# 2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

# BOTTOM ASH IMPOUNDMENT
# LA CYGNE GENERATING STATION
# LA CYGNE, KANSAS

Presented To:
Evergy Metro, Inc. (f/k/a Kansas City Power & Light Co.)

SCS ENGINEERS

27217233.19 | January 2020, Revised December 16, 2022

8575 W 110th Street, Suite 100
Overland Park, Kansas 66210
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# CERTIFICATIONS

I, John R. Rockhold, being a qualified groundwater scientist and Professional Geologist in the State of Kansas, do hereby certify that the 2019 Annual Groundwater Monitoring and Corrective Action Report for the Bottom Ash Impoundment at the La Cygne Generating Station was prepared by me or under my direct supervision and fulfills the requirements of 40 CFR 257.90(e).

JOHN R. ROCKHOLD
29
12-16-22

John R. Rockhold, P.G.

SCS Engineers

I, Douglas L. Doerr, being a qualified licensed Professional Engineer in the State of Kansas, do hereby certify that the 2019 Annual Groundwater Monitoring and Corrective Action Report for the Bottom Ash Impoundment at the La Cygne Generating Station was prepared by me or under my direct supervision and fulfills the requirements of 40 CFR 257.90(e).

DOUGLAS L. DOERR
14136
12-16-22

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SCS Engineers

| Revision Number | Revision Date | Revision Section | Summary of Revisions |
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## Appendices

# 1 INTRODUCTION

This 2019 Annual Groundwater Monitoring and Corrective Action Report was prepared to support compliance with the groundwater monitoring requirements of the "Coal Combustion Residuals (CCR) Final Rule" (Rule) published by the United States Environmental Protection Agency (USEPA) in the *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule*, dated April 17, 2015 (USEPA, 2015). Specifically, this report was prepared for Evergy Metro, Inc. (f/k/a Kansas City Power & Light Company) to fulfill the requirements of 40 CFR 257.90 (e). The applicable sections of the Rule are provided below in *italics*, followed by applicable information relative to the 2019 Annual Groundwater Monitoring and Corrective Action Report for the Bottom Ash Impoundment at the La Cygne Generating Station.

# 2 § 257.90(E) ANNUAL REPORT REQUIREMENTS

***Annual groundwater monitoring and corrective action report.*** *For existing CCR landfills and existing CCR surface impoundments, no later than January 31, 2018, and annually thereafter, the owner or operator must prepare an annual groundwater monitoring and corrective action report. For new CCR landfills, new CCR surface impoundments, and all lateral expansions of CCR units, the owner or operator must prepare the initial annual groundwater monitoring and corrective action report no later than January 31 of the year following the calendar year a groundwater monitoring system has been established for such CCR unit as required by this subpart, and annually thereafter. For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year. For purposes of this section, the owner or operator has prepared the annual report when the report is placed in the facility's operating record as required by § 257.105(h)(1). At a minimum, the annual groundwater monitoring and corrective action report must contain the following information, to the extent available:*

## 2.1 § 257.90(E)(1) SITE MAP

*A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit;*

> A site map with an aerial image showing the Bottom Ash Impoundment and all background (or upgradient) and downgradient monitoring wells with identification numbers for the Bottom Ash Impoundment groundwater monitoring program is provided as **Figure 1** in **Appendix A.**

## 2.2 § 257.90(E)(2) MONITORING SYSTEM CHANGES

*Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken;*

> No new monitoring wells were installed and no wells were decommissioned as part of the CCR groundwater monitoring program for the Bottom Ash Impoundment in 2019.

## 2.3 § 257.90(E)(3) SUMMARY OF SAMPLING EVENTS

*In addition to all the monitoring data obtained under §§ 257.90 through 257.98, a summary including the number of groundwater samples that were collected for analysis for each background and* *downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs;*

Only detection monitoring was conducted during the reporting period (2019). Samples collected in 2019 were collected and analyzed for Appendix III detection monitoring constituents as indicated in **Appendix B**, **Table 1** (Appendix III Detection Monitoring Results), and **Table 2** (Detection Monitoring Field Measurements). The dates of sample collection, the monitoring program requiring the sample, and the results of the analyses are also provided in these tables. These tables include Fall 2018 semiannual detection monitoring event verification data taken in 2019; Spring 2019 semiannual detection monitoring data; and the initial Fall 2019 semiannual detection monitoring data.

## 2.4 § 257.90(E)(4) MONITORING TRANSITION NARRATIVE

*A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels); and*

There was no transition between monitoring programs in 2019. Only detection monitoring was conducted in 2019.

## 2.5 § 257.90(e)(5) OTHER REQUIREMENTS

*Other information required to be included in the annual report as specified in §§ 257.90 through 257.98.*

A summary of potentially required information and the corresponding section of the Rule is provided in the following sections. In addition, the information, if applicable, is provided.

### 2.5.1 § 257.90(e) Program Status

*Status of Groundwater Monitoring and Corrective Action Program.*

The groundwater monitoring and corrective action program is in detection monitoring.

*Summary of Key Actions Completed.*

a. completion of the Fall 2018 verification sampling and analyses per the certified statistical method,

b. completion of the statistical evaluation of the Fall 2018 semiannual detection monitoring sampling and analysis event per the certified statistical method,

c. completion of the 2018 Annual Groundwater Monitoring and Corrective Action Report,

d. completion of a successful alternative source demonstration for the Fall 2018 semiannual sampling and analysis detection monitoring event,

e. completion of the Spring 2019 semiannual detection monitoring sampling and analysis event, and subsequent verification sampling per the certified statistical method,

f. completion of the statistical evaluation of the Spring 2019 semiannual detection monitoring sampling and analysis event per the certified statistical method,

g. completion of a successful alternative source demonstration for the Spring 2019 semiannual detection monitoring sampling and analysis event, and

h. initiation of the Fall 2019 semiannual detection monitoring sampling and analysis event.

*Description of Any Problems Encountered.*

No noteworthy problems were encountered.

*Discussion of Actions to Resolve the Problems.*

Not applicable because no noteworthy problems were encountered.

*Projection of Key Activities for the Upcoming Year (2020).*

Completion of verification sampling and data analysis, and the statistical evaluation of Fall 2019 detection monitoring sampling and analysis event. Semiannual Spring and Fall 2020 groundwater sampling and analysis. Completion of the statistical evaluation of the Spring 2020 detection monitoring sampling and analysis event, and, if required, alternative source demonstration(s).

### 2.5.2 § 257.94(d)(3) Demonstration for Alternative Detection Monitoring Frequency

*The owner or operator must obtain a certification from a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority stating that the demonstration for an alternative groundwater sampling and analysis frequency meets the requirements of this section. The owner or operator must include the demonstration providing the basis for the alternative monitoring frequency and the certification by a qualified professional engineer or the approval from the Participating State Director or approval from EPA where EPA is the permitting authority in the annual groundwater monitoring and corrective action report required by § 257.90(e).*

Not applicable because no alternative monitoring frequency for detection monitoring and certification was pursued.

### 2.5.3 § 257.94(e)(2) Detection Monitoring Alternate Source Demonstration

*Demonstration that a source other than the CCR unit caused the statistically significant increase (SSI) over background levels for a constituent or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. In addition, certification of the demonstration is to be included in the annual report.*

The following demonstration reports are included as **Appendix C.**

C.1 CCR Groundwater Monitoring Alternative Source Demonstration Report November 2018 Groundwater Monitoring Event, Bottom Ash Impoundment, La Cygne Generating Station (June 2019)

C.2 CCR Groundwater Monitoring Alternative Source Demonstration Report May 2019 Groundwater Monitoring Event, Bottom Ash Impoundment, La Cygne Generating Station (December 2019).

### 2.5.4 § 257.95(c)(3) Demonstration for Alternative Assessment Monitoring Frequency

*The owner or operator must obtain a certification from a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority stating that the demonstration for an alternative groundwater sampling and analysis frequency meets the requirements of this section. The owner or operator must include the demonstration providing the basis for the alternative monitoring frequency and the certification by a qualified professional engineer or the approval from the Participating State Director or the approval from EPA where EPA is the permitting authority in the annual groundwater monitoring and corrective action report required by § 257.90(e).*

Not applicable because there was no assessment monitoring conducted.

### 2.5.5 § 257.95(d)(3) Assessment Monitoring Concentrations and Groundwater Protection Standards

*Include the concentrations of Appendix III and detected Appendix IV constituents from the assessment monitoring, the established background concentrations, and the established groundwater protection standards.*

Not applicable because there was no assessment monitoring conducted.

### 2.5.6 § 257.95(g)(3)(ii) Assessment Monitoring Alternate Source Demonstration

*Demonstrate that a source other than the CCR unit caused the contamination, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Any such demonstration must be supported by a report that includes the factual or evidentiary basis for any conclusions and must be certified to be accurate by a qualified professional engineer. If a successful demonstration is made, the owner or operator must continue monitoring in accordance with the assessment monitoring program pursuant to this section, and may return to detection monitoring if the constituents in appendices III and IV to this part are at or below background as specified in paragraph (e) of this section. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer or the approval from the Participating State Director or approval from EPA where EPA is the permitting authority.*

Not applicable because there was no assessment monitoring conducted.

### 2.5.7 § 257.96(a) Demonstration for Additional Time for Assessment of Corrective Measures

*Within 90 days of finding that any constituent listed in appendix IV to this part has been detected at a statistically significant level exceeding the groundwater protection standard defined under § 257.95(h), or immediately upon detection of a release from a CCR unit, the owner or operator must initiate an assessment of corrective measures to prevent further releases, to remediate any releases and to restore affected area to original conditions. The assessment of corrective measures must be completed within 90 days, unless the owner or operator demonstrates the need for additional time to complete the assessment of corrective measures due to site-specific conditions or circumstances. The owner or operator must obtain a certification from a qualified professional engineer attesting that the demonstration is accurate. The 90-day deadline to complete the assessment of corrective measures may be extended for no longer than 60 days. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer or the approval from the Participating State Director or approval from EPA where EPA is the permitting authority.*

Not applicable because there was no assessment monitoring conducted.

# 3 GENERAL COMMENTS

This report has been prepared and reviewed under the direction of a qualified groundwater scientist and qualified professional engineer. The information contained in this report is a reflection of the conditions encountered at the La Cygne Generating Station at the time of fieldwork. This report includes a review and compilation of the required information and does not reflect any variations of the subsurface, which may occur between sampling locations. Actual subsurface conditions may vary and the extent of such variations may not become evident without further investigation.

Conclusions drawn by others from the result of this work should recognize the limitation of the methods used. Please note that SCS Engineers does not warrant the work of regulatory agencies or other third parties supplying information used in the assimilation of this report. This report is prepared in accordance with generally accepted environmental engineering and geological practices, within the constraints of the client's directives. It is intended for the exclusive use of Evergy Metro, Inc. for specific application to the La Cygne Generating Station Bottom Ash Impoundment. No warranties, express or implied, are intended or made.

# APPENDIX A

# FIGURES

## Figure 1: Site Map

LEGEND

| | |
|---|---|
| ▭ | CCR UNIT BOUNDARY (APPROXIMATE LIMITS OF BOTTOM ASH IMPOUNDMENT) |
| ● MW–901 | CCR GROUNDWATER MONITORING SYSTEM WELLS |

NOTES:

1. KDHE FACILITY PERMIT AREA BOUNDARY NOT SHOWN.
2. GOOGLE EARTH IMAGE DATED OCTOBER 2014. BOUNDARY AND MONITOR WELL LOCATIONS ARE APPROXIMATE.
3. BOUNDARY AND MONITOR WELL LOCATIONS ARE PROVIDED BY AECOM.

100 0 100 200

SCALE FEET

| REV. | DATE | CK. BY |
|---|---|---|
| △ | - | - |
| △ | - | - |
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| △ | - | - |
| △ | - | - |

SHEET TITLE
SITE MAP
BOTTOM ASH IMPOUNDMENT
CCR GROUNDWATER MONITORING SYSTEM

PROJECT TITLE
2019 CCR GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

CLIENT
EVERGY METRO, INC
LA CYGNE GENERATING STATION
LA CYGNE, KANSAS

**SCS ENGINEERS**
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PROJ. NO. 27217233.19
DWN. BY: TGW
Q/A RVW BY: JRR
DSN. BY: TGW
CHK. BY: JRR
PROJ. MGR JRR

CADD FILE:
FIG 1 – LA CYGNE BA IMP.DWG

DATE:
1/07/20

FIGURE NO.
1

N:\KCPL\Projects\Groundwater\DWG\La Cygne\CCR Annual Report\2018\Fig 1 - La Cygne BA Imp.dwg Jan 08, 2020 - 10:56am Layout Name: Fig 1 By: 4648jdj

# APPENDIX B

## TABLES

Table 1: Appendix III Detection Monitoring Results

Table 2: Detection Monitoring Field Measurements

# Table 1
# Bottom Ash Impoundment
# Appendix III Detection Monitoring Results
# Evergy LaCygne Generating Station

| Well Number | Sample Date | Appendix III Constituents | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Boron (mg/L) | Calcium (mg/L) | Chloride (mg/L) | Fluoride (mg/L) | pH (S.U.) | Sulfate (mg/L) | Total Dissolved Solids (mg/L) |
| MW-901 | 5/23/2019 | 1.18 | 52.3 | 22.8 | 0.489 | 7.31 | 21.0 | 514 |
| MW-901 | 11/8/2019 | 1.09 | 53.4 | 23.2 | 0.481 | 7.37 | 21.2 | 502 |
| MW-902 | 1/14/2019 | --- | --- | --- | --- | **6.98 | --- | *492 |
| MW-902 | 5/23/2019 | 1.24 | 66.5 | 32.8 | 0.441 | 7.26 | 29.4 | 511 |
| MW-902 | 11/8/2019 | 1.17 | 64.3 | 32.1 | 0.455 | 7.28 | 27.9 | 471 |
| MW-903 | 1/14/2019 | --- | *377 | --- | --- | **6.58 | --- | --- |
| MW-903 | 3/11/2019 | --- | *375 | --- | --- | **6.95 | --- | --- |
| MW-903 | 5/23/2019 | 0.494 | 367 | 24.5 | 0.130 | 6.86 | 1030 | 2030 |
| MW-903 | 7/17/2019 | --- | *373 | --- | --- | **7.11 | --- | --- |
| MW-903 | 8/22/2019 | --- | *366 | --- | --- | **6.73 | --- | --- |
| MW-903 | 11/8/2019 | 0.508 | 348 | 24.5 | 0.140 | 6.83 | 1050 | 1870 |
| MW-904 | 5/23/2019 | 1.11 | 68.2 | 33.4 | 0.382 | 7.23 | 81.7 | 696 |
| MW-904 | 11/8/2019 | 0.957 | 65.3 | 32.6 | 0.369 | 7.34 | 78.3 | 607 |
| MW-905 | 5/23/2019 | 1.87 | 46.4 | 52.0 | 0.494 | 7.36 | 28.7 | 621 |
| MW-905 | 11/8/2019 | 1.77 | 46.0 | 52.8 | 0.488 | 7.52 | 27.7 | 537 |

* Verification Sample obtained per certified statistical method and Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance, March 2009.

**Extra Sample for Quality Control Validation or per Standard Sampling Procedure

mg/L - miligrams per liter

pCi/L - picocuries per liter

S.U. - Standard Units

--- Not Sampled

# Table 2
# Bottom Ash Impoundment
# Detection Monitoring Field Measurements
# Evergy LaCygne Generating Station

| Well Number | Sample Date | pH (S.U.) | Specific Conductivity (µS) | Temperature ($^oC$) | Turbidity (NTU) | ORP (mV) | DO (mg/L) | ***Water Level (ft btoc) | Groundwater Elevation (ft NGVD) |
|---|---|---|---|---|---|---|---|---|---|
| MW-901 | 5/23/2019 | 7.31 | 1030 | 21.38 | 0.00 | 102 | 2.06 | 10.90 | 843.39 |
| MW-901 | 11/8/2019 | 7.37 | 845 | 17.45 | 10.70 | 39 | 0.89 | 10.69 | 843.60 |
| MW-902 | 1/14/2019 | **6.98 | 856 | 14.35 | 8.40 | 415 | 0.00 | 12.68 | 842.39 |
| MW-902 | 5/23/2019 | 7.26 | 1050 | 20.78 | 0.00 | -17 | 2.54 | 12.89 | 842.18 |
| MW-902 | 11/8/2019 | 7.28 | 821 | 16.23 | 0.80 | -19 | 0.45 | 13.70 | 841.37 |
| MW-903 | 1/14/2019 | **6.58 | 2560 | 11.95 | 5.00 | 31 | 1.44 | 13.04 | 841.36 |
| MW-903 | 3/11/2019 | **6.95 | 2420 | 13.21 | 5.90 | 66 | 9.06 | 11.87 | 842.53 |
| MW-903 | 5/23/2019 | 6.86 | 2840 | 17.86 | 0.00 | 27 | 2.47 | 11.89 | 842.51 |
| MW-903 | 7/17/2019 | **7.11 | 2410 | 22.85 | 0.00 | 109 | 1.77 | 12.03 | 842.37 |
| MW-903 | 8/22/2019 | **6.73 | 2370 | 20.58 | 0.50 | 214 | 0.19 | 12.63 | 841.77 |
| MW-903 | 11/8/2019 | 6.83 | 2430 | 15.79 | 0.00 | 45 | 0.88 | 13.10 | 841.30 |
| MW-904 | 5/23/2019 | 7.23 | 1340 | 17.84 | 5.20 | -72 | 2.32 | 13.60 | 841.45 |
| MW-904 | 11/8/2019 | 7.34 | 1070 | 16.58 | 9.10 | -44 | 0.69 | 13.65 | 841.40 |
| MW-905 | 5/23/2019 | 7.36 | 1250 | 17.15 | 21.5 | 24 | 2.47 | 9.98 | 844.24 |
| MW-905 | 11/8/2019 | 7.52 | 1000 | 16.61 | 17.0 | 8 | 1.02 | 11.70 | 842.52 |

* Verification Sample obtained per certified statistical method and Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance, March 2009.

**Extra Sample for Quality Control Validation or per Standard Sampling Procedure

***Depth to water measured in all monitoring wells within 24 hour period prior to the sampling event

S.U. - Standard Units

µS - microsiemens

$^oC$ - Degrees Celsius

ft btoc - Feet Below Top of Casing

ft NGVD - National Geodetic Vertical Datum (NAVD 88)

NTU - Nephelometric Turbidity Unit

# Appendix C

# Alternative Source Demonstrations

C.1 CCR Groundwater Monitoring Alternative Source Demonstration Report November 2018 Groundwater Monitoring Event, Bottom Ash Impoundment, La Cygne Generating Station (June 2019)

C.2 CCR Groundwater Monitoring Alternative Source Demonstration Report May 2019 Groundwater Monitoring Event, La Cygne Generating Station (December 2019)

# C.1 CCR Groundwater Monitoring Alternative Source Demonstration Report November 2018 Groundwater Monitoring Event, Bottom Ash Impoundment, La Cygne Generating Station (June 2019)

# CCR GROUNDWATER MONITORING
# ALTERNATIVE SOURCE DEMONSTRATION REPORT
# NOVEMBER 2018 GROUNDWATER MONITORING EVENT

## BOTTOM ASH IMPOUNDMENT
## LA CYGNE GENERATING STATION
## LA CYGNE, KANSAS

Presented To:

**Kansas City Power & Light Company**

Presented By:

**SCS ENGINEERS**

8575 West 110th Street, Suite 100

Overland Park, Kansas 66210

(913) 681-0030

June 2019

File No. 27217233.19

# CERTIFICATIONS

I, John R. Rockhold, being a qualified groundwater scientist and licensed Professional Geologist in the State of Kansas, do hereby certify the accuracy of the information in the CCR Groundwater Monitoring Alternative Source Demonstration Report for the Bottom Ash Impoundment at the La Cygne Generating Station. The Alternative Source Demonstration was prepared by me or under my direct supervision in accordance with generally accepted hydrogeological practices and the local standard of care.

JOHN R. ROCKHOLD
29
6-27-19

John R. Rockhold, P.G.

SCS Engineers

I, Douglas L. Doerr, being a qualified licensed Professional Engineer in the State of Kansas, do hereby certify the accuracy of the information in the CCR Groundwater Monitoring Alternative Source Demonstration Report for the Bottom Ash Impoundment at the La Cygne Generating Station. The Alternative Source Demonstration was prepared by me or under my direct supervision in accordance with generally accepted engineering practices and the local standard of care.

DOUGLAS L. DOERR
14136
6-27-19

Douglas L. Doerr, P.E.

SCS Engineers

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## Appendices

# 1 REGULATORY FRAMEWORK

Certain owners or operators of Coal Combustion Residuals (CCR) units are required to complete groundwater monitoring activities to evaluate whether a release from the unit has occurred. Included in the activities is the completion of a statistical analysis of the groundwater quality data as prescribed in § 257.93(h) of the CCR Final Rule. If the initial analysis indicates a statistically significant increase (SSI) over background levels, the owner or operator may perform an alternative source demonstration (ASD). In accordance with § 257.94(e)(2), the owner or operator of the CCR unit may demonstrate that a source other than the CCR unit caused the SSI over background levels for a constituent, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting a SSI over background levels to include obtaining a certification from a qualified professional engineer verifying the accuracy of the information in the report. If a successful demonstration is completed within the 90-day period, the owner or operator of the CCR unit may continue with a detection monitoring program under § 257.94. If a successful demonstration is not completed within the 90-day period, the owner or operator of the CCR unit must initiate an assessment monitoring program as required under § 257.95. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.

# 2 STATISTICAL RESULTS

Statistical analysis of monitoring data from the groundwater monitoring system for the Bottom Ash Impoundment at the La Cygne Generating Station has been completed in substantial compliance with the "Statistical Method Certification by A Qualified Professional Engineer" dated October 12, 2017. Detection monitoring groundwater samples were collected on November 29, 2018. Review and validation of the results from the November 2018 Detection Monitoring Event was completed on January 12, 2019, which constitutes completion and finalization of detection monitoring laboratory analyses. A statistical analysis was then conducted to determine whether there was a statistically significant increase (SSI) over background values for each constituent listed in Appendix III to Part 257-Constituents for Detection Monitoring. Two rounds of verification sampling were conducted for certain constituents on January 14, 2019 and March 11, 2019.

The completed statistical evaluation identified Appendix III constituent, calcium, above its prediction limit in monitoring well MW-903. The prediction limit for calcium in monitoring well MW-903 is 358.2 mg/L. The detection monitoring sample was reported at 375 mg/L. The first verification re-sample was collected on January 14, 2019 with a result of 377 mg/L. The second verification re-sample was collected on March 11, 2019 with a result of 375 mg/L.

Therefore, in accordance with the Statistical Method Certification, the detection monitoring sample for calcium from monitoring well MW-903 exceeds its prediction limit and is a confirmed SSI over background.

**Determination: A statistical evaluation was completed for all Appendix III detection monitoring constituents in accordance with the certified statistical method. The statistical evaluation identified one SSI above the background prediction limit for calcium in monitoring well MW-903.**

# 3 ALTERNATIVE SOURCE DEMONSTRATION

An Alternative Source Demonstration (ASD) is a means to provide supporting lines of evidence that something other than a release from a regulated CCR unit caused an SSI. For the above identified SSI for the Bottom Ash Impoundment at the La Cygne Generating Station, there are multiple lines of supporting evidence to indicate the SSI was not caused by a release from the Bottom Ash Impoundment. Select multiple lines of supporting evidence are described as follows.

## 3.1 BOTTOM ASH SPLP ANALYSIS

The Synthetic Precipitation Leaching Procedure (SPLP) is an Environmental Protection Agency (EPA) approved extraction procedure designed to simulate and then analyze leachate, which would be produced from rainfall passing through a contaminated material (assuming the rainfall is slightly acidic). The SPLP is used to assess the potential of a contaminated material (in or on top of the ground) to impact groundwater (or surface water), when exposed to normal weathering. A bottom ash sample was collected on September 17, 2018 and submitted to the laboratory for SPLP analysis for calcium. The calcium result for the SPLP extract (simulated leachate) was 73.7 mg/L. The prediction limit for calcium in monitoring well MW-903 is 358 mg/L and the detection monitoring sample was reported at 375 mg/L. The calcium concentration in the groundwater from MW-903 is significantly greater than what would be expected from bottom ash leachate. The comparison indicates the elevated calcium concentrations in monitoring well MW-903 are not from bottom ash leachate but from a source other than bottom ash, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The laboratory report is provided in **Appendix A.**

## 3.2 BOX AND WHISKERS PLOTS

A commonly accepted method to demonstrate and visualize the distribution of data in a given data set is to construct box and whiskers plots. The basic “box” plotted graphically locates the median, 25th and 75th percentiles of the data set; the "whiskers" extend to the minimum and maximum values of the data set. The range between the ends of a box plot represents the Interquartile Range, which can be used as an estimate of spread or variability. The mean is denoted by a "+".

When comparing multiple wells or well groups, box plots for each well can be lined up on the same axis to roughly compare the variability in each well. This may be used as an exploratory screening for the test of homogeneity of variance across multiple wells.

Based on the bottom ash SPLP calcium analysis compared to the calcium results for MW-903, the calcium levels for additional wells at the LaCygne Generating Station (not part of the CCR Bottom Ash groundwater monitoring system) were reviewed for elevated calcium levels to determine if elevated calcium concentrations could occur naturally in the vicinity of the facility and if natural variability between wells occurred in the vicinity of the facility. Four wells were identified as exhibiting elevated calcium and one of them was an upgradient well. Box and whiskers plots for calcium for upgradient monitoring wells MW-13 and MW-602 and downgradient wells MW-707B, MW-805, and MW-903 were prepared for comparison. Upgradient monitoring well MW-602 does not have elevated calcium but is located in close proximity to MW-13, indicating natural variability of calcium over short distances occurs at the site. The comparison also indicates the calcium levels in monitoring well MW-903 are within the range of calcium concentrations in upgradient wells at the facility site and that significant natural variability occurs between wells and across the site. This demonstrates that a source other than the bottom ash caused the SSI above background levels for calcium, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Box and whiskers plots are provided in **Appendix B**.

## 3.3 TIME SERIES PLOTS

Time series plots provide a graphical method to view changes in data at a particular well (monitoring point) or wells over time. Time series plots display the variability in concentration levels over time and can be used to indicate possible outliers or data errors. More than one well can be compared on the same plot to look for differences between wells. Non-detect data is plotted as censored data at one-half of the laboratory reporting limit. Time series plots can also be used to examine the data for trends.

Four wells were identified as exhibiting elevated calcium and one of them was an upgradient well. Of the four wells exhibiting elevated calcium, wells, MW-805 and MW-903 also exhibited a SSIs. Time series plots for calcium for upgradient monitoring wells MW-13 and MW-602 and downgradient wells MW-707B, MW-805, and MW-903 were prepared for comparison. Upgradient monitoring well MW-602 does not have elevated calcium but is located close to MW-13 indicating natural variability of calcium over short distances occurs at the site. The comparison indicates the calcium levels in monitoring well MW-903 are within the range of calcium concentrations in upgradient wells at the site and that significant natural variability occurs between wells and across the site. This demonstrates that a source other than the bottom ash caused the SSI above background levels for calcium, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Time series plots are provided in **Appendix C**.

## 3.4 PIPER PLOTS

Piper diagrams are a form of tri-linear diagram, and a widely accepted method to provide a visual representation of the ion concentration of groundwater. Piper diagrams portray water compositions and facilitate the interpretation and presentation of chemical analyses. They may be used to visually compare the chemical composition of water quality across wells, and aid in determining whether the waters are similar or dis-similar, and can over time indicate whether the waters are mixing.

A piper diagram has two triangular plots on the right and left side of a 4-sided center field. The three major cations are plotted in the left triangle and anions in the right. Each of the three cation/anion variables, in milliequivalents, is divided by the sum of the three values, to produce a percent of total cation/anions. These percentages determine the location of the associated symbol. The data points in the center field are located by extending the points in the lower triangles to the point of intersection. In order for a piper diagram to be produced, the selected data file must contain the following constituents: Sodium (Na), Potassium (K), Calcium (Ca), Magnesium (Mg), Chloride (Cl), Sulfate (SO4), Carbonate (CO3), and Bicarbonate (HCO3).

A piper diagram generated for samples from MW-903 and samples from MW-13 (upgradient well for the CCR Landfill and Lower AQC Impoundment) are provided in **Appendix D.** The samples plot near one another in the same hydrochemical facies indicating similar geochemical characteristics between an upgradient well in the vicinity of the facility and a downgradient well for the Bottom Ash Impoundment. The comparison indicates the hydrochemical characteristics (particularly calcium) of groundwater from monitoring well MW-903 are similar to the hydrochemical characteristics (particularly calcium) of background groundwater and are a similar range as that of an upgradient well at the facility and that significant natural variability occurs between wells and across the site. This demonstrates that a source other than the bottom ash caused the SSI above background levels for calcium, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The piper diagram plots are provided in **Appendix D**.

## 3.5 FACILITY WIDE INTERWELL PREDICTION LIMIT

Because of known complexities and heterogeneities of the water bearing zone at the facility, an intrawell prediction limit analysis with retesting was the selected statistical method for the Bottom Ash Impoundment. However, false positives (SSIs) may occur due to a limited background data set that may not truly represent the background population for that particular well until the number of background observations are increased to better represent the entire population. The CCR Rule preamble recommends a minimum of eight to ten independent background observations be collected before performing the first statistical test; but also states that background sample sets of at least 20 are considered optimal. To further demonstrate that an intrawell prediction limit exceedance (SSI) could be naturally occurring and likely the result of a limited background data set for a particular well, an interwell prediction limit analysis on a facility wide basis can be useful to further demonstrate natural variability across a site or in the vicinity of the site and that the potential true background population may not be represented.

An interwell prediction limit analysis on a facility wide basis was performed comparing the calcium concentration in MW-903 to the prediction limit calculated from the combined background calcium data from all of the background monitoring wells across the facility. For this scenario, the facility wide interwell prediction limit for calcium is 395 mg/L. The highest calcium concentration from MW-903 is 384 mg/L, which is below the facility wide interwell prediction limit for calcium. The interwell prediction limit analysis further indicates the calcium levels in monitoring well MW-903 are within the range of calcium concentrations in upgradient wells at the facility site. This demonstrates that a source other than the bottom ash could cause the SSI above background levels for calcium, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Facility wide interwell prediction limit outputs are provided in **Appendix E.**

# 4 CONCLUSION

Our opinion is that a sufficient body of evidence is available and presented above to demonstrate that a source other than the Bottom Ash Impoundment caused the SSI above background levels for calcium, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Based on the successful ASD, the owner or operator of the Bottom Ash Impoundment may continue with the detection monitoring program under § 257.94.

# 5 GENERAL COMMENTS

This report has been prepared and reviewed under the direction of a qualified groundwater scientist and qualified professional engineer. Please note that SCS Engineers does not warrant the work of regulatory agencies or other third parties supplying information used in the assimilation of this report. This report is prepared in accordance with generally accepted environmental engineering and geological practices, within the constraints of the client's directives. It is intended for the exclusive use of KCP&L for specific application to the La Cygne Generating Station. No warranties, express or implied, are intended or made.

The signature of the certifying registered geologist and professional engineer on this document represents that to the best of their knowledge, information, and belief in the exercise of their professional judgement in accordance with the standard of practice, it is their professional opinions that the aforementioned information is accurate as of the date of such signature. Any opinion or decisions by them are made on the basis of their experience, qualifications, and professional judgement and are not to be construed as warranties or guaranties. In addition, opinions relating to regulatory, environmental, geologic, geochemical and geotechnical conditions interpretations or other estimates are based on available data, and actual conditions may vary from those encountered at the times and locations where data are obtained, despite the use of due care.

# Appendix A

## Bottom Ash SPLP Laboratory Report

Pace Analytical®
National Center for Testing & Innovation

# ANALYTICAL REPORT

October 01, 2018

## SCS Engineers - KS

| | |
|---|---|
| Sample Delivery Group: | L1027123 |
| Samples Received: | 09/19/2018 |
| Project Number: | 27217233.18 |
| Description: | KCPL - LaCygne Generating Station |
| Report To: | Jason Franks<br>8575 West 110th Street<br>Suite 100<br>Overland Park, KS  66210 |

Entire Report Reviewed By:

Jeff Carr
Project Manager

12065 Lebanon Rd   Mount Juliet, TN 37122   615-758-5858   800-767-5859   www.pacenational.com

# TABLE OF CONTENTS

## BOTTOM ASH L1027123-01 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R Franks | 09/17/18 12:00 | 09/19/18 11:50 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Preparation by Method 1312 | WG1169395 | 1 | 09/21/18 11:47 | 09/21/18 11:47 | TM |
| Wet Chemistry by Method 9056A | WG1169693 | 1 | 09/24/18 20:14 | 09/24/18 20:14 | NJM |
| Metals (ICP) by Method 6010B | WG1170271 | 1 | 09/23/18 09:55 | 09/23/18 22:31 | CCE |

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

# CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Jeff Carr
Project Manager

## Preparation by Method 1312

| Analyte | Result | Qualifier | Prep date / time | Batch |
|---|---|---|---|---|
| SPLP Extraction | - | | 9/21/2018 11:47:27 AM | WG1169395 |

## Wet Chemistry by Method 9056A

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Chloride | ND | | 1000 | 1 | 09/24/2018 20:14 | WG1169693 |
| Fluoride | 118 | | 100 | 1 | 09/24/2018 20:14 | WG1169693 |
| Sulfate | 51100 | | 5000 | 1 | 09/24/2018 20:14 | WG1169693 |

## Metals (ICP) by Method 6010B

| Analyte | Result ug/l | Qualifier | RDL ug/l | Dilution | Analysis date / time | Batch |
|---|---|---|---|---|---|---|
| Boron | 959 | | 200 | 1 | 09/23/2018 22:31 | WG1170271 |
| Calcium | 73700 | | 1000 | 1 | 09/23/2018 22:31 | WG1170271 |

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

## Method Blank (MB)

(MB) R3344732-1 09/24/18 17:59

| | MB Result | MB Qualifier | MB MDL | MB RDL |
|---|---|---|---|---|
| Analyte | ug/l | | ug/l | ug/l |
| Chloride | U | | 51.9 | 1000 |
| Fluoride | U | | 9.90 | 100 |
| Sulfate | U | | 77.4 | 5000 |

## L1027594-11 Original Sample (OS) • Duplicate (DUP)

(OS) L1027594-11 09/24/18 22:52 • (DUP) R3344732-4 09/24/18 23:07

| | Original Result | DUP Result | Dilution | DUP RPD | DUP Qualifier | DUP RPD Limits |
|---|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | | % | | % |
| Chloride | 244 | 184 | 1 | 27.8 | J P1 | 15 |
| Sulfate | U | 0.000 | 1 | 0.000 | | 15 |

## L1027715-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1027715-01 09/25/18 01:45 • (DUP) R3344732-7 09/25/18 02:00

| | Original Result | DUP Result | Dilution | DUP RPD | DUP Qualifier | DUP RPD Limits |
|---|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | | % | | % |
| Chloride | 8430 | 8420 | 1 | 0.118 | | 15 |
| Sulfate | 8690 | 8710 | 1 | 0.147 | | 15 |

## L1027594-11 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1027594-11 09/24/18 22:52 • (MS) R3344732-5 09/24/18 23:21 • (MSD) R3344732-6 09/24/18 23:36

| | Spike Amount | Original Result | MS Result | MSD Result | MS Rec. | MSD Rec. | Dilution | Rec. Limits | MS Qualifier | MSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | ug/l | ug/l | % | % | | % | | | % | % |
| Chloride | 50000 | 244 | 50900 | 51100 | 101 | 102 | 1 | 80.0-120 | | | 0.435 | 15 |
| Sulfate | 50000 | U | 51800 | 51400 | 104 | 103 | 1 | 80.0-120 | | | 0.729 | 15 |

## L1027715-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1027715-01 09/25/18 01:45 • (MS) R3344732-8 09/25/18 02:14

| | Spike Amount | Original Result | MS Result | MS Rec. | Dilution | Rec. Limits | MS Qualifier |
|---|---|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | ug/l | % | | % | |
| Chloride | 50000 | 8430 | 59200 | 102 | 1 | 80.0-120 | |
| Sulfate | 50000 | 8690 | 59100 | 101 | 1 | 80.0-120 | |

## Method Blank (MB)

(MB) R3344358-1 09/23/18 21:58

| Analyte | MB Result<br>ug/l | MB Qualifier | MB MDL<br>ug/l | MB RDL<br>ug/l |
|---|---|---|---|---|
| Boron | U | | 12.6 | 200 |
| Calcium | U | | 46.3 | 1000 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3344358-2 09/23/18 22:01 • (LCSD) R3344358-3 09/23/18 22:03

| Analyte | Spike Amount<br>ug/l | LCS Result<br>ug/l | LCSD Result<br>ug/l | LCS Rec.<br>% | LCSD Rec.<br>% | Rec. Limits<br>% | LCS Qualifier | LCSD Qualifier | RPD<br>% | RPD Limits<br>% |
|---|---|---|---|---|---|---|---|---|---|---|
| Boron | 1000 | 992 | 995 | 99.2 | 99.5 | 80.0-120 | | | 0.340 | 20 |
| Calcium | 10000 | 10000 | 9930 | 100 | 99.3 | 80.0-120 | | | 0.917 | 20 |

## L1026826-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1026826-01 09/23/18 22:06 • (MS) R3344358-5 09/23/18 22:12 • (MSD) R3344358-6 09/23/18 22:14

| Analyte | Spike Amount<br>ug/l | Original Result<br>ug/l | MS Result<br>ug/l | MSD Result<br>ug/l | MS Rec.<br>% | MSD Rec.<br>% | Dilution | Rec. Limits<br>% | MS Qualifier | MSD Qualifier | RPD<br>% | RPD Limits<br>% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Boron | 1000 | 155 | 1170 | 1170 | 101 | 102 | 1 | 75.0-125 | | | 0.133 | 20 |
| Calcium | 10000 | 43500 | 53700 | 53700 | 102 | 102 | 1 | 75.0-125 | | | 0.0395 | 20 |

## Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

## Abbreviations and Definitions

| | |
|---|---|
| MDL | Method Detection Limit. |
| ND | Not detected at the Reporting Limit (or MDL where applicable). |
| RDL | Reported Detection Limit. |
| Rec. | Recovery. |
| RPD | Relative Percent Difference. |
| SDG | Sample Delivery Group. |
| U | Not detected at the Reporting Limit (or MDL where applicable). |
| Analyte | The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported. |
| Dilution | If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor. |
| Limits | These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges. |
| Original Sample | The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG. |
| Qualifier | This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable. |
| Result | The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte. |
| Case Narrative (Cn) | A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report. |
| Quality Control Summary (Qc) | This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material. |
| Sample Chain of Custody (Sc) | This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis. |
| Sample Results (Sr) | This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported. |
| Sample Summary (Ss) | This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis. |

| Qualifier | Description |
|---|---|
| J | The identification of the analyte is acceptable; the reported value is an estimate. |
| P1 | RPD value not applicable for sample concentrations less than 5 times the reporting limit. |

# ACCREDITATIONS & LOCATIONS

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

## State Accreditations

| | | | |
|---|---|---|---|
| Alabama | 40660 | Nebraska | NE-OS-15-05 |
| Alaska | 17-026 | Nevada | TN-03-2002-34 |
| Arizona | AZ0612 | New Hampshire | 2975 |
| Arkansas | 88-0469 | New Jersey–NELAP | TN002 |
| California | 2932 | New Mexico [1] | n/a |
| Colorado | TN00003 | New York | 11742 |
| Connecticut | PH-0197 | North Carolina | Env375 |
| Florida | E87487 | North Carolina [1] | DW21704 |
| Georgia | NELAP | North Carolina [3] | 41 |
| Georgia [1] | 923 | North Dakota | R-140 |
| Idaho | TN00003 | Ohio–VAP | CL0069 |
| Illinois | 200008 | Oklahoma | 9915 |
| Indiana | C-TN-01 | Oregon | TN200002 |
| Iowa | 364 | Pennsylvania | 68-02979 |
| Kansas | E-10277 | Rhode Island | LAO00356 |
| Kentucky [1 6] | 90010 | South Carolina | 84004 |
| Kentucky [2] | 16 | South Dakota | n/a |
| Louisiana | AI30792 | Tennessee [1 4] | 2006 |
| Louisiana [1] | LA180010 | Texas | T 104704245-17-14 |
| Maine | TN0002 | Texas [5] | LAB0152 |
| Maryland | 324 | Utah | TN00003 |
| Massachusetts | M-TN003 | Vermont | VT2006 |
| Michigan | 9958 | Virginia | 460132 |
| Minnesota | 047-999-395 | Washington | C847 |
| Mississippi | TN00003 | West Virginia | 233 |
| Missouri | 340 | Wisconsin | 9980939910 |
| Montana | CERT0086 | Wyoming | A2LA |

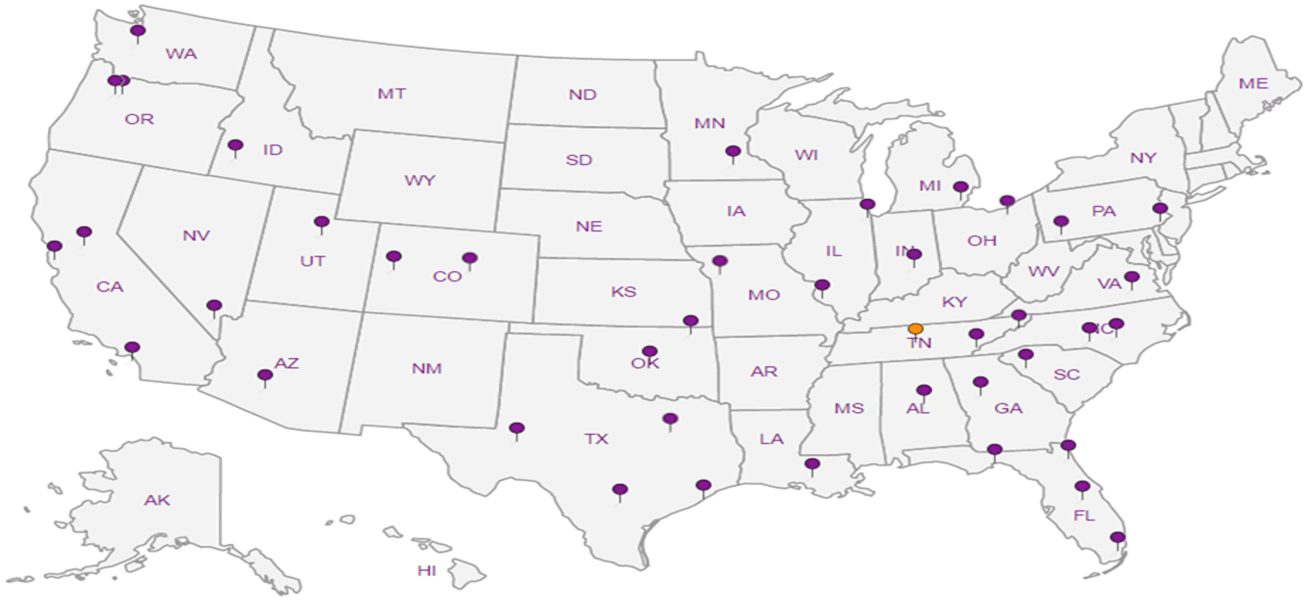
## Third Party Federal Accreditations

| | | | |
|---|---|---|---|
| A2LA – ISO 17025 | 1461.01 | AIHA-LAP,LLC EMLAP | 100789 |
| A2LA – ISO 17025 [5] | 1461.02 | DOD | 1461.01 |
| Canada | 1461.01 | USDA | P330-15-00234 |
| EPA–Crypto | TN00003 | | |

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

## Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



**SCS Engineers - KS**

8575 West 110th Street
Suite 100
Overland Park, KS 66210

Billing Information:
**Accounts Payable**
**8575 West 110th Street**
**Suite 100**
**Overland Park, KS 66210**

Pres Chk

Report to:
**Jason Franks**

Email To: **jfranks@scsengineers.com;**
**jay.martin@kcpl.com;**

Project Description: **KCPL - LaCygne Generating Station**

City/State Collected: LaCygne, KS

Phone: **913-681-0030**
Fax: **913-681-0012**

Client Project #
**27217233.18**

Lab Project #
**AQUAOPKS-LACYGNE**

Collected by (print): JASON R. FRANKS

Site/Facility ID #

P.O. #

Collected by (signature): Jason R. Franks

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Immediately Packed on Ice N ___ Y ✓

Analysis / Container / Preservative

Chain of Custody Page 1 of 1

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L1027123
E242

Acctnum: **AQUAOPKS**
Template: **T140691**
Prelogin: **P672563**
TSR: **206 - Jeff Carr**
PB:
Shipped Via:

| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | No. of Cntrs | SPLP metals / anions 16ozClr-NoPres | Remarks | Sample # (lab only) |
|---|---|---|---|---|---|---|---|---|---|
| BOTTOM ASH | GRAB | SS | – | 9/18/18 | 1200 | 1 | X | | -01 |

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other______

Remarks: **SPLP - Extract for B, Ca, Cl, Fl, and SO4**

pH ______ Temp ______
Flow ______ Other ______

Samples returned via:
__ UPS __ FedEx __ Courier __ ______

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: ✓NP __Y __N
COC Signed/Accurate: ✓Y __N
Bottles arrive intact: ✓Y __N
Correct bottles used: ✓Y __N
Sufficient volume sent: ✓Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: __Y __N

Relinquished by : (Signature) Jason R. Franks
Date: 9/18/18
Time: 1500
Received by: (Signature)
9-18-18 1505

Trip Blank Received: Yes / [✓ No]
HCL / MeoH
TBR

Relinquished by : (Signature)
Date:
Time:
Received by: (Signature)

Temp: 1.6 c-.1 1.5 °C
Bottles Received: 1

If preservation required by Login: Date/Time

Relinquished by : (Signature)
Date:
Time:
Received for lab by: (Signature) 8C1

Date: 9/19/18
Time: 1150

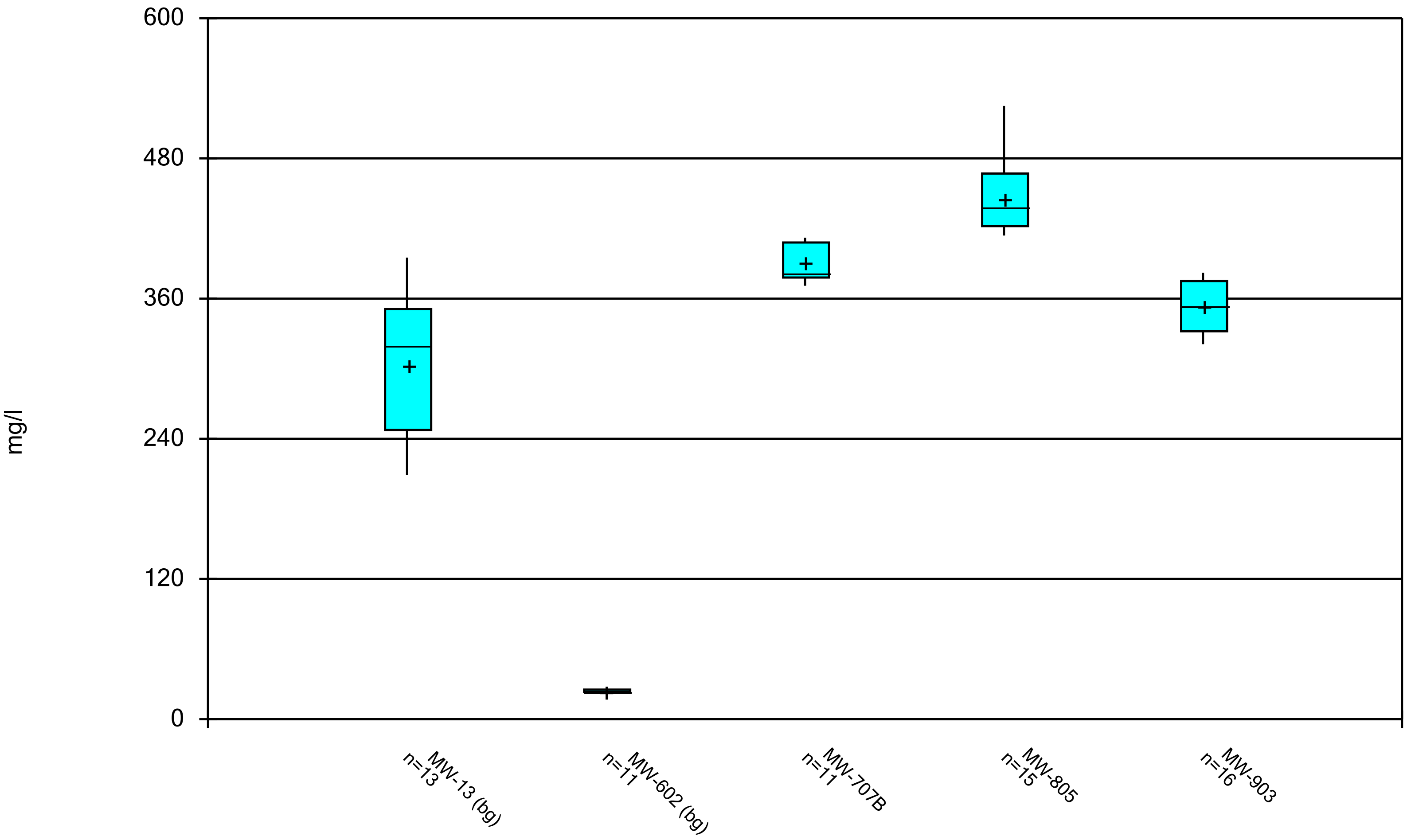
Hold:

Condition: NCF / [✓ OK]

# Appendix B

# Box and Whiskers Plots

# Box & Whiskers Plot



Constituent: CALCIUM    Analysis Run 5/15/2019 4:27 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

# Box & Whiskers Plot

Constituent: CALCIUM (mg/l)  Analysis Run 5/15/2019 4:29 PM  View: Bottom Ash III
LaCygne  Client: SCS Engineers  Data: LaC GW Data

| | MW-13 (bg) | MW-602 (bg) | MW-707B | MW-805 | MW-903 |
|---|---|---|---|---|---|
| 6/7/2016 | | | | 422 | |
| 6/8/2016 | | | | | 362 |
| 6/9/2016 | 363 | | | | |
| 6/10/2016 | | 24.7 | | | |
| 6/23/2016 | | | 371 | | |
| 8/9/2016 | | 23.3 | 412 | | |
| 8/10/2016 | | | | 437 | |
| 8/11/2016 | 371 | | | | 342 |
| 10/11/2016 | | | 408 | 422 | |
| 10/13/2016 | 395 | 25.7 | | | 333 |
| 12/6/2016 | | | 410 | 422 | |
| 12/9/2016 | | 25.3 | | | 331 |
| 12/13/2016 | 336 | | | | |
| 2/6/2017 | | | | 435 | |
| 2/7/2017 | | | 398 | | |
| 2/8/2017 | | 24 | | | |
| 2/10/2017 | 297 | | | | 321 |
| 4/4/2017 | | | 382 | 444 | 339 |
| 4/6/2017 | 320 | | | | |
| 4/7/2017 | | 24.9 | | | |
| 6/13/2017 | | | 374 | 430 | |
| 6/15/2017 | 339 | 23.2 | | | |
| 6/16/2017 | | | | | 331 |
| 8/8/2017 | 319 | | 378 | 414 | |
| 8/10/2017 | | 23.3 | | | 330 |
| 10/3/2017 | | | 382 | | 344 |
| 10/5/2017 | 274 | 25.3 | | 467 | |
| 12/12/2017 | | | | 525 | |
| 1/9/2018 | | | | 439 | |
| 5/23/2018 | 248 | 22.9 | | 434 | 368 |
| 5/24/2018 | | | 396 | | |
| 7/11/2018 | | | | | 371 |
| 8/16/2018 | | | | | 382 |
| 9/17/2018 | 214 | | | | 376 |
| 11/29/2018 | | | | | 375 |
| 11/30/2018 | 209 | 23.7 | | 455 | |
| 12/4/2018 | | | 381 | | |
| 1/14/2019 | 247 | | | 473 | 377 |
| 3/11/2019 | | | | 468 | 375 |
| Median | 319 | 24 | 382 | 437 | 353 |
| LowerQ. | 247.5 | 23.3 | 378 | 422 | 332 |
| UpperQ. | 351 | 25.3 | 408 | 467 | 375 |
| Min | 209 | 22.9 | 371 | 414 | 321 |
| Max | 395 | 25.7 | 412 | 525 | 382 |
| Mean | 302.5 | 24.21 | 390.2 | 445.8 | 353.6 |

# Box & Whiskers Plot

LaCygne     Client: SCS Engineers     Data: LaC GW Data     Printed 5/15/2019, 4:29 PM

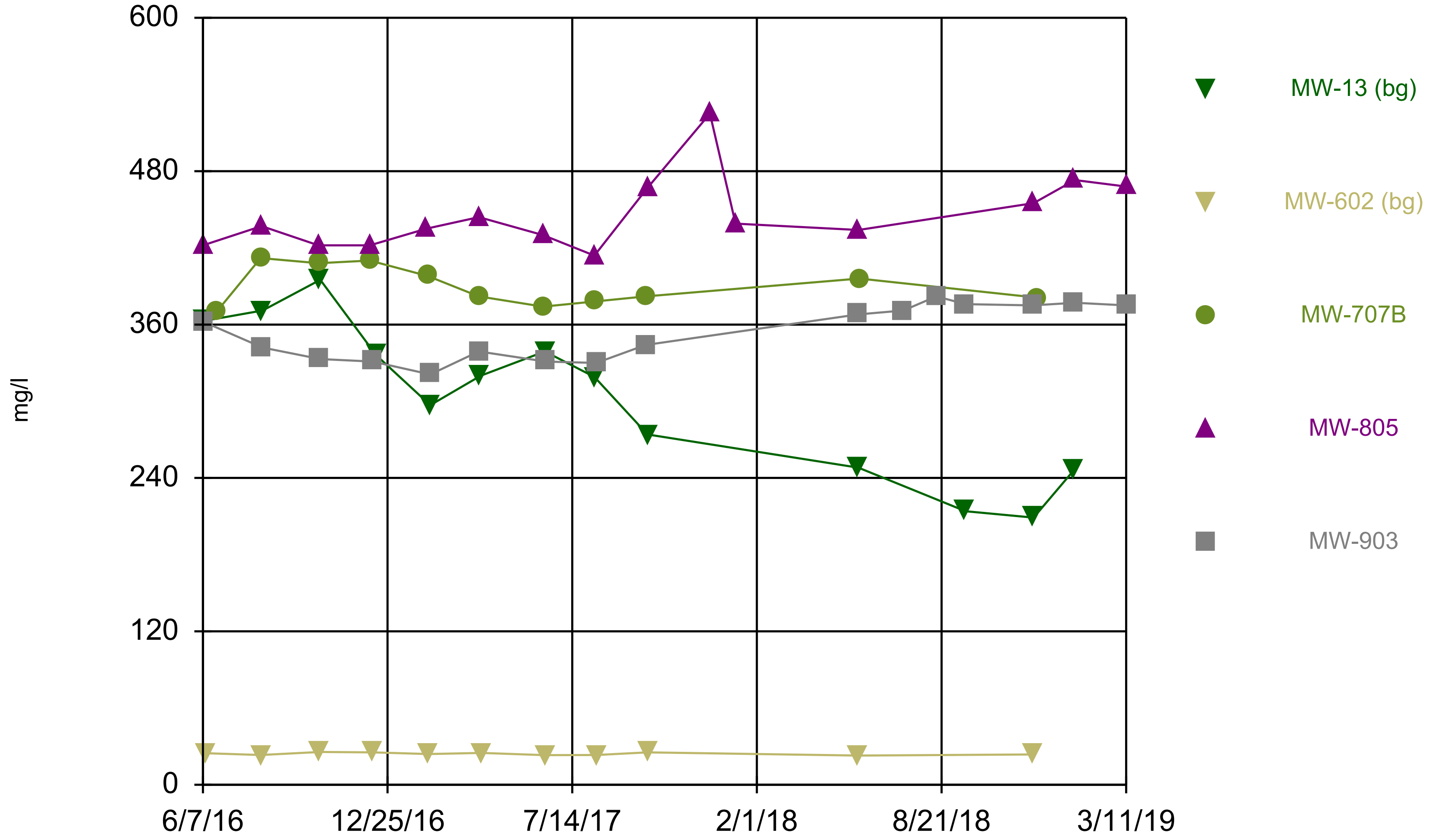
| Constituent | Well | N | Mean | Std. Dev. | Std. Err. | Median | Min. | Max. | %NDs |
|---|---|---|---|---|---|---|---|---|---|
| CALCIUM (mg/l) | MW-13 (bg) | 13 | 302.5 | 60.15 | 16.68 | 319 | 209 | 395 | 0 |
| CALCIUM (mg/l) | MW-602 (bg) | 11 | 24.21 | 1 | 0.3016 | 24 | 22.9 | 25.7 | 0 |
| CALCIUM (mg/l) | MW-707B | 11 | 390.2 | 15.09 | 4.55 | 382 | 371 | 412 | 0 |
| CALCIUM (mg/l) | MW-805 | 15 | 445.8 | 28.51 | 7.362 | 437 | 414 | 525 | 0 |
| CALCIUM (mg/l) | MW-903 | 16 | 353.6 | 21.38 | 5.346 | 353 | 321 | 382 | 0 |

# Appendix C

# Time Series Plots

Sanitas™ v.9.6.13 Sanitas software licensed to SCS Engineers. UG

## Time Series



Constituent: CALCIUM    Analysis Run 5/15/2019 4:33 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

# Time Series

Constituent: CALCIUM (mg/l) Analysis Run 5/15/2019 4:34 PM View: Bottom Ash III

LaCygne Client: SCS Engineers Data: LaC GW Data

---

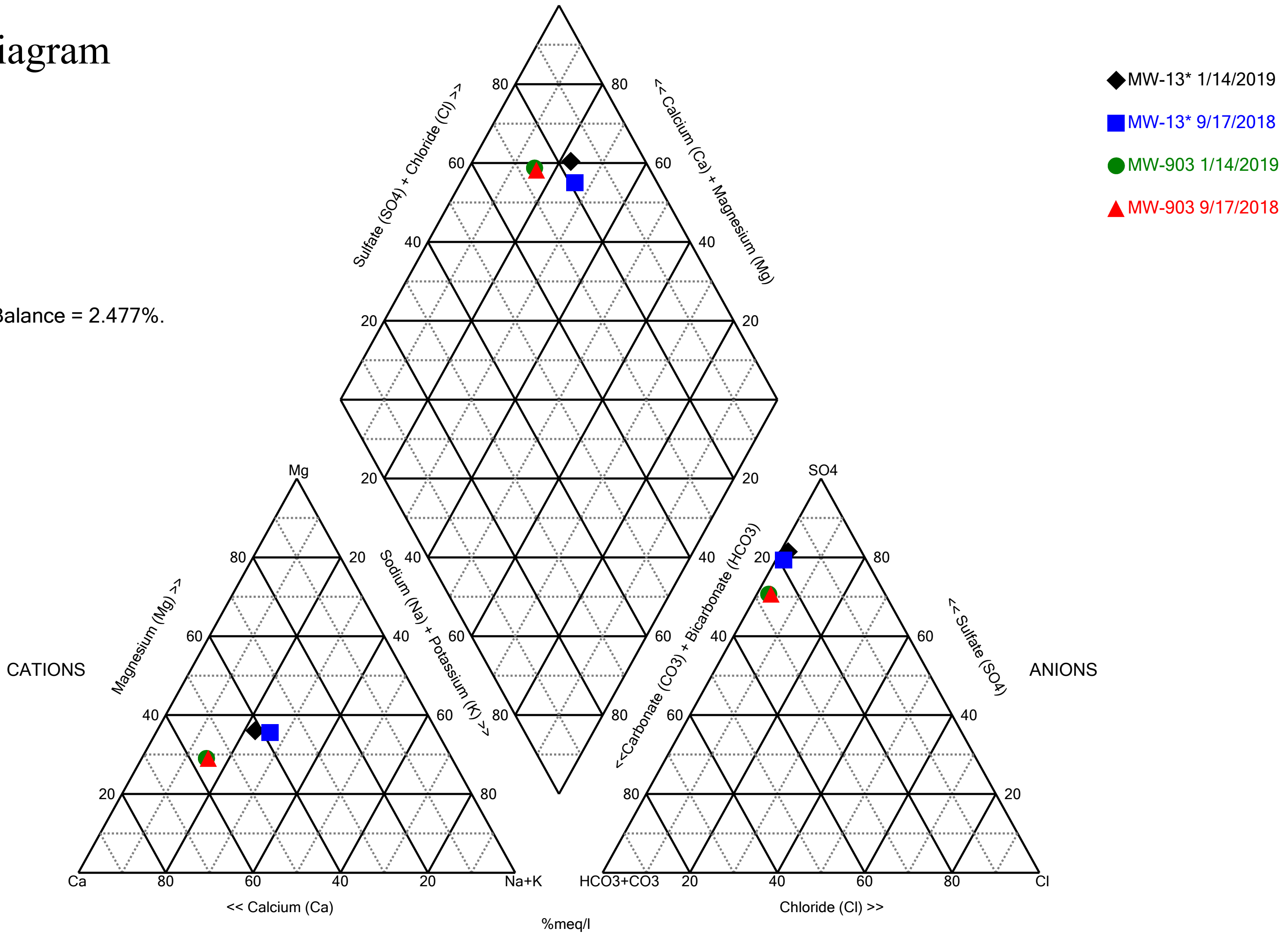
| | MW-13 (bg) | MW-602 (bg) | MW-707B | MW-805 | MW-903 |
|---|---|---|---|---|---|
| 6/7/2016 | | | | 422 | |
| 6/8/2016 | | | | | 362 |
| 6/9/2016 | 363 | | | | |
| 6/10/2016 | | 24.7 | | | |
| 6/23/2016 | | | 371 | | |
| 8/9/2016 | | 23.3 | 412 | | |
| 8/10/2016 | | | | 437 | |
| 8/11/2016 | 371 | | | | 342 |
| 10/11/2016 | | | 408 | 422 | |
| 10/13/2016 | 395 | 25.7 | | | 333 |
| 12/6/2016 | | | 410 | 422 | |
| 12/9/2016 | | 25.3 | | | 331 |
| 12/13/2016 | 336 | | | | |
| 2/6/2017 | | | | 435 | |
| 2/7/2017 | | | 398 | | |
| 2/8/2017 | | 24 | | | |
| 2/10/2017 | 297 | | | | 321 |
| 4/4/2017 | | | 382 | 444 | 339 |
| 4/6/2017 | 320 | | | | |
| 4/7/2017 | | 24.9 | | | |
| 6/13/2017 | | | 374 | 430 | |
| 6/15/2017 | 339 | 23.2 | | | |
| 6/16/2017 | | | | | 331 |
| 8/8/2017 | 319 | | 378 | 414 | |
| 8/10/2017 | | 23.3 | | | 330 |
| 10/3/2017 | | | 382 | | 344 |
| 10/5/2017 | 274 | 25.3 | | 467 | |
| 12/12/2017 | | | | 525 | |
| 1/9/2018 | | | | 439 | |
| 5/23/2018 | 248 | 22.9 | | 434 | 368 |
| 5/24/2018 | | | 396 | | |
| 7/11/2018 | | | | | 371 |
| 8/16/2018 | | | | | 382 |
| 9/17/2018 | 214 | | | | 376 |
| 11/29/2018 | | | | | 375 |
| 11/30/2018 | 209 | 23.7 | | 455 | |
| 12/4/2018 | | | 381 | | |
| 1/14/2019 | 247 | | | 473 | 377 |
| 3/11/2019 | | | | 468 | 375 |

# Appendix D

# Piper Diagrams

# Piper Diagram

Cation-Anion Balance = 2.477%.



Analysis Run 5/15/2019 4:45 PM View: Bottom Ash III

LaCygne Client: SCS Engineers Data: LaC GW Data

# Piper Diagram

Analysis Run 5/15/2019 4:46 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

| Totals (ppm) | Na | K | Ca | Mg | Cl | SO4 | HCO3 | CO3 |
|---|---|---|---|---|---|---|---|---|
| MW-13* 9/17/2018 | 165 | 3.55 | 214 | 120 | 13.1 | 1010 | 295 | 10 |
| MW-13* 1/14/2019 | 151 | 3.3 | 247 | 128 | 12.5 | 1120 | 289 | 10 |
| MW-903 9/17/2018 | 116 | 6.47 | 376 | 117 | 26.1 | 1070 | 497 | 10 |
| MW-903 1/14/2019 | 110 | 6.18 | 377 | 118 | 24.3 | 1070 | 501 | 10 |

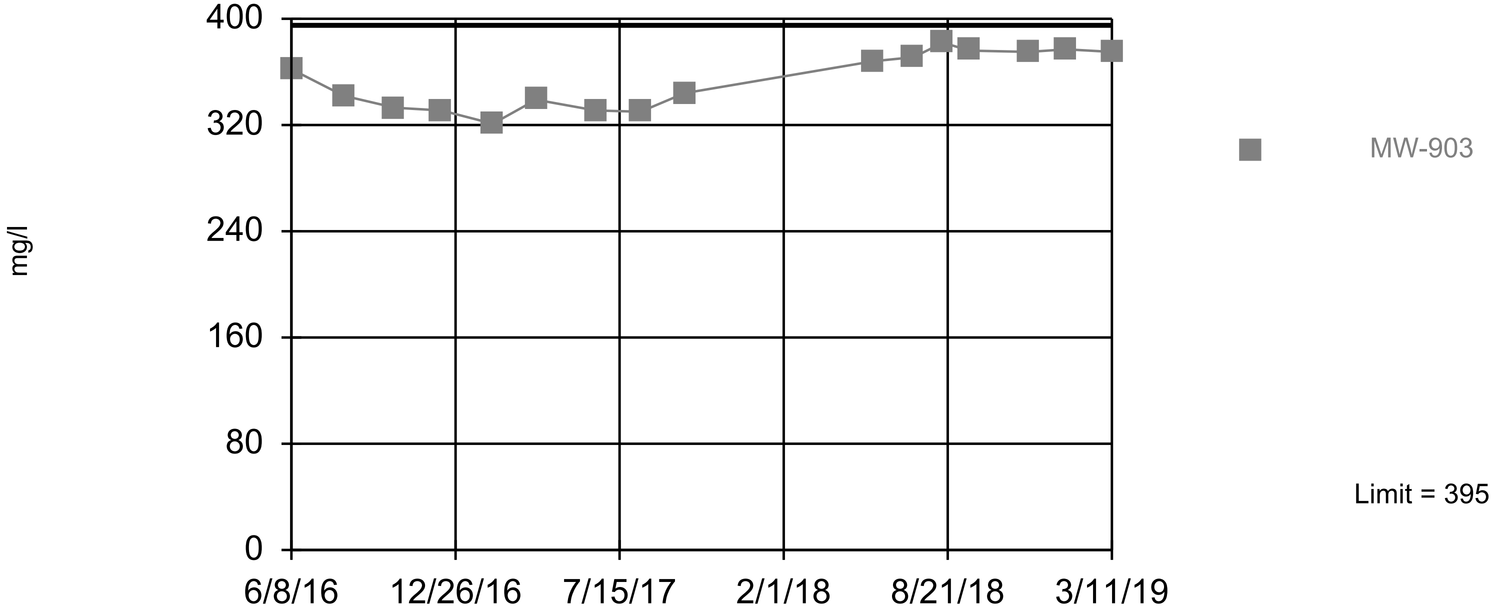
# Appendix E

# Facility Wide Interwell Prediction Limits

Within Limit

# Prediction Limit

## Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 82 background values. Annual per-constituent alpha = 0.0001433. Individual comparison alpha = 0.00001024 (1 of 3). Assumes 6 future values. Seasonality was not detected with 95% confidence.

Constituent: CALCIUM Analysis Run 5/15/2019 4:56 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

# Prediction Limit

Constituent: CALCIUM (mg/l)  Analysis Run 5/15/2019 5:17 PM  View: Bottom Ash III

LaCygne  Client: SCS Engineers  Data: LaC GW Data

---

| | MW-10 (bg) | MW-703 (bg) | MW-701 (bg) | MW-903 | MW-901 (bg) | MW-601 (bg) | MW-13 (bg) | MW-602 (bg) |
|---|---|---|---|---|---|---|---|---|
| 6/6/2016 | 60.1 | | | | | | | |
| 6/7/2016 | | 22 | 39.6 | | | | | |
| 6/8/2016 | | | | 362 | 57.2 | | | |
| 6/9/2016 | | | | | | 21.7 | 363 | |
| 6/10/2016 | | | | | | | | 24.7 |
| 8/9/2016 | | 17.9 | 35.3 | | | 20.3 | | 23.3 |
| 8/11/2016 | 58.7 | | | 342 | 53.9 | | 371 | |
| 10/11/2016 | | 20.5 | 37.2 | | | | | |
| 10/12/2016 | 60.7 | | | | | | | |
| 10/13/2016 | | | | 333 | | 23.9 | 395 | 25.7 |
| 10/14/2016 | | | | | 52.1 | | | |
| 12/6/2016 | | 19.8 | 37.2 | | | | | |
| 12/7/2016 | | | | | | 22.5 | | |
| 12/9/2016 | 59 | | | 331 | | | | 25.3 |
| 12/12/2016 | | | | | 56.9 | | | |
| 12/13/2016 | | | | | | | 336 | |
| 2/7/2017 | | 17.7 | 37.4 | | | | | |
| 2/8/2017 | 58.8 | | | | | 20.1 | | 24 |
| 2/9/2017 | | | | | 55.7 | | | |
| 2/10/2017 | | | | 321 | | | 297 | |
| 4/4/2017 | | 22.4 | 36.3 | 339 | 57.6 | | | |
| 4/6/2017 | 57.4 | | | | | 21.3 | 320 | |
| 4/7/2017 | | | | | | | | 24.9 |
| 6/13/2017 | | | 36.1 | | | | | |
| 6/14/2017 | | 17.4 | | | | | | |
| 6/15/2017 | 55.5 | | | | | 22 | 339 | 23.2 |
| 6/16/2017 | | | | 331 | 56.7 | | | |
| 8/8/2017 | | | 36.3 | | | | 319 | |
| 8/9/2017 | | | | | | 20.9 | | |
| 8/10/2017 | 56.1 | 17.5 | | 330 | | | | 23.3 |
| 8/11/2017 | | | | | 56 | | | |
| 10/3/2017 | | | 36.1 | 344 | 58.2 | | | |
| 10/4/2017 | 58.4 | | | | | | | |
| 10/5/2017 | | 21.6 | | | | | 274 | 25.3 |
| 10/6/2017 | | | | | | 21.1 | | |
| 5/23/2018 | 54.1 | | | 368 | 57.1 | 17.6 | 248 | 22.9 |
| 5/24/2018 | | 21.8 | 39.5 | | | | | |
| 7/11/2018 | | | | 371 | | | | |
| 8/16/2018 | | | | 382 | | | | |
| 9/17/2018 | | | | 376 | | | 214 | |
| 11/29/2018 | | | | 375 | 56.4 | | | |
| 11/30/2018 | 57.5 | | | | | 17.5 | 209 | 23.7 |
| 12/3/2018 | | 17.7 | 44.8 | | | | | |
| 1/14/2019 | | | | 377 | | 17.9 | 247 | |
| 1/15/2019 | | | 40.2 | | | | | |
| 3/11/2019 | | | 44.2 | 375 | | | | |

# Prediction Limit

LaCygne Client: SCS Engineers Data: LaC GW Data Printed 5/15/2019, 5:17 PM

| Constituent | Well | Upper Lim. | Lower Lim. | Date | Observ. | Sig. | Bg N | %NDs | Transform | Alpha | Method |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CALCIUM (mg/l) | MW-903 | 395 | n/a | 3/11/2019 | 375 | No | 82 | 0 | n/a | 0.000... | NP Inter (normality) ... |

## C.2 CCR Groundwater Monitoring Alternative Source Demonstration Report May 2019 Groundwater Monitoring Event, La Cygne Generating Station (December 2019)

# CCR GROUNDWATER MONITORING
# ALTERNATIVE SOURCE DEMONSTRATION REPORT
# MAY 2019 GROUNDWATER MONITORING EVENT

## BOTTOM ASH IMPOUNDMENT
## LA CYGNE GENERATING STATION
## LA CYGNE, KANSAS

Presented To:

**Evergy Metro, Inc.**

Presented By:

**SCS ENGINEERS**
8575 West 110th Street, Suite 100
Overland Park, Kansas 66210
(913) 681-0030

December 2019

File No. 27217233.19

# CERTIFICATIONS

I, John R. Rockhold, being a qualified groundwater scientist and licensed Professional Geologist in the State of Kansas, do hereby certify the accuracy of the information in the CCR Groundwater Monitoring Alternative Source Demonstration Report for the Bottom Ash Impoundment at the La Cygne Generating Station. The Alternative Source Demonstration was prepared by me or under my direct supervision in accordance with generally accepted hydrogeological practices and the local standard of care.

29

12-3-19

John R. Rockhold, P.G.

SCS Engineers

I, Douglas L. Doerr, being a qualified licensed Professional Engineer in the State of Kansas, do hereby certify the accuracy of the information in the CCR Groundwater Monitoring Alternative Source Demonstration Report for the Bottom Ash Impoundment at the La Cygne Generating Station. The Alternative Source Demonstration was prepared by me or under my direct supervision in accordance with generally accepted engineering practices and the local standard of care.

14136

12-3-19

Douglas L. Doerr, P.E.

SCS Engineers

# Table of Contents

## Appendices

# 1 REGULATORY FRAMEWORK

Certain owners or operators of Coal Combustion Residuals (CCR) units are required to complete groundwater monitoring activities to evaluate whether a release from the unit has occurred. Included in the activities is the completion of a statistical analysis of the groundwater quality data as prescribed in § 257.93(h) of the CCR Final Rule. If the initial analysis indicates a statistically significant increase (SSI) over background levels, the owner or operator may perform an alternative source demonstration (ASD). In accordance with § 257.94(e)(2), the owner or operator of the CCR unit may demonstrate that a source other than the CCR unit caused the SSI over background levels for a constituent, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting a SSI over background levels to include obtaining a certification from a qualified professional engineer verifying the accuracy of the information in the report. If a successful demonstration is completed within the 90-day period, the owner or operator of the CCR unit may continue with a detection monitoring program under § 257.94. If a successful demonstration is not completed within the 90-day period, the owner or operator of the CCR unit must initiate an assessment monitoring program as required under § 257.95. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.

# 2 STATISTICAL RESULTS

Statistical analysis of monitoring data from the groundwater monitoring system for the Bottom Ash Impoundment at the La Cygne Generating Station has been completed in substantial compliance with the "Statistical Method Certification by A Qualified Professional Engineer" dated October 12, 2017. Detection monitoring groundwater samples were collected on May 23, 2019. Review and validation of the results from the May 2019 Detection Monitoring Event was completed on July 5, 2019, which constitutes completion and finalization of detection monitoring laboratory analyses. A statistical analysis was then conducted to determine whether there was a statistically significant increase (SSI) over background values for each constituent listed in Appendix III to Part 257-Constituents for Detection Monitoring. Two rounds of verification sampling were conducted for certain constituents on July 17, 2019 and August 22, 2019.

The completed statistical evaluation identified Appendix III constituent, calcium, above its prediction limit in monitoring well MW-903.

| Constituent/Monitoring Well | *UPL | Observation May 23, 2019 | 1st Verification July 17, 2019 | 2nd Verification August 22, 2019 |
|---|---|---|---|---|
| **Calcium** | | | | |
| MW-903 | 358.2 | 367 | 373 | 366 |

*UPL – Upper Prediction Limit

**Determination: A statistical evaluation was completed for all Appendix III detection monitoring constituents in accordance with the certified statistical method. The statistical evaluation confirmed one SSI above the background prediction limit for calcium in monitoring well MW-903.**

# 3 ALTERNATIVE SOURCE DEMONSTRATION

An Alternative Source Demonstration (ASD) is a means to provide supporting lines of evidence that something other than a release from a regulated CCR unit caused an SSI. For the above identified SSI for the Bottom Ash Impoundment at the La Cygne Generating Station, there are multiple lines of supporting evidence to indicate the SSI was not caused by a release from the Bottom Ash Impoundment. Select multiple lines of supporting evidence are described as follows.

## 3.1 BOTTOM ASH SPLP ANALYSIS

The Synthetic Precipitation Leaching Procedure (SPLP) is an Environmental Protection Agency (EPA) approved extraction procedure designed to simulate and then analyze leachate, which would be produced from rainfall passing through a contaminated material (assuming the rainfall is slightly acidic). The SPLP is used to assess the potential of a contaminated material (in or on top of the ground) to impact groundwater (or surface water), when exposed to normal weathering. A bottom ash sample was collected on September 17, 2018 and submitted to the laboratory for SPLP analysis for calcium. The calcium result for the SPLP extract (simulated leachate) was 73.7 mg/L. The prediction limit for calcium in monitoring well MW-903 is 358.2 mg/L and the detection monitoring sample was reported at 367 mg/L. The calcium concentration in the groundwater from MW-903 is significantly greater than what would be expected from bottom ash leachate. The comparison indicates the elevated calcium concentrations in monitoring well MW-903 are not from bottom ash leachate but from a source other than bottom ash, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The laboratory report is provided in **Appendix A.**

## 3.2 BOX AND WHISKERS PLOTS

A commonly accepted method to demonstrate and visualize the distribution of data in a given data set is to construct box and whiskers plots. The basic “box” plotted graphically locates the median, 25th and 75th percentiles of the data set; the "whiskers" extend to the minimum and maximum values of the data set. The range between the ends of a box plot represents the Interquartile Range, which can be used as an estimate of spread or variability. The mean is denoted by a "+".

When comparing multiple wells or well groups, box plots for each well can be lined up on the same axis to roughly compare the variability in each well. This may be used as an exploratory screening for the test of homogeneity of variance across multiple wells.

Based on the bottom ash SPLP calcium analysis compared to the calcium results for MW-903, the calcium levels for additional wells at the La Cygne Generating Station (not part of the CCR Bottom Ash groundwater monitoring system) were reviewed for elevated calcium levels to determine if elevated calcium concentrations could occur naturally in the vicinity of the facility and if natural variability between wells occurred in the vicinity of the facility. Four wells were identified as exhibiting elevated calcium and one of them was an upgradient well. Box and whiskers plots for calcium for upgradient monitoring wells MW-13 and MW-602 and downgradient wells MW-707B, MW-805, and MW-903 were prepared for comparison. Upgradient monitoring well MW-602 does not have elevated calcium but is located in close proximity to MW-13, indicating natural variability of calcium over short distances occurs at the site. The comparison also indicates the calcium levels in monitoring well MW-903 are within the range of calcium concentrations in upgradient wells at the facility site and that significant natural variability occurs between wells and across the site. This demonstrates that a source other than the bottom ash caused the SSI above background levels for calcium, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Box and whiskers plots are provided in **Appendix B**.

## 3.3 TIME SERIES PLOTS

Time series plots provide a graphical method to view changes in data at a particular well (monitoring point) or wells over time. Time series plots display the variability in concentration levels over time and can be used to indicate possible outliers or data errors. More than one well can be compared on the same plot to look for differences between wells. Non-detect data is plotted as censored data at one-half of the laboratory reporting limit. Time series plots can also be used to examine the data for trends.

Four wells were identified as exhibiting elevated calcium and one of them was an upgradient well. Of the four wells exhibiting elevated calcium, wells, MW-805 and MW-903 also exhibited a SSIs. Time series plots for calcium for upgradient monitoring wells MW-13 and MW-602 and downgradient wells MW-707B, MW-805, and MW-903 were prepared for comparison. Upgradient monitoring well MW-602 does not have elevated calcium but is located close to MW-13 indicating natural variability of calcium over short distances occurs at the site. The comparison indicates the calcium levels in monitoring well MW-903 are within the range of calcium concentrations in upgradient wells at the site and that significant natural variability occurs between wells and across the site. This demonstrates that a source other than the bottom ash caused the SSI above background levels for calcium, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Time series plots are provided in **Appendix C**.

## 3.4 PIPER PLOTS

Piper diagrams are a form of tri-linear diagram, and a widely accepted method to provide a visual representation of the ion concentration of groundwater. Piper diagrams portray water compositions and facilitate the interpretation and presentation of chemical analyses. They may be used to visually compare the chemical composition of water quality across wells, and aid in determining whether the waters are similar or dis-similar, and can over time indicate whether the waters are mixing.

A piper diagram has two triangular plots on the right and left side of a 4-sided center field. The three major cations are plotted in the left triangle and anions in the right. Each of the three cation/anion variables, in milliequivalents, is divided by the sum of the three values, to produce a percent of total cation/anions. These percentages determine the location of the associated symbol. The data points in the center field are located by extending the points in the lower triangles to the point of intersection. In order for a piper diagram to be produced, the selected data file must contain the following constituents: Sodium (Na), Potassium (K), Calcium (Ca), Magnesium (Mg), Chloride (Cl), Sulfate (SO4), Carbonate (CO3), and Bicarbonate (HCO3).

A piper diagram generated for samples from MW-903 and samples from MW-13 (upgradient well for the CCR Landfill and Lower AQC Impoundment) are provided in **Appendix D.** The samples plot near one another in the same hydrochemical facies indicating similar geochemical characteristics between an upgradient well at the facility and a downgradient well for the Bottom Ash Impoundment. The comparison indicates the hydrochemical characteristics (particularly calcium) of groundwater from monitoring well MW-903 are similar to the hydrochemical characteristics (particularly calcium) of background groundwater and are a similar range as that of an upgradient well at the facility and that significant natural variability occurs between wells and across the site. This demonstrates that a source other than the bottom ash caused the SSI above background levels for calcium, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The piper diagram plots are provided in **Appendix D**.

## 3.5 FACILITY WIDE INTERWELL PREDICTION LIMIT

Because of known complexities and heterogeneities of the water bearing zone at the facility, an intrawell prediction limit analysis with retesting was the selected statistical method for the Bottom Ash Impoundment. However, false positives (SSIs) may occur due to a limited background data set that may not truly represent the background population for that particular well until the number of background observations are increased to better represent the entire population. The CCR Rule preamble recommends a minimum of eight to ten independent background observations be collected before performing the first statistical test; but also states that background sample sets of at least 20 are considered optimal. To further demonstrate that an intrawell prediction limit exceedance (SSI) could be naturally occurring and likely the result of a limited background data set for a particular well, an interwell prediction limit analysis on a facility wide basis can be useful to further demonstrate natural variability across a site or in the vicinity of the site and that the potential true background population may not be represented.

An interwell prediction limit analysis on a facility wide basis was performed comparing the calcium concentration in MW-903 to the prediction limit calculated from the combined background calcium data from all of the background (upgradient) monitoring wells across the facility. For this scenario, the facility wide interwell prediction limit for calcium is 395 mg/L. The highest calcium concentration from MW-903 is 382 mg/L, which is below the facility wide interwell prediction limit for calcium. The interwell prediction limit analysis further indicates the calcium levels in monitoring well MW-903 are within the range of calcium concentrations in upgradient wells at the facility site. This demonstrates that a source other than the bottom ash could cause the SSI above background levels for calcium, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Facility wide interwell prediction limit outputs are provided in **Appendix E**.

# 4 CONCLUSION

Our opinion is that a sufficient body of evidence is available and presented above to demonstrate that a source other than the Bottom Ash Impoundment caused the SSI above background levels for calcium, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Based on the successful ASD, the owner or operator of the Bottom Ash Impoundment may continue with the detection monitoring program under § 257.94.

# 5 GENERAL COMMENTS

This report has been prepared and reviewed under the direction of a qualified groundwater scientist and qualified professional engineer. Please note that SCS Engineers does not warrant the work of regulatory agencies or other third parties supplying information used in the assimilation of this report. This report is prepared in accordance with generally accepted environmental engineering and geological practices, within the constraints of the client's directives. It is intended for the exclusive use of Evergy Metro, Inc. for specific application to the La Cygne Generating Station. No warranties, express or implied, are intended or made.

The signature of the certifying registered geologist and professional engineer on this document represents that to the best of their knowledge, information, and belief in the exercise of their professional judgement in accordance with the standard of practice, it is their professional opinions that the aforementioned information is accurate as of the date of such signature. Any opinion or decisions by them are made on the basis of their experience, qualifications, and professional judgement and are not to be construed as warranties or guaranties. In addition, opinions relating to regulatory, environmental, geologic, geochemical and geotechnical conditions interpretations or other estimates are based on available data, and actual conditions may vary from those encountered at the times and locations where data are obtained, despite the use of due care.

# Appendix A

# Bottom Ash SPLP Laboratory Report

Pace Analytical®
National Center for Testing & Innovation

# ANALYTICAL REPORT

October 01, 2018

## SCS Engineers - KS

| | |
|---|---|
| Sample Delivery Group: | L1027123 |
| Samples Received: | 09/19/2018 |
| Project Number: | 27217233.18 |
| Description: | KCPL - LaCygne Generating Station |

Report To:

Jason Franks
8575 West 110th Street
Suite 100
Overland Park, KS 66210

Entire Report Reviewed By:

Jeff Carr
Project Manager

12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

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| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R Franks | 09/17/18 12:00 | 09/19/18 11:50 |

## BOTTOM ASH L1027123-01 GW

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Preparation by Method 1312 | WG1169395 | 1 | 09/21/18 11:47 | 09/21/18 11:47 | TM |
| Wet Chemistry by Method 9056A | WG1169693 | 1 | 09/24/18 20:14 | 09/24/18 20:14 | NJM |
| Metals (ICP) by Method 6010B | WG1170271 | 1 | 09/23/18 09:55 | 09/23/18 22:31 | CCE |

# CASE NARRATIVE

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Jeff Carr
Project Manager

## Preparation by Method 1312

| Analyte | Result | Qualifier | Prep<br>date / time | Batch |
|---|---|---|---|---|
| SPLP Extraction | - | | 9/21/2018 11:47:27 AM | WG1169395 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Chloride | ND | | 1000 | 1 | 09/24/2018 20:14 | WG1169693 |
| Fluoride | 118 | | 100 | 1 | 09/24/2018 20:14 | WG1169693 |
| Sulfate | 51100 | | 5000 | 1 | 09/24/2018 20:14 | WG1169693 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Boron | 959 | | 200 | 1 | 09/23/2018 22:31 | WG1170271 |
| Calcium | 73700 | | 1000 | 1 | 09/23/2018 22:31 | WG1170271 |

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

## Method Blank (MB)

(MB) R3344732-1 09/24/18 17:59

| | MB Result | MB Qualifier | MB MDL | MB RDL |
|---|---|---|---|---|
| Analyte | ug/l | | ug/l | ug/l |
| Chloride | U | | 51.9 | 1000 |
| Fluoride | U | | 9.90 | 100 |
| Sulfate | U | | 77.4 | 5000 |

## L1027594-11 Original Sample (OS) • Duplicate (DUP)

(OS) L1027594-11 09/24/18 22:52 • (DUP) R3344732-4 09/24/18 23:07

| | Original Result | DUP Result | Dilution | DUP RPD | DUP Qualifier | DUP RPD Limits |
|---|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | | % | | % |
| Chloride | 244 | 184 | 1 | 27.8 | J P1 | 15 |
| Sulfate | U | 0.000 | 1 | 0.000 | | 15 |

## L1027715-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1027715-01 09/25/18 01:45 • (DUP) R3344732-7 09/25/18 02:00

| | Original Result | DUP Result | Dilution | DUP RPD | DUP Qualifier | DUP RPD Limits |
|---|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | | % | | % |
| Chloride | 8430 | 8420 | 1 | 0.118 | | 15 |
| Sulfate | 8690 | 8710 | 1 | 0.147 | | 15 |

## L1027594-11 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1027594-11 09/24/18 22:52 • (MS) R3344732-5 09/24/18 23:21 • (MSD) R3344732-6 09/24/18 23:36

| | Spike Amount | Original Result | MS Result | MSD Result | MS Rec. | MSD Rec. | Dilution | Rec. Limits | MS Qualifier | MSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | ug/l | ug/l | % | % | | % | | | % | % |
| Chloride | 50000 | 244 | 50900 | 51100 | 101 | 102 | 1 | 80.0-120 | | | 0.435 | 15 |
| Sulfate | 50000 | U | 51800 | 51400 | 104 | 103 | 1 | 80.0-120 | | | 0.729 | 15 |

## L1027715-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1027715-01 09/25/18 01:45 • (MS) R3344732-8 09/25/18 02:14

| | Spike Amount | Original Result | MS Result | MS Rec. | Dilution | Rec. Limits | MS Qualifier |
|---|---|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | ug/l | % | | % | |
| Chloride | 50000 | 8430 | 59200 | 102 | 1 | 80.0-120 | |
| Sulfate | 50000 | 8690 | 59100 | 101 | 1 | 80.0-120 | |

## Method Blank (MB)

(MB) R3344358-1 09/23/18 21:58

| Analyte | MB Result<br>ug/l | MB Qualifier | MB MDL<br>ug/l | MB RDL<br>ug/l |
|---|---|---|---|---|
| Boron | U | | 12.6 | 200 |
| Calcium | U | | 46.3 | 1000 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3344358-2 09/23/18 22:01 • (LCSD) R3344358-3 09/23/18 22:03

| Analyte | Spike Amount<br>ug/l | LCS Result<br>ug/l | LCSD Result<br>ug/l | LCS Rec.<br>% | LCSD Rec.<br>% | Rec. Limits<br>% | LCS Qualifier | LCSD Qualifier | RPD<br>% | RPD Limits<br>% |
|---|---|---|---|---|---|---|---|---|---|---|
| Boron | 1000 | 992 | 995 | 99.2 | 99.5 | 80.0-120 | | | 0.340 | 20 |
| Calcium | 10000 | 10000 | 9930 | 100 | 99.3 | 80.0-120 | | | 0.917 | 20 |

## L1026826-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1026826-01 09/23/18 22:06 • (MS) R3344358-5 09/23/18 22:12 • (MSD) R3344358-6 09/23/18 22:14

| Analyte | Spike Amount<br>ug/l | Original Result<br>ug/l | MS Result<br>ug/l | MSD Result<br>ug/l | MS Rec.<br>% | MSD Rec.<br>% | Dilution | Rec. Limits<br>% | MS Qualifier | MSD Qualifier | RPD<br>% | RPD Limits<br>% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Boron | 1000 | 155 | 1170 | 1170 | 101 | 102 | 1 | 75.0-125 | | | 0.133 | 20 |
| Calcium | 10000 | 43500 | 53700 | 53700 | 102 | 102 | 1 | 75.0-125 | | | 0.0395 | 20 |

## Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

## Abbreviations and Definitions

| | |
|---|---|
| MDL | Method Detection Limit. |
| ND | Not detected at the Reporting Limit (or MDL where applicable). |
| RDL | Reported Detection Limit. |
| Rec. | Recovery. |
| RPD | Relative Percent Difference. |
| SDG | Sample Delivery Group. |
| U | Not detected at the Reporting Limit (or MDL where applicable). |
| Analyte | The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported. |
| Dilution | If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor. |
| Limits | These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges. |
| Original Sample | The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG. |
| Qualifier | This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable. |
| Result | The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte. |
| Case Narrative (Cn) | A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report. |
| Quality Control Summary (Qc) | This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material. |
| Sample Chain of Custody (Sc) | This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis. |
| Sample Results (Sr) | This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported. |
| Sample Summary (Ss) | This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis. |

| Qualifier | Description |
|---|---|
| J | The identification of the analyte is acceptable; the reported value is an estimate. |
| P1 | RPD value not applicable for sample concentrations less than 5 times the reporting limit. |

# ACCREDITATIONS & LOCATIONS

ONE LAB. NATIONWIDE.

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

## State Accreditations

| | |
|---|---|
| Alabama | 40660 |
| Alaska | 17-026 |
| Arizona | AZ0612 |
| Arkansas | 88-0469 |
| California | 2932 |
| Colorado | TN00003 |
| Connecticut | PH-0197 |
| Florida | E87487 |
| Georgia | NELAP |
| Georgia [1] | 923 |
| Idaho | TN00003 |
| Illinois | 200008 |
| Indiana | C-TN-01 |
| Iowa | 364 |
| Kansas | E-10277 |
| Kentucky [1,6] | 90010 |
| Kentucky [2] | 16 |
| Louisiana | AI30792 |
| Louisiana [1] | LA180010 |
| Maine | TN0002 |
| Maryland | 324 |
| Massachusetts | M-TN003 |
| Michigan | 9958 |
| Minnesota | 047-999-395 |
| Mississippi | TN00003 |
| Missouri | 340 |
| Montana | CERT0086 |

| | |
|---|---|
| Nebraska | NE-OS-15-05 |
| Nevada | TN-03-2002-34 |
| New Hampshire | 2975 |
| New Jersey–NELAP | TN002 |
| New Mexico [1] | n/a |
| New York | 11742 |
| North Carolina | Env375 |
| North Carolina [1] | DW21704 |
| North Carolina [3] | 41 |
| North Dakota | R-140 |
| Ohio–VAP | CL0069 |
| Oklahoma | 9915 |
| Oregon | TN200002 |
| Pennsylvania | 68-02979 |
| Rhode Island | LAO00356 |
| South Carolina | 84004 |
| South Dakota | n/a |
| Tennessee [1,4] | 2006 |
| Texas | T 104704245-17-14 |
| Texas [5] | LAB0152 |
| Utah | TN00003 |
| Vermont | VT2006 |
| Virginia | 460132 |
| Washington | C847 |
| West Virginia | 233 |
| Wisconsin | 9980939910 |
| Wyoming | A2LA |

## Third Party Federal Accreditations

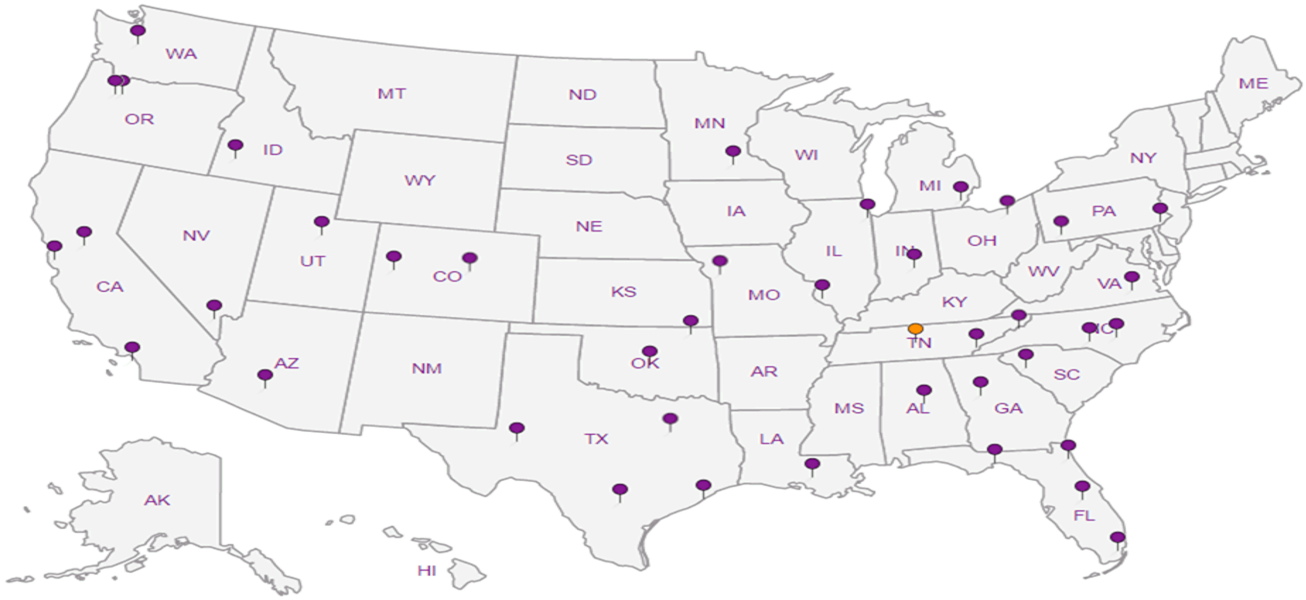
| | |
|---|---|
| A2LA – ISO 17025 | 1461.01 |
| A2LA – ISO 17025 [5] | 1461.02 |
| Canada | 1461.01 |
| EPA–Crypto | TN00003 |

| | |
|---|---|
| AIHA-LAP,LLC EMLAP | 100789 |
| DOD | 1461.01 |
| USDA | P330-15-00234 |

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

## Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



**SCS Engineers - KS**

8575 West 110th Street
Suite 100
Overland Park, KS 66210

Billing Information:

**Accounts Payable**
**8575 West 110th Street**
**Suite 100**
**Overland Park, KS 66210**

Pres Chk

Report to:
**Jason Franks**

Email To: jfranks@scsengineers.com;
jay.martin@kcpl.com;

Project Description: **KCPL - LaCygne Generating Station**

City/State Collected: LaCygne, KS

Phone: **913-681-0030**
Fax: **913-681-0012**

Client Project # **27217233.18**

Lab Project # **AQUAOPKS-LACYGNE**

Collected by (print): JASON R. FRANKS

Site/Facility ID #

P.O. #

Collected by (signature): Jason R. Franks

Immediately Packed on Ice N ___ Y ✓

***Rush?*** (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Analysis / Container / Preservative

| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | No. of Cntrs | SPLP metals / anions 16ozClr-NoPres | Remarks | Sample # (lab only) |
|---|---|---|---|---|---|---|---|---|---|
| BOTTOM ASH | GRAB | SS | – | 9/18/18 | 1200 | 1 | X | | -01 |

Chain of Custody Page 1 of 1

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L1027123
E242

Acctnum: **AQUAOPKS**
Template: **T140691**
Prelogin: **P672563**
TSR: **206 - Jeff Carr**
PB:
Shipped Via:

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other________

Remarks: **SPLP - Extract for B, Ca, Cl, Fl, and SO4**

pH ______ Temp ______
Flow ______ Other ______

Samples returned via:
__ UPS __ FedEx __ Courier __ ______

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: ✓NP __Y __N
COC Signed/Accurate: ✓Y __N
Bottles arrive intact: ✓Y __N
Correct bottles used: ✓Y __N
Sufficient volume sent: ✓Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: __Y __N

Relinquished by : (Signature) Jason R. Franks
Date: 9/18/18
Time: 1500
Received by: (Signature)
9-18-18 1505

Trip Blank Received: Yes / [✓ No]
HCL / MeoH
TBR

Relinquished by : (Signature)
Date:
Time:
Received by: (Signature)

Temp: 1.6 c-.1 1.5 °C
Bottles Received: 1

If preservation required by Login: Date/Time

Relinquished by : (Signature)
Date:
Time:
Received for lab by: (Signature) 8C1

Date: 9/19/18
Time: 1150

Hold:

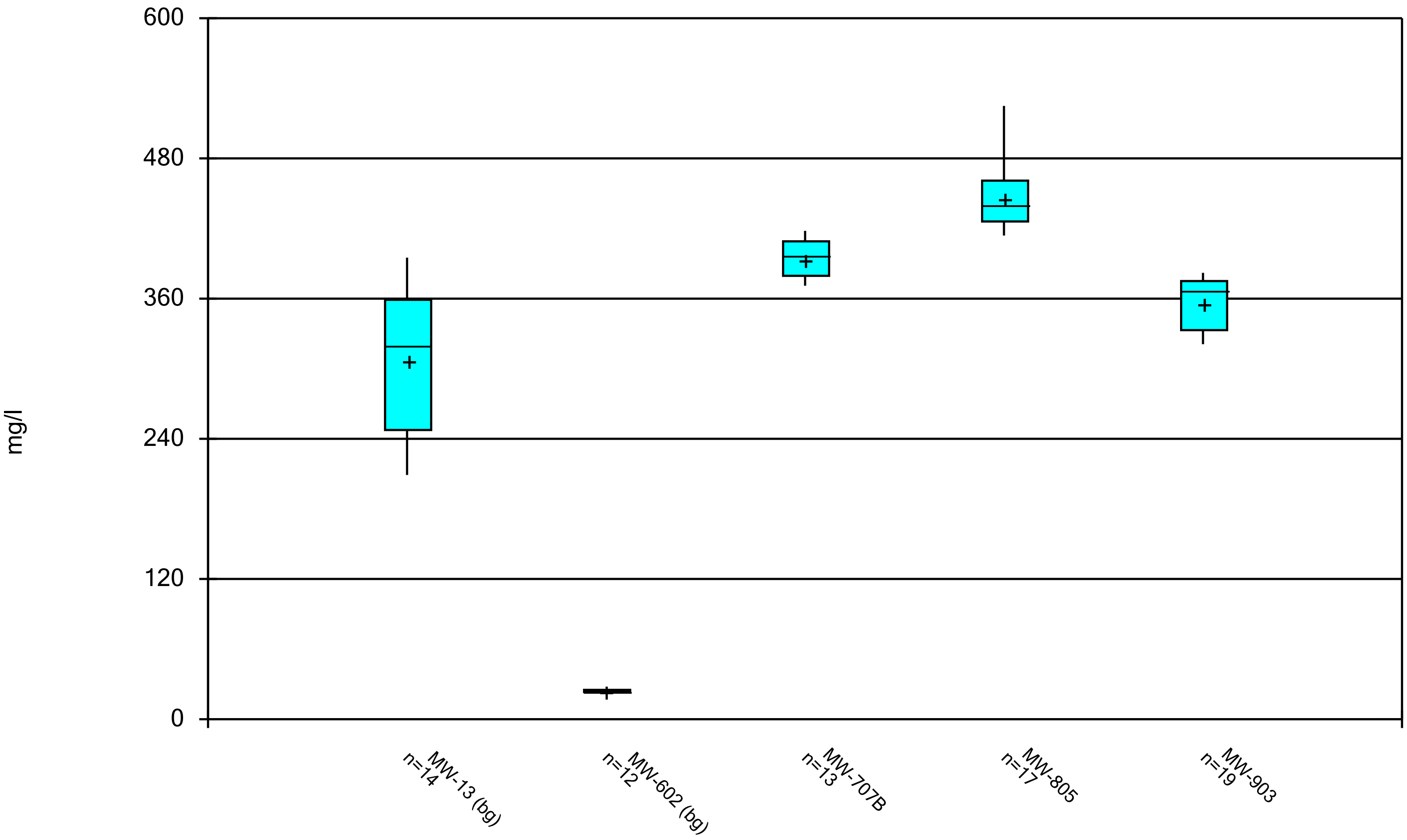
Condition: NCF / [✓ OK]

# Appendix B

# Box and Whiskers Plots

Sanitas™ v.9.6.23 Sanitas software licensed to SCS Engineers. UG

## Box & Whiskers Plot



Constituent: CALCIUM Analysis Run 10/30/2019 9:12 AM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

# Box & Whiskers Plot

Constituent: CALCIUM (mg/l)    Analysis Run 10/30/2019 9:13 AM    View: Bottom Ash III
LaCygne    Client: SCS Engineers    Data: LaC GW Data

---

| | MW-13 (bg) | MW-602 (bg) | MW-707B | MW-805 | MW-903 |
|---|---|---|---|---|---|
| 6/7/2016 | | | | 422 | |
| 6/8/2016 | | | | | 362 |
| 6/9/2016 | 363 | | | | |
| 6/10/2016 | | 24.7 | | | |
| 6/23/2016 | | | 371 | | |
| 8/9/2016 | | 23.3 | 412 | | |
| 8/10/2016 | | | | 437 | |
| 8/11/2016 | 371 | | | | 342 |
| 10/11/2016 | | | 408 | 422 | |
| 10/13/2016 | 395 | 25.7 | | | 333 |
| 12/6/2016 | | | 410 | 422 | |
| 12/9/2016 | | 25.3 | | | 331 |
| 12/13/2016 | 336 | | | | |
| 2/6/2017 | | | | 435 | |
| 2/7/2017 | | | 398 | | |
| 2/8/2017 | | 24 | | | |
| 2/10/2017 | 297 | | | | 321 |
| 4/4/2017 | | | 382 | 444 | 339 |
| 4/6/2017 | 320 | | | | |
| 4/7/2017 | | 24.9 | | | |
| 6/13/2017 | | | 374 | 430 | |
| 6/15/2017 | 339 | 23.2 | | | |
| 6/16/2017 | | | | | 331 |
| 8/8/2017 | 319 | | 378 | 414 | |
| 8/10/2017 | | 23.3 | | | 330 |
| 10/3/2017 | | | 382 | | 344 |
| 10/5/2017 | 274 | 25.3 | | 467 | |
| 12/12/2017 | | | | 525 | |
| 1/9/2018 | | | | 439 | |
| 5/23/2018 | 248 | 22.9 | | 434 | 368 |
| 5/24/2018 | | | 396 | | |
| 7/11/2018 | | | | | 371 |
| 8/16/2018 | | | | | 382 |
| 9/17/2018 | 214 | | | | 376 |
| 11/29/2018 | | | | | 375 |
| 11/30/2018 | 209 | 23.7 | | 455 | |
| 12/4/2018 | | | 381 | | |
| 1/14/2019 | 247 | | | 473 | 377 |
| 3/11/2019 | | | | 468 | 375 |
| 5/23/2019 | 355 | 23.1 | 418 | 442 | 367 |
| 7/17/2019 | | | 406 (i) | 453 (i) | 373 |
| 8/22/2019 | | | | | 366 |
| Median | 319.5 | 23.85 | 396 | 439 | 366 |
| LowerQ. | 247.5 | 23.25 | 379.5 | 426 | 333 |
| UpperQ. | 359 | 25.1 | 409 | 461 | 375 |
| Min | 209 | 22.9 | 371 | 414 | 321 |
| Max | 395 | 25.7 | 418 | 525 | 382 |
| Mean | 306.2 | 24.12 | 393.5 | 446 | 355.9 |

# Box & Whiskers Plot

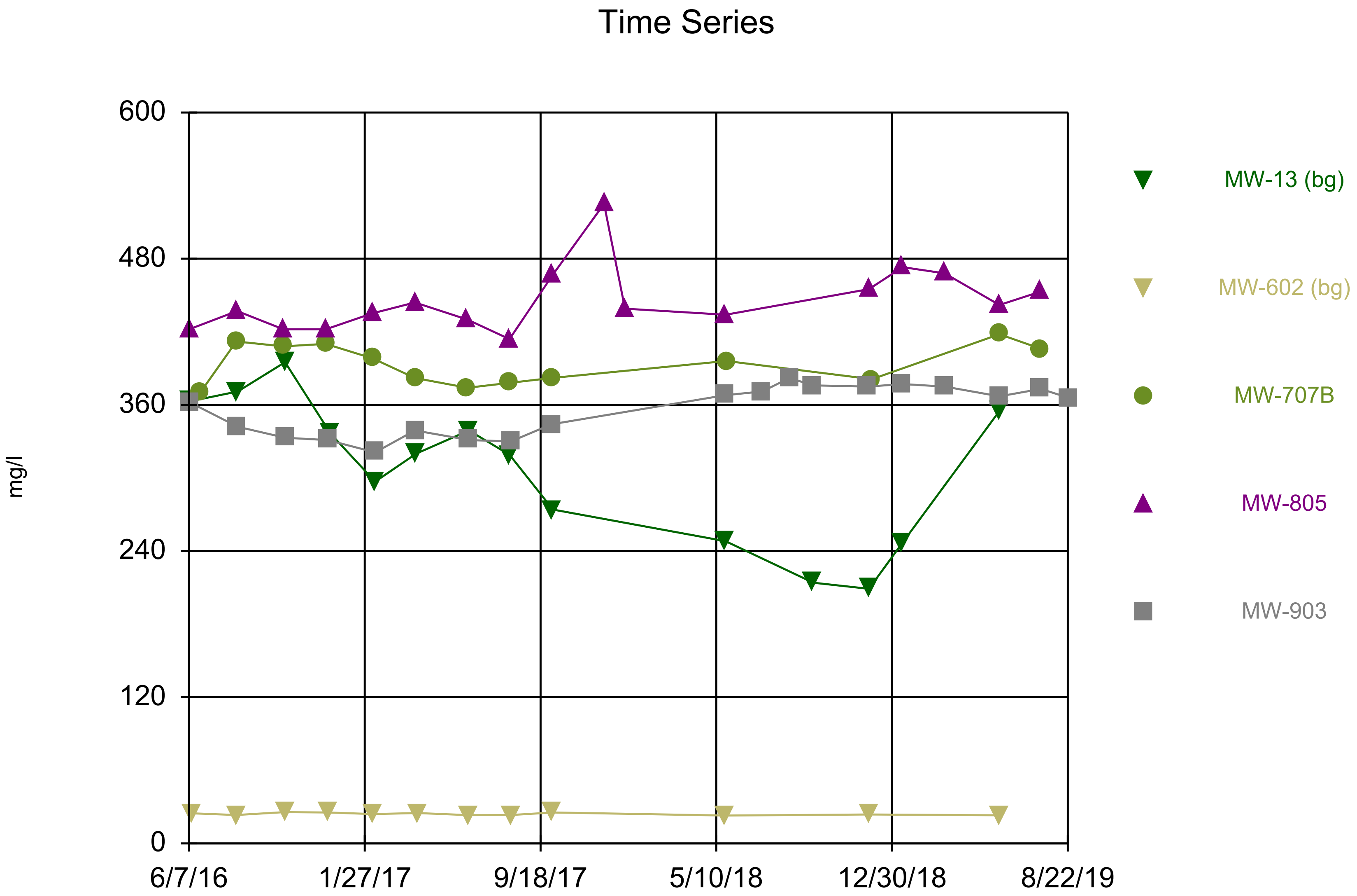
LaCygne Client: SCS Engineers Data: LaC GW Data Printed 10/30/2019, 9:13 AM

| Constituent | Well | N | Mean | Std. Dev. | Std. Err. | Median | Min. | Max. | %NDs |
|---|---|---|---|---|---|---|---|---|---|
| CALCIUM (mg/l) | MW-13 (bg) | 14 | 306.2 | 59.47 | 15.89 | 319.5 | 209 | 395 | 0 |
| CALCIUM (mg/l) | MW-602 (bg) | 12 | 24.12 | 1.006 | 0.2905 | 23.85 | 22.9 | 25.7 | 0 |
| CALCIUM (mg/l) | MW-707B | 13 | 393.5 | 16.22 | 4.497 | 396 | 371 | 418 | 0 |
| CALCIUM (mg/l) | MW-805 | 17 | 446 | 26.75 | 6.488 | 439 | 414 | 525 | 0 |
| CALCIUM (mg/l) | MW-903 | 19 | 355.9 | 20.36 | 4.671 | 366 | 321 | 382 | 0 |

# Appendix C

## Time Series Plots

Sanitas™ v.9.6.23 Sanitas software licensed to SCS Engineers. UG



Constituent: CALCIUM Analysis Run 10/30/2019 8:52 AM View: Bottom Ash III

LaCygne Client: SCS Engineers Data: LaC GW Data

# Time Series

Constituent: CALCIUM (mg/l)  Analysis Run 10/30/2019 8:53 AM  View: Bottom Ash III
LaCygne  Client: SCS Engineers  Data: LaC GW Data

---

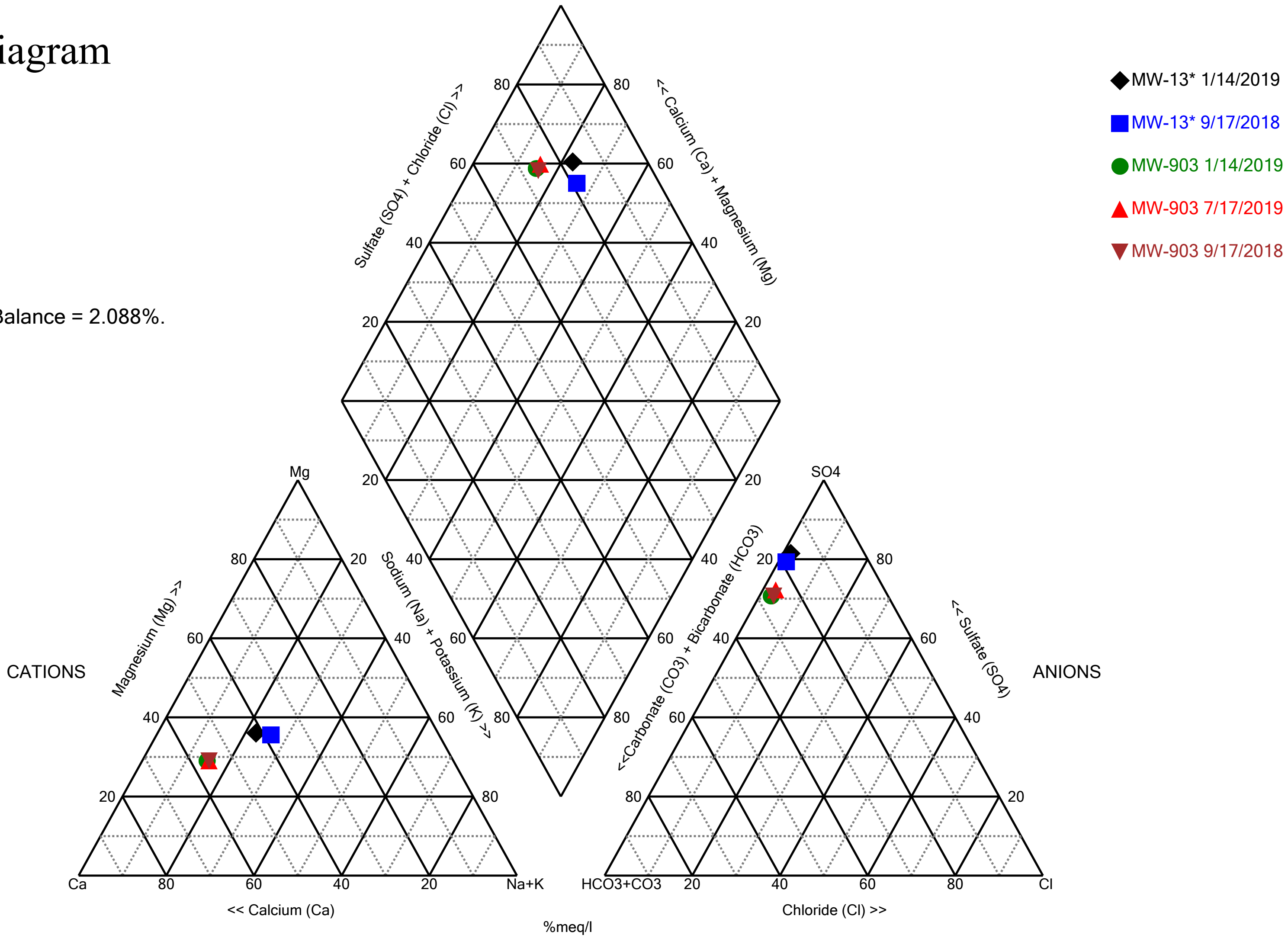
| | MW-13 (bg) | MW-602 (bg) | MW-707B | MW-805 | MW-903 |
|---|---|---|---|---|---|
| 6/7/2016 | | | | 422 | |
| 6/8/2016 | | | | | 362 |
| 6/9/2016 | 363 | | | | |
| 6/10/2016 | | 24.7 | | | |
| 6/23/2016 | | | 371 | | |
| 8/9/2016 | | 23.3 | 412 | | |
| 8/10/2016 | | | | 437 | |
| 8/11/2016 | 371 | | | | 342 |
| 10/11/2016 | | | 408 | 422 | |
| 10/13/2016 | 395 | 25.7 | | | 333 |
| 12/6/2016 | | | 410 | 422 | |
| 12/9/2016 | | 25.3 | | | 331 |
| 12/13/2016 | 336 | | | | |
| 2/6/2017 | | | | 435 | |
| 2/7/2017 | | | 398 | | |
| 2/8/2017 | | 24 | | | |
| 2/10/2017 | 297 | | | | 321 |
| 4/4/2017 | | | 382 | 444 | 339 |
| 4/6/2017 | 320 | | | | |
| 4/7/2017 | | 24.9 | | | |
| 6/13/2017 | | | 374 | 430 | |
| 6/15/2017 | 339 | 23.2 | | | |
| 6/16/2017 | | | | | 331 |
| 8/8/2017 | 319 | | 378 | 414 | |
| 8/10/2017 | | 23.3 | | | 330 |
| 10/3/2017 | | | 382 | | 344 |
| 10/5/2017 | 274 | 25.3 | | 467 | |
| 12/12/2017 | | | | 525 | |
| 1/9/2018 | | | | 439 | |
| 5/23/2018 | 248 | 22.9 | | 434 | 368 |
| 5/24/2018 | | | 396 | | |
| 7/11/2018 | | | | | 371 |
| 8/16/2018 | | | | | 382 |
| 9/17/2018 | 214 | | | | 376 |
| 11/29/2018 | | | | | 375 |
| 11/30/2018 | 209 | 23.7 | | 455 | |
| 12/4/2018 | | | 381 | | |
| 1/14/2019 | 247 | | | 473 | 377 |
| 3/11/2019 | | | | 468 | 375 |
| 5/23/2019 | 355 | 23.1 | 418 | 442 | 367 |
| 7/17/2019 | | | 406 (i) | 453 (i) | 373 |
| 8/22/2019 | | | | | 366 |

# Appendix D

## Piper Diagrams

# Piper Diagram

Cation-Anion Balance = 2.088%.



Analysis Run 10/30/2019 8:59 AM View: Bottom Ash III

LaCygne Client: SCS Engineers Data: LaC GW Data

# Piper Diagram

Analysis Run 10/30/2019 9:01 AM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

| Totals (ppm) | Na | K | Ca | Mg | Cl | SO4 | HCO3 | CO3 |
|---|---|---|---|---|---|---|---|---|
| MW-13* 9/17/2018 | 165 | 3.55 | 214 | 120 | 13.1 | 1010 | 295 | 10 |
| MW-13* 1/14/2019 | 151 | 3.3 | 247 | 128 | 12.5 | 1120 | 289 | 10 |
| MW-903 9/17/2018 | 116 | 6.47 | 376 | 117 | 26.1 | 1070 | 497 | 10 |
| MW-903 1/14/2019 | 110 | 6.18 | 377 | 118 | 24.3 | 1070 | 501 | 10 |
| MW-903 7/17/2019 | 114 | 6.45 | 373 | 117 | 25.6 | 1140 | 495 | 10 |

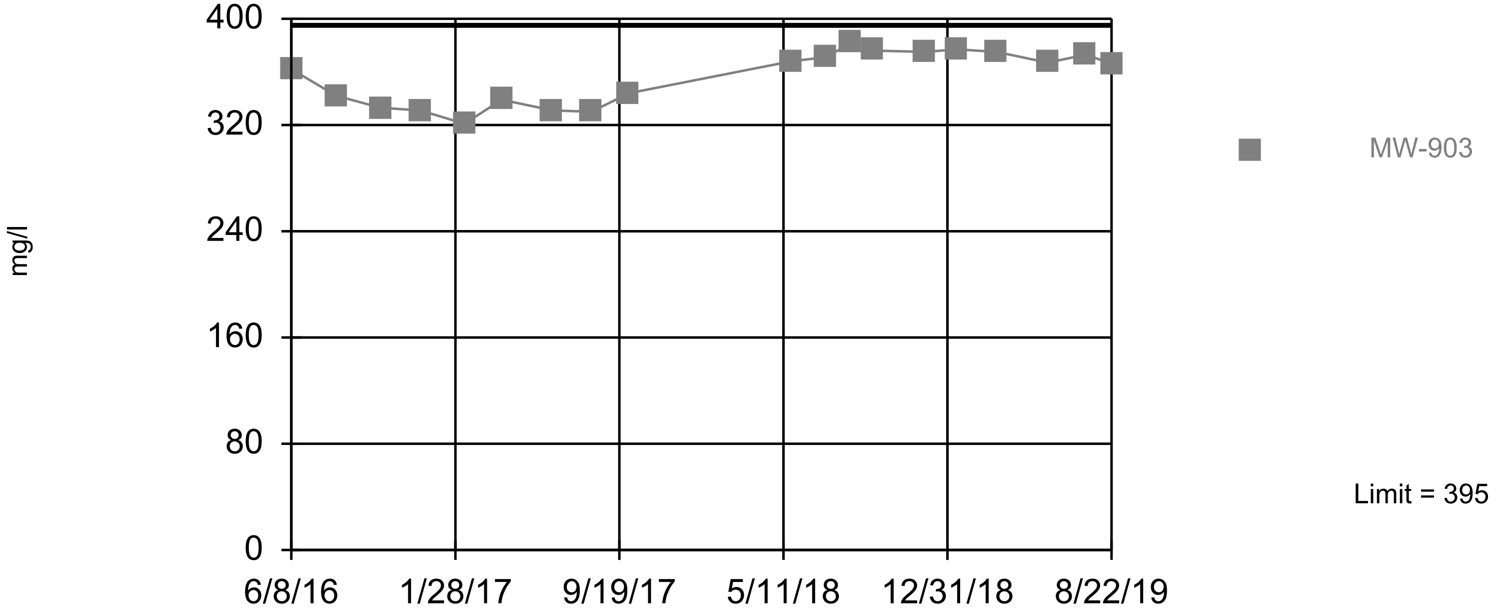
# Appendix E

## Facility Wide Interwell Prediction Limits

Within Limit

# Prediction Limit

## Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Chi Squared normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 105 background values. Annual per-constituent alpha = 0.0000709. Individual comparison alpha = 0.000005064 (1 of 3). Assumes 6 future values. Seasonality was not detected with 95% confidence.

Constituent: CALCIUM Analysis Run 10/30/2019 9:04 AM View: Bottom Ash III

LaCygne Client: SCS Engineers Data: LaC GW Data

# Prediction Limit

Constituent: CALCIUM (mg/l)  Analysis Run 10/30/2019 9:07 AM  View: Bottom Ash III

LaCygne  Client: SCS Engineers  Data: LaC GW Data

| | MW-10 (bg) | MW-703 (bg) | MW-701 (bg) | MW-903 | MW-901 (bg) | MW-702 (bg) | MW-601 (bg) | MW-13 (bg) | MW-602 (bg) |
|---|---|---|---|---|---|---|---|---|---|
| 6/6/2016 | 60.1 | | | | | | | | |
| 6/7/2016 | | 22 | 39.6 | | | | | | |
| 6/8/2016 | | | | 362 | 57.2 | 17.3 | | | |
| 6/9/2016 | | | | | | | 21.7 | 363 | |
| 6/10/2016 | | | | | | | | | 24.7 |
| 8/9/2016 | | 17.9 | 35.3 | | | 11.2 | 20.3 | | 23.3 |
| 8/11/2016 | 58.7 | | | 342 | 53.9 | | | 371 | |
| 10/11/2016 | | 20.5 | 37.2 | | | 14.9 | | | |
| 10/12/2016 | 60.7 | | | | | | | | |
| 10/13/2016 | | | | 333 | | | 23.9 | 395 | 25.7 |
| 10/14/2016 | | | | | 52.1 | | | | |
| 12/6/2016 | | 19.8 | 37.2 | | | | | | |
| 12/7/2016 | | | | | | | 22.5 | | |
| 12/8/2016 | | | | | | 19.4 | | | |
| 12/9/2016 | 59 | | | 331 | | | | | 25.3 |
| 12/12/2016 | | | | | 56.9 | | | | |
| 12/13/2016 | | | | | | | | 336 | |
| 2/7/2017 | | 17.7 | 37.4 | | | | | | |
| 2/8/2017 | 58.8 | | | | | 18.1 | 20.1 | | 24 |
| 2/9/2017 | | | | | 55.7 | | | | |
| 2/10/2017 | | | | 321 | | | | 297 | |
| 4/4/2017 | | 22.4 | 36.3 | 339 | 57.6 | | | | |
| 4/5/2017 | | | | | | 18.5 | | | |
| 4/6/2017 | 57.4 | | | | | | 21.3 | 320 | |
| 4/7/2017 | | | | | | | | | 24.9 |
| 6/13/2017 | | | 36.1 | | | | | | |
| 6/14/2017 | | 17.4 | | | | | | | |
| 6/15/2017 | 55.5 | | | | | 15.1 | 22 | 339 | 23.2 |
| 6/16/2017 | | | | 331 | 56.7 | | | | |
| 8/8/2017 | | | 36.3 | | | | | 319 | |
| 8/9/2017 | | | | | | 20.3 | 20.9 | | |
| 8/10/2017 | 56.1 | 17.5 | | 330 | | | | | 23.3 |
| 8/11/2017 | | | | | 56 | | | | |
| 10/3/2017 | | | 36.1 | 344 | 58.2 | 19.6 | | | |
| 10/4/2017 | 58.4 | | | | | | | | |
| 10/5/2017 | | 21.6 | | | | | | 274 | 25.3 |
| 10/6/2017 | | | | | | | 21.1 | | |
| 5/23/2018 | 54.1 | | | 368 | 57.1 | | 17.6 | 248 | 22.9 |
| 5/24/2018 | | 21.8 | 39.5 | | | 7.13 | | | |
| 7/11/2018 | | | | 371 | | | | | |
| 8/16/2018 | | | | 382 | | | | | |
| 9/17/2018 | | | | 376 | | | | 214 | |
| 11/29/2018 | | | | 375 | 56.4 | | | | |
| 11/30/2018 | 57.5 | | | | | | 17.5 | 209 | 23.7 |
| 12/3/2018 | | 17.7 | 44.8 | | | 3.24 | | | |
| 1/14/2019 | | | | 377 | | 11.2 | 17.9 | 247 | |
| 1/15/2019 | | | 40.2 | | | | | | |
| 3/11/2019 | | | 44.2 | 375 | | | | | |
| 5/23/2019 | 52.9 | 19.3 | 41.6 | 367 | 52.3 | 5.7 | 17.7 | 355 | 23.1 |
| 7/17/2019 | | | 45 | 373 | | | 18.2 (i) | | |
| 8/22/2019 | | | | 366 | | | | | |
| 8/23/2019 | | | 39.9 | | | | | | |

# Prediction Limit

LaCygne  Client: SCS Engineers  Data: LaC GW Data  Printed 10/30/2019, 9:07 AM

| Constituent | Well | Upper Lim. | Lower Lim. | Date | Observ. | Sig. | Bg N | %NDs | Transform | Alpha | Method |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CALCIUM (mg/l) | MW-903 | 395 | n/a | 8/22/2019 | 366 | No | 105 | 0 | n/a | 0.000... | NP Inter (normality) ... |

# Addendum 1

## 2019 Annual Groundwater Monitoring and Corrective Action Report
## Addendum 1

SCS ENGINEERS
Environmental Consulting & Contracting

December 16, 2022
File No. 27217233.19

JOHN R. ROCKHOLD
29
12-16-22

To: Evergy Metro, Inc.
Jared Morrison – Director, Water and Waste Programs

From: SCS Engineers
Douglas L. Doerr, P.E.
John R. Rockhold, P.G.

Subject: 2019 Annual Groundwater Monitoring and Corrective Action Report Addendum 1
Evergy Metro, Inc.
Bottom Ash Impoundment
La Cygne Generating Station - La Cygne, Kansas

The Bottom Ash Impoundment at the La Cygne Generating Station are subject to the groundwater monitoring and corrective action requirements of the “Coal Combustion Residuals (CCR) Final Rule” (Rule); as described in CFR 40 257.90 through CFR 40 257.98. An Annual Groundwater Monitoring and Corrective Action (GWMCA) Report documenting activities completed in 2019 for the Bottom Ash Impoundment was completed and placed in the facility’s operating record on January 30, 2020, as required by the Rule. The Annual GWMCA report was to fulfill the requirements specified in 40 CFR 257.90(e).

This Addendum has been prepared to supplement the operating record in recognition of comments received by Evergy from the U.S. Environmental Protection Agency (USEPA) on January 11, 2022. In addition to the information listed in 40 CFR 257.90(e), the USEPA indicated in their comments that the GWMCA Report contain the following:

- Results of laboratory analysis of groundwater or other environmental media samples for 40 CFR 257 Appendix III and Appendix IV constituents or other constituents, such as those supporting characterization of site conditions that may ultimately affect a remedy.
- Required statistical analysis performed on laboratory analysis results; and
- Calculated groundwater flow rate and direction.

This information is not specifically referred to in 40 CFR 257.90(e) for inclusion in the GWMCA Reports; however, it is routinely collected, determined and maintained in Evergy’s files and is being provided in the attachments to this addendum.

The attachments to this addendum are as follows:

- Attachment 1 – Laboratory Analytical Reports:

  Includes laboratory data packages with supporting information such as case narrative, sample and method summary, analytical results, quality control, and chain-of-custody documentation. The laboratory data packages for the following sampling events are provided:

  - January 2019 – First verification sampling for the Fall 2018 detection monitoring sampling event.
  - March 2019 – Second verification sampling for the Fall 2018 detection monitoring sampling event.
  - May 2019 – Spring 2019 semiannual detection monitoring sampling event.
  - July 2019 – First verification sampling for the Spring 2019 detection monitoring sampling event.
  - August 2019 - Second verification sampling for the Spring 2019 detection monitoring sampling event.
  - November 2019 - Fall 2019 semiannual detection monitoring sampling event.

- Attachment 2 - Statistical Analyses:

  Includes summary of statistical results, prediction limit plots, prediction limit background data, detection sample results, first and second verification re-sample results (when applicable), extra sample results for pH (collected as part of the approved sampling procedures), input parameters, and a Prediction Limit summary table. Statistical analyses completed in 2019 included the following:

  - Fall 2018 semiannual detection monitoring statistical analyses.
  - Spring 2019 semiannual detection monitoring statistical analyses.

- Attachment 3 - Revised Groundwater Potentiometric Surface Maps:

  Includes revised groundwater potentiometric surface maps with the measured groundwater elevations at each well and the generalized groundwater flow direction and the calculated groundwater flow rate. Maps for the following sampling events are provided:

  - May 2019 - Spring 2019 semiannual detection monitoring sampling event.
  - November 2019 - Fall 2019 semiannual detection monitoring sampling event.

# ATTACHMENT 1

## Laboratory Analytical Reports

# ATTACHMENT 1-1

# January 2019 Sampling Event Laboratory Report

Pace Analytical®
National Center for Testing & Innovation

# ANALYTICAL REPORT

January 23, 2019

## SCS Engineers - KS

| | |
|---|---|
| Sample Delivery Group: | L1061523 |
| Samples Received: | 01/16/2019 |
| Project Number: | 27217233.18 |
| Description: | KCPL - LaCygne Generating Station |
| | |
| Report To: | Jason Franks<br>8575 West 110th Street<br>Suite 100<br>Overland Park, KS  66210 |

Entire Report Reviewed By:

Jeff Carr
Project Manager

12065 Lebanon Rd    Mount Juliet, TN 37122    615-758-5858    800-767-5859    www.pacenational.com

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7 Gl
8 Al
9 Sc

## MW-13 L1061523-01 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 01/14/19 16:25 | 01/16/19 08:30 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1225451 | 1 | 01/22/19 14:30 | 01/22/19 14:30 | ST |
| Metals (ICP) by Method 6010B | WG1224609 | 1 | 01/23/19 08:04 | 01/23/19 10:54 | TRB |

## DUPLICATE 1 L1061523-02 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 01/14/19 16:25 | 01/16/19 08:30 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1225451 | 1 | 01/22/19 15:16 | 01/22/19 15:16 | ST |
| Metals (ICP) by Method 6010B | WG1224609 | 1 | 01/23/19 08:04 | 01/23/19 11:25 | TRB |

## MW-14R L1061523-03 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 01/14/19 16:35 | 01/16/19 08:30 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1225457 | 1 | 01/19/19 18:09 | 01/19/19 18:09 | ELN |
| Metals (ICP) by Method 6010B | WG1224609 | 1 | 01/23/19 08:04 | 01/23/19 11:04 | TRB |

## DUPLICATE 2 L1061523-04 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 01/14/19 16:40 | 01/16/19 08:30 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1225451 | 1 | 01/22/19 15:32 | 01/22/19 15:32 | ST |
| Metals (ICP) by Method 6010B | WG1224609 | 1 | 01/23/19 08:04 | 01/23/19 11:28 | TRB |

## MW-15 L1061523-05 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 01/14/19 15:50 | 01/16/19 08:30 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG1224609 | 1 | 01/23/19 08:04 | 01/23/19 11:30 | TRB |

## MW-601 L1061523-06 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 01/14/19 16:00 | 01/16/19 08:30 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1225463 | 1 | 01/22/19 19:04 | 01/22/19 19:04 | ELN |

## DUPLICATE 3 L1061523-07 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 01/14/19 16:00 | 01/16/19 08:30 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1225451 | 1 | 01/22/19 15:47 | 01/22/19 15:47 | ST |

## MW-701 L1061523-08 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 01/15/19 12:05 | 01/16/19 08:30 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG1224609 | 1 | 01/23/19 08:04 | 01/23/19 11:18 | TRB |

## DUPLICATE 4 L1061523-09 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 01/15/19 12:05 | 01/16/19 08:30 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG1224609 | 1 | 01/23/19 08:04 | 01/23/19 11:33 | TRB |

## MW-702 L1061523-10 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 01/14/19 15:05 | 01/16/19 08:30 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1225451 | 1 | 01/22/19 16:03 | 01/22/19 16:03 | ST |

## MW-706 L1061523-11 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 01/15/19 11:55 | 01/16/19 08:30 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1225451 | 1 | 01/22/19 16:33 | 01/22/19 16:33 | ST |

## MW-804 L1061523-12 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 01/14/19 14:05 | 01/16/19 08:30 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG1224609 | 1 | 01/23/19 08:04 | 01/23/19 11:36 | TRB |

## MW-805 L1061523-13 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 01/14/19 14:05 | 01/16/19 08:30 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG1224609 | 1 | 01/23/19 08:04 | 01/23/19 11:38 | TRB |

## MW-902 L1061523-14 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 01/14/19 13:15 | 01/16/19 08:30 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Gravimetric Analysis by Method 2540 C-2011 | WG1224723 | 1 | 01/19/19 18:11 | 01/19/19 20:53 | AJS |

## DUPLICATE 5 L1061523-15 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 01/14/19 13:15 | 01/16/19 08:30 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Gravimetric Analysis by Method 2540 C-2011 | WG1224723 | 1 | 01/19/19 18:11 | 01/19/19 20:53 | AJS |

## MW-903 L1061523-16 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 01/14/19 13:15 | 01/16/19 08:30 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG1224609 | 1 | 01/23/19 08:04 | 01/23/19 11:41 | TRB |

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Jeff Carr

Jeff Carr
Project Manager

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Fluoride | 208 |  | 100 | 1 | 01/22/2019 14:30 | WG1225451 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Boron | 539 |  | 200 | 1 | 01/23/2019 10:54 | WG1224609 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Fluoride | 214 | | 100 | 1 | 01/22/2019 15:16 | WG1225451 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Boron | 558 | | 200 | 1 | 01/23/2019 11:25 | WG1224609 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Chloride | 5960 | | 1000 | 1 | 01/19/2019 18:09 | WG1225457 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Boron | 859 | | 200 | 1 | 01/23/2019 11:04 | WG1224609 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Chloride | 5960 | | 1000 | 1 | 01/22/2019 15:32 | WG1225451 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Boron | 884 | | 200 | 1 | 01/23/2019 11:28 | WG1224609 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Boron | 288 | | 200 | 1 | 01/23/2019 11:30 | WG1224609 |

## Wet Chemistry by Method 9056A

| | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| Analyte | ug/l | | ug/l | | date / time | |
| Sulfate | 5970 | | 5000 | 1 | 01/22/2019 19:04 | WG1225463 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Sulfate | 6650 | | 5000 | 1 | 01/22/2019 15:47 | WG1225451 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Calcium | 40200 | | 1000 | 1 | 01/23/2019 11:18 | WG1224609 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Calcium | 40500 | | 1000 | 1 | 01/23/2019 11:33 | WG1224609 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Fluoride | 1200 | | 100 | 1 | 01/22/2019 16:03 | WG1225451 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Sulfate | 7730 | | 5000 | 1 | 01/22/2019 16:33 | WG1225451 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Boron | 1730 | | 200 | 1 | 01/23/2019 11:36 | WG1224609 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Calcium | 473000 | | 1000 | 1 | 01/23/2019 11:38 | WG1224609 |

## Gravimetric Analysis by Method 2540 C-2011

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Dissolved Solids | 492000 | | 10000 | 1 | 01/19/2019 20:53 | WG1224723 |

## Gravimetric Analysis by Method 2540 C-2011

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Dissolved Solids | 490000 | | 10000 | 1 | 01/19/2019 20:53 | WG1224723 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Calcium | 377000 | | 1000 | 1 | 01/23/2019 11:41 | WG1224609 |

## Method Blank (MB)

(MB) R3377316-1 01/19/19 20:53

| Analyte | MB Result<br>ug/l | MB Qualifier | MB MDL<br>ug/l | MB RDL<br>ug/l |
|---|---|---|---|---|
| Dissolved Solids | U | | 2820 | 10000 |

## Laboratory Control Sample (LCS)

(LCS) R3377316-2 01/19/19 20:53

| Analyte | Spike Amount<br>ug/l | LCS Result<br>ug/l | LCS Rec.<br>% | Rec. Limits<br>% | LCS Qualifier |
|---|---|---|---|---|---|
| Dissolved Solids | 8800000 | 8810000 | 100 | 85.0-115 | |

## Method Blank (MB)

(MB) R3377912-1 01/22/19 10:37

| Analyte | MB Result<br>ug/l | MB Qualifier | MB MDL<br>ug/l | MB RDL<br>ug/l |
|---|---|---|---|---|
| Chloride | U | | 51.9 | 1000 |
| Fluoride | U | | 9.90 | 100 |
| Sulfate | U | | 77.4 | 5000 |

## L1061734-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1061734-03 01/22/19 19:38 • (DUP) R3377912-6 01/22/19 19:54

| Analyte | Original Result<br>ug/l | DUP Result<br>ug/l | Dilution | DUP RPD<br>% | DUP Qualifier | DUP RPD Limits<br>% |
|---|---|---|---|---|---|---|
| Chloride | 2790 | 2800 | 1 | 0.565 | | 15 |
| Fluoride | ND | 89.4 | 1 | 0.673 | J | 15 |
| Sulfate | 104000 | 104000 | 1 | 0.162 | E | 15 |

## L1061734-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1061734-03 01/23/19 09:13 • (DUP) R3377912-8 01/23/19 09:28

| Analyte | Original Result<br>ug/l | DUP Result<br>ug/l | Dilution | DUP RPD<br>% | DUP Qualifier | DUP RPD Limits<br>% |
|---|---|---|---|---|---|---|
| Sulfate | 98700 | 98500 | 5 | 0.272 | | 15 |

## L1061523-10 Original Sample (OS) • Duplicate (DUP)

(OS) L1061523-10 01/22/19 16:03 • (DUP) R3377912-5 01/22/19 16:18

| Analyte | Original Result<br>ug/l | DUP Result<br>ug/l | Dilution | DUP RPD<br>% | DUP Qualifier | DUP RPD Limits<br>% |
|---|---|---|---|---|---|---|
| Chloride | 44000 | 44000 | 1 | 0.114 | | 15 |
| Fluoride | 1200 | 1210 | 1 | 0.612 | | 15 |
| Sulfate | ND | 1690 | 1 | 0.000 | | 15 |

## Laboratory Control Sample (LCS)

(LCS) R3377912-2 01/22/19 11:08

| Analyte | Spike Amount<br>ug/l | LCS Result<br>ug/l | LCS Rec.<br>% | Rec. Limits<br>% | LCS Qualifier |
|---|---|---|---|---|---|
| Chloride | 40000 | 38600 | 96.4 | 80.0-120 | |
| Fluoride | 8000 | 7960 | 99.5 | 80.0-120 | |

## Laboratory Control Sample (LCS)

(LCS) R3377912-2 01/22/19 11:08

| | Spike Amount | LCS Result | LCS Rec. | Rec. Limits | LCS Qualifier |
|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | % | % | |
| Sulfate | 40000 | 39000 | 97.4 | 80.0-120 | |

## L1061734-03 Original Sample (OS) • Matrix Spike (MS)

(OS) L1061734-03 01/22/19 19:38 • (MS) R3377912-7 01/22/19 20:40

| | Spike Amount | Original Result | MS Result | MS Rec. | Dilution | Rec. Limits | MS Qualifier |
|---|---|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | ug/l | % | | % | |
| Chloride | 50000 | 2790 | 53800 | 102 | 1 | 80.0-120 | |
| Fluoride | 5000 | ND | 5060 | 99.5 | 1 | 80.0-120 | |
| Sulfate | 50000 | 104000 | 151000 | 93.3 | 1 | 80.0-120 | E |

## L1061523-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1061523-01 01/22/19 14:30 • (MS) R3377912-3 01/22/19 14:46 • (MSD) R3377912-4 01/22/19 15:01

| | Spike Amount | Original Result | MS Result | MSD Result | MS Rec. | MSD Rec. | Dilution | Rec. Limits | MS Qualifier | MSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | ug/l | ug/l | % | % | | % | | | % | % |
| Chloride | 50000 | 12600 | 62900 | 62300 | 101 | 99.4 | 1 | 80.0-120 | | | 1.05 | 15 |
| Fluoride | 5000 | 208 | 4760 | 4680 | 91.0 | 89.4 | 1 | 80.0-120 | | | 1.69 | 15 |
| Sulfate | 50000 | 1140000 | 1150000 | 1150000 | 32.3 | 29.1 | 1 | 80.0-120 | E V | E V | 0.138 | 15 |

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

## Method Blank (MB)

(MB) R3377661-1 01/19/19 17:17

| | MB Result | MB Qualifier | MB MDL | MB RDL |
|---|---|---|---|---|
| Analyte | ug/l | | ug/l | ug/l |
| Chloride | U | | 51.9 | 1000 |

## L1061779-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1061779-01 01/19/19 20:31 • (DUP) R3377661-5 01/19/19 20:41

| | Original Result | DUP Result | Dilution | DUP RPD | DUP Qualifier | DUP RPD Limits |
|---|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | | % | | % |
| Chloride | 18600 | 18700 | 1 | 0.287 | | 15 |

## L1061818-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1061818-01 01/20/19 00:08 • (DUP) R3377661-6 01/20/19 00:19

| | Original Result | DUP Result | Dilution | DUP RPD | DUP Qualifier | DUP RPD Limits |
|---|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | | % | | % |
| Chloride | 17600 | 17600 | 1 | 0.140 | | 15 |

## Laboratory Control Sample (LCS)

(LCS) R3377661-2 01/19/19 17:27

| | Spike Amount | LCS Result | LCS Rec. | Rec. Limits | LCS Qualifier |
|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | % | % | |
| Chloride | 40000 | 37900 | 94.9 | 80.0-120 | |

## L1061523-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1061523-03 01/19/19 18:09 • (MS) R3377661-3 01/19/19 18:20 • (MSD) R3377661-4 01/19/19 18:31

| | Spike Amount | Original Result | MS Result | MSD Result | MS Rec. | MSD Rec. | Dilution | Rec. Limits | MS Qualifier | MSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | ug/l | ug/l | % | % | | % | | | % | % |
| Chloride | 50000 | 5960 | 54400 | 54200 | 97.0 | 96.5 | 1 | 80.0-120 | | | 0.392 | 15 |

## L1061818-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1061818-01 01/20/19 00:08 • (MS) R3377661-7 01/20/19 00:30

| | Spike Amount | Original Result | MS Result | MS Rec. | Dilution | Rec. Limits | MS Qualifier |
|---|---|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | ug/l | % | | % | |
| Chloride | 50000 | 17600 | 64900 | 94.7 | 1 | 80.0-120 | |

## Method Blank (MB)

(MB) R3377995-1 01/22/19 17:08

| Analyte | MB Result<br>ug/l | MB Qualifier | MB MDL<br>ug/l | MB RDL<br>ug/l |
|---|---|---|---|---|
| Sulfate | U | | 77.4 | 5000 |

## Laboratory Control Sample (LCS)

(LCS) R3377995-2 01/22/19 17:18

| Analyte | Spike Amount<br>ug/l | LCS Result<br>ug/l | LCS Rec.<br>% | Rec. Limits<br>% | LCS Qualifier |
|---|---|---|---|---|---|
| Sulfate | 40000 | 38400 | 96.0 | 80.0-120 | |

## L1061523-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1061523-06 01/22/19 19:04 • (MS) R3377995-3 01/22/19 19:14 • (MSD) R3377995-4 01/22/19 19:25

| Analyte | Spike Amount<br>ug/l | Original Result<br>ug/l | MS Result<br>ug/l | MSD Result<br>ug/l | MS Rec.<br>% | MSD Rec.<br>% | Dilution | Rec. Limits<br>% | MS Qualifier | MSD Qualifier | RPD<br>% | RPD Limits<br>% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sulfate | 50000 | 5970 | 50000 | 50200 | 88.2 | 88.5 | 1 | 80.0-120 | | | 0.360 | 15 |

## Method Blank (MB)

(MB) R3378022-1 01/23/19 10:46

| | MB Result | MB Qualifier | MB MDL | MB RDL |
|---|---|---|---|---|
| Analyte | ug/l | | ug/l | ug/l |
| Boron | 20.0 | J | 12.6 | 200 |
| Calcium | U | | 46.3 | 1000 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3378022-2 01/23/19 10:49 • (LCSD) R3378022-3 01/23/19 10:51

| | Spike Amount | LCS Result | LCSD Result | LCS Rec. | LCSD Rec. | Rec. Limits | LCS Qualifier | LCSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | ug/l | % | % | % | | | % | % |
| Boron | 1000 | 1010 | 999 | 101 | 99.9 | 80.0-120 | | | 1.37 | 20 |
| Calcium | 10000 | 9950 | 9750 | 99.5 | 97.5 | 80.0-120 | | | 1.99 | 20 |

## L1061523-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1061523-01 01/23/19 10:54 • (MS) R3378022-5 01/23/19 10:59 • (MSD) R3378022-6 01/23/19 11:01

| | Spike Amount | Original Result | MS Result | MSD Result | MS Rec. | MSD Rec. | Dilution | Rec. Limits | MS Qualifier | MSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | ug/l | ug/l | % | % | | % | | | % | % |
| Boron | 1000 | 539 | 1570 | 1530 | 103 | 99.0 | 1 | 75.0-125 | | | 2.40 | 20 |
| Calcium | 10000 | 246000 | 255000 | 255000 | 92.7 | 89.0 | 1 | 75.0-125 | | | 0.148 | 20 |

## L1061523-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1061523-03 01/23/19 11:04 • (MS) R3378022-7 01/23/19 11:06 • (MSD) R3378022-8 01/23/19 11:09

| | Spike Amount | Original Result | MS Result | MSD Result | MS Rec. | MSD Rec. | Dilution | Rec. Limits | MS Qualifier | MSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | ug/l | ug/l | % | % | | % | | | % | % |
| Boron | 1000 | 859 | 1890 | 1900 | 103 | 104 | 1 | 75.0-125 | | | 0.267 | 20 |
| Calcium | 10000 | 52900 | 67500 | 67700 | 145 | 148 | 1 | 75.0-125 | V | V | 0.305 | 20 |

## L1061523-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1061523-08 01/23/19 11:18 • (MS) R3378022-9 01/23/19 11:20 • (MSD) R3378022-10 01/23/19 11:23

| | Spike Amount | Original Result | MS Result | MSD Result | MS Rec. | MSD Rec. | Dilution | Rec. Limits | MS Qualifier | MSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | ug/l | ug/l | % | % | | % | | | % | % |
| Boron | 1000 | 987 | 1970 | 1960 | 98.6 | 97.6 | 1 | 75.0-125 | | | 0.488 | 20 |
| Calcium | 10000 | 40200 | 48600 | 48600 | 84.0 | 83.8 | 1 | 75.0-125 | | | 0.0320 | 20 |

## Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

## Abbreviations and Definitions

| | |
|---|---|
| MDL | Method Detection Limit. |
| ND | Not detected at the Reporting Limit (or MDL where applicable). |
| RDL | Reported Detection Limit. |
| Rec. | Recovery. |
| RPD | Relative Percent Difference. |
| SDG | Sample Delivery Group. |
| U | Not detected at the Reporting Limit (or MDL where applicable). |
| Analyte | The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported. |
| Dilution | If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor. |
| Limits | These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges. |
| Original Sample | The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG. |
| Qualifier | This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable. |
| Result | The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte. |
| Uncertainty (Radiochemistry) | Confidence level of 2 sigma. |
| Case Narrative (Cn) | A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report. |
| Quality Control Summary (Qc) | This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material. |
| Sample Chain of Custody (Sc) | This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis. |
| Sample Results (Sr) | This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported. |
| Sample Summary (Ss) | This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis. |

| Qualifier | Description |
|---|---|
| E | The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL). |
| J | The identification of the analyte is acceptable; the reported value is an estimate. |
| V | The sample concentration is too high to evaluate accurate spike recoveries. |

# ACCREDITATIONS & LOCATIONS

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

## State Accreditations

| | | | |
|---|---|---|---|
| Alabama | 40660 | Nebraska | NE-OS-15-05 |
| Alaska | 17-026 | Nevada | TN-03-2002-34 |
| Arizona | AZ0612 | New Hampshire | 2975 |
| Arkansas | 88-0469 | New Jersey–NELAP | TN002 |
| California | 2932 | New Mexico [1] | n/a |
| Colorado | TN00003 | New York | 11742 |
| Connecticut | PH-0197 | North Carolina | Env375 |
| Florida | E87487 | North Carolina [1] | DW21704 |
| Georgia | NELAP | North Carolina [3] | 41 |
| Georgia [1] | 923 | North Dakota | R-140 |
| Idaho | TN00003 | Ohio–VAP | CL0069 |
| Illinois | 200008 | Oklahoma | 9915 |
| Indiana | C-TN-01 | Oregon | TN200002 |
| Iowa | 364 | Pennsylvania | 68-02979 |
| Kansas | E-10277 | Rhode Island | LAO00356 |
| Kentucky [1,6] | 90010 | South Carolina | 84004 |
| Kentucky [2] | 16 | South Dakota | n/a |
| Louisiana | AI30792 | Tennessee [1,4] | 2006 |
| Louisiana [1] | LA180010 | Texas | T 104704245-17-14 |
| Maine | TN0002 | Texas [5] | LAB0152 |
| Maryland | 324 | Utah | TN00003 |
| Massachusetts | M-TN003 | Vermont | VT2006 |
| Michigan | 9958 | Virginia | 460132 |
| Minnesota | 047-999-395 | Washington | C847 |
| Mississippi | TN00003 | West Virginia | 233 |
| Missouri | 340 | Wisconsin | 9980939910 |
| Montana | CERT0086 | Wyoming | A2LA |

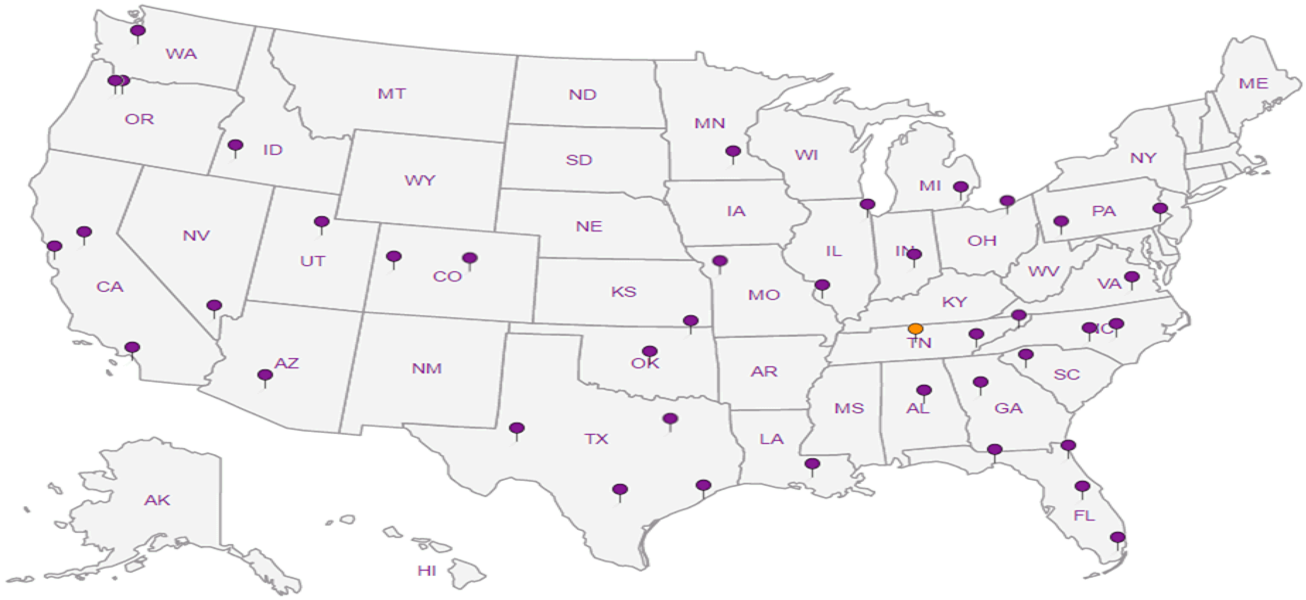
## Third Party Federal Accreditations

| | | | |
|---|---|---|---|
| A2LA – ISO 17025 | 1461.01 | AIHA-LAP,LLC EMLAP | 100789 |
| A2LA – ISO 17025 [5] | 1461.02 | DOD | 1461.01 |
| Canada | 1461.01 | USDA | P330-15-00234 |
| EPA–Crypto | TN00003 | | |

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

## Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



**SCS Engineers - KS**

8575 West 110th Street
Suite 100
Overland Park, KS 66210

Billing Information:
**Accounts Payable**
**8575 West 110th Street**
**Suite 100**
**Overland Park, KS 66210**

Pres Chk: L2

Chain of Custody Page 1 of 3

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

Report to: **Jason Franks**

Email To: jfranks@scsengineers.com; jay.martin@kcpl.com;

Project Description: **KCPL - LaCygne Generating Station**

City/State Collected: La Cygne

Phone: **913-681-0030**
Fax: **913-681-0012**

Client Project #: **27217233.18**

Lab Project #: **AQUAOPKS-LACYGNE**

Collected by (print): JASON R. FRANKS

Site/Facility ID #:

P.O. #:

Collected by (signature):

Immediately Packed on Ice N ___ Y ✓

*Rush?* (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #:

Date Results Needed:

L#: L1061523

1066

Acctnum: **AQUAOPKS**
Template: **T136276**
Prelogin: **P689385**
TSR: **206 - Jeff Carr**
PB:
Shipped Via:

Analysis / Container / Preservative

| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | No. of Cntrs | Boron - 6010 250mlHDPE-HNO3 | Calcium - 6010 250mlHDPE-HNO3 | Chloride 125mlHDPE-NoPres | Fluoride 250mlHDPE-NoPres | Sulfate 125mlHDPE-NoPres | TDS 125mlHDPE-NoPres | | | | | Remarks | Sample # (lab only) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-13 | GRAB | GW | – | 1/14/19 | 1625 | 2 | X | | | X | | | | | | | | -01 |
| DUPLICATE 1 | | GW | – | | 1625 | 2 | X | | | X | | | | | | | | -02 |
| MW13 MS/MSD | | GW | – | | 1625 | 2 | X | | | X | | | | | | | | -01 |
| MW-14R | | GW | – | | 1635 | 2 | X | | X | | | | | | | | | -03 |
| DUPLICATE 2 | | GW | – | | 1640 | 2 | X | | X | | | | | | | | | -04 |
| MW14R MS/MSD | | GW | – | | 1645 | 2 | X | | X | | | | | | | | | -03 |
| MW-15 | | GW | – | | 1550 | 1 | X | | | | | | | | | | | -05 |
| MW-601 | | GW | – | | 1600 | 1 | | | | | X | | | | | | | -06 |
| DUPLICATE 3 | | GW | – | | 1600 | 1 | | | | | X | | | | | | | -07 |
| MW601 MS/MSD | | GW | – | | 1600 | 1 | | | | | X | | | | | | | -06 |

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other________

Remarks:

pH ______ Temp ______

Flow ______ Other ______

Samples returned via:
__ UPS __ FedEx __ Courier ________

Tracking # 4510 1661 7621

Sample Receipt Checklist
COC Seal Present/Intact: ✓NP __Y __N
COC Signed/Accurate: ✓Y __N
Bottles arrive intact: ✓Y __N
Correct bottles used: ✓Y __N
Sufficient volume sent: ✓Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: ✓Y __N
RAD SCREEN: <0.5 mR/hr

| | | | | | |
|---|---|---|---|---|---|
| Relinquished by : (Signature) | Date: 1/15/19 | Time: 1430 | Received by: (Signature) | Trip Blank Received: Yes / [✓ No]<br>HCL / MeoH<br>TBR | |
| Relinquished by : (Signature) | Date: | Time: | Received by: (Signature) | Temp: 1.0±1=1.1 °C<br>Bottles Received: 27 | If preservation required by Login: Date/Time |
| Relinquished by : (Signature) | Date: | Time: | Received for lab by: (Signature) | Date: 01/16/19<br>Time: 08:30 | Hold:<br>Condition: NCF / [✓ OK] |

**SCS Engineers - KS**

8575 West 110th Street
Suite 100
Overland Park, KS 66210

Billing Information:

Accounts Payable
8575 West 110th Street
Suite 100
Overland Park, KS 66210

Report to:
**Jason Franks**

Email To: jfranks@scsengineers.com; jay.martin@kcpl.com;

Project Description: **KCPL - LaCygne Generating Station**

City/State Collected: La Cygne, KS

Phone: 913-681-0030
Fax: 913-681-0012

Client Project # 27217233.18

Lab Project # AQUAOPKS-LACYGNE

Collected by (print): JASON R. FRANKS

Site/Facility ID #

P.O. #

Collected by (signature):

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Immediately Packed on Ice N ___ Y ✓

Chain of Custody Page 2 of 3

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L061523

Table #

Acctnum: **AQUAOPKS**
Template: **T136276**
Prelogin: **P689385**
TSR: **206 - Jeff Carr**
PB:
Shipped Via:

Analysis / Container / Preservative

| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | No. of Cntrs | Boron - 6010 250mlHDPE-HNO3 | Calcium - 6010 250mlHDPE-HNO3 | Chloride 125mlHDPE-NoPres | Fluoride 125mlHDPE-NoPres | Sulfate 125mlHDPE-NoPres | TDS ~~125~~mlHDPE-NoPres | | | | | Remarks | Sample # (lab only) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pres Chk | | | | | | | L2 | L2 | | | | | | | | | | |
| MW-701 | GRAB | GW | – | 1/15/19 | 1205 | 1 | | X | | | | | | | | | | -08 |
| DUPLICATE 4 | | GW | – | 1/15/19 | 1205 | 1 | | X | | | | | | | | | | -09 |
| MW 701 MS/MSD | | GW | – | 1/15/19 | 1205 | 1 | | X | | | | | | | | | | -08 |
| MW-702 | | GW | – | 1/14/19 | 1505 | 1 | | | | X | | | | | | | | -10 |
| MW-706 | | GW | – | 1/15/19 | 1155 | 1 | | | | | X | | | | | | | -11 |
| MW-804 | | GW | – | 1/14/19 | 1405 | 1 | X | | | | | | | | | | | -12 |
| MW-805 | | GW | – | 1/14/19 | 1408 | 1 | | X | | | | | | | | | | -13 |
| MW-902 | | GW | – | 1/14/19 | 1315 | 1 | | | | | | X | | | | | | -14 |
| DUPLICATE 5 | | GW | – | 1/14/19 | 1315 | 1 | | | | | | X | | | | | | -15 |
| MW 902 MS/MSD | | GW | – | 1/14/19 | 1315 | 1 | | | | | | X | | | | | | -14 |

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other ________

Remarks:

pH ______ Temp ______

Flow ______ Other ______

Samples returned via:
__ UPS __ FedEx __ Courier ______

Tracking #

**Sample Receipt Checklist**
COC Seal Present/Intact: ✓ NP __ Y __ N
COC Signed/Accurate: ✓ Y __ N
Bottles arrive intact: ✓ Y __ N
Correct bottles used: ✓ Y __ N
Sufficient volume sent: ✓ Y __ N
If Applicable
VOA Zero Headspace: __ Y __ N
Preservation Correct/Checked: ✓ Y __ N

| | | | |
|---|---|---|---|
| Relinquished by : (Signature) | Date: 1/15/19 | Time: 1430 | Received by: (Signature) |
| Relinquished by : (Signature) | Date: | Time: | Received by: (Signature) |
| Relinquished by : (Signature) | Date: | Time: | Received for lab by: (Signature) |

Trip Blank Received: Yes / [✓ No]
HCL / MeoH
TBR

Temp: 1.0+.1=1.1 °C

Bottles Received: 27

Date: 01/16/19 Time: 08:30

If preservation required by Login: Date/Time

Hold:

Condition: NCF / [✓ OK]

Chain of Custody Page 3 of 3

**SCS Engineers - KS**

**8575 West 110th Street**
**Suite 100**
**Overland Park, KS 66210**

Billing Information:
**Accounts Payable**
**8575 West 110th Street**
**Suite 100**
**Overland Park, KS 66210**

Pres Chk

Email To: **jfranks@scsengineers.com;**
**jay.martin@kcpl.com;**

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

Report to: **Jason Franks**

Project Description: **KCPL - LaCygne Generating Station**

City/State Collected: La Cygne, KS

Phone: **913-681-0030**
Fax: **913-681-0012**

Client Project # **27217233.18**

Lab Project # **AQUAOPKS-LACYGNE**

Collected by (print): Jason R. Franks

Site/Facility ID #

P.O. #

Collected by (signature): Jason R. Franks

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Immediately Packed on Ice N ___ Y ✓

L# L1061523

Table #

Acctnum: **AQUAOPKS**
Template: **T136276**
Prelogin: **P689385**
TSR: **206 - Jeff Carr**
PB:
Shipped Via:

Analysis / Container / Preservative

| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | No. of Cntrs | Boron - 6010 250mlHDPE-HNO3 | Calcium - 6010 250mlHDPE-HNO3 | Chloride 125mlHDPE-NoPres | Fluoride 125mlHDPE-NoPres | Sulfate 125mlHDPE-NoPres | TDS 250mlHDPE-NoPres | | | | Remarks | Sample # (lab only) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | <2 | | | | | | | | | |
| **MW-903** | Grab | **GW** | – | 1/14/19 | 1315 | **1** | | **X** | | | | | | | | | -15 |
| | | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | | | |

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other________

Remarks:

pH ______ Temp ______
Flow ______ Other ______

Samples returned via:
__ UPS __ FedEx __ Courier ______

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: ✓ NP __Y __N
COC Signed/Accurate: ✓Y __N
Bottles arrive intact: ✓Y __N
Correct bottles used: ✓Y __N
Sufficient volume sent: ✓Y __N
If Applicable
VOA Zero Headspace: ✓Y __N
Preservation Correct/Checked: __Y __N

Relinquished by : (Signature) Jason R. Franks
Date: 1/15/19
Time: 1430
Received by: (Signature)

Trip Blank Received: Yes / [✓ No]
HCL / MeoH
TBR

Relinquished by : (Signature)
Date:
Time:
Received by: (Signature)

Temp: 1.0+-1=1.1 °C
Bottles Received: 27

If preservation required by Login: Date/Time

Relinquished by : (Signature)
Date:
Time:
Received for lab by: (Signature)

Date: 01/16/19
Time: 08:30

Hold:

Condition: NCF / [✓ OK]

# ATTACHMENT 1-2

# March 2019 Sampling Event Laboratory Report

Pace Analytical®
National Center for Testing & Innovation

# ANALYTICAL REPORT

March 21, 2019

**SCS Engineers - KS**

| | |
|---|---|
| Sample Delivery Group: | L1078452 |
| Samples Received: | 03/13/2019 |
| Project Number: | 27217233.18 |
| Description: | KCPL - LaCygne Generating Station |

Report To:

Jason Franks
8575 West 110th Street
Suite 100
Overland Park, KS  66210

Entire Report Reviewed By:

Jeff Carr
Project Manager

12065 Lebanon Rd   Mount Juliet, TN 37122   615-758-5858   800-767-5859   www.pacenational.com

# TABLE OF CONTENTS

# SAMPLE SUMMARY

## MW-13 L1078452-01 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Whit Martin | 03/11/19 13:50 | 03/13/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1251927 | 1 | 03/20/19 01:33 | 03/20/19 01:33 | ELN | Mt. Juliet, TN |
| Metals (ICP) by Method 6010B | WG1249634 | 1 | 03/16/19 14:14 | 03/20/19 17:07 | CCE | Mt. Juliet, TN |

## DUPLICATE 1 L1078452-02 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Whit Martin | 03/11/19 13:50 | 03/13/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1251927 | 1 | 03/20/19 02:21 | 03/20/19 02:21 | ELN | Mt. Juliet, TN |
| Metals (ICP) by Method 6010B | WG1249634 | 1 | 03/16/19 14:14 | 03/20/19 18:13 | CCE | Mt. Juliet, TN |

## MW-14R L1078452-03 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Whit Martin | 03/11/19 13:00 | 03/13/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1251930 | 1 | 03/20/19 01:39 | 03/20/19 01:39 | ELN | Mt. Juliet, TN |
| Metals (ICP) by Method 6010B | WG1249634 | 1 | 03/16/19 14:14 | 03/20/19 17:18 | CCE | Mt. Juliet, TN |

## DUPLICATE 2 L1078452-04 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Whit Martin | 03/11/19 13:00 | 03/13/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1251927 | 1 | 03/20/19 02:37 | 03/20/19 02:37 | ELN | Mt. Juliet, TN |
| Metals (ICP) by Method 6010B | WG1249634 | 1 | 03/16/19 14:14 | 03/20/19 18:16 | CCE | Mt. Juliet, TN |

## MW-601 L1078452-05 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Whit Martin | 03/11/19 11:55 | 03/13/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1251930 | 1 | 03/20/19 02:39 | 03/20/19 02:39 | ELN | Mt. Juliet, TN |

## DUPLICATE 3 L1078452-06 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Whit Martin | 03/11/19 11:55 | 03/13/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1251927 | 1 | 03/20/19 03:09 | 03/20/19 03:09 | ELN | Mt. Juliet, TN |

## MW-701 L1078452-07 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Whit Martin | 03/11/19 14:55 | 03/13/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG1249634 | 1 | 03/16/19 14:14 | 03/20/19 17:32 | CCE | Mt. Juliet, TN |

## DUPLICATE 4 L1078452-08 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Whit Martin | 03/11/19 14:55 | 03/13/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG1249634 | 1 | 03/16/19 14:14 | 03/20/19 18:19 | CCE | Mt. Juliet, TN |

## MW-706 L1078452-09 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Whit Martin | 03/11/19 15:50 | 03/13/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1251927 | 1 | 03/20/19 03:56 | 03/20/19 03:56 | ELN | Mt. Juliet, TN |

## MW-804 L1078452-10 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Whit Martin | 03/11/19 10:55 | 03/13/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG1249634 | 1 | 03/16/19 14:14 | 03/20/19 18:21 | CCE | Mt. Juliet, TN |

## MW-805 L1078452-11 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Whit Martin | 03/11/19 10:15 | 03/13/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG1249634 | 1 | 03/16/19 14:14 | 03/20/19 18:24 | CCE | Mt. Juliet, TN |

## MW-903 L1078452-12 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Whit Martin | 03/11/19 09:05 | 03/13/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG1249634 | 1 | 03/16/19 14:14 | 03/20/19 18:27 | CCE | Mt. Juliet, TN |

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Jeff Carr
Project Manager

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Fluoride | 194 | | 100 | 1 | 03/20/2019 01:33 | WG1251927 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Boron | 470 | | 200 | 1 | 03/20/2019 17:07 | WG1249634 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Fluoride | 202 |  | 100 | 1 | 03/20/2019 02:21 | WG1251927 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Boron | 475 |  | 200 | 1 | 03/20/2019 18:13 | WG1249634 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Chloride | 4440 | | 1000 | 1 | 03/20/2019 01:39 | WG1251930 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Boron | 591 | | 200 | 1 | 03/20/2019 17:18 | WG1249634 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Chloride | 4740 | | 1000 | 1 | 03/20/2019 02:37 | WG1251927 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Boron | 604 | | 200 | 1 | 03/20/2019 18:16 | WG1249634 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Sulfate | 5890 | | 5000 | 1 | 03/20/2019 02:39 | WG1251930 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Sulfate | 5740 | | 5000 | 1 | 03/20/2019 03:09 | WG1251927 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Calcium | 44200 | | 1000 | 1 | 03/20/2019 17:32 | WG1249634 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Calcium | 44200 | | 1000 | 1 | 03/20/2019 18:19 | WG1249634 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Sulfate | 6960 | | 5000 | 1 | 03/20/2019 03:56 | WG1251927 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Boron | 1740 | | 200 | 1 | 03/20/2019 18:21 | WG1249634 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Calcium | 468000 | | 1000 | 1 | 03/20/2019 18:24 | WG1249634 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Calcium | 375000 | | 1000 | 1 | 03/20/2019 18:27 | WG1249634 |

## Method Blank (MB)

(MB) R3393205-1 03/19/19 18:05

| Analyte | MB Result ug/l | MB Qualifier | MB MDL ug/l | MB RDL ug/l |
|---|---|---|---|---|
| Chloride | U | | 51.9 | 1000 |
| Fluoride | U | | 9.90 | 100 |
| Sulfate | U | | 77.4 | 5000 |

## L1078397-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1078397-03 03/19/19 18:56 • (DUP) R3393205-3 03/19/19 19:11

| Analyte | Original Result ug/l | DUP Result ug/l | Dilution | DUP RPD % | DUP Qualifier | DUP RPD Limits % |
|---|---|---|---|---|---|---|
| Chloride | 4380 | 4380 | 1 | 0.0206 | | 15 |
| Fluoride | 301 | 299 | 1 | 0.500 | | 15 |
| Sulfate | 44200 | 44300 | 1 | 0.134 | | 15 |

## L1078452-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1078452-04 03/20/19 02:37 • (DUP) R3393205-10 03/20/19 02:53

| Analyte | Original Result ug/l | DUP Result ug/l | Dilution | DUP RPD % | DUP Qualifier | DUP RPD Limits % |
|---|---|---|---|---|---|---|
| Chloride | 4740 | 4710 | 1 | 0.722 | | 15 |
| Fluoride | 258 | 253 | 1 | 2.07 | | 15 |
| Sulfate | 52100 | 52000 | 1 | 0.195 | | 15 |

## Laboratory Control Sample (LCS)

(LCS) R3393205-2 03/19/19 18:21

| Analyte | Spike Amount ug/l | LCS Result ug/l | LCS Rec. % | Rec. Limits % | LCS Qualifier |
|---|---|---|---|---|---|
| Chloride | 40000 | 40700 | 102 | 80.0-120 | |
| Fluoride | 8000 | 8300 | 104 | 80.0-120 | |
| Sulfate | 40000 | 41100 | 103 | 80.0-120 | |

## L1078397-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1078397-03 03/19/19 18:56 • (MS) R3393205-4 03/19/19 19:27 • (MSD) R3393205-5 03/19/19 19:43

| | Spike Amount | Original Result | MS Result | MSD Result | MS Rec. | MSD Rec. | Dilution | Rec. Limits | MS Qualifier | MSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Analyte** | ug/l | ug/l | ug/l | ug/l | % | % | | % | | | % | % |
| Chloride | 50000 | 4380 | 55100 | 55700 | 101 | 103 | 1 | 80.0-120 | | | 1.19 | 15 |
| Fluoride | 5000 | 301 | 5350 | 5430 | 101 | 103 | 1 | 80.0-120 | | | 1.37 | 15 |
| Sulfate | 50000 | 44200 | 93500 | 94100 | 98.6 | 99.8 | 1 | 80.0-120 | | | 0.615 | 15 |

## L1078397-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1078397-08 03/19/19 23:10 • (MS) R3393205-6 03/19/19 23:26 • (MSD) R3393205-7 03/19/19 23:42

| | Spike Amount | Original Result | MS Result | MSD Result | MS Rec. | MSD Rec. | Dilution | Rec. Limits | MS Qualifier | MSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Analyte** | ug/l | ug/l | ug/l | ug/l | % | % | | % | | | % | % |
| Chloride | 50000 | 29300 | 79400 | 79000 | 100 | 99.4 | 1 | 80.0-120 | | | 0.470 | 15 |
| Fluoride | 5000 | 210 | 5290 | 5280 | 102 | 101 | 1 | 80.0-120 | | | 0.231 | 15 |
| Sulfate | 50000 | 257000 | 288000 | 288000 | 62.2 | 62.4 | 1 | 80.0-120 | E V | E V | 0.0316 | 15 |

## L1078452-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1078452-01 03/20/19 01:33 • (MS) R3393205-8 03/20/19 01:49 • (MSD) R3393205-9 03/20/19 02:05

| | Spike Amount | Original Result | MS Result | MSD Result | MS Rec. | MSD Rec. | Dilution | Rec. Limits | MS Qualifier | MSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Analyte** | ug/l | ug/l | ug/l | ug/l | % | % | | % | | | % | % |
| Chloride | 50000 | 15700 | 66200 | 66200 | 101 | 101 | 1 | 80.0-120 | | | 0.00423 | 15 |
| Fluoride | 5000 | 194 | 4910 | 4900 | 94.4 | 94.2 | 1 | 80.0-120 | | | 0.151 | 15 |
| Sulfate | 50000 | 1420000 | 1360000 | 1360000 | 0.000 | 0.000 | 1 | 80.0-120 | E V | E V | 0.0425 | 15 |

## Method Blank (MB)

(MB) R3393348-1 03/20/19 00:36

| Analyte | MB Result ug/l | MB Qualifier | MB MDL ug/l | MB RDL ug/l |
|---|---|---|---|---|
| Chloride | U | | 51.9 | 1000 |
| Sulfate | U | | 77.4 | 5000 |

## L1078452-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1078452-03 03/20/19 01:39 • (DUP) R3393348-3 03/20/19 01:54

| Analyte | Original Result ug/l | DUP Result ug/l | Dilution | DUP RPD % | DUP Qualifier | DUP RPD Limits % |
|---|---|---|---|---|---|---|
| Chloride | 4440 | 4440 | 1 | 0.00901 | | 15 |
| Sulfate | 51600 | 51700 | 1 | 0.0116 | | 15 |

## Laboratory Control Sample (LCS)

(LCS) R3393348-2 03/20/19 00:51

| Analyte | Spike Amount ug/l | LCS Result ug/l | LCS Rec. % | Rec. Limits % | LCS Qualifier |
|---|---|---|---|---|---|
| Chloride | 40000 | 40000 | 99.9 | 80.0-120 | |
| Sulfate | 40000 | 40500 | 101 | 80.0-120 | |

## L1078452-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1078452-03 03/20/19 01:39 • (MS) R3393348-4 03/20/19 02:09 • (MSD) R3393348-5 03/20/19 02:24

| Analyte | Spike Amount ug/l | Original Result ug/l | MS Result ug/l | MSD Result ug/l | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 50000 | 4440 | 55400 | 55600 | 102 | 102 | 1 | 80.0-120 | | | 0.206 | 15 |
| Sulfate | 50000 | 51600 | 102000 | 102000 | 100 | 101 | 1 | 80.0-120 | E | E | 0.167 | 15 |

## L1078452-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1078452-05 03/20/19 02:39 • (MS) R3393348-6 03/20/19 02:54 • (MSD) R3393348-7 03/20/19 03:09

| Analyte | Spike Amount ug/l | Original Result ug/l | MS Result ug/l | MSD Result ug/l | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 50000 | 166000 | 209000 | 209000 | 84.5 | 84.2 | 1 | 80.0-120 | E | E | 0.0679 | 15 |
| Sulfate | 50000 | 5890 | 56200 | 56200 | 101 | 101 | 1 | 80.0-120 | | | 0.0114 | 15 |

## Method Blank (MB)

(MB) R3393602-1 03/20/19 17:00

| | MB Result | MB Qualifier | MB MDL | MB RDL |
|---|---|---|---|---|
| Analyte | ug/l | | ug/l | ug/l |
| Boron | U | | 12.6 | 200 |
| Calcium | U | | 46.3 | 1000 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3393602-2 03/20/19 17:02 • (LCSD) R3393602-3 03/20/19 17:05

| | Spike Amount | LCS Result | LCSD Result | LCS Rec. | LCSD Rec. | Rec. Limits | LCS Qualifier | LCSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | ug/l | % | % | % | | | % | % |
| Boron | 1000 | 991 | 982 | 99.1 | 98.2 | 80.0-120 | | | 0.996 | 20 |
| Calcium | 10000 | 10100 | 10100 | 101 | 101 | 80.0-120 | | | 0.241 | 20 |

## L1078452-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1078452-01 03/20/19 17:07 • (MS) R3393602-5 03/20/19 17:13

| | Spike Amount | Original Result | MS Result | MS Rec. | Dilution | Rec. Limits | MS Qualifier |
|---|---|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | ug/l | % | | % | |
| Boron | 1000 | 470 | 1470 | 99.9 | 1 | 75.0-125 | |
| Calcium | 10000 | 310000 | 315000 | 51.6 | 1 | 75.0-125 | V |

## L1078452-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1078452-03 03/20/19 17:18 • (MS) R3393602-7 03/20/19 17:21 • (MSD) R3393602-8 03/20/19 17:23

| | Spike Amount | Original Result | MS Result | MSD Result | MS Rec. | MSD Rec. | Dilution | Rec. Limits | MS Qualifier | MSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | ug/l | ug/l | % | % | | % | | | % | % |
| Boron | 1000 | 591 | 1590 | 1570 | 100 | 98.3 | 1 | 75.0-125 | | | 1.13 | 20 |
| Calcium | 10000 | 61300 | 70000 | 70400 | 86.6 | 90.9 | 1 | 75.0-125 | | | 0.616 | 20 |

## L1078452-07 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1078452-07 03/20/19 17:32 • (MS) R3393602-9 03/20/19 17:34 • (MSD) R3393602-10 03/20/19 17:37

| | Spike Amount | Original Result | MS Result | MSD Result | MS Rec. | MSD Rec. | Dilution | Rec. Limits | MS Qualifier | MSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | ug/l | ug/l | % | % | | % | | | % | % |
| Boron | 1000 | 1020 | 1990 | 1990 | 97.4 | 97.6 | 1 | 75.0-125 | | | 0.0895 | 20 |
| Calcium | 10000 | 44200 | 53400 | 53800 | 92.6 | 96.1 | 1 | 75.0-125 | | | 0.641 | 20 |

## Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

## Abbreviations and Definitions

| | |
|---|---|
| MDL | Method Detection Limit. |
| RDL | Reported Detection Limit. |
| Rec. | Recovery. |
| RPD | Relative Percent Difference. |
| SDG | Sample Delivery Group. |
| U | Not detected at the Reporting Limit (or MDL where applicable). |
| Analyte | The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported. |
| Dilution | If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor. |
| Limits | These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges. |
| Original Sample | The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG. |
| Qualifier | This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable. |
| Result | The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte. |
| Uncertainty (Radiochemistry) | Confidence level of 2 sigma. |
| Case Narrative (Cn) | A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report. |
| Quality Control Summary (Qc) | This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material. |
| Sample Chain of Custody (Sc) | This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis. |
| Sample Results (Sr) | This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported. |
| Sample Summary (Ss) | This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis. |

| Qualifier | Description |
|---|---|
| E | The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL). |
| V | The sample concentration is too high to evaluate accurate spike recoveries. |

# ACCREDITATIONS & LOCATIONS

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

## State Accreditations

| | | | |
|---|---|---|---|
| Alabama | 40660 | Nebraska | NE-OS-15-05 |
| Alaska | 17-026 | Nevada | TN-03-2002-34 |
| Arizona | AZ0612 | New Hampshire | 2975 |
| Arkansas | 88-0469 | New Jersey–NELAP | TN002 |
| California | 2932 | New Mexico [1] | n/a |
| Colorado | TN00003 | New York | 11742 |
| Connecticut | PH-0197 | North Carolina | Env375 |
| Florida | E87487 | North Carolina [1] | DW21704 |
| Georgia | NELAP | North Carolina [3] | 41 |
| Georgia [1] | 923 | North Dakota | R-140 |
| Idaho | TN00003 | Ohio–VAP | CL0069 |
| Illinois | 200008 | Oklahoma | 9915 |
| Indiana | C-TN-01 | Oregon | TN200002 |
| Iowa | 364 | Pennsylvania | 68-02979 |
| Kansas | E-10277 | Rhode Island | LAO00356 |
| Kentucky [1,6] | 90010 | South Carolina | 84004 |
| Kentucky [2] | 16 | South Dakota | n/a |
| Louisiana | AI30792 | Tennessee [1,4] | 2006 |
| Louisiana [1] | LA180010 | Texas | T104704245-18-15 |
| Maine | TN0002 | Texas [5] | LAB0152 |
| Maryland | 324 | Utah | TN00003 |
| Massachusetts | M-TN003 | Vermont | VT2006 |
| Michigan | 9958 | Virginia | 460132 |
| Minnesota | 047-999-395 | Washington | C847 |
| Mississippi | TN00003 | West Virginia | 233 |
| Missouri | 340 | Wisconsin | 9980939910 |
| Montana | CERT0086 | Wyoming | A2LA |

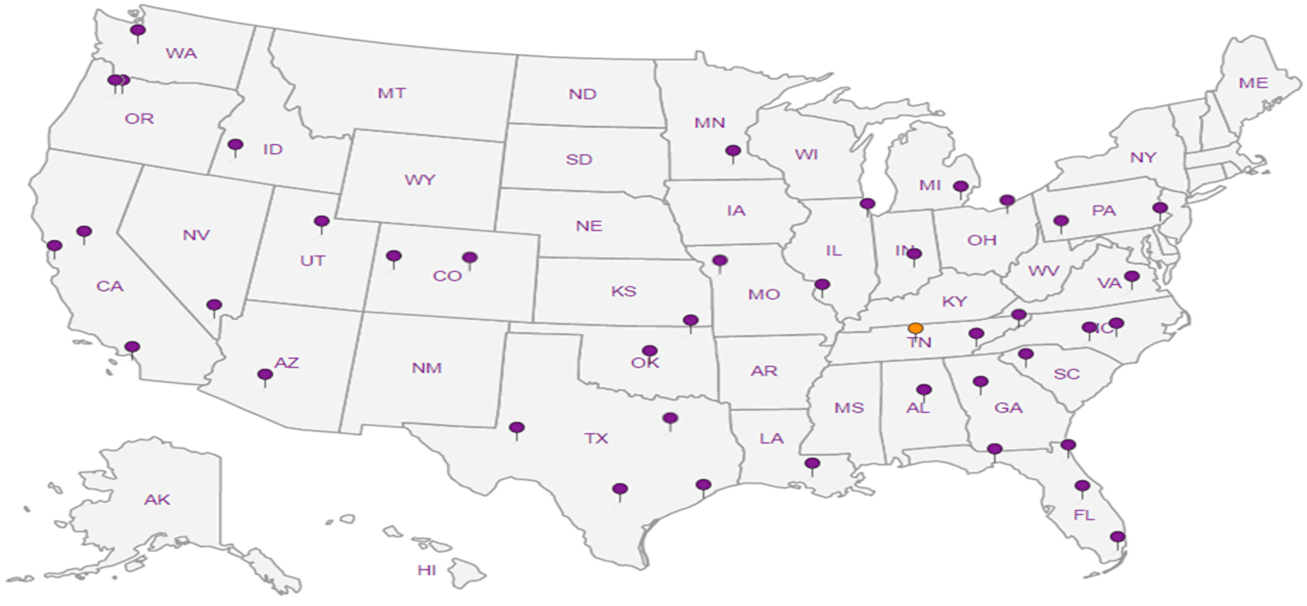
## Third Party Federal Accreditations

| | | | |
|---|---|---|---|
| A2LA – ISO 17025 | 1461.01 | AIHA-LAP,LLC EMLAP | 100789 |
| A2LA – ISO 17025 [5] | 1461.02 | DOD | 1461.01 |
| Canada | 1461.01 | USDA | P330-15-00234 |
| EPA–Crypto | TN00003 | | |

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

## Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



**SCS Engineers - KS**

8575 West 110th Street
Suite 100
Overland Park, KS 66210

Report to:
Jason Franks

Billing Information:
**Accounts Payable**
**8575 West 110th Street**
**Suite 100**
**Overland Park, KS 66210**

Pres Chk

Email To: **jfranks@scsengineers.com;**
**jay.martin@kcpl.com;**

Project Description: **KCPL - LaCygne Generating Station**

City/State Collected:

Phone: 913-681-0030
Fax: 913-681-0012

Client Project #: **27217233.18**

Lab Project #: **AQUAOPKS-LACYGNE**

Collected by (print): Whit Martin

Site/Facility ID #:

P.O. #:

Collected by (signature): Whit Martin

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed: Std

Immediately Packed on Ice N ___ Y X

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# 1078452

I026

Acctnum: **AQUAOPKS**
Template: **T136276**
Prelogin: **P698300**
TSR: **206 - Jeff Carr**
PB:
Shipped Via:

| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | No. of Cntrs | Boron - 6010 250mlHDPE-HNO3 <2 | Calcium - 6010 250mlHDPE-HNO3 <2 | Chloride 125mlHDPE-NoPres | Fluoride 125mlHDPE-NoPres | Sulfate 125mlHDPE-NoPres | Remarks | Sample # (lab only) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-13 | Grab | GW | | 3/11/19 | 1350 | 2 | X | | | X | | | -01 |
| DUPLICATE 1 | Grab | GW | | 3/11/19 | 1350 | 2 | X | | | X | | | -02 |
| MW-13 MS/MSD | Grab | GW | | 3/11/19 | 1355 | 2 | X | | | X | | | -01 |
| MW-14R | Grab | GW | | 3/11/19 | 1300 | 2 | X | | X | | | | -03 |
| DUPLICATE 2 | Grab | GW | | 3/11/19 | 1300 | 2 | X | | X | | | | -04 |
| MW-14R MS/MSD | Grab | GW | | 3/11/19 | 1305 | 2 | X | | X | | | | -03 |
| MW-601 | Grab | GW | | 3/11/19 | 1155 | 1 | | | | | X | | -05 |
| DUPLICATE 3 | Grab | GW | | 3/11/19 | 1155 | 1 | | | | | X | | -06 |
| MW-601 MS/MSD | Grab | GW | | 3/11/19 | 1200 | 1 | | | | | X | | -05 |
| MW-701 | Grab | GW | | 3/11/19 | 1455 | 1 | | X | | | | | -07 |

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_________

Remarks:

pH _______ Temp _______
Flow _______ Other _______

Samples returned via:
__ UPS __ FedEx __ Courier ___ ______

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: ✓ NP __Y __N
COC Signed/Accurate: ✓Y __N
Bottles arrive intact: ✓Y __N
Correct bottles used: ✓Y __N
Sufficient volume sent: ✓Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: ✓Y __N

RAD SCREEN: <0.5 mR/hr

| Relinquished by : (Signature) | Date: | Time: | Received by: (Signature) |
|---|---|---|---|
| Whit Martin | 3/12/19 | 1555 | |

Trip Blank Received: Yes / No
HCL / MeoH
TBR

| Relinquished by : (Signature) | Date: | Time: | Received by: (Signature) |
|---|---|---|---|
| | | | |

Temp: 0.3+.1=0.4 °C
Bottles Received: 22

If preservation required by Login: Date/Time

| Relinquished by : (Signature) | Date: | Time: | Received for lab by: (Signature) |
|---|---|---|---|
| | | | Malik T. |

Date: 3/13
Time: 8:45

Hold:

Condition: NCF / [✓ OK]

**SCS Engineers - KS**

8575 West 110th Street
Suite 100
Overland Park, KS 66210

Billing Information:

**Accounts Payable**
**8575 West 110th Street**
**Suite 100**
**Overland Park, KS 66210**

Pres Chk

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

Report to:
**Jason Franks**

Email To: **jfranks@scsengineers.com; jay.martin@kcpl.com;**

Project Description: **KCPL - LaCygne Generating Station**

City/State Collected:

Phone: **913-681-0030**
Fax: **913-681-0012**

Client Project #
**27217233.18**

Lab Project #
**AQUAOPKS-LACYGNE**

L # 1078452

Table #

Collected by (print): Whit Martin

Site/Facility ID #

P.O. #

Acctnum: **AQUAOPKS**
Template: **T136276**
Prelogin: **P698300**
TSR: **206 - Jeff Carr**
PB:
Shipped Via:

Collected by (signature): Whit Martin

Immediately Packed on Ice N____ Y X

*Rush?* (Lab MUST Be Notified)
____ Same Day ____ Five Day
____ Next Day ____ 5 Day (Rad Only)
____ Two Day ____ 10 Day (Rad Only)
____ Three Day

Quote #

Date Results Needed: Std

| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | No. of Cntrs | Boron - 6010 250mlHDPE-HNO3 <2 | Calcium - 6010 250mlHDPE-HNO3 <2 | Chloride 125mlHDPE-NoPres | Fluoride 125mlHDPE-NoPres | Sulfate 125mlHDPE-NoPres | | | | | | Remarks | Sample # (lab only) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **DUPLICATE 4** | Grab | GW | | 3/11/19 | 1455 | 1 | | X | | | | | | | | | | -08 |
| **MW-701 MS/MSD** | Grab | GW | | 3/11/19 | 1500 | 1 | | X | | | | | | | | | | -07 |
| **MW-706** | Grab | GW | | 3/11/19 | 1550 | 1 | | | | | X | | | | | | | -09 |
| **MW-804** | Grab | GW | | 3/11/19 | 1055 | 1 | X | | | | | | | | | | | -10 |
| **MW-805** | Grab | GW | | 3/11/19 | 1015 | 1 | | X | | | | | | | | | | -11 |
| **MW-903** | Grab | GW | | 3/11/19 | 0905 | 1 | | X | | | | | | | | | | -12 |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other________

**Remarks:**

pH ______ Temp ______
Flow ______ Other ______

Samples returned via:
__ UPS __ FedEx __ Courier __ ______

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: ✓NP __Y __N
COC Signed/Accurate: ✓Y __N
Bottles arrive intact: ✓Y __N
Correct bottles used: ✓Y __N
Sufficient volume sent: ✓Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: ✓Y __N
RAD SCREEN: <0.5 mR/hr

| | | | | | |
|---|---|---|---|---|---|
| Relinquished by : (Signature) Whit Martin | Date: 3/12/19 | Time: 1555 | Received by: (Signature) | Trip Blank Received: Yes / No<br>HCL / MeoH<br>TBR | |
| Relinquished by : (Signature) | Date: | Time: | Received by: (Signature) | Temp: 0.3+.1=0.4 °C Bottles Received: 22 | If preservation required by Login: Date/Time |
| Relinquished by : (Signature) | Date: | Time: | Received for lab by: (Signature) Malik T. | Date: 3/13 Time: 8:45 | Hold: Condition: NCF / [✓ OK] |

# ATTACHMENT 1-3

## May 2019 Sampling Event Laboratory Report

# ANALYTICAL REPORT

June 07, 2019

## SCS Engineers - KS

| | |
|---|---|
| Sample Delivery Group: | L1102793 |
| Samples Received: | 05/25/2019 |
| Project Number: | 27217233.19 |
| Description: | KCPL - LaCygne Generating Station |
| Report To: | Jason Franks<br>8575 West 110th Street<br>Suite 100<br>Overland Park, KS 66210 |

Entire Report Reviewed By:

Jeff Carr
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace National is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

TABLE OF CONTENTS

## MW-901 L1102793-01 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 05/23/19 13:30 | 05/25/19 08:00 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Gravimetric Analysis by Method 2540 C-2011 | WG1288054 | 1 | 05/30/19 20:53 | 05/30/19 23:30 | MMF | Mt. Juliet, TN |
| Wet Chemistry by Method 9056A | WG1291176 | 1 | 06/06/19 17:50 | 06/06/19 17:50 | ELN | Mt. Juliet, TN |
| Metals (ICP) by Method 6010B | WG1287651 | 1 | 05/29/19 15:30 | 05/30/19 15:03 | CCE | Mt. Juliet, TN |

## MW-902 L1102793-02 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 05/23/19 12:50 | 05/25/19 08:00 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Gravimetric Analysis by Method 2540 C-2011 | WG1288054 | 1 | 05/30/19 20:53 | 05/30/19 23:30 | MMF | Mt. Juliet, TN |
| Wet Chemistry by Method 9056A | WG1290621 | 1 | 06/06/19 11:23 | 06/06/19 11:23 | ELN | Mt. Juliet, TN |
| Metals (ICP) by Method 6010B | WG1287651 | 1 | 05/29/19 15:30 | 05/30/19 15:14 | CCE | Mt. Juliet, TN |

## MW-903 L1102793-03 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 05/23/19 12:05 | 05/25/19 08:00 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Gravimetric Analysis by Method 2540 C-2011 | WG1288054 | 1 | 05/30/19 20:53 | 05/30/19 23:30 | MMF | Mt. Juliet, TN |
| Wet Chemistry by Method 9056A | WG1290621 | 1 | 06/06/19 11:34 | 06/06/19 11:34 | ELN | Mt. Juliet, TN |
| Wet Chemistry by Method 9056A | WG1290621 | 20 | 06/06/19 12:29 | 06/06/19 12:29 | ELN | Mt. Juliet, TN |
| Metals (ICP) by Method 6010B | WG1287651 | 1 | 05/29/19 15:30 | 05/30/19 15:16 | CCE | Mt. Juliet, TN |

## MW-904 L1102793-04 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 05/23/19 11:20 | 05/25/19 08:00 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Gravimetric Analysis by Method 2540 C-2011 | WG1288054 | 1 | 05/30/19 20:53 | 05/30/19 23:30 | MMF | Mt. Juliet, TN |
| Wet Chemistry by Method 9056A | WG1291176 | 1 | 06/06/19 18:38 | 06/06/19 18:38 | ELN | Mt. Juliet, TN |
| Metals (ICP) by Method 6010B | WG1287651 | 1 | 05/29/19 15:30 | 05/30/19 15:19 | CCE | Mt. Juliet, TN |

## MW-905 L1102793-05 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 05/23/19 12:30 | 05/25/19 08:00 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Gravimetric Analysis by Method 2540 C-2011 | WG1288054 | 1 | 05/30/19 20:53 | 05/30/19 23:30 | MMF | Mt. Juliet, TN |
| Wet Chemistry by Method 9056A | WG1291176 | 1 | 06/06/19 19:41 | 06/06/19 19:41 | ELN | Mt. Juliet, TN |
| Metals (ICP) by Method 6010B | WG1287651 | 1 | 05/29/19 15:30 | 05/30/19 15:22 | CCE | Mt. Juliet, TN |

## DUPLICATE 1 L1102793-06 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 05/23/19 13:35 | 05/25/19 08:00 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Gravimetric Analysis by Method 2540 C-2011 | WG1288054 | 1 | 05/30/19 20:53 | 05/30/19 23:30 | MMF | Mt. Juliet, TN |
| Wet Chemistry by Method 9056A | WG1291176 | 1 | 06/06/19 19:57 | 06/06/19 19:57 | ELN | Mt. Juliet, TN |
| Metals (ICP) by Method 6010B | WG1287651 | 1 | 05/29/19 15:30 | 05/30/19 15:24 | CCE | Mt. Juliet, TN |

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report.  Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis.  All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Jeff Carr
Project Manager

MW-901

Collected date/time: 05/23/19 13:30

# SAMPLE RESULTS - 01

L1102793

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

## Gravimetric Analysis by Method 2540 C-2011

| | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| Analyte | ug/l | | ug/l | | date / time | |
| Dissolved Solids | 514000 | | 10000 | 1 | 05/30/2019 23:30 | WG1288054 |

## Wet Chemistry by Method 9056A

| | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| Analyte | ug/l | | ug/l | | date / time | |
| Chloride | 22800 | | 1000 | 1 | 06/06/2019 17:50 | WG1291176 |
| Fluoride | 489 | | 100 | 1 | 06/06/2019 17:50 | WG1291176 |
| Sulfate | 21000 | | 5000 | 1 | 06/06/2019 17:50 | WG1291176 |

## Metals (ICP) by Method 6010B

| | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| Analyte | ug/l | | ug/l | | date / time | |
| Boron | 1180 | | 200 | 1 | 05/30/2019 15:03 | WG1287651 |
| Calcium | 52300 | | 1000 | 1 | 05/30/2019 15:03 | WG1287651 |

## Gravimetric Analysis by Method 2540 C-2011

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Dissolved Solids | 511000 | | 10000 | 1 | 05/30/2019 23:30 | WG1288054 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Chloride | 32800 | | 1000 | 1 | 06/06/2019 11:23 | WG1290621 |
| Fluoride | 441 | | 100 | 1 | 06/06/2019 11:23 | WG1290621 |
| Sulfate | 29400 | | 5000 | 1 | 06/06/2019 11:23 | WG1290621 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Boron | 1240 | | 200 | 1 | 05/30/2019 15:14 | WG1287651 |
| Calcium | 66500 | | 1000 | 1 | 05/30/2019 15:14 | WG1287651 |

## Gravimetric Analysis by Method 2540 C-2011

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Dissolved Solids | 2030000 | | 25000 | 1 | 05/30/2019 23:30 | WG1288054 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Chloride | 24500 | | 1000 | 1 | 06/06/2019 11:34 | WG1290621 |
| Fluoride | 130 | | 100 | 1 | 06/06/2019 11:34 | WG1290621 |
| Sulfate | 1030000 | | 100000 | 20 | 06/06/2019 12:29 | WG1290621 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Boron | 494 | | 200 | 1 | 05/30/2019 15:16 | WG1287651 |
| Calcium | 367000 | | 1000 | 1 | 05/30/2019 15:16 | WG1287651 |

MW-904
Collected date/time: 05/23/19 11:20

# SAMPLE RESULTS - 04

L1102793

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

## Gravimetric Analysis by Method 2540 C-2011

| | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| Analyte | ug/l | | ug/l | | date / time | |
| Dissolved Solids | 696000 | | 13300 | 1 | 05/30/2019 23:30 | WG1288054 |

## Wet Chemistry by Method 9056A

| | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| Analyte | ug/l | | ug/l | | date / time | |
| Chloride | 33400 | | 1000 | 1 | 06/06/2019 18:38 | WG1291176 |
| Fluoride | 382 | | 100 | 1 | 06/06/2019 18:38 | WG1291176 |
| Sulfate | 81700 | | 5000 | 1 | 06/06/2019 18:38 | WG1291176 |

## Metals (ICP) by Method 6010B

| | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| Analyte | ug/l | | ug/l | | date / time | |
| Boron | 1110 | | 200 | 1 | 05/30/2019 15:19 | WG1287651 |
| Calcium | 68200 | | 1000 | 1 | 05/30/2019 15:19 | WG1287651 |

## Gravimetric Analysis by Method 2540 C-2011

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Dissolved Solids | 621000 | | 13300 | 1 | 05/30/2019 23:30 | WG1288054 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Chloride | 52000 | | 1000 | 1 | 06/06/2019 19:41 | WG1291176 |
| Fluoride | 494 | | 100 | 1 | 06/06/2019 19:41 | WG1291176 |
| Sulfate | 28700 | | 5000 | 1 | 06/06/2019 19:41 | WG1291176 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Boron | 1870 | | 200 | 1 | 05/30/2019 15:22 | WG1287651 |
| Calcium | 46400 | | 1000 | 1 | 05/30/2019 15:22 | WG1287651 |

## Gravimetric Analysis by Method 2540 C-2011

| | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| Analyte | ug/l | | ug/l | | date / time | |
| Dissolved Solids | 517000 | | 10000 | 1 | 05/30/2019 23:30 | WG1288054 |

## Wet Chemistry by Method 9056A

| | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| Analyte | ug/l | | ug/l | | date / time | |
| Chloride | 22800 | | 1000 | 1 | 06/06/2019 19:57 | WG1291176 |
| Fluoride | 489 | | 100 | 1 | 06/06/2019 19:57 | WG1291176 |
| Sulfate | 21100 | | 5000 | 1 | 06/06/2019 19:57 | WG1291176 |

## Metals (ICP) by Method 6010B

| | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| Analyte | ug/l | | ug/l | | date / time | |
| Boron | 1160 | | 200 | 1 | 05/30/2019 15:24 | WG1287651 |
| Calcium | 52100 | | 1000 | 1 | 05/30/2019 15:24 | WG1287651 |

## Method Blank (MB)

(MB) R3417295-1 05/30/19 23:30

| Analyte | MB Result<br>ug/l | MB Qualifier | MB MDL<br>ug/l | MB RDL<br>ug/l |
|---|---|---|---|---|
| Dissolved Solids | U | | 2820 | 10000 |

## L1102793-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1102793-05 05/30/19 23:30 • (DUP) R3417295-3 05/30/19 23:30

| Analyte | Original Result<br>ug/l | DUP Result<br>ug/l | Dilution | DUP RPD<br>% | DUP Qualifier | DUP RPD Limits<br>% |
|---|---|---|---|---|---|---|
| Dissolved Solids | 621000 | 617000 | 1 | 0.646 | | 5 |

## Laboratory Control Sample (LCS)

(LCS) R3417295-2 05/30/19 23:30

| Analyte | Spike Amount<br>ug/l | LCS Result<br>ug/l | LCS Rec.<br>% | Rec. Limits<br>% | LCS Qualifier |
|---|---|---|---|---|---|
| Dissolved Solids | 8800000 | 8840000 | 100 | 85.0-115 | |

## Method Blank (MB)

(MB) R3418444-1 06/06/19 03:03

| Analyte | MB Result<br>ug/l | MB Qualifier | MB MDL<br>ug/l | MB RDL<br>ug/l |
|---|---|---|---|---|
| Chloride | U | | 51.9 | 1000 |
| Fluoride | U | | 9.90 | 100 |
| Sulfate | U | | 77.4 | 5000 |

## L1102791-08 Original Sample (OS) • Duplicate (DUP)

(OS) L1102791-08 06/06/19 04:50 • (DUP) R3418444-5 06/06/19 05:01

| Analyte | Original Result<br>ug/l | DUP Result<br>ug/l | Dilution | DUP RPD<br>% | DUP Qualifier | DUP RPD Limits<br>% |
|---|---|---|---|---|---|---|
| Chloride | 34200 | 34200 | 1 | 0.0410 | | 15 |
| Fluoride | 816 | 812 | 1 | 0.455 | | 15 |
| Sulfate | ND | 0.000 | 1 | 0.000 | | 15 |

## L1102792-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1102792-05 06/06/19 08:17 • (DUP) R3418444-6 06/06/19 08:28

| Analyte | Original Result<br>ug/l | DUP Result<br>ug/l | Dilution | DUP RPD<br>% | DUP Qualifier | DUP RPD Limits<br>% |
|---|---|---|---|---|---|---|
| Chloride | 41800 | 40800 | 1 | 2.50 | | 15 |
| Fluoride | 1210 | 1220 | 1 | 0.255 | | 15 |
| Sulfate | ND | 2370 | 1 | 2.78 | J | 15 |

## Laboratory Control Sample (LCS)

(LCS) R3418444-2 06/06/19 03:14

| Analyte | Spike Amount<br>ug/l | LCS Result<br>ug/l | LCS Rec.<br>% | Rec. Limits<br>% | LCS Qualifier |
|---|---|---|---|---|---|
| Chloride | 40000 | 40200 | 100 | 80.0-120 | |
| Fluoride | 8000 | 8280 | 104 | 80.0-120 | |
| Sulfate | 40000 | 40600 | 101 | 80.0-120 | |

## L1102791-07 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1102791-07 06/06/19 04:07 • (MS) R3418444-3 06/06/19 04:17 • (MSD) R3418444-4 06/06/19 04:28

| Analyte | Spike Amount<br>ug/l | Original Result<br>ug/l | MS Result<br>ug/l | MSD Result<br>ug/l | MS Rec.<br>% | MSD Rec.<br>% | Dilution | Rec. Limits<br>% | MS Qualifier | MSD Qualifier | RPD<br>% | RPD Limits<br>% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 50000 | 89400 | 136000 | 136000 | 92.4 | 93.0 | 1 | 80.0-120 | E | E | 0.201 | 15 |
| Fluoride | 5000 | 922 | 6150 | 6160 | 104 | 105 | 1 | 80.0-120 | | | 0.242 | 15 |
| Sulfate | 50000 | ND | 51700 | 51800 | 96.6 | 96.8 | 1 | 80.0-120 | | | 0.190 | 15 |

## L1102792-05 Original Sample (OS) • Matrix Spike (MS)

(OS) L1102792-05 06/06/19 08:17 • (MS) R3418444-7 06/06/19 08:39

| Analyte | Spike Amount<br>ug/l | Original Result<br>ug/l | MS Result<br>ug/l | MS Rec.<br>% | Dilution | Rec. Limits<br>% | MS Qualifier |
|---|---|---|---|---|---|---|---|
| Chloride | 50000 | 41800 | 89200 | 94.8 | 1 | 80.0-120 | |
| Fluoride | 5000 | 1210 | 6480 | 105 | 1 | 80.0-120 | |
| Sulfate | 50000 | ND | 51600 | 98.4 | 1 | 80.0-120 | |

## Method Blank (MB)

(MB) R3418770-1 06/06/19 15:59

| Analyte | MB Result<br>ug/l | MB Qualifier | MB MDL<br>ug/l | MB RDL<br>ug/l |
|---|---|---|---|---|
| Chloride | U | | 51.9 | 1000 |
| Fluoride | U | | 9.90 | 100 |
| Sulfate | U | | 77.4 | 5000 |

## L1102793-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1102793-04 06/06/19 18:38 • (DUP) R3418770-7 06/06/19 19:26

| Analyte | Original Result<br>ug/l | DUP Result<br>ug/l | Dilution | DUP RPD<br>% | DUP Qualifier | DUP RPD Limits<br>% |
|---|---|---|---|---|---|---|
| Chloride | 33400 | 33600 | 1 | 0.590 | | 15 |
| Fluoride | 382 | 383 | 1 | 0.497 | | 15 |
| Sulfate | 81700 | 82100 | 1 | 0.565 | | 15 |

## L1103234-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1103234-05 06/06/19 22:36 • (DUP) R3418770-8 06/06/19 22:52

| Analyte | Original Result<br>ug/l | DUP Result<br>ug/l | Dilution | DUP RPD<br>% | DUP Qualifier | DUP RPD Limits<br>% |
|---|---|---|---|---|---|---|
| Chloride | 5450 | 5470 | 1 | 0.496 | | 15 |
| Fluoride | 214 | 217 | 1 | 1.21 | | 15 |
| Sulfate | 15700 | 15800 | 1 | 0.658 | | 15 |

## Laboratory Control Sample (LCS)

(LCS) R3418770-2 06/06/19 16:15

| Analyte | Spike Amount<br>ug/l | LCS Result<br>ug/l | LCS Rec.<br>% | Rec. Limits<br>% | LCS Qualifier |
|---|---|---|---|---|---|
| Chloride | 40000 | 40300 | 101 | 80.0-120 | |
| Fluoride | 8000 | 8470 | 106 | 80.0-120 | |
| Sulfate | 40000 | 40000 | 100 | 80.0-120 | |

## L1102792-07 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1102792-07 06/06/19 16:46 • (MS) R3418770-3 06/06/19 17:02 • (MSD) R3418770-4 06/06/19 17:18

| Analyte | Spike Amount ug/l | Original Result ug/l | MS Result ug/l | MSD Result ug/l | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 50000 | 87200 | 134000 | 135000 | 94.4 | 95.2 | 1 | 80.0-120 | E | E | 0.302 | 15 |
| Fluoride | 5000 | 828 | 6030 | 6060 | 104 | 105 | 1 | 80.0-120 | | | 0.501 | 15 |
| Sulfate | 50000 | 170000 | 213000 | 214000 | 87.1 | 88.2 | 1 | 80.0-120 | E | E | 0.265 | 15 |

## L1102793-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1102793-01 06/06/19 17:50 • (MS) R3418770-5 06/06/19 18:06 • (MSD) R3418770-6 06/06/19 18:22

| Analyte | Spike Amount ug/l | Original Result ug/l | MS Result ug/l | MSD Result ug/l | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 50000 | 22800 | 73000 | 70400 | 101 | 95.2 | 1 | 80.0-120 | | | 3.68 | 15 |
| Fluoride | 5000 | 489 | 5650 | 5430 | 103 | 98.8 | 1 | 80.0-120 | | | 3.98 | 15 |
| Sulfate | 50000 | 21000 | 72100 | 69400 | 102 | 96.8 | 1 | 80.0-120 | | | 3.81 | 15 |

## Method Blank (MB)

(MB) R3416282-1 05/30/19 12:44

| Analyte | MB Result ug/l | MB Qualifier | MB MDL ug/l | MB RDL ug/l |
|---|---|---|---|---|
| Boron | U | | 12.6 | 200 |
| Calcium | 67.5 | J | 46.3 | 1000 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3416282-2 05/30/19 12:47 • (LCSD) R3416282-3 05/30/19 12:49

| Analyte | Spike Amount ug/l | LCS Result ug/l | LCSD Result ug/l | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| Boron | 1000 | 985 | 974 | 98.5 | 97.4 | 80.0-120 | | | 1.11 | 20 |
| Calcium | 10000 | 9970 | 9920 | 99.7 | 99.2 | 80.0-120 | | | 0.512 | 20 |

## L1102792-07 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1102792-07 05/30/19 12:52 • (MS) R3416282-5 05/30/19 12:57 • (MSD) R3416282-6 05/30/19 13:00

| Analyte | Spike Amount ug/l | Original Result ug/l | MS Result ug/l | MSD Result ug/l | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Boron | 1000 | 2030 | 2950 | 2960 | 92.2 | 93.1 | 1 | 75.0-125 | | | 0.281 | 20 |
| Calcium | 10000 | 21900 | 31200 | 31500 | 92.2 | 95.2 | 1 | 75.0-125 | | | 0.960 | 20 |

## L1102793-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1102793-01 05/30/19 15:03 • (MS) R3416282-7 05/30/19 15:05 • (MSD) R3416282-8 05/30/19 15:08

| Analyte | Spike Amount ug/l | Original Result ug/l | MS Result ug/l | MSD Result ug/l | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Boron | 1000 | 1180 | 2120 | 2150 | 94.5 | 97.4 | 1 | 75.0-125 | | | 1.38 | 20 |
| Calcium | 10000 | 52300 | 60900 | 60800 | 85.5 | 85.2 | 1 | 75.0-125 | | | 0.0488 | 20 |

## Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

## Abbreviations and Definitions

| | |
|---|---|
| MDL | Method Detection Limit. |
| ND | Not detected at the Reporting Limit (or MDL where applicable). |
| RDL | Reported Detection Limit. |
| Rec. | Recovery. |
| RPD | Relative Percent Difference. |
| SDG | Sample Delivery Group. |
| U | Not detected at the Reporting Limit (or MDL where applicable). |
| Analyte | The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported. |
| Dilution | If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor. |
| Limits | These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges. |
| Original Sample | The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG. |
| Qualifier | This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable. |
| Result | The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte. |
| Uncertainty (Radiochemistry) | Confidence level of 2 sigma. |
| Case Narrative (Cn) | A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report. |
| Quality Control Summary (Qc) | This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material. |
| Sample Chain of Custody (Sc) | This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis. |
| Sample Results (Sr) | This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported. |
| Sample Summary (Ss) | This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis. |

| Qualifier | Description |
|---|---|
| E | The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL). |
| J | The identification of the analyte is acceptable; the reported value is an estimate. |

# ACCREDITATIONS & LOCATIONS

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

## State Accreditations

| | |
|---|---|
| Alabama | 40660 |
| Alaska | 17-026 |
| Arizona | AZ0612 |
| Arkansas | 88-0469 |
| California | 2932 |
| Colorado | TN00003 |
| Connecticut | PH-0197 |
| Florida | E87487 |
| Georgia | NELAP |
| Georgia[1] | 923 |
| Idaho | TN00003 |
| Illinois | 200008 |
| Indiana | C-TN-01 |
| Iowa | 364 |
| Kansas | E-10277 |
| Kentucky[1,6] | 90010 |
| Kentucky[2] | 16 |
| Louisiana | AI30792 |
| Louisiana[1] | LA180010 |
| Maine | TN0002 |
| Maryland | 324 |
| Massachusetts | M-TN003 |
| Michigan | 9958 |
| Minnesota | 047-999-395 |
| Mississippi | TN00003 |
| Missouri | 340 |
| Montana | CERT0086 |

| | |
|---|---|
| Nebraska | NE-OS-15-05 |
| Nevada | TN-03-2002-34 |
| New Hampshire | 2975 |
| New Jersey–NELAP | TN002 |
| New Mexico[1] | n/a |
| New York | 11742 |
| North Carolina | Env375 |
| North Carolina[1] | DW21704 |
| North Carolina[3] | 41 |
| North Dakota | R-140 |
| Ohio–VAP | CL0069 |
| Oklahoma | 9915 |
| Oregon | TN200002 |
| Pennsylvania | 68-02979 |
| Rhode Island | LAO00356 |
| South Carolina | 84004 |
| South Dakota | n/a |
| Tennessee[1,4] | 2006 |
| Texas | T104704245-18-15 |
| Texas[5] | LAB0152 |
| Utah | TN00003 |
| Vermont | VT2006 |
| Virginia | 460132 |
| Washington | C847 |
| West Virginia | 233 |
| Wisconsin | 9980939910 |
| Wyoming | A2LA |

## Third Party Federal Accreditations

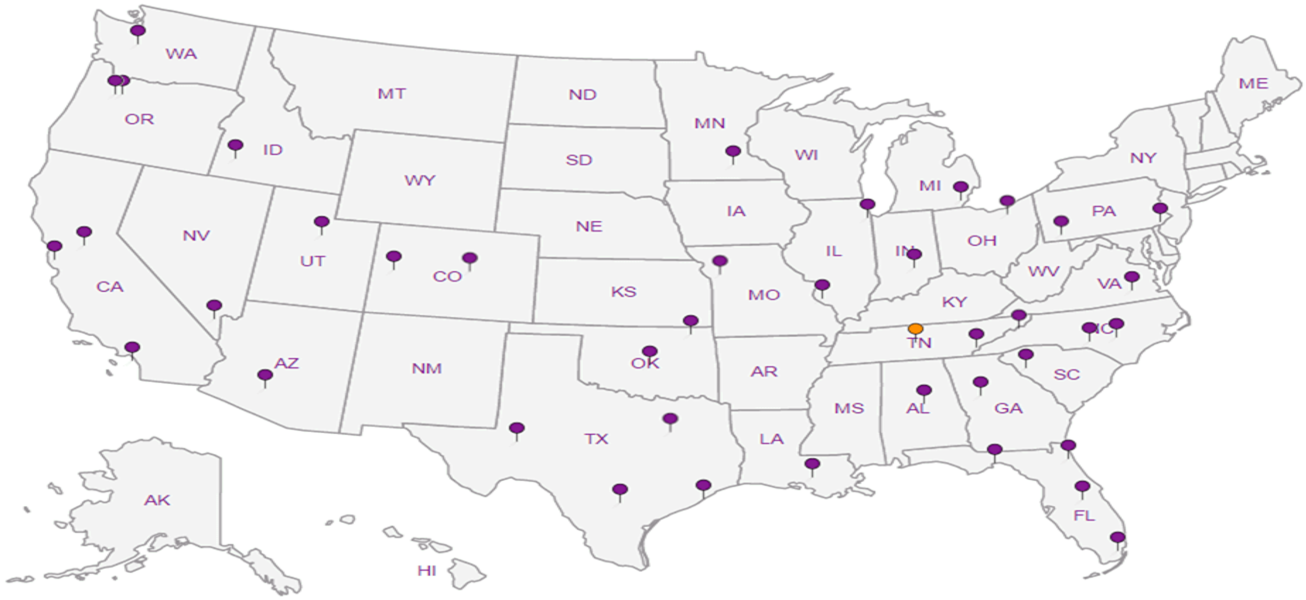
| | |
|---|---|
| A2LA – ISO 17025 | 1461.01 |
| A2LA – ISO 17025[5] | 1461.02 |
| Canada | 1461.01 |
| EPA–Crypto | TN00003 |

| | |
|---|---|
| AIHA-LAP,LLC EMLAP | 100789 |
| DOD | 1461.01 |
| USDA | P330-15-00234 |

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

## Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



**SCS Engineers - KS**

**8575 West 110th Street, Ste. 100**
**Overland Park, KS 66210**

Billing Information:

**Accounts Payable**
**8575 West 110th Street, Ste. 100**
**Overland Park, KS 66210**

Pres Chk

Analysis / Container / Preservative

Chain of Custody Page 1 of 1

ESC
LAB SCIENCES

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

Report to:
**Jason Franks**

Email To: **jfranks@scsengineers.com;**
**jay.martin@kcpl.com;**

Project Description: **KCPL - LaCygne Generating Station**

City/State Collected: **La Cygne, Kansas**

Phone: **913-681-0030**
Fax: **913-681-0012**

Client Project #
**27217233.19**

Lab Project #
**AQUAOPKS-LACYGNE**

L# L1162793

**J156**

Acctnum: **AQUAOPKS**

Template: **T136292**

Prelogin:

TSR: **206 - Jeff Carr**

PB:

Shipped Via:

Collected by (print):
**Jason R. Franks**

Site/Facility ID #

P.O. #

Collected by (signature): Jason R. Franks

Immediately Packed on Ice N ___ Y X

*Rush?* (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | No. of Cntrs | Anions (Cld, F, SO4) 125mlHDPE-NoPres | B, Ca - 6010 250mlHDPE-HNO3 | TDS 250mlHDPE-NoPres | Remarks | Sample # (lab only) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pres Chk |  |  |  |  |  |  |  | <2 |  |  |  |
| MW-901 | Grab | GW | NA | 05/23/19 | 1330 | 3 | X | X | X |  | -01 |
| MW-902 | Grab | GW | NA | 05/23/19 | 1250 | 3 | X | X | X |  | 02 |
| MW-903 | Grab | GW | NA | 05/23/19 | 1205 | 3 | X | X | X |  | 03 |
| MW-904 | Grab | GW | NA | 05/23/19 | 1120 | 3 | X | X | X |  | 04 |
| MW-905 | Grab | GW | NA | 05/23/19 | 1230 | 3 | X | X | X |  | 05 |
| 901 MS/MSD | Grab | GW | NA | 05/23/19 | 1340 | 3 | X | X | X |  | 01 |
| DUPLICATE 1 | Grab | GW | NA | 05/23/19 | 1335 | 3 | X | X | X |  | 06 |

* Matrix:
**SS** - Soil **AIR** - Air **F** - Filter
**GW** - Groundwater **B** - Bioassay
**WW** - WasteWater
**DW** - Drinking Water
**OT** - Other ________

**Remarks:**

**RAD SCREEN: <0.5 mR/hr**

pH ______ Temp ______
Flow ______ Other ______

Samples returned via:
__ UPS __ FedEx __ Courier SWA

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: ✓NP __Y __N
COC Signed/Accurate: ✓Y __N
Bottles arrive intact: ✓Y __N
Correct bottles used: ✓Y __N
Sufficient volume sent: ✓Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: ✓Y __N

| | | | |
|---|---|---|---|
| Relinquished by : (Signature) Jason R. Franks | Date: 5/24/19 | Time: 1500 | Received by: (Signature) Allen Nelson 5-24-19 1500 |
| Relinquished by : (Signature) Allen Nelson | Date: 5/24/19 | Time: 1600 | Received by: (Signature) |
| Relinquished by : (Signature) | Date: 5/24/19 | Time: 1700 | Received for lab by: (Signature) ~~SWA~~ |

Trip Blank Received: Yes / [✓ No] Ø
HCL / MeoH
TBR

Temp: 1.1+0=1.1 °C 43 SR
Bottles Received: 21

Date: 5/25/19
Time: 0800

If preservation required by Login: Date/Time

Hold:

Condition: NCF / [✓ OK]

# ATTACHMENT 1-4

# July 2019 Sampling Event Laboratory Report

Pace Analytical®
National Center for Testing & Innovation

# ANALYTICAL REPORT

July 25, 2019

## SCS Engineers - KS

| | |
|---|---|
| Sample Delivery Group: | L1120582 |
| Samples Received: | 07/19/2019 |
| Project Number: | 27217233.19 |
| Description: | KCPL - LaCygne Generating Station |

Report To:

Jason Franks
8575 West 110th Street
Suite 100
Overland Park, KS  66210

Entire Report Reviewed By:

Jeff Carr
Project Manager

# TABLE OF CONTENTS

## MW-14R L1120582-01 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Whit Martin | 07/17/19 10:35 | 07/19/19 08:00 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1316426 | 1 | 07/24/19 15:58 | 07/24/19 15:58 | ST | Mt. Juliet, TN |

## DUPLICATE 1 L1120582-02 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Whit Martin | 07/17/19 10:35 | 07/19/19 08:00 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1316426 | 1 | 07/24/19 16:57 | 07/24/19 16:57 | ST | Mt. Juliet, TN |

## MW-601 L1120582-03 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Whit Martin | 07/17/19 11:20 | 07/19/19 08:00 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1316426 | 1 | 07/24/19 17:12 | 07/24/19 17:12 | ST | Mt. Juliet, TN |

## MW-701 L1120582-04 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Whit Martin | 07/17/19 12:45 | 07/19/19 08:00 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG1314696 | 1 | 07/22/19 11:47 | 07/23/19 20:12 | EL | Mt. Juliet, TN |

## MW-704 L1120582-05 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Whit Martin | 07/17/19 12:05 | 07/19/19 08:00 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1316426 | 1 | 07/24/19 18:12 | 07/24/19 18:12 | ST | Mt. Juliet, TN |

## MW-706 L1120582-06 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Whit Martin | 07/17/19 13:55 | 07/19/19 08:00 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1316426 | 1 | 07/24/19 18:27 | 07/24/19 18:27 | ST | Mt. Juliet, TN |

## MW-707B L1120582-07 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Whit Martin | 07/17/19 13:10 | 07/19/19 08:00 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1316426 | 50 | 07/24/19 18:42 | 07/24/19 18:42 | ST | Mt. Juliet, TN |

## DUPLICATE 3 L1120582-08 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Whit Martin | 07/17/19 13:15 | 07/19/19 08:00 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1316426 | 100 | 07/25/19 01:38 | 07/25/19 01:38 | LDC | Mt. Juliet, TN |

## MW-804 L1120582-09 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Whit Martin | 07/17/19 12:07 | 07/19/19 08:00 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG1314696 | 1 | 07/22/19 11:47 | 07/23/19 19:22 | EL | Mt. Juliet, TN |

## DUPLICATE 2 L1120582-10 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Whit Martin | 07/17/19 12:15 | 07/19/19 08:00 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG1314696 | 1 | 07/22/19 11:47 | 07/23/19 20:21 | EL | Mt. Juliet, TN |

## MW-805 L1120582-11 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Whit Martin | 07/17/19 11:20 | 07/19/19 08:00 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG1314696 | 1 | 07/22/19 11:47 | 07/23/19 20:24 | EL | Mt. Juliet, TN |

## MW-903 L1120582-12 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Whit Martin | 07/17/19 09:45 | 07/19/19 08:00 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG1314696 | 1 | 07/22/19 11:47 | 07/23/19 19:33 | EL | Mt. Juliet, TN |

## DUPLICATE 4 L1120582-13 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Whit Martin | 07/17/19 09:45 | 07/19/19 08:00 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG1314696 | 1 | 07/22/19 11:47 | 07/23/19 20:27 | EL | Mt. Juliet, TN |

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Jeff Carr
Project Manager

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Chloride | 6140 | | 1000 | 1 | 07/24/2019 15:58 | WG1316426 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Chloride | 6010 | | 1000 | 1 | 07/24/2019 16:57 | WG1316426 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Sulfate | 5750 | | 5000 | 1 | 07/24/2019 17:12 | WG1316426 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Calcium | 45000 | | 1000 | 1 | 07/23/2019 20:12 | WG1314696 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Chloride | 89700 | | 1000 | 1 | 07/24/2019 18:12 | WG1316426 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Sulfate | 8270 | | 5000 | 1 | 07/24/2019 18:27 | WG1316426 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Sulfate | 4920000 | V | 250000 | 50 | 07/24/2019 18:42 | WG1316426 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Sulfate | 4880000 |  | 500000 | 100 | 07/25/2019 01:38 | WG1316426 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Boron | 1710 | O1 | 200 | 1 | 07/23/2019 19:22 | WG1314696 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Boron | 1720 | | 200 | 1 | 07/23/2019 20:21 | WG1314696 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Boron | 550 | | 200 | 1 | 07/23/2019 20:24 | WG1314696 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Calcium | 373000 | V | 1000 | 1 | 07/23/2019 19:33 | WG1314696 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Calcium | 379000 | | 1000 | 1 | 07/23/2019 20:27 | WG1314696 |

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

## Method Blank (MB)

(MB) R3433988-1 07/24/19 14:56

| Analyte | MB Result<br>ug/l | MB Qualifier | MB MDL<br>ug/l | MB RDL<br>ug/l |
|---|---|---|---|---|
| Chloride | U | | 51.9 | 1000 |
| Sulfate | U | | 77.4 | 5000 |

## L1120582-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1120582-01 07/24/19 15:58 • (DUP) R3433988-3 07/24/19 16:13

| Analyte | Original Result<br>ug/l | DUP Result<br>ug/l | Dilution | DUP RPD<br>% | DUP Qualifier | DUP RPD Limits<br>% |
|---|---|---|---|---|---|---|
| Chloride | 6140 | 5950 | 1 | 3.25 | | 15 |
| Sulfate | 59300 | 59300 | 1 | 0.0944 | | 15 |

## L1120583-09 Original Sample (OS) • Duplicate (DUP)

(OS) L1120583-09 07/24/19 22:25 • (DUP) R3433988-8 07/24/19 22:40

| Analyte | Original Result<br>ug/l | DUP Result<br>ug/l | Dilution | DUP RPD<br>% | DUP Qualifier | DUP RPD Limits<br>% |
|---|---|---|---|---|---|---|
| Chloride | 25600 | 25700 | 1 | 0.319 | | 15 |

## L1120583-09 Original Sample (OS) • Duplicate (DUP)

(OS) L1120583-09 07/25/19 02:08 • (DUP) R3433988-9 07/25/19 02:23

| Analyte | Original Result<br>ug/l | DUP Result<br>ug/l | Dilution | DUP RPD<br>% | DUP Qualifier | DUP RPD Limits<br>% |
|---|---|---|---|---|---|---|
| Sulfate | 1140000 | 1200000 | 20 | 5.12 | | 15 |

## Laboratory Control Sample (LCS)

(LCS) R3433988-2 07/24/19 15:11

| Analyte | Spike Amount<br>ug/l | LCS Result<br>ug/l | LCS Rec.<br>% | Rec. Limits<br>% | LCS Qualifier |
|---|---|---|---|---|---|
| Chloride | 40000 | 40200 | 100 | 80.0-120 | |
| Sulfate | 40000 | 41600 | 104 | 80.0-120 | |

## L1120582-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1120582-01 07/24/19 15:58 • (MS) R3433988-4 07/24/19 16:27 • (MSD) R3433988-5 07/24/19 16:42

| Analyte | Spike Amount ug/l | Original Result ug/l | MS Result ug/l | MSD Result ug/l | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 50000 | 6140 | 56400 | 56200 | 100 | 100 | 1 | 80.0-120 | | | 0.223 | 15 |
| Sulfate | 50000 | 59300 | 106000 | 106000 | 93.3 | 93.5 | 1 | 80.0-120 | E | E | 0.132 | 15 |

## L1120582-07 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1120582-07 07/24/19 18:42 • (MS) R3433988-6 07/24/19 18:57 • (MSD) R3433988-7 07/24/19 19:12

| Analyte | Spike Amount ug/l | Original Result ug/l | MS Result ug/l | MSD Result ug/l | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 1000 | 198000 | 2750000 | 2730000 | 5110 | 5070 | 50 | 80.0-120 | J5 | J5 | 0.672 | 15 |
| Sulfate | 1000 | 4920000 | 7170000 | 7140000 | 4510 | 4450 | 50 | 80.0-120 | E V | E V | 0.422 | 15 |

## Method Blank (MB)

(MB) R3433521-1 07/23/19 19:14

| Analyte | MB Result | MB Qualifier | MB MDL | MB RDL |
|---|---|---|---|---|
| | ug/l | | ug/l | ug/l |
| Boron | U | | 12.6 | 200 |
| Calcium | U | | 46.3 | 1000 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3433521-2 07/23/19 19:16 • (LCSD) R3433521-3 07/23/19 19:19

| Analyte | Spike Amount | LCS Result | LCSD Result | LCS Rec. | LCSD Rec. | Rec. Limits | LCS Qualifier | LCSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|
| | ug/l | ug/l | ug/l | % | % | % | | | % | % |
| Boron | 1000 | 1020 | 1020 | 102 | 102 | 80.0-120 | | | 0.807 | 20 |
| Calcium | 10000 | 10100 | 10200 | 101 | 102 | 80.0-120 | | | 0.807 | 20 |

## L1120582-09 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1120582-09 07/23/19 19:22 • (MS) R3433521-5 07/23/19 19:27 • (MSD) R3433521-6 07/23/19 19:30

| Analyte | Spike Amount | Original Result | MS Result | MSD Result | MS Rec. | MSD Rec. | Dilution | Rec. Limits | MS Qualifier | MSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ug/l | ug/l | ug/l | ug/l | % | % | | % | | | % | % |
| Boron | 1000 | 1710 | 2700 | 2680 | 99.5 | 97.9 | 1 | 75.0-125 | | | 0.600 | 20 |
| Calcium | 10000 | 66300 | 75700 | 75100 | 93.8 | 87.9 | 1 | 75.0-125 | | | 0.781 | 20 |

## L1120582-12 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1120582-12 07/23/19 19:33 • (MS) R3433521-7 07/23/19 19:35 • (MSD) R3433521-8 07/23/19 19:38

| Analyte | Spike Amount | Original Result | MS Result | MSD Result | MS Rec. | MSD Rec. | Dilution | Rec. Limits | MS Qualifier | MSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ug/l | ug/l | ug/l | ug/l | % | % | | % | | | % | % |
| Boron | 1000 | 539 | 1550 | 1570 | 102 | 103 | 1 | 75.0-125 | | | 1.15 | 20 |
| Calcium | 10000 | 373000 | 378000 | 380000 | 47.5 | 77.4 | 1 | 75.0-125 | V | | 0.788 | 20 |

# GLOSSARY OF TERMS

## Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

## Abbreviations and Definitions

| | |
|---|---|
| MDL | Method Detection Limit. |
| RDL | Reported Detection Limit. |
| Rec. | Recovery. |
| RPD | Relative Percent Difference. |
| SDG | Sample Delivery Group. |
| U | Not detected at the Reporting Limit (or MDL where applicable). |
| Analyte | The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported. |
| Dilution | If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor. |
| Limits | These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges. |
| Original Sample | The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG. |
| Qualifier | This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable. |
| Result | The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte. |
| Uncertainty (Radiochemistry) | Confidence level of 2 sigma. |
| Case Narrative (Cn) | A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report. |
| Quality Control Summary (Qc) | This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material. |
| Sample Chain of Custody (Sc) | This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis. |
| Sample Results (Sr) | This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported. |
| Sample Summary (Ss) | This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis. |

| Qualifier | Description |
|---|---|
| E | The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL). |
| J5 | The sample matrix interfered with the ability to make any accurate determination; spike value is high. |
| O1 | The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference. |
| V | The sample concentration is too high to evaluate accurate spike recoveries. |

# ACCREDITATIONS & LOCATIONS

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

## State Accreditations

| | | | |
|---|---|---|---|
| Alabama | 40660 | Nebraska | NE-OS-15-05 |
| Alaska | 17-026 | Nevada | TN-03-2002-34 |
| Arizona | AZ0612 | New Hampshire | 2975 |
| Arkansas | 88-0469 | New Jersey–NELAP | TN002 |
| California | 2932 | New Mexico [1] | n/a |
| Colorado | TN00003 | New York | 11742 |
| Connecticut | PH-0197 | North Carolina | Env375 |
| Florida | E87487 | North Carolina [1] | DW21704 |
| Georgia | NELAP | North Carolina [3] | 41 |
| Georgia [1] | 923 | North Dakota | R-140 |
| Idaho | TN00003 | Ohio–VAP | CL0069 |
| Illinois | 200008 | Oklahoma | 9915 |
| Indiana | C-TN-01 | Oregon | TN200002 |
| Iowa | 364 | Pennsylvania | 68-02979 |
| Kansas | E-10277 | Rhode Island | LAO00356 |
| Kentucky [1 6] | 90010 | South Carolina | 84004 |
| Kentucky [2] | 16 | South Dakota | n/a |
| Louisiana | AI30792 | Tennessee [1 4] | 2006 |
| Louisiana [1] | LA180010 | Texas | T104704245-18-15 |
| Maine | TN0002 | Texas [5] | LAB0152 |
| Maryland | 324 | Utah | TN00003 |
| Massachusetts | M-TN003 | Vermont | VT2006 |
| Michigan | 9958 | Virginia | 460132 |
| Minnesota | 047-999-395 | Washington | C847 |
| Mississippi | TN00003 | West Virginia | 233 |
| Missouri | 340 | Wisconsin | 9980939910 |
| Montana | CERT0086 | Wyoming | A2LA |

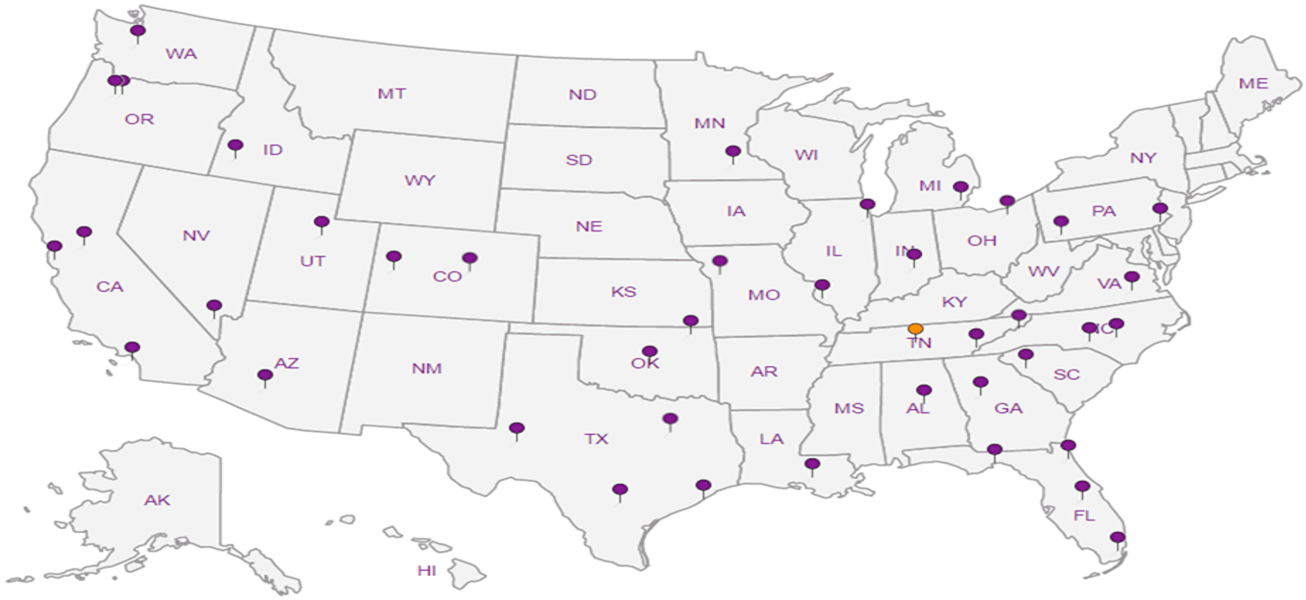
## Third Party Federal Accreditations

| | | | |
|---|---|---|---|
| A2LA – ISO 17025 | 1461.01 | AIHA-LAP,LLC EMLAP | 100789 |
| A2LA – ISO 17025 [5] | 1461.02 | DOD | 1461.01 |
| Canada | 1461.01 | USDA | P330-15-00234 |
| EPA–Crypto | TN00003 | | |

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

## Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



**SCS Engineers - KS**

8575 West 110th Street
Suite 100
Overland Park, KS 66210

Billing Information:
**Accounts Payable**
**8575 West 110th Street**
**Suite 100**
**Overland Park, KS 66210**

Pres Chk 42

Chain of Custody Page 1 of 2

National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

Report to: **Jason Franks**

Email To: **jfranks@scsengineers.com; jay.martin@kcpl.com;**

Project Description: **KCPL - LaCygne Generating Station**

City/State Collected:

Phone: **913-681-0030**
Fax: **913-681-0012**

Client Project # **27217233.19**

Lab Project # **AQUAOPKS-LACYGNE**

L# L1120582

H094

Collected by (print): Whit Martin

Site/Facility ID #

P.O. #

Collected by (signature): Whit Martin

Immediately Packed on Ice N___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed Std

Acctnum: **AQUAOPKS**
Template: **T136276**
Prelogin: **P719479**
TSR: **206 - Jeff Carr**
PB:
Shipped Via:

Analysis / Container / Preservative

| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | No. of Cntrs | Boron - 6010 250mlHDPE-HNO3 | Calcium - 6010 250mlHDPE-HNO3 | Chloride 125mlHDPE-NoPres | Sulfate 125mlHDPE-NoPres | Remarks | Sample # (lab only) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-14R | Grab | GW | | 7/17/19 | 1035 | 1 | | | X | | | -01 |
| DUPLICATE 1 | Grab | GW | | 7/17/19 | 1035 | 1 | | | X | | | 02 |
| MW-14R MS/MSD | Grab | GW | | 7/17/19 | 1040 | 1 | | | X | | | 01 |
| MW-601 | Grab | GW | | 7/17/19 | 1120 | 1 | | | | X | | 03 |
| MW-701 | Grab | GW | | 7/17/19 | 1245 | 1 | | X | | | | 04 |
| MW-704 | Grab | GW | | 7/17/19 | 1205 | 1 | | | X | | | 05 |
| MW-706 | Grab | GW | | 7/17/19 | 1355 | 1 | | | | X | | 06 |
| MW-707B | Grab | GW | | 7/17/19 | 1310 | 1 | | | | X | | 07 |
| DUPLICATE 3 | Grab | GW | | 7/17/19 | 1315 | 1 | | | | X | | 08 |
| MW-707B MS/MSD | Grab | GW | | 7/17/19 | 1320 | 1 | | | | X | | 07 |

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other________

Remarks:

pH ______ Temp ______

Flow ______ Other ______

Samples returned via:
__ UPS __ FedEx __ Courier J SWA

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: ✓NP __Y __N
COC Signed/Accurate: ✓Y __N
Bottles arrive intact: ✓Y __N
Correct bottles used: ✓Y __N
Sufficient volume sent: ✓Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: ✓Y __N

**RAD SCREEN: <0.5 mR/hr**

Relinquished by : (Signature) Whit Martin
Date: 7-18-19
Time: 1419
Received by: (Signature) Alan Nelson 7-18-19 1420

Trip Blank Received: Yes / [✓ No]
HCL / MeoH
TBR

Relinquished by : (Signature) Alan Nelson
Date: 7-18-19
Time: 1800
Received by: (Signature)

Temp: °C 5.6+.1=5.7 45c
Bottles Received: 17

If preservation required by Login: Date/Time

Relinquished by : (Signature)
Date:
Time:
Received for lab by: (Signature)

Date: 7/19/19
Time: 8:00

Hold:

Condition: NCF / [✓ OK]

**SCS Engineers - KS**

8575 West 110th Street
Suite 100
Overland Park, KS 66210

Billing Information:
Accounts Payable
8575 West 110th Street
Suite 100
Overland Park, KS 66210

Pres Chk: cz cz

Analysis / Container / Preservative

Chain of Custody Page 2 of 2

National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

Report to: **Jason Franks**

Email To: jfranks@scsengineers.com; jay.martin@kcpl.com;

Project Description: **KCPL - LaCygne Generating Station**

City/State Collected:

Phone: **913-681-0030**
Fax: **913-681-0012**

Client Project # **27217233.19**

Lab Project # **AQUAOPKS-LACYGNE**

L #

Table #

Acctnum: **AQUAOPKS**
Template: **T136276**
Prelogin: **P719479**
TSR: **206 - Jeff Carr**
PB:
Shipped Via:

Collected by (print): Whit Martin

Site/Facility ID #

P.O. #

Collected by (signature): Whit Martin

Rush? (Lab MUST Be Notified)
- ___ Same Day
- ___ Five Day
- ___ Next Day
- ___ 5 Day (Rad Only)
- ___ Two Day
- ___ 10 Day (Rad Only)
- ___ Three Day

Quote #

Date Results Needed: Std

Immediately Packed on Ice N ___ Y X

| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | No. of Cntrs | Boron - 6010 250mlHDPE-HNO3 | Calcium - 6010 250mlHDPE-HNO3 | Chloride 125mlHDPE-NoPres | Sulfate 125mlHDPE-NoPres | | | | | | | Remarks | Sample # (lab only) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-804 | Grab | GW | | 7/17/19 | 1207 | 1 | X | | | | | | | | | | | -08 |
| DUPLICATE 2 | Grab | GW | | 7/17/19 | 1215 | 1 | X | | | | | | | | | | | 69 |
| MW-804 MS/MSD | Grab | GW | | 7/17/19 | 1210 | 1 | X | | | | | | | | | | | 08 |
| MW-805 | Grab | GW | | 7/17/19 | 1120 | 1 | X | | | | | | | | | | | 10 |
| MW-903 | Grab | GW | | 7/17/19 | 0945 | 1 | | X | | | | | | | | | | 11 |
| DUPLICATE 4 | Grab | GW | | 7/17/19 | 0945 | 1 | | X | | | | | | | | | | 10 |
| MW-903 MS/MSD | Grab | GW | | 7/17/19 | 0950 | 1 | | X | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_________

Remarks:

pH ______ Temp ______

Flow ______ Other ______

Samples returned via:
__ UPS __ FedEx __ Courier __ ______

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: ✓NP __Y __N
COC Signed/Accurate: ✓Y __N
Bottles arrive intact: ✓Y __N
Correct bottles used: ✓Y __N
Sufficient volume sent: ✓Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: ✓Y __N

RAD SCREEN: <0.5 mR/hr

Relinquished by : (Signature) Whit Martin
Date: 7/18/19
Time: 1419
Received by: (Signature) Alan Nelson 7-18-19 1420

Trip Blank Received: Yes / No
HCL / MeoH
TBR

Relinquished by : (Signature) Alan Nelson
Date: 7-18-19
Time: 1800
Received by: (Signature)

Temp: 5.6+.1=5.7 °C
Bottles Received:

If preservation required by Login: Date/Time

Relinquished by : (Signature)
Date:
Time:
Received for lab by: (Signature)
Date:
Time:
Hold:
Condition: NCF / [✓ OK]

# ATTACHMENT 1-5

## August 2019 Sampling Event Laboratory Report

Pace Analytical®
National Center for Testing & Innovation

# ANALYTICAL REPORT

September 03, 2019

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

## SCS Engineers - KS

| | |
|---|---|
| Sample Delivery Group: | L1132586 |
| Samples Received: | 08/24/2019 |
| Project Number: | 27217233.19 |
| Description: | KCPL - LaCygne Generating Station |

Report To:

Jason Franks
8575 West 110th Street
Suite 100
Overland Park, KS  66210

Entire Report Reviewed By:

Jason Romer
Project Manager

# TABLE OF CONTENTS

## MW-14R L1132586-01 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason Franks | 08/23/19 12:25 | 08/24/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1334824 | 1 | 08/26/19 19:31 | 08/26/19 19:31 | LDC | Mt. Juliet, TN |

## DUPLICATE 1 L1132586-02 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason Franks | 08/23/19 12:25 | 08/24/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1334824 | 1 | 08/26/19 20:57 | 08/26/19 20:57 | LDC | Mt. Juliet, TN |

## MW-601 L1132586-03 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason Franks | 08/23/19 13:05 | 08/24/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1334824 | 1 | 08/27/19 09:07 | 08/27/19 09:07 | LDC | Mt. Juliet, TN |

## MW-701 L1132586-04 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason Franks | 08/23/19 11:50 | 08/24/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG1334773 | 1 | 08/26/19 09:59 | 08/27/19 11:40 | EL | Mt. Juliet, TN |

## MW-704 L1132586-05 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason Franks | 08/23/19 11:20 | 08/24/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1334824 | 5 | 08/26/19 21:26 | 08/26/19 21:26 | LDC | Mt. Juliet, TN |

## MW-706 L1132586-06 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason Franks | 08/23/19 10:40 | 08/24/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1334824 | 1 | 08/26/19 21:41 | 08/26/19 21:41 | LDC | Mt. Juliet, TN |

## DUPLICATE 3 L1132586-07 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason Franks | 08/23/19 10:40 | 08/24/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Wet Chemistry by Method 9056A | WG1334824 | 1 | 08/27/19 09:21 | 08/27/19 09:21 | LDC | Mt. Juliet, TN |

## MW-804 L1132586-08 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason Franks | 08/22/19 16:05 | 08/24/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG1334773 | 1 | 08/26/19 09:59 | 08/27/19 10:33 | EL | Mt. Juliet, TN |

| | | |
|---|---|---|
| Collected by | Collected date/time | Received date/time |
| Jason Franks | 08/22/19 16:05 | 08/24/19 08:45 |

## DUPLICATE 2 L1132586-09 GW

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG1334773 | 1 | 08/26/19 09:59 | 08/27/19 11:43 | EL | Mt. Juliet, TN |

| | | |
|---|---|---|
| Collected by | Collected date/time | Received date/time |
| Jason Franks | 08/22/19 15:35 | 08/24/19 08:45 |

## MW-805 L1132586-10 GW

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG1334773 | 1 | 08/26/19 09:59 | 08/27/19 11:46 | EL | Mt. Juliet, TN |

| | | |
|---|---|---|
| Collected by | Collected date/time | Received date/time |
| Jason Franks | 08/22/19 15:00 | 08/24/19 08:45 |

## MW-903 L1132586-11 GW

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG1334773 | 1 | 08/26/19 09:59 | 08/27/19 10:44 | EL | Mt. Juliet, TN |

| | | |
|---|---|---|
| Collected by | Collected date/time | Received date/time |
| Jason Franks | 08/22/19 15:00 | 08/24/19 08:45 |

## DUPLICATE 4 L1132586-12 GW

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Metals (ICP) by Method 6010B | WG1334774 | 1 | 08/28/19 12:40 | 08/28/19 23:51 | EL | Mt. Juliet, TN |

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Jason Romer
Project Manager

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Chloride | 6080 | | 1000 | 1 | 08/26/2019 19:31 | WG1334824 |

# DUPLICATE 1

Collected date/time: 08/23/19 12:25

# SAMPLE RESULTS - 02

L1132586

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

## Wet Chemistry by Method 9056A

|  | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| Analyte | ug/l |  | ug/l |  | date / time |  |
| Chloride | 6080 |  | 1000 | 1 | 08/26/2019 20:57 | WG1334824 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Sulfate | 6320 | | 5000 | 1 | 08/27/2019 09:07 | WG1334824 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Calcium | 39900 | | 1000 | 1 | 08/27/2019 11:40 | WG1334773 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Chloride | 89200 | | 5000 | 5 | 08/26/2019 21:26 | WG1334824 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Sulfate | 8790 | | 5000 | 1 | 08/26/2019 21:41 | WG1334824 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Sulfate | 8550 | | 5000 | 1 | 08/27/2019 09:21 | WG1334824 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Boron | 1630 | | 200 | 1 | 08/27/2019 10:33 | WG1334773 |

## Metals (ICP) by Method 6010B

| | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| Analyte | ug/l | | ug/l | | date / time | |
| Boron | 1640 | | 200 | 1 | 08/27/2019 11:43 | WG1334773 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Boron | 537 | | 200 | 1 | 08/27/2019 11:46 | WG1334773 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Calcium | 366000 | V | 1000 | 1 | 08/27/2019 10:44 | WG1334773 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Calcium | 358000 | O1 V | 1000 | 1 | 08/28/2019 23:51 | WG1334774 |

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

## Method Blank (MB)

(MB) R3444477-1 08/26/19 14:56

| Analyte | MB Result<br>ug/l | MB Qualifier | MB MDL<br>ug/l | MB RDL<br>ug/l |
|---|---|---|---|---|
| Chloride | U | | 51.9 | 1000 |
| Sulfate | U | | 77.4 | 5000 |

## L1132563-07 Original Sample (OS) • Duplicate (DUP)

(OS) L1132563-07 08/26/19 16:09 • (DUP) R3444477-3 08/26/19 16:24

| Analyte | Original Result<br>ug/l | DUP Result<br>ug/l | Dilution | DUP RPD<br>% | DUP Qualifier | DUP RPD Limits<br>% |
|---|---|---|---|---|---|---|
| Chloride | 38700 | 38400 | 1 | 0.568 | | 15 |
| Sulfate | 86800 | 86700 | 1 | 0.133 | | 15 |

## L1132586-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1132586-01 08/26/19 19:31 • (DUP) R3444477-4 08/26/19 19:45

| Analyte | Original Result<br>ug/l | DUP Result<br>ug/l | Dilution | DUP RPD<br>% | DUP Qualifier | DUP RPD Limits<br>% |
|---|---|---|---|---|---|---|
| Chloride | 6080 | 6030 | 1 | 0.755 | | 15 |
| Sulfate | 60600 | 60400 | 1 | 0.232 | | 15 |

## Laboratory Control Sample (LCS)

(LCS) R3444477-2 08/26/19 15:10

| Analyte | Spike Amount<br>ug/l | LCS Result<br>ug/l | LCS Rec.<br>% | Rec. Limits<br>% | LCS Qualifier |
|---|---|---|---|---|---|
| Chloride | 40000 | 39500 | 98.8 | 80.0-120 | |
| Sulfate | 40000 | 39700 | 99.2 | 80.0-120 | |

## L1132586-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1132586-01 08/26/19 19:31 • (MS) R3444477-5 08/26/19 20:00 • (MSD) R3444477-6 08/26/19 20:14

| Analyte | Spike Amount<br>ug/l | Original Result<br>ug/l | MS Result<br>ug/l | MSD Result<br>ug/l | MS Rec.<br>% | MSD Rec.<br>% | Dilution | Rec. Limits<br>% | MS Qualifier | MSD Qualifier | RPD<br>% | RPD Limits<br>% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 50000 | 6080 | 52700 | 52900 | 93.2 | 93.7 | 1 | 80.0-120 | | | 0.414 | 15 |
| Sulfate | 50000 | 60600 | 99100 | 98900 | 77.0 | 76.7 | 1 | 80.0-120 | J6 | J6 | 0.128 | 15 |

## L1132586-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1132586-06 08/26/19 21:41 • (MS) R3444477-7 08/26/19 21:55 • (MSD) R3444477-8 08/26/19 22:10

| Analyte | Spike Amount ug/l | Original Result ug/l | MS Result ug/l | MSD Result ug/l | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 50000 | 249000 | 283000 | 284000 | 68.8 | 69.7 | 1 | 80.0-120 | E V | E V | 0.154 | 15 |
| Sulfate | 50000 | 8790 | 51600 | 51800 | 85.6 | 86.1 | 1 | 80.0-120 | | | 0.464 | 15 |

## Method Blank (MB)

(MB) R3444820-1 08/27/19 10:26

| | MB Result | MB Qualifier | MB MDL | MB RDL |
|---|---|---|---|---|
| Analyte | ug/l | | ug/l | ug/l |
| Boron | U | | 12.6 | 200 |
| Calcium | U | | 46.3 | 1000 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3444820-2 08/27/19 10:28 • (LCSD) R3444820-3 08/27/19 10:31

| | Spike Amount | LCS Result | LCSD Result | LCS Rec. | LCSD Rec. | Rec. Limits | LCS Qualifier | LCSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | ug/l | % | % | % | | | % | % |
| Boron | 1000 | 1000 | 980 | 100 | 98.0 | 80.0-120 | | | 2.04 | 20 |
| Calcium | 10000 | 10100 | 9800 | 101 | 98.0 | 80.0-120 | | | 2.82 | 20 |

## L1132586-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1132586-08 08/27/19 10:33 • (MS) R3444820-5 08/27/19 10:39 • (MSD) R3444820-6 08/27/19 10:41

| | Spike Amount | Original Result | MS Result | MSD Result | MS Rec. | MSD Rec. | Dilution | Rec. Limits | MS Qualifier | MSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | ug/l | ug/l | % | % | | % | | | % | % |
| Boron | 1000 | 1630 | 2630 | 2650 | 100 | 102 | 1 | 75.0-125 | | | 0.830 | 20 |
| Calcium | 10000 | 60300 | 73100 | 73700 | 128 | 134 | 1 | 75.0-125 | V | V | 0.767 | 20 |

## L1132586-11 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1132586-11 08/27/19 10:44 • (MS) R3444820-7 08/27/19 10:46 • (MSD) R3444820-8 08/27/19 10:49

| | Spike Amount | Original Result | MS Result | MSD Result | MS Rec. | MSD Rec. | Dilution | Rec. Limits | MS Qualifier | MSD Qualifier | RPD | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Analyte | ug/l | ug/l | ug/l | ug/l | % | % | | % | | | % | % |
| Boron | 1000 | 510 | 1530 | 1520 | 102 | 101 | 1 | 75.0-125 | | | 0.0864 | 20 |
| Calcium | 10000 | 366000 | 371000 | 368000 | 50.2 | 20.9 | 1 | 75.0-125 | V | V | 0.792 | 20 |

## Method Blank (MB)

(MB) R3445287-1 08/28/19 23:42

| Analyte | MB Result ug/l | MB Qualifier | MB MDL ug/l | MB RDL ug/l |
|---|---|---|---|---|
| Calcium | U | | 46.3 | 1000 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3445287-2 08/28/19 23:45 • (LCSD) R3445287-3 08/28/19 23:48

| Analyte | Spike Amount ug/l | LCS Result ug/l | LCSD Result ug/l | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|
| Calcium | 10000 | 9530 | 9600 | 95.3 | 96.0 | 80.0-120 | | | 0.785 | 20 |

## L1132586-12 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1132586-12 08/28/19 23:51 • (MS) R3445287-5 08/28/19 23:56 • (MSD) R3445287-6 08/28/19 23:59

| Analyte | Spike Amount ug/l | Original Result ug/l | MS Result ug/l | MSD Result ug/l | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Calcium | 10000 | 358000 | 360000 | 364000 | 15.4 | 62.6 | 1 | 75.0-125 | V | V | 1.30 | 20 |

# GLOSSARY OF TERMS

## Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

## Abbreviations and Definitions

| | |
|---|---|
| MDL | Method Detection Limit. |
| RDL | Reported Detection Limit. |
| Rec. | Recovery. |
| RPD | Relative Percent Difference. |
| SDG | Sample Delivery Group. |
| U | Not detected at the Reporting Limit (or MDL where applicable). |
| Analyte | The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported. |
| Dilution | If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor. |
| Limits | These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges. |
| Original Sample | The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG. |
| Qualifier | This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable. |
| Result | The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte. |
| Uncertainty (Radiochemistry) | Confidence level of 2 sigma. |
| Case Narrative (Cn) | A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report. |
| Quality Control Summary (Qc) | This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material. |
| Sample Chain of Custody (Sc) | This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis. |
| Sample Results (Sr) | This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported. |
| Sample Summary (Ss) | This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis. |

| Qualifier | Description |
|---|---|
| E | The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL). |
| J6 | The sample matrix interfered with the ability to make any accurate determination; spike value is low. |
| O1 | The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference. |
| V | The sample concentration is too high to evaluate accurate spike recoveries. |

# ACCREDITATIONS & LOCATIONS

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

## State Accreditations

| | | | |
|---|---|---|---|
| Alabama | 40660 | Nebraska | NE-OS-15-05 |
| Alaska | 17-026 | Nevada | TN-03-2002-34 |
| Arizona | AZ0612 | New Hampshire | 2975 |
| Arkansas | 88-0469 | New Jersey–NELAP | TN002 |
| California | 2932 | New Mexico [1] | n/a |
| Colorado | TN00003 | New York | 11742 |
| Connecticut | PH-0197 | North Carolina | Env375 |
| Florida | E87487 | North Carolina [1] | DW21704 |
| Georgia | NELAP | North Carolina [3] | 41 |
| Georgia [1] | 923 | North Dakota | R-140 |
| Idaho | TN00003 | Ohio–VAP | CL0069 |
| Illinois | 200008 | Oklahoma | 9915 |
| Indiana | C-TN-01 | Oregon | TN200002 |
| Iowa | 364 | Pennsylvania | 68-02979 |
| Kansas | E-10277 | Rhode Island | LAO00356 |
| Kentucky [1 6] | 90010 | South Carolina | 84004 |
| Kentucky [2] | 16 | South Dakota | n/a |
| Louisiana | AI30792 | Tennessee [1 4] | 2006 |
| Louisiana [1] | LA180010 | Texas | T104704245-18-15 |
| Maine | TN0002 | Texas [5] | LAB0152 |
| Maryland | 324 | Utah | TN00003 |
| Massachusetts | M-TN003 | Vermont | VT2006 |
| Michigan | 9958 | Virginia | 460132 |
| Minnesota | 047-999-395 | Washington | C847 |
| Mississippi | TN00003 | West Virginia | 233 |
| Missouri | 340 | Wisconsin | 9980939910 |
| Montana | CERT0086 | Wyoming | A2LA |

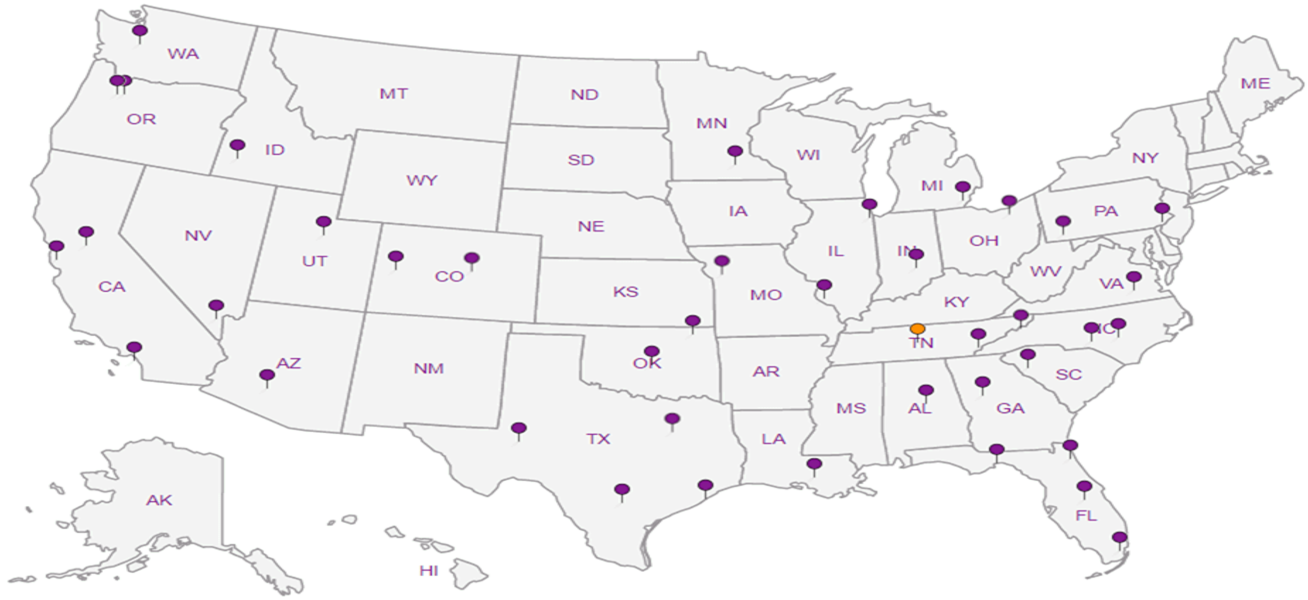
## Third Party  Federal Accreditations

| | | | |
|---|---|---|---|
| A2LA – ISO 17025 | 1461.01 | AIHA-LAP,LLC EMLAP | 100789 |
| A2LA – ISO 17025 [5] | 1461.02 | DOD | 1461.01 |
| Canada | 1461.01 | USDA | P330-15-00234 |
| EPA–Crypto | TN00003 | | |

[1] Drinking Water  [2] Underground Storage Tanks  [3] Aquatic Toxicity  [4] Chemical/Microbiological  [5] Mold  [6] Wastewater  n/a Accreditation not applicable

## Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



**SCS Engineers - KS**

8575 West 110th Street
Suite 100
Overland Park, KS 66210

Billing Information:
Accounts Payable
8575 West 110th Street
Suite 100
Overland Park, KS 66210

Pres Chk

Chain of Custody Page 1 of 2

National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

Report to: **Jason Franks**

Email To: **jfranks@scsengineers.com; jay.martin@kcpl.com;** [illegible]

Project Description: **KCPL - LaCygne Generating Stat**

City/State Collected: LaCygne KS

Please Circle: PT MT CT ET

Phone: **913-681-0030**
Fax: **913-681-0012**

Client Project # **27217233.19**

Lab Project # **AQUAOPKS-LACYGNE**

Collected by (print): JASON FRANKS

Site/Facility ID #

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y ✓

***Rush?*** (Lab MUST Be Notified)
- ___ Same Day
- ___ Five Day
- ___ Next Day
- ___ 5 Day (Rad Only)
- ___ Two Day
- ___ 10 Day (Rad Only)
- ___ Three Day

Quote #

Date Results Needed

SDG # 1132586

D120

Acctnum: **AQUAOPKS**
Template: **T136276**
Prelogin: **P725643**
PM: **206 - Jeff Carr**
PB:
Shipped Via:

Analysis / Container / Preservative

| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | No. of Cntrs | Boron - 6010 250mlHDPE-HNO3 | Calcium - 6010 250mlHDPE-HNO3 Cd | Chloride 125mlHDPE-NoPres | Sulfate 125mlHDPE-NoPres | Remarks | Sample # (lab only) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **MW-14R** | GRAB | GW | | 8/23/19 | 1225 | 1 | | | X | | | -1 |
| **DUPLICATE 1** | | GW | | | 1225 | 1 | | | X | | | -2 |
| **MW-14R MS/MSD** | | GW | | | 1225 | 1 | | | X | | | |
| **MW-601** | | GW | | | 1305 | 1 | | | | X | | -3 |
| **MW-701** | | GW | | | 1150 | 1 | | X | | | | -4 |
| **MW-704** | | GW | | | 1120 | 1 | | | X | | | -5 |
| **MW-706** | | GW | | | 1040 | 1 | | | | X | | -6 |
| **DUPLICATE 3** | | GW | | | 1040 | 1 | | | | X | | -7 |
| **MW-706 MS/MSD** | | GW | | | 1040 | 1 | | | | X | | |
| **MW-804** | | GW | | 8/22/19 | 1605 | 1 | X | | | | | -8 |

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_________

**Remarks:**

pH _______ Temp _______

Flow _______ Other _______

Samples returned via:
__ UPS __ FedEx __ Courier ________

Tracking # 4510 1661 8644

Sample Receipt Checklist
COC Seal Present/Intact: ✓NP __Y __N
COC Signed/Accurate: ✓Y __N
Bottles arrive intact: ✓Y __N
Correct bottles used: ✓Y __N
Sufficient volume sent: ✓Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: ✓Y __N
RAD Screen <0.5 mR/hr: ✓Y __N

| Relinquished by : (Signature) | Date: | Time: | Received by: (Signature) | | |
|---|---|---|---|---|---|
| | 8/23/19 | 1436 | 8-23-19 1436 | Trip Blank Received: Yes / [✓ No]<br>HCL / MeoH<br>TBR | |
| Relinquished by : (Signature) | Date: 8/23/19 | Time: 1800 | Received by: (Signature) | Temp: A3BF °C 4.3±0=4.3<br>Bottles Received: 16 | If preservation required by Login: Date/Time |
| Relinquished by : (Signature) | Date: | Time: | Received for lab by: (Signature) | Date: 8/24 Time: 0845 | Hold: |

Condition: NCF / [✓ OK]

**SCS Engineers - KS**

8575 West 110th Street
Suite 100
Overland Park, KS 66210

Billing Information:
**Accounts Payable**
**8575 West 110th Street**
**Suite 100**
**Overland Park, KS 66210**

Pres Chk

Report to: **Jason Franks**

Email To: **jfranks@scsengineers.com; jay.martin@kcpl.com;**

Project Description: **KCPL - LaCygne Generating Stat**

City/State Collected: LA Cygne, KS

Please Circle: PT MT CT ET

Phone: **913-681-0030**
Fax: **913-681-0012**

Client Project # **27217233.19**

Lab Project # **AQUAOPKS-LACYGNE**

Collected by (print): JASON R FRANKS

Site/Facility ID #

P.O. #

Collected by (signature):

Immediately Packed on Ice N____ Y ✓

*Rush?* (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Analysis / Container / Preservative

Chain of Custody Page 2 of 2

National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

SDG # 1132586

Table #

Acctnum: **AQUAOPKS**
Template: **T136276**
Prelogin: **P725643**
PM: **206 - Jeff Carr**
PB:
Shipped Via:

| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | No. of Cntrs | Boron - 6010 250mlHDPE-HNO3 | Calcium - 6010 250mlHDPE-HNO3 | Chloride 125mlHDPE-NoPres | Sulfate 125mlHDPE-NoPres | | | | | | | Remarks | Sample # (lab only) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DUPLICATE 2 | GRAB | GW | | 8/22/19 | 1605 | 1 | X | | | | | | | | | | | -9 |
| MW-804 MS/MSD | | GW | | | 1605 | 1 | X | | | | | | | | | | | |
| MW-805 | | GW | | | 1535 | 1 | X | | | | | | | | | | | -10 |
| MW-903 | | GW | | | 1500 | 1 | | X | | | | | | | | | | -11 |
| DUPLICATE 4 | | GW | | | 1500 | 1 | | X | | | | | | | | | | -12 |
| MW-903 MS/MSD | | GW | | | 1500 | 1 | | X | | | | | | | | | | |

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other________

Remarks:

pH ______ Temp ______

Flow ______ Other ______

Samples returned via:
__ UPS __ FedEx __ Courier ________

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: ✓NP __Y __N
COC Signed/Accurate: ✓Y __N
Bottles arrive intact: ✓Y __N
Correct bottles used: ✓Y __N
Sufficient volume sent: ✓Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: ✓Y __N
RAD Screen <0.5 mR/hr: ✓Y __N

| Relinquished by : (Signature) | Date: | Time: | Received by: (Signature) | | |
|---|---|---|---|---|---|
| | 8/23/19 | 1436 | 8-23-19 1436 | Trip Blank Received: Yes [✓ No]<br>HCL / MeoH<br>TBR | |
| Relinquished by : (Signature)<br>Alan Nelson | Date: 8/23/19 | Time: 1800 | Received by: (Signature) | Temp: A3BF °C<br>4.3±0=4.3 | Bottles Received:<br>16 |
| Relinquished by : (Signature) | Date: | Time: | Received for lab by: (Signature) | Date: 8/24 | Time: 0845 |

If preservation required by Login: Date/Time

Hold:

Condition: NCF / [✓ OK]

# ATTACHMENT 1-6

## November 2019 Sampling Event Laboratory Report

# ANALYTICAL REPORT

November 18, 2019

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

## SCS Engineers - KS

| | |
|---|---|
| Sample Delivery Group: | L1159196 |
| Samples Received: | 11/09/2019 |
| Project Number: | 27217233.19 |
| Description: | Evergy - LaCygne Generating Station |

Report To:

Jason Franks
8575 West 110th Street
Suite 100
Overland Park, KS 66210

Entire Report Reviewed By:

Jeff Carr
Project Manager

# TABLE OF CONTENTS

## MW-901 L1159196-01 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 11/08/19 13:50 | 11/09/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Gravimetric Analysis by Method 2540 C-2011 | WG1378170 | 1 | 11/13/19 07:13 | 11/13/19 08:12 | MMF | Mt. Juliet, TN |
| Wet Chemistry by Method 9056A | WG1379280 | 1 | 11/13/19 01:20 | 11/13/19 01:20 | ELN | Mt. Juliet, TN |
| Metals (ICP) by Method 6010B | WG1380941 | 1 | 11/15/19 11:53 | 11/16/19 10:00 | TRB | Mt. Juliet, TN |

## MW-902 L1159196-02 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 11/08/19 11:00 | 11/09/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Gravimetric Analysis by Method 2540 C-2011 | WG1378170 | 1 | 11/13/19 07:13 | 11/13/19 08:12 | MMF | Mt. Juliet, TN |
| Wet Chemistry by Method 9056A | WG1379280 | 1 | 11/13/19 01:51 | 11/13/19 01:51 | ELN | Mt. Juliet, TN |
| Metals (ICP) by Method 6010B | WG1380941 | 1 | 11/15/19 11:53 | 11/16/19 10:03 | TRB | Mt. Juliet, TN |

## MW-903 L1159196-03 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 11/08/19 11:45 | 11/09/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Gravimetric Analysis by Method 2540 C-2011 | WG1378170 | 1 | 11/13/19 07:13 | 11/13/19 08:12 | MMF | Mt. Juliet, TN |
| Wet Chemistry by Method 9056A | WG1379280 | 1 | 11/13/19 02:07 | 11/13/19 02:07 | ELN | Mt. Juliet, TN |
| Wet Chemistry by Method 9056A | WG1379280 | 20 | 11/13/19 02:55 | 11/13/19 02:55 | ELN | Mt. Juliet, TN |
| Metals (ICP) by Method 6010B | WG1380941 | 1 | 11/15/19 11:53 | 11/16/19 10:06 | TRB | Mt. Juliet, TN |

## MW-904 L1159196-04 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 11/08/19 12:20 | 11/09/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Gravimetric Analysis by Method 2540 C-2011 | WG1378170 | 1 | 11/13/19 07:13 | 11/13/19 08:12 | MMF | Mt. Juliet, TN |
| Wet Chemistry by Method 9056A | WG1379280 | 1 | 11/13/19 03:11 | 11/13/19 03:11 | ELN | Mt. Juliet, TN |
| Metals (ICP) by Method 6010B | WG1380941 | 1 | 11/15/19 11:53 | 11/16/19 09:30 | TRB | Mt. Juliet, TN |

## MW-905 L1159196-05 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 11/08/19 13:15 | 11/09/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Gravimetric Analysis by Method 2540 C-2011 | WG1378170 | 1 | 11/13/19 07:13 | 11/13/19 08:12 | MMF | Mt. Juliet, TN |
| Wet Chemistry by Method 9056A | WG1379280 | 1 | 11/13/19 03:59 | 11/13/19 03:59 | ELN | Mt. Juliet, TN |
| Metals (ICP) by Method 6010B | WG1380941 | 1 | 11/15/19 11:53 | 11/16/19 10:09 | TRB | Mt. Juliet, TN |

## DUPLICATE L1159196-06 GW

| Collected by | Collected date/time | Received date/time |
|---|---|---|
| Jason R. Franks | 11/08/19 12:20 | 11/09/19 08:45 |

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
|---|---|---|---|---|---|---|
| Gravimetric Analysis by Method 2540 C-2011 | WG1378170 | 1 | 11/13/19 07:13 | 11/13/19 08:12 | MMF | Mt. Juliet, TN |
| Wet Chemistry by Method 9056A | WG1379280 | 1 | 11/13/19 04:15 | 11/13/19 04:15 | ELN | Mt. Juliet, TN |
| Metals (ICP) by Method 6010B | WG1380941 | 1 | 11/15/19 11:53 | 11/16/19 10:12 | TRB | Mt. Juliet, TN |

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Jeff Carr

Jeff Carr
Project Manager

# MW-901

Collected date/time: 11/08/19 13:50

# SAMPLE RESULTS - 01

L1159196

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

## Gravimetric Analysis by Method 2540 C-2011

| | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| Analyte | ug/l | | ug/l | | date / time | |
| Dissolved Solids | 502000 | | 10000 | 1 | 11/13/2019 08:12 | WG1378170 |

## Wet Chemistry by Method 9056A

| | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| Analyte | ug/l | | ug/l | | date / time | |
| Chloride | 23200 | | 1000 | 1 | 11/13/2019 01:20 | WG1379280 |
| Fluoride | 481 | | 100 | 1 | 11/13/2019 01:20 | WG1379280 |
| Sulfate | 21200 | | 5000 | 1 | 11/13/2019 01:20 | WG1379280 |

## Metals (ICP) by Method 6010B

| | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| Analyte | ug/l | | ug/l | | date / time | |
| Boron | 1090 | | 200 | 1 | 11/16/2019 10:00 | WG1380941 |
| Calcium | 53400 | | 1000 | 1 | 11/16/2019 10:00 | WG1380941 |

## Gravimetric Analysis by Method 2540 C-2011

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Dissolved Solids | 471000 | | 10000 | 1 | 11/13/2019 08:12 | WG1378170 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Chloride | 32100 | | 1000 | 1 | 11/13/2019 01:51 | WG1379280 |
| Fluoride | 455 | | 100 | 1 | 11/13/2019 01:51 | WG1379280 |
| Sulfate | 27900 | | 5000 | 1 | 11/13/2019 01:51 | WG1379280 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Boron | 1170 | | 200 | 1 | 11/16/2019 10:03 | WG1380941 |
| Calcium | 64300 | | 1000 | 1 | 11/16/2019 10:03 | WG1380941 |

## Gravimetric Analysis by Method 2540 C-2011

|  | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| **Analyte** | ug/l |  | ug/l |  | date / time |  |
| Dissolved Solids | 1870000 |  | 25000 | 1 | 11/13/2019 08:12 | WG1378170 |

## Wet Chemistry by Method 9056A

|  | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| **Analyte** | ug/l |  | ug/l |  | date / time |  |
| Chloride | 24500 |  | 1000 | 1 | 11/13/2019 02:07 | WG1379280 |
| Fluoride | 140 |  | 100 | 1 | 11/13/2019 02:07 | WG1379280 |
| Sulfate | 1050000 |  | 100000 | 20 | 11/13/2019 02:55 | WG1379280 |

## Metals (ICP) by Method 6010B

|  | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| **Analyte** | ug/l |  | ug/l |  | date / time |  |
| Boron | 508 |  | 200 | 1 | 11/16/2019 10:06 | WG1380941 |
| Calcium | 348000 |  | 1000 | 1 | 11/16/2019 10:06 | WG1380941 |

## Gravimetric Analysis by Method 2540 C-2011

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Dissolved Solids | 607000 | | 13300 | 1 | 11/13/2019 08:12 | WG1378170 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Chloride | 32600 | | 1000 | 1 | 11/13/2019 03:11 | WG1379280 |
| Fluoride | 369 | | 100 | 1 | 11/13/2019 03:11 | WG1379280 |
| Sulfate | 78300 | | 5000 | 1 | 11/13/2019 03:11 | WG1379280 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Boron | 957 | | 200 | 1 | 11/16/2019 09:30 | WG1380941 |
| Calcium | 65300 | | 1000 | 1 | 11/16/2019 09:30 | WG1380941 |

## Gravimetric Analysis by Method 2540 C-2011

| | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| **Analyte** | ug/l | | ug/l | | date / time | |
| Dissolved Solids | 537000 | | 13300 | 1 | 11/13/2019 08:12 | WG1378170 |

## Wet Chemistry by Method 9056A

| | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| **Analyte** | ug/l | | ug/l | | date / time | |
| Chloride | 52800 | | 1000 | 1 | 11/13/2019 03:59 | WG1379280 |
| Fluoride | 488 | | 100 | 1 | 11/13/2019 03:59 | WG1379280 |
| Sulfate | 27700 | | 5000 | 1 | 11/13/2019 03:59 | WG1379280 |

## Metals (ICP) by Method 6010B

| | Result | Qualifier | RDL | Dilution | Analysis | Batch |
|---|---|---|---|---|---|---|
| **Analyte** | ug/l | | ug/l | | date / time | |
| Boron | 1770 | | 200 | 1 | 11/16/2019 10:09 | WG1380941 |
| Calcium | 46000 | | 1000 | 1 | 11/16/2019 10:09 | WG1380941 |

## Gravimetric Analysis by Method 2540 C-2011

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Dissolved Solids | 620000 | | 13300 | 1 | 11/13/2019 08:12 | WG1378170 |

## Wet Chemistry by Method 9056A

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Chloride | 32500 | | 1000 | 1 | 11/13/2019 04:15 | WG1379280 |
| Fluoride | 366 | | 100 | 1 | 11/13/2019 04:15 | WG1379280 |
| Sulfate | 78200 | | 5000 | 1 | 11/13/2019 04:15 | WG1379280 |

## Metals (ICP) by Method 6010B

| Analyte | Result<br>ug/l | Qualifier | RDL<br>ug/l | Dilution | Analysis<br>date / time | Batch |
|---|---|---|---|---|---|---|
| Boron | 951 | | 200 | 1 | 11/16/2019 10:12 | WG1380941 |
| Calcium | 64700 | | 1000 | 1 | 11/16/2019 10:12 | WG1380941 |

## Method Blank (MB)

(MB) R3472026-1 11/13/19 08:12

| Analyte | MB Result ug/l | MB Qualifier | MB MDL ug/l | MB RDL ug/l |
|---|---|---|---|---|
| Dissolved Solids | U | | 2820 | 10000 |

## L1159196-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1159196-03 11/13/19 08:12 • (DUP) R3472026-3 11/13/19 08:12

| Analyte | Original Result ug/l | DUP Result ug/l | Dilution | DUP RPD % | DUP Qualifier | DUP RPD Limits % |
|---|---|---|---|---|---|---|
| Dissolved Solids | 1870000 | 1900000 | 1 | 1.33 | | 5 |

## L1159236-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1159236-02 11/13/19 08:12 • (DUP) R3472026-4 11/13/19 08:12

| Analyte | Original Result ug/l | DUP Result ug/l | Dilution | DUP RPD % | DUP Qualifier | DUP RPD Limits % |
|---|---|---|---|---|---|---|
| Dissolved Solids | 2030000 | 2370000 | 1 | 15.2 | J3 | 5 |

## Laboratory Control Sample (LCS)

(LCS) R3472026-2 11/13/19 08:12

| Analyte | Spike Amount ug/l | LCS Result ug/l | LCS Rec. % | Rec. Limits % | LCS Qualifier |
|---|---|---|---|---|---|
| Dissolved Solids | 8800000 | 8580000 | 97.5 | 85.0-115 | |

## Method Blank (MB)

(MB) R3471427-1 11/12/19 23:17

| Analyte | MB Result<br>ug/l | MB Qualifier | MB MDL<br>ug/l | MB RDL<br>ug/l |
|---|---|---|---|---|
| Chloride | U | | 51.9 | 1000 |
| Fluoride | U | | 9.90 | 100 |
| Sulfate | U | | 77.4 | 5000 |

## L1159196-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1159196-01 11/13/19 01:20 • (DUP) R3471427-3 11/13/19 01:36

| Analyte | Original Result<br>ug/l | DUP Result<br>ug/l | Dilution | DUP RPD<br>% | DUP Qualifier | DUP RPD Limits<br>% |
|---|---|---|---|---|---|---|
| Chloride | 23200 | 23100 | 1 | 0.397 | | 15 |
| Fluoride | 481 | 480 | 1 | 0.167 | | 15 |
| Sulfate | 21200 | 21100 | 1 | 0.387 | | 15 |

## L1159236-10 Original Sample (OS) • Duplicate (DUP)

(OS) L1159236-10 11/13/19 08:29 • (DUP) R3471427-8 11/13/19 09:17

| Analyte | Original Result<br>ug/l | DUP Result<br>ug/l | Dilution | DUP RPD<br>% | DUP Qualifier | DUP RPD Limits<br>% |
|---|---|---|---|---|---|---|
| Chloride | 29000 | 29000 | 1 | 0.0934 | | 15 |
| Fluoride | 430 | 434 | 1 | 0.810 | | 15 |
| Sulfate | 21900 | 21900 | 1 | 0.227 | | 15 |

## Laboratory Control Sample (LCS)

(LCS) R3471427-2 11/12/19 23:33

| Analyte | Spike Amount<br>ug/l | LCS Result<br>ug/l | LCS Rec.<br>% | Rec. Limits<br>% | LCS Qualifier |
|---|---|---|---|---|---|
| Chloride | 40000 | 38700 | 96.9 | 80.0-120 | |
| Fluoride | 8000 | 8000 | 100 | 80.0-120 | |
| Sulfate | 40000 | 38900 | 97.2 | 80.0-120 | |

## L1159196-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1159196-04 11/13/19 03:11 • (MS) R3471427-4 11/13/19 03:27 • (MSD) R3471427-5 11/13/19 03:43

| Analyte | Spike Amount<br>ug/l | Original Result<br>ug/l | MS Result<br>ug/l | MSD Result<br>ug/l | MS Rec.<br>% | MSD Rec.<br>% | Dilution | Rec. Limits<br>% | MS Qualifier | MSD Qualifier | RPD<br>% | RPD Limits<br>% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 50000 | 32600 | 81300 | 80400 | 97.4 | 95.6 | 1 | 80.0-120 | | | 1.10 | 15 |
| Fluoride | 5000 | 369 | 5100 | 5170 | 94.7 | 96.1 | 1 | 80.0-120 | | | 1.33 | 15 |
| Sulfate | 50000 | 78300 | 125000 | 125000 | 92.6 | 94.0 | 1 | 80.0-120 | E | E | 0.553 | 15 |

## L1159236-07 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1159236-07 11/13/19 07:10 • (MS) R3471427-6 11/13/19 07:26 • (MSD) R3471427-7 11/13/19 07:41

| Analyte | Spike Amount<br>ug/l | Original Result<br>ug/l | MS Result<br>ug/l | MSD Result<br>ug/l | MS Rec.<br>% | MSD Rec.<br>% | Dilution | Rec. Limits<br>% | MS Qualifier | MSD Qualifier | RPD<br>% | RPD Limits<br>% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 50000 | 92000 | 136000 | 137000 | 89.0 | 89.9 | 1 | 80.0-120 | E | E | 0.344 | 15 |
| Fluoride | 5000 | 951 | 5760 | 5850 | 96.2 | 98.0 | 1 | 80.0-120 | | | 1.52 | 15 |
| Sulfate | 50000 | ND | 47800 | 47900 | 93.6 | 93.8 | 1 | 80.0-120 | | | 0.216 | 15 |

# QUALITY CONTROL SUMMARY

L1159196-01,02,03,04,05,06

## Method Blank (MB)

(MB) R3472629-1 11/16/19 09:22

| Analyte | MB Result<br>ug/l | MB Qualifier | MB MDL<br>ug/l | MB RDL<br>ug/l |
|---|---|---|---|---|
| Boron | U | | 12.6 | 200 |
| Calcium | U | | 46.3 | 1000 |

## Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3472629-2 11/16/19 09:24 • (LCSD) R3472629-3 11/16/19 09:27

| Analyte | Spike Amount<br>ug/l | LCS Result<br>ug/l | LCSD Result<br>ug/l | LCS Rec.<br>% | LCSD Rec.<br>% | Rec. Limits<br>% | LCS Qualifier | LCSD Qualifier | RPD<br>% | RPD Limits<br>% |
|---|---|---|---|---|---|---|---|---|---|---|
| Boron | 1000 | 890 | 902 | 89.0 | 90.2 | 80.0-120 | | | 1.33 | 20 |
| Calcium | 10000 | 9110 | 9080 | 91.1 | 90.8 | 80.0-120 | | | 0.303 | 20 |

## L1159196-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1159196-04 11/16/19 09:30 • (MS) R3472629-5 11/16/19 09:35 • (MSD) R3472629-6 11/16/19 09:38

| Analyte | Spike Amount<br>ug/l | Original Result<br>ug/l | MS Result<br>ug/l | MSD Result<br>ug/l | MS Rec.<br>% | MSD Rec.<br>% | Dilution | Rec. Limits<br>% | MS Qualifier | MSD Qualifier | RPD<br>% | RPD Limits<br>% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Boron | 1000 | 957 | 1860 | 1870 | 90.6 | 90.8 | 1 | 75.0-125 | | | 0.121 | 20 |
| Calcium | 10000 | 65300 | 73600 | 73200 | 82.9 | 79.2 | 1 | 75.0-125 | | | 0.510 | 20 |

## Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

## Abbreviations and Definitions

| | |
|---|---|
| MDL | Method Detection Limit. |
| ND | Not detected at the Reporting Limit (or MDL where applicable). |
| RDL | Reported Detection Limit. |
| Rec. | Recovery. |
| RPD | Relative Percent Difference. |
| SDG | Sample Delivery Group. |
| U | Not detected at the Reporting Limit (or MDL where applicable). |
| Analyte | The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported. |
| Dilution | If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor. |
| Limits | These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges. |
| Original Sample | The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG. |
| Qualifier | This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable. |
| Result | The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte. |
| Uncertainty (Radiochemistry) | Confidence level of 2 sigma. |
| Case Narrative (Cn) | A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report. |
| Quality Control Summary (Qc) | This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material. |
| Sample Chain of Custody (Sc) | This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis. |
| Sample Results (Sr) | This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported. |
| Sample Summary (Ss) | This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis. |

| Qualifier | Description |
|---|---|
| E | The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL). |
| J3 | The associated batch QC was outside the established quality control range for precision. |

# ACCREDITATIONS & LOCATIONS

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

## State Accreditations

| | | | |
|---|---|---|---|
| Alabama | 40660 | Nebraska | NE-OS-15-05 |
| Alaska | 17-026 | Nevada | TN-03-2002-34 |
| Arizona | AZ0612 | New Hampshire | 2975 |
| Arkansas | 88-0469 | New Jersey–NELAP | TN002 |
| California | 2932 | New Mexico [1] | n/a |
| Colorado | TN00003 | New York | 11742 |
| Connecticut | PH-0197 | North Carolina | Env375 |
| Florida | E87487 | North Carolina [1] | DW21704 |
| Georgia | NELAP | North Carolina [3] | 41 |
| Georgia [1] | 923 | North Dakota | R-140 |
| Idaho | TN00003 | Ohio–VAP | CL0069 |
| Illinois | 200008 | Oklahoma | 9915 |
| Indiana | C-TN-01 | Oregon | TN200002 |
| Iowa | 364 | Pennsylvania | 68-02979 |
| Kansas | E-10277 | Rhode Island | LAO00356 |
| Kentucky [1,6] | 90010 | South Carolina | 84004 |
| Kentucky [2] | 16 | South Dakota | n/a |
| Louisiana | AI30792 | Tennessee [1,4] | 2006 |
| Louisiana [1] | LA180010 | Texas | T104704245-18-15 |
| Maine | TN0002 | Texas [5] | LAB0152 |
| Maryland | 324 | Utah | TN00003 |
| Massachusetts | M-TN003 | Vermont | VT2006 |
| Michigan | 9958 | Virginia | 460132 |
| Minnesota | 047-999-395 | Washington | C847 |
| Mississippi | TN00003 | West Virginia | 233 |
| Missouri | 340 | Wisconsin | 9980939910 |
| Montana | CERT0086 | Wyoming | A2LA |

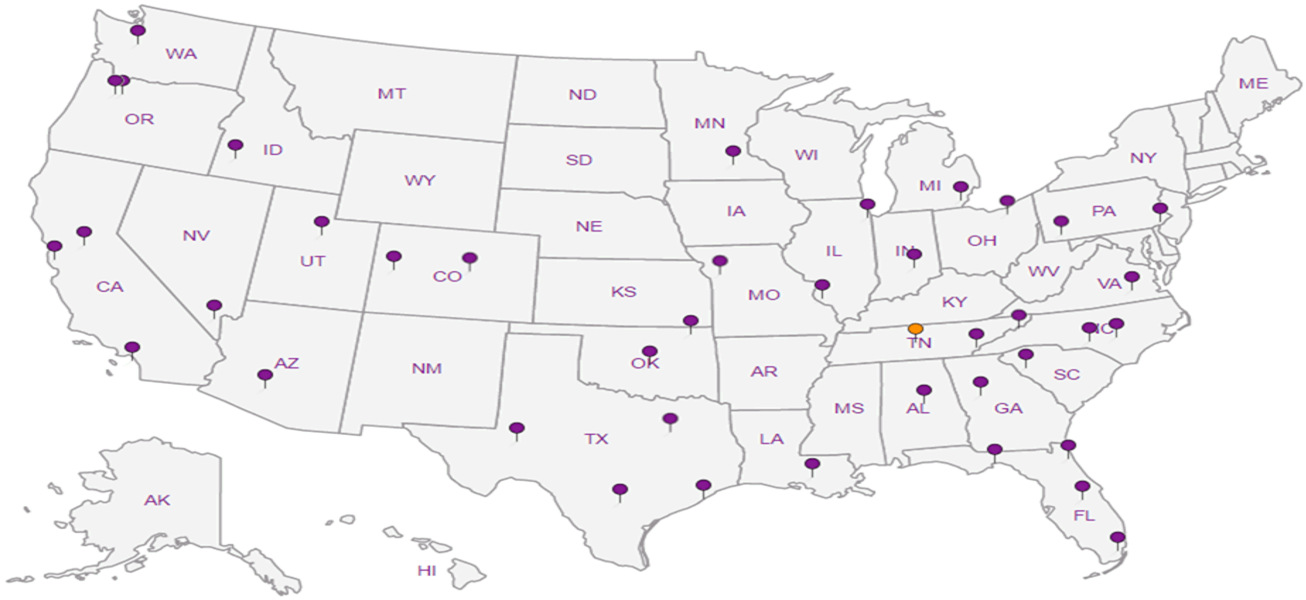
## Third Party Federal Accreditations

| | | | |
|---|---|---|---|
| A2LA – ISO 17025 | 1461.01 | AIHA-LAP,LLC EMLAP | 100789 |
| A2LA – ISO 17025 [5] | 1461.02 | DOD | 1461.01 |
| Canada | 1461.01 | USDA | P330-15-00234 |
| EPA–Crypto | TN00003 | | |

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

## Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



**SCS Engineers - KS**

8575 West 110th Street
Suite 100
Overland Park, KS 66210

Billing Information:

**Accounts Payable**
**8575 West 110th Street**
**Suite 100**
**Overland Park, KS 66210**

Pres Chk

Chain of Custody Page 1 of 1

National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

Report to:
**Jason Franks**

Email To: **jfranks@scsengineers.com;**
**jay.martin@kcpl.com;**

Project Description: EVERGY ~~**KCPL**~~ **- LaCygne Generating Stat**

City/State Collected: LaCygne, KS

Please Circle: PT MT [✓ CT] ET

Phone: **913-681-0030**
Fax: **913-681-0012**

Client Project #
**27217233.19**

Lab Project #
**AQUAOPKS-LACYGNE**

Collected by (print): JASON R. FRANKS

Site/Facility ID #

P.O. #

Collected by (signature): Jason R. Franks

Immediately Packed on Ice N ____ Y ✓

***Rush?*** (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

**Quote #**

Date Results Needed

SDG # L1159196

Tab B225

Acct

Template:**T157983**

Prelogin: **P736956**

PM: **206 - Jeff Carr**

PB:

Shipped Via:

Analysis / Container / Preservative

| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | No. of Cntrs | Anions (Cld, F, SO4) 125mlHDPE-NoPres | B, Ca - 6010 250mlHDPE-HNO3 ✓ | TDS 250mlHDPE-NoPres | Remarks | Sample # (lab only) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **MW-901** | GRAB | **GW** | – | 11/8/19 | 1350 | 3 | X | X | X | | -01 |
| **MW-902** | ↓ | **GW** | – | ↓ | 1100 | 3 | X | X | X | | -02 |
| **MW-903** | | **GW** | – | | 1145 | 3 | X | X | X | | -03 |
| **MW-904** | | **GW** | – | | 1220 | 3 | X | X | X | | -04 |
| **MW-905** | | **GW** | – | | 1315 | 3 | X | X | X | | -05 |
| 904 **MS/MSD** | | **GW** | – | | 1220 | 3 | X | X | X | | -04 |
| **DUPLICATE** | | **GW** | – | | 1220 | 3 | X | X | X | | -06 |

* Matrix:
**SS** - Soil **AIR** - Air **F** - Filter
**GW** - Groundwater **B** - Bioassay
**WW** - WasteWater
**DW** - Drinking Water
**OT** - Other ______

**Remarks:**

pH ______ Temp ______

Flow ______ Other ______

Samples returned via:
__ UPS __ FedEx __ Courier ________

Tracking #

| Relinquished by : (Signature) | Date: | Time: | Received by: (Signature) |
|---|---|---|---|
| Jason R. Franks | 11/8/19 | 1547 | Alan Nelson 11-8-19 1547 |
| Alan Nelson | 11/8/19 | 1800 | |

Relinquished by : (Signature)
Date:
Time:
Received for lab by: (Signature)

Trip Blank Received: Yes / No
HCL / MeoH
TBR

Temp: 2.3-.2=2.1 A3 CK °C
Bottles Received: 21

Date: 11/9
Time: 0845

Sample Receipt Checklist
COC Seal Present/Intact: ☒ NP __Y __N
COC Signed/Accurate: ✓Y __N
Bottles arrive intact: ✓Y __N
Correct bottles used: ✓Y __N
Sufficient volume sent: ✓Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: ✓Y __N
RAD Screen <0.5 mR/hr: ☒Y __N

If preservation required by Login: Date/Time

Hold:

Condition: NCF / [✓ OK]

# ATTACHMENT 2

## Statistical Analyses

# ATTACHMENT 2-1

# Fall 2018 Semiannual Detection Monitoring Statistical Analyses

# MEMORANDUM

**April 11, 2019**

JOHN R. ROCKHOLD
LICENSED
29
4-11-19
KANSAS
PROFESSIONAL GEOLOGIST

**To:** **La Cygne Generating Station**
**25166 East 2200 Road**
**La Cygne, Kansas 66040**
**Kansas City Power & Light Company**

**From:** **SCS Engineers**

**RE:** **Determination of Statistically Significant Increases – Bottom Ash Impoundment**
**Fall 2018 Semiannual Detection Monitoring 40 CFR 257.94**

Statistical analysis of monitoring data from the groundwater monitoring system for the Bottom Ash Impoundment at the La Cygne Generating Station has been completed in substantial compliance with the “Statistical Method Certification by A Qualified Professional Engineer” dated October 12, 2017. Detection monitoring groundwater samples were collected on November 29, 2018. Review and validation of the results from the November 2018 Detection Monitoring Event was completed on January 12, 2019, which constitutes completion and finalization of detection monitoring laboratory analyses. A statistical analysis was then conducted to determine whether there was a statistically significant increase (SSI) over background values for each constituent listed in Appendix III to Part 257-Constituents for Detection Monitoring. Two rounds of verification sampling were conducted for certain constituents on January 14, 2019 and March 11, 2019.

The completed statistical evaluation identified Appendix III constituent, calcium, above its prediction limit in monitoring well MW-903. The prediction limit for calcium in monitoring well MW-903 is 358.2 mg/L. The detection monitoring sample was reported at 375 mg/L. The first verification re-sample was collected on January 14, 2019 with a result of 377 mg/L. The second verification re-sample was collected on March 11, 2019 with a result of 375 mg/L.

Therefore, in accordance with the Statistical Method Certification, the detection monitoring sample for calcium from monitoring well MW-903 exceeds its prediction limit and is a confirmed SSI over background.

**Determination: A statistical evaluation was completed for all Appendix III detection monitoring constituents in accordance with the certified statistical method. The statistical evaluation identified one SSI above the background prediction limit for calcium in monitor well MW-903.**

Attached to this memorandum are the following backup information:

Attachment 1: Sanitas$^{\text{TM}}$ Output:

Statistical evaluation output from Sanitas$^{TM}$ for the prediction limit analysis. This includes prediction limit plots, prediction limit background data, detection sample result, 1st verification re-sample result (when applicable), 2nd verification re-sample result (when applicable), extra sample results for pH because pH is collected as part of the sampling procedure, and a Prediction Limit summary table. Output documentation includes the analytical data used for the statistical analyses.

Attachment 2: Sanitas$^{TM}$ Configuration Settings:

Screen shots of the applicable Sanitas$^{TM}$ configuration settings for the statistical prediction limit analysis. This includes data configuration, output configuration, prediction limit configuration and other tests configuration.

| **Revision Number** | **Revision Date** | **Attachment Revised** | **Summary of Revisions** |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

La Cygne Generating Station
Determination of Statistically Significant Increases
Bottom Ash Impoundment
April 11, 2019

# ATTACHMENT 1

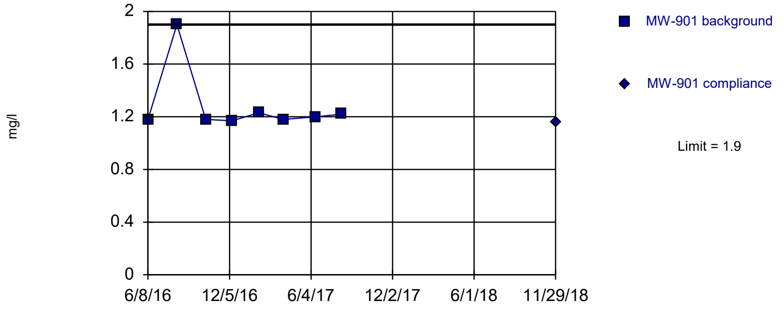
## Sanitas$^{TM}$ Output

Sanitas™ v.9.6.12 Sanitas software licensed to SCS Engineers. UG

Within Limit

## Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.01179. Individual comparison alpha = 0.005912 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: BORON Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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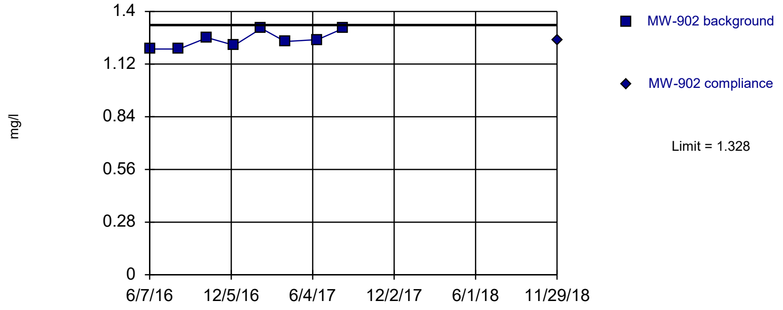
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=1.249, Std. Dev.=0.04357, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8927, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: BORON Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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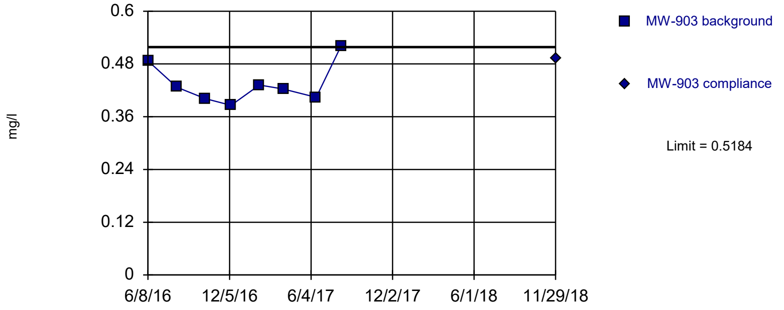
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=0.4351, Std. Dev.=0.04604, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8763, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: BORON Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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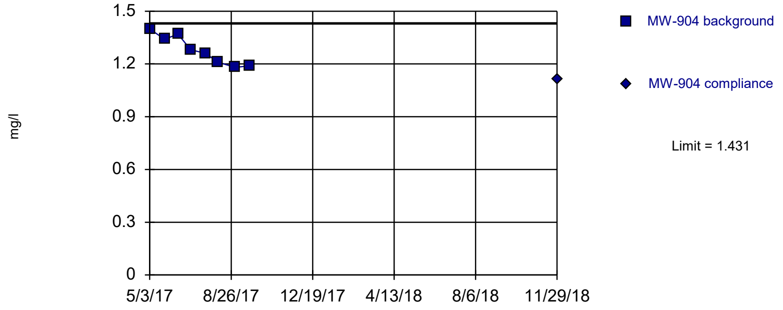
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=1.279, Std. Dev.=0.08408, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9243, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: BORON Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

# Prediction Limit

Constituent: BORON (mg/l)    Analysis Run 3/29/2019 4:18 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

---

|  | MW-901 | MW-901 |
|---|---|---|
| 6/8/2016 | 1.18 |  |
| 8/11/2016 | 1.9 |  |
| 10/14/2016 | 1.18 |  |
| 12/12/2016 | 1.17 |  |
| 2/9/2017 | 1.23 |  |
| 4/4/2017 | 1.18 |  |
| 6/16/2017 | 1.2 |  |
| 8/11/2017 | 1.22 |  |
| 11/29/2018 |  | 1.16 |

# Prediction Limit

Constituent: BORON (mg/l)    Analysis Run 3/29/2019 4:18 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

|  | MW-902 | MW-902 |
|---|---|---|
| 6/7/2016 | 1.2 |  |
| 8/11/2016 | 1.2 |  |
| 10/13/2016 | 1.26 |  |
| 12/12/2016 | 1.22 |  |
| 2/10/2017 | 1.31 |  |
| 4/4/2017 | 1.24 |  |
| 6/15/2017 | 1.25 |  |
| 8/11/2017 | 1.31 |  |
| 11/29/2018 |  | 1.25 |

# Prediction Limit

Constituent: BORON (mg/l)    Analysis Run 3/29/2019 4:18 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

---

|  | MW-903 | MW-903 |
|---|---|---|
| 6/8/2016 | 0.487 |  |
| 8/11/2016 | 0.427 |  |
| 10/13/2016 | 0.401 |  |
| 12/9/2016 | 0.386 |  |
| 2/10/2017 | 0.432 |  |
| 4/4/2017 | 0.423 |  |
| 6/16/2017 | 0.404 |  |
| 8/10/2017 | 0.521 |  |
| 11/29/2018 |  | 0.493 |

# Prediction Limit

Constituent: BORON (mg/l)    Analysis Run 3/29/2019 4:18 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

---

| | MW-904 | MW-904 |
|---|---|---|
| 5/3/2017 | 1.4 | |
| 5/24/2017 | 1.34 | |
| 6/12/2017 | 1.37 | |
| 6/30/2017 | 1.28 | |
| 7/21/2017 | 1.26 | |
| 8/7/2017 | 1.21 | |
| 9/1/2017 | 1.18 | |
| 9/22/2017 | 1.19 | |
| 11/29/2018 | | 1.11 |

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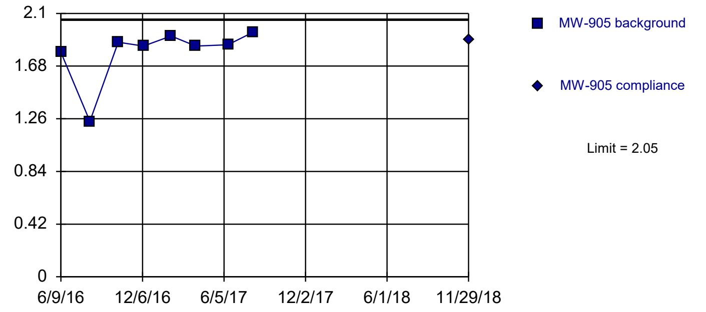
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary (based on x^4 transformation): Mean=10.94, Std. Dev.=3.707, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7543, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: BORON Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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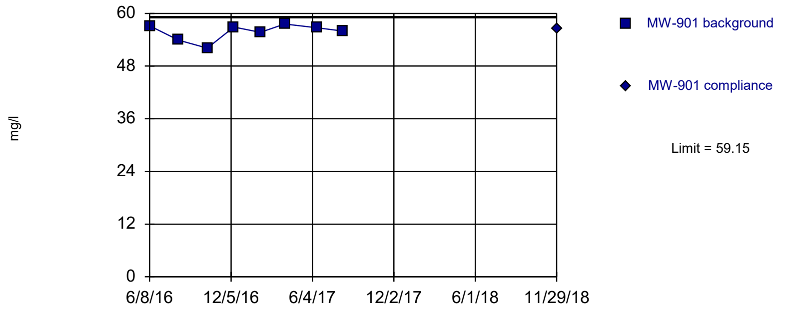
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=55.76, Std. Dev.=1.873, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8695, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: CALCIUM Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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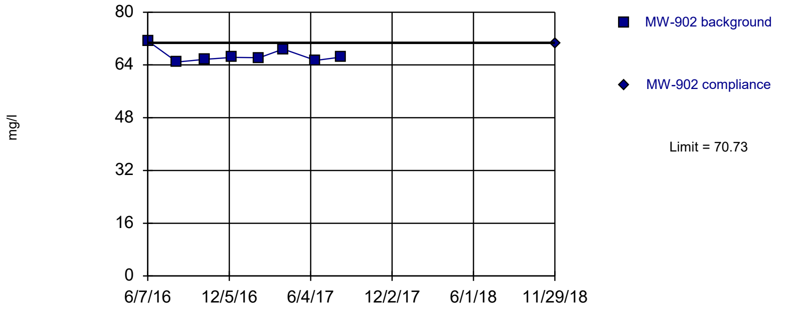
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=66.88, Std. Dev.=2.13, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8116, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: CALCIUM Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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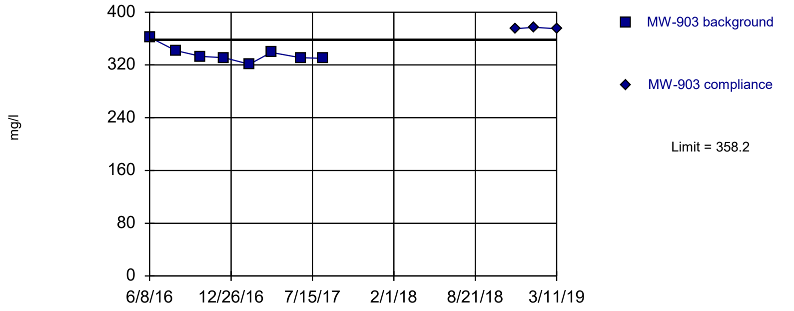
Exceeds Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=336.1, Std. Dev.=12.19, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8714, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: CALCIUM Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

# Prediction Limit

Constituent: BORON (mg/l)    Analysis Run 3/29/2019 4:18 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

---

|  | MW-905 | MW-905 |
|---|---|---|
| 6/9/2016 | 1.79 |  |
| 8/12/2016 | 1.24 |  |
| 10/14/2016 | 1.87 |  |
| 12/9/2016 | 1.84 |  |
| 2/8/2017 | 1.92 |  |
| 4/4/2017 | 1.84 |  |
| 6/14/2017 | 1.85 |  |
| 8/9/2017 | 1.95 |  |
| 11/29/2018 |  | 1.89 |

# Prediction Limit

Constituent: CALCIUM (mg/l)  Analysis Run 3/29/2019 4:18 PM  View: Bottom Ash III

LaCygne  Client: SCS Engineers  Data: LaC GW Data

---

| | MW-901 | MW-901 |
|---|---|---|
| 6/8/2016 | 57.2 | |
| 8/11/2016 | 53.9 | |
| 10/14/2016 | 52.1 | |
| 12/12/2016 | 56.9 | |
| 2/9/2017 | 55.7 | |
| 4/4/2017 | 57.6 | |
| 6/16/2017 | 56.7 | |
| 8/11/2017 | 56 | |
| 11/29/2018 | | 56.4 |

# Prediction Limit

Constituent: CALCIUM (mg/l)    Analysis Run 3/29/2019 4:18 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

---

| | MW-902 | MW-902 |
|---|---|---|
| 6/7/2016 | 71.3 | |
| 8/11/2016 | 64.9 | |
| 10/13/2016 | 65.7 | |
| 12/12/2016 | 66.3 | |
| 2/10/2017 | 66.2 | |
| 4/4/2017 | 68.8 | |
| 6/15/2017 | 65.4 | |
| 8/11/2017 | 66.4 | |
| 11/29/2018 | | 70.4 |

# Prediction Limit

Constituent: CALCIUM (mg/l) Analysis Run 3/29/2019 4:18 PM View: Bottom Ash III

LaCygne Client: SCS Engineers Data: LaC GW Data

---

| | MW-903 | MW-903 | |
|---|---|---|---|
| 6/8/2016 | 362 | | |
| 8/11/2016 | 342 | | |
| 10/13/2016 | 333 | | |
| 12/9/2016 | 331 | | |
| 2/10/2017 | 321 | | |
| 4/4/2017 | 339 | | |
| 6/16/2017 | 331 | | |
| 8/10/2017 | 330 | | |
| 11/29/2018 | | 375 | |
| 1/14/2019 | | 377 | 1st verification re-sample |
| 3/11/2019 | | 375 | 2nd verification re-sample |

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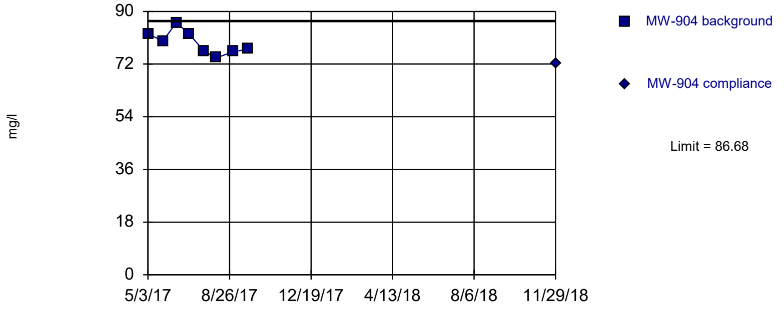
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=79.34, Std. Dev.=4.056, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9418, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: CALCIUM Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

---

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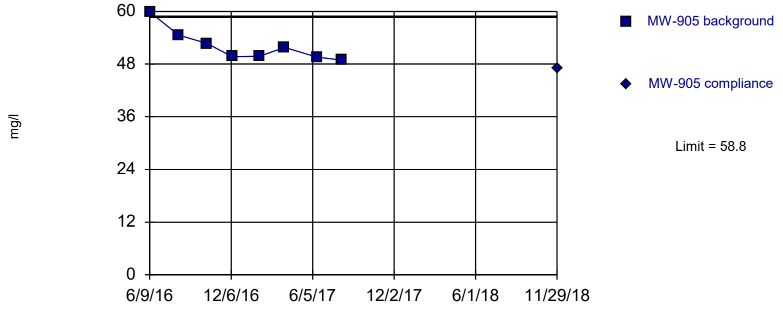
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=52.13, Std. Dev.=3.685, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8283, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: CALCIUM Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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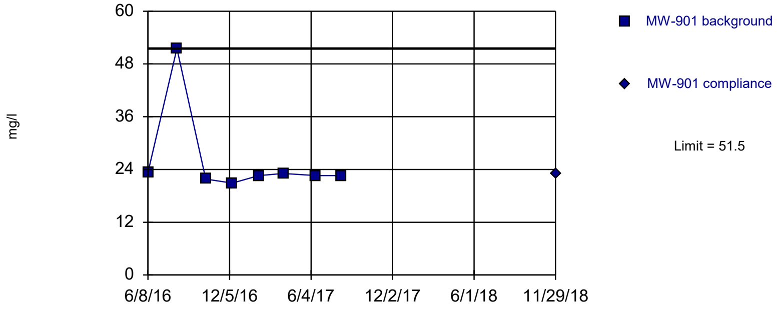
Within Limit

## Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.01179. Individual comparison alpha = 0.005912 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: CHLORIDE Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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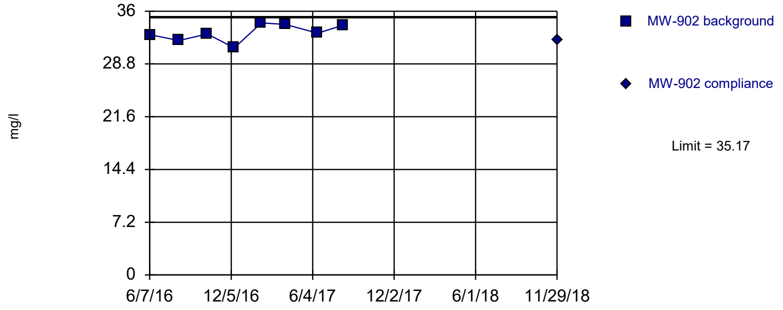
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=33.05, Std. Dev.=1.174, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9249, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: CHLORIDE Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

# Prediction Limit

Constituent: CALCIUM (mg/l) Analysis Run 3/29/2019 4:18 PM View: Bottom Ash III

LaCygne Client: SCS Engineers Data: LaC GW Data

|  | MW-904 | MW-904 |
|---|---|---|
| 5/3/2017 | 82.4 |  |
| 5/24/2017 | 79.8 |  |
| 6/12/2017 | 86.2 |  |
| 6/30/2017 | 82.3 |  |
| 7/21/2017 | 76.5 |  |
| 8/7/2017 | 74.1 |  |
| 9/1/2017 | 76.3 |  |
| 9/22/2017 | 77.1 |  |
| 11/29/2018 |  | 72.1 |

# Prediction Limit

Constituent: CALCIUM (mg/l)    Analysis Run 3/29/2019 4:18 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

---

|  | MW-905 | MW-905 |
|---|---|---|
| 6/9/2016 | 59.9 |  |
| 8/12/2016 | 54.6 |  |
| 10/14/2016 | 52.7 |  |
| 12/9/2016 | 49.7 |  |
| 2/8/2017 | 49.8 |  |
| 4/4/2017 | 51.8 |  |
| 6/14/2017 | 49.6 |  |
| 8/9/2017 | 48.9 |  |
| 11/29/2018 |  | 46.9 |

# Prediction Limit

Constituent: CHLORIDE (mg/l)    Analysis Run 3/29/2019 4:18 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

---

| | MW-901 | MW-901 |
|---|---|---|
| 6/8/2016 | 23.3 | |
| 8/11/2016 | 51.5 | |
| 10/14/2016 | 21.8 | |
| 12/12/2016 | 20.9 | |
| 2/9/2017 | 22.6 | |
| 4/4/2017 | 23.1 | |
| 6/16/2017 | 22.6 | |
| 8/11/2017 | 22.6 | |
| 11/29/2018 | | 23 |

# Prediction Limit

Constituent: CHLORIDE (mg/l)    Analysis Run 3/29/2019 4:19 PM    View: Bottom Ash III

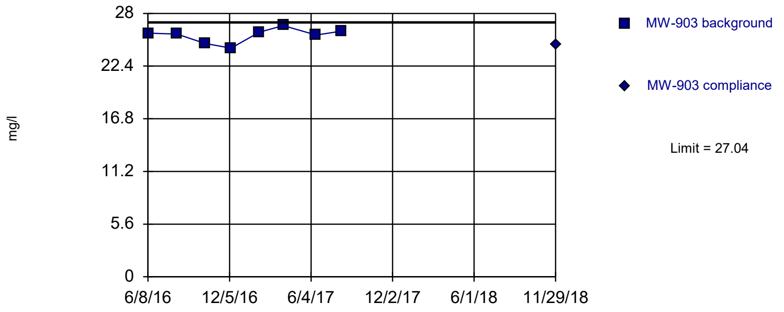
LaCygne    Client: SCS Engineers    Data: LaC GW Data

|  | MW-902 | MW-902 |
|---|---|---|
| 6/7/2016 | 32.8 |  |
| 8/11/2016 | 32 |  |
| 10/13/2016 | 32.9 |  |
| 12/12/2016 | 31 |  |
| 2/10/2017 | 34.4 |  |
| 4/4/2017 | 34.2 |  |
| 6/15/2017 | 33 |  |
| 8/11/2017 | 34.1 |  |
| 11/29/2018 |  | 32.1 |

Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=25.66, Std. Dev.=0.7615, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9099, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

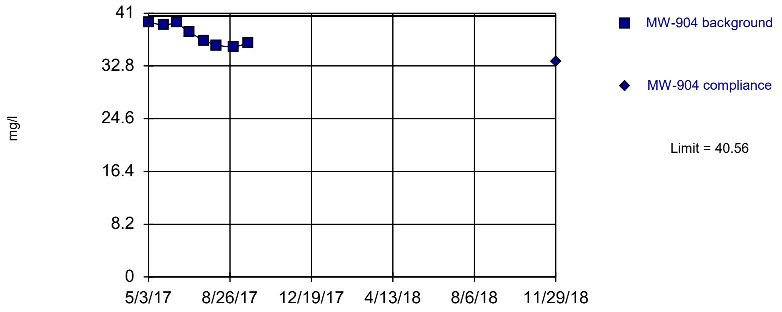
Constituent: CHLORIDE Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

---

Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=37.63, Std. Dev.=1.623, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8728, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

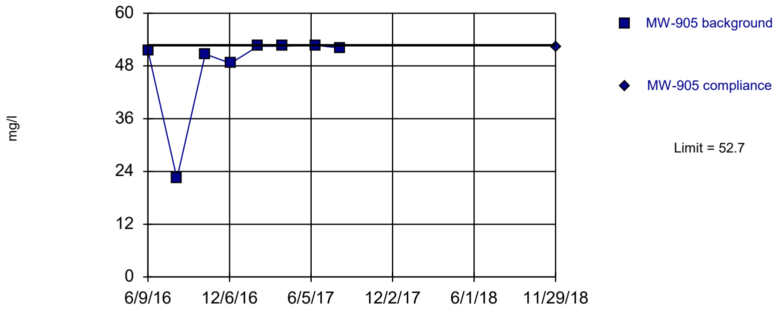
Constituent: CHLORIDE Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

---

Within Limit

## Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.01179. Individual comparison alpha = 0.005912 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

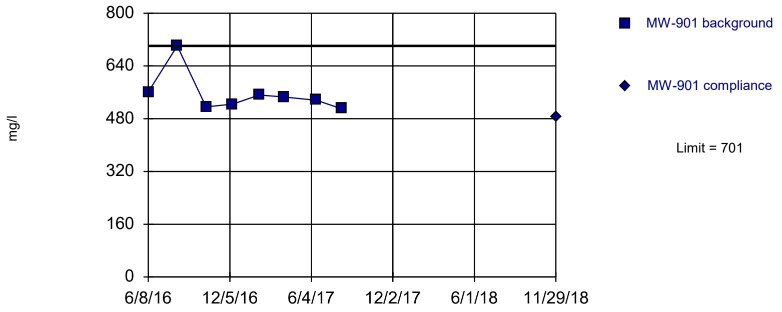
Constituent: CHLORIDE Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

---

Within Limit

## Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.01179. Individual comparison alpha = 0.005912 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: DISSOLVED SOLIDS Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

# Prediction Limit

Constituent: CHLORIDE (mg/l)    Analysis Run 3/29/2019 4:19 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

---

| | MW-903 | MW-903 |
|---|---|---|
| 6/8/2016 | 25.9 | |
| 8/11/2016 | 25.8 | |
| 10/13/2016 | 24.8 | |
| 12/9/2016 | 24.3 | |
| 2/10/2017 | 26 | |
| 4/4/2017 | 26.7 | |
| 6/16/2017 | 25.7 | |
| 8/10/2017 | 26.1 | |
| 11/29/2018 | | 24.7 |

# Prediction Limit

Constituent: CHLORIDE (mg/l)    Analysis Run 3/29/2019 4:19 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

---

|  | MW-904 | MW-904 |
|---|---|---|
| 5/3/2017 | 39.6 |  |
| 5/24/2017 | 39.1 |  |
| 6/12/2017 | 39.5 |  |
| 6/30/2017 | 38 |  |
| 7/21/2017 | 36.7 |  |
| 8/7/2017 | 36 |  |
| 9/1/2017 | 35.7 |  |
| 9/22/2017 | 36.4 |  |
| 11/29/2018 |  | 33.5 |

# Prediction Limit

Constituent: CHLORIDE (mg/l)    Analysis Run 3/29/2019 4:19 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

---

|  | MW-905 | MW-905 |
|---|---|---|
| 6/9/2016 | 51.5 |  |
| 8/12/2016 | 22.4 |  |
| 10/14/2016 | 50.7 |  |
| 12/9/2016 | 48.6 |  |
| 2/8/2017 | 52.5 |  |
| 4/4/2017 | 52.5 |  |
| 6/14/2017 | 52.7 |  |
| 8/9/2017 | 52.1 |  |
| 11/29/2018 |  | 52.4 |

# Prediction Limit

Constituent: DISSOLVED SOLIDS (mg/l)    Analysis Run 3/29/2019 4:19 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

---

| | MW-901 | MW-901 |
|---|---|---|
| 6/8/2016 | 561 | |
| 8/11/2016 | 701 | |
| 10/14/2016 | 516 | |
| 12/12/2016 | 524 | |
| 2/9/2017 | 552 | |
| 4/4/2017 | 546 | |
| 6/16/2017 | 536 | |
| 8/11/2017 | 510 | |
| 11/29/2018 | | 487 |

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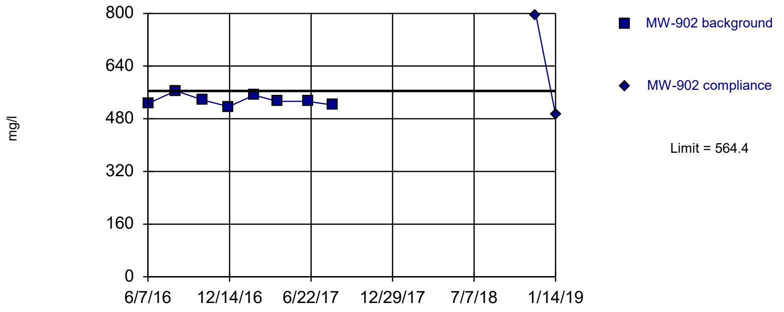
Within Limit

## Prediction Limit

### Intrawell Parametric



Background Data Summary: Mean=535.6, Std. Dev.=15.91, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9238, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: DISSOLVED SOLIDS Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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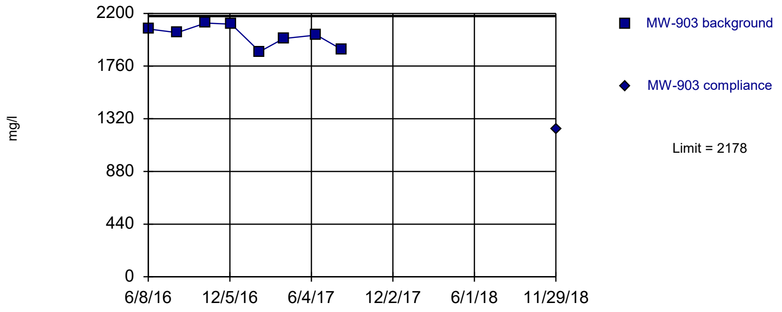
Within Limit

## Prediction Limit

### Intrawell Parametric



Background Data Summary: Mean=2016, Std. Dev.=89.27, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9217, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: DISSOLVED SOLIDS Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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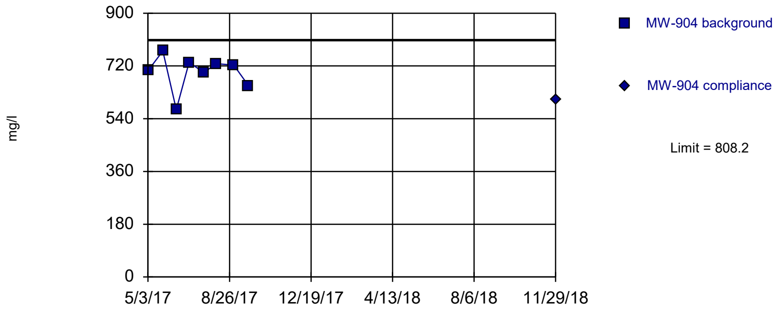
Within Limit

## Prediction Limit

### Intrawell Parametric



Background Data Summary: Mean=697.3, Std. Dev.=61.28, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8884, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: DISSOLVED SOLIDS Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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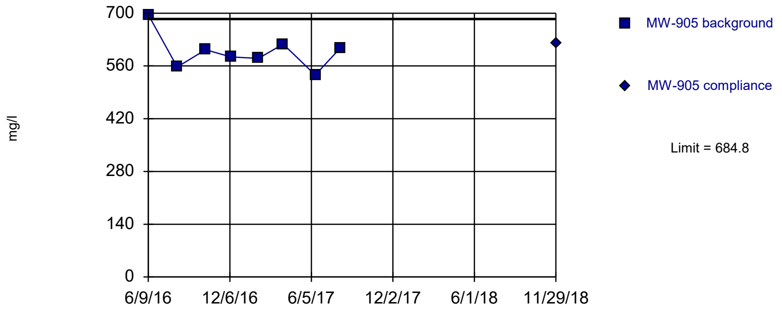
Within Limit

## Prediction Limit

### Intrawell Parametric



Background Data Summary: Mean=597.8, Std. Dev.=48.07, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9215, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: DISSOLVED SOLIDS Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

# Prediction Limit

Constituent: DISSOLVED SOLIDS (mg/l)  Analysis Run 3/29/2019 4:19 PM  View: Bottom Ash III

LaCygne  Client: SCS Engineers  Data: LaC GW Data

| | MW-902 | MW-902 | |
|---|---|---|---|
| 6/7/2016 | 526 | | |
| 8/11/2016 | 565 | | |
| 10/13/2016 | 537 | | |
| 12/12/2016 | 517 | | |
| 2/10/2017 | 552 | | |
| 4/4/2017 | 533 | | |
| 6/15/2017 | 533 | | |
| 8/11/2017 | 522 | | |
| 11/29/2018 | | 796 | |
| 1/14/2019 | | 492 | 1st verification re-sample |

# Prediction Limit

Constituent: DISSOLVED SOLIDS (mg/l)   Analysis Run 3/29/2019 4:19 PM   View: Bottom Ash III

LaCygne   Client: SCS Engineers   Data: LaC GW Data

| | MW-903 | MW-903 |
|---|---|---|
| 6/8/2016 | 2070 | |
| 8/11/2016 | 2040 | |
| 10/13/2016 | 2120 | |
| 12/9/2016 | 2110 | |
| 2/10/2017 | 1880 | |
| 4/4/2017 | 1990 | |
| 6/16/2017 | 2020 | |
| 8/10/2017 | 1900 | |
| 11/29/2018 | | 1230 |

# Prediction Limit

Constituent: DISSOLVED SOLIDS (mg/l)    Analysis Run 3/29/2019 4:19 PM    View: Bottom Ash III
LaCygne    Client: SCS Engineers    Data: LaC GW Data

---

| | MW-904 | MW-904 |
|---|---|---|
| 5/3/2017 | 704 | |
| 5/24/2017 | 771 | |
| 6/12/2017 | 571 | |
| 6/30/2017 | 732 | |
| 7/21/2017 | 697 | |
| 8/7/2017 | 728 | |
| 9/1/2017 | 723 | |
| 9/22/2017 | 652 | |
| 11/29/2018 | | 604 |

# Prediction Limit

Constituent: DISSOLVED SOLIDS (mg/l)     Analysis Run 3/29/2019 4:19 PM     View: Bottom Ash III

LaCygne     Client: SCS Engineers     Data: LaC GW Data

---

| | MW-905 | MW-905 |
|---|---|---|
| 6/9/2016 | 696 | |
| 8/12/2016 | 557 | |
| 10/14/2016 | 603 | |
| 12/9/2016 | 584 | |
| 2/8/2017 | 580 | |
| 4/4/2017 | 618 | |
| 6/14/2017 | 536 | |
| 8/9/2017 | 608 | |
| 11/29/2018 | | 619 |

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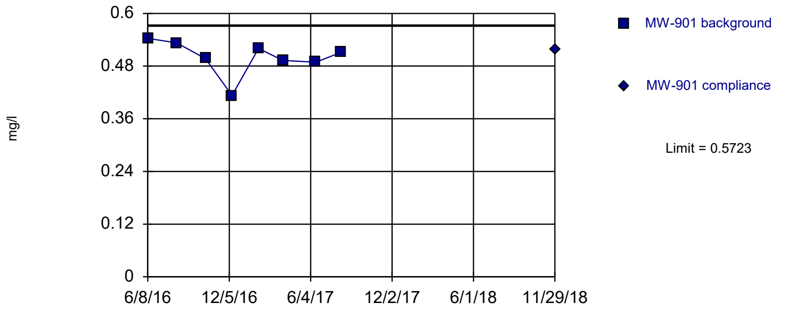
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=0.4999, Std. Dev.=0.04001, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8585, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: FLUORIDE Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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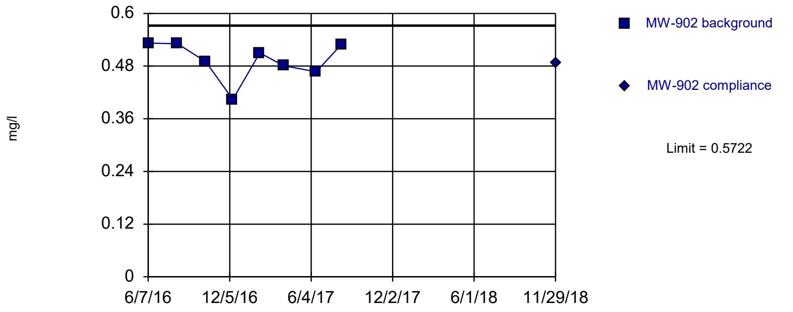
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=0.4931, Std. Dev.=0.04371, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8622, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: FLUORIDE Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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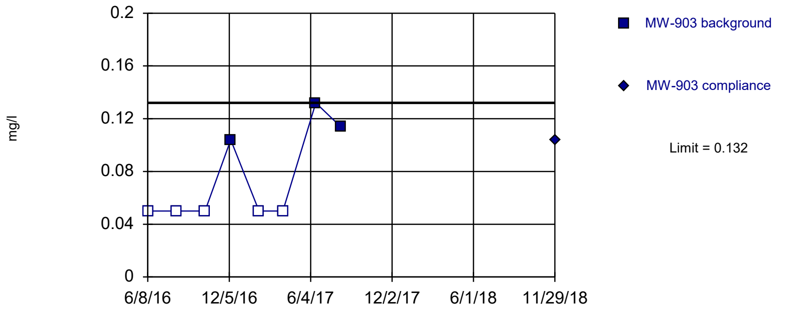
Hollow symbols indicate censored values.

Within Limit

## Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 8 background values. 62.5% NDs. Well-constituent pair annual alpha = 0.01179. Individual comparison alpha = 0.005912 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: FLUORIDE Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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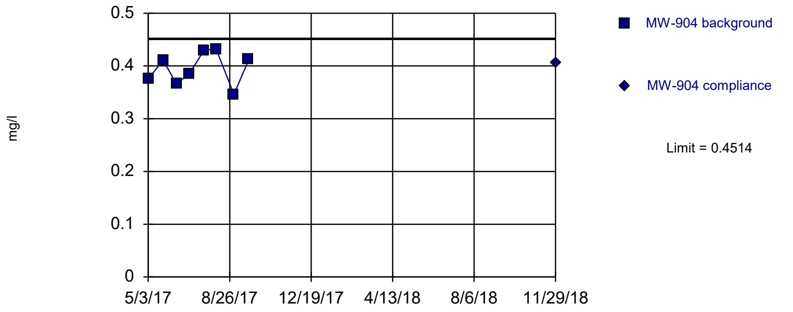
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=0.3946, Std. Dev.=0.03135, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.935, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: FLUORIDE Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

# Prediction Limit

Constituent: FLUORIDE (mg/l)   Analysis Run 3/29/2019 4:19 PM   View: Bottom Ash III

LaCygne   Client: SCS Engineers   Data: LaC GW Data

|  | MW-901 | MW-901 |
|---|---|---|
| 6/8/2016 | 0.543 |  |
| 8/11/2016 | 0.533 |  |
| 10/14/2016 | 0.497 |  |
| 12/12/2016 | 0.413 |  |
| 2/9/2017 | 0.52 |  |
| 4/4/2017 | 0.493 |  |
| 6/16/2017 | 0.489 |  |
| 8/11/2017 | 0.511 |  |
| 11/29/2018 |  | 0.517 |

# Prediction Limit

Constituent: FLUORIDE (mg/l)    Analysis Run 3/29/2019 4:19 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

| | MW-902 | MW-902 |
|---|---|---|
| 6/7/2016 | 0.532 | |
| 8/11/2016 | 0.531 | |
| 10/13/2016 | 0.49 | |
| 12/12/2016 | 0.404 | |
| 2/10/2017 | 0.51 | |
| 4/4/2017 | 0.481 | |
| 6/15/2017 | 0.467 | |
| 8/11/2017 | 0.53 | |
| 11/29/2018 | | 0.488 |

# Prediction Limit

Constituent: FLUORIDE (mg/l)    Analysis Run 3/29/2019 4:19 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

| | MW-903 | MW-903 |
|---|---|---|
| 6/8/2016 | <0.1 | |
| 8/11/2016 | <0.1 | |
| 10/13/2016 | <0.1 | |
| 12/9/2016 | 0.104 | |
| 2/10/2017 | <0.1 | |
| 4/4/2017 | <0.1 | |
| 6/16/2017 | 0.132 | |
| 8/10/2017 | 0.114 | |
| 11/29/2018 | | 0.104 |

# Prediction Limit

Constituent: FLUORIDE (mg/l)    Analysis Run 3/29/2019 4:19 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

|  | MW-904 | MW-904 |
|---|---|---|
| 5/3/2017 | 0.375 |  |
| 5/24/2017 | 0.411 |  |
| 6/12/2017 | 0.366 |  |
| 6/30/2017 | 0.385 |  |
| 7/21/2017 | 0.43 |  |
| 8/7/2017 | 0.432 |  |
| 9/1/2017 | 0.346 |  |
| 9/22/2017 | 0.412 |  |
| 11/29/2018 |  | 0.406 |

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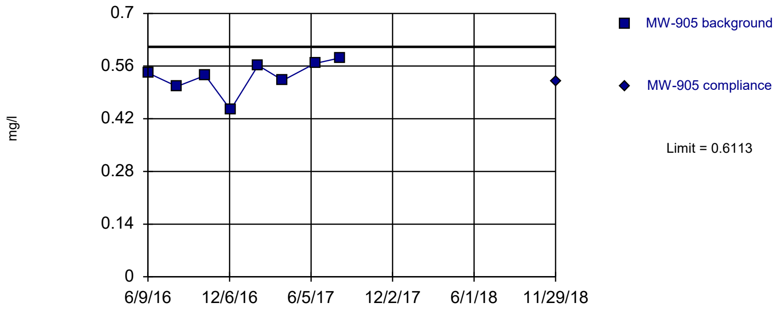
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=0.5325, Std. Dev.=0.04351, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9161, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: FLUORIDE Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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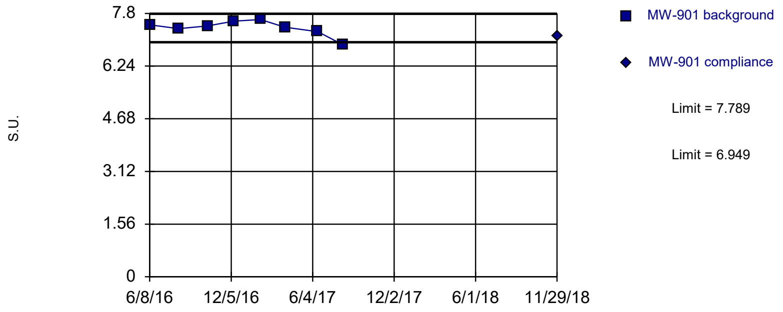
Within Limits

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=7.369, Std. Dev.=0.2321, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8719, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: pH Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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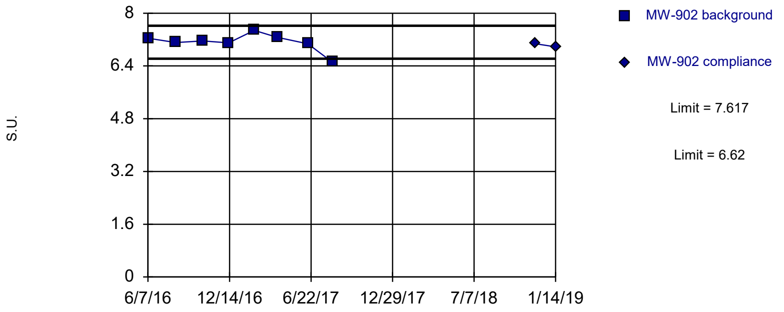
Within Limits

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=7.119, Std. Dev.=0.2754, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.849, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: pH Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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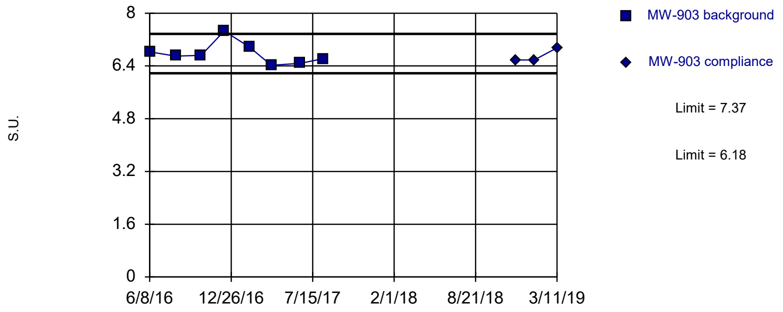
Within Limits

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=6.775, Std. Dev.=0.3286, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8941, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: pH Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

# Prediction Limit

Constituent: FLUORIDE (mg/l)  Analysis Run 3/29/2019 4:19 PM  View: Bottom Ash III

LaCygne  Client: SCS Engineers  Data: LaC GW Data

---

| | MW-905 | MW-905 |
|---|---|---|
| 6/9/2016 | 0.542 | |
| 8/12/2016 | 0.506 | |
| 10/14/2016 | 0.535 | |
| 12/9/2016 | 0.444 | |
| 2/8/2017 | 0.562 | |
| 4/4/2017 | 0.522 | |
| 6/14/2017 | 0.567 | |
| 8/9/2017 | 0.582 | |
| 11/29/2018 | | 0.52 |

# Prediction Limit

Constituent: pH (S.U.)    Analysis Run 3/29/2019 4:19 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

| | MW-901 | MW-901 |
|---|---|---|
| 6/8/2016 | 7.46 | |
| 8/11/2016 | 7.35 | |
| 10/14/2016 | 7.43 | |
| 12/12/2016 | 7.57 | |
| 2/9/2017 | 7.62 | |
| 4/4/2017 | 7.39 | |
| 6/16/2017 | 7.26 | |
| 8/11/2017 | 6.87 | |
| 11/29/2018 | | 7.12 |

# Prediction Limit

Constituent: pH (S.U.)    Analysis Run 3/29/2019 4:19 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

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| | MW-902 | MW-902 | |
|---|---|---|---|
| 6/7/2016 | 7.24 | | |
| 8/11/2016 | 7.11 | | |
| 10/13/2016 | 7.16 | | |
| 12/12/2016 | 7.1 | | |
| 2/10/2017 | 7.48 | | |
| 4/4/2017 | 7.27 | | |
| 6/15/2017 | 7.07 | | |
| 8/11/2017 | 6.52 | | |
| 11/29/2018 | | 7.07 | |
| 1/14/2019 | | 6.98 | extra sample |

# Prediction Limit

Constituent: pH (S.U.)    Analysis Run 3/29/2019 4:19 PM    View: Bottom Ash III
LaCygne    Client: SCS Engineers    Data: LaC GW Data

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| | MW-903 | MW-903 | |
|---|---|---|---|
| 6/8/2016 | 6.83 | | |
| 8/11/2016 | 6.7 | | |
| 10/13/2016 | 6.72 | | |
| 12/9/2016 | 7.46 | | |
| 2/10/2017 | 6.97 | | |
| 4/4/2017 | 6.42 | | |
| 6/15/2017 | 6.48 | | |
| 8/10/2017 | 6.62 | | |
| 11/29/2018 | | 6.58 | |
| 1/14/2019 | | 6.58 | extra sample |
| 3/11/2019 | | 6.95 | extra sample |

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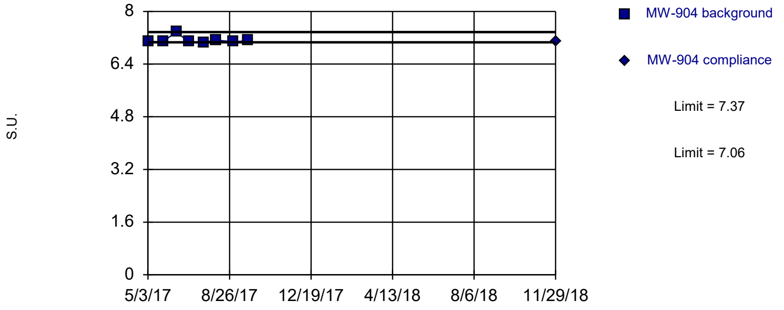
Within Limits

## Prediction Limit

### Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limits are highest and lowest of 8 background values. Well-constituent pair annual alpha = 0.02358. Individual comparison alpha = 0.01182 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: pH Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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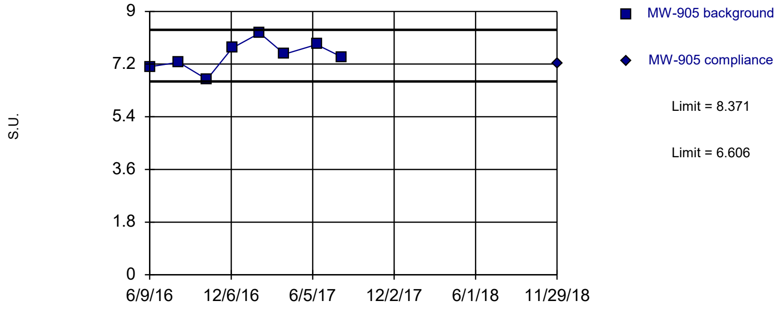
Within Limits

## Prediction Limit

### Intrawell Parametric



Background Data Summary: Mean=7.489, Std. Dev.=0.4875, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9969, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: pH Analysis Run 3/29/2019 4:15 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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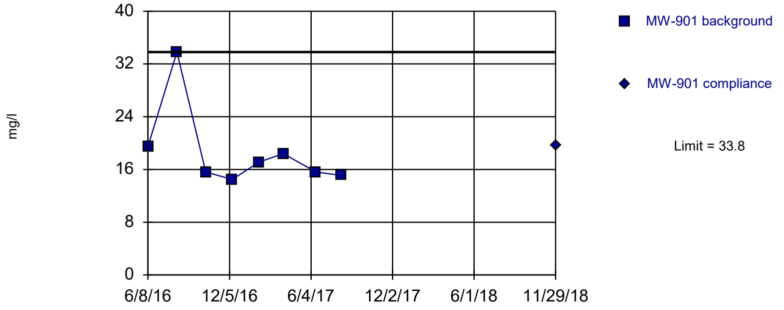
Within Limit

## Prediction Limit

### Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.01179. Individual comparison alpha = 0.005912 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: SULFATE Analysis Run 3/29/2019 4:16 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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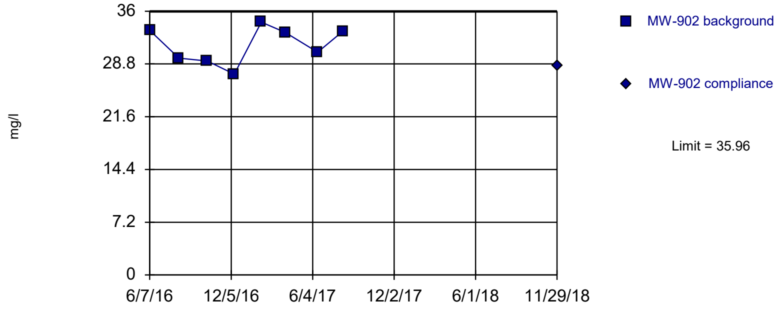
Within Limit

## Prediction Limit

### Intrawell Parametric



Background Data Summary: Mean=31.36, Std. Dev.=2.54, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9129, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: SULFATE Analysis Run 3/29/2019 4:16 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

# Prediction Limit

Constituent: pH (S.U.)    Analysis Run 3/29/2019 4:19 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

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| | MW-904 | MW-904 |
|---|---|---|
| 5/3/2017 | 7.09 | |
| 5/24/2017 | 7.08 | |
| 6/12/2017 | 7.37 | |
| 6/30/2017 | 7.07 | |
| 7/21/2017 | 7.06 | |
| 8/7/2017 | 7.13 | |
| 9/1/2017 | 7.08 | |
| 9/22/2017 | 7.11 | |
| 11/29/2018 | | 7.07 |

# Prediction Limit

Constituent: pH (S.U.)    Analysis Run 3/29/2019 4:19 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

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| | MW-905 | MW-905 |
|---|---|---|
| 6/9/2016 | 7.11 | |
| 8/12/2016 | 7.26 | |
| 10/14/2016 | 6.68 | |
| 12/9/2016 | 7.75 | |
| 2/8/2017 | 8.26 | |
| 4/4/2017 | 7.54 | |
| 6/14/2017 | 7.87 | |
| 8/9/2017 | 7.44 | |
| 11/29/2018 | | 7.23 |

# Prediction Limit

Constituent: SULFATE (mg/l)  Analysis Run 3/29/2019 4:19 PM  View: Bottom Ash III

LaCygne  Client: SCS Engineers  Data: LaC GW Data

| | MW-901 | MW-901 |
|---|---|---|
| 6/8/2016 | 19.5 | |
| 8/11/2016 | 33.8 | |
| 10/14/2016 | 15.6 | |
| 12/12/2016 | 14.5 | |
| 2/9/2017 | 17.1 | |
| 4/4/2017 | 18.4 | |
| 6/16/2017 | 15.6 | |
| 8/11/2017 | 15.1 | |
| 11/29/2018 | | 19.7 |

# Prediction Limit

Constituent: SULFATE (mg/l)    Analysis Run 3/29/2019 4:19 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

|  | MW-902 | MW-902 |
|---|---|---|
| 6/7/2016 | 33.4 |  |
| 8/11/2016 | 29.6 |  |
| 10/13/2016 | 29.2 |  |
| 12/12/2016 | 27.4 |  |
| 2/10/2017 | 34.5 |  |
| 4/4/2017 | 33.1 |  |
| 6/15/2017 | 30.4 |  |
| 8/11/2017 | 33.3 |  |
| 11/29/2018 |  | 28.6 |

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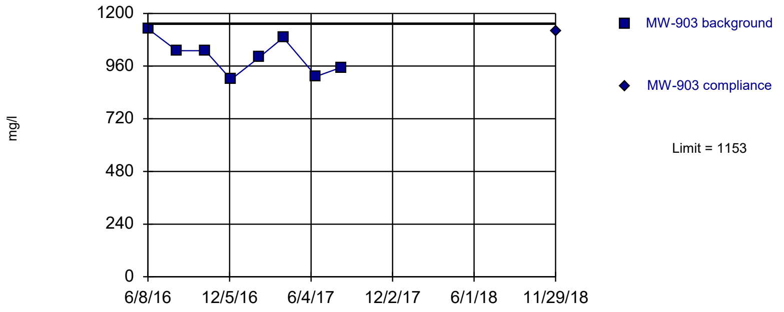
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=1006, Std. Dev.=81.43, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9566, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: SULFATE Analysis Run 3/29/2019 4:16 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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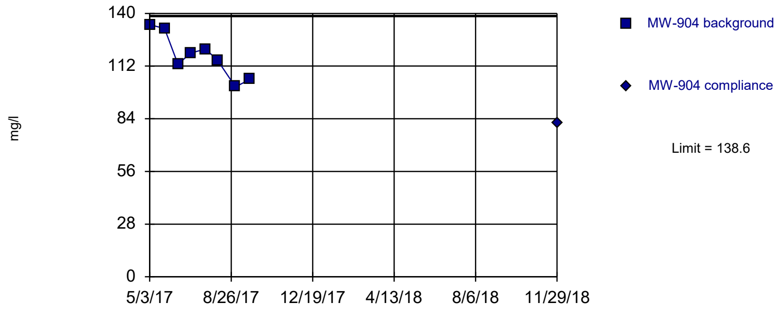
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=117.5, Std. Dev.=11.66, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9538, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: SULFATE Analysis Run 3/29/2019 4:16 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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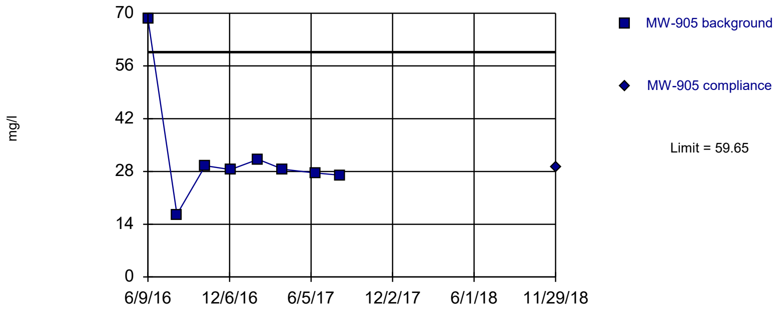
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary (based on cube root transformation): Mean=3.127, Std. Dev.=0.4312, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7552, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: SULFATE Analysis Run 3/29/2019 4:16 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

# Prediction Limit

Constituent: SULFATE (mg/l)    Analysis Run 3/29/2019 4:19 PM    View: Bottom Ash III
LaCygne    Client: SCS Engineers    Data: LaC GW Data

|  | MW-903 | MW-903 |
|---|---|---|
| 6/8/2016 | 1130 |  |
| 8/11/2016 | 1030 |  |
| 10/13/2016 | 1030 |  |
| 12/9/2016 | 899 |  |
| 2/10/2017 | 1000 |  |
| 4/4/2017 | 1090 |  |
| 6/16/2017 | 913 |  |
| 8/10/2017 | 954 |  |
| 11/29/2018 |  | 1120 |

# Prediction Limit

Constituent: SULFATE (mg/l)  Analysis Run 3/29/2019 4:19 PM  View: Bottom Ash III

LaCygne  Client: SCS Engineers  Data: LaC GW Data

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| | MW-904 | MW-904 |
|---|---|---|
| 5/3/2017 | 134 | |
| 5/24/2017 | 132 | |
| 6/12/2017 | 113 | |
| 6/30/2017 | 119 | |
| 7/21/2017 | 121 | |
| 8/7/2017 | 115 | |
| 9/1/2017 | 101 | |
| 9/22/2017 | 105 | |
| 11/29/2018 | | 81.5 |

# Prediction Limit

Constituent: SULFATE (mg/l)    Analysis Run 3/29/2019 4:19 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

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|  | MW-905 | MW-905 |
|---|---|---|
| 6/9/2016 | 68.5 |  |
| 8/12/2016 | 16.6 |  |
| 10/14/2016 | 29.5 |  |
| 12/9/2016 | 28.5 |  |
| 2/8/2017 | 31.2 |  |
| 4/4/2017 | 28.6 |  |
| 6/14/2017 | 27.6 |  |
| 8/9/2017 | 27 |  |
| 11/29/2018 |  | 29 |

# Prediction Limit

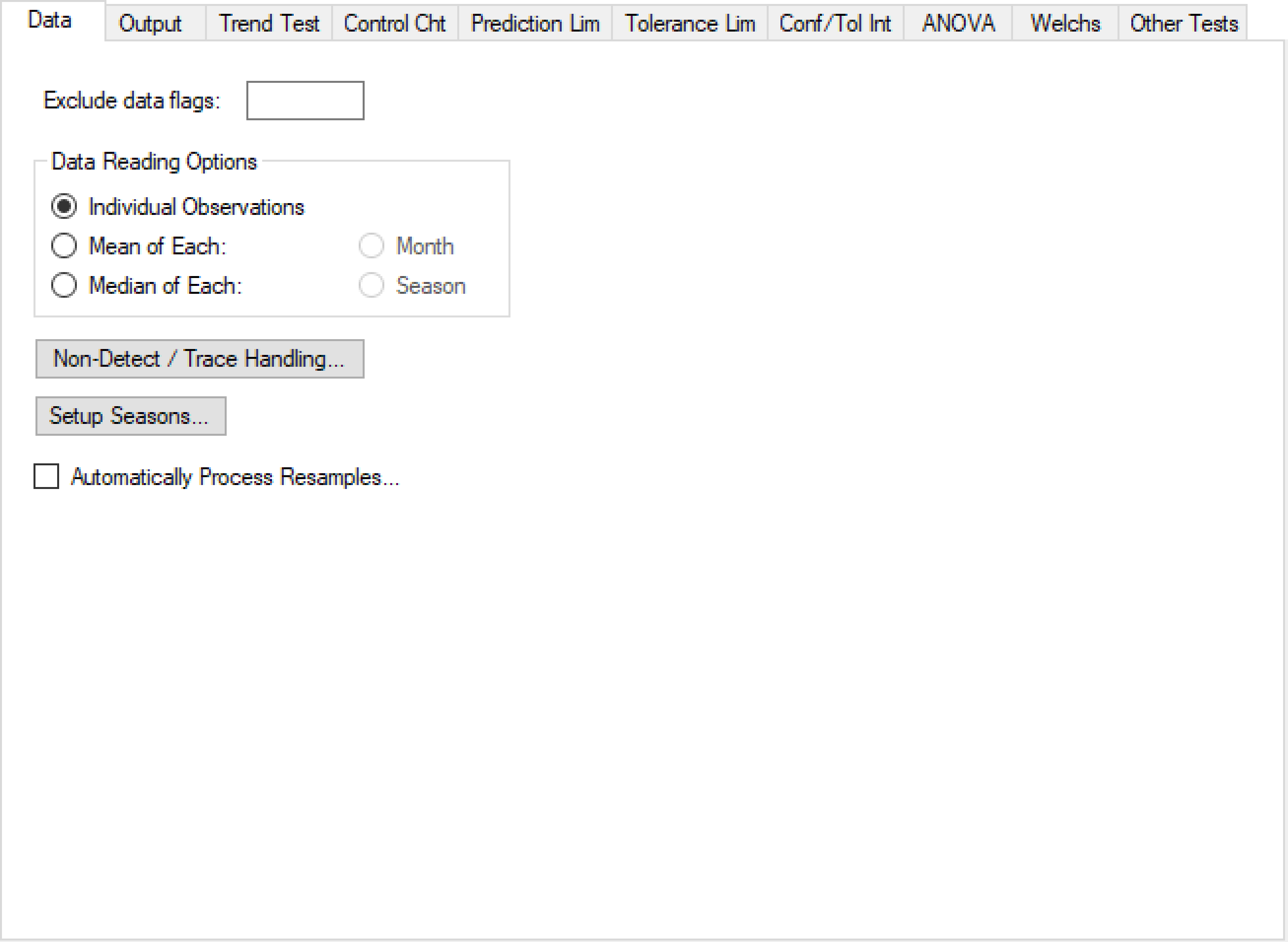
LaCygne Client: SCS Engineers Data: LaC GW Data Printed 3/29/2019, 4:19 PM

| Constituent | Well | Upper Lim. | Lower Lim. | Date | Observ. | Sig. | Bg N | %NDs | Transform | Alpha | Method |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BORON (mg/l) | MW-901 | 1.9 | n/a | 11/29/2018 | 1.16 | No | 8 | 0 | n/a | 0.005912 | NP Intra (normality) ... |
| BORON (mg/l) | MW-902 | 1.328 | n/a | 11/29/2018 | 1.25 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| BORON (mg/l) | MW-903 | 0.5184 | n/a | 11/29/2018 | 0.493 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| BORON (mg/l) | MW-904 | 1.431 | n/a | 11/29/2018 | 1.11 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| BORON (mg/l) | MW-905 | 2.05 | n/a | 11/29/2018 | 1.89 | No | 8 | 0 | x^4 | 0.00188 | Param Intra 1 of 3 |
| CALCIUM (mg/l) | MW-901 | 59.15 | n/a | 11/29/2018 | 56.4 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| CALCIUM (mg/l) | MW-902 | 70.73 | n/a | 11/29/2018 | 70.4 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| **CALCIUM (mg/l)** | **MW-903** | **358.2** | **n/a** | **3/11/2019** | **375** | **Yes** | **8** | **0** | **No** | **0.00188** | **Param Intra 1 of 3** |
| CALCIUM (mg/l) | MW-904 | 86.68 | n/a | 11/29/2018 | 72.1 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| CALCIUM (mg/l) | MW-905 | 58.8 | n/a | 11/29/2018 | 46.9 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| CHLORIDE (mg/l) | MW-901 | 51.5 | n/a | 11/29/2018 | 23 | No | 8 | 0 | n/a | 0.005912 | NP Intra (normality) ... |
| CHLORIDE (mg/l) | MW-902 | 35.17 | n/a | 11/29/2018 | 32.1 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| CHLORIDE (mg/l) | MW-903 | 27.04 | n/a | 11/29/2018 | 24.7 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| CHLORIDE (mg/l) | MW-904 | 40.56 | n/a | 11/29/2018 | 33.5 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| CHLORIDE (mg/l) | MW-905 | 52.7 | n/a | 11/29/2018 | 52.4 | No | 8 | 0 | n/a | 0.005912 | NP Intra (normality) ... |
| DISSOLVED SOLIDS (mg/l) | MW-901 | 701 | n/a | 11/29/2018 | 487 | No | 8 | 0 | n/a | 0.005912 | NP Intra (normality) ... |
| DISSOLVED SOLIDS (mg/l) | MW-902 | 564.4 | n/a | 1/14/2019 | 492 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| DISSOLVED SOLIDS (mg/l) | MW-903 | 2178 | n/a | 11/29/2018 | 1230 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| DISSOLVED SOLIDS (mg/l) | MW-904 | 808.2 | n/a | 11/29/2018 | 604 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| DISSOLVED SOLIDS (mg/l) | MW-905 | 684.8 | n/a | 11/29/2018 | 619 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| FLUORIDE (mg/l) | MW-901 | 0.5723 | n/a | 11/29/2018 | 0.517 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| FLUORIDE (mg/l) | MW-902 | 0.5722 | n/a | 11/29/2018 | 0.488 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| FLUORIDE (mg/l) | MW-903 | 0.132 | n/a | 11/29/2018 | 0.104 | No | 8 | 62.5 | n/a | 0.005912 | NP Intra (NDs) 1 of 3 |
| FLUORIDE (mg/l) | MW-904 | 0.4514 | n/a | 11/29/2018 | 0.406 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| FLUORIDE (mg/l) | MW-905 | 0.6113 | n/a | 11/29/2018 | 0.52 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| pH (S.U.) | MW-901 | 7.789 | 6.949 | 11/29/2018 | 7.12 | No | 8 | 0 | No | 0.000... | Param Intra 1 of 3 |
| pH (S.U.) | MW-902 | 7.617 | 6.62 | 1/14/2019 | 6.98 | No | 8 | 0 | No | 0.000... | Param Intra 1 of 3 |
| pH (S.U.) | MW-903 | 7.37 | 6.18 | 3/11/2019 | 6.95 | No | 8 | 0 | No | 0.000... | Param Intra 1 of 3 |
| pH (S.U.) | MW-904 | 7.37 | 7.06 | 11/29/2018 | 7.07 | No | 8 | 0 | n/a | 0.01182 | NP Intra (normality) ... |
| pH (S.U.) | MW-905 | 8.371 | 6.606 | 11/29/2018 | 7.23 | No | 8 | 0 | No | 0.000... | Param Intra 1 of 3 |
| SULFATE (mg/l) | MW-901 | 33.8 | n/a | 11/29/2018 | 19.7 | No | 8 | 0 | n/a | 0.005912 | NP Intra (normality) ... |
| SULFATE (mg/l) | MW-902 | 35.96 | n/a | 11/29/2018 | 28.6 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| SULFATE (mg/l) | MW-903 | 1153 | n/a | 11/29/2018 | 1120 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| SULFATE (mg/l) | MW-904 | 138.6 | n/a | 11/29/2018 | 81.5 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| SULFATE (mg/l) | MW-905 | 59.65 | n/a | 11/29/2018 | 29 | No | 8 | 0 | x^(1/3) | 0.00188 | Param Intra 1 of 3 |

La Cygne Generating Station
Determination of Statistically Significant Increases
Bottom Ash Impoundment
April 11, 2019

# ATTACHMENT 2

## Sanitas$^{TM}$ Configuration Settings



Exclude data flags:

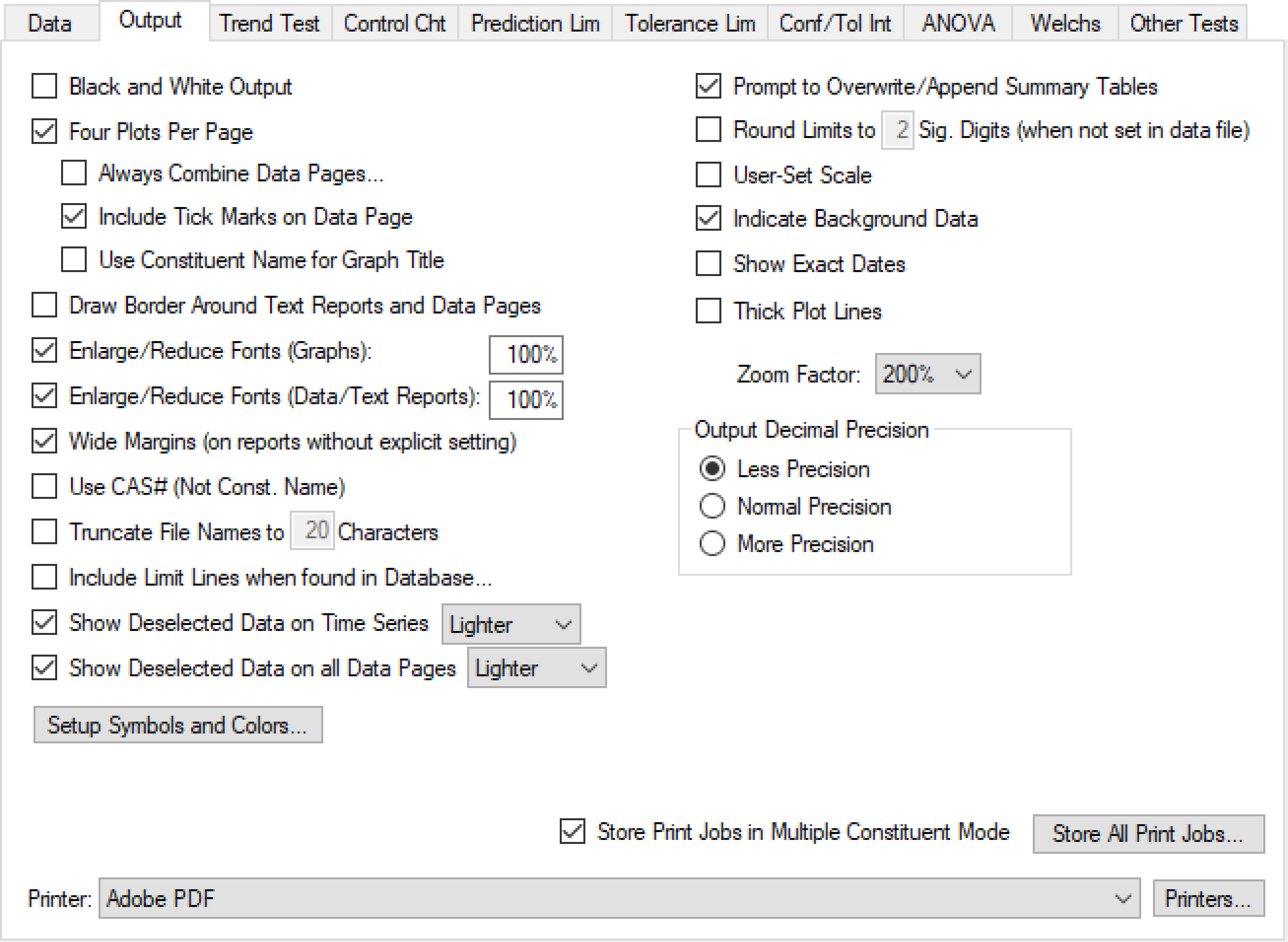
Data Reading Options

● Individual Observations

○ Mean of Each: ○ Month

○ Median of Each: ○ Season

☐ Automatically Process Resamples...



☐ Black and White Output
☑ Four Plots Per Page
  ☐ Always Combine Data Pages...
  ☑ Include Tick Marks on Data Page
  ☐ Use Constituent Name for Graph Title
☐ Draw Border Around Text Reports and Data Pages
☑ Enlarge/Reduce Fonts (Graphs): 100%
☑ Enlarge/Reduce Fonts (Data/Text Reports): 100%
☑ Wide Margins (on reports without explicit setting)
☐ Use CAS# (Not Const. Name)
☐ Truncate File Names to 20 Characters
☐ Include Limit Lines when found in Database...
☑ Show Deselected Data on Time Series Lighter
☑ Show Deselected Data on all Data Pages Lighter

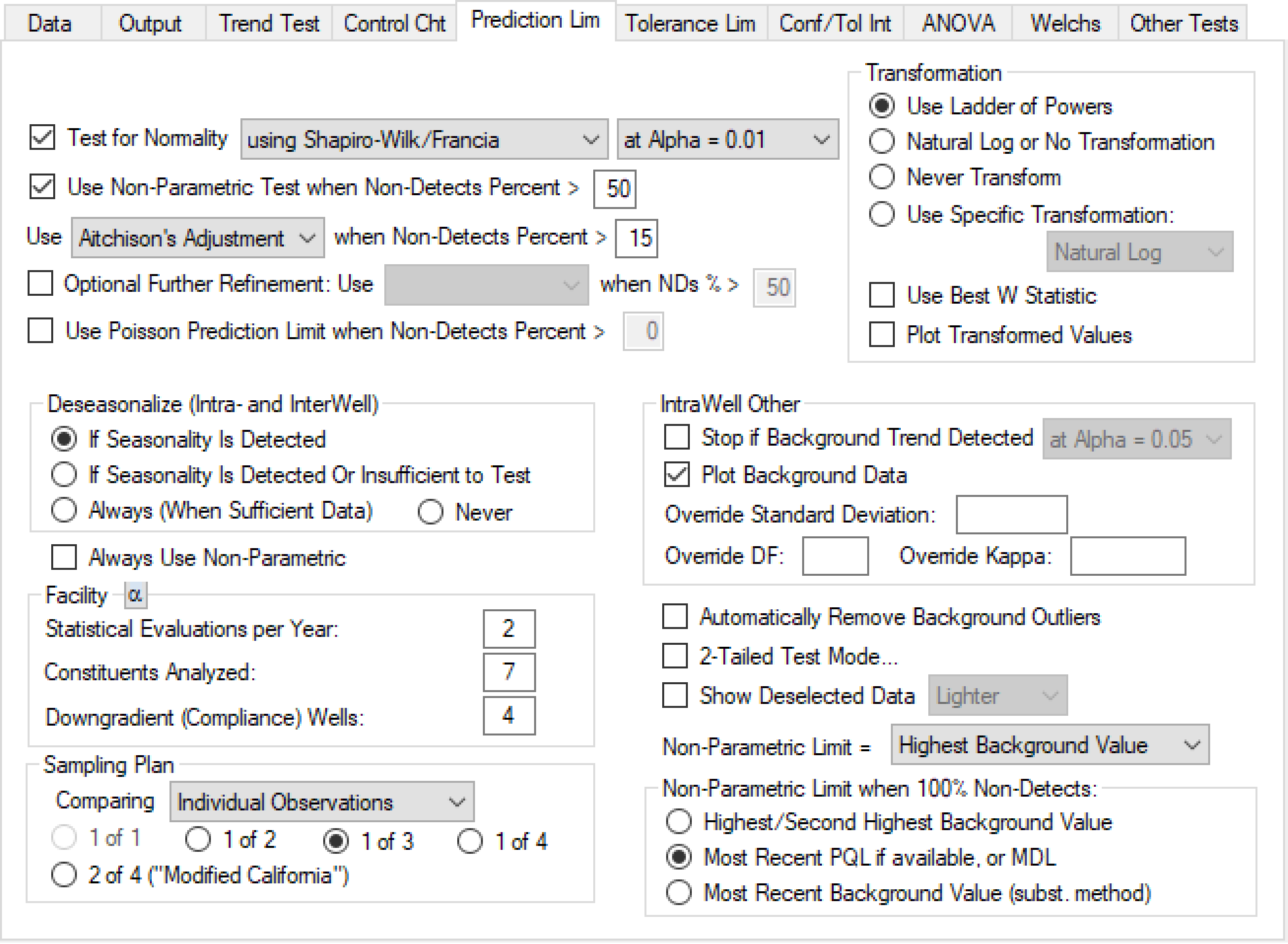
☑ Prompt to Overwrite/Append Summary Tables
☐ Round Limits to 2 Sig. Digits (when not set in data file)
☐ User-Set Scale
☑ Indicate Background Data
☐ Show Exact Dates
☐ Thick Plot Lines

Zoom Factor: 200%

Output Decimal Precision
● Less Precision
○ Normal Precision
○ More Precision

☑ Store Print Jobs in Multiple Constituent Mode

Printer: Adobe PDF



☑ Test for Normality using Shapiro-Wilk/Francia at Alpha = 0.01

☑ Use Non-Parametric Test when Non-Detects Percent > 50

Use Aitchison's Adjustment when Non-Detects Percent > 15

☐ Optional Further Refinement: Use when NDs % > 50

☐ Use Poisson Prediction Limit when Non-Detects Percent > 0

Transformation
● Use Ladder of Powers
○ Natural Log or No Transformation
○ Never Transform
○ Use Specific Transformation: Natural Log
☐ Use Best W Statistic
☐ Plot Transformed Values

Deseasonalize (Intra- and InterWell)
● If Seasonality Is Detected
○ If Seasonality Is Detected Or Insufficient to Test
○ Always (When Sufficient Data) ○ Never

☐ Always Use Non-Parametric

Facility α
Statistical Evaluations per Year: 2
Constituents Analyzed: 7
Downgradient (Compliance) Wells: 4

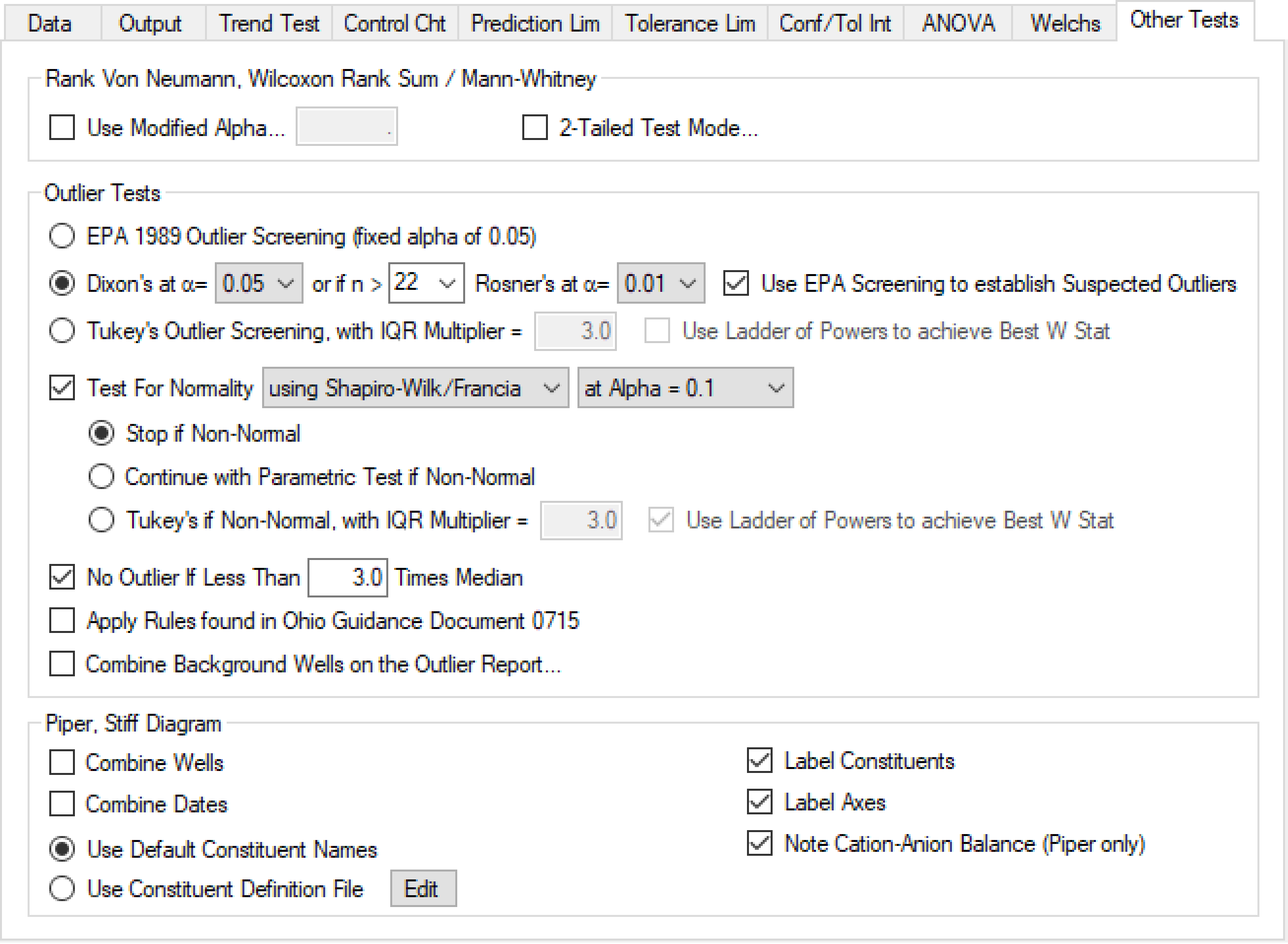
Sampling Plan
Comparing Individual Observations
○ 1 of 1 ○ 1 of 2 ● 1 of 3 ○ 1 of 4
○ 2 of 4 ("Modified California")

IntraWell Other
☐ Stop if Background Trend Detected at Alpha = 0.05
☑ Plot Background Data
Override Standard Deviation:
Override DF: Override Kappa:

☐ Automatically Remove Background Outliers
☐ 2-Tailed Test Mode...
☐ Show Deselected Data Lighter

Non-Parametric Limit = Highest Background Value

Non-Parametric Limit when 100% Non-Detects:
○ Highest/Second Highest Background Value
● Most Recent PQL if available, or MDL
○ Most Recent Background Value (subst. method)



Rank Von Neumann, Wilcoxon Rank Sum / Mann-Whitney

☐ Use Modified Alpha... ☐ 2-Tailed Test Mode...

Outlier Tests

○ EPA 1989 Outlier Screening (fixed alpha of 0.05)

● Dixon's at α= 0.05 or if n > 22 Rosner's at α= 0.01 ☑ Use EPA Screening to establish Suspected Outliers

○ Tukey's Outlier Screening, with IQR Multiplier = 3.0 ☐ Use Ladder of Powers to achieve Best W Stat

☑ Test For Normality using Shapiro-Wilk/Francia at Alpha = 0.1

- ● Stop if Non-Normal
- ○ Continue with Parametric Test if Non-Normal
- ○ Tukey's if Non-Normal, with IQR Multiplier = 3.0 ☑ Use Ladder of Powers to achieve Best W Stat

☑ No Outlier If Less Than 3.0 Times Median

☐ Apply Rules found in Ohio Guidance Document 0715

☐ Combine Background Wells on the Outlier Report...

Piper, Stiff Diagram

☐ Combine Wells

☐ Combine Dates

● Use Default Constituent Names

○ Use Constituent Definition File Edit

☑ Label Constituents

☑ Label Axes

☑ Note Cation-Anion Balance (Piper only)

# ATTACHMENT 2-2

## Spring 2019 Semiannual Detection Monitoring Statistical Analyses

**MEMORANDUM**

**October 1, 2019**

JOHN R. ROCKHOLD
LICENSED
29
10-01-19
KANSAS
PROFESSIONAL GEOLOGIST

**To:** **La Cygne Generating Station**
**25166 East 2200 Road**
**La Cygne, Kansas 66040**
**Kansas City Power & Light Company**

**From:** **SCS Engineers**

**RE:** **Determination of Statistically Significant Increases –**
**Bottom Ash Impoundment**
**Spring 2019 Semiannual Detection Monitoring 40 CFR 257.94**

Statistical analysis of monitoring data from the groundwater monitoring system for the Bottom Ash Impoundment at the La Cygne Generating Station has been completed in substantial compliance with the “Statistical Method Certification by A Qualified Professional Engineer” dated October 12, 2017. Detection monitoring groundwater samples were collected on May 23, 2019. Review and validation of the results from the May 2019 Detection Monitoring Event was completed on July 5, 2019, which constitutes completion and finalization of detection monitoring laboratory analyses. A statistical analysis was then conducted to determine whether there was a statistically significant increase (SSI) over background values for each constituent listed in Appendix III to Part 257-Constituents for Detection Monitoring. Two rounds of verification sampling were conducted for certain constituents on July 17, 2019 and August 22, 2019.

The completed statistical evaluation identified Appendix III constituent, calcium, above its prediction limit in monitoring well MW-903.

| Constituent/Monitoring Well | *UPL | Observation May 23, 2019 | 1st Verification July 17, 2019 | 2nd Verification August 22, 2019 |
|---|---|---|---|---|
| **Calcium** | | | | |
| MW-903 | 358.2 | 367 | 373 | 366 |

*UPL – Upper Prediction Limit

**Determination: A statistical evaluation was completed for all Appendix III detection monitoring constituents in accordance with the certified statistical method. The statistical evaluation confirmed one SSI above the background prediction limit for calcium in monitoring well MW-903.**

Attached to this memorandum are the following backup information:

Attachment 1: Sanitas$^{TM}$ Output:

Statistical evaluation output from Sanitas$^{TM}$ for the prediction limit analysis. This includes prediction limit plots, prediction limit background data, detection sample result, 1st verification re-sample result (when applicable), 2nd verification re-sample result (when applicable), extra sample results for pH because pH is collected as part of the sampling procedure, and a Prediction Limit summary table. Output documentation includes the analytical data used for the statistical analyses.

Attachment 2: Sanitas$^{TM}$ Configuration Settings:

Screen shots of the applicable Sanitas$^{TM}$ configuration settings for the statistical prediction limit analysis. This includes data configuration, output configuration, prediction limit configuration and other tests configuration.

| **Revision Number** | **Revision Date** | **Attachment Revised** | **Summary of Revisions** |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

# ATTACHMENT 1

## Sanitas$^{TM}$ Output

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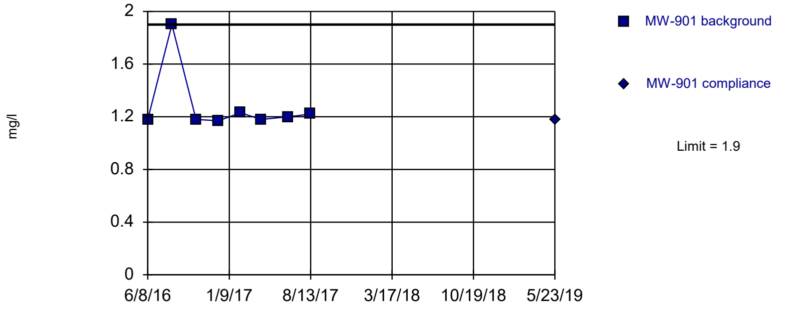
Within Limit

## Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.01179. Individual comparison alpha = 0.005912 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: BORON Analysis Run 9/25/2019 12:12 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

---

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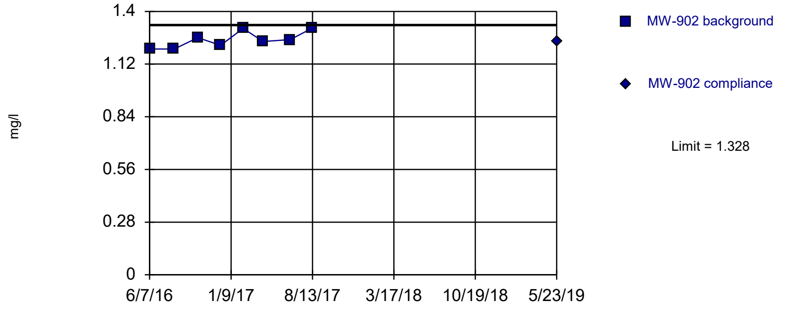
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=1.249, Std. Dev.=0.04357, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8927, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: BORON Analysis Run 9/25/2019 12:12 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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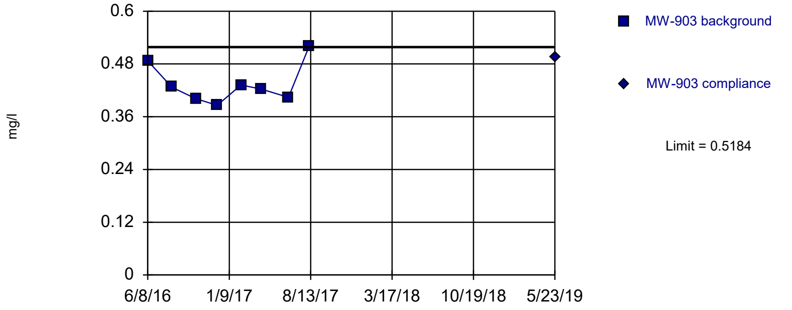
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=0.4351, Std. Dev.=0.04604, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8763, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: BORON Analysis Run 9/25/2019 12:12 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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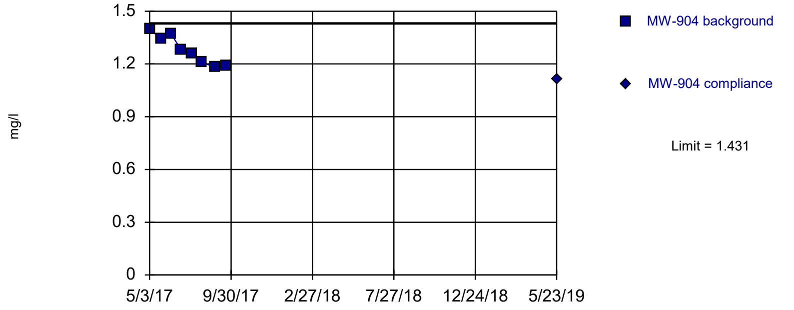
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=1.279, Std. Dev.=0.08408, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9243, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: BORON Analysis Run 9/25/2019 12:12 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

# Prediction Limit

Constituent: BORON (mg/l)  Analysis Run 9/25/2019 12:14 PM  View: Bottom Ash III

LaCygne  Client: SCS Engineers  Data: LaC GW Data

| | MW-901 | MW-901 |
|---|---|---|
| 6/8/2016 | 1.18 | |
| 8/11/2016 | 1.9 | |
| 10/14/2016 | 1.18 | |
| 12/12/2016 | 1.17 | |
| 2/9/2017 | 1.23 | |
| 4/4/2017 | 1.18 | |
| 6/16/2017 | 1.2 | |
| 8/11/2017 | 1.22 | |
| 5/23/2019 | | 1.18 |

# Prediction Limit

Constituent: BORON (mg/l)  Analysis Run 9/25/2019 12:14 PM  View: Bottom Ash III

LaCygne  Client: SCS Engineers  Data: LaC GW Data

---

| | MW-902 | MW-902 |
|---|---|---|
| 6/7/2016 | 1.2 | |
| 8/11/2016 | 1.2 | |
| 10/13/2016 | 1.26 | |
| 12/12/2016 | 1.22 | |
| 2/10/2017 | 1.31 | |
| 4/4/2017 | 1.24 | |
| 6/15/2017 | 1.25 | |
| 8/11/2017 | 1.31 | |
| 5/23/2019 | | 1.24 |

# Prediction Limit

Constituent: BORON (mg/l)    Analysis Run 9/25/2019 12:14 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

|  | MW-903 | MW-903 |
|---|---|---|
| 6/8/2016 | 0.487 |  |
| 8/11/2016 | 0.427 |  |
| 10/13/2016 | 0.401 |  |
| 12/9/2016 | 0.386 |  |
| 2/10/2017 | 0.432 |  |
| 4/4/2017 | 0.423 |  |
| 6/16/2017 | 0.404 |  |
| 8/10/2017 | 0.521 |  |
| 5/23/2019 |  | 0.494 |

# Prediction Limit

Constituent: BORON (mg/l)  Analysis Run 9/25/2019 12:14 PM  View: Bottom Ash III

LaCygne  Client: SCS Engineers  Data: LaC GW Data

| | MW-904 | MW-904 |
|---|---|---|
| 5/3/2017 | 1.4 | |
| 5/24/2017 | 1.34 | |
| 6/12/2017 | 1.37 | |
| 6/30/2017 | 1.28 | |
| 7/21/2017 | 1.26 | |
| 8/7/2017 | 1.21 | |
| 9/1/2017 | 1.18 | |
| 9/22/2017 | 1.19 | |
| 5/23/2019 | | 1.11 |

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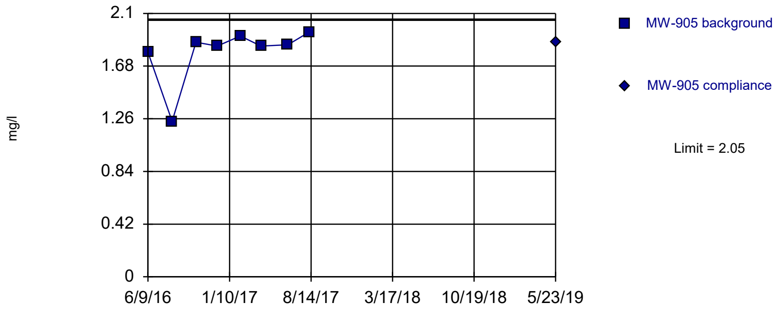
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary (based on x^4 transformation): Mean=10.94, Std. Dev.=3.707, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7543, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: BORON Analysis Run 9/25/2019 12:12 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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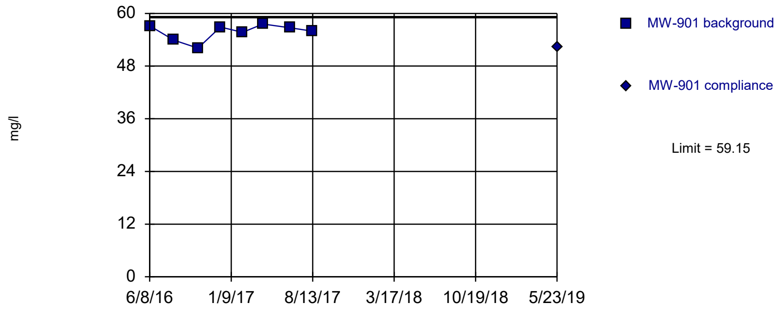
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=55.76, Std. Dev.=1.873, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8695, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: CALCIUM Analysis Run 9/25/2019 12:12 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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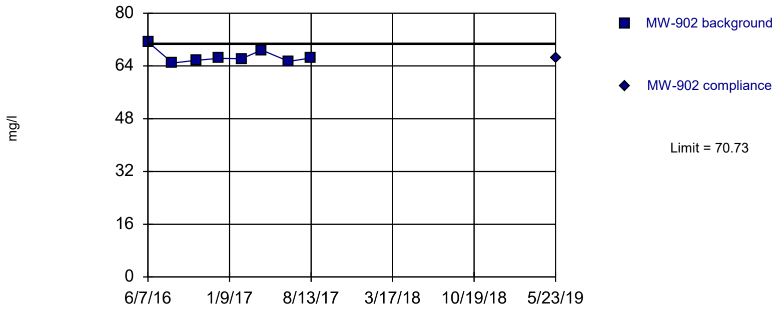
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=66.88, Std. Dev.=2.13, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8116, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: CALCIUM Analysis Run 9/25/2019 12:12 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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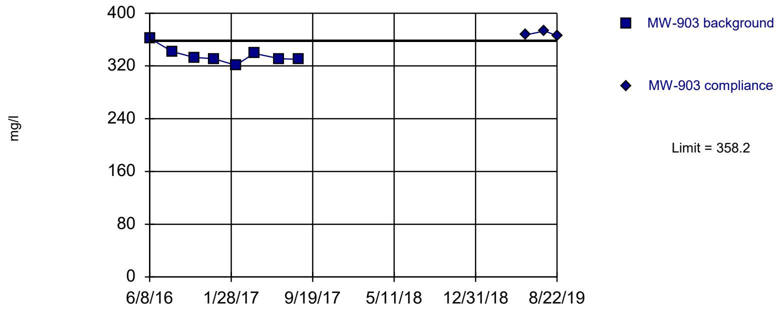
Exceeds Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=336.1, Std. Dev.=12.19, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8714, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: CALCIUM Analysis Run 9/25/2019 12:12 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

# Prediction Limit

Constituent: BORON (mg/l)    Analysis Run 9/25/2019 12:14 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

---

| | MW-905 | MW-905 |
|---|---|---|
| 6/9/2016 | 1.79 | |
| 8/12/2016 | 1.24 | |
| 10/14/2016 | 1.87 | |
| 12/9/2016 | 1.84 | |
| 2/8/2017 | 1.92 | |
| 4/4/2017 | 1.84 | |
| 6/14/2017 | 1.85 | |
| 8/9/2017 | 1.95 | |
| 5/23/2019 | | 1.87 |

# Prediction Limit

Constituent: CALCIUM (mg/l)    Analysis Run 9/25/2019 12:14 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

---

| | MW-901 | MW-901 |
|---|---|---|
| 6/8/2016 | 57.2 | |
| 8/11/2016 | 53.9 | |
| 10/14/2016 | 52.1 | |
| 12/12/2016 | 56.9 | |
| 2/9/2017 | 55.7 | |
| 4/4/2017 | 57.6 | |
| 6/16/2017 | 56.7 | |
| 8/11/2017 | 56 | |
| 5/23/2019 | | 52.3 |

# Prediction Limit

Constituent: CALCIUM (mg/l)  Analysis Run 9/25/2019 12:14 PM  View: Bottom Ash III

LaCygne  Client: SCS Engineers  Data: LaC GW Data

---

| | MW-902 | MW-902 |
|---|---|---|
| 6/7/2016 | 71.3 | |
| 8/11/2016 | 64.9 | |
| 10/13/2016 | 65.7 | |
| 12/12/2016 | 66.3 | |
| 2/10/2017 | 66.2 | |
| 4/4/2017 | 68.8 | |
| 6/15/2017 | 65.4 | |
| 8/11/2017 | 66.4 | |
| 5/23/2019 | | 66.5 |

# Prediction Limit

Constituent: CALCIUM (mg/l)    Analysis Run 9/25/2019 12:14 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

---

| | MW-903 | MW-903 | |
|---|---|---|---|
| 6/8/2016 | 362 | | |
| 8/11/2016 | 342 | | |
| 10/13/2016 | 333 | | |
| 12/9/2016 | 331 | | |
| 2/10/2017 | 321 | | |
| 4/4/2017 | 339 | | |
| 6/16/2017 | 331 | | |
| 8/10/2017 | 330 | | |
| 5/23/2019 | | 367 | |
| 7/17/2019 | | 373 | 1st verification sample |
| 8/22/2019 | | 366 | 2nd verification sample |

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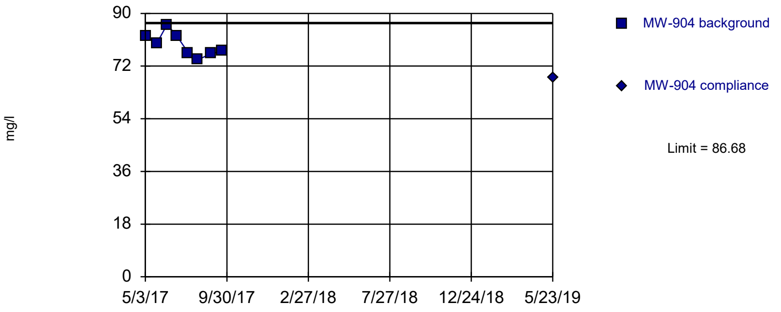
Within Limit

## Prediction Limit

### Intrawell Parametric



Background Data Summary: Mean=79.34, Std. Dev.=4.056, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9418, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: CALCIUM Analysis Run 9/25/2019 12:12 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

---

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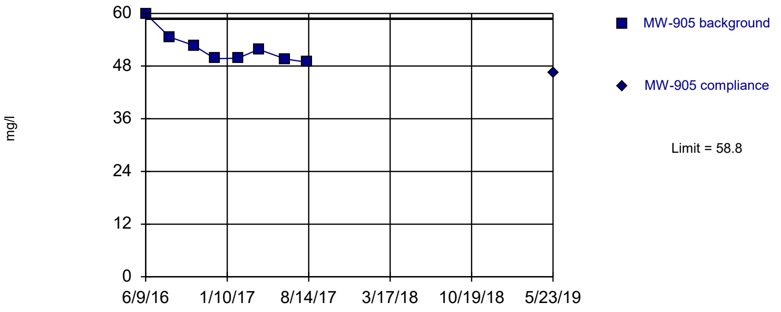
Within Limit

## Prediction Limit

### Intrawell Parametric



Background Data Summary: Mean=52.13, Std. Dev.=3.685, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8283, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: CALCIUM Analysis Run 9/25/2019 12:12 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

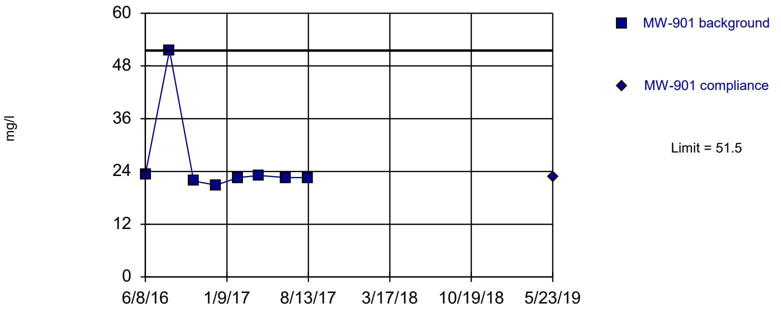
---

Sanitas™ v.9.6.23 Sanitas software licensed to SCS Engineers. UG

Within Limit

## Prediction Limit

### Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.01179. Individual comparison alpha = 0.005912 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: CHLORIDE Analysis Run 9/25/2019 12:12 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

---

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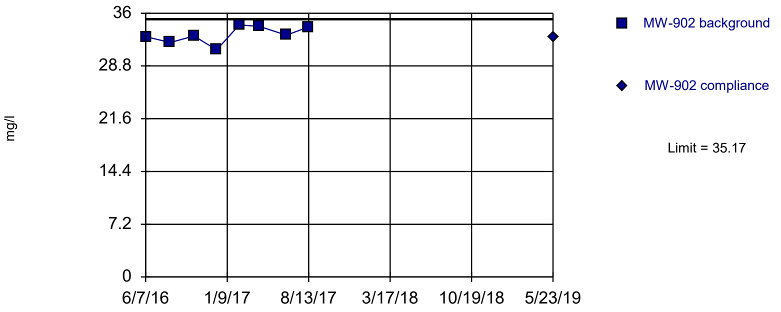
Within Limit

## Prediction Limit

### Intrawell Parametric



Background Data Summary: Mean=33.05, Std. Dev.=1.174, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9249, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: CHLORIDE Analysis Run 9/25/2019 12:12 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

# Prediction Limit

Constituent: CALCIUM (mg/l)  Analysis Run 9/25/2019 12:14 PM  View: Bottom Ash III

LaCygne  Client: SCS Engineers  Data: LaC GW Data

---

| | MW-904 | MW-904 |
|---|---|---|
| 5/3/2017 | 82.4 | |
| 5/24/2017 | 79.8 | |
| 6/12/2017 | 86.2 | |
| 6/30/2017 | 82.3 | |
| 7/21/2017 | 76.5 | |
| 8/7/2017 | 74.1 | |
| 9/1/2017 | 76.3 | |
| 9/22/2017 | 77.1 | |
| 5/23/2019 | | 68.2 |

# Prediction Limit

Constituent: CALCIUM (mg/l)    Analysis Run 9/25/2019 12:14 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

|  | MW-905 | MW-905 |
|---|---|---|
| 6/9/2016 | 59.9 |  |
| 8/12/2016 | 54.6 |  |
| 10/14/2016 | 52.7 |  |
| 12/9/2016 | 49.7 |  |
| 2/8/2017 | 49.8 |  |
| 4/4/2017 | 51.8 |  |
| 6/14/2017 | 49.6 |  |
| 8/9/2017 | 48.9 |  |
| 5/23/2019 |  | 46.4 |

# Prediction Limit

Constituent: CHLORIDE (mg/l)  Analysis Run 9/25/2019 12:14 PM  View: Bottom Ash III
LaCygne  Client: SCS Engineers  Data: LaC GW Data

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| | MW-901 | MW-901 |
|---|---|---|
| 6/8/2016 | 23.3 | |
| 8/11/2016 | 51.5 | |
| 10/14/2016 | 21.8 | |
| 12/12/2016 | 20.9 | |
| 2/9/2017 | 22.6 | |
| 4/4/2017 | 23.1 | |
| 6/16/2017 | 22.6 | |
| 8/11/2017 | 22.6 | |
| 5/23/2019 | | 22.8 |

# Prediction Limit

Constituent: CHLORIDE (mg/l)    Analysis Run 9/25/2019 12:14 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

| | MW-902 | MW-902 |
|---|---|---|
| 6/7/2016 | 32.8 | |
| 8/11/2016 | 32 | |
| 10/13/2016 | 32.9 | |
| 12/12/2016 | 31 | |
| 2/10/2017 | 34.4 | |
| 4/4/2017 | 34.2 | |
| 6/15/2017 | 33 | |
| 8/11/2017 | 34.1 | |
| 5/23/2019 | | 32.8 |

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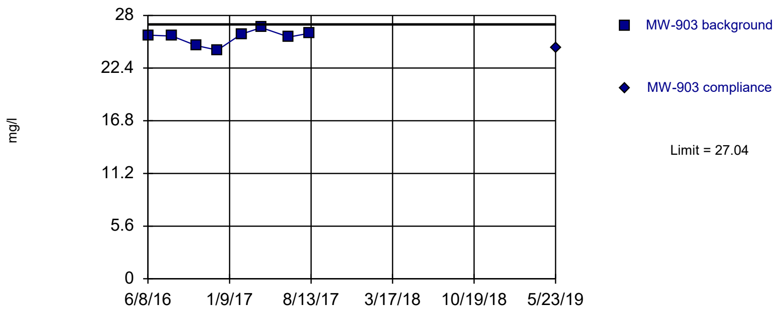
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=25.66, Std. Dev.=0.7615, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9099, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: CHLORIDE Analysis Run 9/25/2019 12:13 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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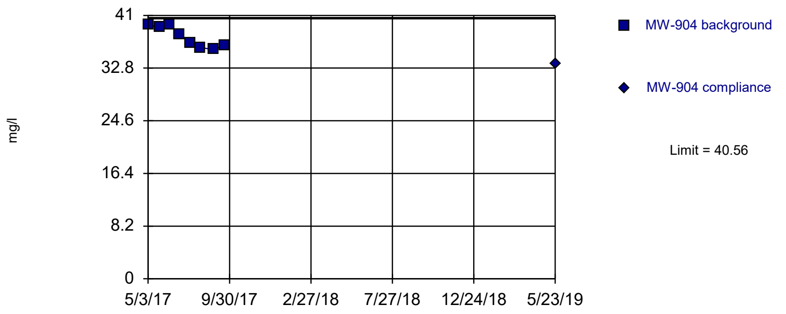
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=37.63, Std. Dev.=1.623, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8728, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: CHLORIDE Analysis Run 9/25/2019 12:13 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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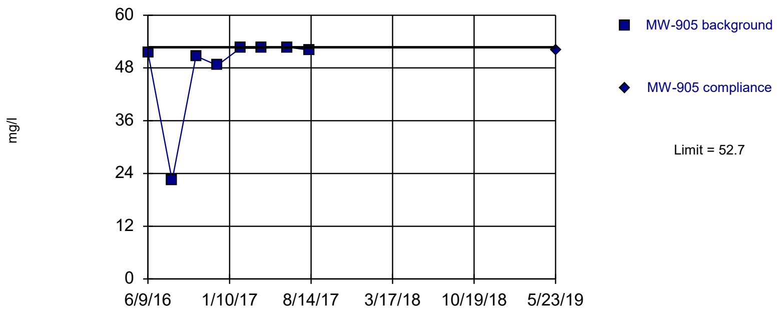
Within Limit

## Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.01179. Individual comparison alpha = 0.005912 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: CHLORIDE Analysis Run 9/25/2019 12:13 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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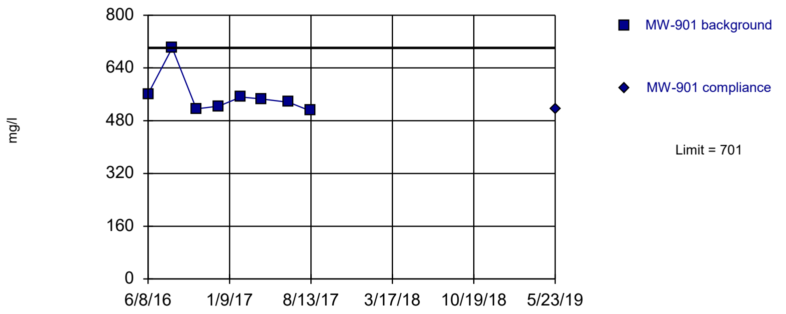
Within Limit

## Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.01179. Individual comparison alpha = 0.005912 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: DISSOLVED SOLIDS Analysis Run 9/25/2019 12:13 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

# Prediction Limit

Constituent: CHLORIDE (mg/l)    Analysis Run 9/25/2019 12:14 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

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| | MW-903 | MW-903 |
|---|---|---|
| 6/8/2016 | 25.9 | |
| 8/11/2016 | 25.8 | |
| 10/13/2016 | 24.8 | |
| 12/9/2016 | 24.3 | |
| 2/10/2017 | 26 | |
| 4/4/2017 | 26.7 | |
| 6/16/2017 | 25.7 | |
| 8/10/2017 | 26.1 | |
| 5/23/2019 | | 24.5 |

# Prediction Limit

Constituent: CHLORIDE (mg/l)    Analysis Run 9/25/2019 12:14 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

---

| | MW-904 | MW-904 |
|---|---|---|
| 5/3/2017 | 39.6 | |
| 5/24/2017 | 39.1 | |
| 6/12/2017 | 39.5 | |
| 6/30/2017 | 38 | |
| 7/21/2017 | 36.7 | |
| 8/7/2017 | 36 | |
| 9/1/2017 | 35.7 | |
| 9/22/2017 | 36.4 | |
| 5/23/2019 | | 33.4 |

# Prediction Limit

Constituent: CHLORIDE (mg/l) Analysis Run 9/25/2019 12:14 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

|  | MW-905 | MW-905 |
|---|---|---|
| 6/9/2016 | 51.5 |  |
| 8/12/2016 | 22.4 |  |
| 10/14/2016 | 50.7 |  |
| 12/9/2016 | 48.6 |  |
| 2/8/2017 | 52.5 |  |
| 4/4/2017 | 52.5 |  |
| 6/14/2017 | 52.7 |  |
| 8/9/2017 | 52.1 |  |
| 5/23/2019 |  | 52 |

# Prediction Limit

Constituent: DISSOLVED SOLIDS (mg/l) Analysis Run 9/25/2019 12:14 PM View: Bottom Ash III

LaCygne Client: SCS Engineers Data: LaC GW Data

| | MW-901 | MW-901 |
|---|---|---|
| 6/8/2016 | 561 | |
| 8/11/2016 | 701 | |
| 10/14/2016 | 516 | |
| 12/12/2016 | 524 | |
| 2/9/2017 | 552 | |
| 4/4/2017 | 546 | |
| 6/16/2017 | 536 | |
| 8/11/2017 | 510 | |
| 5/23/2019 | | 514 |

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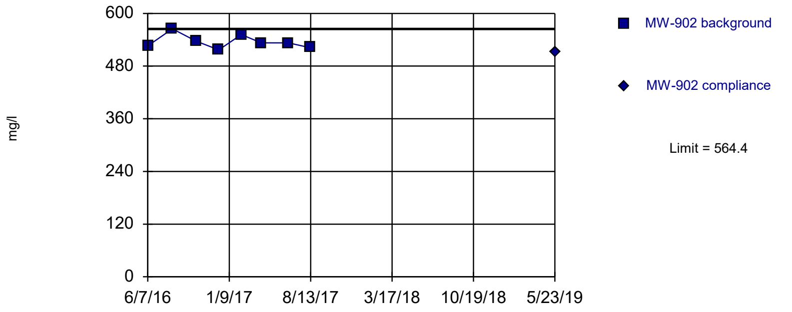
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=535.6, Std. Dev.=15.91, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9238, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: DISSOLVED SOLIDS Analysis Run 9/25/2019 12:13 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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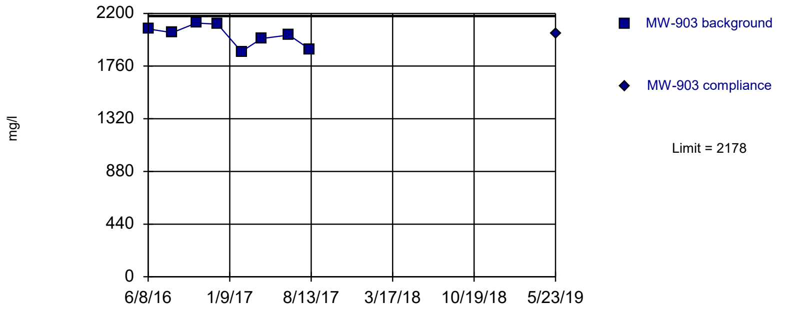
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=2016, Std. Dev.=89.27, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9217, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: DISSOLVED SOLIDS Analysis Run 9/25/2019 12:13 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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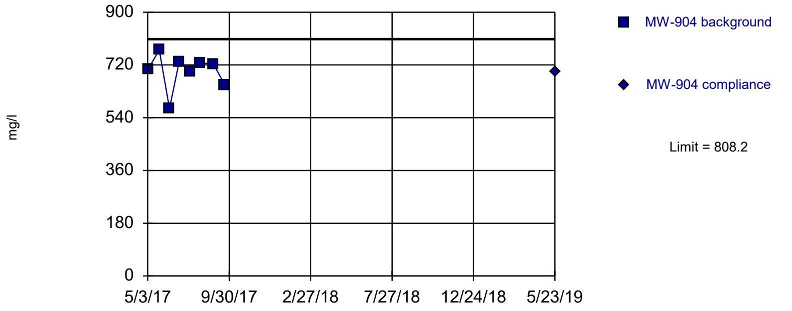
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=697.3, Std. Dev.=61.28, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8884, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: DISSOLVED SOLIDS Analysis Run 9/25/2019 12:13 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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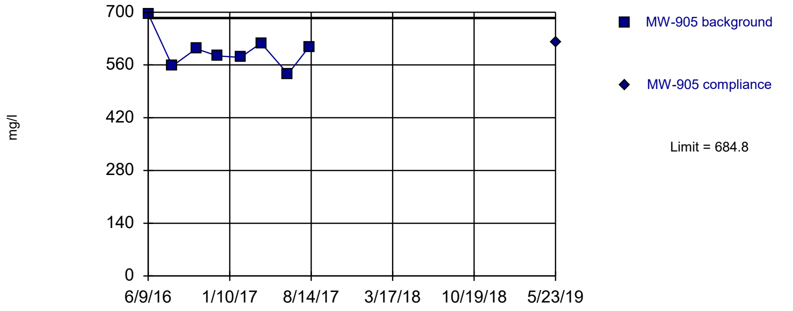
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=597.8, Std. Dev.=48.07, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9215, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: DISSOLVED SOLIDS Analysis Run 9/25/2019 12:13 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

# Prediction Limit

Constituent: DISSOLVED SOLIDS (mg/l)    Analysis Run 9/25/2019 12:14 PM    View: Bottom Ash III
LaCygne    Client: SCS Engineers    Data: LaC GW Data

---

| | MW-902 | MW-902 |
|---|---|---|
| 6/7/2016 | 526 | |
| 8/11/2016 | 565 | |
| 10/13/2016 | 537 | |
| 12/12/2016 | 517 | |
| 2/10/2017 | 552 | |
| 4/4/2017 | 533 | |
| 6/15/2017 | 533 | |
| 8/11/2017 | 522 | |
| 5/23/2019 | | 511 |

# Prediction Limit

Constituent: DISSOLVED SOLIDS (mg/l)    Analysis Run 9/25/2019 12:14 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

|  | MW-903 | MW-903 |
|---|---|---|
| 6/8/2016 | 2070 |  |
| 8/11/2016 | 2040 |  |
| 10/13/2016 | 2120 |  |
| 12/9/2016 | 2110 |  |
| 2/10/2017 | 1880 |  |
| 4/4/2017 | 1990 |  |
| 6/16/2017 | 2020 |  |
| 8/10/2017 | 1900 |  |
| 5/23/2019 |  | 2030 |

# Prediction Limit

Constituent: DISSOLVED SOLIDS (mg/l)    Analysis Run 9/25/2019 12:14 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

|  | MW-904 | MW-904 |
|---|---|---|
| 5/3/2017 | 704 |  |
| 5/24/2017 | 771 |  |
| 6/12/2017 | 571 |  |
| 6/30/2017 | 732 |  |
| 7/21/2017 | 697 |  |
| 8/7/2017 | 728 |  |
| 9/1/2017 | 723 |  |
| 9/22/2017 | 652 |  |
| 5/23/2019 |  | 696 |

# Prediction Limit

Constituent: DISSOLVED SOLIDS (mg/l)    Analysis Run 9/25/2019 12:14 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

---

| | MW-905 | MW-905 |
|---|---|---|
| 6/9/2016 | 696 | |
| 8/12/2016 | 557 | |
| 10/14/2016 | 603 | |
| 12/9/2016 | 584 | |
| 2/8/2017 | 580 | |
| 4/4/2017 | 618 | |
| 6/14/2017 | 536 | |
| 8/9/2017 | 608 | |
| 5/23/2019 | | 621 |

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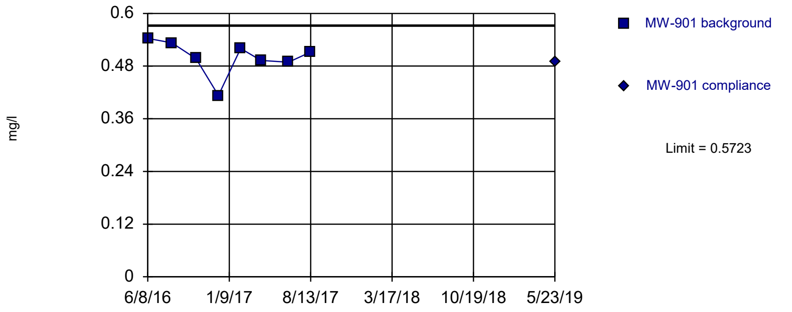
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=0.4999, Std. Dev.=0.04001, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8585, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: FLUORIDE Analysis Run 9/25/2019 12:13 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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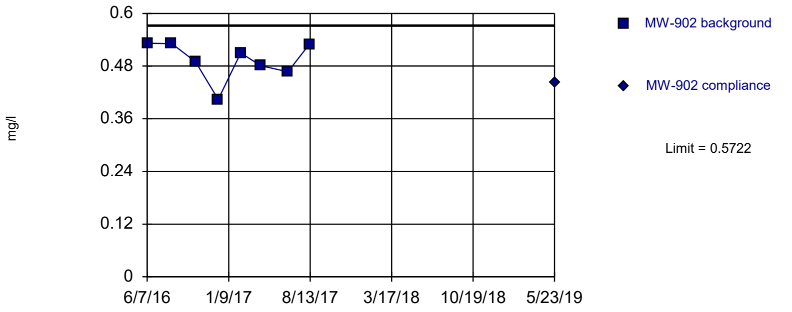
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=0.4931, Std. Dev.=0.04371, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8622, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: FLUORIDE Analysis Run 9/25/2019 12:13 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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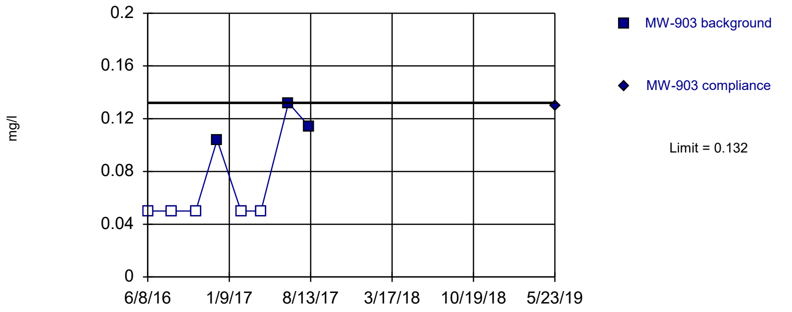
Hollow symbols indicate censored values.

Within Limit

## Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 8 background values. 62.5% NDs. Well-constituent pair annual alpha = 0.01179. Individual comparison alpha = 0.005912 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: FLUORIDE Analysis Run 9/25/2019 12:13 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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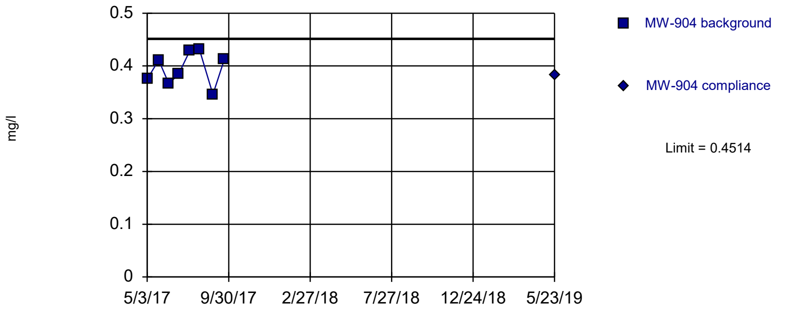
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=0.3946, Std. Dev.=0.03135, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.935, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: FLUORIDE Analysis Run 9/25/2019 12:13 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

# Prediction Limit

Constituent: FLUORIDE (mg/l)    Analysis Run 9/25/2019 12:14 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

---

|  | MW-901 | MW-901 |
|---|---|---|
| 6/8/2016 | 0.543 |  |
| 8/11/2016 | 0.533 |  |
| 10/14/2016 | 0.497 |  |
| 12/12/2016 | 0.413 |  |
| 2/9/2017 | 0.52 |  |
| 4/4/2017 | 0.493 |  |
| 6/16/2017 | 0.489 |  |
| 8/11/2017 | 0.511 |  |
| 5/23/2019 |  | 0.489 |

# Prediction Limit

Constituent: FLUORIDE (mg/l)    Analysis Run 9/25/2019 12:14 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

---

| | MW-902 | MW-902 |
|---|---|---|
| 6/7/2016 | 0.532 | |
| 8/11/2016 | 0.531 | |
| 10/13/2016 | 0.49 | |
| 12/12/2016 | 0.404 | |
| 2/10/2017 | 0.51 | |
| 4/4/2017 | 0.481 | |
| 6/15/2017 | 0.467 | |
| 8/11/2017 | 0.53 | |
| 5/23/2019 | | 0.441 |

# Prediction Limit

Constituent: FLUORIDE (mg/l)    Analysis Run 9/25/2019 12:14 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

---

| | MW-903 | MW-903 |
|---|---|---|
| 6/8/2016 | <0.1 | |
| 8/11/2016 | <0.1 | |
| 10/13/2016 | <0.1 | |
| 12/9/2016 | 0.104 | |
| 2/10/2017 | <0.1 | |
| 4/4/2017 | <0.1 | |
| 6/16/2017 | 0.132 | |
| 8/10/2017 | 0.114 | |
| 5/23/2019 | | 0.13 |

# Prediction Limit

Constituent: FLUORIDE (mg/l)    Analysis Run 9/25/2019 12:14 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

|  | MW-904 | MW-904 |
|---|---|---|
| 5/3/2017 | 0.375 |  |
| 5/24/2017 | 0.411 |  |
| 6/12/2017 | 0.366 |  |
| 6/30/2017 | 0.385 |  |
| 7/21/2017 | 0.43 |  |
| 8/7/2017 | 0.432 |  |
| 9/1/2017 | 0.346 |  |
| 9/22/2017 | 0.412 |  |
| 5/23/2019 |  | 0.382 |

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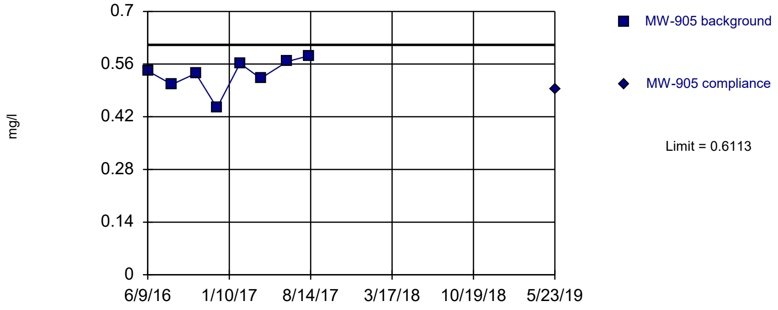
Within Limit

## Prediction Limit

### Intrawell Parametric



Background Data Summary: Mean=0.5325, Std. Dev.=0.04351, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9161, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: FLUORIDE Analysis Run 9/25/2019 12:13 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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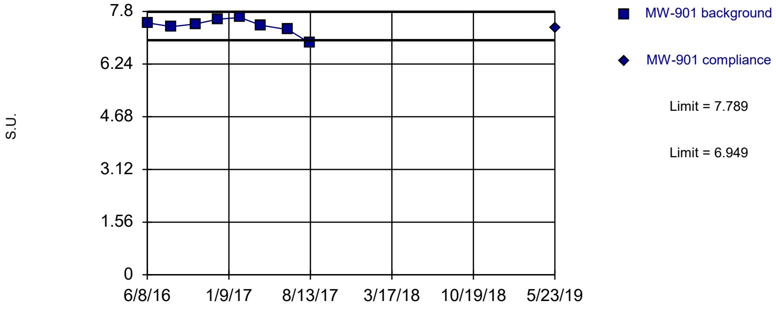
Within Limits

## Prediction Limit

### Intrawell Parametric



Background Data Summary: Mean=7.369, Std. Dev.=0.2321, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8719, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: pH Analysis Run 9/25/2019 12:13 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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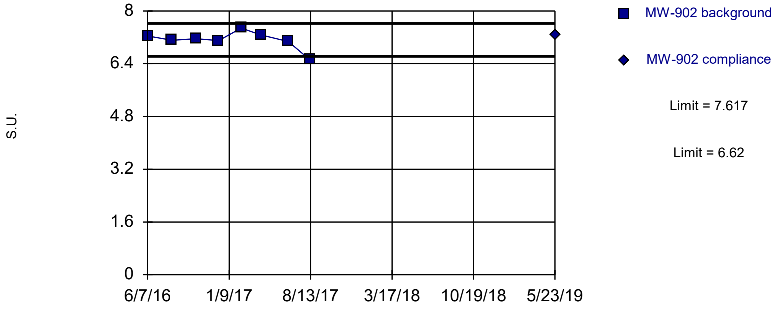
Within Limits

## Prediction Limit

### Intrawell Parametric



Background Data Summary: Mean=7.119, Std. Dev.=0.2754, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.849, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: pH Analysis Run 9/25/2019 12:13 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

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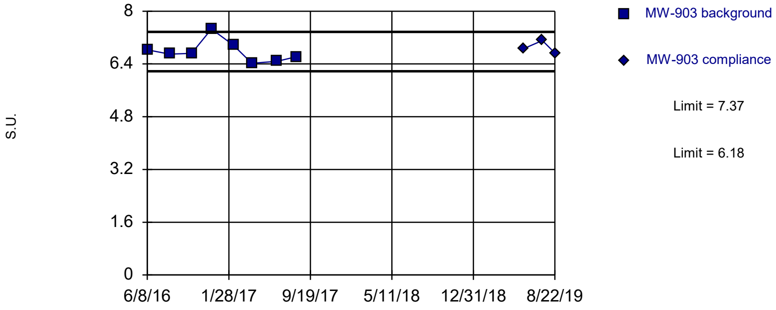
Within Limits

## Prediction Limit

### Intrawell Parametric



Background Data Summary: Mean=6.775, Std. Dev.=0.3286, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8941, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: pH Analysis Run 9/25/2019 12:13 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

# Prediction Limit

Constituent: FLUORIDE (mg/l)    Analysis Run 9/25/2019 12:14 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

| | MW-905 | MW-905 |
|---|---|---|
| 6/9/2016 | 0.542 | |
| 8/12/2016 | 0.506 | |
| 10/14/2016 | 0.535 | |
| 12/9/2016 | 0.444 | |
| 2/8/2017 | 0.562 | |
| 4/4/2017 | 0.522 | |
| 6/14/2017 | 0.567 | |
| 8/9/2017 | 0.582 | |
| 5/23/2019 | | 0.494 |

# Prediction Limit

Constituent: pH (S.U.)  Analysis Run 9/25/2019 12:14 PM  View: Bottom Ash III

LaCygne  Client: SCS Engineers  Data: LaC GW Data

---

| | MW-901 | MW-901 |
|---|---|---|
| 6/8/2016 | 7.46 | |
| 8/11/2016 | 7.35 | |
| 10/14/2016 | 7.43 | |
| 12/12/2016 | 7.57 | |
| 2/9/2017 | 7.62 | |
| 4/4/2017 | 7.39 | |
| 6/16/2017 | 7.26 | |
| 8/11/2017 | 6.87 | |
| 5/23/2019 | | 7.31 |

# Prediction Limit

Constituent: pH (S.U.)    Analysis Run 9/25/2019 12:14 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

---

| | MW-902 | MW-902 |
|---|---|---|
| 6/7/2016 | 7.24 | |
| 8/11/2016 | 7.11 | |
| 10/13/2016 | 7.16 | |
| 12/12/2016 | 7.1 | |
| 2/10/2017 | 7.48 | |
| 4/4/2017 | 7.27 | |
| 6/15/2017 | 7.07 | |
| 8/11/2017 | 6.52 | |
| 5/23/2019 | | 7.26 |

# Prediction Limit

Constituent: pH (S.U.) Analysis Run 9/25/2019 12:14 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

---

| | MW-903 | MW-903 | |
|---|---|---|---|
| 6/8/2016 | 6.83 | | |
| 8/11/2016 | 6.7 | | |
| 10/13/2016 | 6.72 | | |
| 12/9/2016 | 7.46 | | |
| 2/10/2017 | 6.97 | | |
| 4/4/2017 | 6.42 | | |
| 6/15/2017 | 6.48 | | |
| 8/10/2017 | 6.62 | | |
| 5/23/2019 | | 6.86 | |
| 7/17/2019 | | 7.11 | extra sample |
| 8/22/2019 | | 6.73 | extra sample |

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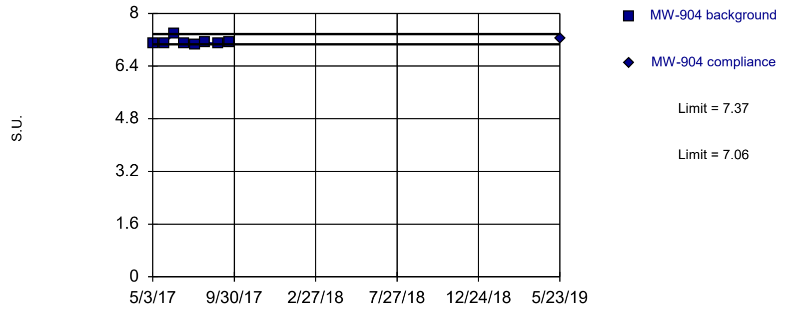
Within Limits

## Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limits are highest and lowest of 8 background values. Well-constituent pair annual alpha = 0.02358. Individual comparison alpha = 0.01182 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: pH Analysis Run 9/25/2019 12:13 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

---

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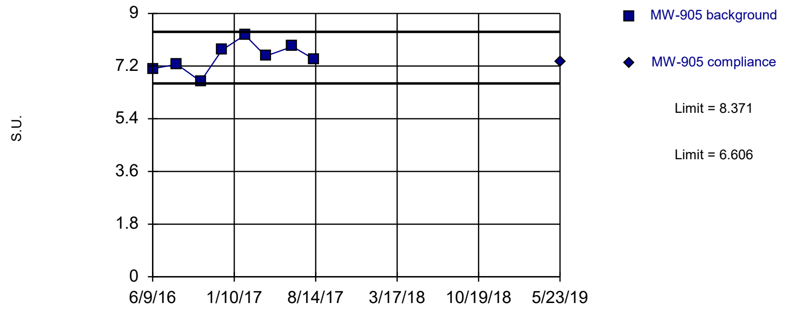
Within Limits

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=7.489, Std. Dev.=0.4875, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9969, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: pH Analysis Run 9/25/2019 12:13 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

---

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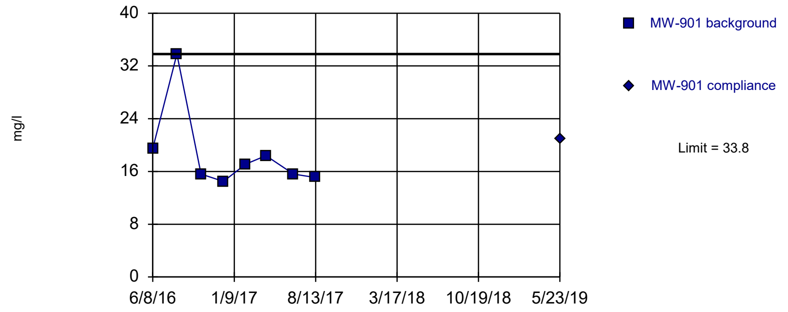
Within Limit

## Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.01179. Individual comparison alpha = 0.005912 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: SULFATE Analysis Run 9/25/2019 12:13 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

---

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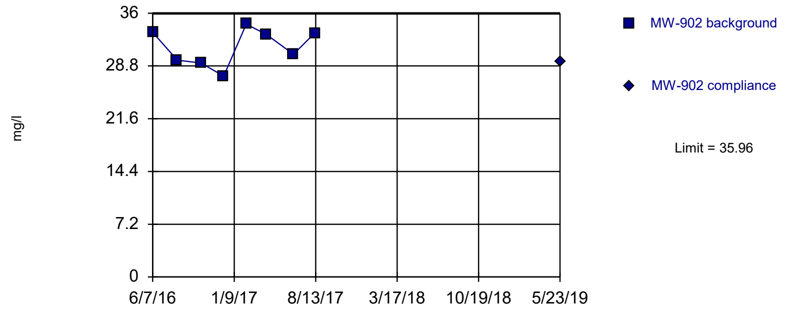
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=31.36, Std. Dev.=2.54, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9129, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: SULFATE Analysis Run 9/25/2019 12:13 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

# Prediction Limit

Constituent: pH (S.U.)  Analysis Run 9/25/2019 12:14 PM  View: Bottom Ash III
LaCygne  Client: SCS Engineers  Data: LaC GW Data

| | MW-904 | MW-904 |
|---|---|---|
| 5/3/2017 | 7.09 | |
| 5/24/2017 | 7.08 | |
| 6/12/2017 | 7.37 | |
| 6/30/2017 | 7.07 | |
| 7/21/2017 | 7.06 | |
| 8/7/2017 | 7.13 | |
| 9/1/2017 | 7.08 | |
| 9/22/2017 | 7.11 | |
| 5/23/2019 | | 7.23 |

# Prediction Limit

Constituent: pH (S.U.)    Analysis Run 9/25/2019 12:14 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

|  | MW-905 | MW-905 |
|---|---|---|
| 6/9/2016 | 7.11 |  |
| 8/12/2016 | 7.26 |  |
| 10/14/2016 | 6.68 |  |
| 12/9/2016 | 7.75 |  |
| 2/8/2017 | 8.26 |  |
| 4/4/2017 | 7.54 |  |
| 6/14/2017 | 7.87 |  |
| 8/9/2017 | 7.44 |  |
| 5/23/2019 |  | 7.36 |

# Prediction Limit

Constituent: SULFATE (mg/l)    Analysis Run 9/25/2019 12:14 PM    View: Bottom Ash III

LaCygne    Client: SCS Engineers    Data: LaC GW Data

| | MW-901 | MW-901 |
|---|---|---|
| 6/8/2016 | 19.5 | |
| 8/11/2016 | 33.8 | |
| 10/14/2016 | 15.6 | |
| 12/12/2016 | 14.5 | |
| 2/9/2017 | 17.1 | |
| 4/4/2017 | 18.4 | |
| 6/16/2017 | 15.6 | |
| 8/11/2017 | 15.1 | |
| 5/23/2019 | | 21 |

# Prediction Limit

Constituent: SULFATE (mg/l)  Analysis Run 9/25/2019 12:14 PM  View: Bottom Ash III

LaCygne  Client: SCS Engineers  Data: LaC GW Data

---

| | MW-902 | MW-902 |
|---|---|---|
| 6/7/2016 | 33.4 | |
| 8/11/2016 | 29.6 | |
| 10/13/2016 | 29.2 | |
| 12/12/2016 | 27.4 | |
| 2/10/2017 | 34.5 | |
| 4/4/2017 | 33.1 | |
| 6/15/2017 | 30.4 | |
| 8/11/2017 | 33.3 | |
| 5/23/2019 | | 29.4 |

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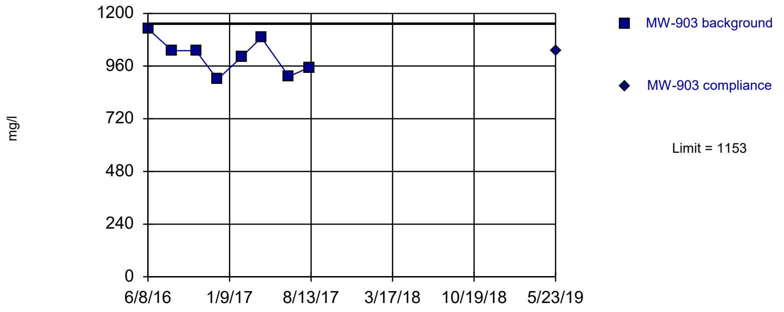
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=1006, Std. Dev.=81.43, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9566, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: SULFATE Analysis Run 9/25/2019 12:13 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

---

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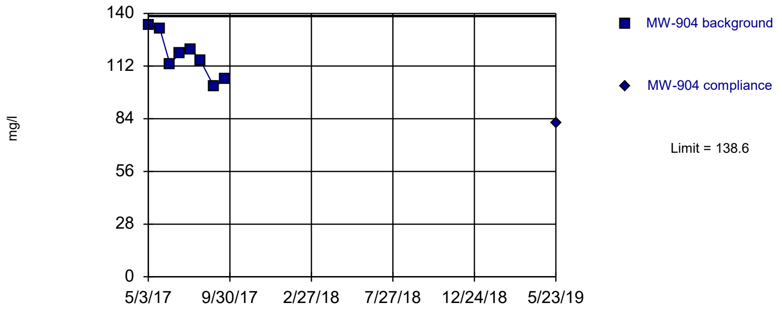
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=117.5, Std. Dev.=11.66, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9538, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: SULFATE Analysis Run 9/25/2019 12:13 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

---

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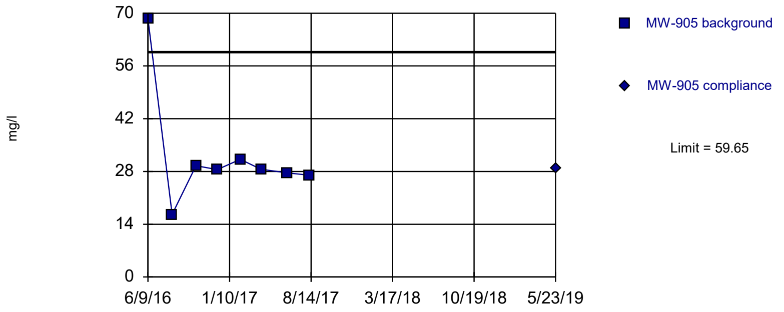
Within Limit

## Prediction Limit

Intrawell Parametric



Background Data Summary (based on cube root transformation): Mean=3.127, Std. Dev.=0.4312, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7552, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.05132). Report alpha = 0.00188.

Constituent: SULFATE Analysis Run 9/25/2019 12:13 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

# Prediction Limit

Constituent: SULFATE (mg/l) Analysis Run 9/25/2019 12:14 PM View: Bottom Ash III
LaCygne Client: SCS Engineers Data: LaC GW Data

|  | MW-903 | MW-903 |
|---|---|---|
| 6/8/2016 | 1130 |  |
| 8/11/2016 | 1030 |  |
| 10/13/2016 | 1030 |  |
| 12/9/2016 | 899 |  |
| 2/10/2017 | 1000 |  |
| 4/4/2017 | 1090 |  |
| 6/16/2017 | 913 |  |
| 8/10/2017 | 954 |  |
| 5/23/2019 |  | 1030 |

# Prediction Limit

Constituent: SULFATE (mg/l) Analysis Run 9/25/2019 12:14 PM View: Bottom Ash III

LaCygne Client: SCS Engineers Data: LaC GW Data

|  | MW-904 | MW-904 |
|---|---|---|
| 5/3/2017 | 134 |  |
| 5/24/2017 | 132 |  |
| 6/12/2017 | 113 |  |
| 6/30/2017 | 119 |  |
| 7/21/2017 | 121 |  |
| 8/7/2017 | 115 |  |
| 9/1/2017 | 101 |  |
| 9/22/2017 | 105 |  |
| 5/23/2019 |  | 81.7 |

# Prediction Limit

Constituent: SULFATE (mg/l) Analysis Run 9/25/2019 12:14 PM View: Bottom Ash III

LaCygne Client: SCS Engineers Data: LaC GW Data

| | MW-905 | MW-905 |
|---|---|---|
| 6/9/2016 | 68.5 | |
| 8/12/2016 | 16.6 | |
| 10/14/2016 | 29.5 | |
| 12/9/2016 | 28.5 | |
| 2/8/2017 | 31.2 | |
| 4/4/2017 | 28.6 | |
| 6/14/2017 | 27.6 | |
| 8/9/2017 | 27 | |
| 5/23/2019 | | 28.7 |

# Prediction Limit

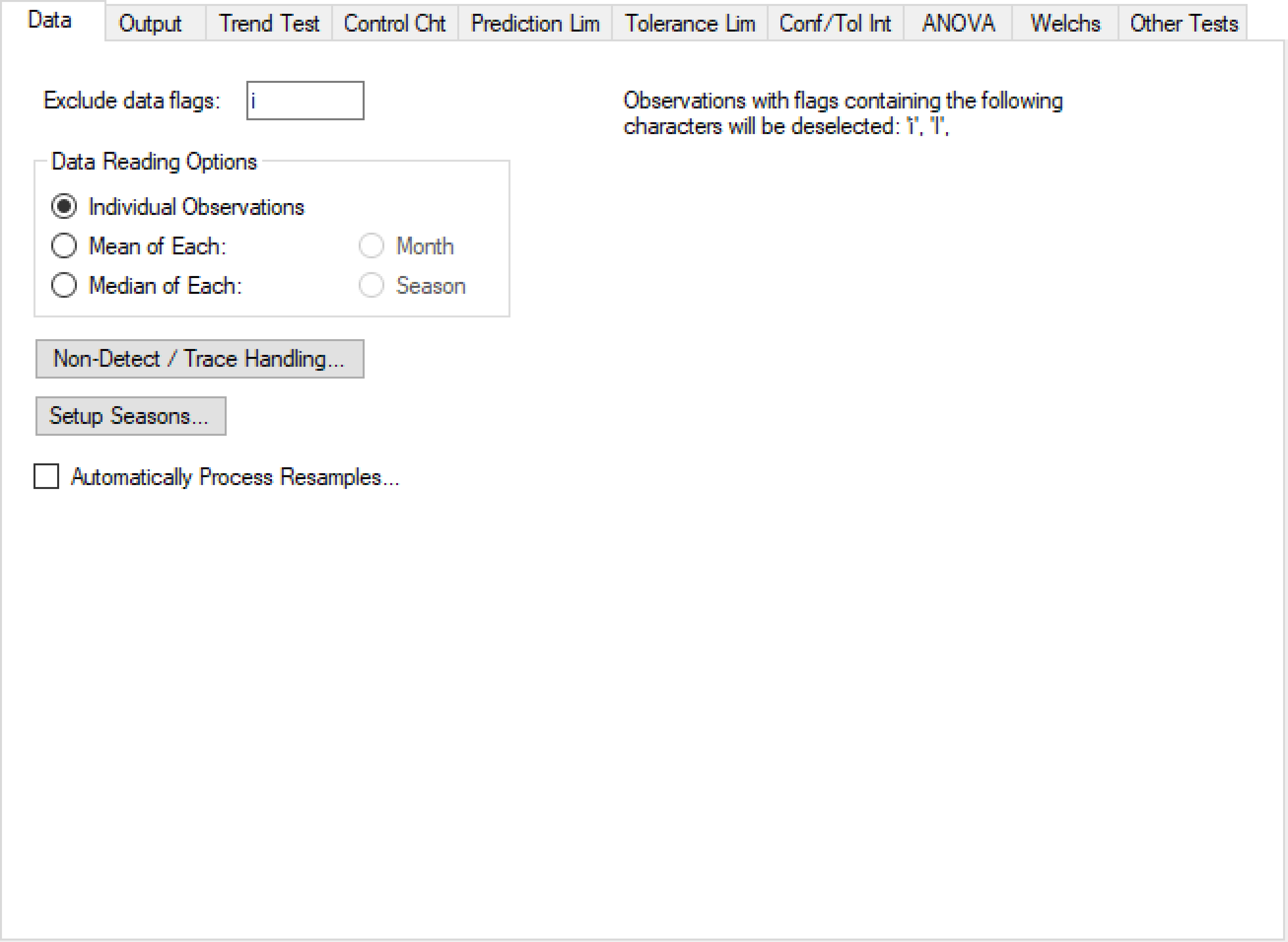
LaCygne Client: SCS Engineers Data: LaC GW Data Printed 9/25/2019, 12:14 PM

| Constituent | Well | Upper Lim. | Lower Lim. | Date | Observ. | Sig. | Bg N | %NDs | Transform | Alpha | Method |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BORON (mg/l) | MW-901 | 1.9 | n/a | 5/23/2019 | 1.18 | No | 8 | 0 | n/a | 0.005912 | NP Intra (normality) ... |
| BORON (mg/l) | MW-902 | 1.328 | n/a | 5/23/2019 | 1.24 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| BORON (mg/l) | MW-903 | 0.5184 | n/a | 5/23/2019 | 0.494 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| BORON (mg/l) | MW-904 | 1.431 | n/a | 5/23/2019 | 1.11 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| BORON (mg/l) | MW-905 | 2.05 | n/a | 5/23/2019 | 1.87 | No | 8 | 0 | x^4 | 0.00188 | Param Intra 1 of 3 |
| CALCIUM (mg/l) | MW-901 | 59.15 | n/a | 5/23/2019 | 52.3 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| CALCIUM (mg/l) | MW-902 | 70.73 | n/a | 5/23/2019 | 66.5 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| **CALCIUM (mg/l)** | **MW-903** | **358.2** | **n/a** | **8/22/2019** | **366** | **Yes** | **8** | **0** | **No** | **0.00188** | **Param Intra 1 of 3** |
| CALCIUM (mg/l) | MW-904 | 86.68 | n/a | 5/23/2019 | 68.2 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| CALCIUM (mg/l) | MW-905 | 58.8 | n/a | 5/23/2019 | 46.4 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| CHLORIDE (mg/l) | MW-901 | 51.5 | n/a | 5/23/2019 | 22.8 | No | 8 | 0 | n/a | 0.005912 | NP Intra (normality) ... |
| CHLORIDE (mg/l) | MW-902 | 35.17 | n/a | 5/23/2019 | 32.8 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| CHLORIDE (mg/l) | MW-903 | 27.04 | n/a | 5/23/2019 | 24.5 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| CHLORIDE (mg/l) | MW-904 | 40.56 | n/a | 5/23/2019 | 33.4 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| CHLORIDE (mg/l) | MW-905 | 52.7 | n/a | 5/23/2019 | 52 | No | 8 | 0 | n/a | 0.005912 | NP Intra (normality) ... |
| DISSOLVED SOLIDS (mg/l) | MW-901 | 701 | n/a | 5/23/2019 | 514 | No | 8 | 0 | n/a | 0.005912 | NP Intra (normality) ... |
| DISSOLVED SOLIDS (mg/l) | MW-902 | 564.4 | n/a | 5/23/2019 | 511 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| DISSOLVED SOLIDS (mg/l) | MW-903 | 2178 | n/a | 5/23/2019 | 2030 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| DISSOLVED SOLIDS (mg/l) | MW-904 | 808.2 | n/a | 5/23/2019 | 696 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| DISSOLVED SOLIDS (mg/l) | MW-905 | 684.8 | n/a | 5/23/2019 | 621 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| FLUORIDE (mg/l) | MW-901 | 0.5723 | n/a | 5/23/2019 | 0.489 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| FLUORIDE (mg/l) | MW-902 | 0.5722 | n/a | 5/23/2019 | 0.441 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| FLUORIDE (mg/l) | MW-903 | 0.132 | n/a | 5/23/2019 | 0.13 | No | 8 | 62.5 | n/a | 0.005912 | NP Intra (NDs) 1 of 3 |
| FLUORIDE (mg/l) | MW-904 | 0.4514 | n/a | 5/23/2019 | 0.382 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| FLUORIDE (mg/l) | MW-905 | 0.6113 | n/a | 5/23/2019 | 0.494 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| pH (S.U.) | MW-901 | 7.789 | 6.949 | 5/23/2019 | 7.31 | No | 8 | 0 | No | 0.000... | Param Intra 1 of 3 |
| pH (S.U.) | MW-902 | 7.617 | 6.62 | 5/23/2019 | 7.26 | No | 8 | 0 | No | 0.000... | Param Intra 1 of 3 |
| pH (S.U.) | MW-903 | 7.37 | 6.18 | 8/22/2019 | 6.73 | No | 8 | 0 | No | 0.000... | Param Intra 1 of 3 |
| pH (S.U.) | MW-904 | 7.37 | 7.06 | 5/23/2019 | 7.23 | No | 8 | 0 | n/a | 0.01182 | NP Intra (normality) ... |
| pH (S.U.) | MW-905 | 8.371 | 6.606 | 5/23/2019 | 7.36 | No | 8 | 0 | No | 0.000... | Param Intra 1 of 3 |
| SULFATE (mg/l) | MW-901 | 33.8 | n/a | 5/23/2019 | 21 | No | 8 | 0 | n/a | 0.005912 | NP Intra (normality) ... |
| SULFATE (mg/l) | MW-902 | 35.96 | n/a | 5/23/2019 | 29.4 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| SULFATE (mg/l) | MW-903 | 1153 | n/a | 5/23/2019 | 1030 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| SULFATE (mg/l) | MW-904 | 138.6 | n/a | 5/23/2019 | 81.7 | No | 8 | 0 | No | 0.00188 | Param Intra 1 of 3 |
| SULFATE (mg/l) | MW-905 | 59.65 | n/a | 5/23/2019 | 28.7 | No | 8 | 0 | x^(1/3) | 0.00188 | Param Intra 1 of 3 |

La Cygne Generating Station
Determination of Statistically Significant Increases
Bottom Ash Impoundment
October 1, 2019

# ATTACHMENT 2

## Sanitas<sup>TM</sup> Configuration Settings



Exclude data flags: i

Observations with flags containing the following characters will be deselected: 'i', 'I',

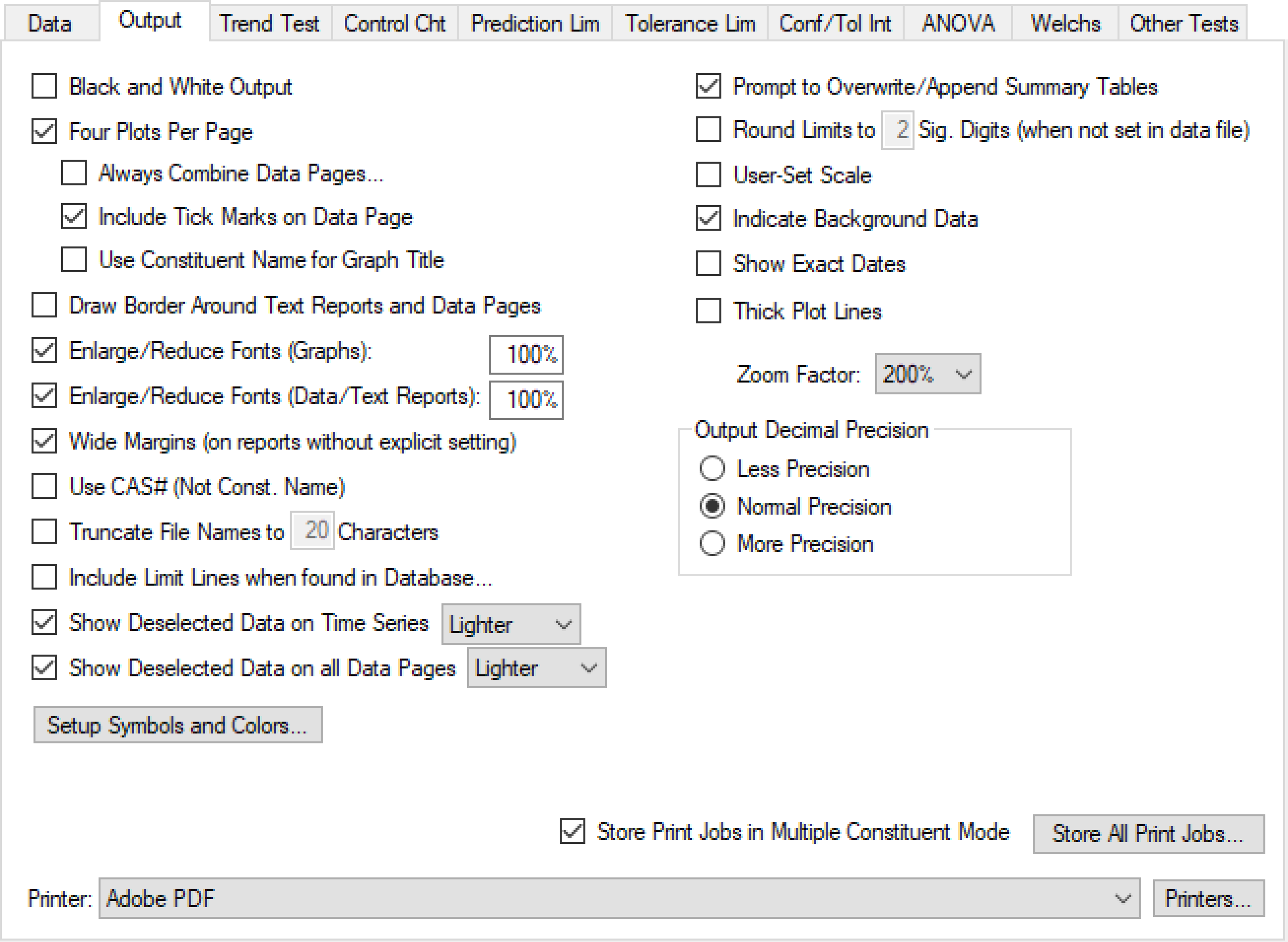
Data Reading Options

● Individual Observations

○ Mean of Each: ○ Month

○ Median of Each: ○ Season

☐ Automatically Process Resamples...



☐ Black and White Output

☑ Four Plots Per Page

  ☐ Always Combine Data Pages...

  ☑ Include Tick Marks on Data Page

  ☐ Use Constituent Name for Graph Title

☐ Draw Border Around Text Reports and Data Pages

☑ Enlarge/Reduce Fonts (Graphs): 100%

☑ Enlarge/Reduce Fonts (Data/Text Reports): 100%

☑ Wide Margins (on reports without explicit setting)

☐ Use CAS# (Not Const. Name)

☐ Truncate File Names to 20 Characters

☐ Include Limit Lines when found in Database...

☑ Show Deselected Data on Time Series: Lighter

☑ Show Deselected Data on all Data Pages: Lighter

☑ Prompt to Overwrite/Append Summary Tables

☐ Round Limits to 2 Sig. Digits (when not set in data file)

☐ User-Set Scale

☑ Indicate Background Data

☐ Show Exact Dates

☐ Thick Plot Lines

Zoom Factor: 200%

Output Decimal Precision

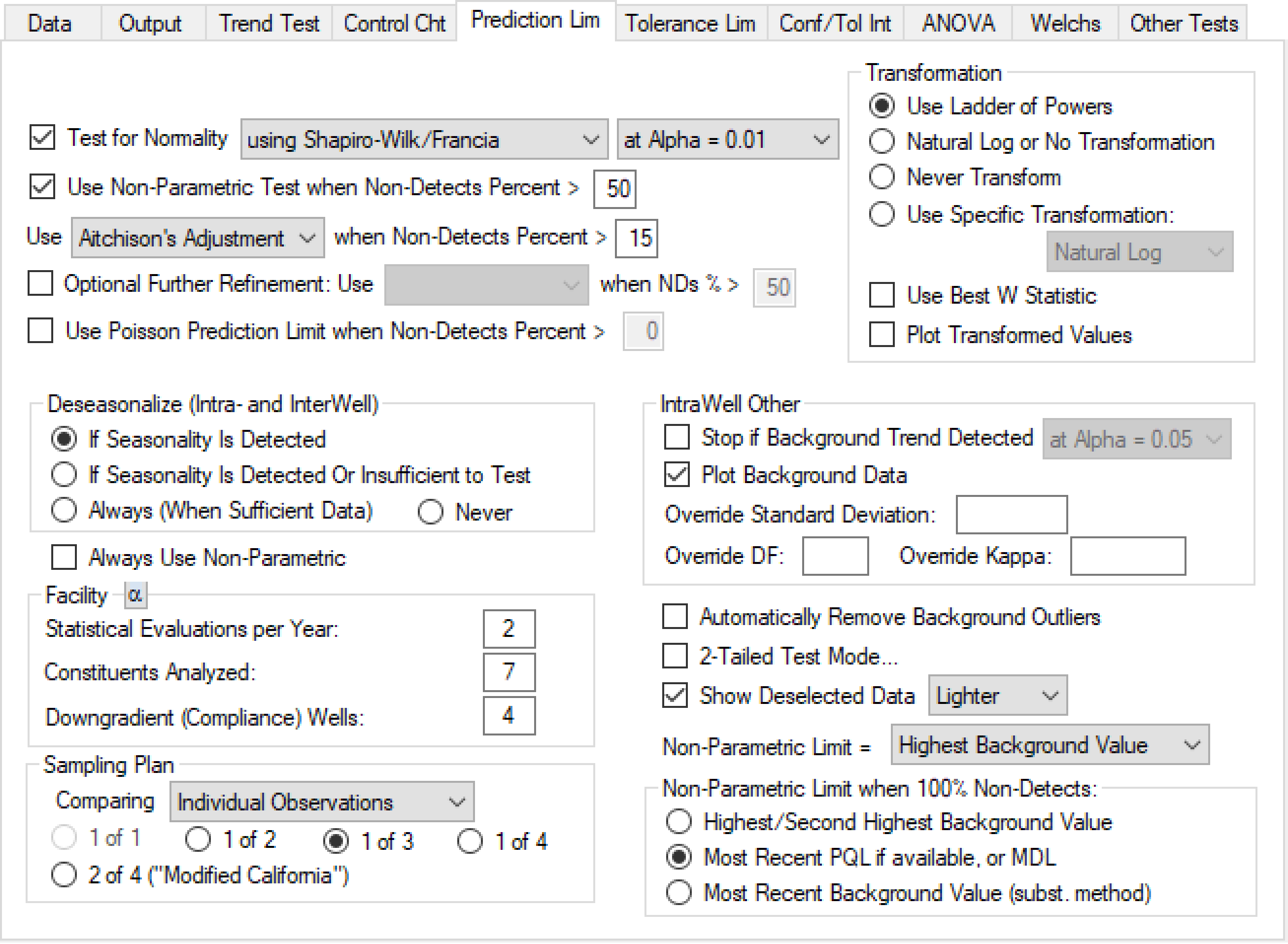
○ Less Precision

● Normal Precision

○ More Precision

☑ Store Print Jobs in Multiple Constituent Mode

Printer: Adobe PDF



☑ Test for Normality using Shapiro-Wilk/Francia at Alpha = 0.01

☑ Use Non-Parametric Test when Non-Detects Percent > 50

Use Aitchison's Adjustment when Non-Detects Percent > 15

☐ Optional Further Refinement: Use when NDs % > 50

☐ Use Poisson Prediction Limit when Non-Detects Percent > 0

Transformation
● Use Ladder of Powers
○ Natural Log or No Transformation
○ Never Transform
○ Use Specific Transformation: Natural Log
☐ Use Best W Statistic
☐ Plot Transformed Values

Deseasonalize (Intra- and InterWell)
● If Seasonality Is Detected
○ If Seasonality Is Detected Or Insufficient to Test
○ Always (When Sufficient Data) ○ Never

☐ Always Use Non-Parametric

Facility α
Statistical Evaluations per Year: 2
Constituents Analyzed: 7
Downgradient (Compliance) Wells: 4

Sampling Plan
Comparing Individual Observations
○ 1 of 1 ○ 1 of 2 ● 1 of 3 ○ 1 of 4
○ 2 of 4 ("Modified California")

IntraWell Other
☐ Stop if Background Trend Detected at Alpha = 0.05
☑ Plot Background Data
Override Standard Deviation:
Override DF: Override Kappa:

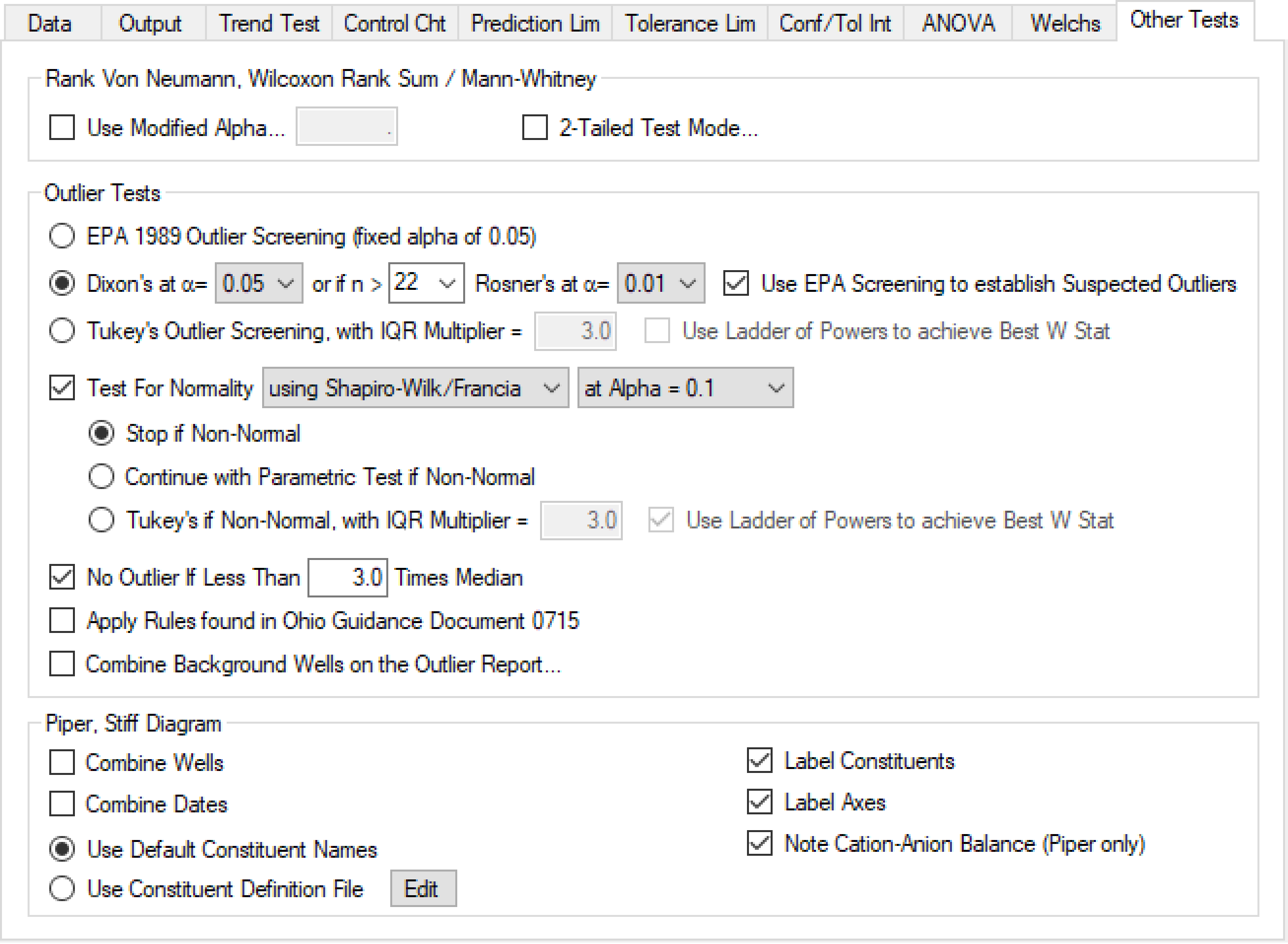
☐ Automatically Remove Background Outliers

☐ 2-Tailed Test Mode...

☑ Show Deselected Data Lighter

Non-Parametric Limit = Highest Background Value

Non-Parametric Limit when 100% Non-Detects:
○ Highest/Second Highest Background Value
● Most Recent PQL if available, or MDL
○ Most Recent Background Value (subst. method)



Rank Von Neumann, Wilcoxon Rank Sum / Mann-Whitney

☐ Use Modified Alpha... ☐ 2-Tailed Test Mode...

Outlier Tests

○ EPA 1989 Outlier Screening (fixed alpha of 0.05)

● Dixon's at α= 0.05 or if n > 22 Rosner's at α= 0.01 ☑ Use EPA Screening to establish Suspected Outliers

○ Tukey's Outlier Screening, with IQR Multiplier = 3.0 ☐ Use Ladder of Powers to achieve Best W Stat

☑ Test For Normality using Shapiro-Wilk/Francia at Alpha = 0.1

- ● Stop if Non-Normal
- ○ Continue with Parametric Test if Non-Normal
- ○ Tukey's if Non-Normal, with IQR Multiplier = 3.0 ☑ Use Ladder of Powers to achieve Best W Stat

☑ No Outlier If Less Than 3.0 Times Median

☐ Apply Rules found in Ohio Guidance Document 0715

☐ Combine Background Wells on the Outlier Report...

Piper, Stiff Diagram

☐ Combine Wells

☐ Combine Dates

● Use Default Constituent Names

○ Use Constituent Definition File

☑ Label Constituents

☑ Label Axes

☑ Note Cation-Anion Balance (Piper only)

# ATTACHMENT 3

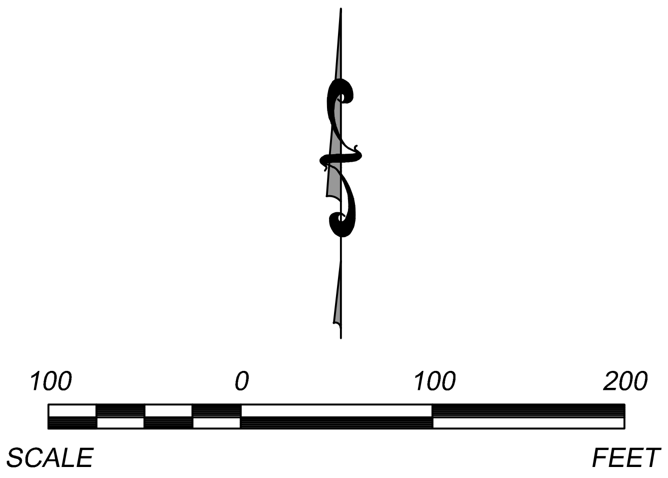
## Groundwater Potentiometric Surface Maps

LEGEND

| | |
|---|---|
| MW-901 (843.01) | CCR GROUNDWATER MONITORING SYSTEM WELLS (GROUNDWATER ELEVATION) |
| —823— | GROUNDWATER POTENTIOMETRIC SURFACE ELEVATIONS (REPRESENTATIVE FOR THIS UNIT) |
| ← 16 FT/YR | DIRECTION OF GROUNDWATER FLOW AND CALCULATED GROUNDWATER FLOW RATE (FEET/YEAR) |

NOTES:

1. KDHE FACILITY PERMIT AREA BOUNDARY NOT SHOWN.
2. GOOGLE EARTH IMAGE DATED OCTOBER 2014. BOUNDARY AND MONITOR WELL LOCATIONS ARE APPROXIMATE.
3. BOUNDARY AND MONITOR WELL LOCATIONS ARE PROVIDED BY AECOM.
4. WATER LEVEL MEASUREMENTS COMPLETED MAY 23, 2019.



| REV. | DATE | CK. BY |
|---|---|---|
| △ | - | - |
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| △ | - | - |

SHEET TITLE
POTENTIOMETRIC SURFACE MAP (MAY 2019)
BOTTOM ASH IMPOUNDMENT

PROJECT TITLE
2019 GROUNDWATER MONITORING AND
CORRECTIVE ACTION REPORT ADDENDUM

CLIENT
EVERGY METRO
LA CYGNE GENERATING STATION
LA CYGNE, KANSAS

SCS ENGINEERS
8575 W. 110th St, Ste. 100
Overland Park, Kansas 66210
PH. (913) 681-0030 FAX. (913) 681-0012

PROJ. NO. 27217233.18
DSN. BY: DAW
DWN. BY: DAW
CHK. BY: JRR
Q/A RVW BY: JRR
PROJ. MGR JRF

CADD FILE:
LA CYGNE BA KDHE GW_MAY V0.02.DWG

DATE:
11/29/22

FIGURE NO.
1

N:\KCPL\Projects\Groundwater\DWG\La Cygne\2019\La Cygne BA KDHE GW_MAY v0.02.dwg Dec 01, 2022 - 2:12pm Layout Name: Fig 1 By: swyly

LEGEND

| | |
|---|---|
| ▲ MW–901 (843.01) | CCR GROUNDWATER MONITORING SYSTEM WELLS (GROUNDWATER ELEVATION) |
| —823— | GROUNDWATER POTENTIOMETRIC SURFACE ELEVATIONS (REPRESENTATIVE FOR THIS UNIT) |
| ← 15 FT/YR | DIRECTION OF GROUNDWATER FLOW AND CALCULATED GROUNDWATER FLOW RATE (FEET/YEAR) |

NOTES:

1. KDHE FACILITY PERMIT AREA BOUNDARY NOT SHOWN.
2. GOOGLE EARTH IMAGE DATED OCTOBER 2014. BOUNDARY AND MONITOR WELL LOCATIONS ARE APPROXIMATE.
3. BOUNDARY AND MONITOR WELL LOCATIONS ARE PROVIDED BY AECOM.
4. WATER LEVEL MEASUREMENTS COMPLETED NOVEMBER 8, 2019.

100 0 100 200

SCALE FEET

| REV. | DATE | CK. BY |
|---|---|---|
| △ | – | – |
| △ | – | – |
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| △ | – | – |
| △ | – | – |
| △ | – | – |

SHEET TITLE

POTENTIOMETRIC SURFACE MAP (NOVEMBER 2019)
BOTTOM ASH IMPOUNDMENT

PROJECT TITLE

2019 GROUNDWATER MONITORING AND
CORRECTIVE ACTION REPORT ADDENDUM

CLIENT

EVERGY METRO
LA CYGNE GENERATING STATION
LA CYGNE, KANSAS

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CADD FILE:
LA CYGNE BA KDHE GW_NOV V0.02.DWG

DATE:
11/29/22

FIGURE NO.
2

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