW846 8260B
1,4-DICHLOROENZENE	1 ND	SW846 8260B
DICHLORODIFLUOROMETHANE	1 ND	SW846 8260B
1,2-DICHLOROPROPANE	1 ND	SW846 8260B
cis 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
trans 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
2-BUTANONE (MEK)	10 ND	SW846 8260B
4-METHYL-2-PENTANONE (MIBK)	5 ND	SW846 8260B
1,1,1,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROFLUOROMETHANE	1 ND	SW846 8260B
1,2,3-TRICHLOROPROPANE	2 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

I.D. No	100008
Monitoring Point No.	CWMP012W
Sample Date	4/23/2020

FORM 19
ANNUAL WATER QUALITY ANALYSES

SUBTITLE D - Detection Zone Add-On List - When the MCL of any VOC is exceeded in the detection zone Form 50 monitoring, the following analytes must be monitored annually in the groundwater monitoring wells.

ORGANICS AND METALS (Enter all data in ug/l)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ACETONE	10 ND	SW846 8260B
ACRYLONITRILE	5 ND	SW846 8260B
BROMOCHLOROMETHANE) CHLOROBROMOMETHAN	1 ND	SW846 8260B
BROMODICHLOROMETHANE	1 ND	SW846 8260B
CARBON DISULFIDE	1 ND	SW846 8260B
CHLOROFORM	1 ND	SW846 8260B
1,2-DIBROMO-3-CHLOROPROPANE (DBCP) (DIBROMO	7 ND	SW846 8260B
trans 1,4-DICHLORO-2-BUTENE	3 ND	SW846 8260B
2-HEXANONE	5 ND	SW846 8260B
DIBROMOMETHANE	1 ND	SW846 8260B
IODOMETHANE	1 ND	SW846 8260B
STYRENE	1 ND	SW846 8260B
VINYL ACETATE	5 ND	SW846 8260B
ANTIMONY	2.2 ND	EPA 200.8
BERYLLIUM	1.1 ND	EPA 200.8
COBALT	5.6 ND	SW846 6010C
NICKEL	9.5	SW846 6010C
THALLIUM	1.1 ND	EPA 200.8
VANADIUM	2.2 ND	SW846 6010C

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
06/01/2020

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: Creswell Landfill

Facility ID (as issued by DEP): 100008

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: CWMP018S Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County

Municipality: Manor

Sampling Point: Latitude: 39 ° 56 ' 55.11 " Longitude: 76 ° 26 ' 51.66 "

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

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

Sampling Depth: 0 ft Volume of Water Column: #Error gal

Total Well Depth: _____ 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): 4/23/2020 Sample Collection Time: 11:20

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): 3098689002 Final Lab Analysis CompletionDate: 5/1/2020

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

Comments: _____

I.D. No 100008

Monitoring Point No. CWMP018S

Sample Date 4/23/2020

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	ASTM D6919-09
BICARBONATE	395	SM20 2321
CALCIUM, TOTAL	67.4	SW846 6010C
CALCIUM, DISSOLVED	63.4	SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	22	EPA 410.4
CHLORIDE	401	EPA 300
FLUORIDE	0.5 ND	EPA 300
IRON, TOTAL (ug/l)	250	SW846 6010C
IRON, DISSOLVED (ug/l)	56 ND	SW846 6010C
MAGNESIUM, TOTAL	74.8	SW846 6010C
MAGNESIUM, DISSOLVED	72.5	SW846 6010C
MANGANESE, TOTAL (ug/l)	5.6 ND	SW846 6010C
MANGANESE, DISSOLVED (ug/l)	5.6 ND	SW846 6010C
NITRATE-NITROGEN	18.6	EPA 300
pH-FIELD (SU)	7.93	FIELD
pH-LAB (SU)	8.75	SM4500B
POTASSIUM, TOTAL	15.4	SW846 6010C
POTASSIUM, DISSOLVED	15	6SW846 010C
SODIUM, TOTAL	282	SW846 6010C
SODIUM, DISSOLVED	279	SW 846 6010C
SPEC. COND., FIELD (umhos/cm)	2310	FIELD
SPEC. COND., LAB (umhos/cm)	2210	EPA 120.1
SULFATE	34.6	EPA 300
ALKALINITY	395	SM20 2320B
TDS (TOTAL DISSOLVED SOLIDS)	1220	SM20 2540C
TOC (TOTAL ORGANIC CARBON)	8.2	SM20 5310B
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.54	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. 100008

Monitoring Point No. CWMP018S

Sample Date 4/23/2020

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 (EDB) (ETHYLENE D	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.

I.D. No. 100008

Monitoring Point No. CWMP018S

Sample Date 4/23/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES**

- 1-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ARSENIC, TOTAL	3.3 ND	SW846 6010C
ARSENIC, DISSOLVED	3 ND	SW846 6010C
BARIUM, TOTAL	30	SW846 6010C
BARIUM, DISSOLVED	31	SW846 6010C
CADMIUM, TOTAL	1.1 ND	SW846 6010C
CADMIUM, DISSOLVED	1.1 ND	SW846 6010C
CHROMIUM, TOTAL	2.2 ND	SW846 6010C
CHROMIUM, DISSOLVED	2.2 ND	SW846 6010C
COPPER, TOTAL	5.6 ND	SW846 6010C
COPPER, DISSOLVED	5.6 ND	SW846 6010C
LEAD-FLAMELESS, TOTAL	2.2 ND	SW846 6010C
LEAD, DISSOLVED	2.2 ND	SW846 6010C
MERCURY, TOTAL	0.5 ND	SW846 7470A
MERCURY, DISSOLVED	0.5 ND	SW846 7470A
SELENIUM, TOTAL	5.6 ND	SW846 6010C
SELENIUM, DISSOLVED	5.6 ND	SW846 6010C
SILVER, TOTAL	2.2 ND	SW846 6010C
SILVER, DISSOLVED	2.2 ND	SW846 6010C
ZINC, TOTAL	18	SW846 6010C
ZINC, DISSOLVED	18	SW846 6010C

^T Please indicate detection limit if analyte is not detected.

I.D. No 100008

Monitoring Point No. CWMP018S

Sample Date 4/23/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BROMOFORM	1 ND	SW846 8260B
BROMOMETHANE	1 ND	SW846 8260B
CARBON TETRACHLORIDE	1 ND	SW846 8260B
CHLOROENZENE	1 ND	SW846 8260B
CHLOROETHANE	1 ND	SW846 8260B
DIBROMOCHLOROMETHANE (CHLORODIBROMOMET	1 ND	SW846 8260B
CHLOROMETHANE	1 ND	SW846 8260B
3-CHLORO-1-PROPENE	1 ND	SW846 8260B
1,2-DICHLOROENZENE	1 ND	SW846 8260B
1,3-DICHLOROENZENE	1 ND	SW846 8260B
1,4-DICHLOROENZENE	1 ND	SW846 8260B
DICHLORODIFLUOROMETHANE	1 ND	SW846 8260B
1,2-DICHLOROPROPANE	1 ND	SW846 8260B
cis 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
trans 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
2-BUTANONE (MEK)	10 ND	SW846 8260B
4-METHYL-2-PENTANONE (MIBK)	5 ND	SW846 8260B
1,1,1,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROFLUOROMETHANE	1 ND	SW846 8260B
1,2,3-TRICHLOROPROPANE	2 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

I.D. No. 100008

Monitoring Point No. CWMP018S

Sample Date 4/23/2020

FORM 19
ANNUAL WATER QUALITY ANALYSES

SUBTITLE D - Detection Zone Add-On List - When the MCL of any VOC is exceeded in the detection zone Form 50 monitoring, the following analytes must be monitored annually in the groundwater monitoring wells.

ORGANICS AND METALS (Enter all data in ug/l)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ACETONE	10 ND	SW846 8260B
ACRYLONITRILE	5 ND	SW846 8260B
BROMOCHLOROMETHANE) CHLOROBROMOMETHAN	1 ND	SW846 8260B
BROMODICHLOROMETHANE	1 ND	SW846 8260B
CARBON DISULFIDE	1 ND	SW846 8260B
CHLOROFORM	1 ND	SW846 8260B
1,2-DIBROMO-3-CHLOROPROPANE (DBCP) (DIBROMO	7 ND	SW846 8260B
trans 1,4-DICHLORO-2-BUTENE	3 ND	SW846 8260B
2-HEXANONE	5 ND	SW846 8260B
DIBROMOMETHANE	1 ND	SW846 8260B
IODOMETHANE	1 ND	SW846 8260B
STYRENE	1 ND	SW846 8260B
VINYL ACETATE	5 ND	SW846 8260B
ANTIMONY	2.2 ND	EPA 200.8
BERYLLIUM	1.1 ND	EPA 200.8
COBALT	5.6 ND	SW846 6010C
NICKEL	14	SW846 6010C
THALLIUM	1.1 ND	EPA 200.8
VANADIUM	2.2 ND	SW846 6010C

T Please indicate detection limit if analyte is not detected.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
06/01/2020

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: Creswell Landfill

Facility ID (as issued by DEP): 100008

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: CWMP017S Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County

Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 20.41 " Longitude: 76 ° 26 ' 45.1 "

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

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

Sampling Depth: 0 ft Volume of Water Column: #Error gal

Total Well Depth: _____ 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): 4/23/2020 Sample Collection Time: 11:49

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): 3098689003 Final Lab Analysis Completion Date: 5/5/2020

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

Comments: _____

I.D. No 100008

Monitoring Point No. CWMP017S

Sample Date 4/23/2020

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	ASTM D6919-09
BICARBONATE	590	SM20 2321
CALCIUM, TOTAL	79.3	SW846 6010C
CALCIUM, DISSOLVED	72.8	SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	619	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	290	SW846 6010C
IRON, DISSOLVED (ug/l)	120	SW846 6010C
MAGNESIUM, TOTAL	116	SW846 6010C
MAGNESIUM, DISSOLVED	111	SW846 6010C
MANGANESE, TOTAL (ug/l)	99	SW846 6010C
MANGANESE, DISSOLVED (ug/l)	75	SW846 6010C
NITRATE-NITROGEN	24.8	EPA 300
pH-FIELD (SU)	7.9	FIELD
pH-LAB (SU)	8.46	SM4500B
POTASSIUM, TOTAL	16.2	SW846 6010C
POTASSIUM, DISSOLVED	15.9	6SW846 010C
SODIUM, TOTAL	452	SW846 6010C
SODIUM, DISSOLVED	448	SW 846 6010C
SPEC. COND., FIELD (umhos/cm)	3369	FIELD
SPEC. COND., LAB (umhos/cm)	3190	EPA 120.1
SULFATE	62.9	EPA 300
ALKALINITY	590	SM20 2320B
TDS (TOTAL DISSOLVED SOLIDS)	1850	SM20 2540C
TOC (TOTAL ORGANIC CARBON)	5.6	SM20 5310B
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	1.91	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. 100008

Monitoring Point No. CWMP017S

Sample Date 4/23/2020

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 (EDB) (ETHYLENE D	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.

I.D. No. 100008

Monitoring Point No. CWMP017S

Sample Date 4/23/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES**

- 1-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ARSENIC, TOTAL	3.3 ND	SW846 6010C
ARSENIC, DISSOLVED	3 ND	SW846 6010C
BARIUM, TOTAL	23	SW846 6010C
BARIUM, DISSOLVED	24	SW846 6010C
CADMIUM, TOTAL	1.1 ND	SW846 6010C
CADMIUM, DISSOLVED	1.1 ND	SW846 6010C
CHROMIUM, TOTAL	2.2 ND	SW846 6010C
CHROMIUM, DISSOLVED	2.2 ND	SW846 6010C
COPPER, TOTAL	5.6 ND	SW846 6010C
COPPER, DISSOLVED	5.6 ND	SW846 6010C
LEAD-FLAMELESS, TOTAL	2.2 ND	SW846 6010C
LEAD, DISSOLVED	2.2 ND	SW846 6010C
MERCURY, TOTAL	0.5 ND	SW846 7470A
MERCURY, DISSOLVED	0.5 ND	SW846 7470A
SELENIUM, TOTAL	5.6 ND	SW846 6010C
SELENIUM, DISSOLVED	5.6 ND	SW846 6010C
SILVER, TOTAL	2.2 ND	SW846 6010C
SILVER, DISSOLVED	2.2 ND	SW846 6010C
ZINC, TOTAL	69	SW846 6010C
ZINC, DISSOLVED	62	SW846 6010C

^T Please indicate detection limit if analyte is not detected.

I.D. No 100008

Monitoring Point No. CWMP017S

Sample Date 4/23/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BROMOFORM	1 ND	SW846 8260B
BROMOMETHANE	1 ND	SW846 8260B
CARBON TETRACHLORIDE	1 ND	SW846 8260B
CHLOROENZENE	1 ND	SW846 8260B
CHLOROETHANE	1 ND	SW846 8260B
DIBROMOCHLOROMETHANE (CHLORODIBROMOMET	1 ND	SW846 8260B
CHLOROMETHANE	1 ND	SW846 8260B
3-CHLORO-1-PROPENE	1 ND	SW846 8260B
1,2-DICHLOROENZENE	1 ND	SW846 8260B
1,3-DICHLOROENZENE	1 ND	SW846 8260B
1,4-DICHLOROENZENE	1 ND	SW846 8260B
DICHLORODIFLUOROMETHANE	1 ND	SW846 8260B
1,2-DICHLOROPROPANE	1 ND	SW846 8260B
cis 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
trans 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
2-BUTANONE (MEK)	10 ND	SW846 8260B
4-METHYL-2-PENTANONE (MIBK)	5 ND	SW846 8260B
1,1,1,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROFLUOROMETHANE	1 ND	SW846 8260B
1,2,3-TRICHLOROPROPANE	2 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

I.D. No	100008
Monitoring Point No.	CWMP017S
Sample Date	4/23/2020

FORM 19
ANNUAL WATER QUALITY ANALYSES

SUBTITLE D - Detection Zone Add-On List - When the MCL of any VOC is exceeded in the detection zone Form 50 monitoring, the following analytes must be monitored annually in the groundwater monitoring wells.

ORGANICS AND METALS (Enter all data in ug/l)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ACETONE	10 ND	SW846 8260B
ACRYLONITRILE	5 ND	SW846 8260B
BROMOCHLOROMETHANE) CHLOROBROMOMETHAN	1 ND	SW846 8260B
BROMODICHLOROMETHANE	1 ND	SW846 8260B
CARBON DISULFIDE	1 ND	SW846 8260B
CHLOROFORM	1 ND	SW846 8260B
1,2-DIBROMO-3-CHLOROPROPANE (DBCP) (DIBROMO	7 ND	SW846 8260B
trans 1,4-DICHLORO-2-BUTENE	3 ND	SW846 8260B
2-HEXANONE	5 ND	SW846 8260B
DIBROMOMETHANE	1 ND	SW846 8260B
IODOMETHANE	1 ND	SW846 8260B
STYRENE	1 ND	SW846 8260B
VINYL ACETATE	5 ND	SW846 8260B
ANTIMONY	2.2 ND	EPA 200.8
BERYLLIUM	1.1 ND	EPA 200.8
COBALT	5.6 ND	SW846 6010C
NICKEL	10	SW846 6010C
THALLIUM	1.1 ND	EPA 200.8
VANADIUM	2.2 ND	SW846 6010C

T Please indicate detection limit if analyte is not detected.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT**



Date Prepared/Revised
06/01/2020

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: Creswell Landfill

Facility ID (as issued by DEP): 100008

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: CWMP003W Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County

Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 20.17 " Longitude: 76 ° 26 ' 8.37 "

Depth to Water Level: 100.02 ft Measured from: Land Surface TOC

Casing Stickup: -1.29 ft Elevation of Water Level: 424.19 ft./MSL

Sampling Depth: 100 ft Volume of Water Column: -36.75 gal

Total Well Depth: 75 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): 4/23/2020 Sample Collection Time: 12:59

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): 3098689004 Final Lab Analysis Completion Date: 4/30/2020

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

Comments: _____

I.D. No 100008

Monitoring Point No. CWMP003W

Sample Date 4/23/2020

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	0.486	ASTM D6919-09
BICARBONATE	34	SM20 2321
CALCIUM, TOTAL	23.2	SW846 6010C
CALCIUM, DISSOLVED	22	SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	60.6	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	56 ND	SW846 6010C
IRON, DISSOLVED (ug/l)	56 ND	SW846 6010C
MAGNESIUM, TOTAL	8.2	SW846 6010C
MAGNESIUM, DISSOLVED	8	SW846 6010C
MANGANESE, TOTAL (ug/l)	5.6 ND	SW846 6010C
MANGANESE, DISSOLVED (ug/l)	5.6 ND	SW846 6010C
NITRATE-NITROGEN	6.9	EPA 300
pH-FIELD (SU)	5.32	FIELD
pH-LAB (SU)	6.33	SM4500B
POTASSIUM, TOTAL	1.6	SW846 6010C
POTASSIUM, DISSOLVED	1.5	6SW846 010C
SODIUM, TOTAL	20.7	SW846 6010C
SODIUM, DISSOLVED	20.5	SW 846 6010C
SPEC. COND., FIELD (umhos/cm)	363	FIELD
SPEC. COND., LAB (umhos/cm)	342	EPA 120.1
SULFATE	5	EPA 300
ALKALINITY	34	SM20 2320B
TDS (TOTAL DISSOLVED SOLIDS)	244	SM20 2540C
TOC (TOTAL ORGANIC CARBON)	0.59	SM20 5310B
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.15	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. 100008

Monitoring Point No. CWMP003W

Sample Date 4/23/2020

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 (EDB) (ETHYLENE D	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1.1	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.

I.D. No. 100008

Monitoring Point No. CWMP003W

Sample Date 4/23/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES**

- 1-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ARSENIC, TOTAL	3.3 ND	SW846 6010C
ARSENIC, DISSOLVED	3 ND	SW846 6010C
BARIUM, TOTAL	16	SW846 6010C
BARIUM, DISSOLVED	18	SW846 6010C
CADMIUM, TOTAL	1.1 ND	SW846 6010C
CADMIUM, DISSOLVED	1.1 ND	SW846 6010C
CHROMIUM, TOTAL	2.2 ND	SW846 6010C
CHROMIUM, DISSOLVED	6.6	SW846 6010C
COPPER, TOTAL	5.6 ND	SW846 6010C
COPPER, DISSOLVED	5.6 ND	SW846 6010C
LEAD-FLAMELESS, TOTAL	2.2 ND	SW846 6010C
LEAD, DISSOLVED	2.2 ND	SW846 6010C
MERCURY, TOTAL	0.5 ND	SW846 7470A
MERCURY, DISSOLVED	0.5 ND	SW846 7470A
SELENIUM, TOTAL	5.6 ND	SW846 6010C
SELENIUM, DISSOLVED	5.6 ND	SW846 6010C
SILVER, TOTAL	2.2 ND	SW846 6010C
SILVER, DISSOLVED	2.2 ND	SW846 6010C
ZINC, TOTAL	7.3	SW846 6010C
ZINC, DISSOLVED	8	SW846 6010C

^T Please indicate detection limit if analyte is not detected.

I.D. No 100008

Monitoring Point No. CWMP003W

Sample Date 4/23/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BROMOFORM	1 ND	SW846 8260B
BROMOMETHANE	1 ND	SW846 8260B
CARBON TETRACHLORIDE	1 ND	SW846 8260B
CHLOROENZENE	1 ND	SW846 8260B
CHLOROETHANE	1 ND	SW846 8260B
DIBROMOCHLOROMETHANE (CHLORODIBROMOMET	1 ND	SW846 8260B
CHLOROMETHANE	1 ND	SW846 8260B
3-CHLORO-1-PROPENE	1 ND	SW846 8260B
1,2-DICHLOROENZENE	1 ND	SW846 8260B
1,3-DICHLOROENZENE	1 ND	SW846 8260B
1,4-DICHLOROENZENE	1 ND	SW846 8260B
DICHLORODIFLUOROMETHANE	1 ND	SW846 8260B
1,2-DICHLOROPROPANE	1 ND	SW846 8260B
cis 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
trans 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
2-BUTANONE (MEK)	10 ND	SW846 8260B
4-METHYL-2-PENTANONE (MIBK)	5 ND	SW846 8260B
1,1,1,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROFLUOROMETHANE	1 ND	SW846 8260B
1,2,3-TRICHLOROPROPANE	2 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

I.D. No	100008
Monitoring Point No.	CWMP003W
Sample Date	4/23/2020

FORM 19
ANNUAL WATER QUALITY ANALYSES

SUBTITLE D - Detection Zone Add-On List - When the MCL of any VOC is exceeded in the detection zone Form 50 monitoring, the following analytes must be monitored annually in the groundwater monitoring wells.

ORGANICS AND METALS (Enter all data in ug/l)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ACETONE	10 ND	SW846 8260B
ACRYLONITRILE	5 ND	SW846 8260B
BROMOCHLOROMETHANE) CHLOROBROMOMETHAN	1 ND	SW846 8260B
BROMODICHLOROMETHANE	1 ND	SW846 8260B
CARBON DISULFIDE	1 ND	SW846 8260B
CHLOROFORM	1 ND	SW846 8260B
1,2-DIBROMO-3-CHLOROPROPANE (DBCP) (DIBROMO	7 ND	SW846 8260B
trans 1,4-DICHLORO-2-BUTENE	3 ND	SW846 8260B
2-HEXANONE	5 ND	SW846 8260B
DIBROMOMETHANE	1 ND	SW846 8260B
IODOMETHANE	1 ND	SW846 8260B
STYRENE	1 ND	SW846 8260B
VINYL ACETATE	5 ND	SW846 8260B
ANTIMONY	2.2 ND	EPA 200.8
BERYLLIUM	1.1 ND	EPA 200.8
COBALT	5.6 ND	SW846 6010C
NICKEL	8.1	SW846 6010C
THALLIUM	1.1 ND	EPA 200.8
VANADIUM	2.2 ND	SW846 6010C

T Please indicate detection limit if analyte is not detected.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT**



Date Prepared/Revised
06/01/2020

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: Creswell Landfill

Facility ID (as issued by DEP): 100008

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: CWMP004W Well Spring Stream Other
 Upgradient/Upstream Downgradient/Downstream

Location (County): Lancaster County

Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 17.9 " Longitude: 76 ° 26 ' 7.05 "

Depth to Water Level: 99.23 ft Measured from: Land Surface TOC

Casing Stickup: -1.37 ft Elevation of Water Level: 430.30 ft./MSL

Sampling Depth: 130 ft Volume of Water Column: 59.88 gal

Total Well Depth: 140 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): 4/23/2020 Sample Collection Time: 12:42

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): 3098689005 Final Lab Analysis Completion Date: 4/29/2020

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

Comments: _____

I.D. No 100008

Monitoring Point No. CWMP004W

Sample Date 4/23/2020

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	0.317	ASTM D6919-09
BICARBONATE	29	SM20 2321
CALCIUM, TOTAL	20	SW846 6010C
CALCIUM, DISSOLVED	18.8	SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	42	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	56 ND	SW846 6010C
IRON, DISSOLVED (ug/l)	56 ND	SW846 6010C
MAGNESIUM, TOTAL	6.6	SW846 6010C
MAGNESIUM, DISSOLVED	6.4	SW846 6010C
MANGANESE, TOTAL (ug/l)	8.3	SW846 6010C
MANGANESE, DISSOLVED (ug/l)	9	SW846 6010C
NITRATE-NITROGEN	5.7	EPA 300
pH-FIELD (SU)	5.65	FIELD
pH-LAB (SU)	6.74	SM4500B
POTASSIUM, TOTAL	1.4	SW846 6010C
POTASSIUM, DISSOLVED	1.3	6SW846 010C
SODIUM, TOTAL	15.4	SW846 6010C
SODIUM, DISSOLVED	14.9	SW 846 6010C
SPEC. COND., FIELD (umhos/cm)	292	FIELD
SPEC. COND., LAB (umhos/cm)	263	EPA 120.1
SULFATE	5.3	EPA 300
ALKALINITY	29	SM20 2320B
TDS (TOTAL DISSOLVED SOLIDS)	198	SM20 2540C
TOC (TOTAL ORGANIC CARBON)	0.55	SM20 5310B
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.1 ND	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. 100008

Monitoring Point No. CWMP004W

Sample Date 4/23/2020

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 (EDB) (ETHYLENE D	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.

I.D. No. 100008

Monitoring Point No. CWMP004W

Sample Date 4/23/2020

FORM 19**QUARTERLY AND ANNUAL WATER QUALITY ANALYSES**

- 1-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ARSENIC, TOTAL	3.3 ND	SW846 6010C
ARSENIC, DISSOLVED	3 ND	SW846 6010C
BARIUM, TOTAL	22	SW846 6010C
BARIUM, DISSOLVED	21	SW846 6010C
CADMIUM, TOTAL	1.1 ND	SW846 6010C
CADMIUM, DISSOLVED	1.1 ND	SW846 6010C
CHROMIUM, TOTAL	2.2 ND	SW846 6010C
CHROMIUM, DISSOLVED	2.2 ND	SW846 6010C
COPPER, TOTAL	5.6 ND	SW846 6010C
COPPER, DISSOLVED	5.6 ND	SW846 6010C
LEAD-FLAMELESS, TOTAL	2.2 ND	SW846 6010C
LEAD, DISSOLVED	2.2 ND	SW846 6010C
MERCURY, TOTAL	0.5 ND	SW846 7470A
MERCURY, DISSOLVED	0.5 ND	SW846 7470A
SELENIUM, TOTAL	5.6 ND	SW846 6010C
SELENIUM, DISSOLVED	5.6 ND	SW846 6010C
SILVER, TOTAL	2.2 ND	SW846 6010C
SILVER, DISSOLVED	2.2 ND	SW846 6010C
ZINC, TOTAL	5.6 ND	SW846 6010C
ZINC, DISSOLVED	5.6 ND	SW846 6010C

^T Please indicate detection limit if analyte is not detected.

I.D. No 100008

Monitoring Point No. CWMP004W

Sample Date 4/23/2020

FORM 19
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
BROMOFORM	1 ND	SW846 8260B
BROMOMETHANE	1 ND	SW846 8260B
CARBON TETRACHLORIDE	1 ND	SW846 8260B
CHLOROENZENE	1 ND	SW846 8260B
CHLOROETHANE	1 ND	SW846 8260B
DIBROMOCHLOROMETHANE (CHLORODIBROMOMET	1 ND	SW846 8260B
CHLOROMETHANE	1 ND	SW846 8260B
3-CHLORO-1-PROPENE	1 ND	SW846 8260B
1,2-DICHLOROENZENE	1 ND	SW846 8260B
1,3-DICHLOROENZENE	1 ND	SW846 8260B
1,4-DICHLOROENZENE	1 ND	SW846 8260B
DICHLORODIFLUOROMETHANE	1 ND	SW846 8260B
1,2-DICHLOROPROPANE	1 ND	SW846 8260B
cis 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
trans 1,3-DICHLOROPROPENE	1 ND	SW846 8260B
2-BUTANONE (MEK)	10 ND	SW846 8260B
4-METHYL-2-PENTANONE (MIBK)	5 ND	SW846 8260B
1,1,1,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2,2-TETRACHLOROETHANE	1 ND	SW846 8260B
1,1,2-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROFLUOROMETHANE	1 ND	SW846 8260B
1,2,3-TRICHLOROPROPANE	2 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

I.D. No 100008

Monitoring Point No. CWMP004W

Sample Date 4/23/2020

FORM 19
ANNUAL WATER QUALITY ANALYSES

SUBTITLE D - Detection Zone Add-On List - When the MCL of any VOC is exceeded in the detection zone Form 50 monitoring, the following analytes must be monitored annually in the groundwater monitoring wells.

ORGANICS AND METALS (Enter all data in ug/l)

ANALYTE	VALUE^T	ANALYSIS METHOD NUMBER
ACETONE	10 ND	SW846 8260B
ACRYLONITRILE	5 ND	SW846 8260B
BROMOCHLOROMETHANE) CHLOROBROMOMETHAN	1 ND	SW846 8260B
BROMODICHLOROMETHANE	1 ND	SW846 8260B
CARBON DISULFIDE	1 ND	SW846 8260B
CHLOROFORM	1 ND	SW846 8260B
1,2-DIBROMO-3-CHLOROPROPANE (DBCP) (DIBROMO	7 ND	SW846 8260B
trans 1,4-DICHLORO-2-BUTENE	3 ND	SW846 8260B
2-HEXANONE	5 ND	SW846 8260B
DIBROMOMETHANE	1 ND	SW846 8260B
IODOMETHANE	1 ND	SW846 8260B
STYRENE	1 ND	SW846 8260B
VINYL ACETATE	5 ND	SW846 8260B
ANTIMONY	2.2 ND	EPA 200.8
BERYLLIUM	1.1 ND	EPA 200.8
COBALT	5.6 ND	SW846 6010C
NICKEL	5.6 ND	SW846 6010C
THALLIUM	1.1 ND	EPA 200.8
VANADIUM	2.2 ND	SW846 6010C

T Please indicate detection limit if analyte is not detected.

April 30, 2020

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

Certificate of Analysis

Project Name:	CRESWELL	Workorder:	3097998
Purchase Order:	PO1000127	Workorder ID:	2ND QTR 2020 CWMP-FORM 19A

Dear Mr. Brown:

Enclosed are the analytical results for samples received by the laboratory on Monday, April 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.

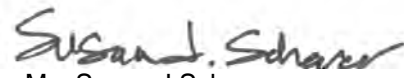
Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications 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: 3097998 2ND QTR 2020 CWMP-FORM 19A

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
3097998001	CWMP007W	Ground Water	4/20/2020 11:09	4/20/2020 16:02	Mr. Brian G Shade
3097998002	CWMP001W	Ground Water	4/20/2020 12:27	4/20/2020 16:02	Mr. Brian G Shade
3097998003	CWMP005W	Ground Water	4/20/2020 14:07	4/20/2020 16:02	Mr. Brian G Shade

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SAMPLE SUMMARY

Workorder: 3097998 2ND QTR 2020 CWMP-FORM 19A

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: 3097998 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3097998001** Date Collected: 4/20/2020 11:09 Matrix: Ground Water
Sample ID: **CWMP007W** Date Received: 4/20/2020 16:02

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	ND		ug/L	10.0	SW846 8260B			4/21/20 16:48	DPC	J
Acrylonitrile	ND		ug/L	5.0	SW846 8260B			4/21/20 16:48	DPC	J
Benzene	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
Bromochloromethane	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
Bromodichloromethane	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
Bromoform	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
Bromomethane	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
2-Butanone	ND		ug/L	10.0	SW846 8260B			4/21/20 16:48	DPC	J
Carbon Disulfide	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
Carbon Tetrachloride	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
Chlorobenzene	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
Chlorodibromomethane	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
Chloroethane	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
Chloroform	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
Chloromethane	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
3-Chloro-1-propene	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	SW846 8260B			4/21/20 16:48	DPC	J
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
Dibromomethane	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
trans-1,4-Dichloro-2-butene	ND		ug/L	3.0	SW846 8260B			4/21/20 16:48	DPC	J
1,2-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
1,3-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
1,4-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
Dichlorodifluoromethane	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
1,1-Dichloroethene	ND	3	ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
1,2-Dichloropropane	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
cis-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
trans-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
2-Hexanone	ND		ug/L	5.0	SW846 8260B			4/21/20 16:48	DPC	J
Iodomethane	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	SW846 8260B			4/21/20 16:48	DPC	J

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ANALYTICAL RESULTS

Workorder: 3097998 2ND QTR 2020 CWMP-FORM 19A

 Lab ID: **3097998001** Date Collected: 4/20/2020 11:09 Matrix: Ground Water
 Sample ID: **CWMP007W** Date Received: 4/20/2020 16:02

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
Styrene	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
1,1,1,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
Toluene	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
Total Xylenes	ND		ug/L	3.0	SW846 8260B			4/21/20 16:48	DPC	J
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
1,1,2-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
Trichloroethene	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
1,2,3-Trichloropropane	ND		ug/L	2.0	SW846 8260B			4/21/20 16:48	DPC	J
Vinyl Acetate	ND		ug/L	5.0	SW846 8260B			4/21/20 16:48	DPC	J
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			4/21/20 16:48	DPC	J
Surrogate Recoveries	Results	Flag	Units	Limits	Method	Prepared	By	Analyzed	By	Cntr
1,2-Dichloroethane-d4 (S)	107		%	62 - 133	SW846 8260B			4/21/20 16:48	DPC	J
4-Bromofluorobenzene (S)	100		%	79 - 114	SW846 8260B			4/21/20 16:48	DPC	J
Dibromofluoromethane (S)	102		%	78 - 116	SW846 8260B			4/21/20 16:48	DPC	J
Toluene-d8 (S)	95.8		%	76 - 127	SW846 8260B			4/21/20 16:48	DPC	J

LIBRARY SEARCH - VOLATILES

No TIC's Detected . Lib Search VOC 4/21/20 16:48 CPK J

WET CHEMISTRY

Alkalinity, Bicarbonate	23		mg/L	5	SM2320B-2011			4/22/20 17:56	MBW	B
Alkalinity, Total	23	1	mg/L	5	SM2320B-2011			4/22/20 17:56	MBW	A
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			4/29/20 02:59	JXL	C
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			4/23/20 02:27	JAM	C
Chloride	62.3		mg/L	2.0	EPA 300.0			4/21/20 06:35	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			4/21/20 06:35	MBW	B
Nitrate-N	9.3		mg/L	0.20	EPA 300.0			4/21/20 06:35	MBW	B
pH	6.32	2	pH_Units		S4500HB-11			4/22/20 17:56	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	4/21/20 14:00	VXF	4/21/20 15:45	VXF	I
Specific Conductance	355		umhos/cm	1	SM2510B-2011			4/22/20 17:56	MBW	B
Sulfate	21.3		mg/L	2.0	EPA 300.0			4/21/20 06:35	MBW	B
Total Dissolved Solids	310		mg/L	25	S2540C-11			4/22/20 22:54	VXF	B
Total Organic Carbon (TOC)	ND		mg/L	0.50	SM5310B-2011			4/29/20 06:23	PAG	G
Turbidity	0.11		NTU	0.10	SM2130B-2011			4/21/20 04:05	R2B	B

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ANALYTICAL RESULTS

Workorder: 3097998 2ND QTR 2020 CWMP-FORM 19A

Lab ID: 3097998001	Date Collected: 4/20/2020 11:09	Matrix: Ground Water
Sample ID: CWMP007W	Date Received: 4/20/2020 16:02	

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Antimony, Total	ND		mg/L	0.0022	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:00	MSA	E1
Arsenic, Total	ND		mg/L	0.0033	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:00	MSA	E1
Arsenic, Dissolved	ND		mg/L	0.0030	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:16	MSA	D1
Barium, Total	0.045		mg/L	0.0056	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:00	MSA	E1
Barium, Dissolved	0.045		mg/L	0.0056	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:16	MSA	D1
Beryllium, Total	ND		mg/L	0.0011	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:00	MSA	E1
Cadmium, Total	ND		mg/L	0.0011	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:00	MSA	E1
Cadmium, Dissolved	ND		mg/L	0.0011	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:16	MSA	D1
Calcium, Total	17.3		mg/L	0.11	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:00	MSA	E1
Calcium, Dissolved	16.0		mg/L	0.11	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:16	MSA	D1
Chromium, Total	ND		mg/L	0.0022	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:00	MSA	E1
Chromium, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:16	MSA	D1
Cobalt, Total	ND		mg/L	0.0056	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:00	MSA	E1
Copper, Total	ND		mg/L	0.0056	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:00	MSA	E1
Copper, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:16	MSA	D1
Iron, Total	ND		mg/L	0.056	SW846 6020A	4/21/20 17:40	SXC	4/24/20 01:15	MSA	E1
Iron, Dissolved	ND		mg/L	0.056	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:16	MSA	D1
Lead, Total	ND		mg/L	0.0022	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:00	MSA	E1
Lead, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:16	MSA	D1
Magnesium, Total	10		mg/L	0.11	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:00	MSA	E1
Magnesium, Dissolved	9.5		mg/L	0.11	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:16	MSA	D1
Manganese, Total	0.0065		mg/L	0.0056	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:00	MSA	E1
Manganese, Dissolved	0.0060		mg/L	0.0056	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:16	MSA	D1
Mercury, Total	ND		mg/L	0.00050	SW846 7470A	4/21/20 10:30	AHI	4/21/20 13:20	AHI	E
Mercury, Dissolved	ND		mg/L	0.00050	SW846 7470A	4/21/20 10:30	AHI	4/21/20 13:37	AHI	D
Nickel, Total	ND		mg/L	0.0056	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:00	MSA	E1
Potassium, Total	2.2		mg/L	0.11	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:00	MSA	E1
Potassium, Dissolved	2.2		mg/L	0.11	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:16	MSA	D1
Selenium, Total	ND		mg/L	0.0056	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:00	MSA	E1
Selenium, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:16	MSA	D1
Silver, Total	ND		mg/L	0.0022	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:00	MSA	E1
Silver, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:16	MSA	D1
Sodium, Total	35.9		mg/L	0.11	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:00	MSA	E1
Sodium, Dissolved	33.3		mg/L	0.11	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:16	MSA	D1
Thallium, Total	ND		mg/L	0.0011	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:00	MSA	E1
Vanadium, Total	ND		mg/L	0.0022	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:00	MSA	E1
Zinc, Total	0.0068		mg/L	0.0056	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:00	MSA	E1

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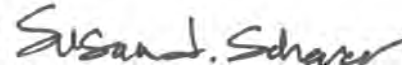
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ANALYTICAL RESULTS

Workorder: 3097998 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3097998001** Date Collected: 4/20/2020 11:09 Matrix: Ground Water
 Sample ID: **CWMP007W** Date Received: 4/20/2020 16:02

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Zinc, Dissolved	0.0059		mg/L	0.0056	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:16	MSA	D1
FIELD PARAMETERS										
Depth to Water Level	5.25		Feet		Field			4/20/20 11:09	BGS	F
Elev Top MW Casing above MSL	453.40		Feet		Field			4/20/20 11:09	BGS	F
Flow Rate	1.66		gal/min		Field			4/20/20 11:09	BGS	F
Ground Water Elevation	448.15		ft/MSL		Field			4/20/20 11:09	BGS	F
pH, Field (SM4500B)	5.19		pH_Units		Field			4/20/20 11:09	BGS	F
Sample Depth	33.00		Feet		Field			4/20/20 11:09	BGS	F
Specific Conductance, Field	379		umhos/cm	1	Field			4/20/20 11:09	BGS	F
Temperature	9.42		Deg. C		Field			4/20/20 11:09	BGS	F
Total Well Depth	36.50		Feet		Field			4/20/20 11:09	BGS	F
Volume in Water Column	45.94		Gallons		Field			4/20/20 11:09	BGS	F
Water Level After Purge	5.30		Feet		Field			4/20/20 11:09	BGS	F
Well Volumes Purged	2.53		Vol		Field			4/20/20 11:09	BGS	F



Ms. Susan J Scherer
 Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3097998 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3097998002** Date Collected: 4/20/2020 12:27 Matrix: Ground Water
Sample ID: **CWMP001W** Date Received: 4/20/2020 16:02

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	ND		ug/L	10.0	SW846 8260B			4/21/20 17:11	DPC	J
Acrylonitrile	ND		ug/L	5.0	SW846 8260B			4/21/20 17:11	DPC	J
Benzene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
Bromochloromethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
Bromodichloromethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
Bromoform	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
Bromomethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
2-Butanone	ND		ug/L	10.0	SW846 8260B			4/21/20 17:11	DPC	J
Carbon Disulfide	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
Carbon Tetrachloride	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
Chlorobenzene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
Chlorodibromomethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
Chloroethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
Chloroform	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
Chloromethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
3-Chloro-1-propene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	SW846 8260B			4/21/20 17:11	DPC	J
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
Dibromomethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
trans-1,4-Dichloro-2-butene	ND		ug/L	3.0	SW846 8260B			4/21/20 17:11	DPC	J
1,2-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
1,3-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
1,4-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
Dichlorodifluoromethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
1,1-Dichloroethene	ND	2	ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
1,2-Dichloropropane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
cis-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
trans-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
2-Hexanone	ND		ug/L	5.0	SW846 8260B			4/21/20 17:11	DPC	J
Iodomethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	SW846 8260B			4/21/20 17:11	DPC	J

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ANALYTICAL RESULTS

Workorder: 3097998 2ND QTR 2020 CWMP-FORM 19A

 Lab ID: **3097998002** Date Collected: 4/20/2020 12:27 Matrix: Ground Water
 Sample ID: **CWMP001W** Date Received: 4/20/2020 16:02

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
Styrene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
1,1,1,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
Toluene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
Total Xylenes	ND		ug/L	3.0	SW846 8260B			4/21/20 17:11	DPC	J
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
1,1,2-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
Trichloroethene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
1,2,3-Trichloropropane	ND		ug/L	2.0	SW846 8260B			4/21/20 17:11	DPC	J
Vinyl Acetate	ND		ug/L	5.0	SW846 8260B			4/21/20 17:11	DPC	J
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			4/21/20 17:11	DPC	J
Surrogate Recoveries	Results	Flag	Units	Limits	Method	Prepared	By	Analyzed	By	Cntr
1,2-Dichloroethane-d4 (S)	108		%	62 - 133	SW846 8260B			4/21/20 17:11	DPC	J
4-Bromofluorobenzene (S)	99.5		%	79 - 114	SW846 8260B			4/21/20 17:11	DPC	J
Dibromofluoromethane (S)	98.3		%	78 - 116	SW846 8260B			4/21/20 17:11	DPC	J
Toluene-d8 (S)	94.1		%	76 - 127	SW846 8260B			4/21/20 17:11	DPC	J

LIBRARY SEARCH - VOLATILES

No TIC's Detected . Lib Search VOC 4/21/20 17:11 CPK J

WET CHEMISTRY

Alkalinity, Bicarbonate	7		mg/L	5	SM2320B-2011			4/25/20 00:15	MBW	A
Alkalinity, Total	7	3	mg/L	5	SM2320B-2011			4/25/20 00:15	MBW	A
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			4/29/20 03:13	JXL	C
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			4/23/20 02:27	JAM	C
Chloride	27.7		mg/L	2.0	EPA 300.0			4/21/20 06:54	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			4/21/20 06:54	MBW	B
Nitrate-N	19.4		mg/L	0.20	EPA 300.0			4/21/20 06:54	MBW	B
pH	6.18	1	pH_Units		S4500HB-11			4/22/20 17:56	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	4/21/20 14:00	VXF	4/21/20 15:45	VXF	I
Specific Conductance	265		umhos/cm	1	SM2510B-2011			4/22/20 17:56	MBW	B
Sulfate	2.2		mg/L	2.0	EPA 300.0			4/21/20 06:54	MBW	B
Total Dissolved Solids	276		mg/L	25	S2540C-11			4/22/20 22:54	VXF	B
Total Organic Carbon (TOC)	ND		mg/L	0.50	SM5310B-2011			4/29/20 06:23	PAG	G
Turbidity	14.7		NTU	0.10	SM2130B-2011			4/21/20 04:05	R2B	B

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ANALYTICAL RESULTS

Workorder: 3097998 2ND QTR 2020 CWMP-FORM 19A

 Lab ID: **3097998002** Date Collected: 4/20/2020 12:27 Matrix: Ground Water
 Sample ID: **CWMP001W** Date Received: 4/20/2020 16:02

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Antimony, Total	ND		mg/L	0.0022	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:04	MSA	E1
Arsenic, Total	ND		mg/L	0.0033	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:04	MSA	E1
Arsenic, Dissolved	ND		mg/L	0.0030	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:19	MSA	D1
Barium, Total	0.076		mg/L	0.0056	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:04	MSA	E1
Barium, Dissolved	0.079		mg/L	0.0056	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:19	MSA	D1
Beryllium, Total	ND		mg/L	0.0011	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:04	MSA	E1
Cadmium, Total	ND		mg/L	0.0011	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:04	MSA	E1
Cadmium, Dissolved	ND		mg/L	0.0011	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:19	MSA	D1
Calcium, Total	15.1		mg/L	0.11	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:04	MSA	E1
Calcium, Dissolved	14.1		mg/L	0.11	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:19	MSA	D1
Chromium, Total	ND		mg/L	0.0022	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:04	MSA	E1
Chromium, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:19	MSA	D1
Cobalt, Total	ND		mg/L	0.0056	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:04	MSA	E1
Copper, Total	ND		mg/L	0.0056	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:04	MSA	E1
Copper, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:19	MSA	D1
Iron, Total	1.1		mg/L	0.056	SW846 6020A	4/21/20 17:40	SXC	4/24/20 01:18	MSA	E1
Iron, Dissolved	ND		mg/L	0.056	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:19	MSA	D1
Lead, Total	0.0030		mg/L	0.0022	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:04	MSA	E1
Lead, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:19	MSA	D1
Magnesium, Total	12.5		mg/L	0.11	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:04	MSA	E1
Magnesium, Dissolved	10.8		mg/L	0.11	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:19	MSA	D1
Manganese, Total	0.061		mg/L	0.0056	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:04	MSA	E1
Manganese, Dissolved	0.047		mg/L	0.0056	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:19	MSA	D1
Mercury, Total	ND		mg/L	0.00050	SW846 7470A	4/21/20 10:30	AHI	4/21/20 13:21	AHI	E
Mercury, Dissolved	ND		mg/L	0.00050	SW846 7470A	4/21/20 10:30	AHI	4/21/20 13:38	AHI	D
Nickel, Total	0.0066		mg/L	0.0056	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:04	MSA	E1
Potassium, Total	2.6		mg/L	0.11	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:04	MSA	E1
Potassium, Dissolved	2.3		mg/L	0.11	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:19	MSA	D1
Selenium, Total	ND		mg/L	0.0056	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:04	MSA	E1
Selenium, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:19	MSA	D1
Silver, Total	ND		mg/L	0.0022	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:04	MSA	E1
Silver, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:19	MSA	D1
Sodium, Total	15.8		mg/L	0.11	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:04	MSA	E1
Sodium, Dissolved	13.4		mg/L	0.11	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:19	MSA	D1
Thallium, Total	ND		mg/L	0.0011	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:04	MSA	E1
Vanadium, Total	ND		mg/L	0.0022	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:04	MSA	E1
Zinc, Total	0.020		mg/L	0.0056	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:04	MSA	E1

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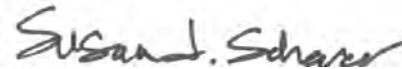
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ANALYTICAL RESULTS

Workorder: 3097998 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3097998002** Date Collected: 4/20/2020 12:27 Matrix: Ground Water
 Sample ID: **CWMP001W** Date Received: 4/20/2020 16:02

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Zinc, Dissolved	0.018		mg/L	0.0056	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:19	MSA	D1
FIELD PARAMETERS										
Depth to Water Level	28.39		Feet		Field			4/20/20 12:27	BGS	F
Elev Top MW Casing above MSL	515.13		Feet		Field			4/20/20 12:27	BGS	F
Flow Rate	1.78		gal/min		Field			4/20/20 12:27	BGS	F
Ground Water Elevation	486.74		ft/MSL		Field			4/20/20 12:27	BGS	F
pH, Field (SM4500B)	5.01		pH_Units		Field			4/20/20 12:27	BGS	F
Sample Depth	57.00		Feet		Field			4/20/20 12:27	BGS	F
Specific Conductance, Field	287		umhos/cm	1	Field			4/20/20 12:27	BGS	F
Temperature	10.39		Deg. C		Field			4/20/20 12:27	BGS	F
Total Well Depth	66.30		Feet		Field			4/20/20 12:27	BGS	F
Volume in Water Column	55.73		Gallons		Field			4/20/20 12:27	BGS	F
Water Level After Purge	48.48		Feet		Field			4/20/20 12:27	BGS	F
Well Volumes Purged	1.92		Vol		Field			4/20/20 12:27	BGS	F



Ms. Susan J Scherer
 Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3097998 2ND QTR 2020 CWMP-FORM 19A

 Lab ID: **3097998003** Date Collected: 4/20/2020 14:07 Matrix: Ground Water
 Sample ID: **CWMP005W** Date Received: 4/20/2020 16:02

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	ND		ug/L	10.0	SW846 8260B			4/21/20 17:33	DPC	J
Acrylonitrile	ND		ug/L	5.0	SW846 8260B			4/21/20 17:33	DPC	J
Benzene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
Bromochloromethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
Bromodichloromethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
Bromoform	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
Bromomethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
2-Butanone	ND		ug/L	10.0	SW846 8260B			4/21/20 17:33	DPC	J
Carbon Disulfide	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
Carbon Tetrachloride	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
Chlorobenzene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
Chlorodibromomethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
Chloroethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
Chloroform	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
Chloromethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
3-Chloro-1-propene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	SW846 8260B			4/21/20 17:33	DPC	J
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
Dibromomethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
trans-1,4-Dichloro-2-butene	ND		ug/L	3.0	SW846 8260B			4/21/20 17:33	DPC	J
1,2-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
1,3-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
1,4-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
Dichlorodifluoromethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
1,1-Dichloroethene	ND	3	ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
1,2-Dichloropropane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
cis-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
trans-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
2-Hexanone	ND		ug/L	5.0	SW846 8260B			4/21/20 17:33	DPC	J
Iodomethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	SW846 8260B			4/21/20 17:33	DPC	J

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ANALYTICAL RESULTS

Workorder: 3097998 2ND QTR 2020 CWMP-FORM 19A

Lab ID: 3097998003	Date Collected: 4/20/2020 14:07	Matrix: Ground Water
Sample ID: CWMP005W	Date Received: 4/20/2020 16:02	

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
Styrene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
1,1,1,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
Toluene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
Total Xylenes	ND		ug/L	3.0	SW846 8260B			4/21/20 17:33	DPC	J
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
1,1,2-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
Trichloroethene	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
1,2,3-Trichloropropane	ND		ug/L	2.0	SW846 8260B			4/21/20 17:33	DPC	J
Vinyl Acetate	ND		ug/L	5.0	SW846 8260B			4/21/20 17:33	DPC	J
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			4/21/20 17:33	DPC	J
Surrogate Recoveries	Results	Flag	Units	Limits	Method	Prepared	By	Analyzed	By	Cntr
1,2-Dichloroethane-d4 (S)	109		%	62 - 133	SW846 8260B			4/21/20 17:33	DPC	J
4-Bromofluorobenzene (S)	100		%	79 - 114	SW846 8260B			4/21/20 17:33	DPC	J
Dibromofluoromethane (S)	100		%	78 - 116	SW846 8260B			4/21/20 17:33	DPC	J
Toluene-d8 (S)	95.2		%	76 - 127	SW846 8260B			4/21/20 17:33	DPC	J

LIBRARY SEARCH - VOLATILES

No TIC's Detected	Lib Search VOC	4/21/20 17:33	CPK	J
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WET CHEMISTRY

Alkalinity, Bicarbonate	23		mg/L	5	SM2320B-2011			4/22/20 17:56	MBW	B
Alkalinity, Total	23	1	mg/L	5	SM2320B-2011			4/22/20 17:56	MBW	A
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			4/29/20 03:27	JXL	C
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			4/23/20 02:27	JAM	C
Chloride	71.3		mg/L	2.0	EPA 300.0			4/21/20 07:12	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			4/21/20 07:12	MBW	B
Nitrate-N	8.7		mg/L	0.20	EPA 300.0			4/21/20 07:12	MBW	B
pH	6.42	2	pH_Units		S4500HB-11			4/22/20 17:56	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	4/21/20 14:00	VXF	4/21/20 15:45	VXF	I
Specific Conductance	358		umhos/cm	1	SM2510B-2011			4/22/20 17:56	MBW	B
Sulfate	4.7		mg/L	2.0	EPA 300.0			4/21/20 07:12	MBW	B
Total Dissolved Solids	302		mg/L	25	S2540C-11			4/22/20 22:54	VXF	B
Total Organic Carbon (TOC)	ND		mg/L	0.50	SM5310B-2011			4/29/20 06:23	PAG	G
Turbidity	0.42		NTU	0.10	SM2130B-2011			4/21/20 04:05	R2B	B

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ANALYTICAL RESULTS

Workorder: 3097998 2ND QTR 2020 CWMP-FORM 19A

Lab ID: 3097998003	Date Collected: 4/20/2020 14:07	Matrix: Ground Water
Sample ID: CWMP005W	Date Received: 4/20/2020 16:02	

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Antimony, Total	ND		mg/L	0.0022	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:07	MSA	E1
Arsenic, Total	ND		mg/L	0.0033	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:07	MSA	E1
Arsenic, Dissolved	ND		mg/L	0.0030	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:22	MSA	D1
Barium, Total	0.052		mg/L	0.0056	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:07	MSA	E1
Barium, Dissolved	0.052		mg/L	0.0056	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:22	MSA	D1
Beryllium, Total	ND		mg/L	0.0011	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:07	MSA	E1
Cadmium, Total	ND		mg/L	0.0011	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:07	MSA	E1
Cadmium, Dissolved	ND		mg/L	0.0011	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:22	MSA	D1
Calcium, Total	16.4		mg/L	0.11	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:07	MSA	E1
Calcium, Dissolved	14.9		mg/L	0.11	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:22	MSA	D1
Chromium, Total	ND		mg/L	0.0022	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:07	MSA	E1
Chromium, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:22	MSA	D1
Cobalt, Total	ND		mg/L	0.0056	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:07	MSA	E1
Copper, Total	ND		mg/L	0.0056	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:07	MSA	E1
Copper, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:22	MSA	D1
Iron, Total	0.066		mg/L	0.056	SW846 6020A	4/21/20 17:40	SXC	4/24/20 01:22	MSA	E1
Iron, Dissolved	ND		mg/L	0.056	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:22	MSA	D1
Lead, Total	ND		mg/L	0.0022	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:07	MSA	E1
Lead, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:22	MSA	D1
Magnesium, Total	9.8		mg/L	0.11	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:07	MSA	E1
Magnesium, Dissolved	9.3		mg/L	0.11	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:22	MSA	D1
Manganese, Total	0.070		mg/L	0.0056	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:07	MSA	E1
Manganese, Dissolved	0.066		mg/L	0.0056	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:22	MSA	D1
Mercury, Total	ND		mg/L	0.00050	SW846 7470A	4/21/20 10:30	AHI	4/21/20 13:22	AHI	E
Mercury, Dissolved	ND		mg/L	0.00050	SW846 7470A	4/21/20 10:30	AHI	4/21/20 13:44	AHI	D
Nickel, Total	0.0059		mg/L	0.0056	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:07	MSA	E1
Potassium, Total	2.6		mg/L	0.11	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:07	MSA	E1
Potassium, Dissolved	2.4		mg/L	0.11	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:22	MSA	D1
Selenium, Total	ND		mg/L	0.0056	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:07	MSA	E1
Selenium, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:22	MSA	D1
Silver, Total	ND		mg/L	0.0022	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:07	MSA	E1
Silver, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:22	MSA	D1
Sodium, Total	37.3		mg/L	0.11	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:07	MSA	E1
Sodium, Dissolved	34.4		mg/L	0.11	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:22	MSA	D1
Thallium, Total	ND		mg/L	0.0011	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:07	MSA	E1
Vanadium, Total	ND		mg/L	0.0022	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:07	MSA	E1
Zinc, Total	0.011		mg/L	0.0056	SW846 6020A	4/21/20 17:40	SXC	4/23/20 10:07	MSA	E1

ALS Environmental Laboratory Locations Across North America

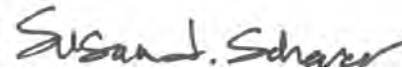
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ANALYTICAL RESULTS

Workorder: 3097998 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3097998003** Date Collected: 4/20/2020 14:07 Matrix: Ground Water
 Sample ID: **CWMP005W** Date Received: 4/20/2020 16:02

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Zinc, Dissolved	0.0093		mg/L	0.0056	SW846 6020A	4/21/20 20:05	SXC	4/22/20 07:22	MSA	D1
FIELD PARAMETERS										
Depth to Water Level	40.72		Feet		Field			4/20/20 14:07	BGS	F
Elev Top MW Casing above MSL	513.43		Feet		Field			4/20/20 14:07	BGS	F
Flow Rate	4.38		gal/min		Field			4/20/20 14:07	BGS	F
Ground Water Elevation	472.71		ft/MSL		Field			4/20/20 14:07	BGS	F
pH, Field (SM4500B)	4.75		pH_Units		Field			4/20/20 14:07	BGS	F
Sample Depth	130.00		Feet		Field			4/20/20 14:07	BGS	F
Specific Conductance, Field	373		umhos/cm	1	Field			4/20/20 14:07	BGS	F
Temperature	9.68		Deg. C		Field			4/20/20 14:07	BGS	F
Total Well Depth	138.92		Feet		Field			4/20/20 14:07	BGS	F
Volume in Water Column	144.35		Gallons		Field			4/20/20 14:07	BGS	F
Water Level After Purge	41.50		Feet		Field			4/20/20 14:07	BGS	F
Well Volumes Purged	2.43		Vol		Field			4/20/20 14:07	BGS	F



Ms. Susan J Scherer
 Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3097998 2ND QTR 2020 CWMP-FORM 19A

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
3097998001	1	CWMP007W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3097998001	2	CWMP007W	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.				
3097998001	3	CWMP007W	SW846 8260B	1,1-Dichloroethene
The QC sample type LCS for method SW846 8260B was outside the control limits for the analyte 1,1-Dichloroethene. The % Recovery was reported as 129 and the control limits were 63 to 128.				
3097998002	1	CWMP001W	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.				
3097998002	2	CWMP001W	SW846 8260B	1,1-Dichloroethene
The QC sample type LCS for method SW846 8260B was outside the control limits for the analyte 1,1-Dichloroethene. The % Recovery was reported as 129 and the control limits were 63 to 128.				
3097998002	3	CWMP001W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3097998003	1	CWMP005W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3097998003	2	CWMP005W	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.				
3097998003	3	CWMP005W	SW846 8260B	1,1-Dichloroethene
The QC sample type LCS for method SW846 8260B was outside the control limits for the analyte 1,1-Dichloroethene. The % Recovery was reported as 129 and the control limits were 63 to 128.				

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3097998 2ND QTR 2020 CWMP-FORM 19A

Lab ID	Sample ID	Analysis Method	Prep Method
3097998001	CWMP007W	ASTM D6919-09	
3097998001	CWMP007W	EPA 300.0	
3097998001	CWMP007W	EPA 410.4	
3097998001	CWMP007W	Field	
3097998001	CWMP007W	Lib Search VOC	
3097998001	CWMP007W	S2540C-11	
3097998001	CWMP007W	S4500HB-11	
3097998001	CWMP007W	SM2130B-2011	
3097998001	CWMP007W	SM2320B-2011	
3097998001	CWMP007W	SM2510B-2011	
3097998001	CWMP007W	SM5310B-2011	
3097998001	CWMP007W	SW846 6020A	SW846 3015
3097998001	CWMP007W	SW846 7470A	SW846 7470A
3097998001	CWMP007W	SW846 8260B	
3097998001	CWMP007W	SW846 9066	420.4/9066
3097998002	CWMP001W	ASTM D6919-09	
3097998002	CWMP001W	EPA 300.0	
3097998002	CWMP001W	EPA 410.4	
3097998002	CWMP001W	Field	
3097998002	CWMP001W	Lib Search VOC	
3097998002	CWMP001W	S2540C-11	
3097998002	CWMP001W	S4500HB-11	
3097998002	CWMP001W	SM2130B-2011	
3097998002	CWMP001W	SM2320B-2011	
3097998002	CWMP001W	SM2510B-2011	
3097998002	CWMP001W	SM5310B-2011	
3097998002	CWMP001W	SW846 6020A	SW846 3015
3097998002	CWMP001W	SW846 7470A	SW846 7470A
3097998002	CWMP001W	SW846 8260B	
3097998002	CWMP001W	SW846 9066	420.4/9066
3097998003	CWMP005W	ASTM D6919-09	
3097998003	CWMP005W	EPA 300.0	
3097998003	CWMP005W	EPA 410.4	
3097998003	CWMP005W	Field	
3097998003	CWMP005W	Lib Search VOC	
3097998003	CWMP005W	S2540C-11	
3097998003	CWMP005W	S4500HB-11	
3097998003	CWMP005W	SM2130B-2011	
3097998003	CWMP005W	SM2320B-2011	
3097998003	CWMP005W	SM2510B-2011	
3097998003	CWMP005W	SM5310B-2011	
3097998003	CWMP005W	SW846 6020A	SW846 3015
3097998003	CWMP005W	SW846 7470A	SW846 7470A
3097998003	CWMP005W	SW846 8260B	
3097998003	CWMP005W	SW846 9066	420.4/9066

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301 Furling Mill Road • Middletown, PA 17057 • Tel: 717.544.5511 • Fax: 717.544.1430

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

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

Contact: Mark Reider
Phone#: (717) 735-0193
Project Name#: Creswell/GWMP Form 19A
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.org
Fax? Y N No.: (717) 397-9973

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time
1. CWNMP007W	04/20/20	1109
2. CWNMP001W	04/20/20	1227
3. CWNMP005W	04/20/20	1407
4		
5		
6		
7		
8		
9		
10		

Project Comments:

LOGGED BY (signature):

REVIEWED BY (signature):

Relinquished By / Company Name: ALS

Date: 4-20-20 Time: 1602

Received By / Company Name: [Signature]

Date: 4/20/20 Time: 1602

Time: 4

Time: 6

Time: 8

Time: 10

Generated by ALS

1 of 1

plied by Receiving Lab

Cooler Temp: _____ Therm ID: 120

No. of Coolers: _____ Y N Initial

Customary 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

Total Metals Form 19A + Subtitle D

Diss Metals Form 19A (Field)

NH₃-N, COD

Sample Depth for AUX Data

FM

Alkalinity, HCO₃

pH, Cl, Spc, F, SO₄, NO₃, T_h, TDS

8260 VOCs - Form 19A + Subtitle D

O₂H

TOC

**Matrix

G or C

Enter Number of Containers Per Sample or Field Results Below.

Standard

CLP-like

USACE

Special Processing

USACE

Navy

State Samples Collected In

NY

NJ

PA

NC

Special

ALS Field Services: Pickup Labor

Composite_Sampling Rental_Equipment

Other:

Reportable to PADEP?

Yes

Lab

Special

PWSID #

EDDS: Formar Type

**Matrix - A=Air; DW=Drinking Water; GW=Groundwater; O=Oil; OL=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: LCSWMA Work Order #: 3097998 Initials: CS Date: 4/20/2020

- | | | | |
|--|----------------------|------------|-----------|
| 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?..... | | <u>YES</u> | NO |
| 5. 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>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 |
| 6. Are all aqueous samples requiring preservation preserved correctly?..... | N/A | <u>YES</u> | NO |
| 7. Were all samples placed in the proper containers for the requested analyses, with sufficient volume?..... | | <u>YES</u> | NO |
| 8. Are all samples within holding times for the requested analyses?..... | <u>PL IS expired</u> | YES | <u>NO</u> |
| 9. Were all sample containers received intact and headspace free when required? (not broken, leaking, frozen, etc.)..... | | <u>YES</u> | 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?..... | | <u>YES</u> | NO |
| 12. Were sample temperatures measured at 0.0-6.0°C..... | <u>Above 6°C</u> | YES | <u>NO</u> |
| 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): 10

Thermometer ID: L107

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





April 30, 2020

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

Certificate of Analysis

Project Name:	CRESWELL	Workorder:	3098214
Purchase Order:	PO1000127	Workorder ID:	2ND QTR 2020 CWMP-FORM 19A

Dear Mr. Brown:

Enclosed are the analytical results for samples received by the laboratory on Tuesday, April 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.

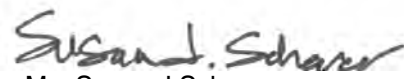
Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications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

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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: 3098214 2ND QTR 2020 CWMP-FORM 19A

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
3098214001	CWMP002W	Ground Water	4/21/2020 13:15	4/21/2020 16:08	Mr. Brian G Shade

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SAMPLE SUMMARY

Workorder: 3098214 2ND QTR 2020 CWMP-FORM 19A

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: 3098214 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098214001** Date Collected: 4/21/2020 13:15 Matrix: Ground Water
Sample ID: **CWMP002W** Date Received: 4/21/2020 16:08

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS									
Acetone	ND		ug/L	10.0	SW846 8260B		4/23/20 00:45	PDK	J
Acrylonitrile	ND		ug/L	5.0	SW846 8260B		4/23/20 00:45	PDK	J
Benzene	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
Bromochloromethane	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
Bromodichloromethane	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
Bromoform	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
Bromomethane	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
2-Butanone	ND		ug/L	10.0	SW846 8260B		4/23/20 00:45	PDK	J
Carbon Disulfide	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
Carbon Tetrachloride	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
Chlorobenzene	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
Chlorodibromomethane	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
Chloroethane	31.2		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
Chloroform	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
Chloromethane	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
3-Chloro-1-propene	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	SW846 8260B		4/23/20 00:45	PDK	J
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
Dibromomethane	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
trans-1,4-Dichloro-2-butene	ND		ug/L	3.0	SW846 8260B		4/23/20 00:45	PDK	J
1,2-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
1,3-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
1,4-Dichlorobenzene	1.1		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
Dichlorodifluoromethane	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
1,1-Dichloroethane	13.4		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
1,2-Dichloropropane	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
cis-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
trans-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
Ethylbenzene	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
2-Hexanone	ND		ug/L	5.0	SW846 8260B		4/23/20 00:45	PDK	J
Iodomethane	ND		ug/L	1.0	SW846 8260B		4/23/20 00:45	PDK	J
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	SW846 8260B		4/23/20 00:45	PDK	J

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ANALYTICAL RESULTS

Workorder: 3098214 2ND QTR 2020 CWMP-FORM 19A

Lab ID: 3098214001	Date Collected: 4/21/2020 13:15	Matrix: Ground Water
Sample ID: CWMP002W	Date Received: 4/21/2020 16:08	

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			4/23/20 00:45	PDK	J
Styrene	ND		ug/L	1.0	SW846 8260B			4/23/20 00:45	PDK	J
1,1,1,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/23/20 00:45	PDK	J
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/23/20 00:45	PDK	J
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			4/23/20 00:45	PDK	J
Toluene	ND		ug/L	1.0	SW846 8260B			4/23/20 00:45	PDK	J
Total Xylenes	ND		ug/L	3.0	SW846 8260B			4/23/20 00:45	PDK	J
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/23/20 00:45	PDK	J
1,1,2-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/23/20 00:45	PDK	J
Trichloroethene	ND		ug/L	1.0	SW846 8260B			4/23/20 00:45	PDK	J
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			4/23/20 00:45	PDK	J
1,2,3-Trichloropropane	ND		ug/L	2.0	SW846 8260B			4/23/20 00:45	PDK	J
Vinyl Acetate	ND		ug/L	5.0	SW846 8260B			4/23/20 00:45	PDK	J
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			4/23/20 00:45	PDK	J
Surrogate Recoveries	Results	Flag	Units	Limits	Method	Prepared	By	Analyzed	By	Cntr
1,2-Dichloroethane-d4 (S)	113		%	62 - 133	SW846 8260B			4/23/20 00:45	PDK	J
4-Bromofluorobenzene (S)	110		%	79 - 114	SW846 8260B			4/23/20 00:45	PDK	J
Dibromofluoromethane (S)	107		%	78 - 116	SW846 8260B			4/23/20 00:45	PDK	J
Toluene-d8 (S)	99.9		%	76 - 127	SW846 8260B			4/23/20 00:45	PDK	J

LIBRARY SEARCH - VOLATILES

No TIC's Detected	Lib Search VOC	4/23/20 00:45	CPK	J
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WET CHEMISTRY

Alkalinity, Bicarbonate	89		mg/L	5	SM2320B-2011			4/25/20 00:15	MBW	B
Alkalinity, Total	89	1	mg/L	5	SM2320B-2011			4/25/20 00:15	MBW	B
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			4/25/20 03:32	JXL	C
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			4/23/20 02:27	JAM	C
Chloride	107		mg/L	2.0	EPA 300.0			4/22/20 14:43	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			4/22/20 14:43	MBW	B
Nitrate-N	3.3		mg/L	0.20	EPA 300.0			4/22/20 14:43	MBW	B
pH	6.02	2	pH_Units		S4500HB-11			4/25/20 00:15	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	4/27/20 12:20	VXF	4/28/20 15:30	VXF	I
Specific Conductance	574		umhos/cm	1	SM2510B-2011			4/25/20 00:15	MBW	B
Sulfate	21.0		mg/L	2.0	EPA 300.0			4/22/20 14:43	MBW	B
Total Dissolved Solids	356		mg/L	25	S2540C-11			4/23/20 15:05	KXH	B
Total Organic Carbon (TOC)	4.9		mg/L	0.50	SM5310B-2011			4/29/20 01:32	PAG	G
Turbidity	0.14		NTU	0.10	SM2130B-2011			4/22/20 06:08	R2B	B

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ANALYTICAL RESULTS

Workorder: 3098214 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098214001** Date Collected: 4/21/2020 13:15 Matrix: Ground Water
Sample ID: **CWMP002W** Date Received: 4/21/2020 16:08

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Antimony, Total	ND		mg/L	0.0022	SW846 6020A	4/22/20 16:00	SXC	4/24/20 07:49	MSA	E1
Arsenic, Total	ND		mg/L	0.0033	SW846 6020A	4/22/20 16:00	SXC	4/24/20 07:49	MSA	E1
Arsenic, Dissolved	ND		mg/L	0.0030	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:34	MSA	D
Barium, Total	0.050		mg/L	0.0056	SW846 6020A	4/22/20 16:00	SXC	4/24/20 07:49	MSA	E1
Barium, Dissolved	0.056		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:34	MSA	D
Beryllium, Total	ND		mg/L	0.0011	SW846 6020A	4/22/20 16:00	SXC	4/24/20 07:49	MSA	E1
Cadmium, Total	ND		mg/L	0.0011	SW846 6020A	4/22/20 16:00	SXC	4/24/20 07:49	MSA	E1
Cadmium, Dissolved	ND		mg/L	0.0011	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:34	MSA	D
Calcium, Total	52.5		mg/L	0.11	SW846 6020A	4/22/20 16:00	SXC	4/24/20 07:49	MSA	E1
Calcium, Dissolved	51.5		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:34	MSA	D
Chromium, Total	ND		mg/L	0.0022	SW846 6020A	4/22/20 16:00	SXC	4/24/20 07:49	MSA	E1
Chromium, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:34	MSA	D
Cobalt, Total	0.024		mg/L	0.0056	SW846 6020A	4/22/20 16:00	SXC	4/24/20 07:49	MSA	E1
Copper, Total	ND		mg/L	0.0056	SW846 6020A	4/22/20 16:00	SXC	4/24/20 07:49	MSA	E1
Copper, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:34	MSA	D
Iron, Total	0.17		mg/L	0.056	SW846 6020A	4/22/20 16:00	SXC	4/24/20 07:49	MSA	E1
Iron, Dissolved	ND		mg/L	0.056	SW846 6020A	4/23/20 19:50	SXC	4/28/20 13:26	MO	D
Lead, Total	ND		mg/L	0.0022	SW846 6020A	4/22/20 16:00	SXC	4/24/20 07:49	MSA	E1
Lead, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:34	MSA	D
Magnesium, Total	19.1		mg/L	0.11	SW846 6020A	4/22/20 16:00	SXC	4/24/20 07:49	MSA	E1
Magnesium, Dissolved	16.5		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:34	MSA	D
Manganese, Total	1.1		mg/L	0.0056	SW846 6020A	4/22/20 16:00	SXC	4/24/20 07:49	MSA	E1
Manganese, Dissolved	1.1		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:34	MSA	D
Mercury, Total	ND		mg/L	0.00050	SW846 7470A	4/22/20 11:00	AHI	4/22/20 15:25	AHI	E
Mercury, Dissolved	ND		mg/L	0.00050	SW846 7470A	4/24/20 10:45	AHI	4/24/20 13:55	AHI	D
Nickel, Total	0.027		mg/L	0.0056	SW846 6020A	4/22/20 16:00	SXC	4/24/20 07:49	MSA	E1
Potassium, Total	3.1		mg/L	0.11	SW846 6020A	4/22/20 16:00	SXC	4/24/20 07:49	MSA	E1
Potassium, Dissolved	2.7		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:34	MSA	D
Selenium, Total	ND		mg/L	0.0056	SW846 6020A	4/22/20 16:00	SXC	4/24/20 07:49	MSA	E1
Selenium, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:34	MSA	D
Silver, Total	ND		mg/L	0.0022	SW846 6020A	4/22/20 16:00	SXC	4/24/20 07:49	MSA	E1
Silver, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:34	MSA	D
Sodium, Total	30.4		mg/L	0.11	SW846 6020A	4/22/20 16:00	SXC	4/24/20 07:49	MSA	E1
Sodium, Dissolved	28.3		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:34	MSA	D
Thallium, Total	ND		mg/L	0.0011	SW846 6020A	4/22/20 16:00	SXC	4/24/20 07:49	MSA	E1
Vanadium, Total	ND		mg/L	0.0022	SW846 6020A	4/22/20 16:00	SXC	4/24/20 07:49	MSA	E1
Zinc, Total	0.0080		mg/L	0.0056	SW846 6020A	4/22/20 16:00	SXC	4/24/20 07:49	MSA	E1

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ANALYTICAL RESULTS

Workorder: 3098214 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098214001** Date Collected: 4/21/2020 13:15 Matrix: Ground Water
 Sample ID: **CWMP002W** Date Received: 4/21/2020 16:08

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed By	Cntr
Zinc, Dissolved	0.0077		mg/L	0.0056	SW846 6020A	4/23/20 19:50 SXC	4/25/20 12:34 MSA	D
FIELD PARAMETERS								
Depth to Water Level	61.16		Feet		Field		4/21/20 13:15 BGS	F
Elev Top MW Casing above MSL	525.81		Feet		Field		4/21/20 13:15 BGS	F
Ground Water Elevation	464.65		ft/MSL		Field		4/21/20 13:15 BGS	F
pH, Field (SM4500B)	5.47		pH_Units		Field		4/21/20 13:15 BGS	F
Sample Depth	85.00		Feet		Field		4/21/20 13:15 BGS	F
Specific Conductance, Field	618		umhos/cm	1	Field		4/21/20 13:15 BGS	F
Temperature	10.44		Deg. C		Field		4/21/20 13:15 BGS	F
Total Well Depth	100.00		Feet		Field		4/21/20 13:15 BGS	F


 Ms. Susan J Scherer
 Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3098214 2ND QTR 2020 CWMP-FORM 19A

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
3098214001	1	CWMP002W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3098214001	2	CWMP002W	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.				

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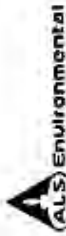
ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3098214 2ND QTR 2020 CWMP-FORM 19A

Lab ID	Sample ID	Analysis Method	Prep Method
3098214001	CWMP002W	ASTM D6919-09	
3098214001	CWMP002W	EPA 300.0	
3098214001	CWMP002W	EPA 410.4	
3098214001	CWMP002W	Field	
3098214001	CWMP002W	Lib Search VOC	
3098214001	CWMP002W	S2540C-11	
3098214001	CWMP002W	S4500HB-11	
3098214001	CWMP002W	SM2130B-2011	
3098214001	CWMP002W	SM2320B-2011	
3098214001	CWMP002W	SM2510B-2011	
3098214001	CWMP002W	SM5310B-2011	
3098214001	CWMP002W	SW846 6020A	SW846 3015
3098214001	CWMP002W	SW846 7470A	SW846 7470A
3098214001	CWMP002W	SW846 8260B	
3098214001	CWMP002W	SW846 9066	420.4/9066

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

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

Client Name: Lancaster County Solid Waste MA
Address: 1298 Harritsburg Pike, P.O. Box 4424
Lancaster, PA 17604

Contact: Dan Brown
Phone#: (717) 735-0193
Project Name#: Creswell/GWMP Form 19A
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 **dbrown@LCSWMA.org**
Fax? Y N **No.: (717) 397-9973**

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

Sample ID	Sample Date	Time
1. CWNMP002W	04/21/20	13:15
2		
3		
4		
5		
6		
7		
8		
9		
10		

Project Comments:

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

Relinquished By / Company Name	Date	Time	Received By / Company Name
1. <i>ASG</i>	4-21-20	16:00	<i>GM</i>
3			
5			
7			
9			

1 of 1

301 Fulfilling Mill Rd • Middletown, PA 17057 • 717.544.5541 • Fax: 717.544.1450

Client Name: Lancaster County Solid Waste MA
Address: 1298 Harritsburg Pike, P.O. Box 4424
Lancaster, PA 17604

Contact: Dan Brown
Phone#: (717) 735-0193
Project Name#: Creswell/GWMP Form 19A
Bill To: Lancaster County Solid Waste MA

TAT Normal-Standard TAT is 10-12 business days.
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Date Required: _____ **Approved By:** _____
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Project Comments:

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

Relinquished By / Company Name	Date	Time	Received By / Company Name
1. <i>ASG</i>	4-21-20	16:00	<i>GM</i>
3			
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7			
9			

1 of 1

301 Fulfilling Mill Rd • Middletown, PA 17057 • 717.544.5541 • Fax: 717.544.1450

Client Name: Lancaster County Solid Waste MA
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Fax? Y N **No.: (717) 397-9973**

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

Sample ID	Sample Date	Time
1. CWNMP002W	04/21/20	13:15
2		
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4		
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6		
7		
8		
9		
10		

Project Comments:

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

Relinquished By / Company Name	Date	Time	Received By / Company Name
1. <i>ASG</i>	4-21-20	16:00	<i>GM</i>
3			
5			
7			
9			



301 Fulling Mill Road
Middletown, PA 17057

P: (717) 944-5541

F: (717) 944-1430

Condition of Sample Receipt Form

Client: LCSWMA Work Order #: 3098214 Initials: GOM Date: 4/21/2020

- | | | | |
|--|-----------------------|------------|-----------|
| 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?..... | <u>YES</u> | YES | NO |
| 5. Are the COC and bottle labels complete, legible and in agreement?..... | <u>YES</u> | YES | NO |
| 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?..... | <u>YES</u> | YES | NO |
| 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 |
| 6. Are all aqueous samples requiring preservation preserved correctly?..... | N/A | YES | NO |
| 7. Were all samples placed in the proper containers for the requested analyses, with sufficient volume?..... | <u>YES</u> | YES | NO |
| 8. Are all samples within holding times for the requested analyses?..... | <u>PH out of hold</u> | <u>YES</u> | <u>NO</u> |
| 9. Were all sample containers received intact and headspace free when required? (not broken, leaking, frozen, etc.)..... | <u>YES</u> | 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?..... | <u>YES</u> | YES | NO |
| 12. Were sample temperatures measured at 0.0-6.0°C..... | <u>YES</u> | 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 |

GOM
4/21

Cooler #: _____
 Temperature (°C): 4°C
 Thermometer ID: 441
 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



May 6, 2020

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

Certificate of Analysis

Project Name:	CRESWELL	Workorder:	3098689
Purchase Order:	PO1000127	Workorder ID:	2ND QTR 2020 CWMP-FORM 19A

Dear Mr. Brown:

Enclosed are the analytical results for samples received by the laboratory on Thursday, April 23, 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.

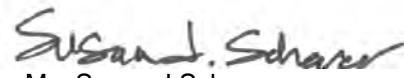
Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications 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: 3098689 2ND QTR 2020 CWMP-FORM 19A

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
3098689001	CWMP012W	Ground Water	4/23/2020 09:26	4/23/2020 16:16	Mr. Brian G Shade
3098689002	CWMP018S	Ground Water	4/23/2020 11:20	4/23/2020 16:16	Mr. Brian G Shade
3098689003	CWMP017S	Ground Water	4/23/2020 11:49	4/23/2020 16:16	Mr. Brian G Shade
3098689004	CWMP003W	Ground Water	4/23/2020 12:59	4/23/2020 16:16	Mr. Brian G Shade
3098689005	CWMP004W	Ground Water	4/23/2020 12:42	4/23/2020 16:16	Mr. Brian G Shade
3098689006	Field Blank	Water	4/23/2020 09:15	4/23/2020 16:16	Mr. Brian G Shade
3098689007	Trip Blank	Water	4/23/2020 16:16	4/23/2020 16:16	Mr. Brian G Shade

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SAMPLE SUMMARY

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

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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Vancouver Waterloo · Winnipeg · Yellowknife United States: Cincinnati · Everett · Fort Collins · Holland · Houston · Middletown · Salt Lake City · Spring City · York Mexico: Monterrey

ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098689001** Date Collected: 4/23/2020 09:26 Matrix: Ground Water
Sample ID: **CWMP012W** Date Received: 4/23/2020 16:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	ND		ug/L	10.0	SW846 8260B			4/28/20 03:01	PDK	J
Acrylonitrile	ND		ug/L	5.0	SW846 8260B			4/28/20 03:01	PDK	J
Benzene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
Bromochloromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
Bromodichloromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
Bromoform	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
Bromomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
2-Butanone	ND		ug/L	10.0	SW846 8260B			4/28/20 03:01	PDK	J
Carbon Disulfide	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
Carbon Tetrachloride	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
Chlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
Chlorodibromomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
Chloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
Chloroform	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
Chloromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
3-Chloro-1-propene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	SW846 8260B			4/28/20 03:01	PDK	J
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
Dibromomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
trans-1,4-Dichloro-2-butene	ND		ug/L	3.0	SW846 8260B			4/28/20 03:01	PDK	J
1,2-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
1,3-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
1,4-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
Dichlorodifluoromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
1,2-Dichloropropane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
cis-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
trans-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
2-Hexanone	ND		ug/L	5.0	SW846 8260B			4/28/20 03:01	PDK	J
Iodomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	SW846 8260B			4/28/20 03:01	PDK	J

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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

 Lab ID: **3098689001** Date Collected: 4/23/2020 09:26 Matrix: Ground Water
 Sample ID: **CWMP012W** Date Received: 4/23/2020 16:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
Styrene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
1,1,1,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
Toluene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
Total Xylenes	ND		ug/L	3.0	SW846 8260B			4/28/20 03:01	PDK	J
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
1,1,2-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
Trichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
1,2,3-Trichloropropane	ND		ug/L	2.0	SW846 8260B			4/28/20 03:01	PDK	J
Vinyl Acetate	ND		ug/L	5.0	SW846 8260B			4/28/20 03:01	PDK	J
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			4/28/20 03:01	PDK	J
Surrogate Recoveries	Results	Flag	Units	Limits	Method	Prepared	By	Analyzed	By	Cntr
1,2-Dichloroethane-d4 (S)	91.8		%	62 - 133	SW846 8260B			4/28/20 03:01	PDK	J
4-Bromofluorobenzene (S)	102		%	79 - 114	SW846 8260B			4/28/20 03:01	PDK	J
Dibromofluoromethane (S)	92.1		%	78 - 116	SW846 8260B			4/28/20 03:01	PDK	J
Toluene-d8 (S)	93.3		%	76 - 127	SW846 8260B			4/28/20 03:01	PDK	J

LIBRARY SEARCH - VOLATILES

No TIC's Detected . Lib Search VOC 4/28/20 03:01 CPK J

WET CHEMISTRY

Alkalinity, Bicarbonate	89		mg/L	5	SM2320B-2011			4/29/20 19:29	MBW	B
Alkalinity, Total	89	1	mg/L	5	SM2320B-2011			4/29/20 19:29	MBW	A
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			5/1/20 17:57	AK	C
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			4/29/20 01:10	JAM	C
Chloride	34.5		mg/L	2.0	EPA 300.0			4/24/20 10:35	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			4/24/20 10:35	MBW	B
Nitrate-N	8.2		mg/L	0.20	EPA 300.0			4/24/20 10:35	MBW	B
pH	6.76	2	pH_Units		S4500HB-11			4/29/20 19:29	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	4/27/20 12:20	VXF	4/28/20 15:30	VXF	I
Specific Conductance	323		umhos/cm	1	SM2510B-2011			4/29/20 19:29	MBW	B
Sulfate	4.5		mg/L	2.0	EPA 300.0			4/24/20 10:35	MBW	B
Total Dissolved Solids	212		mg/L	25	S2540C-11			4/28/20 11:15	KXH	B
Total Organic Carbon (TOC)	1.7		mg/L	0.50	SM5310B-2011			4/29/20 20:05	PAG	G
Turbidity	94.8		NTU	0.10	SM2130B-2011			4/24/20 07:13	R2B	B

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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098689001** Date Collected: 4/23/2020 09:26 Matrix: Ground Water
Sample ID: **CWMP012W** Date Received: 4/23/2020 16:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Antimony, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:43	MSA	E
Arsenic, Total	0.0057		mg/L	0.0033	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:43	MSA	E
Arsenic, Dissolved	ND		mg/L	0.0030	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:43	MSA	D1
Barium, Total	0.093		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:43	MSA	E
Barium, Dissolved	0.089		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:43	MSA	D1
Beryllium, Total	ND		mg/L	0.0011	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:43	MSA	E
Cadmium, Total	ND		mg/L	0.0011	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:43	MSA	E
Cadmium, Dissolved	ND		mg/L	0.0011	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:43	MSA	D1
Calcium, Total	30.4		mg/L	0.11	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:43	MSA	E
Calcium, Dissolved	31.0		mg/L	0.11	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:43	MSA	D1
Chromium, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:43	MSA	E
Chromium, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:43	MSA	D1
Cobalt, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:43	MSA	E
Copper, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:43	MSA	E
Copper, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:43	MSA	D1
Iron, Total	80.1		mg/L	0.056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:43	MSA	E
Iron, Dissolved	ND		mg/L	0.056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:43	MSA	D1
Lead, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:43	MSA	E
Lead, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:43	MSA	D1
Magnesium, Total	8.4		mg/L	0.11	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:43	MSA	E
Magnesium, Dissolved	8.6		mg/L	0.11	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:43	MSA	D1
Manganese, Total	0.25		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:43	MSA	E
Manganese, Dissolved	0.11		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:43	MSA	D1
Mercury, Total	ND		mg/L	0.00050	SW846 7470A	4/25/20 10:20	AHI	4/25/20 13:25	AHI	E
Mercury, Dissolved	ND		mg/L	0.00050	SW846 7470A	4/25/20 10:20	AHI	4/25/20 12:53	AHI	D
Nickel, Total	0.0095		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:43	MSA	E
Potassium, Total	1.3		mg/L	0.11	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:43	MSA	E
Potassium, Dissolved	1.4		mg/L	0.11	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:43	MSA	D1
Selenium, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:43	MSA	E
Selenium, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:43	MSA	D1
Silver, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:43	MSA	E
Silver, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:43	MSA	D1
Sodium, Total	12.4		mg/L	0.11	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:43	MSA	E
Sodium, Dissolved	12.7		mg/L	0.11	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:43	MSA	D1
Thallium, Total	ND		mg/L	0.0011	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:43	MSA	E
Vanadium, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:43	MSA	E
Zinc, Total	0.0072		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:43	MSA	E

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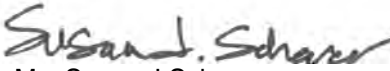
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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098689001** Date Collected: 4/23/2020 09:26 Matrix: Ground Water
 Sample ID: **CWMP012W** Date Received: 4/23/2020 16:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Zinc, Dissolved	0.0056		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:43	MSA	D1
FIELD PARAMETERS										
Depth to Water Level	62.22		Feet		Field			4/23/20 09:26	BGS	F
pH, Field (SM4500B)	5.77		pH_Units		Field			4/23/20 09:26	BGS	F
Specific Conductance, Field	346		umhos/cm	1	Field			4/23/20 09:26	BGS	F
Temperature	13.50		Deg. C		Field			4/23/20 09:26	BGS	F


 Ms. Susan J Scherer
 Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098689002** Date Collected: 4/23/2020 11:20 Matrix: Ground Water
Sample ID: **CWMP018S** Date Received: 4/23/2020 16:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	ND		ug/L	10.0	SW846 8260B			4/28/20 03:23	PDK	J
Acrylonitrile	ND		ug/L	5.0	SW846 8260B			4/28/20 03:23	PDK	J
Benzene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
Bromochloromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
Bromodichloromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
Bromoform	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
Bromomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
2-Butanone	ND		ug/L	10.0	SW846 8260B			4/28/20 03:23	PDK	J
Carbon Disulfide	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
Carbon Tetrachloride	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
Chlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
Chlorodibromomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
Chloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
Chloroform	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
Chloromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
3-Chloro-1-propene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	SW846 8260B			4/28/20 03:23	PDK	J
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
Dibromomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
trans-1,4-Dichloro-2-butene	ND		ug/L	3.0	SW846 8260B			4/28/20 03:23	PDK	J
1,2-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
1,3-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
1,4-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
Dichlorodifluoromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
1,2-Dichloropropane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
cis-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
trans-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
2-Hexanone	ND		ug/L	5.0	SW846 8260B			4/28/20 03:23	PDK	J
Iodomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	SW846 8260B			4/28/20 03:23	PDK	J

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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098689002** Date Collected: 4/23/2020 11:20 Matrix: Ground Water
Sample ID: **CWMP018S** Date Received: 4/23/2020 16:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
Styrene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
1,1,1,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
Toluene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
Total Xylenes	ND		ug/L	3.0	SW846 8260B			4/28/20 03:23	PDK	J
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
1,1,2-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
Trichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J
1,2,3-Trichloropropane	ND		ug/L	2.0	SW846 8260B			4/28/20 03:23	PDK	J
Vinyl Acetate	ND		ug/L	5.0	SW846 8260B			4/28/20 03:23	PDK	J
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			4/28/20 03:23	PDK	J

Surrogate Recoveries	Results	Flag	Units	Limits	Method	Prepared	By	Analyzed	By	Cntr
1,2-Dichloroethane-d4 (S)	92.6		%	62 - 133	SW846 8260B			4/28/20 03:23	PDK	J
4-Bromofluorobenzene (S)	104		%	79 - 114	SW846 8260B			4/28/20 03:23	PDK	J
Dibromofluoromethane (S)	92.1		%	78 - 116	SW846 8260B			4/28/20 03:23	PDK	J
Toluene-d8 (S)	94.4		%	76 - 127	SW846 8260B			4/28/20 03:23	PDK	J

LIBRARY SEARCH - VOLATILES

No TIC's Detected . Lib Search VOC 4/28/20 03:23 CPK J

WET CHEMISTRY

Alkalinity, Bicarbonate	395		mg/L	5	SM2320B-2011			4/30/20 01:35	MBW	B
Alkalinity, Total	395	2	mg/L	5	SM2320B-2011			4/30/20 01:35	MBW	A
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			5/1/20 18:10	AK	C
Chemical Oxygen Demand (COD)	22		mg/L	15	EPA 410.4			4/29/20 01:10	JAM	C
Chloride	401		mg/L	5.0	EPA 300.0			4/24/20 10:54	MBW	B
Fluoride	ND		mg/L	0.50	EPA 300.0			4/24/20 10:54	MBW	B
Nitrate-N	18.6		mg/L	0.50	EPA 300.0			4/24/20 10:54	MBW	B
pH	8.75	1	pH_Units		S4500HB-11			4/29/20 19:29	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	4/27/20 12:20	VXF	4/28/20 15:30	VXF	I
Specific Conductance	2210		umhos/cm	1	SM2510B-2011			4/29/20 19:29	MBW	B
Sulfate	34.6		mg/L	5.0	EPA 300.0			4/24/20 10:54	MBW	B
Total Dissolved Solids	1220		mg/L	25	S2540C-11			4/28/20 11:15	KXH	B
Total Organic Carbon (TOC)	8.2		mg/L	0.50	SM5310B-2011			4/29/20 20:05	PAG	G
Turbidity	0.54		NTU	0.10	SM2130B-2011			4/24/20 07:13	R2B	B

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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

 Lab ID: **3098689002** Date Collected: 4/23/2020 11:20 Matrix: Ground Water
 Sample ID: **CWMP018S** Date Received: 4/23/2020 16:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Antimony, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:46	MSA	E
Arsenic, Total	ND		mg/L	0.0033	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:46	MSA	E
Arsenic, Dissolved	ND		mg/L	0.0030	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:47	MSA	D1
Barium, Total	0.030		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:46	MSA	E
Barium, Dissolved	0.031		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:47	MSA	D1
Beryllium, Total	ND		mg/L	0.0011	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:46	MSA	E
Cadmium, Total	ND		mg/L	0.0011	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:46	MSA	E
Cadmium, Dissolved	ND		mg/L	0.0011	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:47	MSA	D1
Calcium, Total	67.4		mg/L	0.11	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:46	MSA	E
Calcium, Dissolved	63.4		mg/L	0.11	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:47	MSA	D1
Chromium, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:46	MSA	E
Chromium, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:47	MSA	D1
Cobalt, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:46	MSA	E
Copper, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:46	MSA	E
Copper, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:47	MSA	D1
Iron, Total	0.25		mg/L	0.056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:46	MSA	E
Iron, Dissolved	ND		mg/L	0.056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:47	MSA	D1
Lead, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:46	MSA	E
Lead, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:47	MSA	D1
Magnesium, Total	74.8		mg/L	0.11	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:46	MSA	E
Magnesium, Dissolved	72.5		mg/L	0.11	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:47	MSA	D1
Manganese, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:46	MSA	E
Manganese, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:47	MSA	D1
Mercury, Total	ND		mg/L	0.00050	SW846 7470A	4/25/20 10:20	AHI	4/25/20 13:26	AHI	E
Mercury, Dissolved	ND		mg/L	0.00050	SW846 7470A	4/25/20 10:20	AHI	4/25/20 12:55	AHI	D
Nickel, Total	0.014		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:46	MSA	E
Potassium, Total	15.4		mg/L	0.11	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:46	MSA	E
Potassium, Dissolved	15.0		mg/L	0.11	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:47	MSA	D1
Selenium, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:46	MSA	E
Selenium, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:47	MSA	D1
Silver, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:46	MSA	E
Silver, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:47	MSA	D1
Sodium, Total	282		mg/L	11.0	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:59	MSA	E
Sodium, Dissolved	279		mg/L	11.0	SW846 6020A	4/24/20 16:15	AHI	4/25/20 09:25	MSA	D1
Thallium, Total	ND		mg/L	0.0011	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:46	MSA	E
Vanadium, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:46	MSA	E
Zinc, Total	0.018		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:46	MSA	E

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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098689002** Date Collected: 4/23/2020 11:20 Matrix: Ground Water
 Sample ID: **CWMP018S** Date Received: 4/23/2020 16:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Zinc, Dissolved	0.018		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:47	MSA	D1
FIELD PARAMETERS										
Dissolved Oxygen	11.60		mg/L	0.01	Field			4/23/20 11:20	BGS	F
pH, Field (SM4500B)	7.93		pH_Units		Field			4/23/20 11:20	BGS	F
Specific Conductance, Field	2310		umhos/cm	1	Field			4/23/20 11:20	BGS	F
Temperature	8.20		Deg. C		Field			4/23/20 11:20	BGS	F

Susan J. Scherer
 Ms. Susan J Scherer
 Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

 Lab ID: **3098689003** Date Collected: 4/23/2020 11:49 Matrix: Ground Water
 Sample ID: **CWMP017S** Date Received: 4/23/2020 16:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	ND		ug/L	10.0	SW846 8260B			4/28/20 03:46	PDK	J
Acrylonitrile	ND		ug/L	5.0	SW846 8260B			4/28/20 03:46	PDK	J
Benzene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
Bromochloromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
Bromodichloromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
Bromoform	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
Bromomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
2-Butanone	ND		ug/L	10.0	SW846 8260B			4/28/20 03:46	PDK	J
Carbon Disulfide	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
Carbon Tetrachloride	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
Chlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
Chlorodibromomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
Chloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
Chloroform	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
Chloromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
3-Chloro-1-propene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	SW846 8260B			4/28/20 03:46	PDK	J
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
Dibromomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
trans-1,4-Dichloro-2-butene	ND		ug/L	3.0	SW846 8260B			4/28/20 03:46	PDK	J
1,2-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
1,3-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
1,4-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
Dichlorodifluoromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
1,2-Dichloropropane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
cis-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
trans-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
2-Hexanone	ND		ug/L	5.0	SW846 8260B			4/28/20 03:46	PDK	J
Iodomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	SW846 8260B			4/28/20 03:46	PDK	J

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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

 Lab ID: **3098689003** Date Collected: 4/23/2020 11:49 Matrix: Ground Water
 Sample ID: **CWMP017S** Date Received: 4/23/2020 16:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
Styrene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
1,1,1,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
Toluene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
Total Xylenes	ND		ug/L	3.0	SW846 8260B			4/28/20 03:46	PDK	J
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
1,1,2-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
Trichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J
1,2,3-Trichloropropane	ND		ug/L	2.0	SW846 8260B			4/28/20 03:46	PDK	J
Vinyl Acetate	ND		ug/L	5.0	SW846 8260B			4/28/20 03:46	PDK	J
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			4/28/20 03:46	PDK	J

Surrogate Recoveries	Results	Flag	Units	Limits	Method	Prepared	By	Analyzed	By	Cntr
1,2-Dichloroethane-d4 (S)	92.9		%	62 - 133	SW846 8260B			4/28/20 03:46	PDK	J
4-Bromofluorobenzene (S)	103		%	79 - 114	SW846 8260B			4/28/20 03:46	PDK	J
Dibromofluoromethane (S)	92.5		%	78 - 116	SW846 8260B			4/28/20 03:46	PDK	J
Toluene-d8 (S)	94		%	76 - 127	SW846 8260B			4/28/20 03:46	PDK	J

LIBRARY SEARCH - VOLATILES

No TIC's Detected . Lib Search VOC 4/28/20 03:46 CPK J

WET CHEMISTRY

Alkalinity, Bicarbonate	590		mg/L	5	SM2320B-2011			4/30/20 01:35	MBW	B
Alkalinity, Total	590	2	mg/L	5	SM2320B-2011			4/30/20 01:35	MBW	A
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			5/5/20 15:14	JXL	C
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			4/29/20 01:10	JAM	C
Chloride	619		mg/L	25.0	EPA 300.0			4/24/20 11:30	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			4/24/20 11:12	MBW	B
Nitrate-N	24.8		mg/L	2.5	EPA 300.0			4/24/20 11:30	MBW	B
pH	8.46	1	pH_Units		S4500HB-11			4/29/20 19:29	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	4/27/20 12:20	VXF	4/28/20 15:30	VXF	I
Specific Conductance	3190		umhos/cm	1	SM2510B-2011			4/29/20 19:29	MBW	B
Sulfate	62.9		mg/L	2.0	EPA 300.0			4/24/20 11:12	MBW	B
Total Dissolved Solids	1850		mg/L	25	S2540C-11			4/28/20 11:15	KXH	B
Total Organic Carbon (TOC)	5.6		mg/L	0.50	SM5310B-2011			4/29/20 20:05	PAG	G
Turbidity	1.91		NTU	0.10	SM2130B-2011			4/24/20 07:13	R2B	B

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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

 Lab ID: **3098689003** Date Collected: 4/23/2020 11:49 Matrix: Ground Water
 Sample ID: **CWMP017S** Date Received: 4/23/2020 16:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Antimony, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:49	MSA	E
Arsenic, Total	ND		mg/L	0.0033	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:49	MSA	E
Arsenic, Dissolved	ND		mg/L	0.0030	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:50	MSA	D1
Barium, Total	0.023		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:49	MSA	E
Barium, Dissolved	0.024		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:50	MSA	D1
Beryllium, Total	ND		mg/L	0.0011	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:49	MSA	E
Cadmium, Total	ND		mg/L	0.0011	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:49	MSA	E
Cadmium, Dissolved	ND		mg/L	0.0011	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:50	MSA	D1
Calcium, Total	79.3		mg/L	0.11	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:49	MSA	E
Calcium, Dissolved	72.8		mg/L	0.11	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:50	MSA	D1
Chromium, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:49	MSA	E
Chromium, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:50	MSA	D1
Cobalt, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:49	MSA	E
Copper, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:49	MSA	E
Copper, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:50	MSA	D1
Iron, Total	0.29		mg/L	0.056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:49	MSA	E
Iron, Dissolved	0.12		mg/L	0.056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:50	MSA	D1
Lead, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:49	MSA	E
Lead, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:50	MSA	D1
Magnesium, Total	116		mg/L	0.11	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:49	MSA	E
Magnesium, Dissolved	111		mg/L	0.11	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:50	MSA	D1
Manganese, Total	0.099		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:49	MSA	E
Manganese, Dissolved	0.075		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:50	MSA	D1
Mercury, Total	ND		mg/L	0.00050	SW846 7470A	4/25/20 10:20	AHI	4/25/20 13:30	AHI	E
Mercury, Dissolved	ND		mg/L	0.00050	SW846 7470A	4/25/20 10:20	AHI	4/25/20 12:56	AHI	D
Nickel, Total	0.010		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:49	MSA	E
Potassium, Total	16.2		mg/L	0.11	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:49	MSA	E
Potassium, Dissolved	15.9		mg/L	0.11	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:50	MSA	D1
Selenium, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:49	MSA	E
Selenium, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:50	MSA	D1
Silver, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:49	MSA	E
Silver, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:50	MSA	D1
Sodium, Total	452		mg/L	11.0	SW846 6020A	4/26/20 21:05	SXC	4/28/20 23:03	MSA	E
Sodium, Dissolved	448		mg/L	11.0	SW846 6020A	4/24/20 16:15	AHI	4/25/20 09:29	MSA	D1
Thallium, Total	ND		mg/L	0.0011	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:49	MSA	E
Vanadium, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:49	MSA	E
Zinc, Total	0.069		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:49	MSA	E

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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098689003** Date Collected: 4/23/2020 11:49 Matrix: Ground Water
 Sample ID: **CWMP017S** Date Received: 4/23/2020 16:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Zinc, Dissolved	0.062		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:50	MSA	D1
FIELD PARAMETERS										
Dissolved Oxygen	11.22		mg/L	0.01	Field			4/23/20 11:49	BGS	F
pH, Field (SM4500B)	7.90		pH_Units		Field			4/23/20 11:49	BGS	F
Specific Conductance, Field	3369		umhos/cm	1	Field			4/23/20 11:49	BGS	F
Temperature	13.15		Deg. C		Field			4/23/20 11:49	BGS	F

Susan J. Scherer
 Ms. Susan J Scherer
 Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098689004** Date Collected: 4/23/2020 12:59 Matrix: Ground Water
Sample ID: **CWMP003W** Date Received: 4/23/2020 16:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	ND		ug/L	10.0	SW846 8260B			4/28/20 02:15	PDK	J
Acrylonitrile	ND		ug/L	5.0	SW846 8260B			4/28/20 02:15	PDK	J
Benzene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
Bromochloromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
Bromodichloromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
Bromoform	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
Bromomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
2-Butanone	ND		ug/L	10.0	SW846 8260B			4/28/20 02:15	PDK	J
Carbon Disulfide	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
Carbon Tetrachloride	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
Chlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
Chlorodibromomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
Chloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
Chloroform	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
Chloromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
3-Chloro-1-propene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	SW846 8260B			4/28/20 02:15	PDK	J
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
Dibromomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
trans-1,4-Dichloro-2-butene	ND		ug/L	3.0	SW846 8260B			4/28/20 02:15	PDK	J
1,2-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
1,3-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
1,4-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
Dichlorodifluoromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
1,1-Dichloroethane	1.1		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
1,2-Dichloropropane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
cis-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
trans-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
2-Hexanone	ND		ug/L	5.0	SW846 8260B			4/28/20 02:15	PDK	J
Iodomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	SW846 8260B			4/28/20 02:15	PDK	J

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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

 Lab ID: **3098689004** Date Collected: 4/23/2020 12:59 Matrix: Ground Water
 Sample ID: **CWMP003W** Date Received: 4/23/2020 16:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
Styrene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
1,1,1,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
Toluene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
Total Xylenes	ND		ug/L	3.0	SW846 8260B			4/28/20 02:15	PDK	J
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
1,1,2-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
Trichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J
1,2,3-Trichloropropane	ND		ug/L	2.0	SW846 8260B			4/28/20 02:15	PDK	J
Vinyl Acetate	ND		ug/L	5.0	SW846 8260B			4/28/20 02:15	PDK	J
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			4/28/20 02:15	PDK	J

Surrogate Recoveries	Results	Flag	Units	Limits	Method	Prepared	By	Analyzed	By	Cntr
1,2-Dichloroethane-d4 (S)	92.3		%	62 - 133	SW846 8260B			4/28/20 02:15	PDK	J
4-Bromofluorobenzene (S)	102		%	79 - 114	SW846 8260B			4/28/20 02:15	PDK	J
Dibromofluoromethane (S)	91.1		%	78 - 116	SW846 8260B			4/28/20 02:15	PDK	J
Toluene-d8 (S)	92.4		%	76 - 127	SW846 8260B			4/28/20 02:15	PDK	J

LIBRARY SEARCH - VOLATILES

No TIC's Detected . Lib Search VOC 4/28/20 02:15 CPK J

WET CHEMISTRY

Alkalinity, Bicarbonate	34		mg/L	5	SM2320B-2011			4/29/20 19:29	MBW	B
Alkalinity, Total	34	1	mg/L	5	SM2320B-2011			4/29/20 19:29	MBW	A
Ammonia-N	0.486		mg/L	0.100	ASTM D6919-09			4/30/20 00:57	JXL	C
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			4/29/20 01:10	JAM	C
Chloride	60.6		mg/L	2.0	EPA 300.0			4/24/20 11:49	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			4/24/20 11:49	MBW	B
Nitrate-N	6.9		mg/L	0.20	EPA 300.0			4/24/20 11:49	MBW	B
pH	6.33	2	pH_Units		S4500HB-11			4/29/20 19:29	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	4/27/20 12:20	VXF	4/28/20 15:30	VXF	I
Specific Conductance	342		umhos/cm	1	SM2510B-2011			4/29/20 19:29	MBW	B
Sulfate	5.0		mg/L	2.0	EPA 300.0			4/24/20 11:49	MBW	B
Total Dissolved Solids	244		mg/L	25	S2540C-11			4/28/20 11:15	KXH	B
Total Organic Carbon (TOC)	0.59		mg/L	0.50	SM5310B-2011			4/29/20 20:05	PAG	G
Turbidity	0.15		NTU	0.10	SM2130B-2011			4/24/20 07:13	R2B	B

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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098689004** Date Collected: 4/23/2020 12:59 Matrix: Ground Water
Sample ID: **CWMP003W** Date Received: 4/23/2020 16:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Antimony, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:53	MSA	E
Arsenic, Total	ND		mg/L	0.0033	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:53	MSA	E
Arsenic, Dissolved	ND		mg/L	0.0030	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:53	MSA	D1
Barium, Total	0.016		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:53	MSA	E
Barium, Dissolved	0.018		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:53	MSA	D1
Beryllium, Total	ND		mg/L	0.0011	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:53	MSA	E
Cadmium, Total	ND		mg/L	0.0011	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:53	MSA	E
Cadmium, Dissolved	ND		mg/L	0.0011	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:53	MSA	D1
Calcium, Total	23.2		mg/L	0.11	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:53	MSA	E
Calcium, Dissolved	22.0		mg/L	0.11	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:53	MSA	D1
Chromium, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:53	MSA	E
Chromium, Dissolved	0.0066		mg/L	0.0022	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:53	MSA	D1
Cobalt, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:53	MSA	E
Copper, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:53	MSA	E
Copper, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:53	MSA	D1
Iron, Total	ND		mg/L	0.056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:53	MSA	E
Iron, Dissolved	ND		mg/L	0.056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:53	MSA	D1
Lead, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:53	MSA	E
Lead, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:53	MSA	D1
Magnesium, Total	8.2		mg/L	0.11	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:53	MSA	E
Magnesium, Dissolved	8.0		mg/L	0.11	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:53	MSA	D1
Manganese, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:53	MSA	E
Manganese, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:53	MSA	D1
Mercury, Total	ND		mg/L	0.00050	SW846 7470A	4/25/20 10:20	AHI	4/25/20 13:31	AHI	E
Mercury, Dissolved	ND		mg/L	0.00050	SW846 7470A	4/25/20 10:20	AHI	4/25/20 12:57	AHI	D
Nickel, Total	0.0081		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:53	MSA	E
Potassium, Total	1.6		mg/L	0.11	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:53	MSA	E
Potassium, Dissolved	1.5		mg/L	0.11	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:53	MSA	D1
Selenium, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:53	MSA	E
Selenium, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:53	MSA	D1
Silver, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:53	MSA	E
Silver, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:53	MSA	D1
Sodium, Total	20.7		mg/L	0.11	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:53	MSA	E
Sodium, Dissolved	20.5		mg/L	0.11	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:53	MSA	D1
Thallium, Total	ND		mg/L	0.0011	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:53	MSA	E
Vanadium, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:53	MSA	E
Zinc, Total	0.0073		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:53	MSA	E

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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098689004** Date Collected: 4/23/2020 12:59 Matrix: Ground Water
 Sample ID: **CWMP003W** Date Received: 4/23/2020 16:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Zinc, Dissolved	0.0080		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:53	MSA	D1
FIELD PARAMETERS										
Depth to Water Level	100.02		Feet		Field			4/23/20 12:59	BGS	F
Elev Top MW Casing above MSL	524.21		Feet		Field			4/23/20 12:59	BGS	F
Ground Water Elevation	424.19		ft/MSL		Field			4/23/20 12:59	BGS	F
pH, Field (SM4500B)	5.32		pH_Units		Field			4/23/20 12:59	BGS	F
Sample Depth	100.00		Feet		Field			4/23/20 12:59	BGS	F
Specific Conductance, Field	363		umhos/cm	1	Field			4/23/20 12:59	BGS	F
Temperature	10.82		Deg. C		Field			4/23/20 12:59	BGS	F
Total Well Depth	140.00		Feet		Field			4/23/20 12:59	BGS	F


 Ms. Susan J Scherer
 Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098689005** Date Collected: 4/23/2020 12:42 Matrix: Ground Water
Sample ID: **CWMP004W** Date Received: 4/23/2020 16:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	ND		ug/L	10.0	SW846 8260B			4/28/20 02:38	PDK	J
Acrylonitrile	ND		ug/L	5.0	SW846 8260B			4/28/20 02:38	PDK	J
Benzene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
Bromochloromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
Bromodichloromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
Bromoform	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
Bromomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
2-Butanone	ND		ug/L	10.0	SW846 8260B			4/28/20 02:38	PDK	J
Carbon Disulfide	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
Carbon Tetrachloride	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
Chlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
Chlorodibromomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
Chloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
Chloroform	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
Chloromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
3-Chloro-1-propene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	SW846 8260B			4/28/20 02:38	PDK	J
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
Dibromomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
trans-1,4-Dichloro-2-butene	ND		ug/L	3.0	SW846 8260B			4/28/20 02:38	PDK	J
1,2-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
1,3-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
1,4-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
Dichlorodifluoromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
1,2-Dichloropropane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
cis-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
trans-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
2-Hexanone	ND		ug/L	5.0	SW846 8260B			4/28/20 02:38	PDK	J
Iodomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	SW846 8260B			4/28/20 02:38	PDK	J

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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098689005** Date Collected: 4/23/2020 12:42 Matrix: Ground Water
Sample ID: **CWMP004W** Date Received: 4/23/2020 16:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
Styrene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
1,1,1,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
Toluene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
Total Xylenes	ND		ug/L	3.0	SW846 8260B			4/28/20 02:38	PDK	J
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
1,1,2-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
Trichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
1,2,3-Trichloropropane	ND		ug/L	2.0	SW846 8260B			4/28/20 02:38	PDK	J
Vinyl Acetate	ND		ug/L	5.0	SW846 8260B			4/28/20 02:38	PDK	J
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			4/28/20 02:38	PDK	J
Surrogate Recoveries	Results	Flag	Units	Limits	Method	Prepared	By	Analyzed	By	Cntr
1,2-Dichloroethane-d4 (S)	90.6		%	62 - 133	SW846 8260B			4/28/20 02:38	PDK	J
4-Bromofluorobenzene (S)	103		%	79 - 114	SW846 8260B			4/28/20 02:38	PDK	J
Dibromofluoromethane (S)	91.9		%	78 - 116	SW846 8260B			4/28/20 02:38	PDK	J
Toluene-d8 (S)	92.7		%	76 - 127	SW846 8260B			4/28/20 02:38	PDK	J

LIBRARY SEARCH - VOLATILES

No TIC's Detected . Lib Search VOC 4/28/20 02:38 CPK J

WET CHEMISTRY

Alkalinity, Bicarbonate	29		mg/L	5	SM2320B-2011			4/29/20 19:29	MBW	B
Alkalinity, Total	29	1	mg/L	5	SM2320B-2011			4/29/20 19:29	MBW	A
Ammonia-N	0.317		mg/L	0.100	ASTM D6919-09			4/29/20 23:39	JXL	C
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			4/29/20 01:10	JAM	C
Chloride	42.0		mg/L	2.0	EPA 300.0			4/24/20 12:07	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			4/24/20 12:07	MBW	B
Nitrate-N	5.7		mg/L	0.20	EPA 300.0			4/24/20 12:07	MBW	B
pH	6.74	2	pH_Units		S4500HB-11			4/29/20 19:29	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	4/27/20 12:20	VXF	4/28/20 15:30	VXF	I
Specific Conductance	263		umhos/cm	1	SM2510B-2011			4/29/20 19:29	MBW	B
Sulfate	5.3		mg/L	2.0	EPA 300.0			4/24/20 12:07	MBW	B
Total Dissolved Solids	198		mg/L	25	S2540C-11			4/28/20 11:15	KXH	B
Total Organic Carbon (TOC)	0.55		mg/L	0.50	SM5310B-2011			4/29/20 20:05	PAG	G
Turbidity	ND		NTU	0.10	SM2130B-2011			4/24/20 07:13	R2B	B

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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098689005** Date Collected: 4/23/2020 12:42 Matrix: Ground Water
Sample ID: **CWMP004W** Date Received: 4/23/2020 16:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Antimony, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:56	MSA	E
Arsenic, Total	ND		mg/L	0.0033	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:56	MSA	E
Arsenic, Dissolved	ND		mg/L	0.0030	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:57	MSA	D1
Barium, Total	0.022		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:56	MSA	E
Barium, Dissolved	0.021		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:57	MSA	D1
Beryllium, Total	ND		mg/L	0.0011	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:56	MSA	E
Cadmium, Total	ND		mg/L	0.0011	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:56	MSA	E
Cadmium, Dissolved	ND		mg/L	0.0011	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:57	MSA	D1
Calcium, Total	20.0		mg/L	0.11	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:56	MSA	E
Calcium, Dissolved	18.8		mg/L	0.11	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:57	MSA	D1
Chromium, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:56	MSA	E
Chromium, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:57	MSA	D1
Cobalt, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:56	MSA	E
Copper, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:56	MSA	E
Copper, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:57	MSA	D1
Iron, Total	ND		mg/L	0.056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:56	MSA	E
Iron, Dissolved	ND		mg/L	0.056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:57	MSA	D1
Lead, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:56	MSA	E
Lead, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:57	MSA	D1
Magnesium, Total	6.6		mg/L	0.11	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:56	MSA	E
Magnesium, Dissolved	6.4		mg/L	0.11	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:57	MSA	D1
Manganese, Total	0.0083		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:56	MSA	E
Manganese, Dissolved	0.0090		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:57	MSA	D1
Mercury, Total	ND		mg/L	0.00050	SW846 7470A	4/25/20 10:20	AHI	4/25/20 13:35	AHI	E
Mercury, Dissolved	ND		mg/L	0.00050	SW846 7470A	4/25/20 10:20	AHI	4/25/20 13:03	AHI	D
Nickel, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:56	MSA	E
Potassium, Total	1.4		mg/L	0.11	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:56	MSA	E
Potassium, Dissolved	1.3		mg/L	0.11	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:57	MSA	D1
Selenium, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:56	MSA	E
Selenium, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:57	MSA	D1
Silver, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:56	MSA	E
Silver, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:57	MSA	D1
Sodium, Total	15.4		mg/L	0.11	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:56	MSA	E
Sodium, Dissolved	14.9		mg/L	0.11	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:57	MSA	D1
Thallium, Total	ND		mg/L	0.0011	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:56	MSA	E
Vanadium, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:56	MSA	E
Zinc, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 22:56	MSA	E

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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098689005** Date Collected: 4/23/2020 12:42 Matrix: Ground Water
 Sample ID: **CWMP004W** Date Received: 4/23/2020 16:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Zinc, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 07:57	MSA	D1
FIELD PARAMETERS										
Depth to Water Level	99.23		Feet		Field			4/23/20 12:42	BGS	F
Elev Top MW Casing above MSL	529.53		Feet		Field			4/23/20 12:42	BGS	F
Ground Water Elevation	430.30		ft/MSL		Field			4/23/20 12:42	BGS	F
pH, Field (SM4500B)	5.65		pH_Units		Field			4/23/20 12:42	BGS	F
Sample Depth	130.00		Feet		Field			4/23/20 12:42	BGS	F
Specific Conductance, Field	292		umhos/cm	1	Field			4/23/20 12:42	BGS	F
Temperature	10.35		Deg. C		Field			4/23/20 12:42	BGS	F
Total Well Depth	140.00		Feet		Field			4/23/20 12:42	BGS	F


 Ms. Susan J Scherer
 Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098689006**

Date Collected: 4/23/2020 09:15

Matrix: Water

Sample ID: **Field Blank**

Date Received: 4/23/2020 16:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	ND		ug/L	10.0	SW846 8260B			4/28/20 01:53	PDK	J
Acrylonitrile	ND		ug/L	5.0	SW846 8260B			4/28/20 01:53	PDK	J
Benzene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
Bromochloromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
Bromodichloromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
Bromoform	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
Bromomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
2-Butanone	ND		ug/L	10.0	SW846 8260B			4/28/20 01:53	PDK	J
Carbon Disulfide	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
Carbon Tetrachloride	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
Chlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
Chlorodibromomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
Chloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
Chloroform	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
Chloromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
3-Chloro-1-propene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	SW846 8260B			4/28/20 01:53	PDK	J
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
Dibromomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
trans-1,4-Dichloro-2-butene	ND		ug/L	3.0	SW846 8260B			4/28/20 01:53	PDK	J
1,2-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
1,3-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
1,4-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
Dichlorodifluoromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
1,2-Dichloropropane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
cis-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
trans-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
2-Hexanone	ND		ug/L	5.0	SW846 8260B			4/28/20 01:53	PDK	J
Iodomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	SW846 8260B			4/28/20 01:53	PDK	J

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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

Lab ID: 3098689006	Date Collected: 4/23/2020 09:15	Matrix: Water
Sample ID: Field Blank	Date Received: 4/23/2020 16:16	

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
Styrene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
1,1,1,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
Toluene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
Total Xylenes	ND		ug/L	3.0	SW846 8260B			4/28/20 01:53	PDK	J
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
1,1,2-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
Trichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
1,2,3-Trichloropropane	ND		ug/L	2.0	SW846 8260B			4/28/20 01:53	PDK	J
Vinyl Acetate	ND		ug/L	5.0	SW846 8260B			4/28/20 01:53	PDK	J
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			4/28/20 01:53	PDK	J
<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)	90.2		%	62 - 133	SW846 8260B			4/28/20 01:53	PDK	J
4-Bromofluorobenzene (S)	104		%	79 - 114	SW846 8260B			4/28/20 01:53	PDK	J
Dibromofluoromethane (S)	91.6		%	78 - 116	SW846 8260B			4/28/20 01:53	PDK	J
Toluene-d8 (S)	92.9		%	76 - 127	SW846 8260B			4/28/20 01:53	PDK	J

LIBRARY SEARCH - VOLATILES

No TIC's Detected	Lib Search VOC	4/28/20 01:53	CPK	J
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WET CHEMISTRY

Alkalinity, Bicarbonate	ND		mg/L	5	SM2320B-2011			4/29/20 19:29	MBW	B
Alkalinity, Total	ND	1	mg/L	5	SM2320B-2011			4/29/20 19:29	MBW	A
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			4/30/20 02:32	JXL	C
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			4/29/20 01:10	JAM	C
Chloride	ND		mg/L	1.0	EPA 300.0			4/24/20 12:26	MBW	B
Fluoride	ND		mg/L	0.10	EPA 300.0			4/24/20 12:26	MBW	B
Nitrate-N	ND		mg/L	0.10	EPA 300.0			4/24/20 12:26	MBW	B
pH	6.19	2	pH_Units		S4500HB-11			4/29/20 19:29	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	4/27/20 12:20	VXF	4/28/20 15:30	VXF	I
Specific Conductance	2		umhos/cm	1	SM2510B-2011			4/29/20 19:29	MBW	B
Sulfate	ND		mg/L	1.0	EPA 300.0			4/24/20 12:26	MBW	B
Total Dissolved Solids	ND		mg/L	25	S2540C-11			4/28/20 11:15	KXH	B
Total Organic Carbon (TOC)	ND		mg/L	0.50	SM5310B-2011			4/29/20 20:05	PAG	G
Turbidity	ND		NTU	0.10	SM2130B-2011			4/24/20 07:13	R2B	B

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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098689006**

Date Collected: 4/23/2020 09:15

Matrix: Water

Sample ID: **Field Blank**

Date Received: 4/23/2020 16:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Antimony, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/29/20 15:03	MO	E
Arsenic, Total	ND		mg/L	0.0033	SW846 6020A	4/26/20 21:05	SXC	4/28/20 23:21	MSA	E
Arsenic, Dissolved	ND		mg/L	0.0030	SW846 6020A	4/24/20 16:15	AHI	4/25/20 08:00	MSA	D1
Barium, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 23:21	MSA	E
Barium, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 08:00	MSA	D1
Beryllium, Total	ND		mg/L	0.0011	SW846 6020A	4/26/20 21:05	SXC	4/28/20 23:21	MSA	E
Cadmium, Total	ND		mg/L	0.0011	SW846 6020A	4/26/20 21:05	SXC	4/28/20 23:21	MSA	E
Cadmium, Dissolved	ND		mg/L	0.0011	SW846 6020A	4/24/20 16:15	AHI	4/25/20 08:00	MSA	D1
Calcium, Total	ND		mg/L	0.11	SW846 6020A	4/26/20 21:05	SXC	4/28/20 23:21	MSA	E
Calcium, Dissolved	0.13		mg/L	0.11	SW846 6020A	4/24/20 16:15	AHI	4/25/20 08:00	MSA	D1
Chromium, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 23:21	MSA	E
Chromium, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/24/20 16:15	AHI	4/25/20 08:00	MSA	D1
Cobalt, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 23:21	MSA	E
Copper, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 23:21	MSA	E
Copper, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 08:00	MSA	D1
Iron, Total	ND		mg/L	0.056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 23:21	MSA	E
Iron, Dissolved	ND		mg/L	0.056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 08:00	MSA	D1
Lead, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 23:21	MSA	E
Lead, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/24/20 16:15	AHI	4/25/20 08:00	MSA	D1
Magnesium, Total	ND		mg/L	0.11	SW846 6020A	4/26/20 21:05	SXC	4/28/20 23:21	MSA	E
Magnesium, Dissolved	ND		mg/L	0.11	SW846 6020A	4/24/20 16:15	AHI	4/25/20 08:00	MSA	D1
Manganese, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 23:21	MSA	E
Manganese, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 08:00	MSA	D1
Mercury, Total	ND		mg/L	0.00050	SW846 7470A	4/25/20 10:20	AHI	4/25/20 13:36	AHI	E
Mercury, Dissolved	ND		mg/L	0.00050	SW846 7470A	4/25/20 10:20	AHI	4/25/20 13:04	AHI	D
Nickel, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 23:21	MSA	E
Potassium, Total	ND		mg/L	0.11	SW846 6020A	4/26/20 21:05	SXC	4/28/20 23:21	MSA	E
Potassium, Dissolved	ND		mg/L	0.11	SW846 6020A	4/24/20 16:15	AHI	4/25/20 08:00	MSA	D1
Selenium, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 23:21	MSA	E
Selenium, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 08:00	MSA	D1
Silver, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 23:21	MSA	E
Silver, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/24/20 16:15	AHI	4/25/20 08:00	MSA	D1
Sodium, Total	0.17		mg/L	0.11	SW846 6020A	4/26/20 21:05	SXC	4/29/20 15:03	MO	E
Sodium, Dissolved	0.20		mg/L	0.11	SW846 6020A	4/24/20 16:15	AHI	4/25/20 08:00	MSA	D1
Thallium, Total	ND		mg/L	0.0011	SW846 6020A	4/26/20 21:05	SXC	4/29/20 15:03	MO	E
Vanadium, Total	ND		mg/L	0.0022	SW846 6020A	4/26/20 21:05	SXC	4/28/20 23:21	MSA	E
Zinc, Total	ND		mg/L	0.0056	SW846 6020A	4/26/20 21:05	SXC	4/28/20 23:21	MSA	E

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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098689006**

Date Collected: 4/23/2020 09:15

Matrix: Water

Sample ID: **Field Blank**

Date Received: 4/23/2020 16:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Zinc, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/24/20 16:15	AHI	4/25/20 08:00	MSA	D1

Ms. Susan J Scherer
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098689007**

Date Collected: 4/23/2020 16:16

Matrix: Water

Sample ID: **Trip Blank**

Date Received: 4/23/2020 16:16

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	ND		ug/L	10.0	SW846 8260B			4/28/20 01:30	PDK	A
Acrylonitrile	ND		ug/L	5.0	SW846 8260B			4/28/20 01:30	PDK	A
Benzene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
Bromochloromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
Bromodichloromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
Bromoform	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
Bromomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
2-Butanone	ND		ug/L	10.0	SW846 8260B			4/28/20 01:30	PDK	A
Carbon Disulfide	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
Carbon Tetrachloride	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
Chlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
Chlorodibromomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
Chloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
Chloroform	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
Chloromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
3-Chloro-1-propene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	SW846 8260B			4/28/20 01:30	PDK	A
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
Dibromomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
trans-1,4-Dichloro-2-butene	ND		ug/L	3.0	SW846 8260B			4/28/20 01:30	PDK	A
1,2-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
1,3-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
1,4-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
Dichlorodifluoromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
1,2-Dichloropropane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
cis-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
trans-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
2-Hexanone	ND		ug/L	5.0	SW846 8260B			4/28/20 01:30	PDK	A
Iodomethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	SW846 8260B			4/28/20 01:30	PDK	A

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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098689007**

Date Collected: 4/23/2020 16:16

Matrix: Water

Sample ID: **Trip Blank**

Date Received: 4/23/2020 16:16

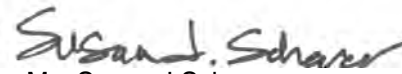
Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
Styrene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
1,1,1,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
Toluene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
Total Xylenes	ND		ug/L	3.0	SW846 8260B			4/28/20 01:30	PDK	A
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
1,1,2-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
Trichloroethene	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
1,2,3-Trichloropropane	ND		ug/L	2.0	SW846 8260B			4/28/20 01:30	PDK	A
Vinyl Acetate	ND		ug/L	5.0	SW846 8260B			4/28/20 01:30	PDK	A
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			4/28/20 01:30	PDK	A
Surrogate Recoveries	Results	Flag	Units	Limits	Method	Prepared	By	Analyzed	By	Cntr
1,2-Dichloroethane-d4 (S)	89.5		%	62 - 133	SW846 8260B			4/28/20 01:30	PDK	A
4-Bromofluorobenzene (S)	103		%	79 - 114	SW846 8260B			4/28/20 01:30	PDK	A
Dibromofluoromethane (S)	91.5		%	78 - 116	SW846 8260B			4/28/20 01:30	PDK	A
Toluene-d8 (S)	93.4		%	76 - 127	SW846 8260B			4/28/20 01:30	PDK	A

LIBRARY SEARCH - VOLATILES

No TIC's Detected

Lib Search VOC

4/28/20 01:30 CPK A



Ms. Susan J Scherer

Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
3098689001	1	CWMP012W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3098689001	2	CWMP012W	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.				
3098689002	1	CWMP018S	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.				
3098689002	2	CWMP018S	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3098689003	1	CWMP017S	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.				
3098689003	2	CWMP017S	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3098689004	1	CWMP003W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3098689004	2	CWMP003W	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.				
3098689005	1	CWMP004W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3098689005	2	CWMP004W	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.				
3098689006	1	Field Blank	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3098689006	2	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.				

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

Lab ID	Sample ID	Analysis Method	Prep Method
3098689001	CWMP012W	ASTM D6919-09	
3098689001	CWMP012W	EPA 300.0	
3098689001	CWMP012W	EPA 410.4	
3098689001	CWMP012W	Field	
3098689001	CWMP012W	Lib Search VOC	
3098689001	CWMP012W	S2540C-11	
3098689001	CWMP012W	S4500HB-11	
3098689001	CWMP012W	SM2130B-2011	
3098689001	CWMP012W	SM2320B-2011	
3098689001	CWMP012W	SM2510B-2011	
3098689001	CWMP012W	SM5310B-2011	
3098689001	CWMP012W	SW846 6020A	SW846 3015
3098689001	CWMP012W	SW846 7470A	SW846 7470A
3098689001	CWMP012W	SW846 8260B	
3098689001	CWMP012W	SW846 9066	420.4/9066
3098689002	CWMP018S	ASTM D6919-09	
3098689002	CWMP018S	EPA 300.0	
3098689002	CWMP018S	EPA 410.4	
3098689002	CWMP018S	Field	
3098689002	CWMP018S	Lib Search VOC	
3098689002	CWMP018S	S2540C-11	
3098689002	CWMP018S	S4500HB-11	
3098689002	CWMP018S	SM2130B-2011	
3098689002	CWMP018S	SM2320B-2011	
3098689002	CWMP018S	SM2510B-2011	
3098689002	CWMP018S	SM5310B-2011	
3098689002	CWMP018S	SW846 6020A	SW846 3015
3098689002	CWMP018S	SW846 7470A	SW846 7470A
3098689002	CWMP018S	SW846 8260B	
3098689002	CWMP018S	SW846 9066	420.4/9066
3098689003	CWMP017S	ASTM D6919-09	
3098689003	CWMP017S	EPA 300.0	
3098689003	CWMP017S	EPA 410.4	
3098689003	CWMP017S	Field	
3098689003	CWMP017S	Lib Search VOC	
3098689003	CWMP017S	S2540C-11	
3098689003	CWMP017S	S4500HB-11	
3098689003	CWMP017S	SM2130B-2011	
3098689003	CWMP017S	SM2320B-2011	
3098689003	CWMP017S	SM2510B-2011	
3098689003	CWMP017S	SM5310B-2011	
3098689003	CWMP017S	SW846 6020A	SW846 3015
3098689003	CWMP017S	SW846 7470A	SW846 7470A
3098689003	CWMP017S	SW846 8260B	
3098689003	CWMP017S	SW846 9066	420.4/9066
3098689004	CWMP003W	ASTM D6919-09	

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3098689 2ND QTR 2020 CWMP-FORM 19A

Lab ID	Sample ID	Analysis Method	Prep Method
3098689004	CWMP003W	EPA 300.0	
3098689004	CWMP003W	EPA 410.4	
3098689004	CWMP003W	Field	
3098689004	CWMP003W	Lib Search VOC	
3098689004	CWMP003W	S2540C-11	
3098689004	CWMP003W	S4500HB-11	
3098689004	CWMP003W	SM2130B-2011	
3098689004	CWMP003W	SM2320B-2011	
3098689004	CWMP003W	SM2510B-2011	
3098689004	CWMP003W	SM5310B-2011	
3098689004	CWMP003W	SW846 6020A	SW846 3015
3098689004	CWMP003W	SW846 7470A	SW846 7470A
3098689004	CWMP003W	SW846 8260B	
3098689004	CWMP003W	SW846 9066	420.4/9066
3098689005	CWMP004W	ASTM D6919-09	
3098689005	CWMP004W	EPA 300.0	
3098689005	CWMP004W	EPA 410.4	
3098689005	CWMP004W	Field	
3098689005	CWMP004W	Lib Search VOC	
3098689005	CWMP004W	S2540C-11	
3098689005	CWMP004W	S4500HB-11	
3098689005	CWMP004W	SM2130B-2011	
3098689005	CWMP004W	SM2320B-2011	
3098689005	CWMP004W	SM2510B-2011	
3098689005	CWMP004W	SM5310B-2011	
3098689005	CWMP004W	SW846 6020A	SW846 3015
3098689005	CWMP004W	SW846 7470A	SW846 7470A
3098689005	CWMP004W	SW846 8260B	
3098689005	CWMP004W	SW846 9066	420.4/9066
3098689006	Field Blank	ASTM D6919-09	
3098689006	Field Blank	EPA 300.0	
3098689006	Field Blank	EPA 410.4	
3098689006	Field Blank	Lib Search VOC	
3098689006	Field Blank	S2540C-11	
3098689006	Field Blank	S4500HB-11	
3098689006	Field Blank	SM2130B-2011	
3098689006	Field Blank	SM2320B-2011	
3098689006	Field Blank	SM2510B-2011	
3098689006	Field Blank	SM5310B-2011	
3098689006	Field Blank	SW846 6020A	SW846 3015
3098689006	Field Blank	SW846 7470A	SW846 7470A
3098689006	Field Blank	SW846 8260B	
3098689006	Field Blank	SW846 9066	420.4/9066
3098689007	Trip Blank	Lib Search VOC	
3098689007	Trip Blank	SW846 8260B	

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3 0 9 8 6 8 9 +

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

Generated by ALS
301 Fulfilling Mill Rd • Middletown, PA 17057 • 717.944.5541 • Fax: 717.944.1430
ALS Environmental
1200 Pine • Middletown, PA 17057 • Phone: 717.944.5541 • Fax: 717.944.1430 • www.als.com

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#: Creswell/GWMP Form 19A
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 dbrown@LCSWMA.org
Fax? -Y -N No.: (717) 397-9973

Container Type	AG	AN	CG	PL	PL	PL	PL	PL	PL	PL
40 ml	40 ml	125 ml	40 ml	1 L	500 ml	None	None	None	None	None
HCl	HCl	H2SO4	HCl	None	None	H2SO4	HNO3	HNO3	HNO3	HNO3

Sample Description/Location	Sample Date	Time	Matrix	TOC	O-OH	8280 VOCs - Form 19A + Subtitle D + TICs	pH, Cl, SPC, F, SO4, NO3, Th, TDS	Alkalinity, HCO3	TM	Sample Depth for AUX Data	Diss Metals Form 19A (Field Filtered)	Total Metals Form 19A + Subtitle D
1. CWMP012W	04/2320	0926	G GW	2	1	2	1	1	X	X	1	1
2. CWMP018S	04/2320	1120	G GW	2	1	2	1	1	X	X	1	1
3. CWMP017S	04/2320	1149	G GW	2	1	2	1	1	X	X	1	1
4. CWMP003W	04/2320	1259	G GW	2	1	2	1	1	X	X	1	1
5. CWMP004W	04/2320	1242	G GW	2	1	2	1	1	X	X	1	1
. Field Blank	04/2320	0915	G GW	2	1	2	1	1	X	X	1	1
. Trip Blank:	04/2320		G GW			2						

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 Lab Special

PWSID # _____

EDUS: Format Type _____

LOGGED BY (signature): _____
REVIEWED BY (signature): _____
Date Time Received By / Company Name
4-23-20 16:16 2
4-23-20 16:16 4
4-23-20 16:16 6
4-23-20 16:16 8
4-23-20 16:16 10

Relinquished By / Company Name: DB Brown
Date Time: 4-23-20 16:16





301 Fulling Mill Road
 Middletown, PA 17057
 P: (717) 944-5541
 F: (717) 944-1430

Condition of Sample Receipt Form

Client: LCSWMA Work Order #: 3098659 Initials: ES Date: 4/23/2020

1. Were airbills / tracking numbers present and recorded?..... NONE YES NO
 Tracking number: _____
2. Are Custody Seals on shipping containers intact?..... NONE YES NO
3. Are Custody Seals on sample containers intact?..... NONE 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..... N/A 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?..... ph is exposed 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)?..... N/A 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 NO
 - 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): 4 _____
 Thermometer ID: 407 _____
 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



April 30, 2020

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

Certificate of Analysis

Project Name:	CRESWELL	Workorder:	3098414
Purchase Order:	PO1000127	Workorder ID:	2ND QTR 2020 CWMP-FORM 19A

Dear Mr. Brown:

Enclosed are the analytical results for samples received by the laboratory on Wednesday, April 22, 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.

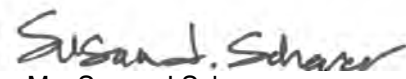
Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications 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: 3098414 2ND QTR 2020 CWMP-FORM 19A

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
3098414001	CWMP016W	Ground Water	4/22/2020 11:37	4/22/2020 15:26	Mr. Brian G Shade
3098414002	CWMP010W	Ground Water	4/22/2020 12:05	4/22/2020 15:26	Mr. Brian G Shade
3098414003	CWMP009W	Ground Water	4/22/2020 12:36	4/22/2020 15:26	Mr. Brian G Shade
3098414004	CWMP008W	Ground Water	4/22/2020 13:12	4/22/2020 15:26	Mr. Brian G Shade

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SAMPLE SUMMARY

Workorder: 3098414 2ND QTR 2020 CWMP-FORM 19A

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: 3098414 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098414001** Date Collected: 4/22/2020 11:37 Matrix: Ground Water
Sample ID: **CWMP016W** Date Received: 4/22/2020 15:26

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS									
Acetone	ND		ug/L	10.0	SW846 8260B		4/24/20 00:24	PDK	J
Acrylonitrile	ND		ug/L	5.0	SW846 8260B		4/24/20 00:24	PDK	J
Benzene	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
Bromochloromethane	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
Bromodichloromethane	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
Bromoform	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
Bromomethane	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
2-Butanone	ND		ug/L	10.0	SW846 8260B		4/24/20 00:24	PDK	J
Carbon Disulfide	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
Carbon Tetrachloride	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
Chlorobenzene	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
Chlorodibromomethane	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
Chloroethane	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
Chloroform	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
Chloromethane	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
3-Chloro-1-propene	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	SW846 8260B		4/24/20 00:24	PDK	J
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
Dibromomethane	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
trans-1,4-Dichloro-2-butene	ND	4	ug/L	3.0	SW846 8260B		4/24/20 00:24	PDK	J
1,2-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
1,3-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
1,4-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
Dichlorodifluoromethane	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
1,2-Dichloropropane	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
cis-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
trans-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
Ethylbenzene	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
2-Hexanone	ND		ug/L	5.0	SW846 8260B		4/24/20 00:24	PDK	J
Iodomethane	ND		ug/L	1.0	SW846 8260B		4/24/20 00:24	PDK	J
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	SW846 8260B		4/24/20 00:24	PDK	J

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ANALYTICAL RESULTS

Workorder: 3098414 2ND QTR 2020 CWMP-FORM 19A

 Lab ID: **3098414001**
 Sample ID: **CWMP016W**

 Date Collected: 4/22/2020 11:37 Matrix: Ground Water
 Date Received: 4/22/2020 15:26

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			4/24/20 00:24	PDK	J
Styrene	ND		ug/L	1.0	SW846 8260B			4/24/20 00:24	PDK	J
1,1,1,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/24/20 00:24	PDK	J
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/24/20 00:24	PDK	J
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			4/24/20 00:24	PDK	J
Toluene	ND		ug/L	1.0	SW846 8260B			4/24/20 00:24	PDK	J
Total Xylenes	ND		ug/L	3.0	SW846 8260B			4/24/20 00:24	PDK	J
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/24/20 00:24	PDK	J
1,1,2-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/24/20 00:24	PDK	J
Trichloroethene	ND		ug/L	1.0	SW846 8260B			4/24/20 00:24	PDK	J
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			4/24/20 00:24	PDK	J
1,2,3-Trichloropropane	ND		ug/L	2.0	SW846 8260B			4/24/20 00:24	PDK	J
Vinyl Acetate	ND		ug/L	5.0	SW846 8260B			4/24/20 00:24	PDK	J
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			4/24/20 00:24	PDK	J

Surrogate Recoveries	Results	Flag	Units	Limits	Method	Prepared	By	Analyzed	By	Cntr
1,2-Dichloroethane-d4 (S)	114		%	62 - 133	SW846 8260B			4/24/20 00:24	PDK	J
4-Bromofluorobenzene (S)	111		%	79 - 114	SW846 8260B			4/24/20 00:24	PDK	J
Dibromofluoromethane (S)	107		%	78 - 116	SW846 8260B			4/24/20 00:24	PDK	J
Toluene-d8 (S)	99		%	76 - 127	SW846 8260B			4/24/20 00:24	PDK	J

LIBRARY SEARCH - VOLATILES

No TIC's Detected . Lib Search VOC 4/24/20 00:24 CPK J

WET CHEMISTRY

Alkalinity, Bicarbonate	6		mg/L	5	SM2320B-2011			4/25/20 00:15	MBW	B
Alkalinity, Total	6	1	mg/L	5	SM2320B-2011			4/25/20 00:15	MBW	B
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			4/26/20 03:27	JXL	C
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			4/29/20 01:10	JAM	C
Chloride	2.4		mg/L	2.0	EPA 300.0			4/23/20 09:42	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			4/23/20 09:42	MBW	B
Nitrate-N	0.64		mg/L	0.20	EPA 300.0			4/23/20 09:42	MBW	B
pH	6.62	2	pH_Units		S4500HB-11			4/25/20 00:15	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	4/27/20 12:20	VXF	4/28/20 15:30	VXF	I
Specific Conductance	53		umhos/cm	1	SM2510B-2011			4/25/20 00:15	MBW	B
Sulfate	11.0		mg/L	2.0	EPA 300.0			4/23/20 09:42	MBW	B
Total Dissolved Solids	ND	3	mg/L	25	S2540C-11			4/23/20 15:33	KXH	B
Total Organic Carbon (TOC)	0.51		mg/L	0.50	SM5310B-2011			4/29/20 10:44	PAG	G
Turbidity	0.68		NTU	0.10	SM2130B-2011			4/23/20 07:46	R2B	B

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ANALYTICAL RESULTS

Workorder: 3098414 2ND QTR 2020 CWMP-FORM 19A

 Lab ID: **3098414001** Date Collected: 4/22/2020 11:37 Matrix: Ground Water
 Sample ID: **CWMP016W** Date Received: 4/22/2020 15:26

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Antimony, Total	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:49	MSA	E1
Arsenic, Total	ND		mg/L	0.0033	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:49	MSA	E1
Arsenic, Dissolved	ND		mg/L	0.0030	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:37	MSA	D
Barium, Total	0.014		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/27/20 17:05	MO	E1
Barium, Dissolved	0.0091		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:37	MSA	D
Beryllium, Total	ND		mg/L	0.0011	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:49	MSA	E1
Cadmium, Total	ND		mg/L	0.0011	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:49	MSA	E1
Cadmium, Dissolved	ND		mg/L	0.0011	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:37	MSA	D
Calcium, Total	4.8		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:49	MSA	E1
Calcium, Dissolved	4.8		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:37	MSA	D
Chromium, Total	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:49	MSA	E1
Chromium, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:37	MSA	D
Cobalt, Total	0.0061		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:49	MSA	E1
Copper, Total	ND		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:49	MSA	E1
Copper, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:37	MSA	D
Iron, Total	0.11		mg/L	0.056	SW846 6020A	4/23/20 19:50	SXC	4/27/20 17:05	MO	E1
Iron, Dissolved	ND		mg/L	0.056	SW846 6020A	4/23/20 19:50	SXC	4/28/20 13:29	MO	D
Lead, Total	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:49	MSA	E1
Lead, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:37	MSA	D
Magnesium, Total	1.1		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:49	MSA	E1
Magnesium, Dissolved	1.1		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:37	MSA	D
Manganese, Total	0.0076		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:49	MSA	E1
Manganese, Dissolved	0.0091		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:37	MSA	D
Mercury, Total	ND		mg/L	0.00050	SW846 7470A	4/23/20 11:00	AHI	4/23/20 15:08	AHI	E
Mercury, Dissolved	ND		mg/L	0.00050	SW846 7470A	4/25/20 10:20	AHI	4/25/20 12:49	AHI	D
Nickel, Total	ND		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:49	MSA	E1
Potassium, Total	0.42		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:49	MSA	E1
Potassium, Dissolved	0.41		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:37	MSA	D
Selenium, Total	ND		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:49	MSA	E1
Selenium, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:37	MSA	D
Silver, Total	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:49	MSA	E1
Silver, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:37	MSA	D
Sodium, Total	2.9		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:49	MSA	E1
Sodium, Dissolved	2.9		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:37	MSA	D
Thallium, Total	ND		mg/L	0.0011	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:49	MSA	E1
Vanadium, Total	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:49	MSA	E1
Zinc, Total	ND		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:49	MSA	E1

ALS Environmental Laboratory Locations Across North America

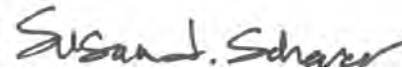
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ANALYTICAL RESULTS

Workorder: 3098414 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098414001** Date Collected: 4/22/2020 11:37 Matrix: Ground Water
 Sample ID: **CWMP016W** Date Received: 4/22/2020 15:26

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Zinc, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:37	MSA	D
FIELD PARAMETERS										
Depth to Water Level	8.18		Feet		Field			4/22/20 11:37	BGS	F
Elev Top MW Casing above MSL	311.97		Feet		Field			4/22/20 11:37	BGS	F
Flow Rate	2.46		gal/min		Field			4/22/20 11:37	BGS	F
Ground Water Elevation	303.79		ft/MSL		Field			4/22/20 11:37	BGS	F
pH, Field (SM4500B)	5.25		pH_Units		Field			4/22/20 11:37	BGS	F
Sample Depth	71.00		Feet		Field			4/22/20 11:37	BGS	F
Specific Conductance, Field	65		umhos/cm	1	Field			4/22/20 11:37	BGS	F
Temperature	8.88		Deg. C		Field			4/22/20 11:37	BGS	F
Total Well Depth	73.52		Feet		Field			4/22/20 11:37	BGS	F
Volume in Water Column	96.05		Gallons		Field			4/22/20 11:37	BGS	F
Water Level After Purge	17.67		Feet		Field			4/22/20 11:37	BGS	F
Well Volumes Purged	1.00		Vol		Field			4/22/20 11:37	BGS	F



Ms. Susan J Scherer
 Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3098414 2ND QTR 2020 CWMP-FORM 19A

 Lab ID: **3098414002**

Date Collected: 4/22/2020 12:05

Matrix: Ground Water

 Sample ID: **CWMP010W**

Date Received: 4/22/2020 15:26

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	ND		ug/L	10.0	SW846 8260B			4/24/20 00:47	PDK	J
Acrylonitrile	ND		ug/L	5.0	SW846 8260B			4/24/20 00:47	PDK	J
Benzene	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
Bromochloromethane	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
Bromodichloromethane	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
Bromoform	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
Bromomethane	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
2-Butanone	ND		ug/L	10.0	SW846 8260B			4/24/20 00:47	PDK	J
Carbon Disulfide	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
Carbon Tetrachloride	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
Chlorobenzene	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
Chlorodibromomethane	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
Chloroethane	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
Chloroform	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
Chloromethane	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
3-Chloro-1-propene	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	SW846 8260B			4/24/20 00:47	PDK	J
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
Dibromomethane	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
trans-1,4-Dichloro-2-butene	ND	3	ug/L	3.0	SW846 8260B			4/24/20 00:47	PDK	J
1,2-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
1,3-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
1,4-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
Dichlorodifluoromethane	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
1,2-Dichloropropane	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
cis-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
trans-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
2-Hexanone	ND		ug/L	5.0	SW846 8260B			4/24/20 00:47	PDK	J
Iodomethane	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	SW846 8260B			4/24/20 00:47	PDK	J

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ANALYTICAL RESULTS

Workorder: 3098414 2ND QTR 2020 CWMP-FORM 19A

 Lab ID: **3098414002** Date Collected: 4/22/2020 12:05 Matrix: Ground Water
 Sample ID: **CWMP010W** Date Received: 4/22/2020 15:26

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
Styrene	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
1,1,1,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
Toluene	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
Total Xylenes	ND		ug/L	3.0	SW846 8260B			4/24/20 00:47	PDK	J
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
1,1,2-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
Trichloroethene	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J
1,2,3-Trichloropropane	ND		ug/L	2.0	SW846 8260B			4/24/20 00:47	PDK	J
Vinyl Acetate	ND		ug/L	5.0	SW846 8260B			4/24/20 00:47	PDK	J
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			4/24/20 00:47	PDK	J

Surrogate Recoveries	Results	Flag	Units	Limits	Method	Prepared	By	Analyzed	By	Cntr
1,2-Dichloroethane-d4 (S)	116		%	62 - 133	SW846 8260B			4/24/20 00:47	PDK	J
4-Bromofluorobenzene (S)	111		%	79 - 114	SW846 8260B			4/24/20 00:47	PDK	J
Dibromofluoromethane (S)	109		%	78 - 116	SW846 8260B			4/24/20 00:47	PDK	J
Toluene-d8 (S)	100		%	76 - 127	SW846 8260B			4/24/20 00:47	PDK	J

LIBRARY SEARCH - VOLATILES

No TIC's Detected . Lib Search VOC 4/24/20 00:47 CPK J

WET CHEMISTRY

Alkalinity, Bicarbonate	147		mg/L	5	SM2320B-2011			4/25/20 00:15	MBW	B
Alkalinity, Total	147	1	mg/L	5	SM2320B-2011			4/25/20 00:15	MBW	B
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			4/26/20 01:05	JXL	C
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			4/29/20 01:10	JAM	C
Chloride	109		mg/L	2.0	EPA 300.0			4/23/20 09:58	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			4/23/20 09:58	MBW	B
Nitrate-N	4.7		mg/L	0.20	EPA 300.0			4/23/20 09:58	MBW	B
pH	7.77	2	pH_Units		S4500HB-11			4/25/20 00:15	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	4/27/20 12:20	VXF	4/28/20 15:30	VXF	I
Specific Conductance	688		umhos/cm	1	SM2510B-2011			4/25/20 00:15	MBW	B
Sulfate	25.3		mg/L	2.0	EPA 300.0			4/23/20 09:58	MBW	B
Total Dissolved Solids	356		mg/L	25	S2540C-11			4/23/20 15:33	KXH	B
Total Organic Carbon (TOC)	2.8		mg/L	0.50	SM5310B-2011			4/29/20 10:44	PAG	G
Turbidity	1.05		NTU	0.10	SM2130B-2011			4/23/20 07:46	R2B	B

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ANALYTICAL RESULTS

Workorder: 3098414 2ND QTR 2020 CWMP-FORM 19A

 Lab ID: **3098414002** Date Collected: 4/22/2020 12:05 Matrix: Ground Water
 Sample ID: **CWMP010W** Date Received: 4/22/2020 15:26

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Antimony, Total	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:52	MSA	E1
Arsenic, Total	ND		mg/L	0.0033	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:52	MSA	E1
Arsenic, Dissolved	ND		mg/L	0.0030	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:41	MSA	D
Barium, Total	0.031		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:52	MSA	E1
Barium, Dissolved	0.029		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:41	MSA	D
Beryllium, Total	ND		mg/L	0.0011	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:52	MSA	E1
Cadmium, Total	ND		mg/L	0.0011	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:52	MSA	E1
Cadmium, Dissolved	ND		mg/L	0.0011	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:41	MSA	D
Calcium, Total	24.9		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:52	MSA	E1
Calcium, Dissolved	26.1		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:41	MSA	D
Chromium, Total	0.010		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:52	MSA	E1
Chromium, Dissolved	0.0067		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:41	MSA	D
Cobalt, Total	ND		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:52	MSA	E1
Copper, Total	0.0068		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:52	MSA	E1
Copper, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:41	MSA	D
Iron, Total	0.39		mg/L	0.056	SW846 6020A	4/23/20 19:50	SXC	4/27/20 17:08	MO	E1
Iron, Dissolved	0.061		mg/L	0.056	SW846 6020A	4/23/20 19:50	SXC	4/28/20 13:32	MO	D
Lead, Total	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:52	MSA	E1
Lead, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:41	MSA	D
Magnesium, Total	21.9		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:52	MSA	E1
Magnesium, Dissolved	22.1		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:41	MSA	D
Manganese, Total	0.21		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:52	MSA	E1
Manganese, Dissolved	0.027		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:41	MSA	D
Mercury, Total	ND		mg/L	0.00050	SW846 7470A	4/23/20 11:00	AHI	4/23/20 15:12	AHI	E
Mercury, Dissolved	ND		mg/L	0.00050	SW846 7470A	4/25/20 10:20	AHI	4/25/20 12:50	AHI	D
Nickel, Total	0.019		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:52	MSA	E1
Potassium, Total	4.5		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:52	MSA	E1
Potassium, Dissolved	4.7		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:41	MSA	D
Selenium, Total	ND		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:52	MSA	E1
Selenium, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:41	MSA	D
Silver, Total	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:52	MSA	E1
Silver, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:41	MSA	D
Sodium, Total	81.0		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:52	MSA	E1
Sodium, Dissolved	81.8		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:41	MSA	D
Thallium, Total	ND		mg/L	0.0011	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:52	MSA	E1
Vanadium, Total	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:52	MSA	E1
Zinc, Total	ND		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:52	MSA	E1

ALS Environmental Laboratory Locations Across North America

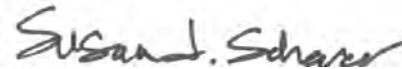
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ANALYTICAL RESULTS

Workorder: 3098414 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098414002** Date Collected: 4/22/2020 12:05 Matrix: Ground Water
 Sample ID: **CWMP010W** Date Received: 4/22/2020 15:26

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Zinc, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:41	MSA	D
FIELD PARAMETERS										
Depth to Water Level	8.49		Feet		Field			4/22/20 12:05	BGS	F
Elev Top MW Casing above MSL	360.90		Feet		Field			4/22/20 12:05	BGS	F
Flow Rate	1.14		gal/min		Field			4/22/20 12:05	BGS	F
Ground Water Elevation	352.41		ft/MSL		Field			4/22/20 12:05	BGS	F
pH, Field (SM4500B)	6.26		pH_Units		Field			4/22/20 12:05	BGS	F
Sample Depth	17.00		Feet		Field			4/22/20 12:05	BGS	F
Specific Conductance, Field	767		umhos/cm	1	Field			4/22/20 12:05	BGS	F
Temperature	7.90		Deg. C		Field			4/22/20 12:05	BGS	F
Total Well Depth	19.60		Feet		Field			4/22/20 12:05	BGS	F
Volume in Water Column	7.22		Gallons		Field			4/22/20 12:05	BGS	F
Water Level After Purge	15.62		Feet		Field			4/22/20 12:05	BGS	F
Well Volumes Purged	1.74		Vol		Field			4/22/20 12:05	BGS	F



Ms. Susan J Scherer
 Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3098414 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098414003** Date Collected: 4/22/2020 12:36 Matrix: Ground Water
Sample ID: **CWMP009W** Date Received: 4/22/2020 15:26

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS									
Acetone	13.2		ug/L	10.0	SW846 8260B		4/24/20 01:09	PDK	J
Acrylonitrile	ND		ug/L	5.0	SW846 8260B		4/24/20 01:09	PDK	J
Benzene	2.1		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
Bromochloromethane	ND		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
Bromodichloromethane	ND		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
Bromoform	ND		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
Bromomethane	ND		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
2-Butanone	ND		ug/L	10.0	SW846 8260B		4/24/20 01:09	PDK	J
Carbon Disulfide	ND		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
Carbon Tetrachloride	ND		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
Chlorobenzene	30.6		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
Chlorodibromomethane	ND		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
Chloroethane	13.8		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
Chloroform	ND		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
Chloromethane	ND		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
3-Chloro-1-propene	ND		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	SW846 8260B		4/24/20 01:09	PDK	J
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
Dibromomethane	ND		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
trans-1,4-Dichloro-2-butene	ND	2	ug/L	3.0	SW846 8260B		4/24/20 01:09	PDK	J
1,2-Dichlorobenzene	3.2		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
1,3-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
1,4-Dichlorobenzene	10.8		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
Dichlorodifluoromethane	ND		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
1,1-Dichloroethane	1.7		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
1,2-Dichloropropane	ND		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
cis-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
trans-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
Ethylbenzene	ND		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
2-Hexanone	ND		ug/L	5.0	SW846 8260B		4/24/20 01:09	PDK	J
Iodomethane	ND		ug/L	1.0	SW846 8260B		4/24/20 01:09	PDK	J
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	SW846 8260B		4/24/20 01:09	PDK	J

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ANALYTICAL RESULTS

Workorder: 3098414 2ND QTR 2020 CWMP-FORM 19A

 Lab ID: **3098414003**
 Sample ID: **CWMP009W**

 Date Collected: 4/22/2020 12:36 Matrix: Ground Water
 Date Received: 4/22/2020 15:26

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			4/24/20 01:09	PDK	J
Styrene	ND		ug/L	1.0	SW846 8260B			4/24/20 01:09	PDK	J
1,1,1,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/24/20 01:09	PDK	J
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/24/20 01:09	PDK	J
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			4/24/20 01:09	PDK	J
Toluene	ND		ug/L	1.0	SW846 8260B			4/24/20 01:09	PDK	J
Total Xylenes	ND		ug/L	3.0	SW846 8260B			4/24/20 01:09	PDK	J
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/24/20 01:09	PDK	J
1,1,2-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/24/20 01:09	PDK	J
Trichloroethene	ND		ug/L	1.0	SW846 8260B			4/24/20 01:09	PDK	J
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			4/24/20 01:09	PDK	J
1,2,3-Trichloropropane	ND		ug/L	2.0	SW846 8260B			4/24/20 01:09	PDK	J
Vinyl Acetate	ND		ug/L	5.0	SW846 8260B			4/24/20 01:09	PDK	J
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			4/24/20 01:09	PDK	J
<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)	117		%	62 - 133	SW846 8260B			4/24/20 01:09	PDK	J
4-Bromofluorobenzene (S)	111		%	79 - 114	SW846 8260B			4/24/20 01:09	PDK	J
Dibromofluoromethane (S)	110		%	78 - 116	SW846 8260B			4/24/20 01:09	PDK	J
Toluene-d8 (S)	101		%	76 - 127	SW846 8260B			4/24/20 01:09	PDK	J
Library Search - Volatiles										
Silanol, trimethyl-	13.5	J N	ug/L		SW846 8260B			4/24/20 01:09	PDK	J
WET CHEMISTRY										
Alkalinity, Bicarbonate	515		mg/L	50	SM2320B-2011			4/29/20 19:29	MBW	B
Alkalinity, Total	515	3	mg/L	50	SM2320B-2011			4/29/20 19:29	MBW	B
Ammonia-N	22.1		mg/L	0.100	ASTM D6919-09			4/26/20 00:49	JXL	C
Chemical Oxygen Demand (COD)	99		mg/L	15	EPA 410.4			4/29/20 01:10	JAM	C
Chloride	491		mg/L	10.0	EPA 300.0			4/25/20 06:50	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			4/23/20 10:14	MBW	B
Nitrate-N	ND		mg/L	0.20	EPA 300.0			4/23/20 10:14	MBW	B
pH	7.19	1	pH_Units		S4500HB-11			4/25/20 00:15	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	4/27/20 12:20	VXF	4/28/20 15:30	VXF	I
Specific Conductance	2280		umhos/cm	1	SM2510B-2011			4/25/20 00:15	MBW	B
Sulfate	5.9		mg/L	2.0	EPA 300.0			4/23/20 10:14	MBW	B
Total Dissolved Solids	1370		mg/L	25	S2540C-11			4/23/20 15:33	KXH	B
Total Organic Carbon (TOC)	34.1		mg/L	2.5	SM5310B-2011			4/29/20 10:44	PAG	G
Turbidity	63.6		NTU	0.20	SM2130B-2011			4/23/20 07:46	R2B	B

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ANALYTICAL RESULTS

Workorder: 3098414 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098414003** Date Collected: 4/22/2020 12:36 Matrix: Ground Water
Sample ID: **CWMP009W** Date Received: 4/22/2020 15:26

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Antimony, Total	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:56	MSA	E1
Arsenic, Total	0.0036		mg/L	0.0033	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:56	MSA	E1
Arsenic, Dissolved	0.0036		mg/L	0.0030	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:44	MSA	D
Barium, Total	0.73		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:56	MSA	E1
Barium, Dissolved	0.74		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:44	MSA	D
Beryllium, Total	ND		mg/L	0.0011	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:56	MSA	E1
Cadmium, Total	ND		mg/L	0.0011	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:56	MSA	E1
Cadmium, Dissolved	ND		mg/L	0.0011	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:44	MSA	D
Calcium, Total	140		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:56	MSA	E1
Calcium, Dissolved	144		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:44	MSA	D
Chromium, Total	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:56	MSA	E1
Chromium, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:44	MSA	D
Cobalt, Total	0.049		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:56	MSA	E1
Copper, Total	ND		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:56	MSA	E1
Copper, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:44	MSA	D
Iron, Total	37.2		mg/L	0.056	SW846 6020A	4/23/20 19:50	SXC	4/27/20 17:11	MO	E1
Iron, Dissolved	35.4		mg/L	0.056	SW846 6020A	4/23/20 19:50	SXC	4/28/20 13:36	MO	D
Lead, Total	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:56	MSA	E1
Lead, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:44	MSA	D
Magnesium, Total	71.5		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:56	MSA	E1
Magnesium, Dissolved	70.4		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:44	MSA	D
Manganese, Total	10.9		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:56	MSA	E1
Manganese, Dissolved	11.3		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:44	MSA	D
Mercury, Total	ND		mg/L	0.00050	SW846 7470A	4/23/20 11:00	AHI	4/23/20 15:13	AHI	E
Mercury, Dissolved	ND		mg/L	0.00050	SW846 7470A	4/25/20 10:20	AHI	4/25/20 12:51	AHI	D
Nickel, Total	0.061		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:56	MSA	E1
Potassium, Total	30.5		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:56	MSA	E1
Potassium, Dissolved	30.8		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:44	MSA	D
Selenium, Total	ND		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:56	MSA	E1
Selenium, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:44	MSA	D
Silver, Total	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:56	MSA	E1
Silver, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:44	MSA	D
Sodium, Total	156		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:56	MSA	E1
Sodium, Dissolved	156		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:44	MSA	D
Thallium, Total	ND		mg/L	0.0011	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:56	MSA	E1
Vanadium, Total	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:56	MSA	E1
Zinc, Total	0.0056		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:56	MSA	E1

ALS Environmental Laboratory Locations Across North America

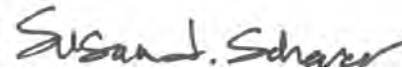
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ANALYTICAL RESULTS

Workorder: 3098414 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098414003** Date Collected: 4/22/2020 12:36 Matrix: Ground Water
 Sample ID: **CWMP009W** Date Received: 4/22/2020 15:26

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Zinc, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:44	MSA	D
FIELD PARAMETERS										
Depth to Water Level	8.99		Feet		Field			4/22/20 12:36	BGS	F
Elev Top MW Casing above MSL	404.20		Feet		Field			4/22/20 12:36	BGS	F
Flow Rate	1.63		gal/min		Field			4/22/20 12:36	BGS	F
Ground Water Elevation	395.21		ft/MSL		Field			4/22/20 12:36	BGS	F
pH, Field (SM4500B)	6.10		pH_Units		Field			4/22/20 12:36	BGS	F
Sample Depth	16.00		Feet		Field			4/22/20 12:36	BGS	F
Specific Conductance, Field	2635		umhos/cm	1	Field			4/22/20 12:36	BGS	F
Temperature	8.32		Deg. C		Field			4/22/20 12:36	BGS	F
Total Well Depth	19.70		Feet		Field			4/22/20 12:36	BGS	F
Volume in Water Column	6.96		Gallons		Field			4/22/20 12:36	BGS	F
Water Level After Purge	9.91		Feet		Field			4/22/20 12:36	BGS	F
Well Volumes Purged	4.68		Vol		Field			4/22/20 12:36	BGS	F



Ms. Susan J Scherer
 Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3098414 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098414004** Date Collected: 4/22/2020 13:12 Matrix: Ground Water
Sample ID: **CWMP008W** Date Received: 4/22/2020 15:26

Parameters	Results	Flag	Units	RDL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS									
Acetone	ND		ug/L	10.0	SW846 8260B		4/24/20 01:32	PDK	J
Acrylonitrile	ND		ug/L	5.0	SW846 8260B		4/24/20 01:32	PDK	J
Benzene	1.8		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
Bromochloromethane	ND		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
Bromodichloromethane	ND		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
Bromoform	ND		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
Bromomethane	ND		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
2-Butanone	ND		ug/L	10.0	SW846 8260B		4/24/20 01:32	PDK	J
Carbon Disulfide	ND		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
Carbon Tetrachloride	ND		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
Chlorobenzene	9.6		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
Chlorodibromomethane	ND		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
Chloroethane	6.0		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
Chloroform	ND		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
Chloromethane	ND		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
3-Chloro-1-propene	ND		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	SW846 8260B		4/24/20 01:32	PDK	J
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
Dibromomethane	ND		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
trans-1,4-Dichloro-2-butene	ND	3	ug/L	3.0	SW846 8260B		4/24/20 01:32	PDK	J
1,2-Dichlorobenzene	1.6		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
1,3-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
1,4-Dichlorobenzene	12.1		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
Dichlorodifluoromethane	ND		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
1,1-Dichloroethane	3.2		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
1,2-Dichloropropane	ND		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
cis-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
trans-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
Ethylbenzene	ND		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
2-Hexanone	ND		ug/L	5.0	SW846 8260B		4/24/20 01:32	PDK	J
Iodomethane	ND		ug/L	1.0	SW846 8260B		4/24/20 01:32	PDK	J
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	SW846 8260B		4/24/20 01:32	PDK	J

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ANALYTICAL RESULTS

Workorder: 3098414 2ND QTR 2020 CWMP-FORM 19A

Lab ID: 3098414004	Date Collected: 4/22/2020 13:12	Matrix: Ground Water
Sample ID: CWMP008W	Date Received: 4/22/2020 15:26	

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			4/24/20 01:32	PDK	J
Styrene	ND		ug/L	1.0	SW846 8260B			4/24/20 01:32	PDK	J
1,1,1,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/24/20 01:32	PDK	J
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			4/24/20 01:32	PDK	J
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			4/24/20 01:32	PDK	J
Toluene	ND		ug/L	1.0	SW846 8260B			4/24/20 01:32	PDK	J
Total Xylenes	ND		ug/L	3.0	SW846 8260B			4/24/20 01:32	PDK	J
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/24/20 01:32	PDK	J
1,1,2-Trichloroethane	ND		ug/L	1.0	SW846 8260B			4/24/20 01:32	PDK	J
Trichloroethene	ND		ug/L	1.0	SW846 8260B			4/24/20 01:32	PDK	J
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			4/24/20 01:32	PDK	J
1,2,3-Trichloropropane	ND		ug/L	2.0	SW846 8260B			4/24/20 01:32	PDK	J
Vinyl Acetate	ND		ug/L	5.0	SW846 8260B			4/24/20 01:32	PDK	J
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			4/24/20 01:32	PDK	J
<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)	116		%	62 - 133	SW846 8260B			4/24/20 01:32	PDK	J
4-Bromofluorobenzene (S)	110		%	79 - 114	SW846 8260B			4/24/20 01:32	PDK	J
Dibromofluoromethane (S)	108		%	78 - 116	SW846 8260B			4/24/20 01:32	PDK	J
Toluene-d8 (S)	101		%	76 - 127	SW846 8260B			4/24/20 01:32	PDK	J
Library Search - Volatiles										
Diethyl sulfide	8.5	J N	ug/L		SW846 8260B			4/24/20 01:32	PDK	J
WET CHEMISTRY										
Alkalinity, Bicarbonate	365		mg/L	5	SM2320B-2011			4/25/20 00:15	MBW	B
Alkalinity, Total	365	1	mg/L	5	SM2320B-2011			4/25/20 00:15	MBW	B
Ammonia-N	4.89		mg/L	0.100	ASTM D6919-09			4/28/20 05:51	JXL	C
Chemical Oxygen Demand (COD)	24		mg/L	15	EPA 410.4			4/29/20 01:10	JAM	C
Chloride	31.8		mg/L	2.0	EPA 300.0			4/23/20 10:31	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			4/23/20 10:31	MBW	B
Nitrate-N	ND		mg/L	0.20	EPA 300.0			4/23/20 10:31	MBW	B
pH	6.86	2	pH_Units		S4500HB-11			4/25/20 00:15	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	4/27/20 12:20	VXF	4/28/20 15:30	VXF	I
Specific Conductance	723		umhos/cm	1	SM2510B-2011			4/25/20 00:15	MBW	B
Sulfate	6.8		mg/L	2.0	EPA 300.0			4/23/20 10:31	MBW	B
Total Dissolved Solids	458		mg/L	25	S2540C-11			4/23/20 15:33	KXH	B
Total Organic Carbon (TOC)	7.8		mg/L	1.0	SM5310B-2011			4/29/20 10:44	PAG	G
Turbidity	12.5		NTU	0.10	SM2130B-2011			4/23/20 07:46	R2B	B

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ANALYTICAL RESULTS

Workorder: 3098414 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098414004** Date Collected: 4/22/2020 13:12 Matrix: Ground Water
Sample ID: **CWMP008W** Date Received: 4/22/2020 15:26

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Antimony, Total	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:59	MSA	E1
Arsenic, Total	ND		mg/L	0.0033	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:59	MSA	E1
Arsenic, Dissolved	ND		mg/L	0.0030	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:48	MSA	D
Barium, Total	0.13		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:59	MSA	E1
Barium, Dissolved	0.033		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:48	MSA	D
Beryllium, Total	ND		mg/L	0.0011	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:59	MSA	E1
Cadmium, Total	ND		mg/L	0.0011	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:59	MSA	E1
Cadmium, Dissolved	ND		mg/L	0.0011	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:48	MSA	D
Calcium, Total	61.2		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:59	MSA	E1
Calcium, Dissolved	25.3		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:48	MSA	D
Chromium, Total	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:59	MSA	E1
Chromium, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:48	MSA	D
Cobalt, Total	0.028		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:59	MSA	E1
Copper, Total	ND		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:59	MSA	E1
Copper, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:48	MSA	D
Iron, Total	27.4		mg/L	0.056	SW846 6020A	4/23/20 19:50	SXC	4/27/20 17:15	MO	E1
Iron, Dissolved	0.64		mg/L	0.056	SW846 6020A	4/23/20 19:50	SXC	4/28/20 13:39	MO	D
Lead, Total	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:59	MSA	E1
Lead, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:48	MSA	D
Magnesium, Total	27.6		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:59	MSA	E1
Magnesium, Dissolved	6.7		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:48	MSA	D
Manganese, Total	14.5		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:59	MSA	E1
Manganese, Dissolved	0.061		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/28/20 13:39	MO	D
Mercury, Total	ND		mg/L	0.00050	SW846 7470A	4/23/20 11:00	AHI	4/23/20 15:15	AHI	E
Mercury, Dissolved	ND		mg/L	0.00050	SW846 7470A	4/25/20 10:20	AHI	4/25/20 12:52	AHI	D
Nickel, Total	0.017		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:59	MSA	E1
Potassium, Total	7.7		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:59	MSA	E1
Potassium, Dissolved	2.1		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:48	MSA	D
Selenium, Total	ND		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:59	MSA	E1
Selenium, Dissolved	ND		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:48	MSA	D
Silver, Total	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:59	MSA	E1
Silver, Dissolved	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:48	MSA	D
Sodium, Total	32.3		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:59	MSA	E1
Sodium, Dissolved	10.5		mg/L	0.11	SW846 6020A	4/23/20 19:50	SXC	4/25/20 12:48	MSA	D
Thallium, Total	ND		mg/L	0.0011	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:59	MSA	E1
Vanadium, Total	ND		mg/L	0.0022	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:59	MSA	E1
Zinc, Total	ND		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/25/20 11:59	MSA	E1

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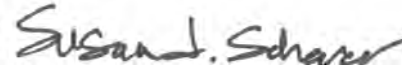
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ANALYTICAL RESULTS

Workorder: 3098414 2ND QTR 2020 CWMP-FORM 19A

Lab ID: **3098414004** Date Collected: 4/22/2020 13:12 Matrix: Ground Water
 Sample ID: **CWMP008W** Date Received: 4/22/2020 15:26

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Zinc, Dissolved	0.0062		mg/L	0.0056	SW846 6020A	4/23/20 19:50	SXC	4/28/20 13:39	MO	D
FIELD PARAMETERS										
Depth to Water Level	2.49		Feet		Field			4/22/20 13:12	BGS	F
Elev Top MW Casing above MSL	422.30		Feet		Field			4/22/20 13:12	BGS	F
Flow Rate	0.87		gal/min		Field			4/22/20 13:12	BGS	F
Ground Water Elevation	419.81		ft/MSL		Field			4/22/20 13:12	BGS	F
pH, Field (SM4500B)	6.08		pH_Units		Field			4/22/20 13:12	BGS	F
Sample Depth	19.00		Feet		Field			4/22/20 13:12	BGS	F
Specific Conductance, Field	836		umhos/cm	1	Field			4/22/20 13:12	BGS	F
Temperature	9.52		Deg. C		Field			4/22/20 13:12	BGS	F
Total Well Depth	22.80		Feet		Field			4/22/20 13:12	BGS	F
Volume in Water Column	3.25		Gallons		Field			4/22/20 13:12	BGS	F
Water Level After Purge	9.68		Feet		Field			4/22/20 13:12	BGS	F
Well Volumes Purged	5.38		Vol		Field			4/22/20 13:12	BGS	F



Ms. Susan J Scherer
 Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3098414 2ND QTR 2020 CWMP-FORM 19A

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
3098414001	1	CWMP016W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO ₃ /L.				
3098414001	2	CWMP016W	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.				
3098414001	3	CWMP016W	S2540C-11	Total Dissolved Solids
The method requires a minimum filter weight after drying of 0.0025g. The sample did not meet these requirements. A bias may exist with the result.				
3098414001	4	CWMP016W	SW846 8260B	trans-1,4-Dichloro-2-butene
The QC sample type LCS for method SW846 8260B was outside the control limits for the analyte trans-1,4-Dichloro-2-butene. The % Recovery was reported as 151 and the control limits were 60 to 141.				
3098414002	1	CWMP010W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO ₃ /L.				
3098414002	2	CWMP010W	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.				
3098414002	3	CWMP010W	SW846 8260B	trans-1,4-Dichloro-2-butene
The QC sample type LCS for method SW846 8260B was outside the control limits for the analyte trans-1,4-Dichloro-2-butene. The % Recovery was reported as 151 and the control limits were 60 to 141.				
3098414003	1	CWMP009W	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.				
3098414003	2	CWMP009W	SW846 8260B	trans-1,4-Dichloro-2-butene
The QC sample type LCS for method SW846 8260B was outside the control limits for the analyte trans-1,4-Dichloro-2-butene. The % Recovery was reported as 151 and the control limits were 60 to 141.				
3098414003	3	CWMP009W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO ₃ /L.				
3098414004	1	CWMP008W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO ₃ /L.				
3098414004	2	CWMP008W	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.				
3098414004	3	CWMP008W	SW846 8260B	trans-1,4-Dichloro-2-butene
The QC sample type LCS for method SW846 8260B was outside the control limits for the analyte trans-1,4-Dichloro-2-butene. The % Recovery was reported as 151 and the control limits were 60 to 141.				

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3098414 2ND QTR 2020 CWMP-FORM 19A

Lab ID	Sample ID	Analysis Method	Prep Method
3098414001	CWMP016W	ASTM D6919-09	
3098414001	CWMP016W	EPA 300.0	
3098414001	CWMP016W	EPA 410.4	
3098414001	CWMP016W	Field	
3098414001	CWMP016W	Lib Search VOC	
3098414001	CWMP016W	S2540C-11	
3098414001	CWMP016W	S4500HB-11	
3098414001	CWMP016W	SM2130B-2011	
3098414001	CWMP016W	SM2320B-2011	
3098414001	CWMP016W	SM2510B-2011	
3098414001	CWMP016W	SM5310B-2011	
3098414001	CWMP016W	SW846 6020A	SW846 3015
3098414001	CWMP016W	SW846 7470A	SW846 7470A
3098414001	CWMP016W	SW846 8260B	
3098414001	CWMP016W	SW846 9066	420.4/9066
3098414002	CWMP010W	ASTM D6919-09	
3098414002	CWMP010W	EPA 300.0	
3098414002	CWMP010W	EPA 410.4	
3098414002	CWMP010W	Field	
3098414002	CWMP010W	Lib Search VOC	
3098414002	CWMP010W	S2540C-11	
3098414002	CWMP010W	S4500HB-11	
3098414002	CWMP010W	SM2130B-2011	
3098414002	CWMP010W	SM2320B-2011	
3098414002	CWMP010W	SM2510B-2011	
3098414002	CWMP010W	SM5310B-2011	
3098414002	CWMP010W	SW846 6020A	SW846 3015
3098414002	CWMP010W	SW846 7470A	SW846 7470A
3098414002	CWMP010W	SW846 8260B	
3098414002	CWMP010W	SW846 9066	420.4/9066
3098414003	CWMP009W	ASTM D6919-09	
3098414003	CWMP009W	EPA 300.0	
3098414003	CWMP009W	EPA 410.4	
3098414003	CWMP009W	Field	
3098414003	CWMP009W	Lib Search VOC	
3098414003	CWMP009W	S2540C-11	
3098414003	CWMP009W	S4500HB-11	
3098414003	CWMP009W	SM2130B-2011	
3098414003	CWMP009W	SM2320B-2011	
3098414003	CWMP009W	SM2510B-2011	
3098414003	CWMP009W	SM5310B-2011	
3098414003	CWMP009W	SW846 6020A	SW846 3015
3098414003	CWMP009W	SW846 7470A	SW846 7470A
3098414003	CWMP009W	SW846 8260B	
3098414003	CWMP009W	SW846 9066	420.4/9066
3098414004	CWMP008W	ASTM D6919-09	

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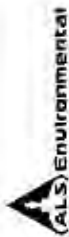
ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3098414 2ND QTR 2020 CWMP-FORM 19A

Lab ID	Sample ID	Analysis Method	Prep Method
3098414004	CWMP008W	EPA 300.0	
3098414004	CWMP008W	EPA 410.4	
3098414004	CWMP008W	Field	
3098414004	CWMP008W	Lib Search VOC	
3098414004	CWMP008W	S2540C-11	
3098414004	CWMP008W	S4500HB-11	
3098414004	CWMP008W	SM2130B-2011	
3098414004	CWMP008W	SM2320B-2011	
3098414004	CWMP008W	SM2510B-2011	
3098414004	CWMP008W	SM5310B-2011	
3098414004	CWMP008W	SW846 6020A	SW846 3015
3098414004	CWMP008W	SW846 7470A	SW846 7470A
3098414004	CWMP008W	SW846 8260B	
3098414004	CWMP008W	SW846 9066	420.4/9066

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301 Fulfilling Mill Rd • Middletown, PA 17057 • Fax: 717-944-5541 • Fax: 717-944-1430

Generated by ALS

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS SAMPLER. INSTRUCTIONS ON THE BACK.

COC #:

ALS QUC



* 3 0 9 8 4 1 4 *

Therm ID: 4455

No. of Coolers: Y N Initial

Cooler Temp: 7

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

ANALYSES/METHOD REQUESTED

Enter Number of Containers Per Sample or Field Results Below.

TOC

O-OH

B2B0 VOCs - Form 19A + Subtitle D

pH, Cl, SPC, F, SO4, NO3, Tn, TDS

Alkalinity, HCO3

FM

Sample Depth for AUX Data

NH3-N, COD

Diss Metals Form 19A (Field)

Total Metals Form 19A + Subtitle D

Matrix

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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#: Creswell/CWMP Form 19A

Bill To: Lancaster County Solid Waste MA

Normal-Standard TAT is 10-12 business days.

Rush-Subject to ALS approval and surcharges.

Date Required: _____ Approved By: _____

Email? Y N dbrown@LCSWMA.org

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

Sample Description/Location

(as it will appear on the lab report)

Sample Date

Time

1. CWMP016W

04/22/20

1137

2. CWMP010W

04/22/20

1205

3. CWMP009W

04/22/20

1236

4. CWMP008W

04/22/20

1312

5

6

7

8

9

Project Comments:

Relinquished By / Company Name

Date

Time

Received By / Company Name

Date

Time

LOGGED BY (signature):

REVIEWED BY (signature):

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LOGGED BY (signature):

REVIEWED BY (signature):

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4-22-20 1526

4-22-20 1526

4-22-20 1526

4-22-20 1526

4-22-20 1526

4-22-20 1526

4-22-20 1526

Standard

CLP-like

USACE

Special Processing

USACE

Navy

State Samples Collected In

NY

NJ

PA

NC

Special

ALS Field Services:

Composite_Sampling

Pickup

Rental_Equipment

Other:

Reportable to PADEP?

Yes

Lab

Special

PWSID #

EDDS: Format type

EDDS: Format type



301 Fulling Mill Road
Middletown, PA 17057

P: (717) 944-5541

F: (717) 944-1430

Condition of Sample Receipt Form

Client: Lancaster County SWM # Work Order #: 8098414 Initials: CS Date: 4/22/2020

1. Were airbills / tracking numbers present and recorded?..... NONE YES NO
Tracking number: _____
2. Are Custody Seals on shipping containers intact?..... NONE YES NO
3. Are Custody Seals on sample containers intact?..... NONE 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?..... N/A 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?..... Ph is expired - CS 4/22/20 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)?..... N/A YES NO
11. Were the samples received on ice?..... YES NO
12. Were sample temperatures measured at 0.0-6.0°C..... Above 6°C YES NO
13. Are the samples DW matrix ? If YES, fill out Reportable Drinking Water questions below..... YES NO
 - 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): 7°C
 Thermometer ID: L141
 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