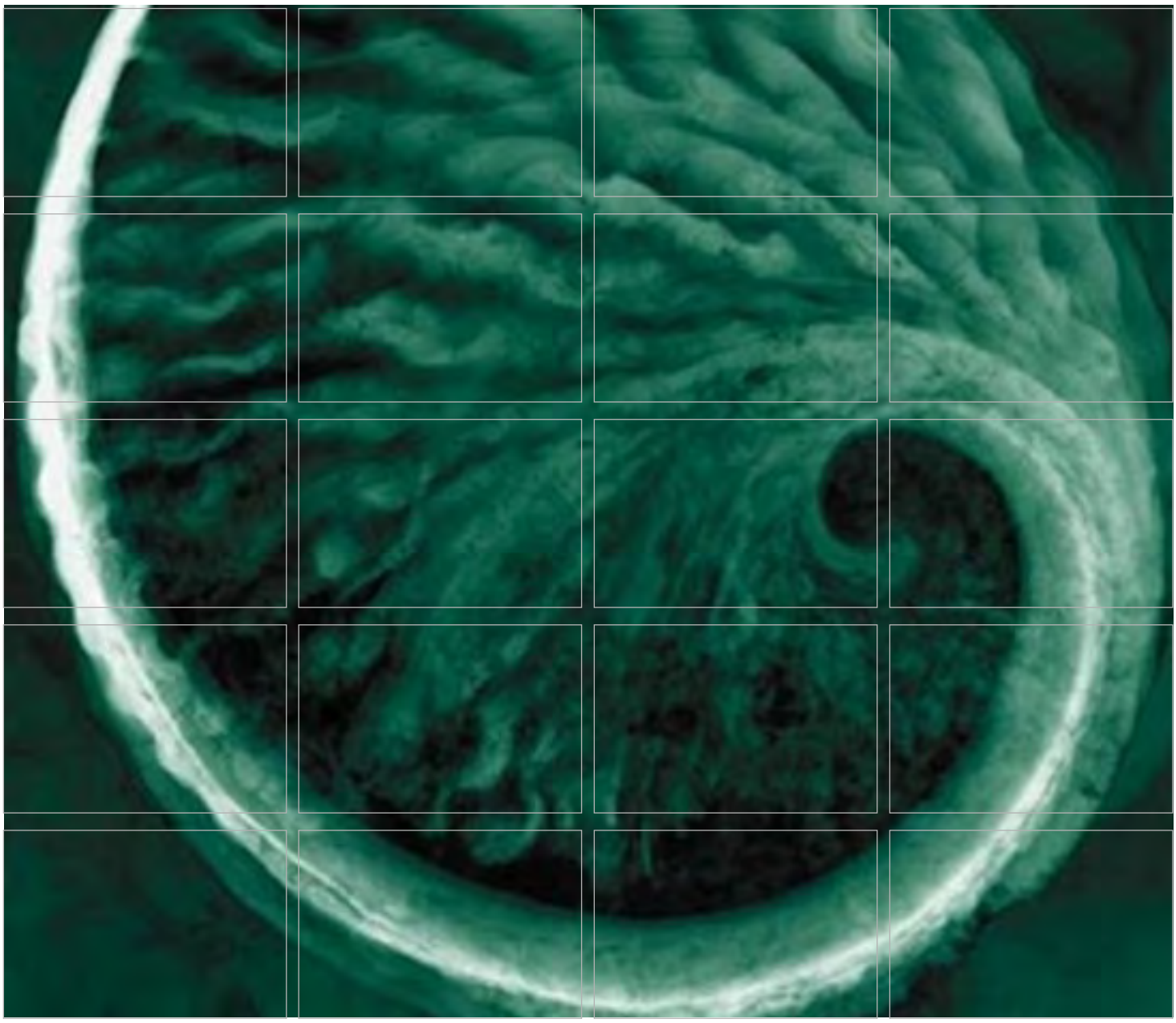


Annual Groundwater Monitoring and Corrective Action Report

CPS Energy
Calaveras Power Station – Bottom Ash Ponds
San Antonio, Texas

January 2020

www.erm.com

ERM

The business of sustainability

Calaveras Power Station – Bottom Ash Ponds

Annual Groundwater Monitoring and Corrective Action Report

January 2020

Project No. 0503422
San Antonio, Texas

Jeffery L. Bauguss, P.E.
Partner-in-Charge

Walter Zverina
Project Manager

Karen Fletcher
Senior Scientist

Environmental Resources Management
206 East 9th Street, Suite 1700
Austin, TX 78701
T: 512-459-4700

Texas Registered Engineering Firm F-2393
Texas Board of Professional Geoscientist Firm 50036

TABLE OF CONTENTS

List of Tables

List of Figures

List of Appendices

1. INTRODUCTION

CPS Energy owns and operates the Calaveras Power Station which consists of two power plants (J.T. Deely and J.K. Spruce) that are subject to regulation under Title 40, Code of Federal Regulations, Part 257 (40 CFR §257) (a.k.a. the CCR Rule). The Power Station is located in unincorporated Bexar County, Texas, approximately 13 miles southeast of San Antonio. Currently, CPS Energy operates three CCR units at the Power Station: Evaporation Pond, Fly Ash Landfill, and the Sludge Recycle Holding (SRH) Pond. Although the J.T. Deely Power Plant ceased operation at the end of December 2018 and sluiced bottom ash is no longer being received at the Bottom Ash Ponds (BAPs), the BAPs will continue to be monitored until the units have undergone closure. This *Annual Groundwater Monitoring and Corrective Action Report* (Report) only addresses the BAPs.

This Report was produced by Environmental Resource Management (ERM), on behalf of CPS Energy, and summarizes the groundwater monitoring activities for the BAPs and provides a statistical summary of the findings for samples collected during the 2019 semi-annual monitoring events. Consistent with the requirements of the CCR Rule, this Report will be posted to the facility's operating records and notification will be made to the State of Texas. Additionally, this Report will be placed on the CPS Energy publically accessible internet site. Unless otherwise mentioned, the analyses in this Report follow the *Groundwater Sampling and Analysis Program* (SAP) (ERM 2017) posted on the internet site. The table below cross references the reporting requirements under the CCR Rule with the contents of this Report.

Regulatory Requirement Cross-Reference

Regulatory Citation	Requirement (paraphrased)	Where Addressed in this Report
§257.90(e)	Status of the groundwater monitoring and corrective action program	Section 2
§257.90(e)	Summarize key actions completed	Section 2
§257.90(e)	Describe any problems encountered and actions to resolve problems	Section 2
§257.90(e)	Key activities for upcoming year	Section 4
§257.90(e)(1)	Map or aerial image of CCR unit and monitoring wells	Figure 1
§257.90(e)(2)	Identification of new monitoring wells installed or decommissioned during the preceding year	Section 2
§257.90(e)(3)	Summary of groundwater data, monitoring wells and dates sampled, and whether sample was required under detection or assessment monitoring	Sections 2 and 3, Tables 1 through 3, Figure 2
§257.90(e)(4)	Narrative discussion of any transition between monitoring programs	Section 4

The BAPs are located east of the Power Station generating units and are adjacent to and immediately east of the SRH Pond. The BAPs consists of two separate, but adjacent, ponds (oriented north and south) containing sluiced bottom ash material. The BAPs were constructed in 1977 as part of the original plant construction. The CCR unit location is shown on Figure 1.

2. PROGRAM STATUS

From December 2016 through October 2017, groundwater samples were collected as part of background sampling. After October 2017, groundwater samples were collected as part of detection monitoring. The samples were collected from the groundwater monitoring well network certified for use in determining compliance with the CCR Rule.

The groundwater monitoring well network consists of two upgradient monitor wells (JKS-49 and JKS-51) and five downgradient monitor wells (JKS-48, JKS-50R, JKS-52, JKS-55, and JKS-56). All monitoring wells are screened within the uppermost groundwater bearing unit (GWBU) in the vicinity of the North and South BAPs. The uppermost GWBU varies in thickness from approximately 9.5 to 21.5 feet thick and is comprised of clayey/silty sand to moderately-sorted sand. The uppermost GWBU is located below semi-confining units (i.e., clay, sandy clay, or silty clay), and above a sandstone bedrock unit.

The monitoring well locations are shown in Figure 1. No problems were encountered in the data collection or in well performance, and no action was required to resolve any issues. No new monitoring wells were installed or decommissioned after the certification of the well network.

Although the J.T. Deely Power Plant ceased operation at the end of December 2018 and sluiced bottom ash is no longer being received at the BAPs, the BAPs will continue to be monitored until the units have undergone closure.

2.1. GROUNDWATER FLOW RATE AND DIRECTION

Depth to groundwater surface measurements were made at each monitoring well prior to sampling. Groundwater elevations were calculated by subtracting the depth to ground-water measurement from the surveyed reference elevation for each well.

Groundwater elevations collected during the monitoring events are summarized in Table 1. Groundwater elevations and the potentiometric surfaces for the April and October 2019 monitoring events are shown on Figure 2A and Figure 2B, respectively. As measured during the April 2019 monitoring event, groundwater in the vicinity of the BAPs appears to flow radially toward Lake Calaveras and the adjacent channel (south and southeast), similarly to potentiometric surfaces reported in 2017 and 2018. The horizontal gradient is less than 0.001 feet/foot.

Groundwater elevations measured during the October 2019 monitoring event appear to display radial flow toward Lake Calaveras and adjacent channel to the south and east. However, unlike previous monitoring events, JKS-49 was one of the lowest potentiometric surface elevations recorded, indicating flow to the north. The horizontal gradient is approximately 0.001 feet/foot. Based on a review of rainfall data, the change in potentiometric surface elevation in JKS-49 may be attributed to a significant decrease in rainfall. The potentiometric surface elevations will continue to be monitored.

2.2. SAMPLING SUMMARY

A summary of the total number of samples collected from each monitoring well is provided in Table 2. Groundwater analytical results for the sampling events are summarized in Table 3. Laboratory data packages are provided in Appendix A.

The BAPs monitoring wells were sampled by CPS Energy using low flow sampling techniques during the monitoring events. No data gaps were identified during the 2019 semi-annual groundwater monitoring events.

2.3. DATA QUALITY

ERM reviewed field and laboratory documentation to assess the validity, reliability and usability of the analytical results. Samples were sent to Xenco Laboratories, located in San Antonio, Texas for analysis. Data quality information reviewed for these results included field sampling forms, chain-of-custody documentation, holding times, lab methods, cooler temperatures, laboratory method blanks, laboratory control sample recoveries, field duplicate samples, matrix spikes/matrix spike duplicates, quantitation limits, and equipment blanks. A summary of the data qualifiers are included in Table 3. The data quality review found the results to be valid, reliable, and useable for decision making purposes with the listed qualifiers. No analytical results were rejected.

3. STATISTICAL ANALYSIS AND RESULTS

Consistent with the CCR Rule and the SAP, a prediction limit approach [40 CFR §257.93(f)] was used to identify potential impacts to groundwater. Tables and figures generated as part of the statistical analysis are provided in Appendix B. The steps outlined in the decision framework in the SAP include:

- Interwell versus intrawell comparisons;
- Establishment of upgradient dataset;
- Calculation of prediction limits; and
- Conclusions.

The remaining sections of this Report are focused on evaluation of the October 2019 sampling results. Note the April 2019 sampling results were evaluated as discussed in the *April 2019 Groundwater Sampling Event – Calaveras Power Station CCR Units* (ERM, 2019) provided in Appendix C.

3.1. INTERWELL VERSUS INTRAWELL COMPARISONS

When multiple upgradient wells were available within the same unit, concentrations were compared among these wells to determine if they could be pooled to create a single, interwell, upgradient dataset. For each analyte, Boxplots (Appendix B, Figure 1) and Kruskal-Wallis test results (Appendix B, Table 1) are provided for upgradient wells. The statistical test shows that:

- One Appendix III analyte [chloride] will follow interwell analysis, with no significant differences present in upgradient data; and

- The remaining six Appendix III analytes [boron, calcium, fluoride, pH, sulfate, and total dissolved solids (TDS)] will follow intrawell analysis, with significant differences present in upgradient data.

Interwell analytes will use a pooled upgradient dataset for subsequent report sections. Conversely, intrawell analytes will have each individual upgradient dataset used for subsequent report sections.

3.2. ESTABLISHMENT OF UPGRADIENT DATASET

When evaluating the concentrations of analytes in groundwater, USEPA Unified Guidance (2009) recommends performing a careful quality check of the data to identify any anomalies. In addition to the data validation that was performed, descriptive statistics, outlier testing, and temporal stationarity checks were completed to finalize the upgradient dataset.

3.2.1. Descriptive Statistics

Descriptive statistics were calculated for the upgradient wells and analytes at the BAPs (Appendix B, Table 2). The descriptive statistics highlight a number of relevant characteristics about the upgradient datasets including:

- There are a total of 13 well-analyte combinations for the upgradient dataset;
- 13 well-analyte combinations have detection rates greater than or equal to 50 percent;
- 12 well-analyte combinations have 100 percent detects;
- 11 well-analyte combinations follow a normal distribution (using Shapiro-Wilks Normality Test); and
- Two well-analyte combinations have no discernible distribution.

3.2.2. Outlier Determination

Both statistical and visual outlier tests were performed on the upgradient datasets. Data points identified as both a statistical and visual outlier (Appendix B, Table 3 and Appendix B, Figure 2) were reviewed before they were excluded from the dataset. A total of five potential outliers were initially flagged in the upgradient datasets. However, these values were consistent with seasonal fluctuations and concentrations detected in other upgradient wells or in historical groundwater sampling results. No analytical or sampling issues were identified during data review; therefore, the five values were considered valid and were retained for upper prediction limit (UPL) calculations.

3.2.3. Check for Temporal Stability

A trend test was performed for all values in the upgradient wells that had at least eight detected data points and at least 50 percent detection rate. Time series figures of upgradient wells are provided in Appendix B, Figure 3. Additionally, the Mann Kendall trend test results are provided in Appendix B, Table 4. The following summarizes the results of the trend analysis:

- There are a total of 13 well-analyte combinations in the upgradient dataset; and
- 13 well-analyte combinations meet the data requirements of the trend test of which:
    - One well-analyte combinations had a significant increasing trend;

- One well-analyte combinations had a significant decreasing trend; and
- 11 well-analyte combinations had no significant trend (i.e., concentrations were stable over time).

3.3. CALCULATION OF PREDICTION LIMITS

A multi-part assessment of the monitoring wells was performed to determine what type of UPL to calculate as a compliance point. A decision framework was applied for each upgradient well based on inter/intrawell analysis, data availability, and presence of temporal trends.

A total of two well-analyte combinations were found to have either increasing or decreasing trends. For these well-analyte combinations, a bootstrapped UPL calculated around a Theil Sen trend was used to derive a more accurate UPL. The remaining 11 well-analyte combinations were found to have no significant trend. Sanitas was used to calculate static UPLs using an annual site-wide false positive rate of 0.1 with a 1-of-2 re-testing approach.

A final UPL was selected for each analyte and compared to the October 2019 sampling results in the downgradient wells. A final lower prediction limit (LPL) was also selected for pH. For the one analyte following interwell analysis, the upgradient dataset was pooled prior to UPL calculations, resulting in a single UPL value per analyte. For the six analytes following intrawell analysis, an UPL value was calculated for each of the upgradient wells. For these wells and analytes, the maximum UPL was selected as the representative UPL for each analyte. A similar approach was used to determine the LPL for pH; however, the minimum LPL was selected in the case of intrawell analysis. All final UPL and LPL values are shown in the table below. Full upgradient well prediction limit calculations are provided in Appendix B, Table 5.

Final UPL and LPL Values

Analysis Type	Analyte	LPL	UPL	Unit
Intrawell	Boron	--	2.40	mg/L
Intrawell	Calcium	--	368	mg/L
Interwell	Chloride	--	608	mg/L
Intrawell	Fluoride	--	0.847	mg/L
Intrawell	pH	5.48	7.31	SU
Intrawell	Sulfate	--	431	mg/L
Intrawell	TDS	--	2,240	mg/L

3.4. CONCLUSIONS

The downgradient samples collected during the October 2019 monitoring event were used for compliance comparisons. All downgradient wells were below the UPLs and above the LPLs with the following exceptions shown in the table below. Full downgradient results are provided in Appendix B, Table 6.

Downgradient Results Exceedances

Analyte	Well	LPL	UPL	Sample Date	Value	Unit
Boron	JKS-50R	--	2.4	2019-10-22	6.93	mg/L
Boron	JKS-56	--	2.4	2019-10-22	4.47	mg/L
Fluoride	JKS-48	--	0.847	2019-10-22	1.25	mg/L

All initial exceedances of the UPL may be confirmed with re-testing of the downgradient wells per the 1-of-2 re-testing scheme. If the initial exceedance is confirmed with re-testing results from the same well, the well-analyte combination will be declared a statistically significant increase (SSI) above background. Any wells with re-testing results at or below the UPL will be considered in compliance and will not require further action. Any resampling results will be reported in the subsequent *Written Demonstration*.

All downgradient wells with initial exceedances were examined for trends to assess the stability of concentrations. A summary of these trend test results are provided in Appendix B, Figure 4. None of the downgradient wells with potential SSIs have increasing or decreasing trends.

4. RECOMMENDATIONS

Currently, there are no plans to transition from detection monitoring to assessment monitoring. Consistent with the 1-of-2 re-testing approach described in the Unified Guidance and the SAP, initial exceedances may be re-tested within 90 days. Based on these re-testing results, if an SSI is found, a notification or *Written Demonstration* will be prepared within 90 days. Based on the findings of the *Written Demonstration*, detection monitoring or assessment monitoring will be initiated as appropriate under §257.94 and §257.95.

5. REFERENCES

ERM, 2017. *Groundwater Sampling and Analysis Program.*

USEPA, 2009. *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities.* Unified Guidance. USEPA/530/R/09/007. Office of Resource Conservation and Recovery. Washington, D.C.

Tables

TABLE 1
Groundwater Elevations Summary
CPS Energy - Calaveras Power Station
Bottom Ash Ponds

		JKS-49 Upgradient		JKS-51 Upgradient		JKS-48 Downgradient		JKS-50R Downgradient	
		TOC Elevation	498.63	TOC Elevation	496.92	TOC Elevation	497.19	TOC Elevation	498.48
Sampling Event	Sampling Event Dates	Depth to Water (feet btoc)	Water Level (msl)	Depth to Water (feet btoc)	Water Level (msl)	Depth to Water (feet btoc)	Water Level (msl)	Depth to Water (feet btoc)	Water Level (msl)
1	12/6/16 to 12/8/16	8.81	489.82	10.76	486.16	11.47	485.72	12.50	485.98
2	2/21/17 to 2/23/17	8.56	490.07	10.80	486.12	11.80	485.39	12.70	485.78
3	3/28/17 to 3/30/17	8.90	489.73	10.59	486.33	11.64	485.55	12.32	486.16
4	5/2/17 to 5/4/17	8.85	489.78	10.56	486.36	11.72	485.47	12.49	485.99
5	6/20/17 to 6/21/17	8.75	489.88	10.56	486.36	12.00	485.19	12.81	485.67
6	7/25/17 to 7/26/17	8.46	490.17	10.68	486.24	11.91	485.28	12.78	485.70
7	8/29/17 to 8/30/17	7.21	491.42	10.48	486.44	11.77	485.42	12.53	485.95
8	10/10/17 to 10/11/17	11.17	487.46	10.98	485.94	12.24	484.95	13.44	485.04
9	4/4/18 to 4/5/18	9.00	489.63	10.93	485.99	12.15	485.04	14.03	484.45
10	10/30/18 to 10/31/18	6.88	491.75	10.45	486.47	11.73	485.46	12.08	486.40
11	4/9/19 to 4/10/19	12.52	486.11	11.02	485.90	11.80	485.39	13.10	485.38
12	10/22/19 to 10/23/19	14.84	483.79	12.00	484.92	12.57	484.62	14.10	484.38

		JKS-52 Downgradient		JKS-55 Downgradient		JKS-56 Downgradient	
		TOC Elevation	493.15	TOC Elevation	493.81	TOC Elevation	496.66
Sampling Event	Sampling Event Dates	Depth to Water (feet btoc)	Water Level (msl)	Depth to Water (feet btoc)	Water Level (msl)	Depth to Water (feet btoc)	Water Level (msl)
1	12/6/16 to 12/8/16	7.53	485.62	8.15	485.66	11.12	485.54
2	2/21/17 to 2/23/17	7.43	485.72	8.51	485.30	10.90	485.76
3	3/28/17 to 3/30/17	7.33	485.82	8.25	485.56	10.50	486.16
4	5/2/17 to 5/4/17	7.35	485.80	8.40	485.41	10.65	486.01
5	6/20/17 to 6/21/17	7.46	485.69	8.79	485.02	11.00	485.66
6	7/25/17 to 7/26/17	7.50	485.65	8.77	485.04	10.95	485.71
7	8/29/17 to 8/30/17	7.40	485.75	8.59	485.22	10.72	485.94
8	10/10/17 to 10/11/17	7.53	485.62	8.92	484.89	11.61	485.05
9	4/4/18 to 4/5/18	8.48	484.67	8.90	484.91	11.13	485.53
10	10/30/18 to 10/31/18	8.33	484.82	8.25	485.56	10.27	486.39
11	4/9/19 to 4/10/19	7.65	485.50	8.60	485.21	11.30	485.36
12	10/22/19 to 10/23/19	9.40	483.75	9.64	484.17	12.34	484.32

NOTES:
btoc = below top of casing
msl = mean sea level

TABLE 2
Groundwater Sampling Summary
CPS Energy - Calaveras Power Station
Bottom Ash Ponds

CCR Unit	Well ID	Well Function	Number of Samples Collected in 2016 - 2019	2016 - 2019 Sample Dates												Monitoring Program
				12/6/16 to 12/8/16	2/21/17 to 2/23/17	3/28/17 to 3/30/17	5/2/17 to 5/4/17	6/20/17 to 6/21/17	7/25/17 to 7/26/17	8/29/17 to 8/30/17	10/10/17 to 10/11/17	4/4/18 to 4/5/18	10/30/18 to 10/31/18	4/9/19 to 4/10/19	10/22/19 to 10/23/19	
Bottom Ash Ponds	JKS-48	Downgradient Monitoring	12	X	X	X	X	X	X	X	X	X	X	X	X	Detection
	JKS-49	Upgradient Monitoring	12	X	X	X	X	X	X	X	X	X	X	X	X	Detection
	JKS-50R	Downgradient Monitoring	12	X	X	X	X	X	X	X	X	X	X	X	X	Detection
	JKS-51	Upgradient Monitoring	12	X	X	X	X	X	X	X	X	X	X	X	X	Detection
	JKS-52	Downgradient Monitoring	12	X	X	X	X	X	X	X	X	X	X	X	X	Detection
	JKS-55	Downgradient Monitoring	12	X	X	X	X	X	X	X	X	X	X	X	X	Detection
	JKS-56	Downgradient Monitoring	12	X	X	X	X	X	X	X	X	X	X	X	X	Detection

NOTES:
X = Indicates that a sample was collected.

TABLE 3
Groundwater Analytical Results Summary
CPS Energy - Calaveras Power Station
Bottom Ash Ponds

		JKS-49 Upgradient											
Sample Date		**12/7/16**	**2/22/17**	**3/28/17**	**5/3/17**	**6/20/17**	**7/25/17**	**8/29/17**	**10/10/17**	**4/4/18**	**10/30/18**	**4/9/19**	**10/22/19**
Task		**Event 1 Dec 2016**	**Event 2 Feb 2017**	**Event 3 Mar 2017**	**Event 4 May 2017**	**Event 5 Jun 2017**	**Event 6 Jul 2017**	**Event 7 Aug 2017**	**Event 8 Oct 2017**	**Event 9 Apr 2018**	**Event 10 Oct 2018**	**Event 11 Apr 2019**	**Event 12 Oct 2019**
Constituents	**Unit**												
Appendix III - Detection Monitoring													
Boron	mg/L	3.24	3.28	3.28	3.03 X	3.04 J	2.76	2.85	2.87	2.71	2.70	2.05	2.58
Calcium	mg/L	130	146	173	113	127	120	145	147	135	117 D	154 D	127 D
Chloride	mg/L	295 D	383 D	372 D	326	414 D	448 D	459 D	424	446 D	408	449	429
Fluoride	mg/L	0.715	0.643 JH	0.665 JH	0.809	0.627 JH	0.617 JH	0.525	0.712	0.697	0.719	0.749	0.793
Sulfate	mg/L	211 D	232 D	234 D	194	218 D	227	265 D	219 X	237	237	240	205
pH - Field Collected	SU	7.19	7.12	7.12	7.02	7.06	6.16	7.05	6.89	7.12	7.12	7.31	6.43
Total dissolved solids	mg/L	1250	1240	1190	1100	1450	1440	1490	1730	1310	1210	1290	1380
Appendix IV - Assessment Monitoring													
Antimony	mg/L	0.00120 U	0.000240 U	0.000240 U	0.00173 J	0.00120 U	0.000240 U	0.000240 U	0.000240 U	NR	NR	NR	NR
Arsenic	mg/L	0.00123 U	0.000676 J	0.000729 J	0.00123 U	0.00123 U	0.000544 J	0.000538 J	0.000478 J	NR	NR	NR	NR
Barium	mg/L	0.0607	0.0575	0.0503	0.0554	0.0783	0.0721	0.0788	0.0735	NR	NR	NR	NR
Beryllium	mg/L	0.000654 U	0.000131 U	0.000131 U	0.000654 U	0.000654 U	0.000131 U	0.000131 U	0.000131 U	NR	NR	NR	NR
Cadmium	mg/L	0.000734 U	0.000147 U	0.000147 U	0.000734 U	0.000734 U	0.000147 U	0.000147 U	0.000147 U	NR	NR	NR	NR
Chromium	mg/L	0.00262 U	0.000859 J	0.000572 J	0.00262 U	0.00262 U	0.000963 J	0.000997 J	0.00113 J	NR	NR	NR	NR
Cobalt	mg/L	0.00102 J	0.00109 J	0.00124 J	0.00155 J	0.00133 J	0.00153 J	0.00155 J	0.00146 J	NR	NR	NR	NR
Fluoride	mg/L	0.715	0.643 JH	0.665 JH	0.809	0.627 JH	0.617 JH	0.525	0.712	NR	NR	NR	NR
Lead	mg/L	0.000758 U	0.000152 U	0.000152 U	0.000758 U	0.000758 U	0.000155 J	0.000152 U	0.000152 U	NR	NR	NR	NR
Lithium	mg/L	0.000476 U	0.000476 U	0.00238 U	0.0137 J	0.0341	0.0295	0.0427	0.0252	NR	NR	NR	NR
Mercury	mg/L	0.0000263 U	0.0000263 U	0.0000263 U	0.0000690 J	0.0000263 U	0.0000490 J	0.0000263 U	0.0000263 U	NR	NR	NR	NR
Molybdenum	mg/L	0.00779 J	0.00846	0.00875	0.0106	0.00908 J	0.00938	0.0107	0.0111	NR	NR	NR	NR
Selenium	mg/L	0.00992 J	0.00597	0.00479	0.00521 J	0.00370 J	0.00235	0.00188 J	0.00141 J	NR	NR	NR	NR
Thallium	mg/L	0.00166 U	0.000332 U	0.000332 U	0.00166 U	0.00166 U	0.000332 U	0.000332 U	0.000332 U	NR	NR	NR	NR
Radium-226	pCi/L	0.198 ± 0.197	0.615 ± 0.272	0.747 ± 0.323	0.195 ± 0.167	0.294 ± 0.192	0.241 ± 0.193	0.159 ± 0.191	0.746 ± 0.274	NR	NR	NR	NR
Radium-228	pCi/L	2.1 ± 0.907	-1.37 ± 1.37	0.854 ± 0.724	1.08 ± 1.72	2.23 ± 0.949	0.658 ± 0.636	0.812 ± 0.604	1.43 ± 0.898	NR	NR	NR	NR

NOTES:
mg/L: Milligrams per Liter.
SU: Standard Units.
pCi/L: Picocuries per Liter.
-- : Laboratory did not analyze sample for indicated constituent.
D: Sample diluted due to targets detected over highest point of calibration curve or due to matrix interference.
H: Bias in sample result likely to be high.
J: Analyte detected above method (sample) detection limit but below method quantitation limit.
L: Bias in sample result likely to be low.
NR: Analysis of this constituent not required for detection monitoring.
U: Analyte not detected at laboratory reporting limit (Sample Detection Limit).
X: Matrix Spike/Matrix Spike Duplicate recoveries were found to be outside of the laboratory control limits.

TABLE 3
Groundwater Analytical Results Summary
CPS Energy - Calaveras Power Station
Bottom Ash Ponds

		JKS-51 Upgradient											
Sample Date		**12/8/16**	**2/22/17**	**3/28/17**	**5/3/17**	**6/21/17**	**7/25/17**	**8/29/17**	**10/10/17**	**4/4/18**	**10/30/18**	**4/9/19**	**10/22/19**
Task		**Event 1 Dec 2016**	**Event 2 Feb 2017**	**Event 3 Mar 2017**	**Event 4 May 2017**	**Event 5 Jun 2017**	**Event 6 Jul 2017**	**Event 7 Aug 2017**	**Event 8 Oct 2017**	**Event 9 Apr 2018**	**Event 10 Oct 2018**	**Event 11 Apr 2019**	**Event 12 Oct 2019**
Constituents	**Unit**												
Appendix III - Detection Monitoring													
Boron	mg/L	0.512	0.517	0.473	0.565	0.512	0.525	0.453	0.509	0.465	0.347	0.489	0.648
Calcium	mg/L	267	292	322	266	261 X	232	236	256	246	149 D	328	336 D
Chloride	mg/L	403 D	331 D	414 D	447	424 D	455 D	384 D	375	395 D	301	559	574 D
Fluoride	mg/L	0.247	0.341 JH	0.415 JH	0.534	0.354	0.391	0.0960 U	0.407 JH	0.305 J	0.291 J	0.329 J	0.405 J
Sulfate	mg/L	293 D	330 D	348 D	359	342 D	330 D	314 D	302	354 D	260	428	405 D
pH - Field Collected	SU	6.59	6.51	6.48	6.56	6.40	5.48	6.38	6.20	6.44	6.70	6.66	5.73
Total dissolved solids	mg/L	1650	1650	1490	1980	1530	1580	1390	1650	1320	916	1890	2150
Appendix IV - Assessment Monitoring													
Antimony	mg/L	0.00120 U	0.000240 U	0.000240 U	0.00120 U	0.000953 J	0.000240 U	0.000240 U	0.000240 U	NR	NR	NR	NR
Arsenic	mg/L	0.00123 U	0.000412 J	0.000390 J	0.00123 U	0.000392 J	0.000344 J	0.000395 J	0.000418 J	NR	NR	NR	NR
Barium	mg/L	0.0655	0.0563	0.0517	0.0512	0.0534	0.0520	0.0520	0.0564	NR	NR	NR	NR
Beryllium	mg/L	0.000654 U	0.000131 U	0.000131 U	0.000654 U	0.000212 J	0.000131 U	0.000131 U	0.000131 U	NR	NR	NR	NR
Cadmium	mg/L	0.000734 U	0.000147 U	0.000147 U	0.000734 U	0.000147 U	0.000147 U	0.000147 U	0.000147 U	NR	NR	NR	NR
Chromium	mg/L	0.00262 U	0.000941 J	0.000525 U	0.00262 U	0.000657 J	0.000874 J	0.00113 J	0.00133 J	NR	NR	NR	NR
Cobalt	mg/L	0.000350 U	0.0000770 J	0.0000920 J	0.000350 U	0.000124 J	0.0000940 J	0.0000800 J	0.000108 J	NR	NR	NR	NR
Fluoride	mg/L	0.247	0.341 JH	0.415 JH	0.534	0.354	0.391	0.0960 U	0.407 JH	NR	NR	NR	NR
Lead	mg/L	0.000758 U	0.000152 U	0.000152 U	0.000758 U	0.000152 U	0.000152 U	0.000152 U	0.000152 U	NR	NR	NR	NR
Lithium	mg/L	0.000476 U	0.000476 U	0.00238 U	0.0322	0.0874	0.0790	0.0958 JX	0.0718	NR	NR	NR	NR
Mercury	mg/L	0.0000263 U	0.0000263 U	0.0000263 U	0.0000263 U	0.0000263 U	0.000199 J	0.0000263 U	0.0000263 U	NR	NR	NR	NR
Molybdenum	mg/L	0.00128 U	0.000255 U	0.000255 U	0.00128 U	0.000255 U	0.000255 U	0.000255 U	0.000255 U	NR	NR	NR	NR
Selenium	mg/L	0.00227 U	0.000454 U	0.000454 U	0.00227 U	0.000454 U	0.000454 U	0.000454 U	0.000454 U	NR	NR	NR	NR
Thallium	mg/L	0.00166 U	0.000332 U	0.000332 U	0.00166 U	0.000332 U	0.000332 U	0.000332 U	0.000332 U	NR	NR	NR	NR
Radium-226	pCi/L	1.09 ± 0.376	0.104 ± 0.122	0.618 ± 0.247	0.197 ± 0.145	0.328 ± 0.195	0.0847 ± 0.186	4.83 ± 0.763	0.682 ± 0.309	NR	NR	NR	NR
Radium-228	pCi/L	0.312 ± 0.688	1.09 ± 1.37	2.32 ± 1.45	-1.26 ± 1.37	-0.799 ± 0.928	1.57 ± 0.786	0.762 ± 0.706	0.963 ± 0.954	NR	NR	NR	NR

NOTES:
mg/L: Milligrams per Liter.
SU: Standard Units.
pCi/L: Picocuries per Liter.
-- : Laboratory did not analyze sample for indicated constituent.
D: Sample diluted due to targets detected over highest point of calibration curve or due to matrix interference.
H: Bias in sample result likely to be high.
J: Analyte detected above method (sample) detection limit but below method quantitation limit.
L: Bias in sample result likely to be low.
NR: Analysis of this constituent not required for detection monitoring.
U: Analyte not detected at laboratory reporting limit (Sample Detection Limit).
X: Matrix Spike/Matrix Spike Duplicate recoveries were found to be outside of the laboratory control limits.

TABLE 3
Groundwater Analytical Results Summary
CPS Energy - Calaveras Power Station
Bottom Ash Ponds

		JKS-48 Downgradient											
Sample Date		**12/7/16**	**2/22/17**	**3/30/17**	**5/2/17**	**6/20/17**	**7/25/17**	**8/29/17**	**10/10/17**	**4/4/18**	**10/30/18**	**4/9/19**	**10/22/19**
Task		**Event 1 Dec 2016**	**Event 2 Feb 2017**	**Event 3 Mar 2017**	**Event 4 May 2017**	**Event 5 Jun 2017**	**Event 6 Jul 2017**	**Event 7 Aug 2017**	**Event 8 Oct 2017**	**Event 9 Apr 2018**	**Event 10 Oct 2018**	**Event 11 Apr 2019**	**Event 12 Oct 2019**
Constituents	**Unit**												
Appendix III - Detection Monitoring													
Boron	mg/L	2.21	2.14	--	2.08	2.13	2.15 X	2.02	2.23	2.03	2.13	2.22	2.27
Calcium	mg/L	130	139	125	NR	111	136 X	134	147	143	128 D	166 D	135 D
Chloride	mg/L	395 D	408 D	435 D	427	440 D	465 D	166 D	427	433 D	438	467	446
Fluoride	mg/L	1.43	1.21 JH	1.62	1.41 JH	1.07	1.62	0.0960 U	1.22	1.35	1.31	1.46	1.25
Sulfate	mg/L	239 D	251 D	266 D	259	253 D	244	140 D	257	282 D	266	271	213
pH - Field Collected	SU	7.06	6.92	6.86	6.99	6.88	5.92	6.90	6.74	6.91	6.92	7.06	6.12
Total dissolved solids	mg/L	1400	1270	1440	1490	1540	1380 J	850	1470	1400	1410	1420	1520
Appendix IV - Assessment Monitoring													
Antimony	mg/L	0.00120 U	0.000240 U	--	0.000240 U	0.00120 U	0.00129 J	0.000240 U	0.000240 U	NR	NR	NR	NR
Arsenic	mg/L	0.00123 U	0.000538 J	--	0.000424 J	0.00123 U	0.000452 J	0.000459 J	0.000475 J	NR	NR	NR	NR
Barium	mg/L	0.0717	0.0699	--	0.0659	0.0686	0.0769	0.0725	0.0761	NR	NR	NR	NR
Beryllium	mg/L	0.000654 U	0.000131 U	--	0.000131 U	0.000654 U	0.000233 J	0.000131 U	0.000131 U	NR	NR	NR	NR
Cadmium	mg/L	0.000734 U	0.000147 U	--	0.000147 U	0.000734 U	0.000147 U	0.000147 U	0.000147 U	NR	NR	NR	NR
Chromium	mg/L	0.00262 U	0.000608 J	--	0.000525 U	0.00262 U	0.000525 U	0.000863 J	0.00130 J	NR	NR	NR	NR
Cobalt	mg/L	0.00111 J	0.000844 J	--	0.000920 J	0.000987 J	0.00137 J	0.000917 J	0.00106 J	NR	NR	NR	NR
Fluoride	mg/L	1.43	1.21 JH	1.62	1.41	1.07	1.62	0.0960 U	1.22	NR	NR	NR	NR
Lead	mg/L	0.000758 U	0.000152 U	--	0.000152 U	0.000758 U	0.000152 U	0.000152 U	0.000203 J	NR	NR	NR	NR
Lithium	mg/L	0.000476 U	0.000476 U	0.00238 U	NR	0.0536	0.0501	0.0700	0.0551	NR	NR	NR	NR
Mercury	mg/L	0.0000263 U	0.0000263 U	0.0000263 U	0.0000310 JX	0.0000263 U	0.0000263 UX	0.0000263 U	0.0000263 U	NR	NR	NR	NR
Molybdenum	mg/L	0.00128 U	0.000422 J	--	0.000263 J	0.00128 U	0.000344 J	0.000255 U	0.000255 U	NR	NR	NR	NR
Selenium	mg/L	0.00227 U	0.000454 U	--	0.000454 U	0.00227 U	0.000454 U	0.000454 U	0.000454 U	NR	NR	NR	NR
Thallium	mg/L	0.00166 U	0.000332 U	--	0.000332 U	0.00166 U	0.000332 U	0.000332 U	0.000332 U	NR	NR	NR	NR
Radium-226	pCi/L	0.139 ± 0.250	0.251 ± 0.149	0.0232 ± 0.136	0.357 ± 0.174	0.46 ± 0.235	0.544 ± 0.259	0.562 ± 0.283	0.26 ± 0.241	NR	NR	NR	NR
Radium-228	pCi/L	0.847 ± 1.14	0.317 ± 1.15	1.1 ± 0.737	-0.109 ± 1.35	0.284 ± 0.662	0.273 ± 0.867	0.459 ± 0.649	0.772 ± 0.931	NR	NR	NR	NR

NOTES:
mg/L: Milligrams per Liter.
SU: Standard Units.
pCi/L: Picocuries per Liter.
-- : Laboratory did not analyze sample for indicated constituent.
D: Sample diluted due to targets detected over highest point of calibration curve or due to matrix interference.
H: Bias in sample result likely to be high.
J: Analyte detected above method (sample) detection limit but below method quantitation limit.
L: Bias in sample result likely to be low.
NR: Analysis of this constituent not required for detection monitoring.
U: Analyte not detected at laboratory reporting limit (Sample Detection Limit).
X: Matrix Spike/Matrix Spike Duplicate recoveries were found to be outside of the laboratory control limits.

TABLE 3
Groundwater Analytical Results Summary
CPS Energy - Calaveras Power Station
Bottom Ash Ponds

		JKS-50R Downgradient											
Sample Date		**12/7/16**	**2/22/17**	**3/28/17**	**5/3/17**	**6/20/17**	**7/25/17**	**8/29/17**	**10/10/17**	**4/4/18**	**10/30/18**	**4/9/19**	**10/22/19**
Task		**Event 1 Dec 2016**	**Event 2 Feb 2017**	**Event 3 Mar 2017**	**Event 4 May 2017**	**Event 5 Jun 2017**	**Event 6 Jul 2017**	**Event 7 Aug 2017**	**Event 8 Oct 2017**	**Event 9 Apr 2018**	**Event 10 Oct 2018**	**Event 11 Apr 2019**	**Event 12 Oct 2019**
Constituents	**Unit**												
Appendix III - Detection Monitoring													
Boron	mg/L	4.70	5.18	5.87	5.92	4.87	4.38	4.18	4.54	3.52	5.17	5.85	6.93
Calcium	mg/L	126	134	189	120	125	108	130	132	127	116 D	159 D	135 D
Chloride	mg/L	47.7 X	49.0 J	63.9	81.3	111	123	141 D	100	170	87.9	70.0	60.3
Fluoride	mg/L	0.316	0.331 JH	0.447 JH	0.528	0.387 JH	0.390 JH	0.0960 U	0.427 JH	0.335 J	0.392 J	0.319 J	0.380 J
Sulfate	mg/L	137 X	146	156	160	146	148	195 D	144	131	141	168	172
pH - Field Collected	SU	6.83	6.77	NR	6.80	6.63	5.69	6.62	6.43	6.67	6.61	6.80	5.85
Total dissolved solids	mg/L	737	808	789	902	914	856	992	947	883	688	842	899
Appendix IV - Assessment Monitoring													
Antimony	mg/L	0.00120 U	0.000240 U	0.000240 U	0.00120 U	0.00120 U	0.000240 U	0.000240 U	0.000240 U	NR	NR	NR	NR
Arsenic	mg/L	0.00123 U	0.00111 J	0.000735 J	0.00123 U	0.00123 U	0.000520 J	0.000545 J	0.000596 J	NR	NR	NR	NR
Barium	mg/L	0.133	0.128	0.113	0.117	0.125	0.117	0.123	0.118	NR	NR	NR	NR
Beryllium	mg/L	0.000654 U	0.000147 J	0.000187 J	0.000654 U	0.000654 U	0.000131 U	0.000131 U	0.000174 J	NR	NR	NR	NR
Cadmium	mg/L	0.000734 U	0.000147 U	0.000147 U	0.000734 U	0.000734 U	0.000147 U	0.000147 U	0.000189 J	NR	NR	NR	NR
Chromium	mg/L	0.00262 U	0.00251 J	0.00169 J	0.00262 U	0.00262 U	0.000788 J	0.000759 J	0.00108 J	NR	NR	NR	NR
Cobalt	mg/L	0.00305 J	0.00345	0.00251	0.00215 J	0.00191 J	0.00216	0.00233	0.00285	NR	NR	NR	NR
Fluoride	mg/L	0.316	0.331 JH	0.447 JH	0.528	0.387 JH	0.390 JH	0.0960 U	0.427 JH	NR	NR	NR	NR
Lead	mg/L	0.000796 J	0.000988 J	0.000627 J	0.000758 U	0.000758 U	0.000178 J	0.000152 U	0.000168 J	NR	NR	NR	NR
Lithium	mg/L	0.000476 U	0.000476 U	0.00238 U	0.000476 U	0.00209 J	0.000476 U	0.00621 J	0.000476 U	NR	NR	NR	NR
Mercury	mg/L	0.0000263 U	0.0000263 U	0.0000263 U	0.0000263 U	0.0000263 U	0.0000263 U	0.0000263 U	0.0000263 U	NR	NR	NR	NR
Molybdenum	mg/L	0.00150 J	0.00153 J	0.00125 J	0.00128 U	0.00128 U	0.00102 J	0.00104 J	0.00108 J	NR	NR	NR	NR
Selenium	mg/L	0.00227 U	0.000514 J	0.000454 U	0.00227 U	0.00227 U	0.000454 U	0.000454 U	0.000454 U	NR	NR	NR	NR
Thallium	mg/L	0.00166 U	0.000332 U	0.000332 U	0.00166 U	0.00166 U	0.000332 U	0.000332 U	0.000332 U	NR	NR	NR	NR
Radium-226	pCi/L	0.102 ± 0.173	0.479 ± 0.216	-0.0714 ± 0.168	0.197 ± 0.183 U	0.245 ± 0.204	0.408 ± 0.226	0 ± 0.176	0.815 ± 0.292	NR	NR	NR	NR
Radium-228	pCi/L	1.99 ± 1.31	-0.428 ± 1.24	0.665 ± 1.14	0.00273 ± 1.33 U	0.783 ± 0.638	1.08 ± 0.832	0.0172 ± 1.12	1.5 ± 0.842	NR	NR	NR	NR

NOTES:
mg/L: Milligrams per Liter.
SU: Standard Units.
pCi/L: Picocuries per Liter.
-- : Laboratory did not analyze sample for indicated constituent.
D: Sample diluted due to targets detected over highest point of calibration curve or due to matrix interference.
H: Bias in sample result likely to be high.
J: Analyte detected above method (sample) detection limit but below method quantitation limit.
L: Bias in sample result likely to be low.
NR: Analysis of this constituent not required for detection monitoring.
U: Analyte not detected at laboratory reporting limit (Sample Detection Limit).
X: Matrix Spike/Matrix Spike Duplicate recoveries were found to be outside of the laboratory control limits.

TABLE 3
Groundwater Analytical Results Summary
CPS Energy - Calaveras Power Station
Bottom Ash Ponds

		JKS-52 Downgradient											
Sample Date		**12/7/16**	**2/21/17**	**3/28/17**	**5/2/17**	**6/21/17**	**7/25/17**	**8/29/17**	**10/10/17**	**4/4/18**	**10/30/18**	**4/9/19**	**10/22/19**
Task		**Event 1 Dec 2016**	**Event 2 Feb 2017**	**Event 3 Mar 2017**	**Event 4 May 2017**	**Event 5 Jun 2017**	**Event 6 Jul 2017**	**Event 7 Aug 2017**	**Event 8 Oct 2017**	**Event 9 Apr 2018**	**Event 10 Oct 2018**	**Event 11 Apr 2019**	**Event 12 Oct 2019**
Constituents	**Unit**												
Appendix III - Detection Monitoring													
Boron	mg/L	1.66	2.11	1.63	1.51	1.33	1.43	1.46	1.71 X	1.95	1.54	1.46 X	1.65
Calcium	mg/L	169	181	189	--	145	140	162	168	175	153 D	195 DX	171 D
Chloride	mg/L	331 D	377 D	323 DX	320	326 D	343 D	417 D	355	360 D	326	336	320
Fluoride	mg/L	0.796	0.665	0.718 JH	0.915 JH	0.705	0.996 JH	0.0960 U	0.740	0.720	0.710	0.831	0.808
Sulfate	mg/L	277 D	318 D	299 DX	290	287 D	292 D	171 D	289	278 D	292	268	288 D
pH - Field Collected	SU	7.01	6.47	6.91	6.94	6.87	5.87	6.81	6.63	6.79	6.76	6.91	6.00
Total dissolved solids	mg/L	1290	1380	1100	1250	1280	1250	1250	1220	1240	1210	1170	1270
Appendix IV - Assessment Monitoring													
Antimony	mg/L	0.00120 U	0.000240 U	0.000240 U	0.000240 U	0.000240 U	0.000240 U	0.000240 U	0.000240 U	NR	NR	NR	NR
Arsenic	mg/L	0.00123 U	0.000565 J	0.000398 J	0.000425 J	0.000427 J	0.000392 J	0.000412 J	0.000448 J	NR	NR	NR	NR
Barium	mg/L	0.0646	0.0583	0.0519	0.0483	0.0527	0.0558	0.0565	0.0616	NR	NR	NR	NR
Beryllium	mg/L	0.000654 U	0.000131 U	0.000131 U	0.000131 U	0.000131 U	0.000131 U	0.000131 U	0.000153 J	NR	NR	NR	NR
Cadmium	mg/L	0.000734 U	0.000147 U	0.000147 U	0.000147 U	0.000147 U	0.000147 U	0.000147 U	0.000147 U	NR	NR	NR	NR
Chromium	mg/L	0.00262 U	0.000525 U	0.000525 U	0.000525 U	0.000841 J	0.000860 J	0.00123 J	0.00108 J	NR	NR	NR	NR
Cobalt	mg/L	0.00188 J	0.00233	0.00112 J	0.00119 J	0.00211	0.00183 J	0.00159 J	0.00189 J	NR	NR	NR	NR
Fluoride	mg/L	0.796	0.665	0.718 JH	0.915 JH	0.705	0.996 JH	0.0960 U	0.740	NR	NR	NR	NR
Lead	mg/L	0.000758 U	0.000152 U	0.000152 U	0.000152 U	0.000292 J	0.000152 U	0.000152 U	0.000163 J	NR	NR	NR	NR
Lithium	mg/L	0.000476 U	0.0471	0.000476 U	--	0.0616	0.0605	0.0827	0.0588	NR	NR	NR	NR
Mercury	mg/L	0.0000263 U	0.000234	0.0000263 U	0.0000263 U	0.0000263 U	0.0000810 J	0.0000263 U	0.0000263 UX	NR	NR	NR	NR
Molybdenum	mg/L	0.00128 U	0.00128 J	0.00115 J	0.00102 J	0.000911 J	0.000865 J	0.000843 J	0.000914 J	NR	NR	NR	NR
Selenium	mg/L	0.00227 U	0.000454 U	0.000454 U	0.000454 U	0.000454 U	0.000454 U	0.000454 U	0.000454 U	NR	NR	NR	NR
Thallium	mg/L	0.00166 U	0.000332 U	0.000332 U	0.000332 U	0.000332 U	0.000332 U	0.000332 U	0.000332 U	NR	NR	NR	NR
Radium-226	pCi/L	1.71 ± 0.465	0.608 ± 0.289	0.296 ± 0.169	0 ± 0.150	0.435 ± 0.241	0.449 ± 0.196	0.194 ± 0.194	0.704 ± 0.319	NR	NR	NR	NR
Radium-228	pCi/L	2.65 ± 1.12	0.744 ± 0.833	0.0645 ± 0.649	0.53 ± 1.10	0.928 ± 0.784	1.16 ± 0.867	0.716 ± 0.767	1.54 ± 1.22	NR	NR	NR	NR

NOTES:
mg/L: Milligrams per Liter.
SU: Standard Units.
pCi/L: Picocuries per Liter.
-- : Laboratory did not analyze sample for indicated constituent.
D: Sample diluted due to targets detected over highest point of calibration curve or due to matrix interference.
H: Bias in sample result likely to be high.
J: Analyte detected above method (sample) detection limit but below method quantitation limit.
L: Bias in sample result likely to be low.
NR: Analysis of this constituent not required for detection monitoring.
U: Analyte not detected at laboratory reporting limit (Sample Detection Limit).
X: Matrix Spike/Matrix Spike Duplicate recoveries were found to be outside of the laboratory control limits.

TABLE 3
Groundwater Analytical Results Summary
CPS Energy - Calaveras Power Station
Bottom Ash Ponds

		JKS-55 Downgradient											
Sample Date		**12/7/16**	**2/22/17**	**3/28/17**	**5/3/17**	**6/20/17**	**7/25/17**	**8/29/17**	**10/10/17**	**4/4/18**	**10/30/18**	**4/9/19**	**10/22/19**
Task		**Event 1 Dec 2016**	**Event 2 Feb 2017**	**Event 3 Mar 2017**	**Event 4 May 2017**	**Event 5 Jun 2017**	**Event 6 Jul 2017**	**Event 7 Aug 2017**	**Event 8 Oct 2017**	**Event 9 Apr 2018**	**Event 10 Oct 2018**	**Event 11 Apr 2019**	**Event 12 Oct 2019**
Constituents	**Unit**												
Appendix III - Detection Monitoring													
Boron	mg/L	0.716	0.716	0.785	0.710	0.787	0.651	0.687	0.759	0.645	0.611	0.740	0.771
Calcium	mg/L	143	153	181	133	133	118	136	146	134	119 D	165 D	145 D
Chloride	mg/L	384 DX	50.5	403 D	388	395 D	400 D	168 D	386	387 D	429	438	432
Fluoride	mg/L	0.857	0.352 JH	0.746 JH	0.891	1.14	1.08 JH	0.0960 U	0.864	0.791	0.820	0.822	0.832
Sulfate	mg/L	164 X	147	172	173	164	166	139 D	157	168	155	168	159
pH - Field Collected	SU	6.85	6.80	6.81	6.82	6.72	5.77	6.72	6.53	6.75	6.70	6.90	5.96
Total dissolved solids	mg/L	1430	1380	1290	1310	1500	1270	826	1470	1300	1190	1420	1370
Appendix IV - Assessment Monitoring													
Antimony	mg/L	0.00120 U	0.000240 U	0.000240 U	0.00120 U	0.00120 U	0.000240 U	0.000240 U	0.000240 U	NR	NR	NR	NR
Arsenic	mg/L	0.00123 U	0.000650 J	0.000520 J	0.00123 U	0.00123 U	0.000507 J	0.000582 J	0.000599 J	NR	NR	NR	NR
Barium	mg/L	0.103	0.0876	0.0823	0.0758	0.0828	0.0780	0.0801	0.0816	NR	NR	NR	NR
Beryllium	mg/L	0.000654 U	0.000131 U	0.000134 J	0.000654 U	0.000654 U	0.000131 U	0.000131 U	0.000131 U	NR	NR	NR	NR
Cadmium	mg/L	0.000734 U	0.000147 U	0.000147 U	0.000734 U	0.000734 U	0.000147 U	0.000147 U	0.000147 U	NR	NR	NR	NR
Chromium	mg/L	0.00262 U	0.000625 J	0.000525 U	0.00262 U	0.00262 U	0.000525 U	0.000797 J	0.000903 J	NR	NR	NR	NR
Cobalt	mg/L	0.00702 J	0.00516	0.00579	0.00750 J	0.00642 J	0.00562	0.00565	0.00565	NR	NR	NR	NR
Fluoride	mg/L	0.857	0.352 JH	0.746 JH	0.891	1.14	1.08 JH	0.0960 U	0.864	NR	NR	NR	NR
Lead	mg/L	0.000758 U	0.000152 U	0.000152 U	0.000758 U	0.000758 U	0.000152 U	0.000152 U	0.000152 U	NR	NR	NR	NR
Lithium	mg/L	0.000476 U	0.000476 U	0.00238 U	0.0136 J	0.0425	0.0354	0.0495	0.0338	NR	NR	NR	NR
Mercury	mg/L	0.0000263 U	0.0000263 U	0.0000263 UX	0.0000263 U	0.0000263 UX	0.0000263 U	0.0000263 U	0.0000263 U	NR	NR	NR	NR
Molybdenum	mg/L	0.00130 J	0.00123 J	0.00108 J	0.00128 U	0.00128 U	0.000804 J	0.000898 J	0.000837 J	NR	NR	NR	NR
Selenium	mg/L	0.00227 U	0.000454 U	0.000454 U	0.00227 U	0.00227 U	0.000454 U	0.000454 U	0.000454 U	NR	NR	NR	NR
Thallium	mg/L	0.00166 U	0.000332 U	0.000332 U	0.00166 U	0.00166 U	0.000332 U	0.000332 U	0.000332 U	NR	NR	NR	NR
Radium-226	pCi/L	0.694 ± 0.358	0.721 ± 0.320	0.745 ± 0.258	0.576 ± 0.261	0.305 ± 0.190	0.0212 ± 0.171	0.327 ± 0.233	0.588 ± 0.314	NR	NR	NR	NR
Radium-228	pCi/L	3.76 ± 1.33	1.87 ± 1.01	-0.0356 ± 1.09	1.01 ± 1.02	0.591 ± 0.843	0.532 ± 0.795	0.234 ± 0.821	1.24 ± 0.848	NR	NR	NR	NR

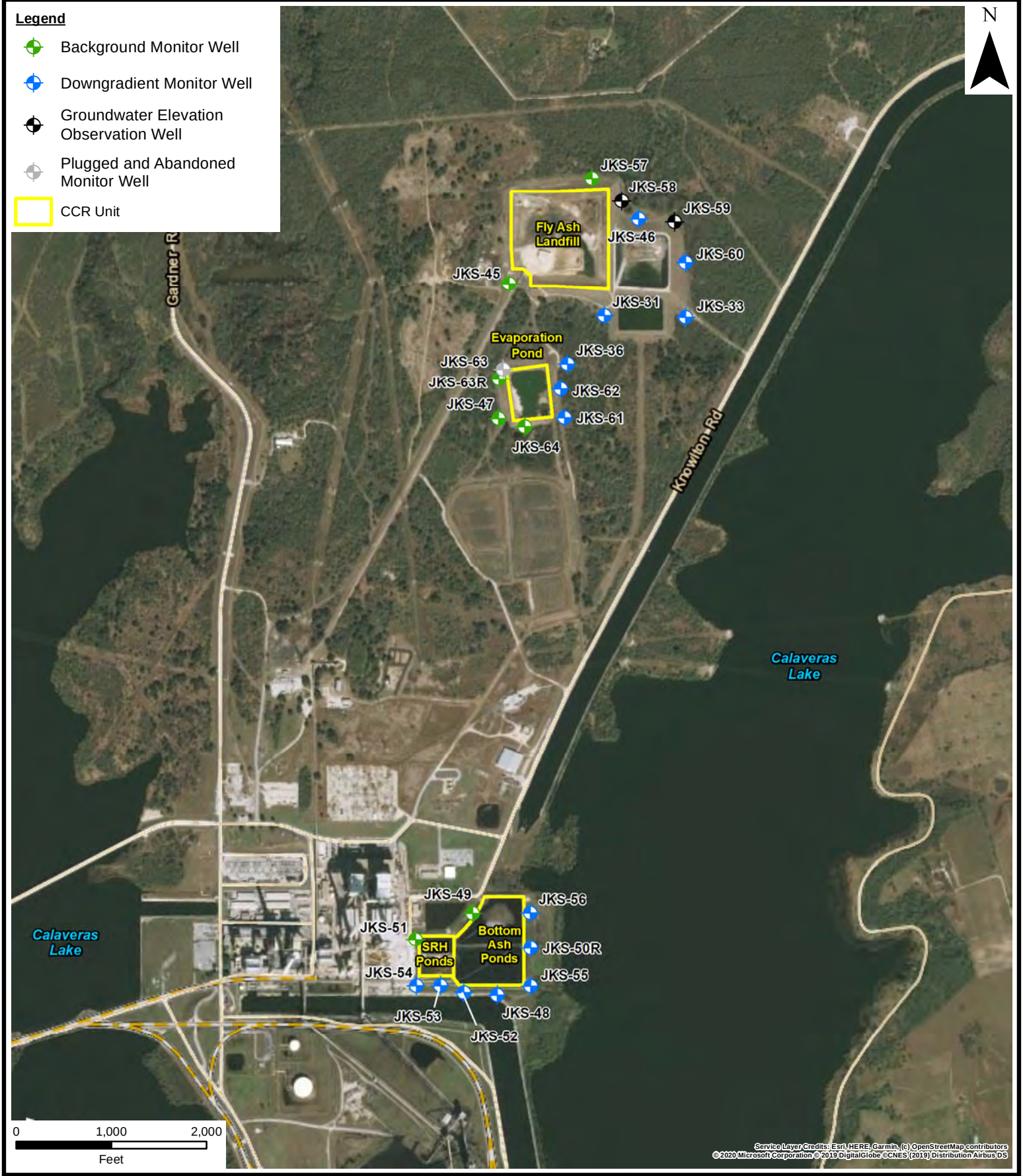
NOTES:
mg/L: Milligrams per Liter.
SU: Standard Units.
pCi/L: Picocuries per Liter.
-- : Laboratory did not analyze sample for indicated constituent.
D: Sample diluted due to targets detected over highest point of calibration curve or due to matrix interference.
H: Bias in sample result likely to be high.
J: Analyte detected above method (sample) detection limit but below method quantitation limit.
L: Bias in sample result likely to be low.
NR: Analysis of this constituent not required for detection monitoring.
U: Analyte not detected at laboratory reporting limit (Sample Detection Limit).
X: Matrix Spike/Matrix Spike Duplicate recoveries were found to be outside of the laboratory control limits.

TABLE 3
Groundwater Analytical Results Summary
CPS Energy - Calaveras Power Station
Bottom Ash Ponds

		JKS-56 Downgradient											
Sample Date		**12/7/16**	**2/22/17**	**3/30/17**	**5/3/17**	**6/20/17**	**7/25/17**	**8/29/17**	**10/10/17**	**4/4/18**	**10/30/18**	**4/9/19**	**10/22/19**
Task		**Event 1 Dec 2016**	**Event 2 Feb 2017**	**Event 3 Mar 2017**	**Event 4 May 2017**	**Event 5 Jun 2017**	**Event 6 Jul 2017**	**Event 7 Aug 2017**	**Event 8 Oct 2017**	**Event 9 Apr 2018**	**Event 10 Oct 2018**	**Event 11 Apr 2019**	**Event 12 Oct 2019**
Constituents	**Unit**												
Appendix III - Detection Monitoring													
Boron	mg/L	3.97	4.13	--	4.60	3.98	3.60	3.60 X	3.48	3.95	3.95	3.85	4.47
Calcium	mg/L	137	143	127	124	136	116	137	146	126	121 D	150 D	131 D
Chloride	mg/L	131	95.7	96.3	95.6	114	126	146 D	150	121	108 JL	81.0	81.2
Fluoride	mg/L	0.344	0.354 JH	0.333	0.564	0.407 JH	0.401 JH	0.0960 U	0.448 JH	0.37 J	0.428 J	0.372 J	0.452 J
Sulfate	mg/L	193	190	188	183	186	194	201 D	200	193	192	193	194
pH - Field Collected	SU	6.73	6.63	6.56	6.71	6.56	5.63	6.57	6.38	6.64	6.55	6.76	5.84
Total dissolved solids	mg/L	1100	969	1020	997	1060	1060	986	1240	992	976	918	968
Appendix IV - Assessment Monitoring													
Antimony	mg/L	0.00120 U	0.000240 U	--	0.00120 U	0.00120 U	0.000240 U	0.00104 J	0.000240 U	NR	NR	NR	NR
Arsenic	mg/L	0.00527 J	0.00425	--	0.00350 J	0.00435 J	0.00373	0.00517	0.00451	NR	NR	NR	NR
Barium	mg/L	0.126	0.0974	--	0.0890	0.0921	0.0897	0.103	0.0909	NR	NR	NR	NR
Beryllium	mg/L	0.000654 U	0.000131 U	--	0.000654 U	0.000654 U	0.000131 U	0.000136 J	0.000131 U	NR	NR	NR	NR
Cadmium	mg/L	0.000734 U	0.000147 U	--	0.000734 U	0.000734 U	0.000147 U	0.000147 U	0.000147 U	NR	NR	NR	NR
Chromium	mg/L	0.00262 U	0.000654 J	--	0.00276 J	0.00262 U	0.000525 U	0.00498	0.00141 J	NR	NR	NR	NR
Cobalt	mg/L	0.00560 J	0.00564	--	0.00641 J	0.00687 J	0.00668	0.00771	0.00746	NR	NR	NR	NR
Fluoride	mg/L	0.344	0.354 JH	0.333	0.564	0.407 JH	0.401 JH	0.0960 U	0.448 JH	NR	NR	NR	NR
Lead	mg/L	0.000758 U	0.000152 U	--	0.000758 U	0.000758 U	0.000152 U	0.000211 J	0.000152 U	NR	NR	NR	NR
Lithium	mg/L	0.000476 U	0.000476 U	0.000476 U	0.000476 U	0.00156 J	0.000476 U	0.00598 J	0.000476 U	NR	NR	NR	NR
Mercury	mg/L	0.0000263 U	0.0000263 U	0.0000263 U	0.0000700 J	0.0000263 UX	0.0000263 U	0.0000263 UX	0.0000263 U	NR	NR	NR	NR
Molybdenum	mg/L	0.00360 J	0.00190 J	--	0.00168 J	0.00152 J	0.00156 J	0.00160 J	0.00155 J	NR	NR	NR	NR
Selenium	mg/L	0.00227 U	0.000454 U	--	0.00227 U	0.00227 U	0.000454 U	0.000454 U	0.000454 U	NR	NR	NR	NR
Thallium	mg/L	0.00166 U	0.000332 U	--	0.00166 U	0.00166 U	0.000332 U	0.000332 U	0.000332 U	NR	NR	NR	NR
Radium-226	pCi/L	1.23 ± 0.430	0.254 ± 0.175	0.372 ± 0.215	0.138 ± 0.166	0.273 ± 0.253	0.177 ± 0.213	0.441 ± 0.225	0.397 ± 0.252	NR	NR	NR	NR
Radium-228	pCi/L	0.949 ± 1.38	3.07 ± 1.28	1.09 ± 0.897	1.97 ± 1.35	1.27 ± 0.994	1.16 ± 0.862	1.45 ± 0.895	3.36 ± 1.42	NR	NR	NR	NR

NOTES:
mg/L: Milligrams per Liter.
SU: Standard Units.
pCi/L: Picocuries per Liter.
-- : Laboratory did not analyze sample for indicated constituent.
D: Sample diluted due to targets detected over highest point of calibration curve or due to matrix interference.
H: Bias in sample result likely to be high.
J: Analyte detected above method (sample) detection limit but below method quantitation limit.
L: Bias in sample result likely to be low.
NR: Analysis of this constituent not required for detection monitoring.
U: Analyte not detected at laboratory reporting limit (Sample Detection Limit).
X: Matrix Spike/Matrix Spike Duplicate recoveries were found to be outside of the laboratory control limits.

Figures



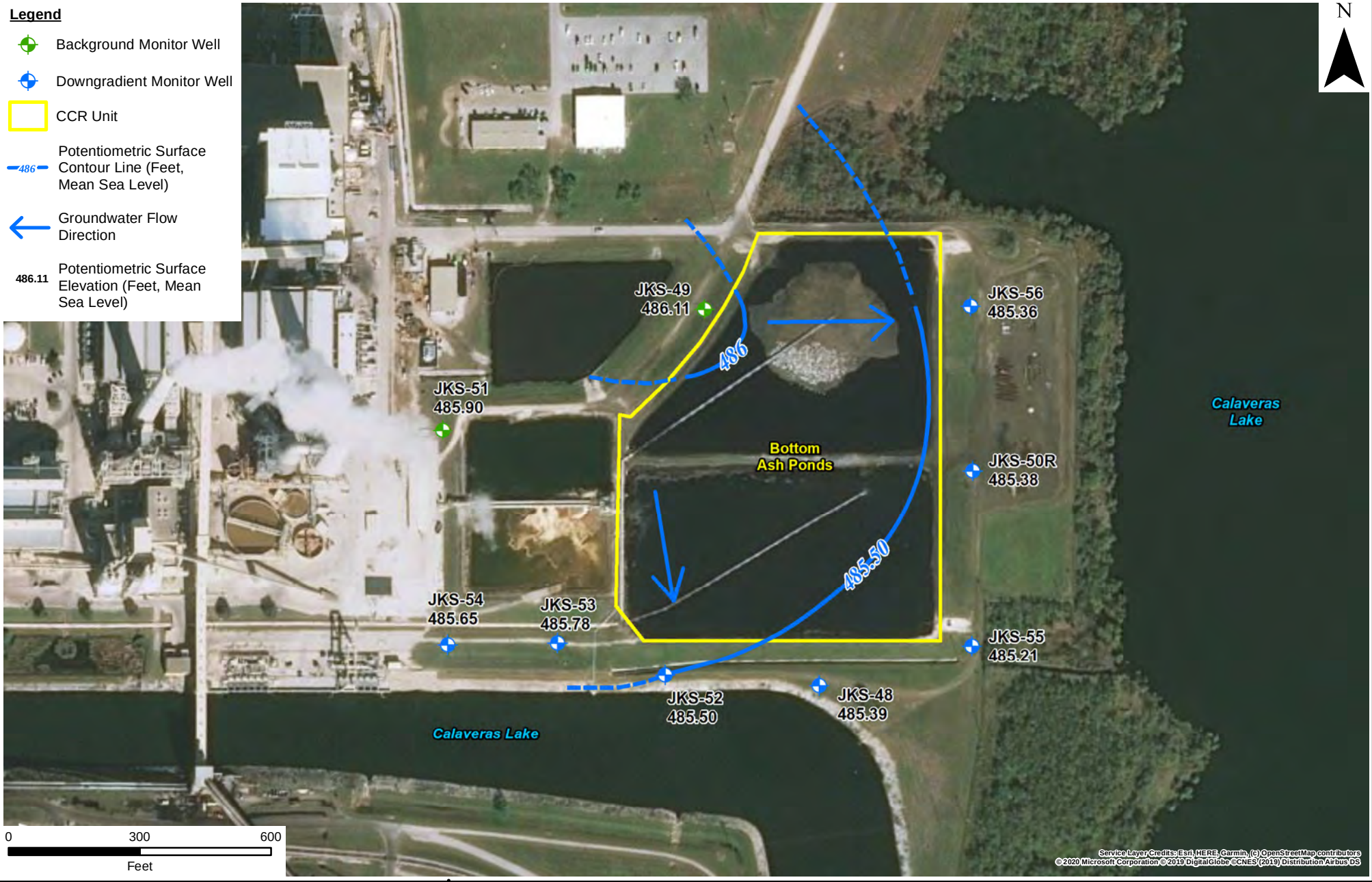
Environmental Resources Management

DESIGN:	WZ	DRAWN:	EFC	CHKD.:	WZ
DATE:	1/17/2020	SCALE:	AS SHOWN	REVISION:	0

\\ushoufs01\Data\Houston\Projects\0503422 CPS Energy Calaveras 2019 CCR Tasks.WZ\GIS_CAD\MXD\2019gwmon\fig1_0503422_CPSCalv_WellLocs.mxd

FIGURE 1
CCR WELL NETWORK LOCATION MAP
CPS Energy - Calaveras Power Station
San Antonio, Texas

ERM



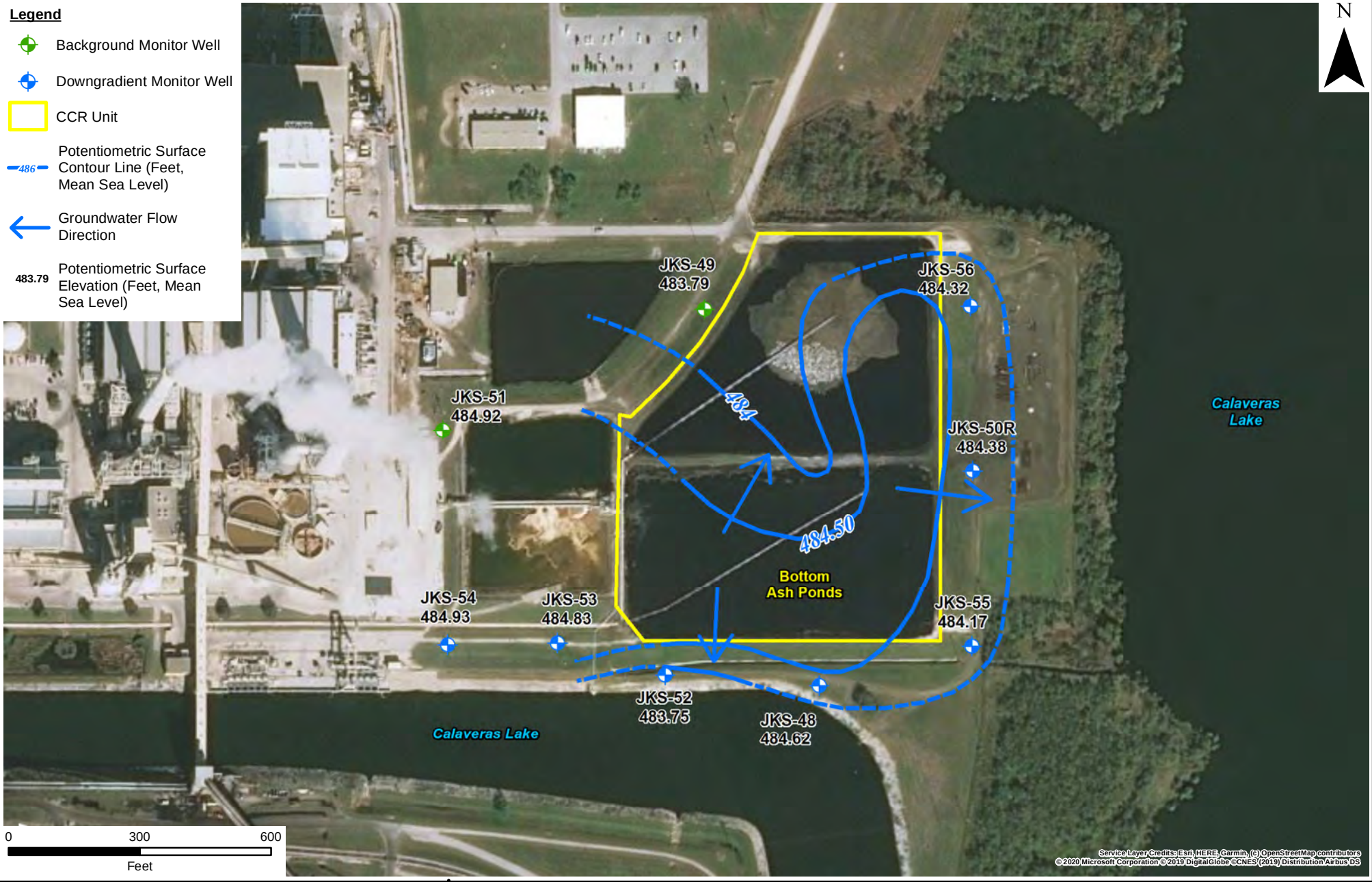
Environmental Resources Management

DESIGN:	NH	DRAWN:	EFC	CHKD.:	WZ
DATE:	1/13/2020	SCALE:	AS SHOWN	REVISION:	1

\\ushoufs01\Data\Houston\Projects\0503422 CPS Energy Calaveras 2019 CCR Tasks.WZ\GIS_CAD\MXD\2019gwmon\fig2A_0503422_CPSCalv_BotAshPond_apr2019pmap.mxd

FIGURE 2A
POTENTIOMETRIC SURFACE MAP - APRIL 2019
Bottom Ash Ponds CCR Unit
CPS Energy - Calaveras Power Station
San Antonio, Texas

ERM



Environmental Resources Management

DESIGN:	NH	DRAWN:	EFC	CHKD.:	WZ
DATE:	1/13/2020	SCALE:	AS SHOWN	REVISION:	1

\\ushoufs01\Data\Houston\Projects\0503422 CPS Energy Calaveras 2019 CCR Tasks.WZ\GIS_CAD\MXD\2019gwmon\fig2B_0503422_CPSCalv_BotAshPond_oct2019pmap.mxd

FIGURE 2B
POTENTIOMETRIC SURFACE MAP - OCTOBER 2019
Bottom Ash Ponds CCR Unit
CPS Energy - Calaveras Power Station
San Antonio, Texas

ERM

Laboratory Data Packages

Appendix A

(*Data Packages Available Upon Request*)

Statistical Analysis Tables and Figures

Appendix B

APPENDIX B - TABLE 1
Kruskal-Wallis Test Comparisons of Upgradient Wells
Calaveras Power Station
Bottom Ash Ponds

Analyte	N	Num Detects	Percent Detect	DF	KW Statistic	p-value	Conclusion	UPL Type
Boron	24	24	100.00%	1	17.3	<0.001	Significant Difference	Intrawell
Calcium	24	24	100.00%	1	16.3	<0.001	Significant Difference	Intrawell
Chloride	24	24	100.00%	1	0.0133	0.908	No Significant Difference	Interwell
Fluoride	24	23	95.83%	1	16.8	<0.001	Significant Difference	Intrawell
pH	24	24	100.00%	1	10.1	0.00146	Significant Difference	Intrawell
Sulfate	24	24	100.00%	1	16.8	<0.001	Significant Difference	Intrawell
Total dissolved solids	24	24	100.00%	1	6.62	0.0101	Significant Difference	Intrawell

NOTES:

Non-detects were substituted with a value of half the detection limit for calculations
N: number of data points
DF: degrees of freedom
statistic: Kruskal Wallis test statistic
p-value: P-values below 0.05 indicate that the median concentrations in the upgradient wells are significantly different from each other and the upgradient wells should not be pooled.
p-value: P-values equal or above 0.05 indicate that the median concentrations in the upgradient wells are not significantly different from each other and the upgradient wells can be pooled.

APPENDIX B - TABLE 2
Descriptive Statistics for Upgradient Wells
Calaveras Power Station
Bottom Ash Ponds

Analyte	Well	Units	N	Num Detects	Percent Detect	Min ND	Max ND	Min Detect	Median	Mean	Max Detect	SD	CV	Distribution
Boron	JKS-49	mg/L	12	12	100.00%			2.05	2.86	2.87	3.28	0.35	0.122282128	Normal
Boron	JKS-51	mg/L	12	12	100.00%			0.347	0.51	0.501	0.648	0.0708	0.141179252	Normal
Calcium	JKS-49	mg/L	12	12	100.00%			113	132	136	173	17.4	0.127963	Normal
Calcium	JKS-51	mg/L	12	12	100.00%			149	264	266	336	51.2	0.192511729	Normal
Chloride	Pooled	mg/L	24	24	100.00%			295	414	413	574	66.7	0.161558148	Normal
Fluoride	JKS-49	mg/L	12	12	100.00%			0.525	0.704	0.689	0.809	0.0795	0.115407035	Normal
Fluoride	JKS-51	mg/L	12	11	91.67%	0.048	0.048	0.247	0.348	0.339	0.534	0.118	0.347320299	Normal
pH	JKS-49	SU	12	12	100.00%			6.16	7.09	6.97	7.31	0.334	0.047904843	NDD
pH	JKS-51	SU	12	12	100.00%			5.48	6.46	6.34	6.7	0.374	0.058933699	NDD
Sulfate	JKS-49	mg/L	12	12	100.00%			194	230	227	265	18.7	0.082662473	Normal
Sulfate	JKS-51	mg/L	12	12	100.00%			260	336	339	428	46.2	0.136457545	Normal
Total dissolved solids	JKS-49	mg/L	12	12	100.00%			1100	1300	1340	1730	170	0.126645991	Normal
Total dissolved solids	JKS-51	mg/L	12	12	100.00%			916	1620	1600	2150	323	0.201797007	Normal

NOTES:

Non-detects were substituted with a value of half the detection limit for calculations
Well = Pooled, indicates that the summary statistics were produced for the pooled upgradient wells based on the Kruskal-Wallis test (Table 1).
SU: Standard units
N: number of data points
ND: Non-detect
SD: Standard Deviation
CV: Coefficient of Variation (standard deviation divided by the mean)
NDD: Non Discernible Distribution

APPENDIX B - TABLE 3
Potential Outliers in Upgradient Wells
Calaveras Power Station
Bottom Ash Ponds

Well	Sample	Date	Analyte	Units	Detect	Concentration	UPL type	Distribution	Statistical Outlier	Visual Outlier	Normal Outlier	Log Statistical Outlier	Log Visual Outlier	Lognormal Outlier	Statistical and Visual Outlier
JKS-51	JKS-51004	10/22/2019	Boron	mg/L	TRUE	0.648	Intrawell	Normal		X		X	X	X	
JKS-51	JKS51620699-001	4/10/2019	Chloride	mg/L	TRUE	559	Interwell	Normal		X			X		
JKS-51	JKS-51004	10/22/2019	Chloride	mg/L	TRUE	574	Interwell	Normal	X	X	X				0
JKS-49	JKS-49-WG-20170725	7/25/2017	pH	SU	TRUE	6.16	Intrawell	NDD	X	X	X	X	X	X	0
JKS-49	JKS-49-WG-20171010	10/10/2017	pH	SU	TRUE	6.89	Intrawell	NDD		X			X		
JKS-49	JKS-49-WG-20191022-02	10/22/2019	pH	SU	TRUE	6.43	Intrawell	NDD	X	X	X	X	X	X	0
JKS-51	JKS-51-WG-20170725	7/25/2017	pH	SU	TRUE	5.48	Intrawell	NDD	X	X	X	X	X	X	0
JKS-51	JKS-51-WG-20191022-02	10/22/2019	pH	SU	TRUE	5.73	Intrawell	NDD	X	X	X	X	X	X	0
JKS-51	JKS-51004	10/22/2019	Sulfate	mg/L	TRUE	405	Intrawell	Normal		X					
JKS-51	JKS-51552352-003	5/3/2017	Total dissolved solids	mg/L	TRUE	1980	Intrawell	Normal		X					
JKS-51	JKS51620699-001	4/10/2019	Total dissolved solids	mg/L	TRUE	1890	Intrawell	Normal		X					
JKS-51	JKS-51004	10/22/2019	Total dissolved solids	mg/L	TRUE	2150	Intrawell	Normal		X					

NOTES:

NDD: No Discernible Distribution
SU: Standard units
Outlier tests were performed on detected data only.
Statistical outliers were determined using a Dixon's test for N < 25 and with Rosner's test for N > 25.
Visual outliers were identified if they fall above the confidence envelope on the QQ plot.
Data points were considered potential outliers if they were both statistical and visual outliers.
NDD wells had data points considered as potential outliers if they were either a normal or lognormal outlier.
[Blank] data distribution indicates that the well data did not have enough detected data points for outlier analysis.
Lognormally distributed data was first log-transformed before visual and statistical outlier tests were performed.
Normal data distribution indicates that the well data was directly used for statistical and visual outlier tests.
NDD indicates that both the untransformed and transformed data were examined with statistical and visual outlier tests.
'0' indicates that the data point was a statistical and visual outlier but was retained after review by the hydrogeologist.

APPENDIX B - TABLE 4
Mann Kendall Test for Trends in Upgradient Wells
Calaveras Power Station
Bottom Ash Ponds

Analyte	UPL Type	Well	N	Num Detects	Percent Detect	p-value	tau	Conclusion
Boron	Intrawell	JKS-49	12	12	100.00%	<0.001	-0.779	Decreasing Trend
Boron	Intrawell	JKS-51	12	12	100.00%	0.45	-0.168	Stable, No Trend
Calcium	Intrawell	JKS-49	12	12	100.00%	0.945	-0.0153	Stable, No Trend
Calcium	Intrawell	JKS-51	12	12	100.00%	0.638	-0.121	Stable, No Trend
Chloride	Interwell	JKS-49, JKS-51	24	24	100.00%	0.0114	0.371	Increasing Trend
Fluoride	Intrawell	JKS-49	12	12	100.00%	0.311	0.242	Stable, No Trend
Fluoride	Intrawell	JKS-51	12	11	91.67%	0.947	-0.0303	Stable, No Trend
pH	Intrawell	JKS-49	12	12	100.00%	0.484	-0.159	Stable, No Trend
pH	Intrawell	JKS-51	12	12	100.00%	0.459	-0.182	Stable, No Trend
Sulfate	Intrawell	JKS-49	12	12	100.00%	0.243	0.26	Stable, No Trend
Sulfate	Intrawell	JKS-51	12	12	100.00%	0.45	0.168	Stable, No Trend
Total dissolved solids	Intrawell	JKS-49	12	12	100.00%	0.459	0.182	Stable, No Trend
Total dissolved solids	Intrawell	JKS-51	12	12	100.00%	0.836	-0.0465	Stable, No Trend

NOTES:

Non-detects were substituted with a value of zero for trend calculations
N: number of data points
tau: Kendall's tau statistic
p-value: A two-sided p-value describing the probability of the H0 being true (a=0.05)
Trend tests were performed on all upgradient data, only if the dataset met the minimum data quality criteria (ERM 2017).

APPENDIX B - TABLE 5
Calculated UPLs for Upgradient Datasets
Calaveras Power Station
Bottom Ash Ponds

Analyte	UPL Type	Trend	Well	N	Num Detects	Percent Detects	LPL	UPL	Units	ND Adjustment	Transformation	Alpha	Method	Final LPL	Final UPL
Boron	Intrawell	Decreasing Trend	JKS-49	12	12	100.00%		2.4	mg/L	None	No	0.00351	NP Detrended UPL		X
Boron	Intrawell	Stable, No Trend	JKS-51	12	12	100.00%		0.642	mg/L	None	No	0.00351	Param Intra 1 of 2		
Calcium	Intrawell	Stable, No Trend	JKS-49	12	12	100.00%		171	mg/L	None	No	0.00351	Param Intra 1 of 2		
Calcium	Intrawell	Stable, No Trend	JKS-51	12	12	100.00%		368	mg/L	None	No	0.00351	Param Intra 1 of 2		X
Chloride	Interwell	Increasing Trend	JKS-49, JKS-51	24	24	100.00%		608	mg/L	None	No	0.00351	NP Detrended UPL		X
Fluoride	Intrawell	Stable, No Trend	JKS-49	12	12	100.00%		0.847	mg/L	None	No	0.00351	Param Intra 1 of 2		X
Fluoride	Intrawell	Stable, No Trend	JKS-51	12	11	91.67%		0.556	mg/L	None	No	0.00351	Param Intra 1 of 2		
pH	Intrawell	Stable, No Trend	JKS-49	12	12	100.00%	6.16	7.31	SU	None	No	0.022	NP Intra (normality) 1 of 2		X
pH	Intrawell	Stable, No Trend	JKS-51	12	12	100.00%	5.48	6.7	SU	None	No	0.022	NP Intra (normality) 1 of 2	X	
Sulfate	Intrawell	Stable, No Trend	JKS-49	12	12	100.00%		264	mg/L	None	No	0.00351	Param Intra 1 of 2		
Sulfate	Intrawell	Stable, No Trend	JKS-51	12	12	100.00%		431	mg/L	None	No	0.00351	Param Intra 1 of 2		X
Total dissolved solids	Intrawell	Stable, No Trend	JKS-49	12	12	100.00%		1680	mg/L	None	No	0.00351	Param Intra 1 of 2		
Total dissolved solids	Intrawell	Stable, No Trend	JKS-51	12	12	100.00%		2240	mg/L	None	No	0.00351	Param Intra 1 of 2		X

NOTES:

Non-detects (ND) were substituted with a value of half the detection limit for calculations
UPL: upper prediction limit
LPL: Lower prediction limit. These were only calculated for pH
UPLs were constructed with a site wide false positive rate of 0.1 and a 1 of 2 retesting.
UPLs were calculated using Sanitas Software.
SU: Standard units
NP: non parametric
Intra: indicates an intrawell UPL was used
Inter: indicates an interwell UPL was used
In the case where multiple UPLs were calculated for an analyte, the maximum UPL was used as the final UPL.
In the case where multiple LPLs were calculated for an pH the minimum LPL was used as the final LPL.

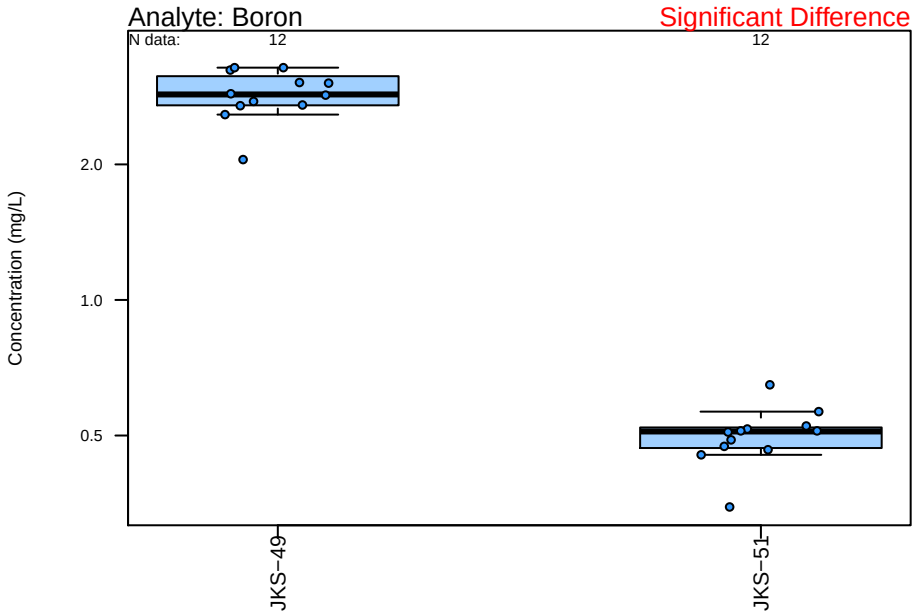
APPENDIX B - TABLE 6
Comparisons of Downgradient Wells to UPLs
Calaveras Power Station
Bottom Ash Ponds

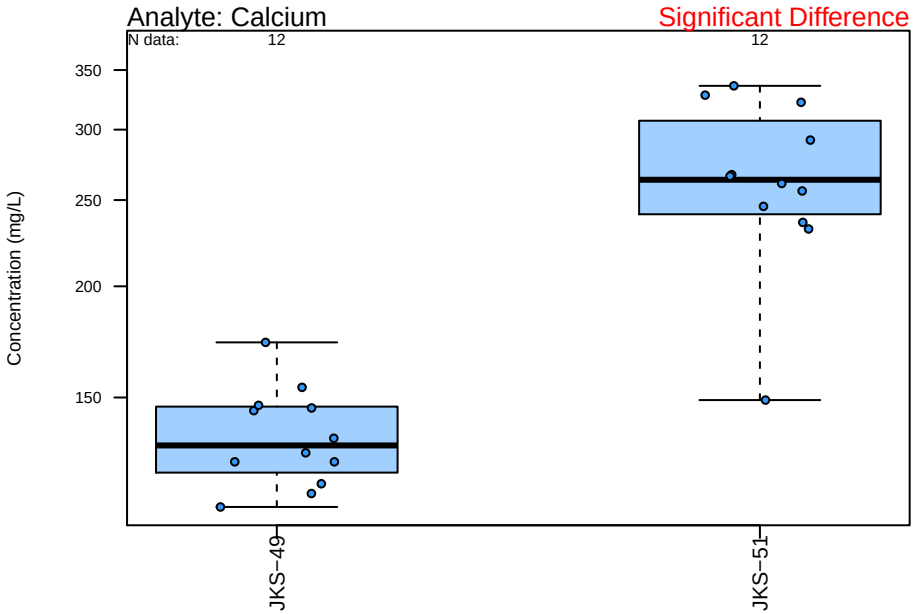
Analyte	Well	LPL	UPL	Units	Recent Date	Observation	Qualifier	Obs > UPL	Notes	Mann Kendall p-value	Mann Kendall tau
Boron	JKS-48		2.4	mg/L	10/22/2019	2.27					
Boron	JKS-50R		2.4	mg/L	10/22/2019	6.93		X	Trend Test: Stable, No Trend	0.947	0.0303
Boron	JKS-52		2.4	mg/L	10/22/2019	1.65					
Boron	JKS-55		2.4	mg/L	10/22/2019	0.771					
Boron	JKS-56		2.4	mg/L	10/22/2019	4.47		X	Trend Test: Stable, No Trend	0.481	-0.167
Calcium	JKS-48		368	mg/L	10/22/2019	135					
Calcium	JKS-50R		368	mg/L	10/22/2019	135					
Calcium	JKS-52		368	mg/L	10/22/2019	171					
Calcium	JKS-55		368	mg/L	10/22/2019	145					
Calcium	JKS-56		368	mg/L	10/22/2019	131					
Chloride	JKS-48		608	mg/L	10/22/2019	446					
Chloride	JKS-50R		608	mg/L	10/22/2019	60.3					
Chloride	JKS-52		608	mg/L	10/22/2019	320					
Chloride	JKS-55		608	mg/L	10/22/2019	432					
Chloride	JKS-56		608	mg/L	10/22/2019	81.2					
Fluoride	JKS-48		0.847	mg/L	10/22/2019	1.25		X	Trend Test: Stable, No Trend	0.731	-0.0763
Fluoride	JKS-50R		0.847	mg/L	10/22/2019	0.38					
Fluoride	JKS-52		0.847	mg/L	10/22/2019	0.808					
Fluoride	JKS-55		0.847	mg/L	10/22/2019	0.832					
Fluoride	JKS-56		0.847	mg/L	10/22/2019	0.452					
pH	JKS-48	5.48	7.31	SU	10/22/2019	6.12					
pH	JKS-50R	5.48	7.31	SU	10/22/2019	5.85					
pH	JKS-52	5.48	7.31	SU	10/22/2019	6					
pH	JKS-55	5.48	7.31	SU	10/22/2019	5.96					
pH	JKS-56	5.48	7.31	SU	10/22/2019	5.84					
Sulfate	JKS-48		431	mg/L	10/22/2019	213					
Sulfate	JKS-50R		431	mg/L	10/22/2019	172					
Sulfate	JKS-52		431	mg/L	10/22/2019	288					
Sulfate	JKS-55		431	mg/L	10/22/2019	159					
Sulfate	JKS-56		431	mg/L	10/22/2019	194					
Total dissolved solids	JKS-48		2240	mg/L	10/22/2019	1520					
Total dissolved solids	JKS-50R		2240	mg/L	10/22/2019	899					
Total dissolved solids	JKS-52		2240	mg/L	10/22/2019	1270					
Total dissolved solids	JKS-55		2240	mg/L	10/22/2019	1370					
Total dissolved solids	JKS-56		2240	mg/L	10/22/2019	968					

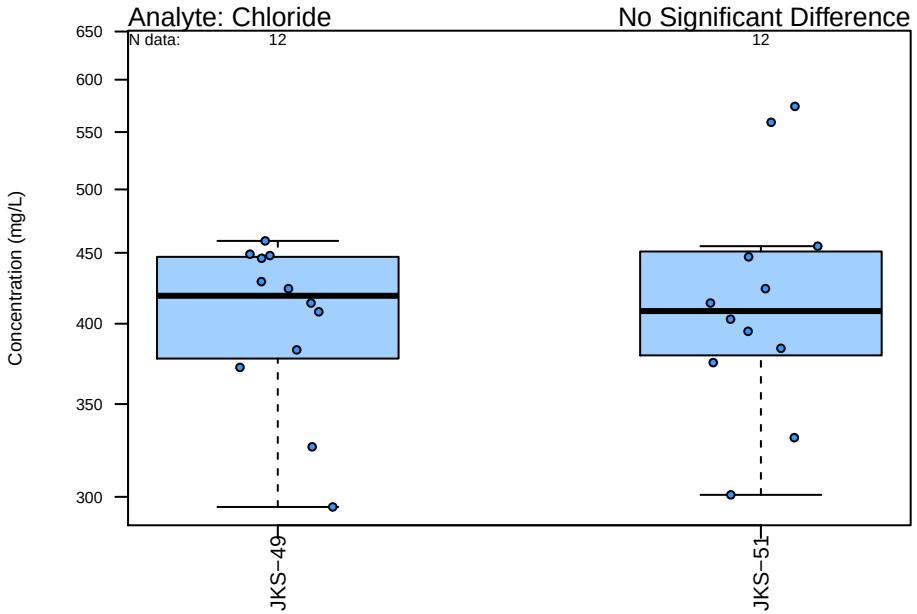
NOTES:

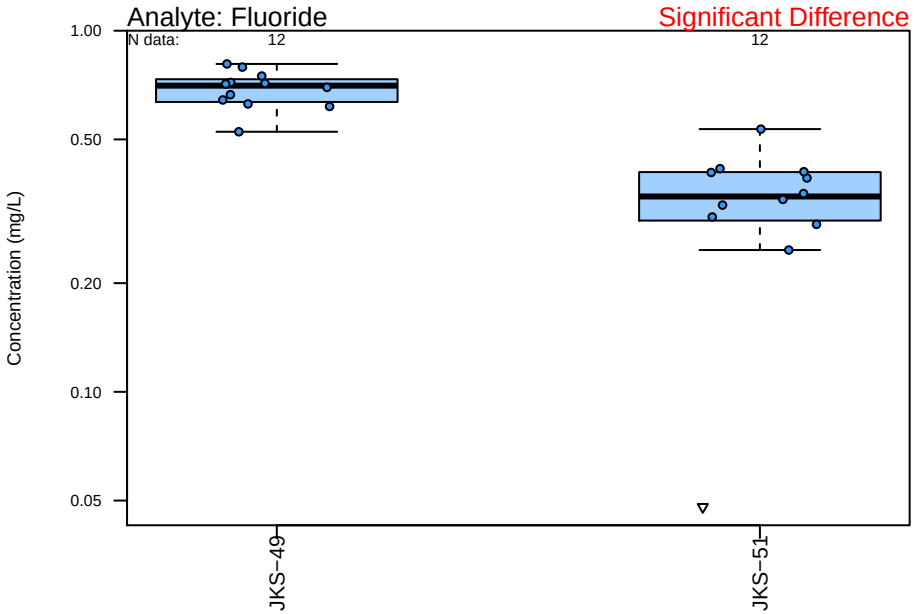
Non-detects were substituted with a value of zero for trend calculations
UPL: Upper Prediction Limit
ND: Not detected
SU: Standard units
tau: Kendall's tau statistic
Obs > UPL: Exceed 'X' indicates that the most recent observed value is higher than the UPL (or out of range of the LPL and UPL in the case of pH.)
Obs > UPL: Exceed 'X0' indicates that the two most recent values are higher than the UPL, but the upgradient well is 100% ND.
Obs > UPL: Exceed '0' indicated that the most recent observed value is higher than the UPL, but is not scored as an SSI due to Double Quantification Rule (ERM 2017).

Appendix B − Figure 1
Unit: Bottom Ash Ponds
Boxplots of Upgradient Wells

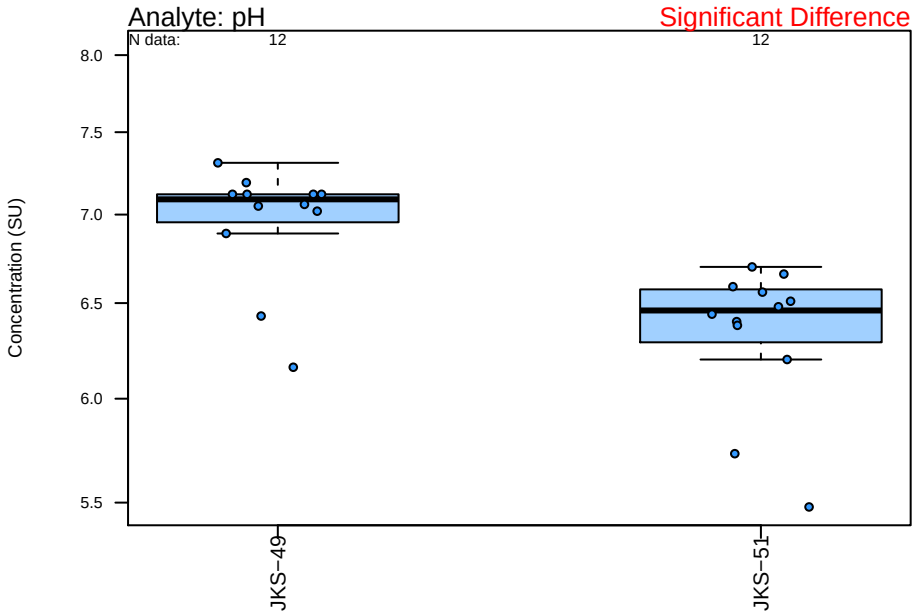


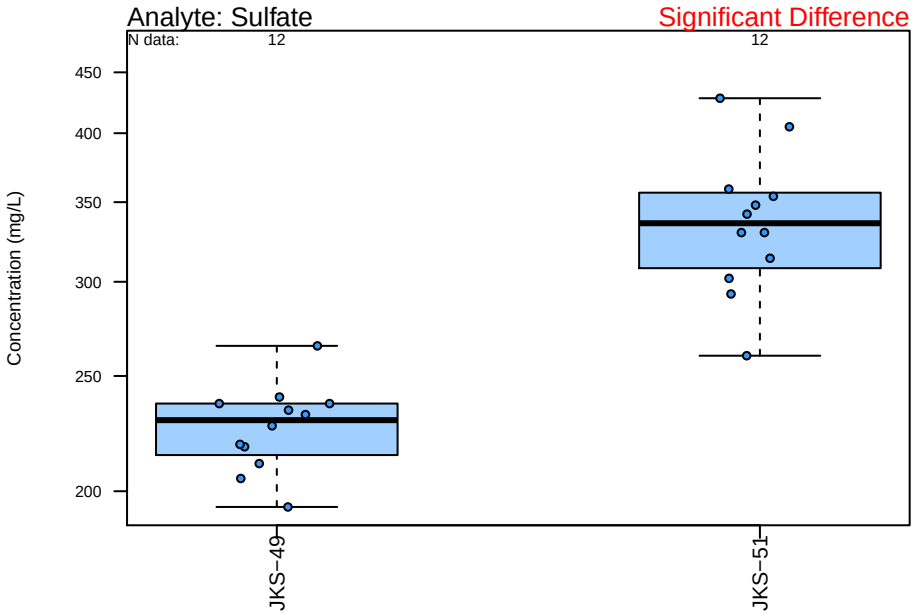


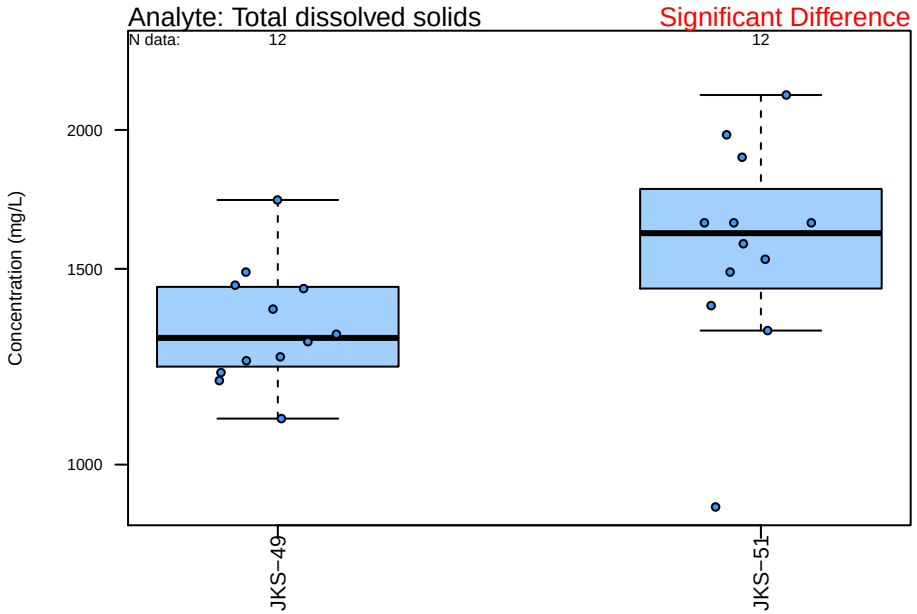




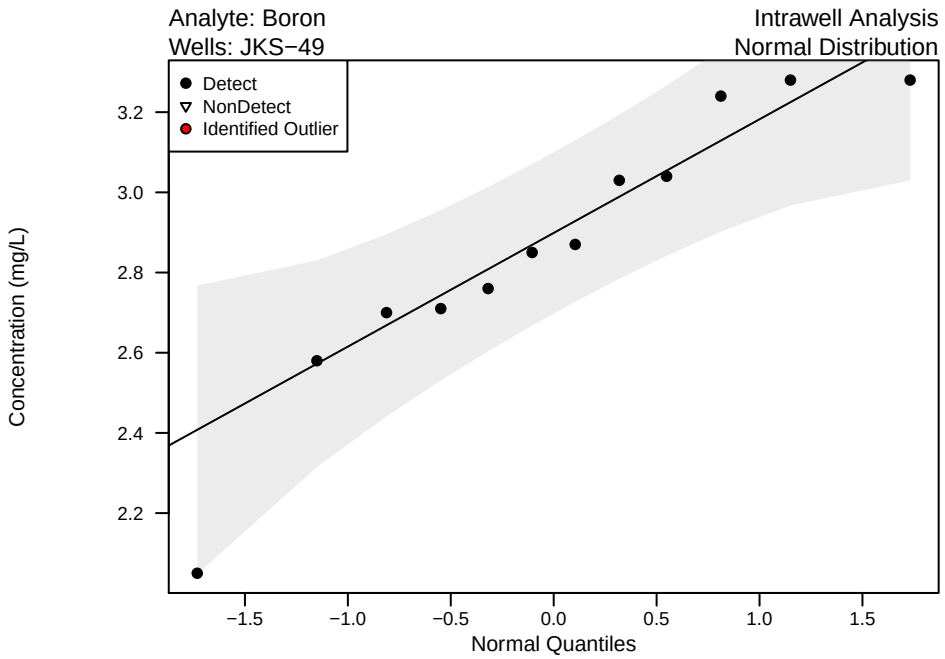
Appendix B − Figure 1
Unit: Bottom Ash Ponds
Boxplots of Upgradient Wells



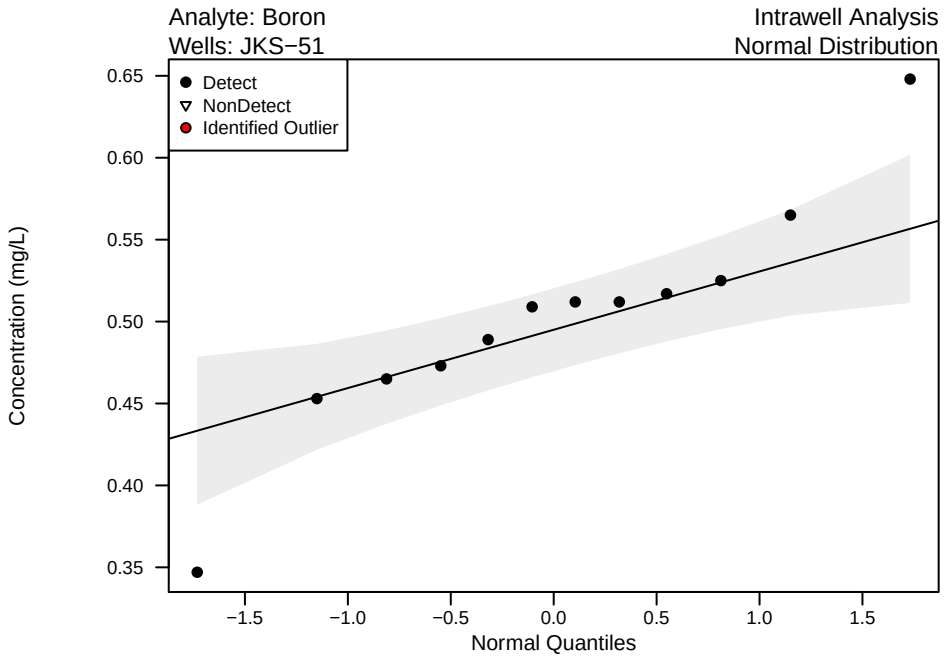




Appendix B − Figure 2
Unit: Bottom Ash Ponds
QQ Plots of Upgradient Wells

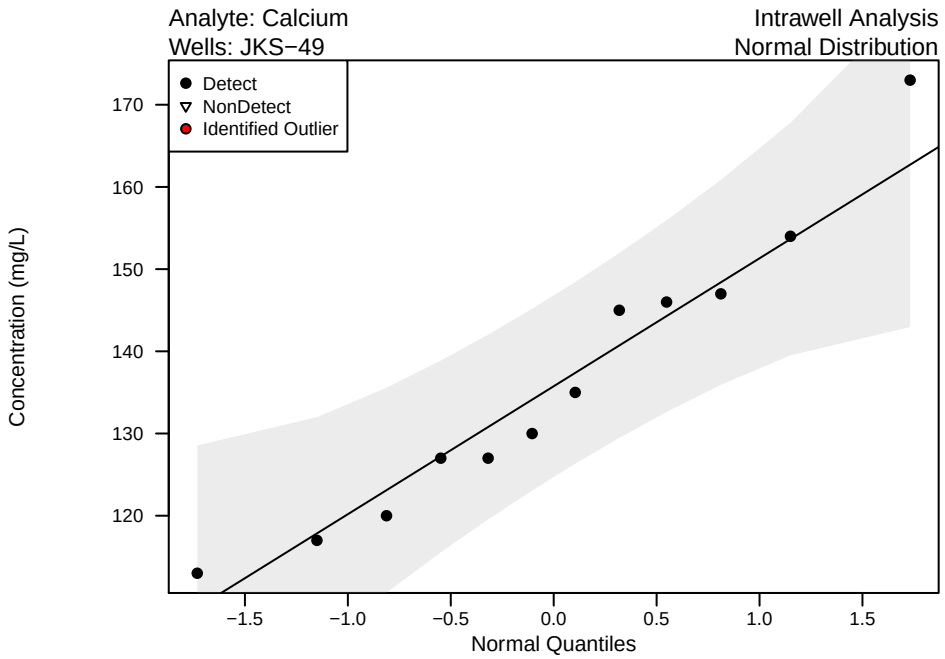


Intentionally left blank,
not Lognormal/NDD distribution.

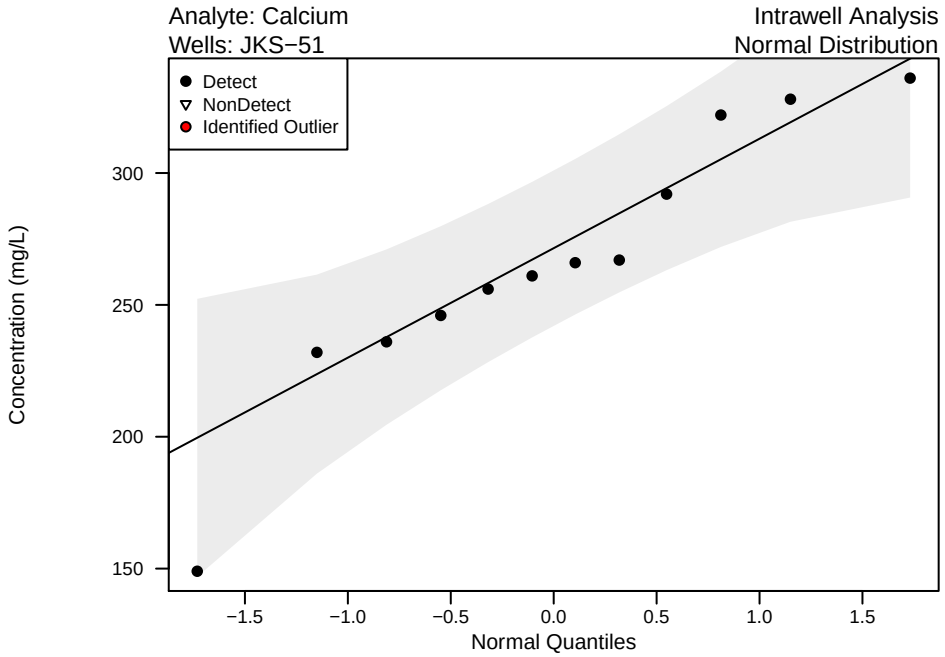


Intentionally left blank,
not Lognormal/NDD distribution.

Appendix B − Figure 2
Unit: Bottom Ash Ponds
QQ Plots of Upgradient Wells

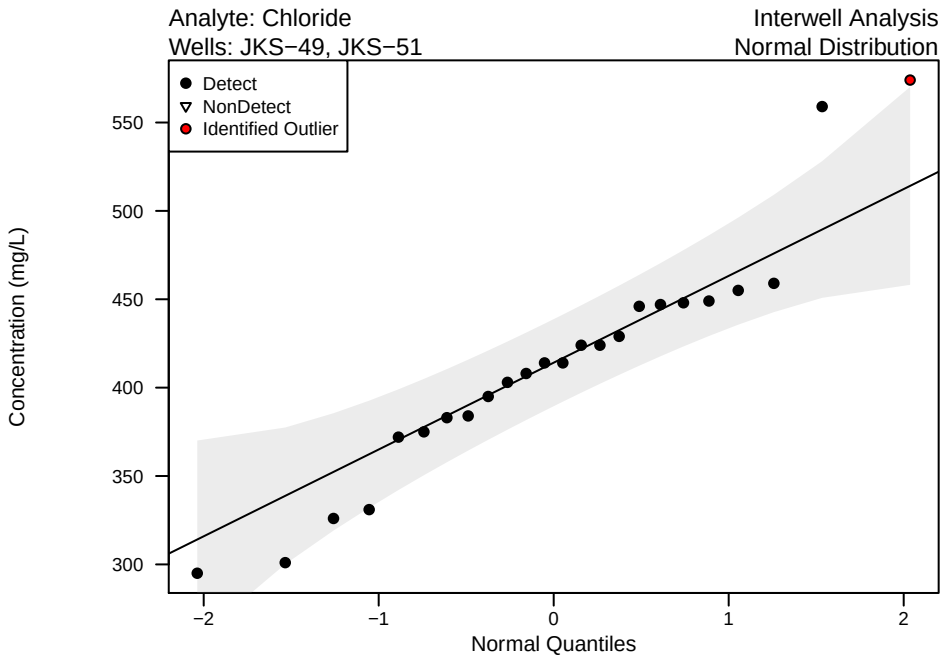


Intentionally left blank,
not Lognormal/NDD distribution.

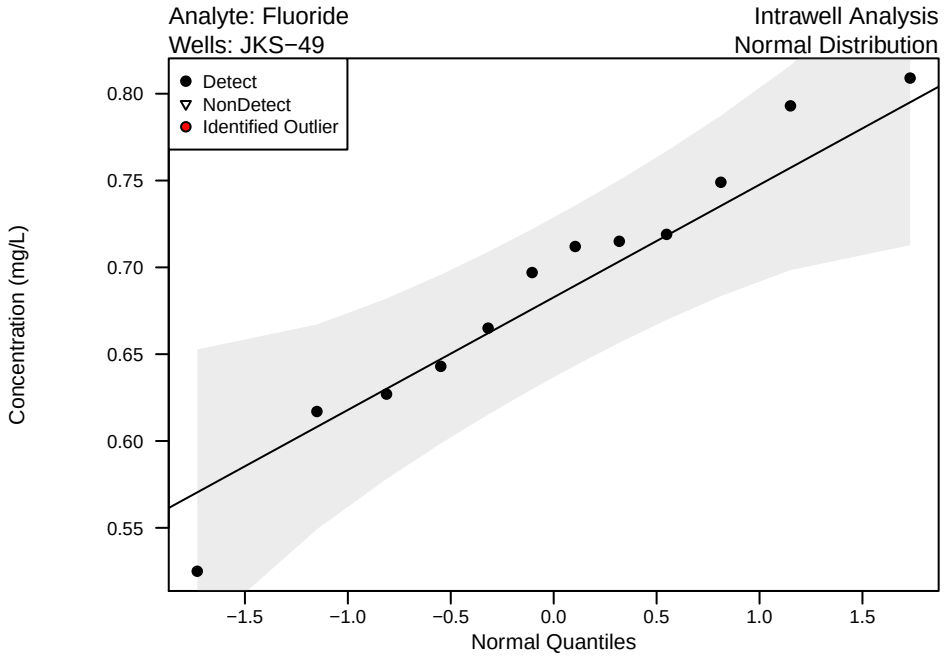


Intentionally left blank,
not Lognormal/NDD distribution.

Appendix B − Figure 2
Unit: Bottom Ash Ponds
QQ Plots of Upgradient Wells

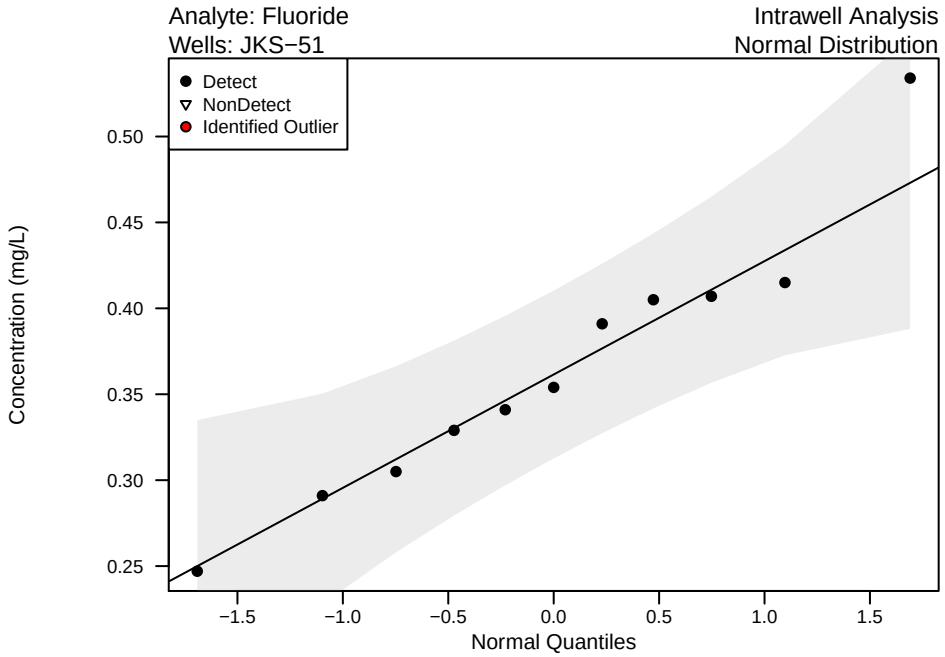


Intentionally left blank,
not Lognormal/NDD distribution.

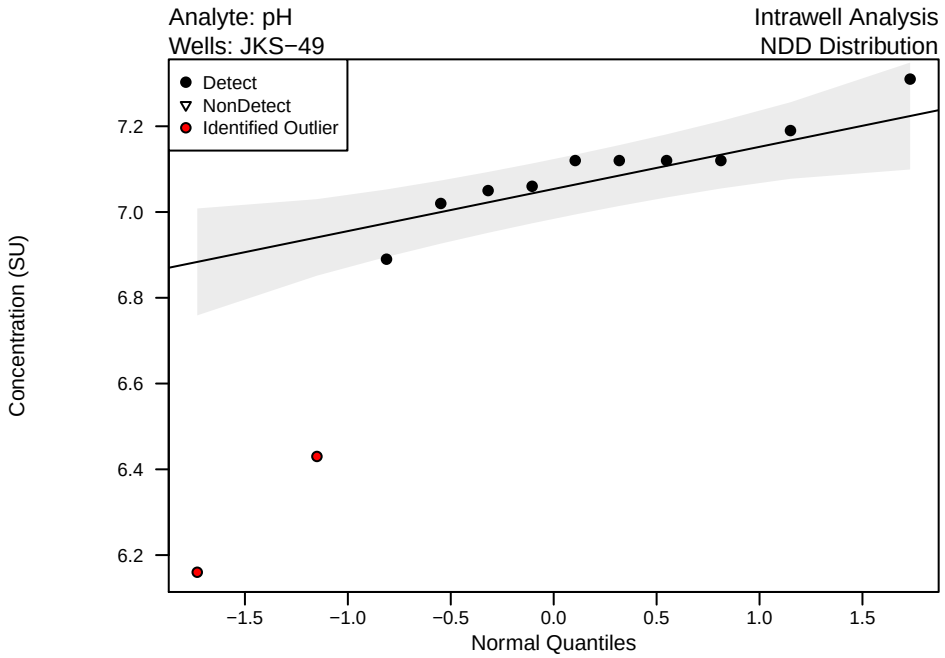


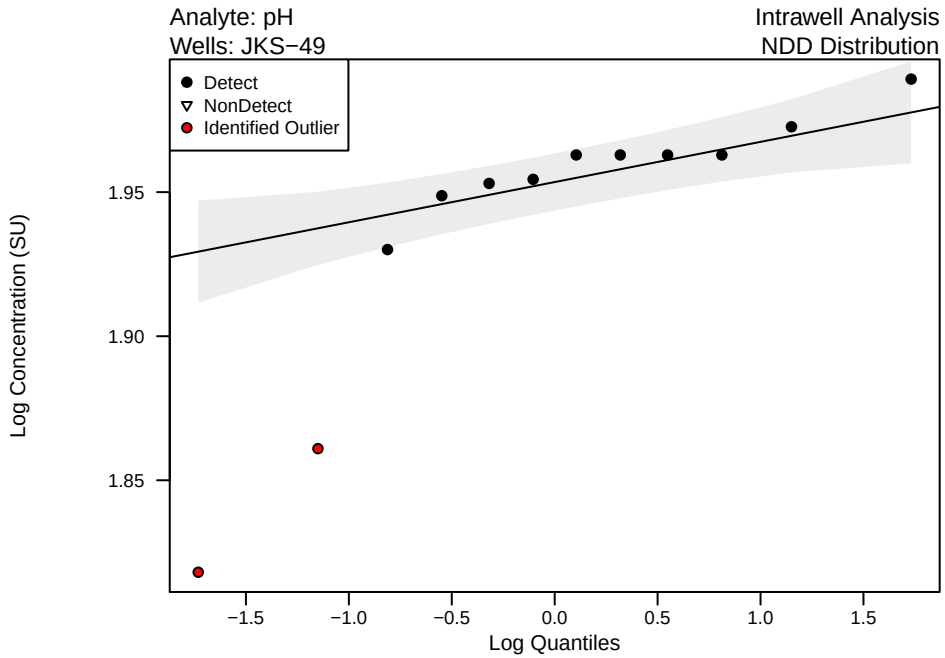
Intentionally left blank,
not Lognormal/NDD distribution.

Appendix B − Figure 2
Unit: Bottom Ash Ponds
QQ Plots of Upgradient Wells

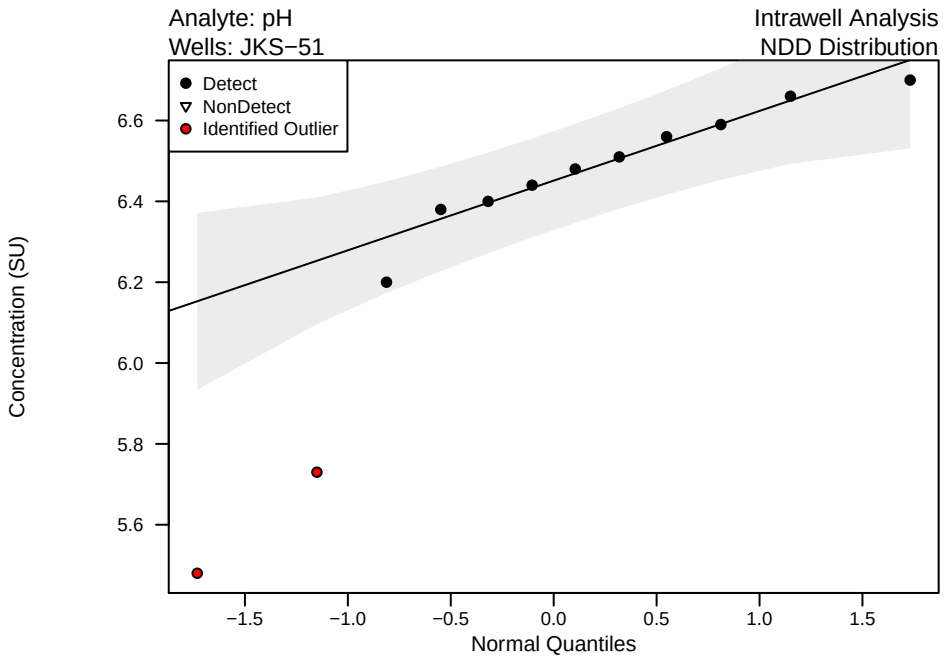


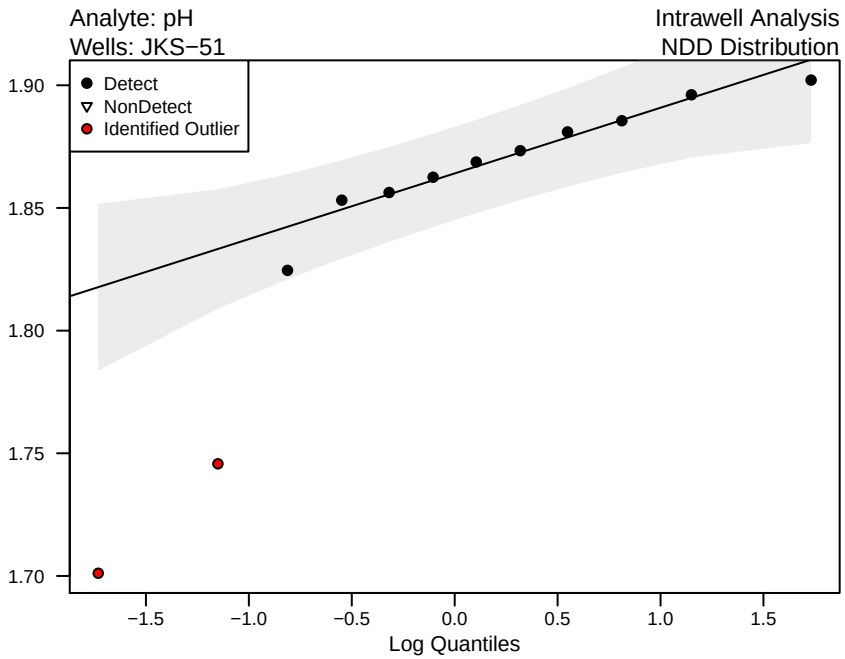
Intentionally left blank,
not Lognormal/NDD distribution.

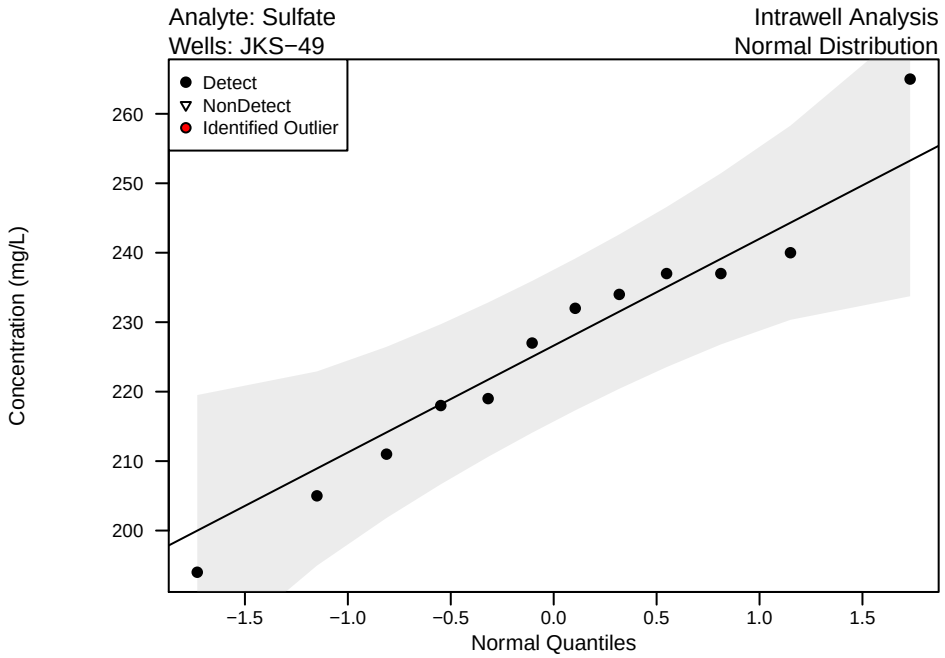




Appendix B − Figure 2
Unit: Bottom Ash Ponds
QQ Plots of Upgradient Wells

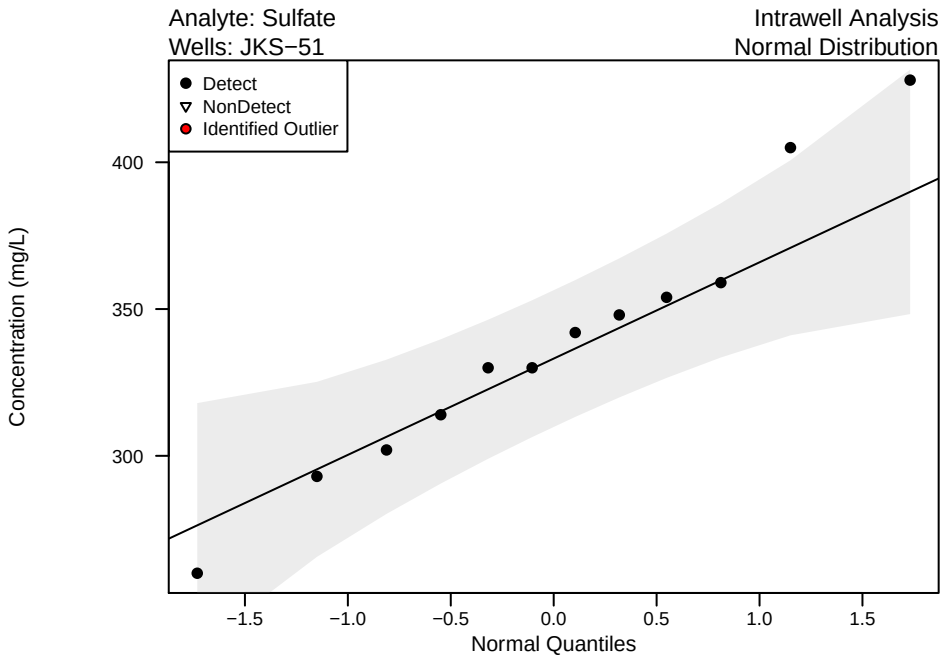




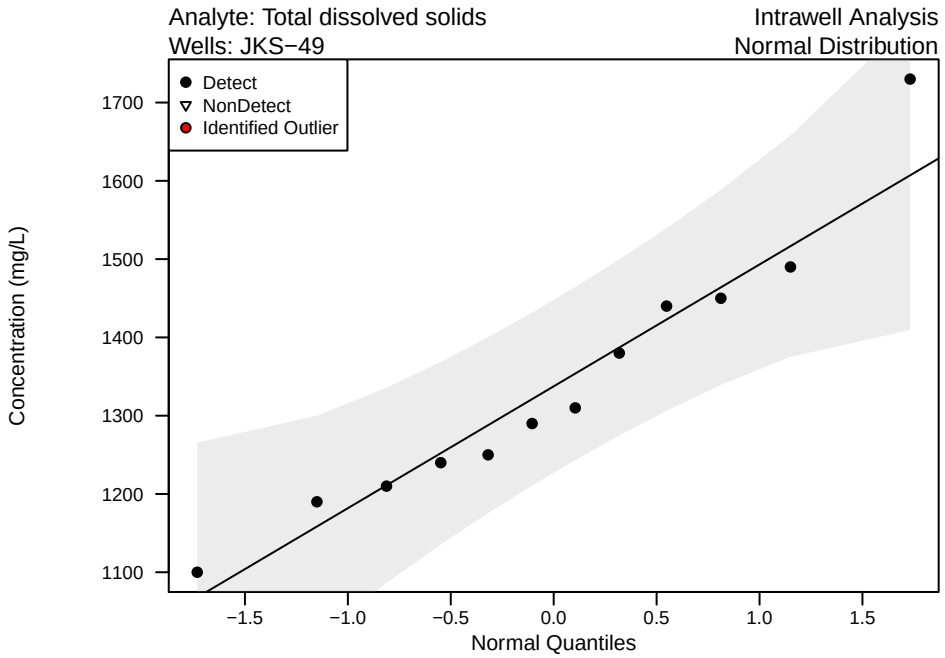


Intentionally left blank,
not Lognormal/NDD distribution.

Appendix B − Figure 2
Unit: Bottom Ash Ponds
QQ Plots of Upgradient Wells

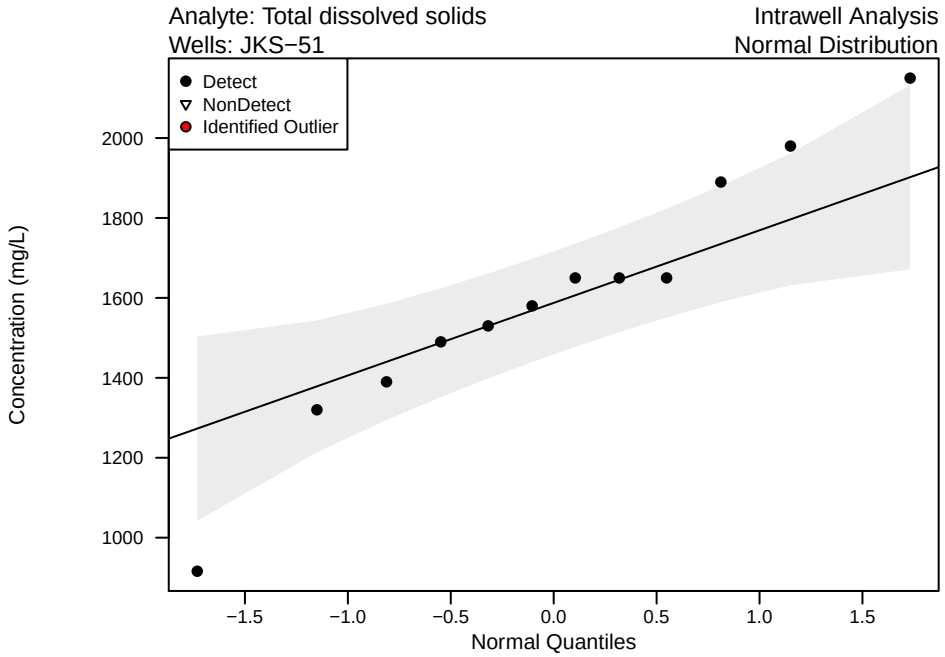


Intentionally left blank,
not Lognormal/NDD distribution.



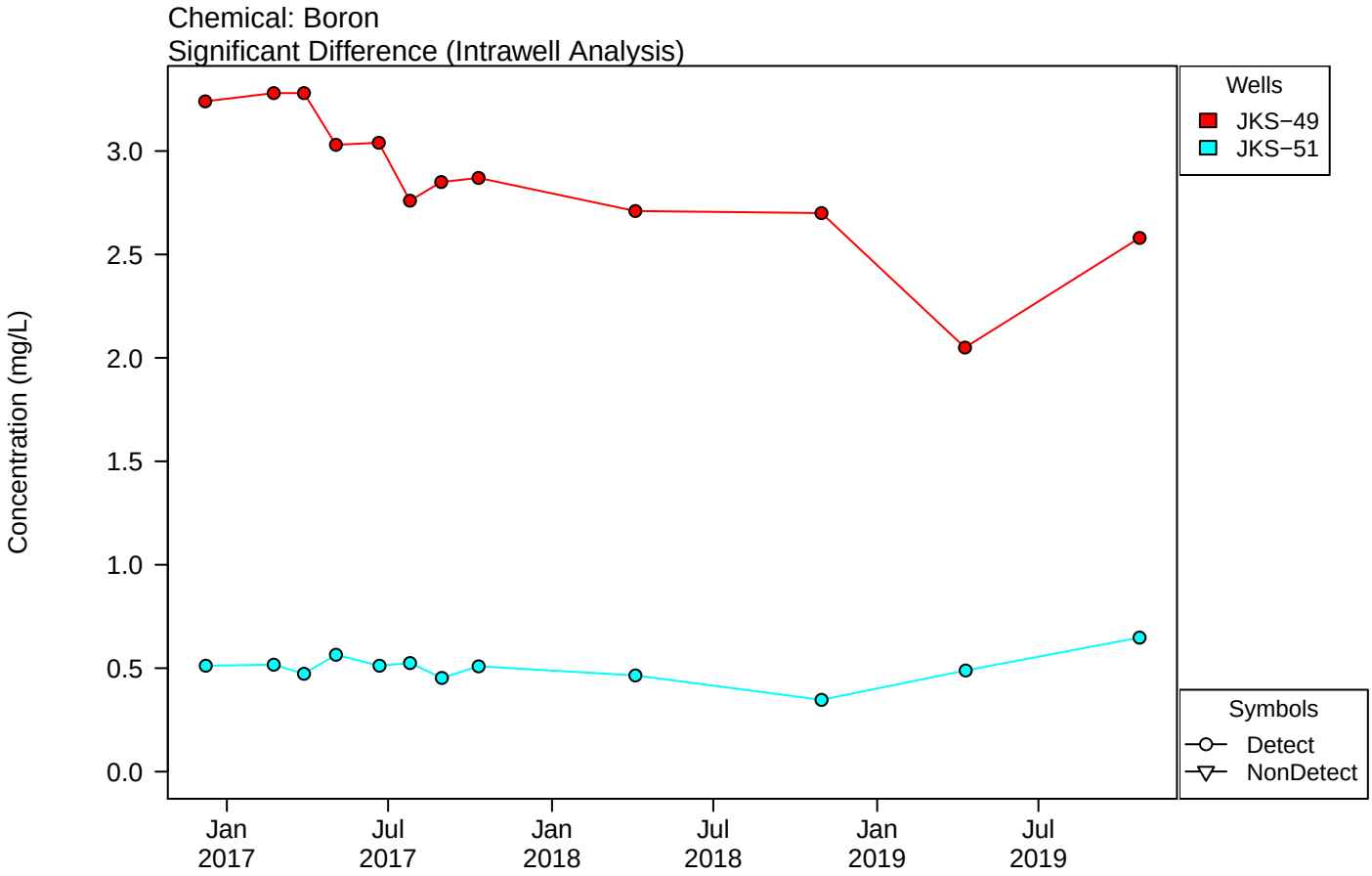
Intentionally left blank,
not Lognormal/NDD distribution.

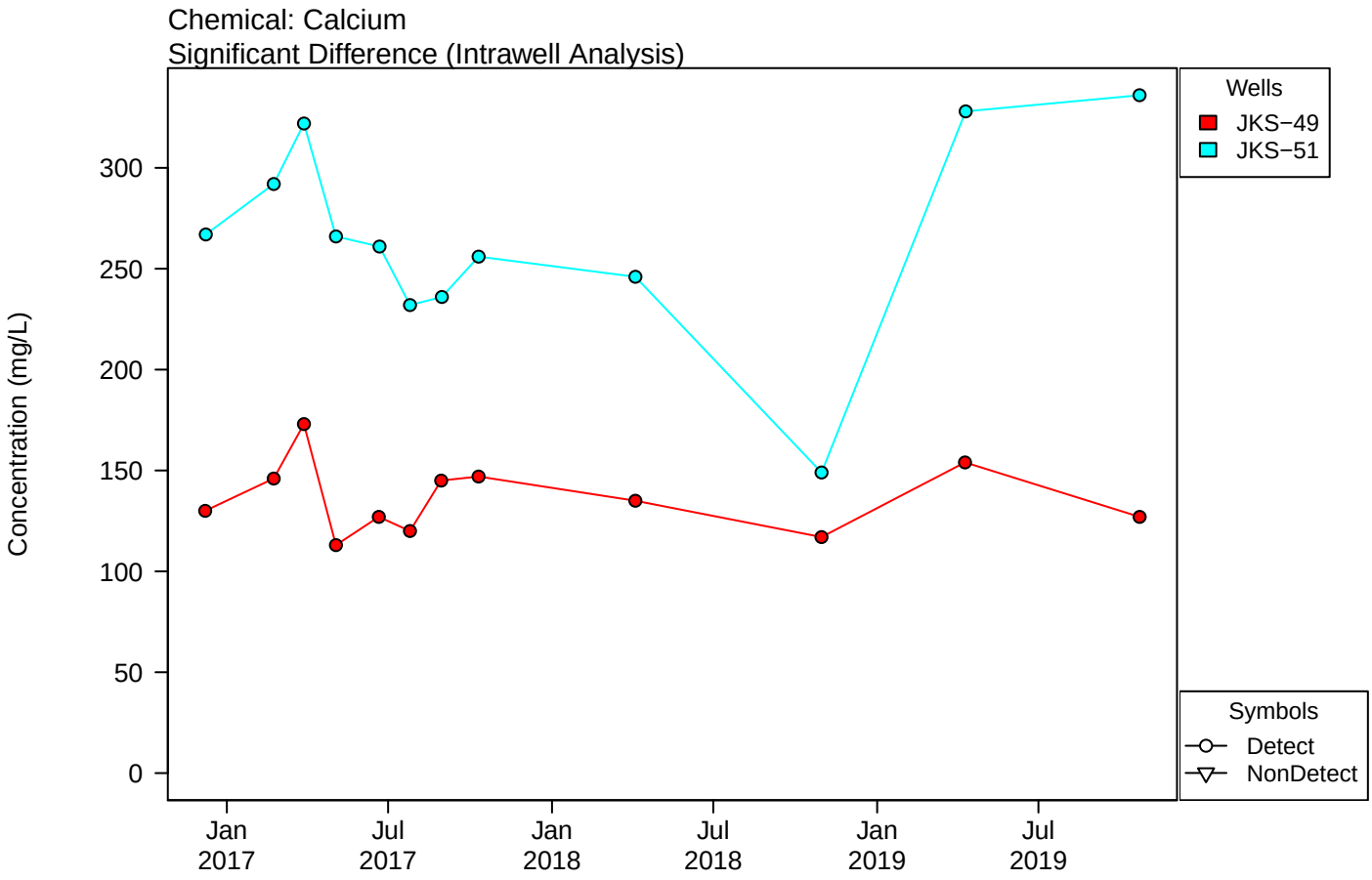
Appendix B − Figure 2
Unit: Bottom Ash Ponds
QQ Plots of Upgradient Wells



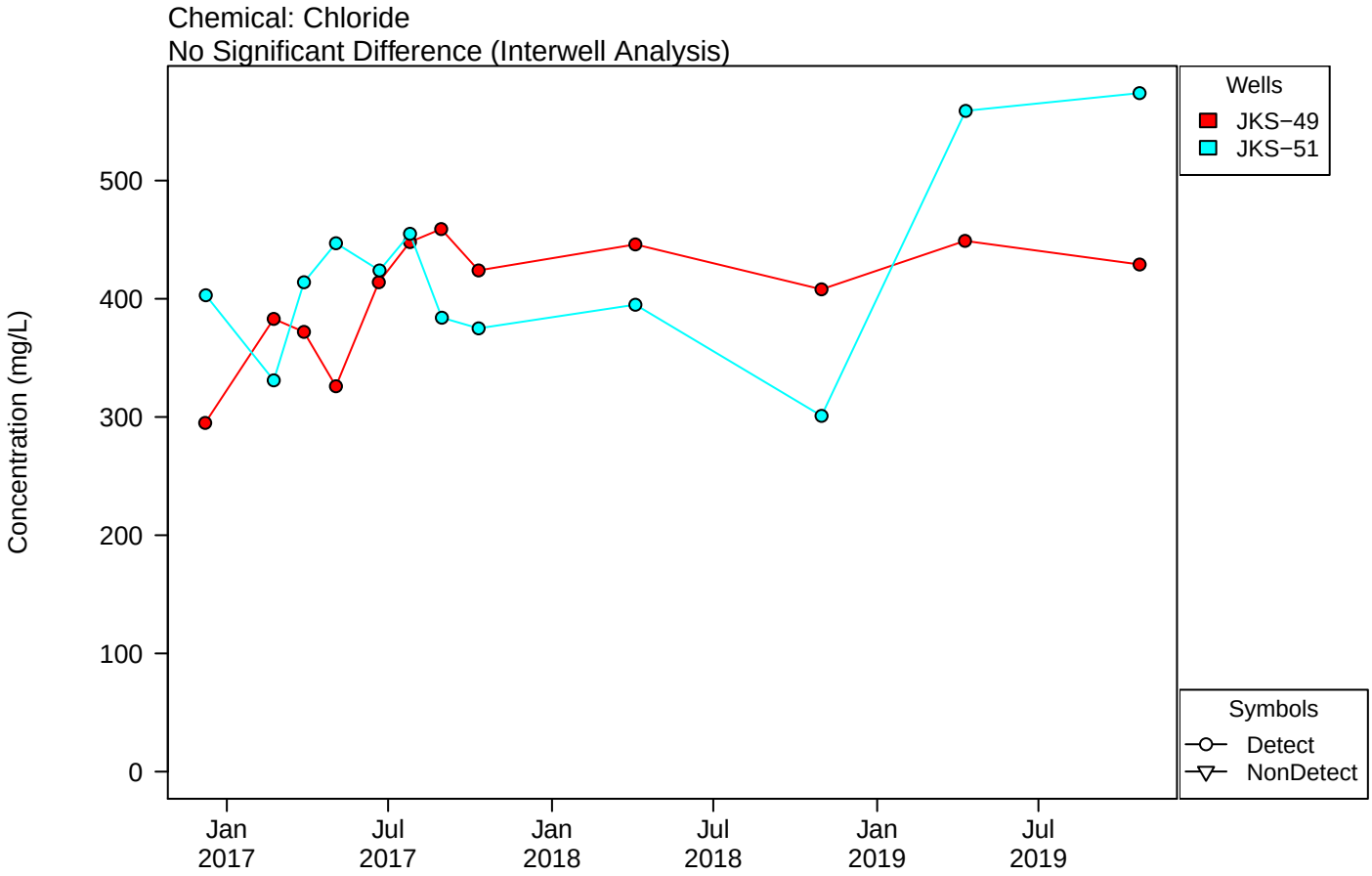
Intentionally left blank,
not Lognormal/NDD distribution.

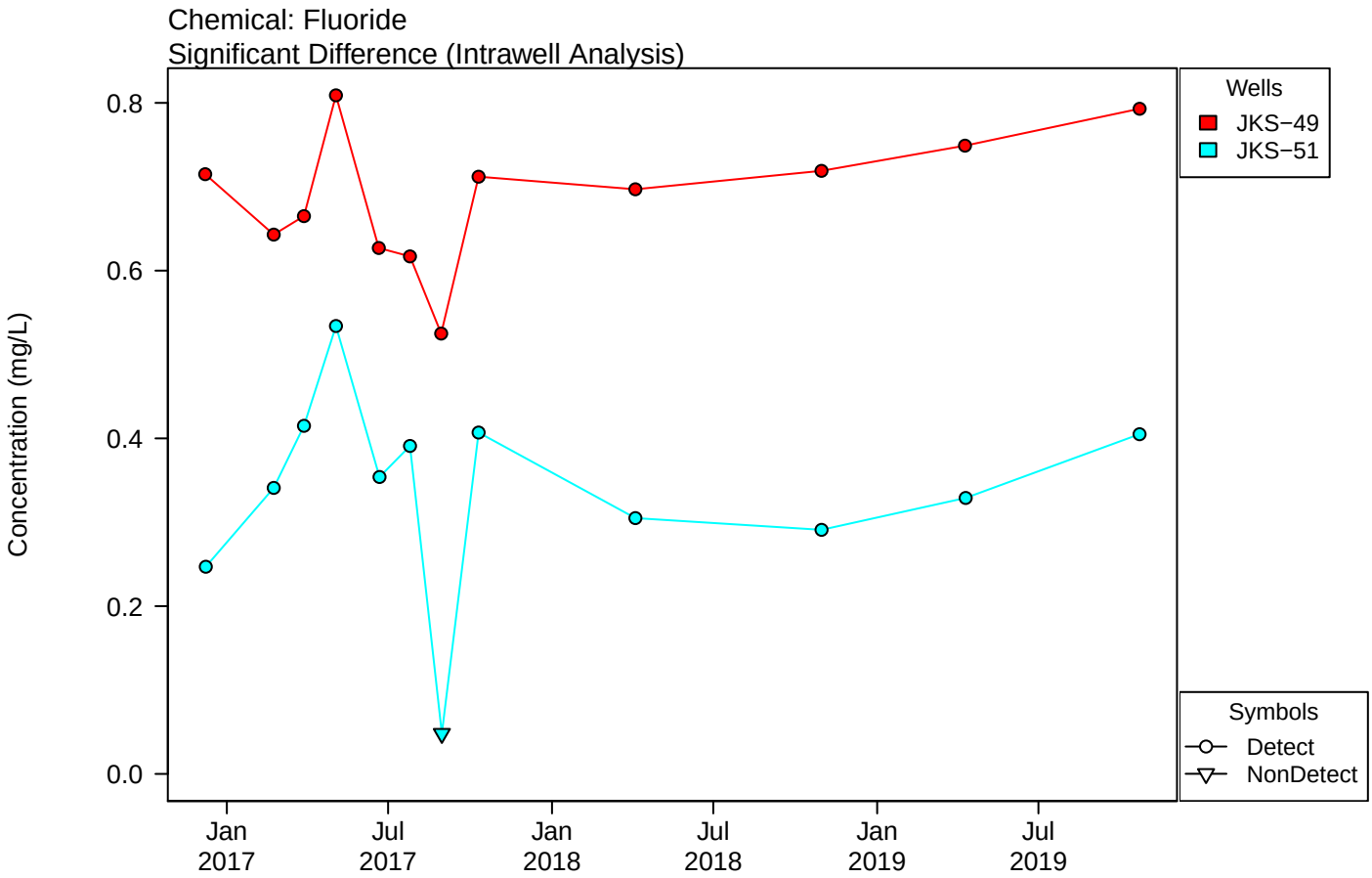
Appendix B − Figure 3
Unit: Bottom Ash Ponds
Timeseries of Upgradient Wells



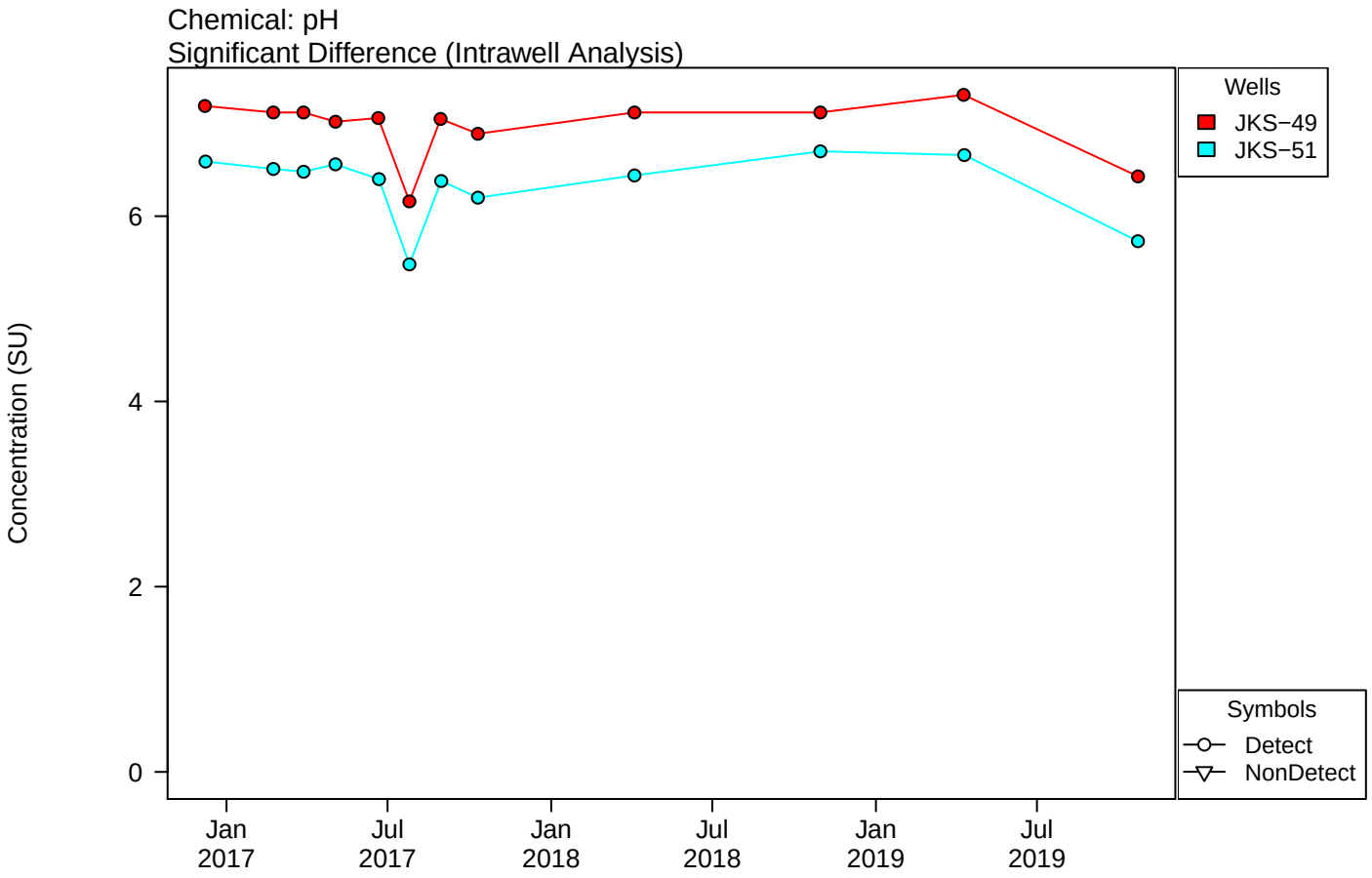


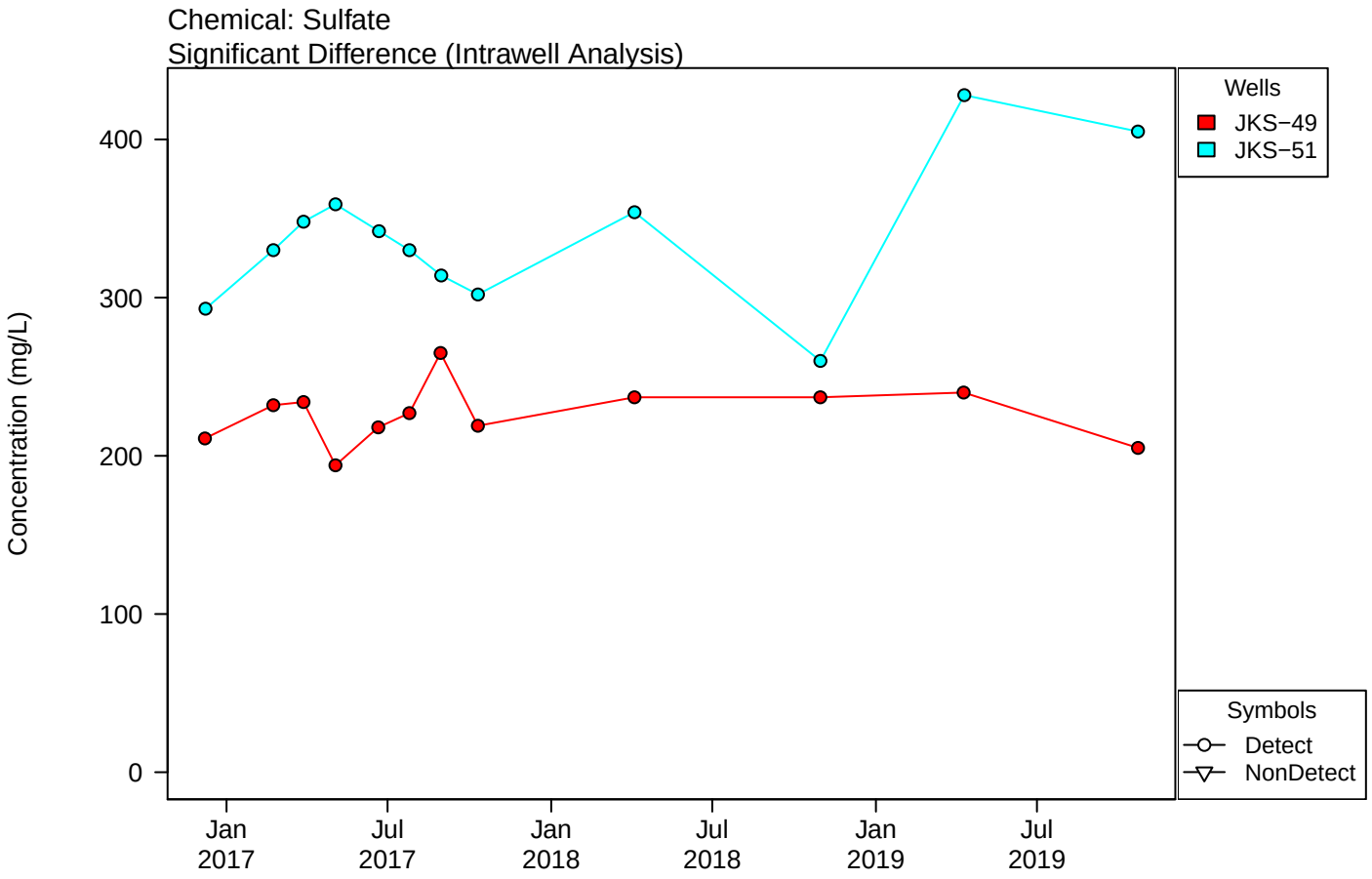
Appendix B − Figure 3
Unit: Bottom Ash Ponds
Timeseries of Upgradient Wells



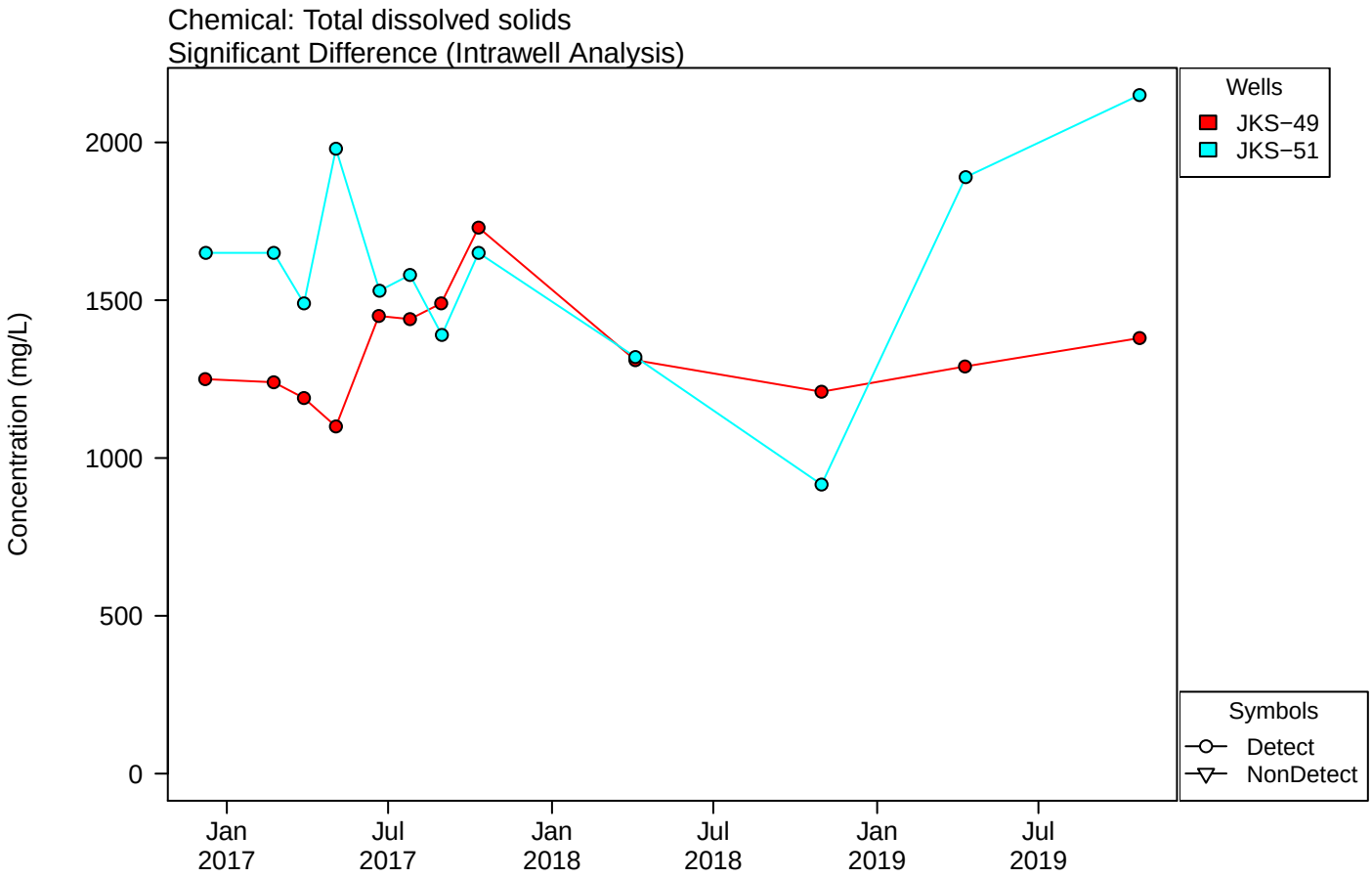


Appendix B − Figure 3
Unit: Bottom Ash Ponds
Timeseries of Upgradient Wells

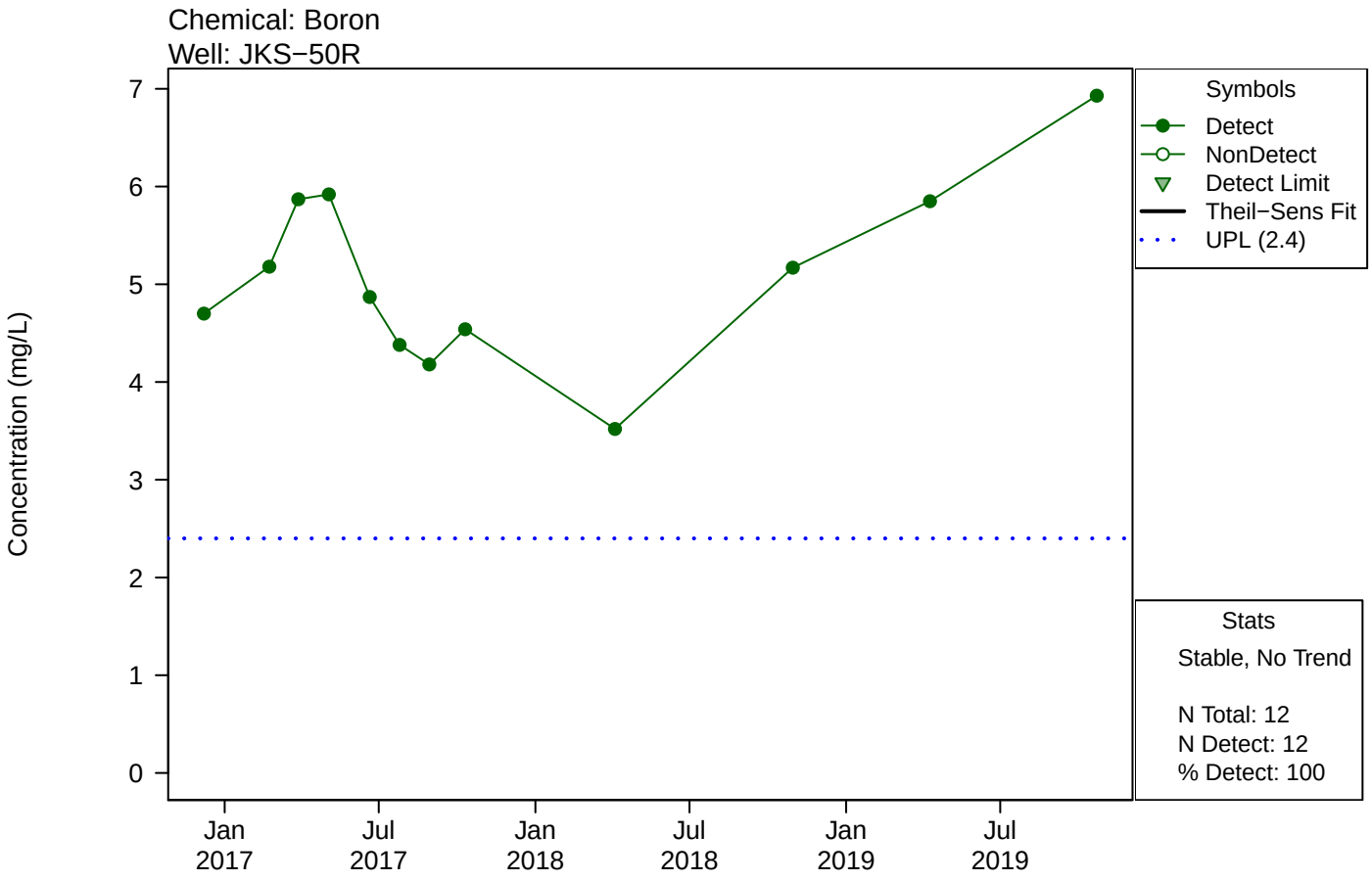


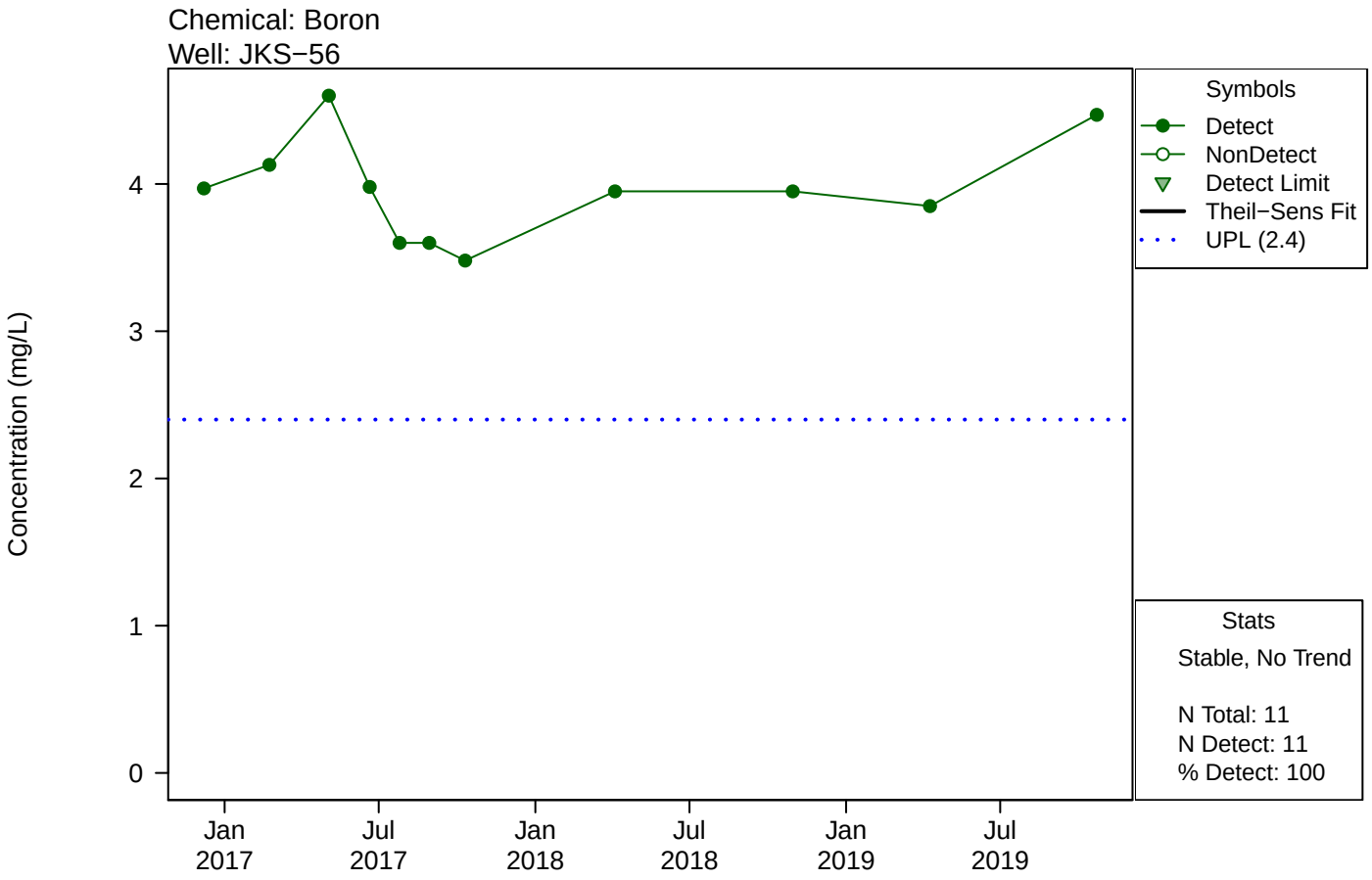


Appendix B − Figure 3
Unit: Bottom Ash Ponds
Timeseries of Upgradient Wells

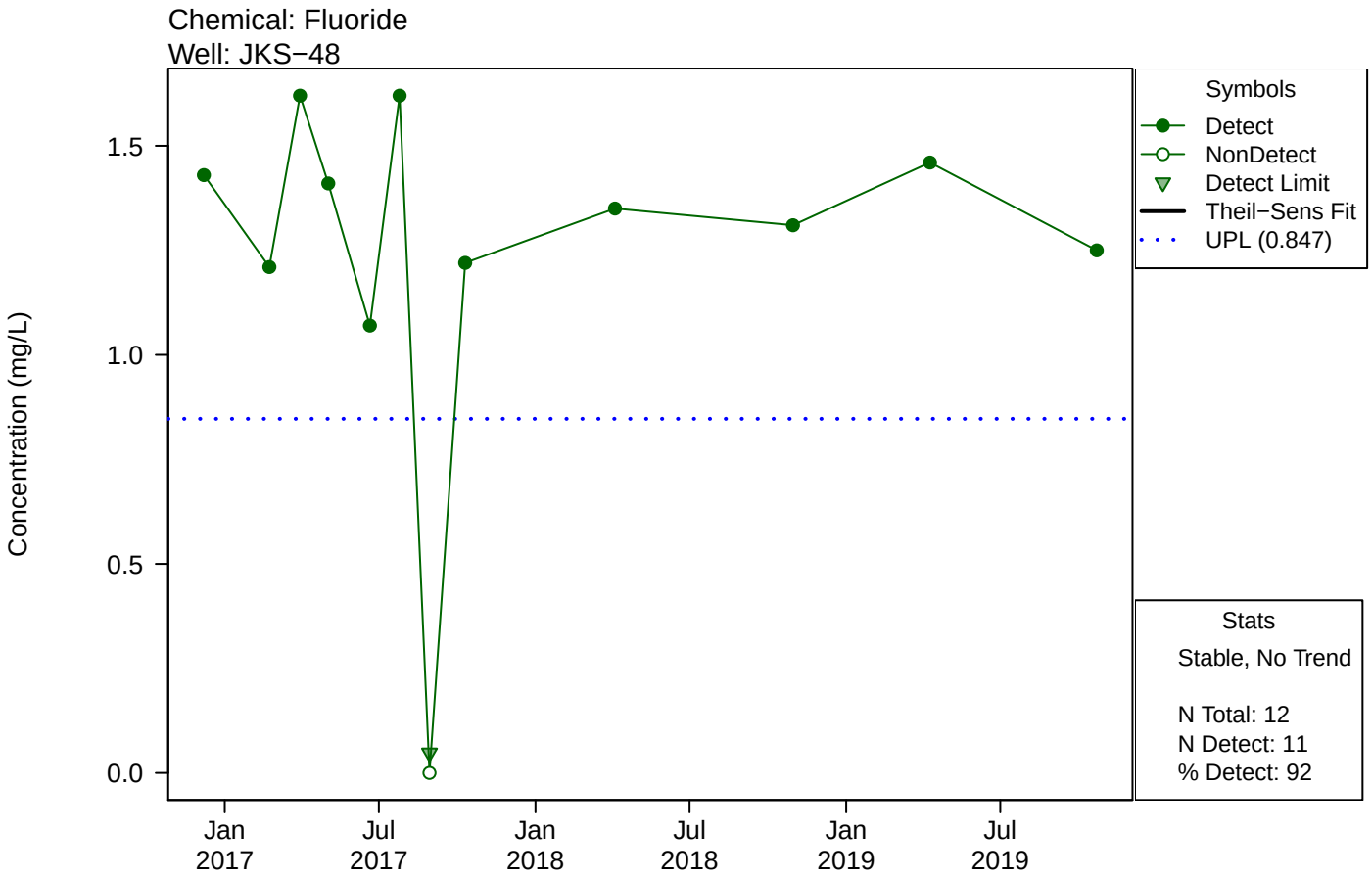


Appendix B − Figure 4
Unit: Bottom Ash Ponds
Trend Analysis of Downgradient Wells with Exceedances





Appendix B − Figure 4
Unit: Bottom Ash Ponds
Trend Analysis of Downgradient Wells with Exceedances



April 2019 Groundwater Sampling Event – Calaveras Power Station CCR Units

Appendix C

Environmental Resources Management

CityCentre Four
840 West Sam Houston Pkwy N.
Suite 600
Houston, Texas 77024
(281) 600-1000
(281) 600-1001 (Fax)

July 11, 2019

Mr. Michael Malone
CPS Energy
145 Navarro Street
San Antonio, Texas 78205

Project No. 0503422

Subject: April 2019 Groundwater Sampling Event
Calaveras Power Station CCR Units
San Antonio, Texas

Dear Mr. Malone:

Introduction

Title 40, Code of Federal Regulations, Part 257 (40 CFR §257) (a.k.a. the Coal Combustion Residual (CCR) Rule) was published in the Federal Register in April 2015 and became effective in October 2015. One of the many requirements of the CCR Rule was for CPS Energy to determine if there are impacts to groundwater from the surface impoundments [Evaporation Pond (EP), Bottom Ash Ponds (BAPs), and Sludge Recycling Holding (SRH) Pond] and the landfill [Fly Ash Landfill (FAL)] that contain CCR at the Calaveras Power Station.

In the initial *Annual Groundwater Monitoring and Corrective Action Report* for each CCR unit, the downgradient monitoring well results from the October 2017 sampling event were compared to Upper Prediction Limits (UPLs) and Lower Prediction Limits (LPLs). UPLs and LPLs were calculated in the respective *Annual Groundwater Monitoring and Corrective Action Reports* for the purpose of determining a potential statistically significant increase (SSI) over background levels. In the second *Annual Groundwater Monitoring and Corrective Action Report* for each CCR unit, the downgradient monitoring well results from the October 2018 sampling event were compared to updated UPLs and LPLs. These updated UPLs and LPLs were recalculated in the respective *Annual Groundwater Monitoring and Corrective Action Reports* using the additional 2018 data. The evaluations of the April 2019 groundwater sample results indicated a potential SSI for a limited number of constituents from the EP, FAL, BAPs, and SRH Pond.

According to the CCR Rule [§257.94(e)], if the owner or operator of a CCR unit determines there is a SSI over background levels for one or more Appendix III constituents, the owner or operator may demonstrate that a source other than the CCR unit caused the SSI over background levels or that the SSI resulted from error in sampling, analysis, statistical evaluation or natural variation in

Texas Registered Engineering Firm F-2393
Texas Board of Professional Geoscientist Firm 50036

groundwater quality. The CCR Rule also indicates that the owner or operator must complete the written demonstration within 90 days of detecting a SSI over the background levels. If a successful demonstration is completed within the 90-day period, the owner or operator may continue with a detection monitoring program.

To address the potential SSIs identified in the initial *Annual Groundwater Monitoring and Corrective Action Reports*, CPS Energy prepared *Written Demonstration – Responses to Potential Statistically Significant Increases (*dated April 4, 2018). To address the potential SSIs identified in the second *Annual Groundwater Monitoring and Corrective Action Reports*, CPS Energy prepared *Written Demonstration – Responses to Potential Statistically Significant Increases (*dated February 27, 2019). Based on the evidence provided in the *Written Demonstrations*, no SSIs over background levels were determined for any of the CPS Energy CCR units (EP, FAL, BAPs, and SRH Pond) and therefore, CPS Energy continued with a detection monitoring program that would include semiannual sampling.

Sampling Event Summary

The first semiannual groundwater sampling event for 2019 was conducted on April 9 through April 10. The sampling event included the collection of water level measurements and groundwater samples from all the background and downgradient monitoring wells in the CCR monitoring program. The groundwater samples were analyzed for Appendix III constituents.

For each CCR unit, the downgradient monitoring well results from the April 2019 sampling event were compared to the updated UPLs and LPLs recalculated in their respective second *Annual Groundwater Monitoring and Corrective Action Report*. The April 2019 groundwater sample results for the downgradient monitoring wells in each CCR unit are summarized in Attachment 1.

Although the evaluations of the April 2019 groundwater sample results indicated a potential SSI for a limited number of constituents, with the exception of calcium in JKS-60 associated with the FAL and fluoride in JKS-52 associated with the SRH Pond, the constituents associated with the potential SSIs are the same constituents, detected at similar concentrations, that were previously identified in one or both of the *Written Demonstrations*. The evaluations of the April 2019 groundwater sample results with potential SSIs are summarized below.

EP – The constituents associated with potential SSIs include boron in JKS-61; fluoride in JKS-36, JKS-61, and JKS-62; and pH in JKS-36. As previously presented in the *Written Demonstrations*, the concentrations of boron, fluoride, and pH appear to reflect natural variation in groundwater quality in the vicinity of the CCR unit. The reported April 2019 concentrations were within the range of naturally occurring concentrations identified in the *Written Demonstrations*.

FAL – The constituents associated with potential SSIs include calcium in JKS-33 and JKS-60; chloride in JKS-33; and pH in JKS-31 and JKS-46. As previously presented in the *Written Demonstrations*, the concentrations of calcium, chloride, and pH appear to reflect natural variation in groundwater quality in the vicinity of the CCR unit. The reported April 2019 concentrations were within the range of naturally occurring concentrations identified in the *Written Demonstrations*.

BAPs – The constituents associated with potential SSIs include boron in JKS-50R and JKS-56 and fluoride in JKS-48. As previously presented in the *Written Demonstrations*, the concentrations of boron and fluoride appear to reflect natural variation in groundwater quality in the vicinity of the CCR unit. The reported April 2019 concentrations were within the range of naturally occurring concentrations identified in the *Written Demonstrations*.

SRH Pond – The constituent associated with a potential SSI is fluoride in JKS-52. Although a potential SSI of fluoride was not previously presented in the *Written Demonstrations*, the concentrations of fluoride appear to reflect natural variation in groundwater quality in the vicinity of the CCR unit and the reported April 2019 concentration is within the range of naturally occurring concentrations identified in the *Annual Groundwater Monitoring and Corrective Action Reports*. Also note that although the normal groundwater sample collected from JKS-52 indicated a potential SSI of fluoride, a field duplicate sample collected from JKS-52 after the normal sample did not indicate a potential SSI.

Conclusions

Based on the April 2019 groundwater sample results and the evidence provided in one or both of the *Written Demonstration*s, no SSIs over background levels have been determined for any of the CPS Energy CCR units (EP, FAL, BAPs, and SRH Pond) and therefore, CPS Energy should continue with a detection monitoring program. The second semiannual sampling event should be performed in October 2019.

We appreciate the opportunity to work with you on this project. Please contact me if you should have any questions.

Sincerely,

Environmental Resources Management

Wally Zverina
Principal Consultant

Attachment 1
April 2019 Groundwater Sample Results

July 2019
Project No. 0503422
CPS Energy

Environmental Resources Management
CityCentre Four
840 West Sam Houston Pkwy N. Suite 600
Houston, Texas 77024
(281) 600-1000

April 2019 Groundwater Sample Results
CCR Unit: Evaporation Pond
CPS Energy Calaveras Power Station
San Antonio, TX

			CCR Unit	EP	EP	EP	EP
			Well Designation	Downgradient	Downgradient	Downgradient	Downgradient
			Well ID	JKS-36	JKS-61	JKS-62	JKS-62
			Sample Date	4/9/2019	4/9/2019	4/9/2019	4/9/2019
			Sample Type Code	N	N	N	FD
Chemical	Units	2017-2018 LPL - EP	2017-2018 UPL - EP				
Boron	mg/L	--	1.33	0.663	2.72	0.612	0.554 X
Calcium	mg/L	--	1310	315 D	176	205 D	173 X
Chloride	mg/L	--	2120	285	253	336	329
Fluoride	mg/L	--	0.271	1.45	0.403 J	0.356 J	0.349 J
pH, Field	SU	5.36	6.63	3.71	6.52	6.29	6.29
Sulfate	mg/L	--	2110	697	619	191	194
Total dissolved solids	mg/L	--	6450	1520	1650	1190	1300

NOTES:

Shaded cell indicates exceedance in either the Upper Prediction Limit (UPL) or the Lower Prediction Limit (LPL) for this CCR unit.
Sample Type Code: N - Normal; FD - Field Duplicate
J - Estimated concentration. Qualified due to high matrix spike % recovery.
X - MS/MSD recoveries were outside of the laboratory contol limts due to possible matrix interference or a concentration of target analyte high enough to affect the recovery of the spike concentration.
D - Sample was diluted due to targets detected over the highest point of the calibration curve or due to matrix interference.

April 2019 Groundwater Sample Results
CCR Unit: Fly Ash Landfill
CPS Energy Calaveras Power Station
San Antonio, TX

			CCR Unit	FAL	FAL	FAL	FAL	FAL
			Well Designation	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient
			Well ID	JKS-31	JKS-33	JKS-46	JKS-60	JKS-60
			Sample Date	4/9/2019	4/9/2019	4/9/2019	4/9/2019	4/9/2019
			Sample Type Code	N	N	N	N	FD
Chemical	Units	2017-2018 LPL - FAL	2017-2018 UPL - FAL					
Boron	mg/L	--	4.22	0.557	1.13	0.997	0.405	0.375
Calcium	mg/L	--	453	295 D	631	212 D	501 D	506 D
Chloride	mg/L	--	380	322	806	13.2	149 X	151
Fluoride	mg/L	--	5.19	0.791	1.23	2.52	0.187 J	0.187 J
pH, Field	SU	3.98	6.73	3.56	5.98	2.85	5.93	5.93
Sulfate	mg/L	--	6370	852	1640	1030	968	976
Total dissolved solid	mg/L	--	11200	1660	2650 JL	1550	2010	2020

NOTES:

Shaded cell indicates exceedance in either the Upper Prediction Limit (UPL) or the Lower Prediction Limit (LPL) for this CCR unit.
Sample Type Code: N - Normal; FD - Field Duplicate
D - Sample was diluted due to targets detected over the highest point of the calibration curve or due to matrix interference.
J - Estimated concentration. Qualified due to high matrix spike % recovery.
JL - Estimated concentration biased low - analyzed outside of recommended holding time.
X - MS/MSD recoveries were outside of the laboratory contol limts due to possible matrix interference or a concentration of target analyte high enough to affect the recovery of the spike concentration.

April 2019 Groundwater Sample Results
CCR Unit: Bottom Ash Ponds
CPS Energy Calaveras Power Station
San Antonio, TX

			CCR Unit	BAP	BAP	BAP	BAP	BAP	BAP
			Well Designation	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient
			Well ID	JKS-48	JKS-50R	JKS-52	JKS-52	JKS-55	JKS-56
			Sample Date	4/9/2019	4/9/2019	4/9/2019	4/9/2019	4/9/2019	4/9/2019
			Sample Type Code	N	N	N	FD	N	N
Chemical	Units	2017-2018 LPL - BAP	2017-2018 UPL - BAP						
Boron	mg/L	--	2.71	2.22	5.85	1.46 X	1.62	0.74	3.85
Calcium	mg/L	--	229	166 D	159 D	195 DX	188 D	165 D	150 D
Chloride	mg/L	--	484	467	70	336	339	438	81
Fluoride	mg/L	--	0.834	1.46	0.319 J	0.831	0.799	0.822	0.372 J
pH, Field	SU	5.48	7.19	7.06	6.8	6.91	6.91	6.9	6.76
Sulfate	mg/L	--	389	271	168	268	285	168	193
Total dissolved solids	mg/L	--	1870	1420	842	1170	1250	1420	918

NOTES:

Shaded cell indicates exceedance in either the Upper Prediction Limit (UPL) or the Lower Prediction Limit (LPL) for this CCR unit.
Sample Type Code: N - Normal; FD - Field Duplicate
D - Sample was diluted due to targets detected over the highest point of the calibration curve or due to matrix interference.
J - Estimated concentration. Qualified due to high matrix spike % recovery.
X - MS/MSD recoveries were outside of the laboratory contol limts due to possible matrix interference or a concentration of target analyte high enough to affect the recovery of the spike concentration.

April 2019 Groundwater Sample Results
CCR Unit: SRH Pond
CPS Energy Calaveras Power Station
San Antonio, TX

			CCR Unit	SRH Pond	SRH Pond	SRH Pond	SRH Pond
			Well Designation	Downgradient	Downgradient	Downgradient	Downgradient
			Well ID	JKS-52	JKS-52	JKS-53	JKS-54
			Sample Date	4/10/2019	4/10/2019	4/10/2019	4/10/2019
			Sample Type Code	N	FD	N	N
Chemical	Units	2017-2018 LPL - SRH	2017-2018 UPL - SRH				
Boron	mg/L	--	2.71	1.46 X	1.62	1.42	1.38
Calcium	mg/L	--	231	195 DX	188 D	116	117
Chloride	mg/L	--	476	336	339	354	385
Fluoride	mg/L	--	0.816	0.831	0.799	0.27 J	0.711
pH, Field	SU	5.48	7.19	6.91	6.91	6.6	6.75
Sulfate	mg/L	--	382	268	285	224	309
Total dissolved solids	mg/L	--	1830	1170	1250	1150	1470

NOTES:

Shaded cell indicates exceedance in either the Upper Prediction Limit (UPL) or the Lower Prediction Limit (LPL) for this CCR unit.
Sample Type Code: N - Normal; FD - Field Duplicate
D - Sample was diluted due to targets detected over the highest point of the calibration curve or due to matrix interference.
J - Estimated concentration. Qualified due to high matrix spike % recovery.
X - MS/MSD recoveries were outside of the laboratory contol limts due to possible matrix interference or a concentration of target analyte high enough to affect the recovery of the spike concentration.