Groundwater Detection Monitoring And Assessment Report

CCR Surface Impoundment System

James DeYoung Power Plant

Holland Board of Public Works

Holland, Michigan

October 13, 2020 **NTH Project No. 73-160017-06**

NTH Consultants, Ltd.
41780 Six Mile Road, Suite 200
Northville, MI 48168

TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

The Holland Board of Public Works (BPW) owns and operated the James DeYoung (JDY) plant located in Holland, Michigan, on the eastern end of Lake Macatawa. JDY was initially built in 1939 with a generating capacity of 15 megawatts (MW). Between 1953 and 1968, three new boilers were added. From the late 1970's to the early 2000's, the plant consisted of three coal-fired boilers capable of producing up to 62.5 MW. On May 20, 2016, BPW discontinued the use of Unit 3; and on June 1, 2017, BPW officially shut down and retired all generation units at JDY. When Units 3-5 were operating on coal, bottom ash from these boiler units was sluiced to the first of three surface impoundments located to the south of the plant, as shown on Figure 1, in Appendix A. These surface impoundments, permitted pursuant to NPDES permit No. MI0001473, became subject to 40 CFR Part 257, Subpart D – Standards for the Disposal of Coal Combustion Residuals (CCR) in Landfills and Surface Impoundments upon promulgation on April 17, 2015.

2.0 STATUS OF THE GROUNDWATER MONITORING PROGRAM

Prior to promulgation of 40 CFR Part 257, a limited hydrogeological investigation work plan was developed for the site between 2009 and 2010 that established a groundwater detection monitoring program to address the requirements of Michigan Administrative Code R 323.2237(4) of Michigan's Natural Resources and Environmental Protection Act, 1994 Public Act 451, as amended (Act 451). The work plan pre-dated the final federal CCR rules and had the purpose of satisfying a request by Michigan Department of Environmental Quality, now known as Department of Environment, Great Lakes and Energy (EGLE), to determine whether the presence of bottom ash lagoons (CCR units) may have affected groundwater

quality in the surrounding area. The results of this investigation were inconclusive and additional investigative activities were implemented between 2011 and 2015 according to the agency approved hydrogeologic workplans and NPDES permit requirements.

2.1 Background

In October 2015, BPW completed these investigation activities, including collection of groundwater elevation data and samples for the analysis of a subset of metals on a quarterly basis, for a period of three years. The results of the investigation identified that certain metals were present in the groundwater above the U.S. EPA's Safe Drinking Water Act's maximum contaminant level (MCL) established in 40 CFR §141.62, and concluded that the groundwater quality in the surrounding area may have been affected by the historic use of the CCR units.

Based on the findings of these investigation activities, the anticipated retirement of the plant, and future requirements of 40 CFR Part 257, Subpart D, BPW decided to close the CCR units through removal of CCR and decontamination of the CCR units, in accordance with 40 CFR §257.102.

2.2 Closure of the CCR Units

BPW initiated closure of the CCR units through removal of CCR material in June 2017. During excavation of CCR materials, three of the monitoring wells installed in proximity to the CCR units as part of the previously conducted investigation activities were removed. This is due to their location within the area where CCR residuals were being removed during closure of the CCR units.

Removal of CCR residuals and final closure of the CCR units was completed in May 2018. The site restoration activities were completed in June 2018 in substantial conformance with 40 CFR §257.101 and 40 CFR §257.103, and the written closure plan prepared by NTH Consultants, Ltd., (NTH) dated October 17, 2016.

2.3 Groundwater Monitoring System

Consistent with the requirements contained in 40 CFR §257.93, a Groundwater Sampling and Analysis Plan (SAP) was developed in October 2017 to evaluate background and downgradient groundwater quality within the JDY plant property (Site). The SAP was developed to collect necessary information to comply with detection monitoring requirements of 40 CFR §257.94, assessment monitoring requirements of 40 CFR §257.95, and clean closure verification per 40 CFR §257.102(c).

To comply with the requirements contained in 40 CFR §257.91, NTH designed the groundwater monitoring system considered representative of groundwater affected by the CCR units.

A review of information regarding the hydrogeologic conditions of the site available at the time the SAP was developed indicates that groundwater generally flows east-to-west across the site and discharges to Lake Macatawa. Based on this information, existing piezometer (PZ-1) is located hydraulically upgradient of the former CCR bottom ash lagoons. We note that PZ-1 was previously identified and sampled as monitoring well MW-7. Groundwater samples from this well represent background groundwater quality that has not been affected by the CCR units. Three additional wells, MW-1, MW-2, and MW-3 were installed downgradient of the CCR units on November 27, 2017 at the facility boundary in the direction of potential contaminant migration. Figure 2, in Appendix A, provides the location of the monitoring wells comprising the groundwater monitoring system. Water level data

obtained from the monitoring wells during the quarterly events were used to develop groundwater contour maps. The quarterly maps are consistent from one sampling event to the next and confirm groundwater flow direction.

As part of the monitoring program, NTH collected groundwater samples from the monitoring system on a quarterly basis during eight quarterly events during the period from January of 2018 to March 2020. Appendix III parameters boron, calcium, chloride, fluoride, pH, sulfate and total dissolved solids (TDS) were analyzed to satisfy the requirements of the detection monitoring program contained in 40 CFR §257.94 given that a formal detection monitoring program was not completed at the site prior to the implementation of closure through removal of CCR. It should be noted that Appendix III constituents are not evaluated as part of the requirements for clean closure.

The samples were also analyzed for constituents listed in Appendix IV to 40 CFR §257.95 and the data collected was evaluated as part of the assessment monitoring program and to verify clean closure as specified in 40 CFR §257.102(c).

2.4 Groundwater Evaluation

To evaluate clean closure, the analytical data from the eight background samples analyzed for the Appendix IV constituents were compared to applicable groundwater protection standards. The groundwater protection standards for each constituent in Appendix IV was established in accordance with 40 CFR §257.95(h). For constituents for which the background level is higher than the levels identified in 40 CFR §257.95(h)(1) and (h)(2), the statistically derived background concentration will be the groundwater protection standard. For all other constituents, the groundwater protection standard will be the established MCL per 40 CFR §257.95(h)(1) or the value outlined in 40 CFR §257.95(h)(2).

For those Appendix IV constituents where the statistically developed background level was higher than the MCL, the groundwater protection standard was determined to be the statistically developed background concentration utilizing the data collected from upgradient/background monitoring well (PZ-1). Background concentrations for each constituent were calculated using an appropriate statistical method based on the distribution of the background data, consistent with 40 CFR §257.93.

3.0 STATISTICAL ANALYSIS

Consistent with the requirements contained in 40 CFR §257.93, this report documents the procedures, statistical techniques, and decision criteria applied to groundwater quality data compiled as part of monitoring activities at the facility. The procedures outlined in this report provide the protocols by which the data sets were screened and evaluated. To meet the requirements contained in 40 CFR §257.93(h) and to assist in determination of clean closure, data collected from downgradient monitoring wells (MW-1, MW2, and MW-3) were compared to data collected from the background/upgradient well (PZ-1) as discussed previously.

The methodologies and techniques used in the evaluation are consistent with the U.S. EPA guidance document titled *March 2009 Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities—Unified Guidance (Unified Guidance)*, and meet the performance standards specified in 40 CFR §257.93(g).

The statistical methods selected were based on the characteristics of the background data sets compiled throughout the monitoring program. The data set characteristics evaluated include:

- sample size
- number of values reported below the practical quantification limit (PQL)
- data distributions (and transformations)
- outliers and seasonality

The following sections provide a brief discussion of each of the data characteristics listed above.

Sample Size

To meet the minimum data requirements of the statistical methods to be used, an appropriate number of samples were collected from the monitoring wells. Note that for parameters that are naturally occurring in the environment (metals, inorganic parameters, etc.), a minimum of eight samples are necessary to establish background and to account for the natural variability of the system monitored, and to meet the data requirements of most method(s) of data analysis. Eight samples were collected from monitoring well PZ-1 to represent background, as discussed previously.

Number of Values Reported as Non-Detect (ND)/Below the Practical Quantification Limit (<PQL)

Specific Guidelines for handling ND values have been established in the Unified Guidance. The evaluation of ND values for samples collected at the facility was complete following the procedures described below:

- Where the number of ND were 15 percent or less of the samples to be evaluated, the ND values was replaced with half of its PQL, the data evaluated as 100 percent detected, and the appropriate statistical method applied.

- Where the number of ND values was between 15 percent and 50 percent, censored values were adjusted using Cohen's or Aitchison's adjustment, the data evaluated as 100 percent detected, and the appropriate statistical method applied.

- Where the number of ND values was between 50 percent and 100 percent, non-parametric tolerance limits were utilized, and no adjustment to the ND set was necessary.

Test of Normality

Most statistical tests assume that the data to be analyzed follow a normal (i.e., Gaussian) distribution and, therefore, to obtain meaningful results, this assumption of normality must be satisfied. The Shapiro-Wilks test for normality was the method used to determine the data distribution given the smaller data sets (less than 50 values), and background data sets containing less than or equal to 15 percent ND. For background data sets containing more than 15 percent ND, probability plots were utilized. Background datasets containing more than 50 percent ND were not tested for normality as they would result in a non-normal distribution. In these instances, a non-parametric procedure was utilized in the evaluation of the post-background data. Note that, if the data sets contained values reported as ND, the test of normality was performed after the appropriate substitution for ND values was completed, as described above.

Data Transformation

When evaluating the background data, if the raw data did not result in a normal distribution, the data was transformed using natural logarithm, log base 10, square root, inverse, arc-sin, or other appropriate transformation of the raw data, all of which are recommended in the Unified Guidance. The objective of performing data transformations is to satisfy the assumption of normality required for most statistical evaluations based on parametric procedures. As recommended in the Unified Guidance, when the raw data exhibited a normal distribution, the data was not transformed. Where the data transformation resulted in a normal distribution,

the transformed data was used in the statistical evaluation. When neither the raw data nor the transformed data could be normalized, the raw data was used in the statistical evaluation, where applicable, or a non-parametric statistical analysis was performed.

Outliers

Prior to completion of statistical analyses, the data sets were screened for statistical outliers. When a sample was identified to be anomalous relative to the remainder of the data set, the data point was formally tested to determine whether the value represents a statistical outlier and all efforts made to determine the cause of the outlier. Oftentimes, sampling error, laboratory conditions at the time of analysis, or data entry errors are the cause of the outlier. As recommended in the Unified Guidance, the Dixon's Test for Outliers was used given that the data sets contained less than 25 values.

Seasonality

While the use of statistical techniques is a valuable tool to screen and investigate changes in groundwater quality over time, the processes that control the occurrence and movement of groundwater and the constituents dissolved in groundwater need to be considered in the selection of a statistical method. This is especially important since nature is not selective with respect to the distribution of elements in the subsurface, and the hydrologic zones being monitored are neither homogeneous with respect to groundwater flow dynamics or geochemical reactions, or from a spatial perspective. In addition to spatial considerations, temporal variability occurs as a function of variable climatic conditions that control recharge rates and drive the processes controlling the geochemical evolution of groundwater. Given the above, the importance of understanding the spatial and temporal/seasonal effects, in addition to other factors, should be considered prior to the selection of a statistical method.

Since only two years of monitoring have been completed for the Facility, the temporal effects on the data collected may not be readily observed. In the future, should the need arise to de-seasonalize the data, several approaches may be used including, but not limited to, data modeled with a sine or cosine function, moving averages or differences, adjustments of monthly (or quarterly or semi-annual) data with a yearly cycle, or other appropriate approach.

Statistical Methodology

The methods of statistical analysis utilized in the evaluation of groundwater data collected from the facility is one of the methods specified in in paragraphs (f)(1) through (5) of 40 §CFR 257.93. In accordance with this rule, statistical analyses were conducted separately for each constituent in each monitoring well, where appropriate, and conform to the performance standards specified in 40 CFR §257.93(g)(1) through (6). The statistical methods and procedures utilized for each constituent in each well is shown on the statistical report in Appendix B

4.0 DATA REVIEW

As discussed previously, results of investigative activities conducted prior to the effective date of the CCR rules concluded that the groundwater quality in the surrounding area may have been affected by the historic use of the CCR units. Based on the findings of this investigation, BPW initiated an assessment of corrective measures, in substantial conformance with 40 CFR §257.96. Based on this assessment, BPW decided to close the CCR units through removal of CCR and decontamination of the CCR units, in accordance with 40 CFR §257.102. Therefore, given that neither a formal detection monitoring program or assessment of corrective measures, consistent with 40 CFR §257.94 and 97, was performed at the site prior to corrective measures being implemented, Appendix III constituents were also analyzed as part of the monitoring program to satisfy these requirements.

Consistent with the requirements contained in 40 CFR §257.94(e), the results of Appendix III constituents were evaluated to determine whether there is a statistically significant increase over background levels for one or more of the Appendix III constituents at any monitoring well.

The samples were also analyzed for constituents listed in Appendix IV to 40 CFR §257.95 and the data collected was evaluated as part of the assessment monitoring program to verify clean closure as specified in 40 CFR §257.102(c). An evaluation of Appendix III and Appendix IV constituents is presented in the following sections.

4.1 Appendix III Constituents

A review of the analytical data for the Appendix III constituents indicate that boron, calcium, chloride, pH, sulfate and total dissolved solids (TDS) were reported above the laboratory PQL in downgradient monitoring wells MW-1, MW-2, and MW-3. Fluoride was reported as ND in all three downgradient wells, and sulfate in MW-2. To further evaluate the reported concentrations of the remaining Appendix III constituents, NTH completed a statistical analysis of the data reported from each monitoring well to determine whether concentrations reported for these constituents exceed background concentrations.

The statistical analysis method selected was dictated by the characteristics (i.e., size, distribution, number of parameters reported as ND, etc.) of the background dataset. Based on the data distribution of the background dataset, an inter-well parametric tolerance limit method was utilized for each of the constituents analyzed. Note that statistical analyses were not completed for constituents reported in each well as ND; ND values would not result in a statistical exceedance. The data distribution and statistical analysis are provided in Appendix B. The results of the statistical analysis indicate that concentrations of boron and calcium in

monitoring wells MW-1, MW-2, and MW-3; chloride in MW-2; and sulfate in MW-3 were calculated as statistically significant increases over background. A summary of the data evaluation for the Appendix III constituents is presented in the table below.

Appendix III Parameters Reported as Statistically Significant Increases In Downgradient Monitoring Wells

Parameter	*Monitoring Well*	*Maximum Concentration*	*Statistical Limit*	*Statistically Significant Increase*
Boron	MW-1 MW-2 MW-3	**1.5 mg/L** **0.77 mg/L** **0.79 mg/L**	0.60 mg/L	Yes Yes Yes
Calcium	MW-1 MW-2 MW-3	**140 mg/L** **90 mg/L** **360 mg/L**	70 mg/L	Yes Yes Yes
Chloride	MW-1 MW-2 MW-3	300 mg/L **620 mg/L** 200 mg/L	348 mg/L	No Yes No
pH	MW-1 MW-2 MW-3	6.8 - 7.3 S.U. 6.6 - 7.2 S.U. 6.1 - 7.1 S.U.	6.1 S.U. (min) 10.1 S.U. (max)	No No No
Sulfate	MW-1 MW-2 MW-3	39 mg/L ND **1300 mg/L**	57 mg/L	No No Yes

Bold = Concentration is a Statistically Significant Increase (SSI) over background

For a site implementing a detection monitoring program designed consistent with 40 CFR §257.94, a statistically significant increase over background levels for one or more of the constituents listed in Appendix III at any monitoring well requires that the owner or operator

establish an assessment monitoring program meeting the requirements of 40 CFR §257.95. 40 CFR §257.95(b) states that within 90 days of triggering an assessment monitoring program, and annually thereafter, the owner or operator of the CCR unit must sample and analyze the groundwater for all constituents listed in Appendix IV and conduct analyses for all parameters in Appendix III on a semi-annual basis as required in 40 CFR §257.95 (d)(1). As stated previously, groundwater samples were analyzed for both Appendix III and Appendix IV constituents to comply with these requirements.

4.2 Appendix IV Constituents

The groundwater monitoring program was designed to meet the requirements contained in 40 CFR §257.95 and 40 CFR §257.102(c), and Appendix IV constituents were analyzed as part of the assessment monitoring program to verify clean closure of the CCR units.

Pursuant to 40 CFR §257.102(c), closure is achieved when affected areas are decontaminated and groundwater monitoring concentrations do not exceed a groundwater protection standard established pursuant to 40 CFR §257.95(h) for constituents listed in Appendix IV to Part 257. 40 CFR §257.95(h) requires that a groundwater protection standard be established for each Appendix IV constituent detected in the groundwater. For constituents for which the background level is higher than the levels identified in 40 CFR §257.95(h)(1) and (h)(2), the statistically derived background concentration will be the groundwater protection standard. For all other constituents, the groundwater protection standard will be the established MCL as stated in 40 CFR §257.95(h)(1) or the value outlined in 40 CFR §257.95(h)(2).

A review of the analytical data for Appendix IV constituents in downgradient wells MW-1, MW-2 and MW-3 indicate that, in general, the concentrations were reported as non-detect and/or below the reporting limit for each constituent, with the exception of arsenic (As), barium (Ba), and lithium (Li). Evaluation for the other Appendix IV constituents was not necessary as these were reported as ND in the downgradient monitoring wells for each monitoring event. A few isolated instances of concentrations above the laboratory PQL were reported for Radium 226/228; however, these values were all below the MCL.

To further evaluate the reported concentrations of arsenic in MW-1, NTH conducted statistical analyses of the background data collected from PZ-1 to determine whether the background concentrations were higher than the levels identified under 40 CFR §257.95(h)(1), in which case the groundwater protection standard for arsenic is the statistically developed background concentration for that constituent, in accordance with 40 CFR §257.91 The statistical analysis method selected was dictated by the characteristics (i.e., size, distribution, number of parameters reported as ND, etc.) of the background data set, as discussed previously. Based on the data distribution of arsenic in PZ-1, an inter-well tolerance limit method was utilized. The statistically developed background concentration for arsenic, utilizing the data collected from upgradient / background monitoring well PZ-1, was calculated as 0.075 mg/L.

A summary of the groundwater protection standard developed for each Appendix IV constituent detected in groundwater above the laboratory PQL in downgradient monitoring wells is presented in the table below.

Groundwater Protection Standards

Parameter	*Groundwater Protection Standard (GWPS)*	
	MCL	*Statistically Derived Concentration*
Arsenic		0.75 mg/L
Barium	2.0 mg/L	
Lithium	0.04* mg/L	
Radium 226/228	5 pCi/L	

* Limit contained in 40 CFR 257.95(h)(2)(iii)

The concentrations reported for arsenic, barium, lithium, and radium 226/228 in the downgradient wells were compared to their respective groundwater protection standard (GWPS) established in accordance with 40 CFR §257.95(h) as outlined in the table below.

Appendix IV Parameters Reported Above the Detection Limit
In Downgradient Monitoring Wells

Parameter	*Monitoring Well*	*Maximum Concentration*	*Exceedance of GWPS*
Arsenic	MW-1	0.056 mg/L	No
Barium	MW-1	0.34 mg/L	No
	MW-2	0.21 mg/L	No
	MW-3	0.046 mg/L	No
Lithium	MW-1	**0.16 mg/L**	Yes
	MW-2	0.012 mg/L	No
	MW-3	0.032 mg/L	No
Radium 226/228	MW-1	0.78/2.21 pCi/L	No
	MW-2	0.64/1.74 pCi/L	No
	MW-3	0.41/1.38 pCi/L	No

Bold = Exceeds GWPS

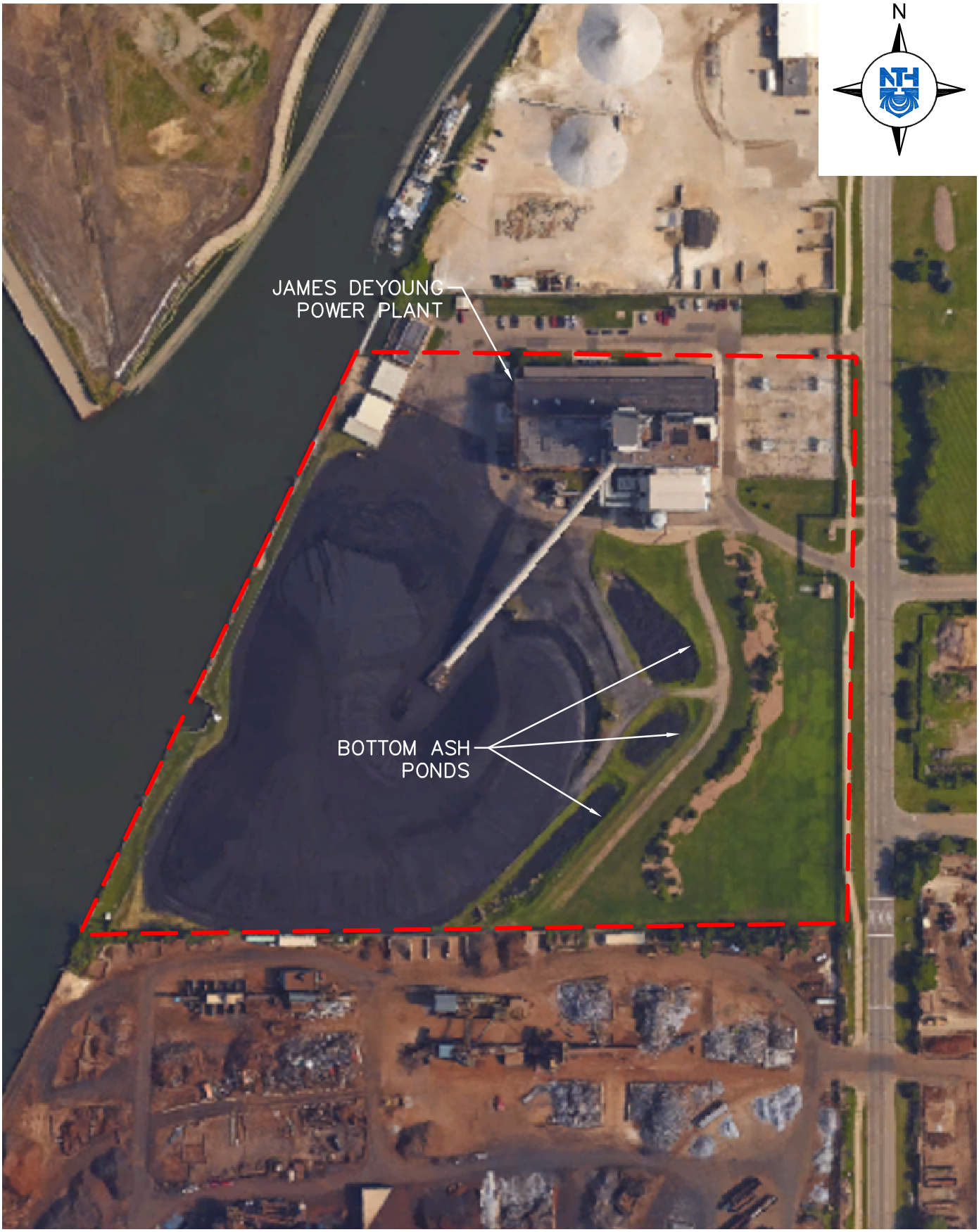
Based on the results of the data evaluation presented above, groundwater monitoring concentrations do not exceed the established groundwater protection standards for constituents listed in Appendix IV of the rules, except for Lithium in monitoring well MW-1.

The GWPS exceedance of Lithium in monitoring well MW-1 is believed to be the result of on-site migration from an adjacent property. Therefore, BPW is proposing to install additional temporary wells in the vicinity of monitoring well MW-1 to evaluate the gradient of lithium concentrations in groundwater at the site, and determine whether groundwater might be impacted by off-site sources. Additionally, BPW is proposing to install a monitoring well between the previous waste boundary and monitoring well MW-3, in the vicinity of the previous ash ponds. Information obtained from this additional groundwater sampling will assist BPW in determining whether additional corrective measures are merited.

Closure will be complete when the concentrations of the Appendix IV constituents are below GWPS for two consecutive sampling events, pursuant to 40 CFR §257.95(h). Once clean closure is achieved, the facility is exempt from further groundwater monitoring and other post-closure requirements as stated in the Preamble to 40 CFR 257 and 40 CFR §257.104(2).

APPENDIX A

FIGURES



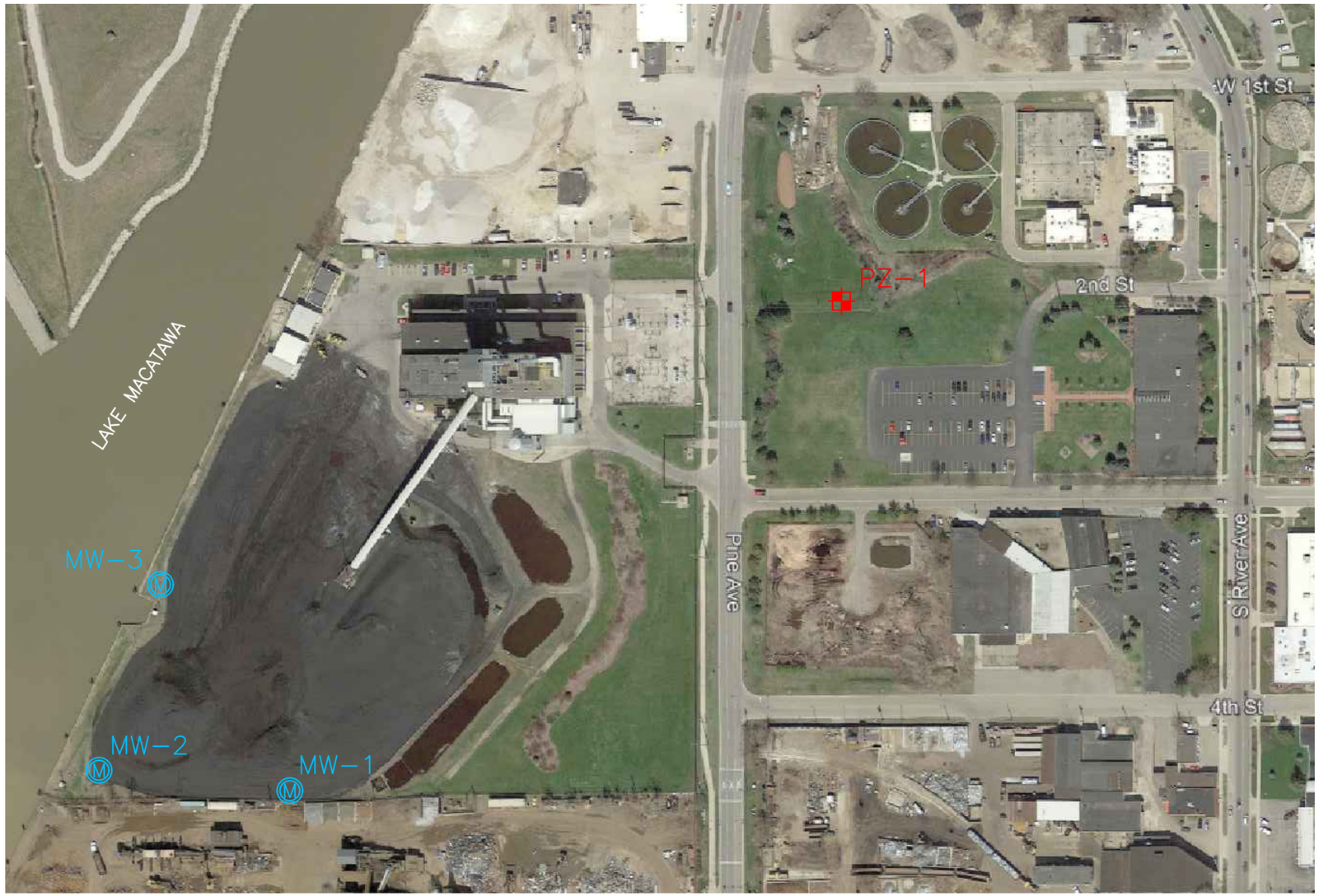
NTH PROJECT No.: 62-160017	CAD FILE NAME: 160017-JDY
DESIGNED BY: SLG	PLOT DATE: 9/28/2016
DRAWN BY: SLG	DRAWING SCALE: 1" = 200'
CHECKED BY: DRL	INCEPTION DATE: 9/7/2016

NTH Consultants, Ltd.
Infrastructure Engineering and Environmental Services

SITE LOCATION PLAN

JAMES DEYOUNG POWER PLANT
HOLLAND, MI

FIGURE: 1



N

0 100' 200'

SCALE

LEGEND

MW-1 — MONITORING WELL LOCATION

PZ-1 — EXISTING PIEZOMETER (UPGRADIENT MONITORING WELL)

NOTE: LOCATIONS AND DIMENSIONS ARE APPROXIMATE. NOT A LEGAL SURVEY.

NTH Consultants, Ltd.
Infrastructure Engineering and Environmental Services

NTH PROJECT No.: 73-160017	CAD FILE NAME: 160017-MWLM
DESIGNED BY: KWO	PLOT DATE: 1/23/2018
DRAWN BY: CRD	DRAWING SCALE: 1" = 200'
CHECKED BY: KWO	INCEPTION DATE: 10/13/2017

MONITORING WELL LOCATION MAP

JAMES DEYOUNG POWER PLANT
HOLLAND, MICHIGAN

FIGURE: 2

j:\2016\73\160017\reports\holland\160017-mwlm.dwg Plotted: 1/29/2019 9:50 AM by cdaniot

APPENDIX B

STATISTICAL ANALYSIS

APPENDIX B-1

Appendix III Constituents

Basic Statistics

Parameter: Boron

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements	31
Total Non-Detects	0 (0%)
Pooled Mean	0.740645
Pooled Std Dev	0.338065
Compliance Meas.	23
Compliance Mean	0.885217
Compliance Std Dev	0.26223
Background Meas.	8
Background Mean	0.325
Background Std Dev	0.087014

Background Locations

There is 1 background location

Location	Meas.	Non-Detects	% ND	Total
PZ-1	8	0	0	2.6

Location	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
PZ-1	0.325	0.087014	0	36	4.5

Compliance Locations

There are 3 compliance location

Location	Obs.	Non-Detects	% ND	Total
MW-1	8	0	0	9.6
MW-2	8	0	0	5.505
MW-3	7	0	0	5.255

Location	Mean	Std Dev	Dif From Bkg	Std Err	Rank Sum	Rank Mean
MW-1	1.2	0.187083	0.875	0.0557539	220	27.5
MW-2	0.688125	0.0564382	0.363125	0.0557539	109	13.625
MW-3	0.750714	0.0506975	0.425714	0.0577108	131	18.7143

Analysis of Variance Statistics

SS Wells	3.09292
SS Total	3.42864

Kruskal-Wallis Statistics

Non-Detect Rank	0
Background Rank Sum	36
Background Rank Mean	4.5
H Statistic	26.7665
H Adjusted for Ties	26.7665

Basic Statistics

Parameter: Calcium

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements	31
Total Non-Detects	0 (0%)
Pooled Mean	137.984
Pooled Std Dev	116.572
Compliance Meas.	23
Compliance Mean	171.5
Compliance Std Dev	118.127
Background Meas.	8
Background Mean	41.625
Background Std Dev	9.00694

Background Locations

There is 1 background location

Location	Meas.	Non-Detects	% ND	Total
PZ-1	8	0	0	333

Location	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
PZ-1	41.625	9.00694	0	38	4.75

Compliance Locations

There are 3 compliance location

Location	Obs.	Non-Detects	% ND	Total
MW-1	8	0	0	920
MW-2	8	0	0	624.5
MW-3	7	0	0	2400

Location	Mean	Std Dev	Dif From Bkg	Std Err	Rank Sum	Rank Mean
MW-1	115	14.842	73.375	7.8339	164	20.5
MW-2	78.0625	12.9572	36.4375	7.8339	98	12.25
MW-3	342.857	23.6039	301.232	8.10885	196	28

Analysis of Variance Statistics

SS Wells	401042
SS Total	407670

Kruskal-Wallis Statistics

Non-Detect Rank	0
Background Rank Sum	38
Background Rank Mean	4.75
H Statistic	27.7621
H Adjusted for Ties	27.7621

Basic Statistics

Parameter: Chloride

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements	31
Total Non-Detects	5 (16.129%)
Pooled Mean	312.065
Pooled Std Dev	258.156
Compliance Meas.	23
Compliance Mean	378.304
Compliance Std Dev	267.389
Background Meas.	8
Background Mean	121.625
Background Std Dev	71.0612

Background Locations

There is 1 background location

Location	Meas.	Non-Detects	% ND	Total
PZ-1	8	2	25	973

Location	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
PZ-1	121.625	71.0612	0	79	9.875

Compliance Locations

There are 3 compliance location

Location	Obs.	Non-Detects	% ND	Total
MW-1	8	1	12.5	1770
MW-2	8	0	0	4071
MW-3	7	2	28.5714	2860

Location	Mean	Std Dev	Dif From Bkg	Std Err	Rank Sum	Rank Mean
MW-1	221.25	44.5413	99.625	108.361	134	16.75
MW-2	508.875	184.403	387.25	108.361	204	25.5
MW-3	408.571	404.328	286.946	112.164	79	11.2857

Analysis of Variance Statistics

SS Wells	731186
SS Total	1.99934e+006

Kruskal-Wallis Statistics

Non-Detect Rank	3
Background Rank Sum	79
Background Rank Mean	9.875
H Statistic	14.3008
H Adjusted for Ties	14.3587

Basic Statistics

Parameter: pH (field)

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements	31
Total Non-Detects	0 (0%)
Pooled Mean	7.21081
Pooled Std Dev	0.661937
Compliance Meas.	23
Compliance Mean	6.89674
Compliance Std Dev	0.326419
Background Meas.	8
Background Mean	8.11375
Background Std Dev	0.535802

Background Locations

There is 1 background location

Location	Meas.	Non-Detects	% ND	Total
PZ-1	8	0	0	64.91

Location	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
PZ-1	8.11375	0.535802	0	205	25.625

Compliance Locations

There are 3 compliance location

Location	Obs.	Non-Detects	% ND	Total
MW-1	8	0	0	56.395
MW-2	8	0	0	56.5
MW-3	7	0	0	45.73

Location	Mean	Std Dev	Dif From Bkg	Std Err	Rank Sum	Rank Mean
MW-1	7.04937	0.166099	-1.06438	0.167238	118	14.75
MW-2	7.0625	0.182032	-1.05125	0.167238	133	16.625
MW-3	6.53286	0.312501	-1.58089	0.173108	40	5.71429

Analysis of Variance Statistics

SS Wells	10.1242
SS Total	13.1448

Kruskal-Wallis Statistics

Non-Detect Rank	0
Background Rank Sum	205
Background Rank Mean	25.625
H Statistic	18.1128
H Adjusted for Ties	18.1128

Basic Statistics

Parameter: Sulfate

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements	31
Total Non-Detects	11 (35.4839%)
Pooled Mean	280.903
Pooled Std Dev	474.585
Compliance Meas.	23
Compliance Mean	372.5
Compliance Std Dev	522.585
Background Meas.	8
Background Mean	17.5625
Background Std Dev	12.4083

Background Locations

There is 1 background location

Location	Meas.	Non-Detects	% ND	Total
PZ-1	8	0	0	140.5

Location	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
PZ-1	17.5625	12.4083	0	133	16.625

Compliance Locations

There are 3 compliance location

Location	Obs.	Non-Detects	% ND	Total
MW-1	8	3	37.5	501.5
MW-2	8	8	100	126
MW-3	7	0	0	7940

Location	Mean	Std Dev	Dif From Bkg	Std Err	Rank Sum	Rank Mean
MW-1	62.6875	76.4727	45.125	38.6002	119	14.875
MW-2	15.75	21.1508	-1.8125	38.6002	48	6
MW-3	1134.29	138.907	1116.72	39.955	196	28

Analysis of Variance Statistics

SS Wells	6.59601e+006
SS Total	6.75693e+006

Kruskal-Wallis Statistics

Non-Detect Rank	6
Background Rank Sum	133
Background Rank Mean	16.625
H Statistic	22.0313
H Adjusted for Ties	23.0538

Basic Statistics

Parameter: Total Dissolved Solids

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements	31
Total Non-Detects	0 (0%)
Pooled Mean	1324.84
Pooled Std Dev	510.383
Compliance Meas.	23
Compliance Mean	1361.74
Compliance Std Dev	555.701
Background Meas.	8
Background Mean	1218.75
Background Std Dev	358.506

Background Locations

There is 1 background location

Location	Meas.	Non-Detects	% ND	Total
PZ-1	8	0	0	9750

Location	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
PZ-1	1218.75	358.506	0	122	15.25

Compliance Locations

There are 3 compliance location

Location	Obs.	Non-Detects	% ND	Total
MW-1	8	0	0	7090
MW-2	8	0	0	9780
MW-3	7	0	0	14450

Location	Mean	Std Dev	Dif From Bkg	Std Err	Rank Sum	Rank Mean
MW-1	886.25	183.201	-332.5	145.123	52	6.5
MW-2	1222.5	231.871	3.75	145.123	131	16.375
MW-3	2064.29	356.738	845.536	150.216	191	27.2857

Analysis of Variance Statistics

SS Wells	5.54018e+006
SS Total	7.81472e+006

Kruskal-Wallis Statistics

Non-Detect Rank	0
Background Rank Sum	122
Background Rank Mean	15.25
H Statistic	19.5871
H Adjusted for Ties	19.5871

Shapiro-Wilks Test of Normality

Parameter: Boron

Location: PZ-1

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 4 for 8 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	0.23	0.47	0.24	0.6052	0.145248
2	0.24	0.41	0.17	0.3164	0.053788
3	0.26	0.38	0.12	0.1743	0.020916
4	0.29	0.32	0.03	0.0561	0.001683
5	0.32	0.29	-0.03		
6	0.38	0.26	-0.12		
7	0.41	0.24	-0.17		
8	0.47	0.23	-0.24		

Sum of b values = 0.221635
Sample Standard Deviation = 0.087014
W Statistic = 0.926832

5% Critical value of 0.818 is less than 0.926832
Data is normally distributed at 95% level of significance

1% Critical value of 0.749 is less than 0.926832
Data is normally distributed at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Calcium

Location: PZ-1

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 4 for 8 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	28	53	25	0.6052	15.13
2	33	53	20	0.3164	6.328
3	38	45	7	0.1743	1.2201
4	38	45	7	0.0561	0.3927
5	45	38	-7		
6	45	38	-7		
7	53	33	-20		
8	53	28	-25		

Sum of b values = 23.0708
Sample Standard Deviation = 9.00694
W Statistic = 0.937287

5% Critical value of 0.818 is less than 0.937287
Data is normally distributed at 95% level of significance

1% Critical value of 0.749 is less than 0.937287
Data is normally distributed at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Chloride

Location: PZ-1

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 4 for 8 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	33	230	197	0.6052	119.224
2	40	210	170	0.3164	53.788
3	100	140	40	0.1743	6.972
4	100	120	20	0.0561	1.122
5	120	100	-20		
6	140	100	-40		
7	210	40	-170		
8	230	33	-197		

Sum of b values = 181.106
Sample Standard Deviation = 71.0612
W Statistic = 0.927907

5% Critical value of 0.818 is less than 0.927907
Data is normally distributed at 95% level of significance

1% Critical value of 0.749 is less than 0.927907
Data is normally distributed at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: pH (field)

Location: PZ-1

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 4 for 8 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	6.89	8.67	1.78	0.6052	1.07726
2	8.08	8.43	0.35	0.3164	0.11074
3	8.1	8.42	0.32	0.1743	0.055776
4	8.12	8.2	0.08	0.0561	0.004488
5	8.2	8.12	-0.08		
6	8.42	8.1	-0.32		
7	8.43	8.08	-0.35		
8	8.67	6.89	-1.78		

Sum of b values = 1.24826
Sample Standard Deviation = 0.535802
W Statistic = 0.77536

5% Critical value of 0.818 exceeds 0.77536
Evidence of non-normality at 95% level of significance

1% Critical value of 0.749 is less than 0.77536
Data is normally distributed at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Sulfate

Location: PZ-1

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 4 for 8 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	4.4	37	32.6	0.6052	19.7295
2	5.8	29	23.2	0.3164	7.34048
3	7.3	28	20.7	0.1743	3.60801
4	11	18	7	0.0561	0.3927
5	18	11	-7		
6	28	7.3	-20.7		
7	29	5.8	-23.2		
8	37	4.4	-32.6		

Sum of b values = 31.0707
Sample Standard Deviation = 12.4083
W Statistic = 0.895738

5% Critical value of 0.818 is less than 0.895738
Data is normally distributed at 95% level of significance

1% Critical value of 0.749 is less than 0.895738
Data is normally distributed at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Total Dissolved Solids

Location: PZ-1

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

K = 4 for 8 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	550	1700	1150	0.6052	695.98
2	1000	1500	500	0.3164	158.2
3	1100	1500	400	0.1743	69.72
4	1200	1200	0	0.0561	0
5	1200	1200	0		
6	1500	1100	-400		
7	1500	1000	-500		
8	1700	550	-1150		

Sum of b values = 923.9
Sample Standard Deviation = 358.506
W Statistic = 0.948764

5% Critical value of 0.818 is less than 0.948764
Data is normally distributed at 95% level of significance

1% Critical value of 0.749 is less than 0.948764
Data is normally distributed at 99% level of significance

Parametric Tolerance Interval Analysis

Parameter: Boron

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 8
Background mean = 0.325
Background standard deviation = 0.087014
One-sided normal tolerance factor (K) at 95% confidence = 3.188
Upper tolerance limit = 0.6024

Location	Date	Value	Significant
MW-1	1/10/2018 ~	1.1	TRUE
	4/3/2018 ~	0.95	TRUE
	7/10/2018	1.2	TRUE
	10/2/2018 ~	1.5	TRUE
	1/17/2019	1.1	TRUE
	9/16/2019 ~	1.45	TRUE
	12/18/2019	1.2	TRUE
	3/6/2020	1.1	TRUE
MW-2	1/10/2018	0.69	TRUE
	4/3/2018	0.6	FALSE
	7/10/2018 ~	0.67	TRUE
	10/2/2018	0.77	TRUE
	1/17/2019 ~	0.645	TRUE
	9/16/2019	0.75	TRUE
	12/18/2019	0.72	TRUE
	3/6/2020 ~	0.66	TRUE
MW-3	1/10/2018	0.79	TRUE
	4/3/2018	0.7	TRUE
	7/10/2018	0.66	TRUE
	10/2/2018	0.76	TRUE
	1/17/2019	0.79	TRUE
	12/18/2019 ~	0.775	TRUE
	3/6/2020	0.78	TRUE

Parametric Tolerance Interval Analysis

Parameter: Calcium

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 8
Background mean = 41.625
Background standard deviation = 9.00694
One-sided normal tolerance factor (K) at 95% confidence = 3.188
Upper tolerance limit = 70.3391

Location	Date	Value	Significant
MW-1	1/10/2018 ~	135	TRUE
	4/3/2018 ~	130	TRUE
	7/10/2018	96	TRUE
	10/2/2018 ~	99	TRUE
	1/17/2019	110	TRUE
	9/16/2019 ~	110	TRUE
	12/18/2019	110	TRUE
	3/6/2020	130	TRUE
MW-2	1/10/2018	81	TRUE
	4/3/2018	90	TRUE
	7/10/2018 ~	80	TRUE
	10/2/2018	82	TRUE
	1/17/2019 ~	80	TRUE
	9/16/2019	47	FALSE
	12/18/2019	83	TRUE
	3/6/2020 ~	81.5	TRUE
MW-3	1/10/2018	320	TRUE
	4/3/2018	360	TRUE
	7/10/2018	300	TRUE
	10/2/2018	350	TRUE
	1/17/2019	360	TRUE
	12/18/2019 ~	350	TRUE
	3/6/2020	360	TRUE

Parametric Tolerance Interval Analysis

Parameter: Chloride

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 8
Background mean = 121.625
Background standard deviation = 71.0612
One-sided normal tolerance factor (K) at 95% confidence = 3.188
Upper tolerance limit = 348.168

Location	Date	Value	Significant
MW-1	1/10/2018 ~	290	FALSE
	4/3/2018 ~	ND<250	FALSE
	7/10/2018	180	FALSE
	10/2/2018 ~	170	FALSE
	1/17/2019	240	FALSE
	9/16/2019 ~	180	FALSE
	12/18/2019	200	FALSE
	3/6/2020	260	FALSE
MW-2	1/10/2018	56	FALSE
	4/3/2018	**570**	**TRUE**
	7/10/2018 ~	**550**	**TRUE**
	10/2/2018	**620**	**TRUE**
	1/17/2019 ~	**550**	**TRUE**
	9/16/2019	**560**	**TRUE**
	12/18/2019	**580**	**TRUE**
	3/6/2020 ~	**585**	**TRUE**
MW-3	**1/10/2018**	**ND<1000**	**TRUE**
	4/3/2018	**ND<1000**	**TRUE**
	7/10/2018	180	FALSE
	10/2/2018	200	FALSE
	1/17/2019	170	FALSE
	12/18/2019 ~	150	FALSE
	3/6/2020	160	FALSE

Parametric Tolerance Interval Analysis

Parameter: pH (field)

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

USEPA 1989 Guidance Tolerance Limit Formula (Two-Tailed)

Background observations = 8
Background mean = 8.11375
Background standard deviation = 0.535802
Two-sided normal tolerance factor (K) at 95% confidence = 3.732
Upper tolerance limit = 10.1134
Lower tolerance limit = 6.11414

Location	Date	Value	Significant
MW-1	1/10/2018 ~	6.83	FALSE
	4/3/2018 ~	6.89	FALSE
	7/10/2018	7.33	FALSE
	10/2/2018 ~	7.06	FALSE
	1/17/2019	6.99	FALSE
	9/16/2019 ~	6.975	FALSE
	12/18/2019	7.1	FALSE
	3/6/2020	7.22	FALSE
MW-2	1/10/2018	6.98	FALSE
	4/3/2018	7.17	FALSE
	7/10/2018 ~	6.65	FALSE
	10/2/2018	7.1	FALSE
	1/17/2019 ~	7.08	FALSE
	9/16/2019	7.15	FALSE
	12/18/2019	7.14	FALSE
	3/6/2020 ~	7.23	FALSE
MW-3	1/10/2018	6.14	FALSE
	4/3/2018	6.45	FALSE
	7/10/2018	7.12	FALSE
	10/2/2018	6.5	FALSE
	1/17/2019	6.3	FALSE
	12/18/2019 ~	6.69	FALSE
	3/6/2020	6.53	FALSE

Parametric Tolerance Interval Analysis

Parameter: Sulfate

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 8
Background mean = 17.5625
Background standard deviation = 12.4083
One-sided normal tolerance factor (K) at 95% confidence = 3.188
Upper tolerance limit = 57.1201

Location	Date	Value	Significant
MW-1	**1/10/2018 ~**	**ND<250**	**TRUE**
	4/3/2018 ~	ND<50	FALSE
	7/10/2018	ND<50	FALSE
	10/2/2018 ~	27.5	FALSE
	1/17/2019	39	FALSE
	9/16/2019 ~	39	FALSE
	12/18/2019	26	FALSE
	3/6/2020	20	FALSE
MW-2	1/10/2018	ND<50	FALSE
	4/3/2018	ND<50	FALSE
	7/10/2018 ~	ND<6	FALSE
	10/2/2018	ND<4	FALSE
	1/17/2019 ~	ND<4	FALSE
	9/16/2019	ND<4	FALSE
	12/18/2019	ND<4	FALSE
	3/6/2020 ~	ND<4	FALSE
MW-3	**1/10/2018**	**1200**	**TRUE**
	4/3/2018	**1300**	**TRUE**
	7/10/2018	**980**	**TRUE**
	10/2/2018	**1100**	**TRUE**
	1/17/2019	**1300**	**TRUE**
	12/18/2019 ~	**960**	**TRUE**
	3/6/2020	**1100**	**TRUE**

Parametric Tolerance Interval Analysis

Parameter: Total Dissolved Solids

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 8
Background mean = 1218.75
Background standard deviation = 358.506
One-sided normal tolerance factor (K) at 95% confidence = 3.188
Upper tolerance limit = 2361.67

Location	Date	Value	Significant
MW-1	1/10/2018 ~	1040	FALSE
	4/3/2018 ~	480	FALSE
	7/10/2018	880	FALSE
	10/2/2018 ~	805	FALSE
	1/17/2019	960	FALSE
	9/16/2019 ~	1045	FALSE
	12/18/2019	900	FALSE
	3/6/2020	980	FALSE
MW-2	1/10/2018	1300	FALSE
	4/3/2018	680	FALSE
	7/10/2018 ~	1400	FALSE
	10/2/2018	1300	FALSE
	1/17/2019 ~	1200	FALSE
	9/16/2019	1400	FALSE
	12/18/2019	1300	FALSE
	3/6/2020 ~	1200	FALSE
MW-3	1/10/2018	2300	FALSE
	4/3/2018	1300	FALSE
	7/10/2018	2200	FALSE
	10/2/2018	2300	FALSE
	1/17/2019	2200	FALSE
	12/18/2019 ~	1950	FALSE
	3/6/2020	2200	FALSE

APPENDIX B-2

Appendix IV Constituent - GWPS

Basic Statistics

Parameter: Arsenic

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

Total Measurements	31
Total Non-Detects	15 (48.3871%)
Pooled Mean	0.0185484
Pooled Std Dev	0.0177775
Compliance Meas.	23
Compliance Mean	0.0114783
Compliance Std Dev	0.0137067
Background Meas.	8
Background Mean	0.038875
Background Std Dev	0.011294

Background Locations

There is 1 background location

Location	Meas.	Non-Detects	% ND	Total
PZ-1	8	0	0	0.311

Location	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
PZ-1	0.038875	0.011294	0	203	25.375

Compliance Locations

There are 3 compliance location

Location	Obs.	Non-Detects	% ND	Total
MW-1	8	0	0	0.2265
MW-2	8	8	100	0.02
MW-3	7	7	100	0.0175

Location	Mean	Std Dev	Dif From Bkg	Std Err	Rank Sum	Rank Mean
MW-1	0.0283125	0.00968776	-0.0105625	0.00378819	173	21.625
MW-2	0.0025	0	-0.036375	0.00378819	64	8
MW-3	0.0025	0	-0.036375	0.00392115	56	8

Analysis of Variance Statistics

SS Wells	0.00793133
SS Total	0.00948118

Kruskal-Wallis Statistics

Non-Detect Rank	8
Background Rank Sum	203
Background Rank Mean	25.375
H Statistic	23.1804
H Adjusted for Ties	26.1307

Shapiro-Wilks Test of Normality

Parameter: Arsenic

Location: PZ-1

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

K = 4 for 8 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	0.02	0.056	0.036	0.6052	0.0217872
2	0.031	0.048	0.017	0.3164	0.0053788
3	0.032	0.045	0.013	0.1743	0.0022659
4	0.037	0.042	0.005	0.0561	0.0002805
5	0.042	0.037	-0.005		
6	0.045	0.032	-0.013		
7	0.048	0.031	-0.017		
8	0.056	0.02	-0.036		

Sum of b values = 0.0297124
Sample Standard Deviation = 0.011294
W Statistic = 0.988746

5% Critical value of 0.818 is less than 0.988746
Data is normally distributed at 95% level of significance

1% Critical value of 0.749 is less than 0.988746
Data is normally distributed at 99% level of significance

Parametric Tolerance Interval Analysis

Parameter: Arsenic

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 8
Background mean = 0.038875
Background standard deviation = 0.011294
One-sided normal tolerance factor (K) at 95% confidence = 3.188
Upper tolerance limit = 0.0748801

Location	Date	Value	Significant
MW-1	1/10/2018 ~	0.0225	FALSE
	4/3/2018 ~	0.021	FALSE
	7/10/2018	0.031	FALSE
	10/2/2018 ~	0.0465	FALSE
	1/17/2019	0.021	FALSE
	9/16/2019 ~	0.0385	FALSE
	12/18/2019	0.026	FALSE
	3/6/2020	0.02	FALSE
MW-2	1/10/2018	ND<0.0025	FALSE
	4/3/2018	ND<0.0025	FALSE
	7/10/2018 ~	ND<0.0025	FALSE
	10/2/2018	ND<0.0025	FALSE
	1/17/2019 ~	ND<0.0025	FALSE
	9/16/2019	ND<0.0025	FALSE
	12/18/2019	ND<0.0025	FALSE
	3/6/2020 ~	ND<0.0025	FALSE
MW-3	1/10/2018	ND<0.0025	FALSE
	4/3/2018	ND<0.0025	FALSE
	7/10/2018	ND<0.0025	FALSE
	10/2/2018	ND<0.0025	FALSE
	1/17/2019	ND<0.0025	FALSE
	12/18/2019 ~	ND<0.0025	FALSE
	3/6/2020	ND<0.0025	FALSE