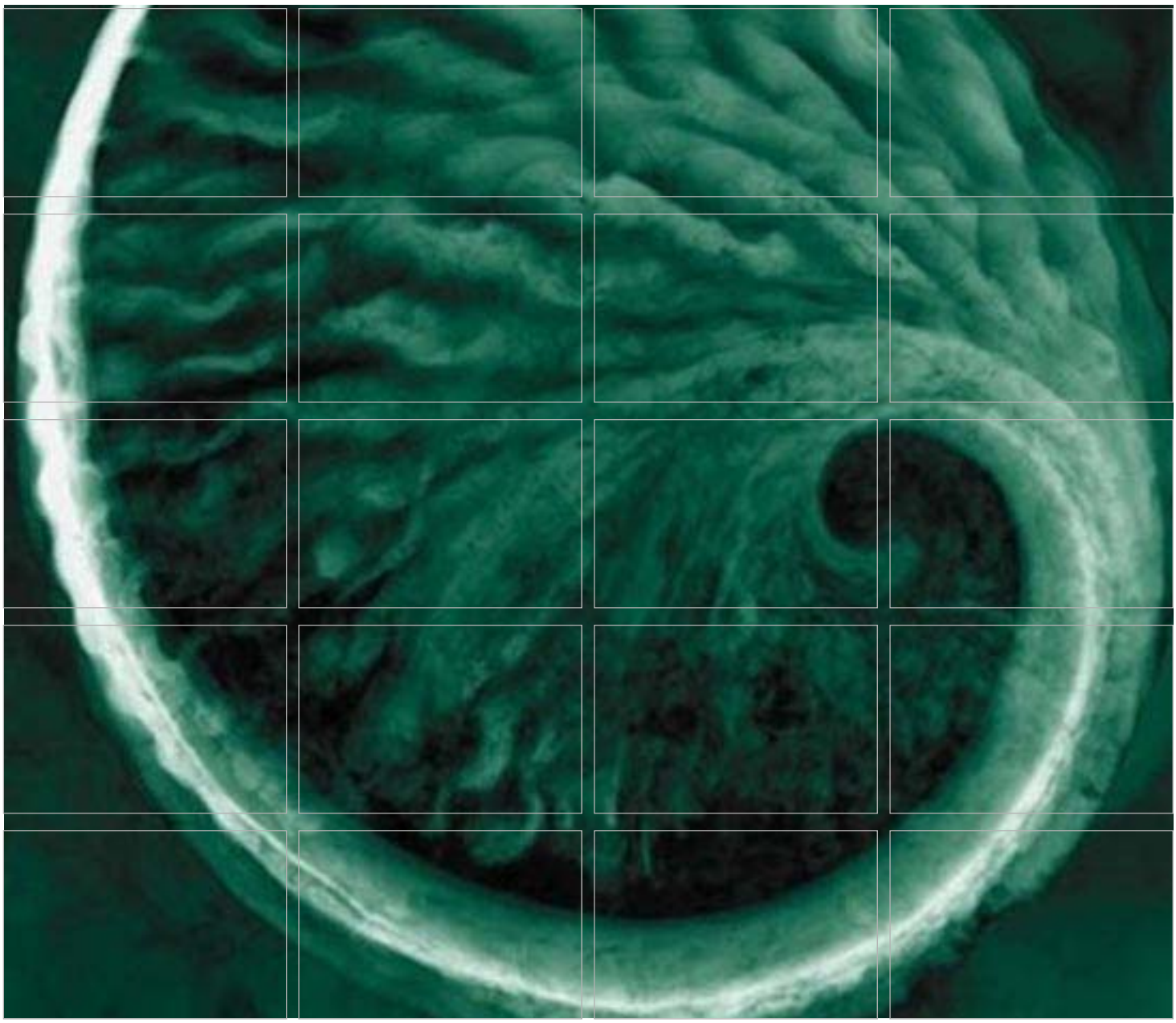

Annual Groundwater Monitoring and Corrective Action Report

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

January 2018

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Calaveras Power Station – Bottom Ash Ponds

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Project No. 0337367
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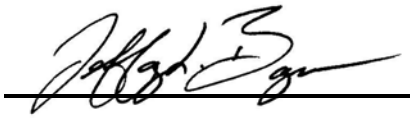

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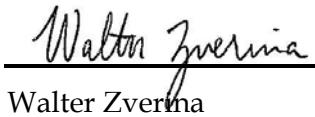

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1. INTRODUCTION

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 four CCR units at the Power Station: Bottom Ash Ponds (BAPs), Evaporation Pond, Fly Ash Landfill, and the Sludge Recycle Holding (SRH) Pond. This Annual Groundwater Monitoring and Corrective Action Report (Report) addresses the BAPs. The other units listed above are discussed in separate reports.

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 on or before October 17, 2017 as required by §257.90. 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 publically accessible internet site no later than January 31, 2018 (§257.105(h), §257.106(h), §257.107(h)). 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*

Since December 2016, groundwater samples were collected as part of background sampling 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.

2.1. *GROUNDWATER FLOW RATE AND DIRECTION*

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

Groundwater elevations for all eight sampling events are summarized in Table 1. Groundwater elevations and the potentiometric surface for the last sampling event (October 2017) are shown on Figure 2. Groundwater in the vicinity of the BAPs appears to flow is radially toward Lake Calaveras and the adjacent channel (south and southeast). The horizontal gradient is approximately 0.003 feet/foot.

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 (Appendix III and Appendix IV constituents) for all eight sampling events are summarized in Table 3. Laboratory data packages are provided in Appendix A.

The BAPs monitoring wells were sampled using low flow sampling techniques during the eight sampling events from December 2016 to October 2017. CPS Energy completed each of the sampling events (ERM assisted during the first and second events). Although each monitoring well was sampled, the following data gaps have been identified:

- Metals were not analyzed from the samples collected from monitoring wells JKS-48 and JKS-56 during the March 2017 sampling event due to an error by the laboratory; and
- Calcium and lithium were not analyzed by the laboratory from the samples collected from monitoring wells JKS-48 and JKS-52 during the May 2017 sampling event due to an error by the laboratory.

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. Xenco Laboratories subcontracted Gel Laboratories, LLC located in Charleston, South Carolina for the analysis of Radium-226 and Radium-228. 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.

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 difference 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 difference 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 one outlier was flagged in the upgradient datasets and was excluded from 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 five 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 is 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;
    - Two well-analyte combinations had a significant decreasing trend; and
    - Ten 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. Different decision framework will be applied for each upgradient well based on inter/intrawell analysis, data availability, and presence of temporal trends.

A total of three well-analyte combinations were found to have either increasing or decreasing trends. For these well-analyte pairs, a bootstrapped UPL calculated around a Theil Sen trend was used to derive a more accurate UPL. The remaining ten 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 most recent sample 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, a 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	--	3.52	mg/L
Intrawell	Calcium	--	334	mg/L
Interwell	Chloride	--	523	mg/L
Intrawell	Fluoride	--	0.857	mg/L
Intrawell	pH	5.56	7.33	SU
Intrawell	Sulfate	--	380	mg/L
Intrawell	TDS	--	1,830	mg/L

3.4. CONCLUSIONS

The downgradient samples collected during the October 2017 sampling 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	--	3.52	2017-10-10	4.54	mg/L
Fluoride	JKS-48	--	0.857	2017-10-10	1.22	mg/L
Fluoride	JKS-55	--	0.857	2017-10-10	0.864	mg/L

All initial exceedances of the UPL will 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 pair 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. These resampling results will be reported in the next Annual Groundwater Monitoring and Corrective Action Report.

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 datasets with potential SSIs have significant 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 will 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 and/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 (1)	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

		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 (1)	7.43	485.72	8.51	477.11	10.90	485.76
3	3/28/17 to 3/30/17	7.33	485.82	8.25	477.37	10.50	486.16
4	5/2/17 to 5/4/17	7.35	485.80	8.40	477.22	10.65	486.01
5	6/20/17 to 6/21/17	7.46	485.69	8.79	476.83	11.00	485.66
6	7/25/17 to 7/26/17	7.50	485.65	8.77	476.85	10.95	485.71
7	8/29/17 to 8/30/17	7.40	485.75	8.59	477.03	10.72	485.94
8	10/10/17 to 10/11/17	7.53	485.62	8.92	476.70	11.61	485.05

NOTES:

btoc = below top of casing
msl = mean sea level
(1) JKS-47 was re-sampled on 2/28/2017.

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 - 2017	2016 - 2017 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	
Bottom Ash Ponds	JKS-48	Downgradient Monitoring	8	X	X	X	X	X	X	X	X	Detection
	JKS-49	Upgradient Monitoring	8	X	X	X	X	X	X	X	X	Detection
	JKS-50R	Downgradient Monitoring	8	X	X	X	X	X	X	X	X	Detection
	JKS-51	Upgradient Monitoring	8	X	X	X	X	X	X	X	X	Detection
	JKS-52	Downgradient Monitoring	8	X	X	X	X	X	X	X	X	Detection
	JKS-55	Downgradient Monitoring	8	X	X	X	X	X	X	X	X	Detection
	JKS-56	Downgradient Monitoring	8	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**
	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**
Constituents	**Unit**								
Appendix III - Detection Monitoring									
Boron	mg/L	3.24	3.28	3.28	3.03	3.04 J	2.76	2.85	2.87
Calcium	mg/L	130	146	176	113	127	120	145	147
Chloride	mg/L	295	383	372	326	414	448	459	424
Fluoride	mg/L	0.715	0.643 JH	0.669 JH	0.809	0.627 JH	0.617 JH	0.525	0.712
Sulfate	mg/L	211	232	234	194	218	227	265	219
pH - Field Collected	Std	7.19	7.12	7.12	7.02	7.06	6.16	7.05	6.89
Total dissolved solids	mg/L	1250	1240	1190	1100	1450	1440	1490	1730
Appendix IV - Assessment Monitoring									
Antimony	mg/L	< 0.0100	< 0.00200	< 0.00200	0.00173	< 0.0100	< 0.00200	< 0.00200	< 0.00200
Arsenic	mg/L	< 0.0100	0.000676	< 0.00200	< 0.0100	< 0.0100	0.000544	0.000538	0.000478
Barium	mg/L	0.0607	0.0575	0.0503	0.0554	0.0783	0.0721	0.0788	0.0735
Beryllium	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.0100	< 0.0100	< 0.00200	< 0.00200	< 0.00200
Cadmium	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.0100	< 0.0100	< 0.00200	< 0.00200	< 0.00200
Chromium	mg/L	< 0.0200	0.000859	< 0.00400	< 0.0200	< 0.0200	0.000963	0.000997	0.00113
Cobalt	mg/L	0.00102	0.00109	< 0.00200	0.00155	< 0.00200	0.00153	0.00155	0.00146
Fluoride	mg/L	0.715	0.643 JH	0.669 JH	0.809	0.627 JH	0.617 JH	0.525	0.712
Lead	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.0100	< 0.0100	0.000155	< 0.00200	< 0.00200
Lithium	mg/L	< 0.0200	< 0.0200	< 0.100	0.0137	0.0341	0.0295	0.0427	0.0252
Mercury	mg/L	< 0.000200	< 0.000200	< 0.000200	0.0000690	< 0.000200	0.0000490	< 0.000200	< 0.000200
Molybdenum	mg/L	0.00779	0.00846	0.00875	0.0106	0.00908	0.00938	0.0107	0.0111
Selenium	mg/L	0.00992	0.00597	0.00479	0.00521	0.00370	0.00235	0.00188	0.00141
Thallium	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.0100	< 0.0100	< 0.00200	< 0.00200	< 0.00200
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
Radium-228	pCi/L	2.10 ± 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

NOTES:

(1) Constituent list from Appendix III and IV of the SEPA CCR Rule (2015).

mg/L: Milligrams per Liter.

Std.: Standard units.

pCi/L: Picocuries per Liter.

-- : Laboratory did not analyze sample for indicated constituent.

<0.0360: Analyte Not Detected at the laboratory reporting limit (Sample Detection Limit).

J: Analyte detected above method (sample) detection limit but below method quantitation limit.

H: Bias in sample result likely to be high.

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**
	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**
Constituents	**Unit**								
Appendix III - Detection Monitoring									
Boron	mg/L	0.512	0.517	0.494	0.565	0.512	0.525	0.453	0.509
Calcium	mg/L	267	292	322	266	261	232	236	256
Chloride	mg/L	403	331	414	447	424	455	384	375
Fluoride	mg/L	0.247	0.341 JH	0.415 JH	0.534	0.354	0.391	< 0.200	0.407 JH
Sulfate	mg/L	293	330	348	359	342	330	314	302
pH - Field Collected	Std	6.59	6.51	6.48	6.56	6.40	5.48	6.38	6.20
Total dissolved solids	mg/L	1650	1650	1490	1980	1530	1580	1390	1650
Appendix IV - Assessment Monitoring									
Antimony	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.0100	0.000953	< 0.00200	< 0.00200	< 0.00200
Arsenic	mg/L	< 0.0100	0.000412	0.000429	< 0.0100	0.000392	0.000344	0.000395	0.000418
Barium	mg/L	0.0655	0.0563	0.0529	0.0512	0.0534	0.0520	0.0520	0.0564
Beryllium	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.0100	0.000212	< 0.00200	< 0.00200	< 0.00200
Cadmium	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.0100	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Chromium	mg/L	< 0.0200	0.000941	< 0.00400	< 0.0200	0.000657	0.000874	0.00113	0.00133
Cobalt	mg/L	< 0.0100	0.0000770	0.0000940	< 0.0100	0.000124	0.0000940	0.0000800	0.000108
Fluoride	mg/L	0.247	0.341 JH	0.415 JH	0.534	0.354	0.391	< 0.200	0.407 JH
Lead	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.0100	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Lithium	mg/L	< 0.0200	< 0.0200	< 0.100	0.0322	0.0874	0.0790	0.0958	0.0718
Mercury	mg/L	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	0.000199	< 0.000200	< 0.000200
Molybdenum	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.0100	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Selenium	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.0100	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Thallium	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.0100	< 0.00200	< 0.00200	< 0.00200	< 0.00200
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
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

NOTES:

(1) Constituent list from Appendix III and IV of the SEPA CCR Rule (2015).

mg/L: Milligrams per Liter.

Std.: Standard units.

pCi/L: Picocuries per Liter.

-- : Laboratory did not analyze sample for indicated constituent.

<0.0360: Analyte Not Detected at the laboratory reporting limit (Sample Detection Limit).

J: Analyte detected above method (sample) detection limit but below method quantitation limit.

H: Bias in sample result likely to be high.

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**
	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**
Constituents	**Unit**								
Appendix III - Detection Monitoring									
Boron	mg/L	2.21	2.14	--	2.08	2.13	2.15	2.02	2.23
Calcium	mg/L	130	139	125	--	111	136	134	147
Chloride	mg/L	395	408	435	427	440	465	166	427
Fluoride	mg/L	1.43	1.21 JH	1.62	1.41	1.07	1.62	< 0.200	1.22
Sulfate	mg/L	239	251	266	259	253	244	140	257
pH - Field Collected	Std	7.06	6.92	6.86	6.99	6.88	5.92	6.90	6.74
Total dissolved solids	mg/L	1400	1270	1440	1490	1540	2360 J	850	1470
Appendix IV - Assessment Monitoring									
Antimony	mg/L	< 0.0100	< 0.00200	--	< 0.00200	< 0.0100	< 0.00200	< 0.00200	< 0.00200
Arsenic	mg/L	< 0.0100	0.000538	--	0.000424	< 0.0100	0.000452	0.000459	0.000475
Barium	mg/L	0.0717	0.0699	--	0.0659	0.0686	0.0769	0.0725	0.0761
Beryllium	mg/L	< 0.0100	< 0.00200	--	< 0.00200	< 0.0100	< 0.00200	< 0.00200	< 0.00200
Cadmium	mg/L	< 0.0100	< 0.00200	--	< 0.00200	< 0.0100	< 0.00200	< 0.00200	< 0.00200
Chromium	mg/L	< 0.0200	0.000608	--	< 0.00400	< 0.0200	< 0.00400	0.000863	0.00130
Cobalt	mg/L	0.00111	0.000844	--	0.000920	0.000987	0.00137	0.000917	0.00106
Fluoride	mg/L	1.43	1.21 JH	1.62	1.41 JH	1.07	1.62	< 0.200	1.22
Lead	mg/L	< 0.0100	< 0.00200	--	< 0.00200	< 0.0100	< 0.00200	< 0.00200	0.000203
Lithium	mg/L	< 0.0200	< 0.0200	< 0.100	--	0.0536	0.0501	0.0700	0.0551
Mercury	mg/L	< 0.000200	< 0.000200	< 0.000200	0.0000310	< 0.000200	< 0.000200	< 0.000200	< 0.000200
Molybdenum	mg/L	< 0.0100	0.000422	--	0.000263	< 0.0100	< 0.00200	< 0.00200	< 0.00200
Selenium	mg/L	< 0.0100	< 0.00200	--	< 0.00200	< 0.0100	< 0.00200	< 0.00200	< 0.00200
Thallium	mg/L	< 0.0100	< 0.00200	--	< 0.00200	< 0.0100	< 0.00200	< 0.00200	< 0.00200
Radium-226	pCi/L	< 0.139 ± 0.250	0.251 ± 0.149	< 0.0232 ± 0.136	0.357 ± 0.174	0.460 ± 0.235	0.544 ± 0.259	0.562 ± 0.283	< 0.260 ± 0.241
Radium-228	pCi/L	< 0.847 ± 1.14	< 0.317 ± 1.15	1.10 ± 0.737	< -0.109 ± 1.35	< 0.284 ± 0.662	< 0.273 ± 0.867	< 0.459 ± 0.649	< 0.772 ± 0.931

NOTES:

(1) Constituent list from Appendix III and IV of the SEPA CCR Rule (2015).

mg/L: Milligrams per Liter.

Std.: Standard units.

pCi/L: Picocuries per Liter.

-- : Laboratory did not analyze sample for indicated constituent.

<0.0360: Analyte Not Detected at the laboratory reporting limit (Sample Detection Limit).

J: Analyte detected above method (sample) detection limit but below method quantitation limit.

H: Bias in sample result likely to be high.

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**
	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**
Constituents	**Unit**								
Appendix III - Detection Monitoring									
Boron	mg/L	4.70	5.27	5.87	5.92	4.87	4.38	4.18	4.54
Calcium	mg/L	126	137	189	120	125	108	130	132
Chloride	mg/L	47.7	384 J	63.9	81.3	111	123	141	100
Fluoride	mg/L	0.316	0.758 JH	0.447 JH	0.528	0.387 JH	0.390 JH	< 0.200	0.427 JH
Sulfate	mg/L	137	168	156	160	146	148	195	144
pH - Field Collected	Std	6.83	6.77	6.77	6.80	6.63	5.69	6.62	6.43
Total dissolved solids	mg/L	737	808	789	902	914	856	992	947
Appendix IV - Assessment Monitoring									
Antimony	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.0100	< 0.0100	< 0.00200	< 0.00200	< 0.00200
Arsenic	mg/L	< 0.0100	< 0.00200	0.000735	< 0.0100	< 0.0100	0.000520	0.000545	0.000596
Barium	mg/L	0.133	0.128	0.113	0.117	0.125	0.117	0.123	0.118
Beryllium	mg/L	< 0.0100	< 0.00200	0.000187	< 0.0100	< 0.0100	< 0.00200	< 0.00200	0.000174
Cadmium	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.0100	< 0.0100	< 0.00200	< 0.00200	0.000189
Chromium	mg/L	< 0.0200	0.00251	0.00169	< 0.0200	< 0.0200	0.000788	0.000759	0.00108
Cobalt	mg/L	0.00305	0.00345	0.00251	0.00215	0.00191	0.00216	0.00233	0.00285
Fluoride	mg/L	0.316	0.758 JH	0.447 JH	0.528	0.387 JH	0.390 JH	< 0.200	0.427 JH
Lead	mg/L	0.000796	< 0.00200	0.000627	< 0.0100	< 0.0100	0.000178	< 0.00200	0.000168
Lithium	mg/L	< 0.0200	< 0.0200	< 0.100	< 0.0200	0.00209	< 0.0200	0.00621	< 0.0200
Mercury	mg/L	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200
Molybdenum	mg/L	0.00150	< 0.00200	0.00125	< 0.0100	< 0.0100	0.00102	0.00104	0.00108
Selenium	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.0100	< 0.0100	< 0.00200	< 0.00200	< 0.00200
Thallium	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.0100	< 0.0100	< 0.00200	< 0.00200	< 0.00200
Radium-226	pCi/L	< 0.102 ± 0.173	0.479 ± 0.216	< -0.0714 ± 0.168	0.197 ± 0.183	< 0.245 ± 0.204	0.408 ± 0.226	< 0.00 ± 0.176	0.815 ± 0.292
Radium-228	pCi/L	< 1.99 ± 1.31	< -0.428 ± 1.24	< 0.665 ± 1.14	0.00273 ± 1.33	< 0.783 ± 0.638	< 1.08 ± 0.832	< 0.0172 ± 1.12	1.50 ± 0.842

NOTES:

(1) Constituent list from Appendix III and IV of the SEPA CCR Rule (2015).

mg/L: Milligrams per Liter.

Std.: Standard units.

pCi/L: Picocuries per Liter.

-- : Laboratory did not analyze sample for indicated constituent.

<0.0360: Analyte Not Detected at the laboratory reporting limit (Sample Detection Limit).

J: Analyte detected above method (sample) detection limit but below method quantitation limit.

H: Bias in sample result likely to be high.

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**
	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**
Constituents	**Unit**								
Appendix III - Detection Monitoring									
Boron	mg/L	1.74	2.11	1.63	1.51	1.33	1.43	1.46	1.78
Calcium	mg/L	171	183	189	--	145	140	162	184
Chloride	mg/L	341	381	323	320	326	343	417	355
Fluoride	mg/L	0.796	0.665	0.718 JH	0.915 JH	0.705	0.996 JH	< 0.200	0.740
Sulfate	mg/L	282	322	299	290	287	292	171	289
pH - Field Collected	Std	7.01	6.47	6.91	6.94	6.87	5.87	6.81	6.63
Total dissolved solids	mg/L	1290	1380	1100	1250	1280	1250	1250	1340
Appendix IV - Assessment Monitoring									
Antimony	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Arsenic	mg/L	< 0.0100	0.000575	0.000398	0.000425	0.000427	0.000392	0.000412	0.000448
Barium	mg/L	0.0669	0.0583	0.0519	0.0483	0.0527	0.0558	0.0565	0.0616
Beryllium	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Cadmium	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Chromium	mg/L	< 0.0200	< 0.00400	< 0.00400	< 0.00400	0.000841	0.000860	0.00123	0.00108
Cobalt	mg/L	0.00202	0.00242	0.00112	0.00119	0.00211	0.00183	0.00159	0.00189
Fluoride	mg/L	0.796	0.665	0.718 JH	0.915 JH	0.705	0.996 JH	< 0.200	0.740
Lead	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.00200	0.000292	< 0.00200	< 0.00200	< 0.00200
Lithium	mg/L	< 0.0200	0.0471	< 0.0200	--	0.0616	0.0605	0.0827	0.0588
Mercury	mg/L	< 0.000200	0.000234	< 0.000200	< 0.000200	< 0.000200	0.0000810	< 0.000200	< 0.000200
Molybdenum	mg/L	< 0.0100	0.00129	0.00115	0.00102	0.000911	0.000865	0.000843	0.000914
Selenium	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Thallium	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Radium-226	pCi/L	1.71 ± 0.465	0.608 ± 0.289	0.296 ± 0.169	< 0.00 ± 0.150	0.435 ± 0.241	0.449 ± 0.196	< 0.194 ± 0.194	0.704 ± 0.319
Radium-228	pCi/L	2.65 ± 1.12	< 0.744 ± 0.833	< 0.0645 ± 0.649	< 0.530 ± 1.10	< 0.928 ± 0.784	< 1.16 ± 0.867	< 0.716 ± 0.767	< 1.54 ± 1.22

NOTES:

(1) Constituent list from Appendix III and IV of the SEPA CCR Rule (2015).

mg/L: Milligrams per Liter.

Std.: Standard units.

pCi/L: Picocuries per Liter.

-- : Laboratory did not analyze sample for indicated constituent.

<0.0360: Analyte Not Detected at the laboratory reporting limit (Sample Detection Limit).

J: Analyte detected above method (sample) detection limit but below method quantitation limit.

H: Bias in sample result likely to be high.

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**
	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**
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
Calcium	mg/L	143	153	181	133	133	118	136	146
Chloride	mg/L	384	50.5	403	388	395	400	168	386
Fluoride	mg/L	0.865	0.352 JH	0.746 JH	0.891	1.14	1.08 JH	< 0.200	0.864
Sulfate	mg/L	164	147	172	173	164	166	139	157
pH - Field Collected	Std	6.85	6.80	6.81	6.82	6.72	5.77	6.72	6.53
Total dissolved solids	mg/L	1460	1380	1290	1310	1500	1270	826	1470
Appendix IV - Assessment Monitoring									
Antimony	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.0100	< 0.0100	< 0.00200	< 0.00200	< 0.00200
Arsenic	mg/L	< 0.0100	0.000650	0.000520	< 0.0100	< 0.0100	0.000507	0.000582	0.000599
Barium	mg/L	0.103	0.0876	0.0823	0.0758	0.0828	0.0780	0.0801	0.0816
Beryllium	mg/L	< 0.0200	< 0.00200	0.000134	< 0.0100	< 0.0100	< 0.00200	< 0.00200	< 0.00200
Cadmium	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.0100	< 0.0100	< 0.00200	< 0.00200	< 0.00200
Chromium	mg/L	< 0.0200	0.000625	< 0.00400	< 0.0200	< 0.0200	< 0.00400	0.000797	0.000903
Cobalt	mg/L	0.00702	0.00516	0.00579	0.00750	0.00642	0.00562	0.00565	0.00565
Fluoride	mg/L	0.865	0.352 JH	0.746 JH	0.891	1.14	1.08 JH	< 0.200	0.864
Lead	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.0100	< 0.0100	< 0.00200	< 0.00200	< 0.00200
Lithium	mg/L	< 0.0200	< 0.0200	< 0.100	0.0136	0.0425	0.0354	0.0495	0.0338
Mercury	mg/L	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200
Molybdenum	mg/L	0.00131	0.00123	0.00108	< 0.0100	< 0.0100	0.000804	0.000898	0.000837
Selenium	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.0100	< 0.0100	< 0.00200	< 0.00200	< 0.00200
Thallium	mg/L	< 0.0100	< 0.00200	< 0.00200	< 0.0100	< 0.0100	< 0.00200	< 0.00200	< 0.00200
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
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

NOTES:

(1) Constituent list from Appendix III and IV of the SEPA CCR Rule (2015).

mg/L: Milligrams per Liter.

Std.: Standard units.

pCi/L: Picocuries per Liter.

-- : Laboratory did not analyze sample for indicated constituent.

<0.0360: Analyte Not Detected at the laboratory reporting limit (Sample Detection Limit).

J: Analyte detected above method (sample) detection limit but below method quantitation limit.

H: Bias in sample result likely to be high.

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**
	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**
Constituents	**Unit**								
Appendix III - Detection Monitoring									
Boron	mg/L	3.97	4.13	--	4.60	3.98	3.60	3.60	3.48
Calcium	mg/L	137	143	127	124	136	116	137	146
Chloride	mg/L	131	95.7	96.3	95.6	114	126	146	150
Fluoride	mg/L	0.344	0.354 JH	0.333	0.564	0.407 JH	0.401 JH	< 0.200	0.448 JH
Sulfate	mg/L	193	190	188	183	186	194	201	200
pH - Field Collected	Std	6.73	6.63	6.56	6.71	6.56	5.63	6.57	6.38
Total dissolved solids	mg/L	1100	969	1020	997	1060	1060	986	1240
Appendix IV - Assessment Monitoring									
Antimony	mg/L	< 0.0100	< 0.00200	--	< 0.0100	< 0.0100	< 0.00200	0.00104	< 0.00200
Arsenic	mg/L	0.00527	0.00425	--	0.00350	0.00435	0.00373	0.00517	0.00451
Barium	mg/L	0.126	0.0974	--	0.0890	0.0921	0.0897	0.103	0.0909
Beryllium	mg/L	< 0.0100	< 0.00200	--	< 0.0100	< 0.0100	< 0.00200	0.000136	< 0.00200
Cadmium	mg/L	< 0.0100	< 0.00200	--	< 0.0100	< 0.0100	< 0.00200	< 0.00200	< 0.00200
Chromium	mg/L	< 0.0200	0.000654	--	0.00276	< 0.0200	< 0.00400	0.00498	0.00141
Cobalt	mg/L	0.00560	0.00564	--	0.00641	0.00687	0.00668	0.00771	0.00746
Fluoride	mg/L	0.344	0.354 JH	0.333	0.564	0.407 JH	0.401 JH	< 0.200	0.448 JH
Lead	mg/L	< 0.0100	< 0.00200	--	< 0.0100	< 0.0100	< 0.00200	0.000211	< 0.00200
Lithium	mg/L	< 0.0200	< 0.0200	< 0.0200	< 0.0200	0.00156	< 0.0200	0.00598	< 0.0200
Mercury	mg/L	< 0.000200	< 0.000200	< 0.000200	0.0000700	< 0.000200	< 0.000200	< 0.000200	< 0.000200
Molybdenum	mg/L	0.00360	0.00190	--	0.00168	0.00152	0.00156	0.00160	0.00155
Selenium	mg/L	< 0.0100	< 0.00200	--	< 0.0100	< 0.0100	< 0.00200	< 0.00200	< 0.00200
Thallium	mg/L	< 0.0100	< 0.00200	--	< 0.0100	< 0.0100	< 0.00200	< 0.00200	< 0.00200
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
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

NOTES:

(1) Constituent list from Appendix III and IV of the SEPA CCR Rule (2015).

mg/L: Milligrams per Liter.

Std.: Standard units.

pCi/L: Picocuries per Liter.

-- : Laboratory did not analyze sample for indicated constituent.

<0.0360: Analyte Not Detected at the laboratory reporting limit (Sample Detection Limit).

J: Analyte detected above method (sample) detection limit but below method quantitation limit.

H: Bias in sample result likely to be high.

Figures

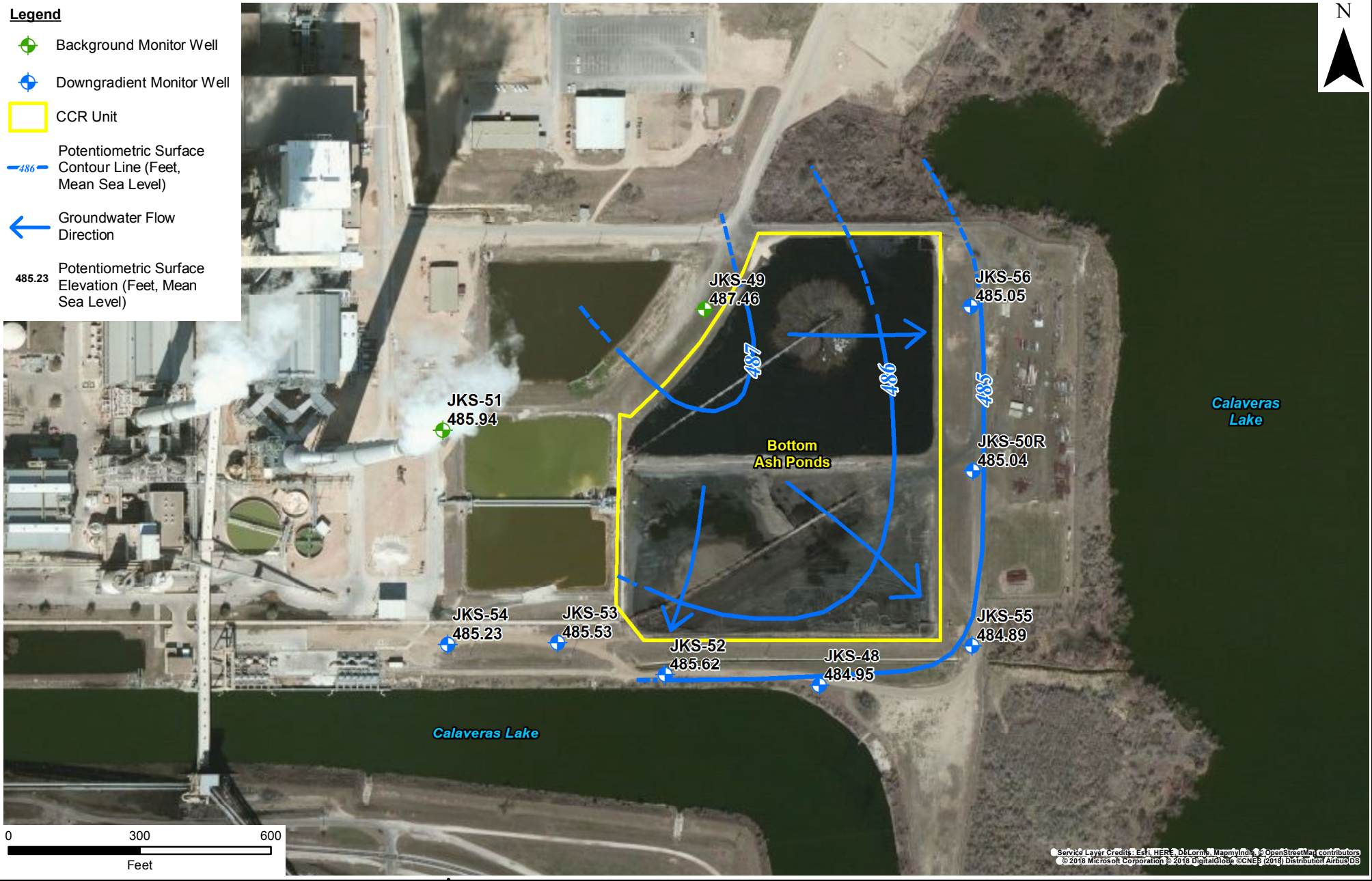
Environmental Resources Management

DESIGN:	NH	DRAWN:	EFC	CHKD.:	WZ
DATE:	1/8/2018	SCALE:	AS SHOWN	REVISION:	0

P:\Projects\0337367 CPS Energy CCR GW Investigation.WZ\Eight Background Sampling Events\GIS\MXD\2017_CAR\0337367_CPSCalv_WellsLocs.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:	1/31/2018	SCALE:	AS SHOWN	REVISION:	1

P:\Projects\0337367 CPS Energy CCR GW Investigation.WZ\Eight Background Sampling Events\GIS\MXD\2017_CAR\0337367_CPSCalv_pmapS_BotAshPonds_oct2017.mxd

FIGURE 2
POTENTIOMETRIC SURFACE MAP - OCTOBER 2017
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 Comparison of Upgradient Wells
CPS Energy - Calaveras Power Station
Bottom Ash Ponds

Analyte	N	Num Detects	Percent Detect	DF	KW Statistic	p-value	Conclusion	UPL Type
Boron	16	16	1	1	11.3	<0.001	Significant Difference	Intrawell
Calcium	16	16	1	1	11.3	<0.001	Significant Difference	Intrawell
Chloride	16	16	1	1	0.177	0.674	No Significant Difference	Interwell
Fluoride	16	15	0.9375	1	10.6	0.00113	Significant Difference	Intrawell
pH	16	16	1	1	6.9	0.0086	Significant Difference	Intrawell
Sulfate	16	16	1	1	11.3	<0.001	Significant Difference	Intrawell
TDS	16	16	1	1	5.14	0.0234	Significant Difference	Intrawell

NOTES:

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.
UPL: upper prediction limit

APPENDIX B-TABLE 2

Descriptive Statistics for Upgradient Wells
CPS Energy - 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	8	8	1			2.76	3.035	3.04	3.28	0.206	0.067838371	Normal
Boron	JKS-51	mg/L	8	8	1			0.453	0.512	0.508	0.565	0.0336	0.066115702	Normal
Calcium	JKS-49	mg/L	8	8	1			113	137.5	138	173	19.1	0.138735465	Normal
Calcium	JKS-51	mg/L	8	8	1			232	263.5	266	322	29.3	0.109793621	Normal
Chloride	Pooled	mg/L	16	16	1			295	408.5	397	459	48.8	0.122765047	Normal
Fluoride	JKS-49	mg/L	8	8	1			0.525	0.654	0.664	0.809	0.0839	0.126336395	Normal
Fluoride	JKS-51	mg/L	8	7	0.875	0.2	0.2	0.247	0.3725	0.349	0.534	0.129	0.369477912	Normal
pH	JKS-49	SU	8	8	1			6.16	7.055	6.95	7.19	0.332	0.047719753	NDD
pH	JKS-51	SU	8	8	1			5.48	6.44	6.32	6.59	0.363	0.057375494	NDD
Sulfate	JKS-49	mg/L	8	8	1			194	223	225	265	20.6	0.091644444	Normal
Sulfate	JKS-51	mg/L	8	8	1			293	330	327	359	22.9	0.069865526	Normal
TDS	JKS-49	mg/L	8	8	1			1100	1345	1360	1730	204	0.149889787	Normal
TDS	JKS-51	mg/L	8	8	1			1390	1615	1620	1980	174	0.107678019	Normal

NOTES:

Pooled well 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
SD: Standard Deviation
CV: Coefficient of Variation (standard deviation divided by the mean)

APPENDIX B-TABLE 3

Potential Outliers in Upgradient Wells
CPS Energy - 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	Notes	Final Outlier Determination
JKS-51	JKS-51552352-003	5/3/2017	Boron	mg/L	TRUE	0.565	Intrawell	Normal		X			X				Not an outlier
JKS-51	JKS-51549648-010	3/28/2017	Calcium	mg/L	TRUE	322	Intrawell	Normal		X			X				Not an outlier
JKS-51	JKS-51552352-003	5/3/2017	Fluoride	mg/L	TRUE	0.534	Intrawell	Normal		X			X				Not an outlier
JKS-49	JKS-49561478-007	8/29/2017	Sulfate	mg/L	TRUE	265	Intrawell	Normal		X			X				Not an outlier
JKS-51	JKS-51552352-003	5/3/2017	TDS	mg/L	TRUE	1980	Intrawell	Normal	X	X	X	X	X	X	X		Excluded from UPL calculations

NOTES:

NDD: No Discernible Distribution
SU: Standard units
Outer 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
CPS Energy - Calaveras Power Station
Bottom Ash Ponds

Analyte	UPL Type	Well	N	Num Detects	Percent Detect	p-value	tau	Conclusion
Boron	Intrawell	JKS-49	8	8	1	0.0615	-0.546	Stable, No Trend
Boron	Intrawell	JKS-51	8	8	1	0.533	-0.182	Stable, No Trend
Calcium	Intrawell	JKS-49	8	8	1	0.905	0.0714	Stable, No Trend
Calcium	Intrawell	JKS-51	8	8	1	0.061	-0.571	Stable, No Trend
Chloride	Interwell	JKS-49, JKS-51	16	16	1	0.0331	0.403	Increasing Trend
Fluoride	Intrawell	JKS-49	8	8	1	0.275	-0.357	Stable, No Trend
Fluoride	Intrawell	JKS-51	8	7	0.875	0.72	0.143	Stable, No Trend
pH	Intrawell	JKS-49	8	8	1	0.0178	-0.691	Decreasing Trend
pH	Intrawell	JKS-51	8	8	1	0.0141	-0.714	Decreasing Trend
Sulfate	Intrawell	JKS-49	8	8	1	0.548	0.214	Stable, No Trend
Sulfate	Intrawell	JKS-51	8	8	1	0.533	-0.182	Stable, No Trend
TDS	Intrawell	JKS-49	8	8	1	0.109	0.5	Stable, No Trend
TDS	Intrawell	JKS-51	7	7	1	0.53	-0.206	Stable, No Trend

NOTES:

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
CPS Energy - 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	Notes
Boron	Intrawell	Stable, No Trend	JKS-49	8	8	1		3.52	mg/L	None	No	0.00351	Param Intra 1 of 2		X	
Boron	Intrawell	Stable, No Trend	JKS-51	8	8	1		0.585	mg/L	None	No	0.00351	Param Intra 1 of 2			
Calcium	Intrawell	Stable, No Trend	JKS-49	8	8	1		181	mg/L	None	No	0.00351	Param Intra 1 of 2			
Calcium	Intrawell	Stable, No Trend	JKS-51	8	8	1		334	mg/L	None	No	0.00351	Param Intra 1 of 2		X	
Chloride	Interwell	Increasing Trend	JKS-49, JKS-51	16	16	1		523	mg/L	None	No	0.00351	NP Detrended UPL		X	
Fluoride	Intrawell	Stable, No Trend	JKS-49	8	8	1		0.857	mg/L	None	No	0.00351	Param Intra 1 of 2		X	
Fluoride	Intrawell	Stable, No Trend	JKS-51	8	7	0.875		0.599	mg/L	None	No	0.00351	Param Intra 1 of 2			
pH	Intrawell	Decreasing Trend	JKS-49	8	8	1	6.24	7.33	SU	None	No	0.0444	NP Detrended UPL		X	
pH	Intrawell	Decreasing Trend	JKS-51	8	8	1	5.56	6.7	SU	None	No	0.0444	NP Detrended UPL	X		
Sulfate	Intrawell	Stable, No Trend	JKS-49	8	8	1		272	mg/L	None	No	0.00351	Param Intra 1 of 2			
Sulfate	Intrawell	Stable, No Trend	JKS-51	8	8	1		380	mg/L	None	No	0.00351	Param Intra 1 of 2		X	
TDS	Intrawell	Stable, No Trend	JKS-49	8	8	1		1830	mg/L	None	No	0.00351	Param Intra 1 of 2		X	
TDS	Intrawell	Stable, No Trend	JKS-51	7	7	1		1810	mg/L	None	No	0.00351	Param Intra 1 of 2			

NOTES:

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
RL: Reporting Limit
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

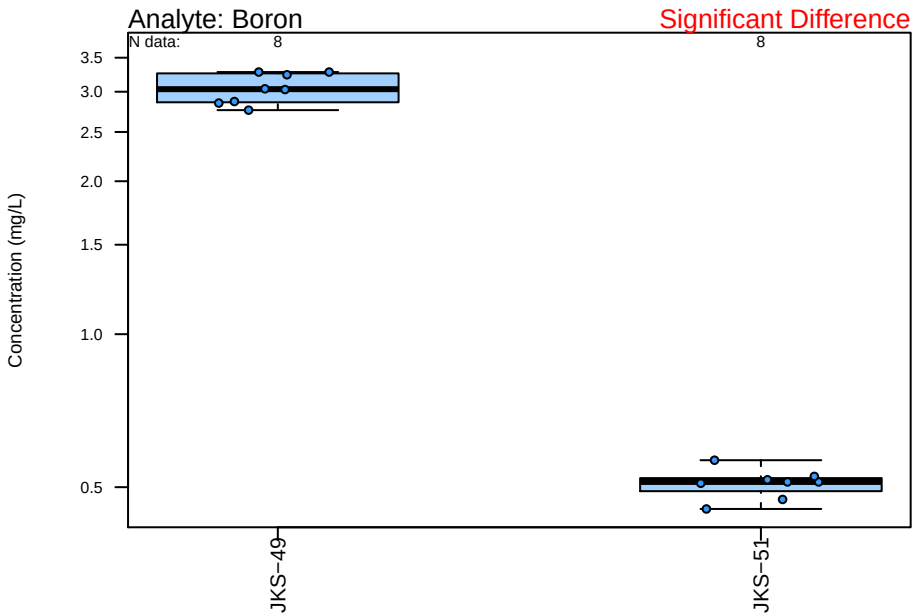
Comparison of Downgradient Wells to UPLs/LPLs
CPS Energy - Calaveras Power Station
Bottom Ash Ponds

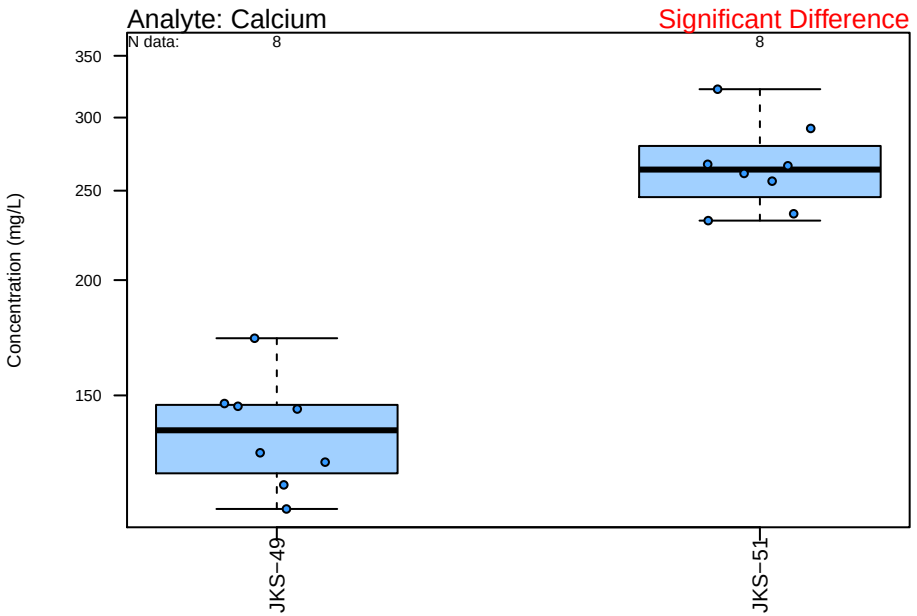
Analyte	Well	LPL	UPL	Units	Recent Date	Observation	Qualifier	Obs > UPL	Notes	Mann Kendall p-value	Mann Kendall tau
Boron	JKS-48		3.52	mg/L	10/10/2017	2.23					
Boron	JKS-50R		3.52	mg/L	10/10/2017	4.54		X	Trend Test: Stable, No Trend	0.275	-0.357
Boron	JKS-52		3.52	mg/L	10/10/2017	1.71					
Boron	JKS-55		3.52	mg/L	10/10/2017	0.759					
Boron	JKS-56		3.52	mg/L	10/10/2017	3.48					
Calcium	JKS-48		334	mg/L	10/10/2017	147					
Calcium	JKS-50R		334	mg/L	10/10/2017	132					
Calcium	JKS-52		334	mg/L	10/10/2017	168					
Calcium	JKS-55		334	mg/L	10/10/2017	146					
Calcium	JKS-56		334	mg/L	10/10/2017	146					
Chloride	JKS-48		523	mg/L	10/10/2017	427					
Chloride	JKS-50R		523	mg/L	10/10/2017	100					
Chloride	JKS-52		523	mg/L	10/10/2017	355					
Chloride	JKS-55		523	mg/L	10/10/2017	386					
Chloride	JKS-56		523	mg/L	10/10/2017	150					
Fluoride	JKS-48		0.857	mg/L	10/10/2017	1.22		X	Trend Test: Stable, No Trend	0.383	-0.255
Fluoride	JKS-50R		0.857	mg/L	10/10/2017	0.427					
Fluoride	JKS-52		0.857	mg/L	10/10/2017	0.74					
Fluoride	JKS-55		0.857	mg/L	10/10/2017	0.864		X	Trend Test: Stable, No Trend	0.72	0.143
Fluoride	JKS-56		0.857	mg/L	10/10/2017	0.448					
pH	JKS-48	5.56	7.33	SU	10/10/2017	6.74					
pH	JKS-50R	5.56	7.33	SU	10/10/2017	6.43					
pH	JKS-52	5.56	7.33	SU	10/10/2017	6.63					
pH	JKS-55	5.56	7.33	SU	10/10/2017	6.53					
pH	JKS-56	5.56	7.33	SU	10/10/2017	6.38					
Sulfate	JKS-48		380	mg/L	10/10/2017	257					
Sulfate	JKS-50R		380	mg/L	10/10/2017	144					
Sulfate	JKS-52		380	mg/L	10/10/2017	289					
Sulfate	JKS-55		380	mg/L	10/10/2017	157					
Sulfate	JKS-56		380	mg/L	10/10/2017	200					
TDS	JKS-48		1830	mg/L	10/10/2017	1470					
TDS	JKS-50R		1830	mg/L	10/10/2017	947					
TDS	JKS-52		1830	mg/L	10/10/2017	1220					
TDS	JKS-55		1830	mg/L	10/10/2017	1470					
TDS	JKS-56		1830	mg/L	10/10/2017	1240					

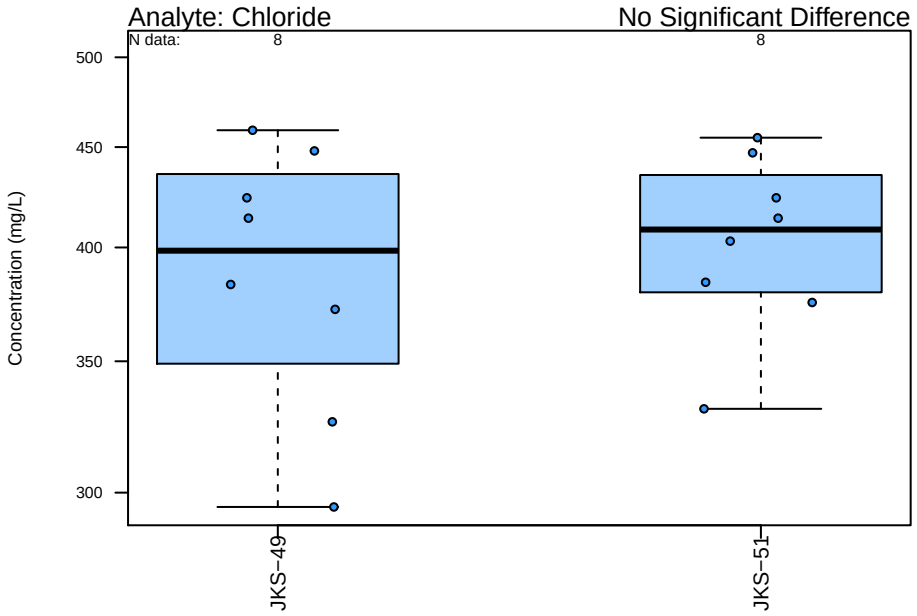
NOTES:

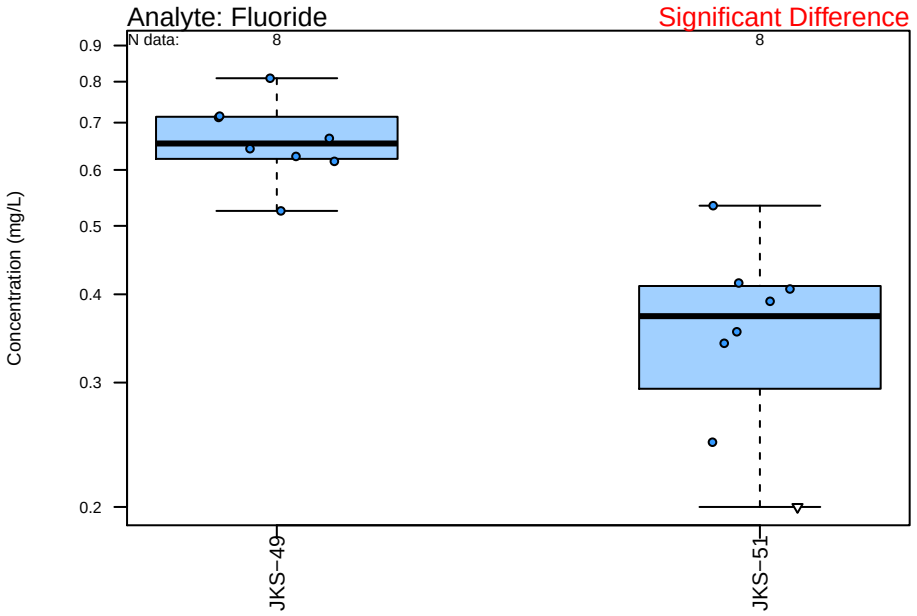
UPL: Upper Prediction Limit
ND: Not detected
SU: Standard units
tau: Kendall's tau statistic
p-value: A two-sided p-value describing the probability of the H0 being true (a=0.05)
Exceed 'X' indicates that the most recent observed value is higher than the UPL (or out of range of the LPL and UPL in the case of pH.)
Exceed 'X0' indicates that the two most recent values are higher than the UPL, but the upgradient well is 100% ND.
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

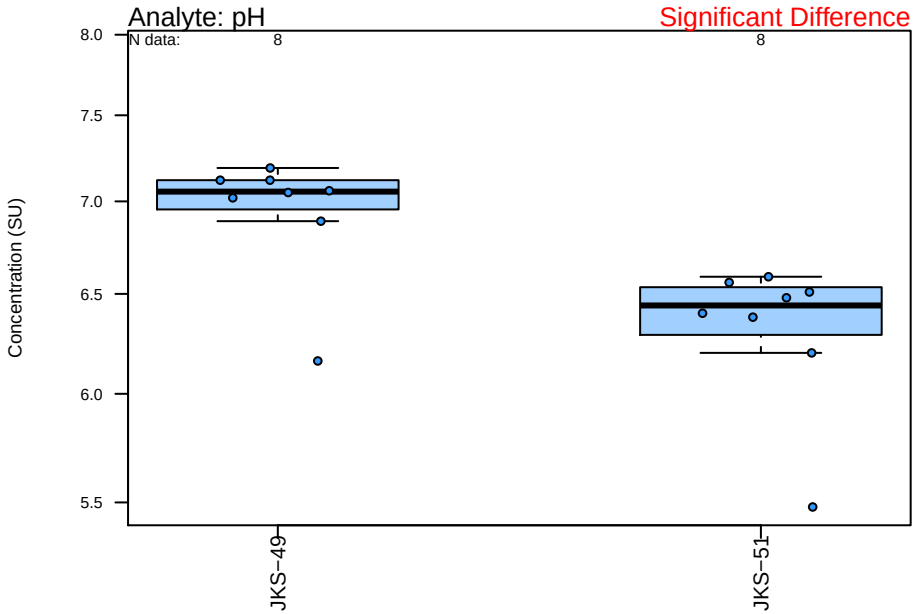


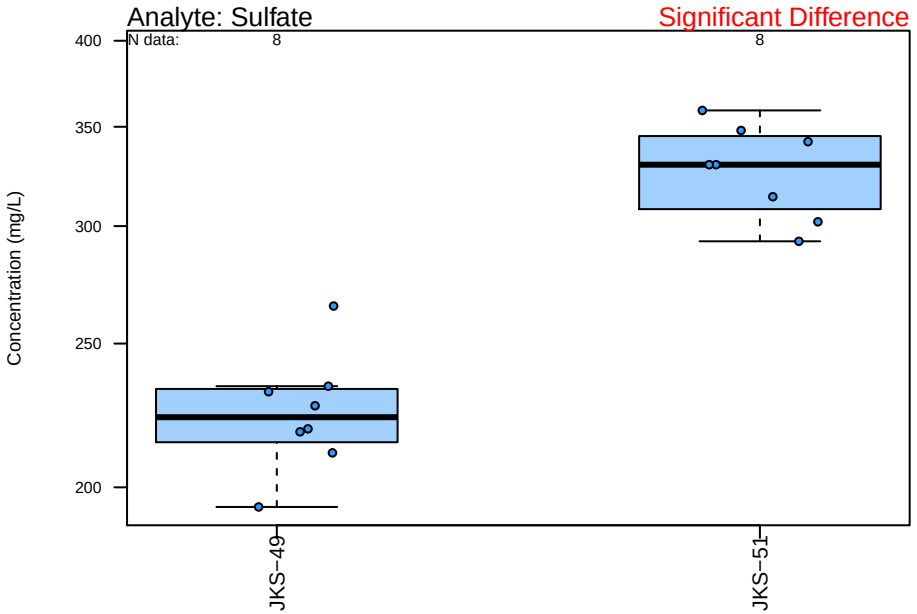


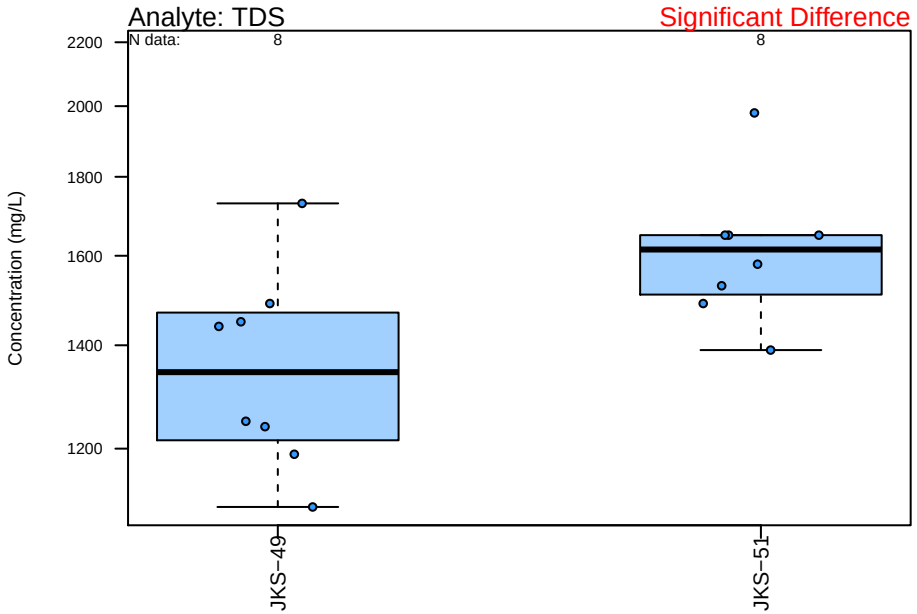




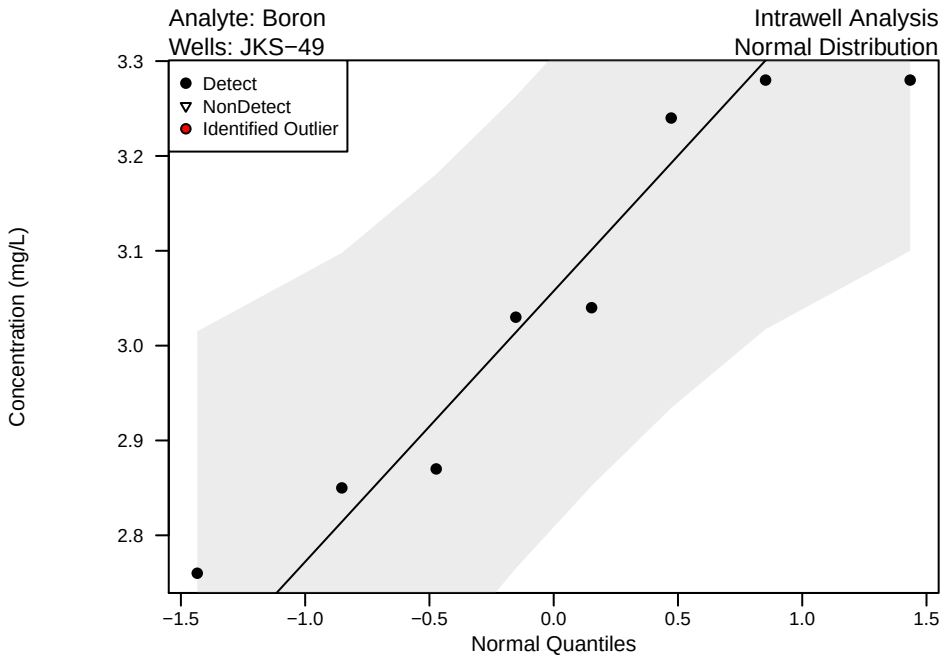
APPENDIX B-FIGURE 1
Unit: Bottom Ash Ponds
Boxplots of Upgradient Wells







APPENDIX B-FIGURE 2
Unit: Bottom Ash Ponds
QQ Plots of Upgradient Wells



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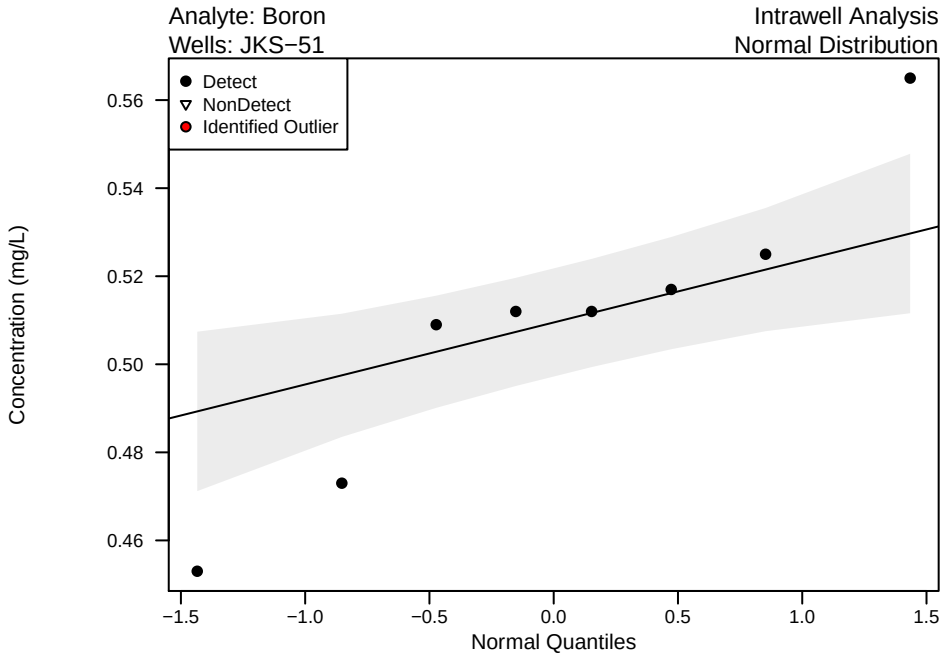

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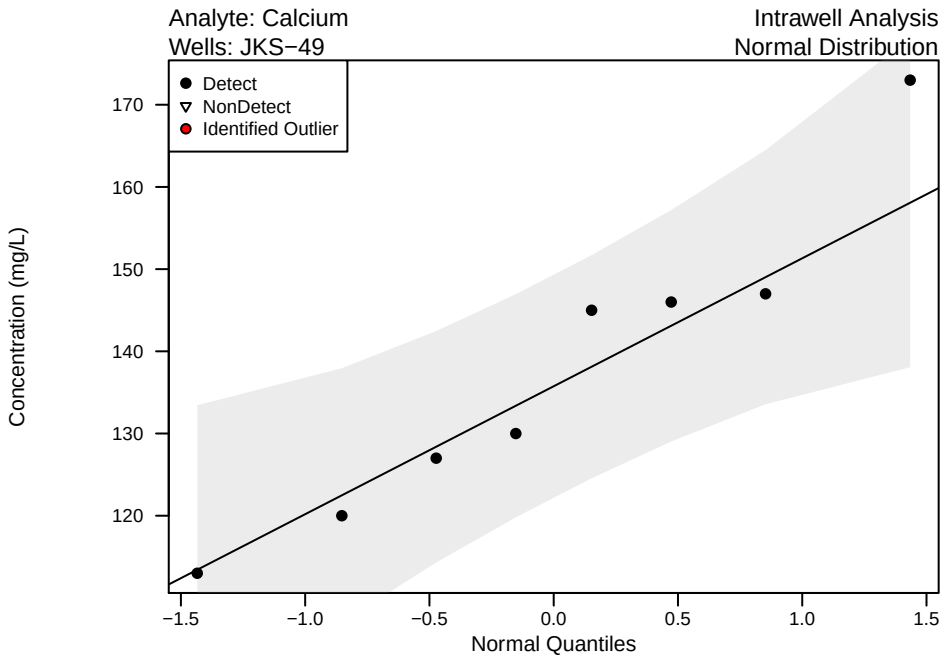
APPENDIX B-FIGURE 2
Unit: Bottom Ash Ponds
QQ Plots of Upgradient Wells



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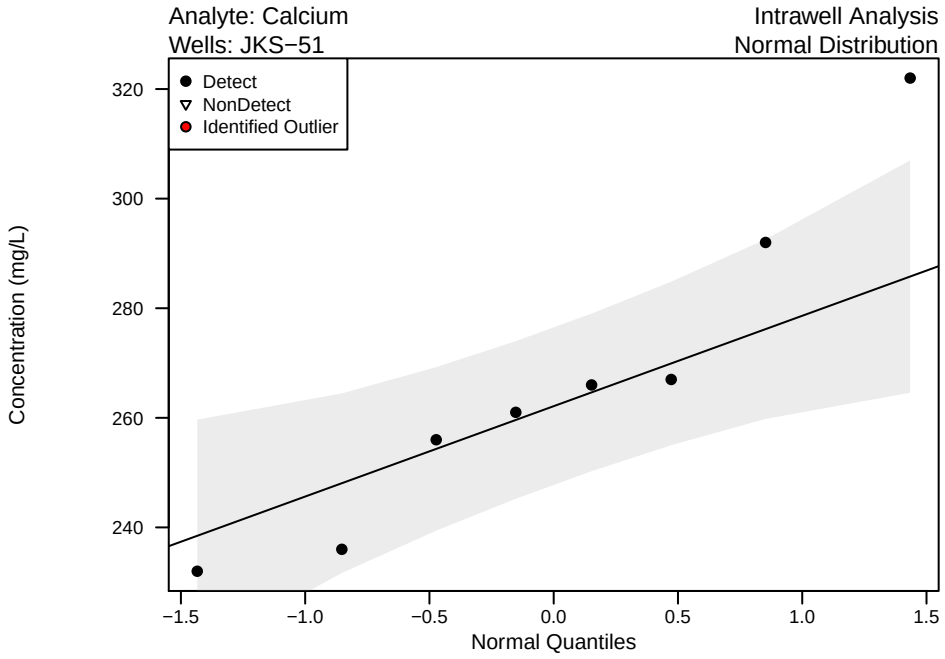

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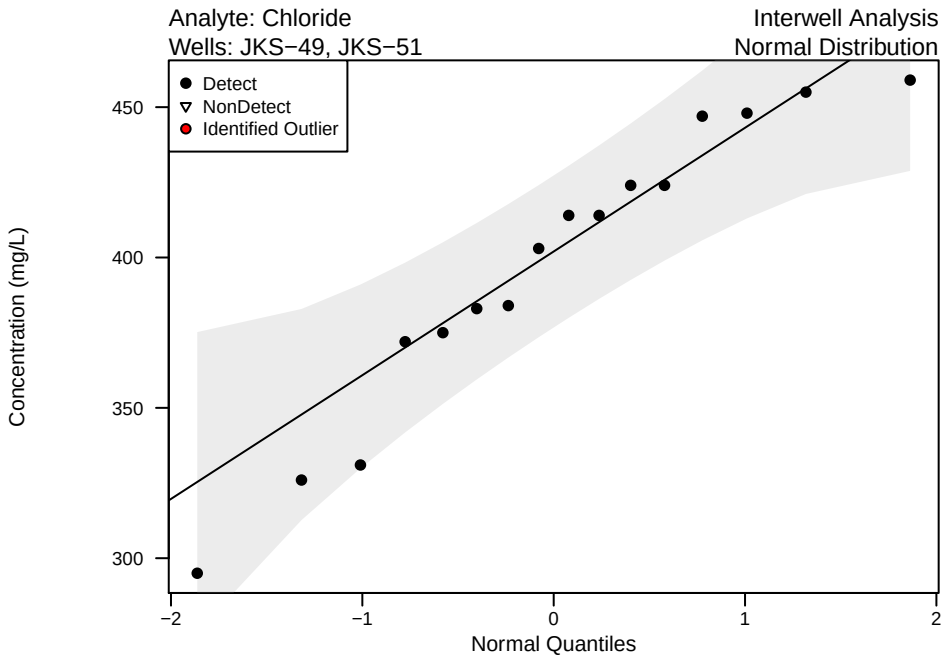
APPENDIX B-FIGURE 2
Unit: Bottom Ash Ponds
QQ Plots of Upgradient Wells



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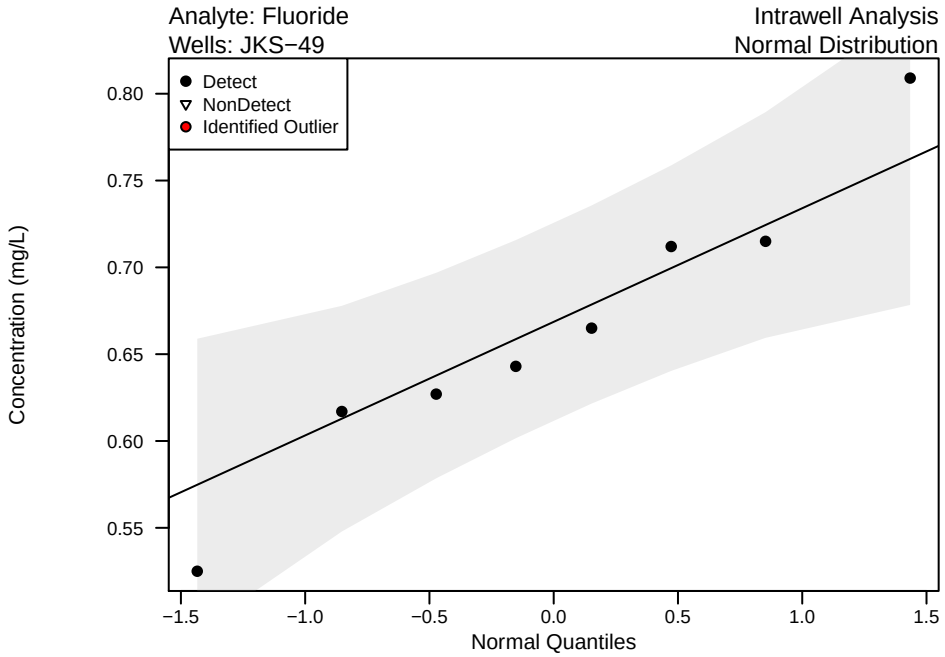

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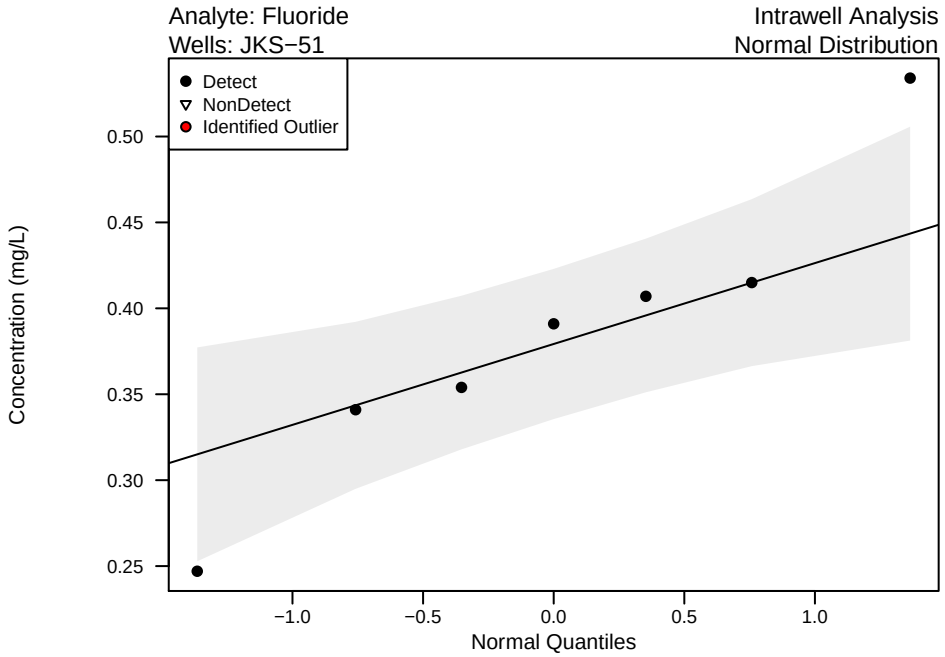
APPENDIX B-FIGURE 2
Unit: Bottom Ash Ponds
QQ Plots of Upgradient Wells



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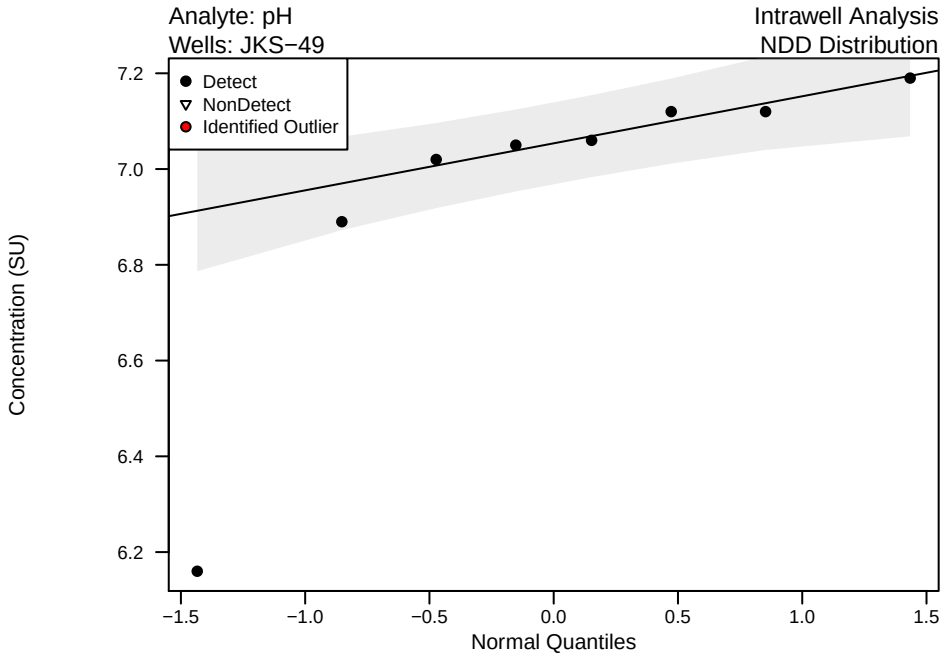
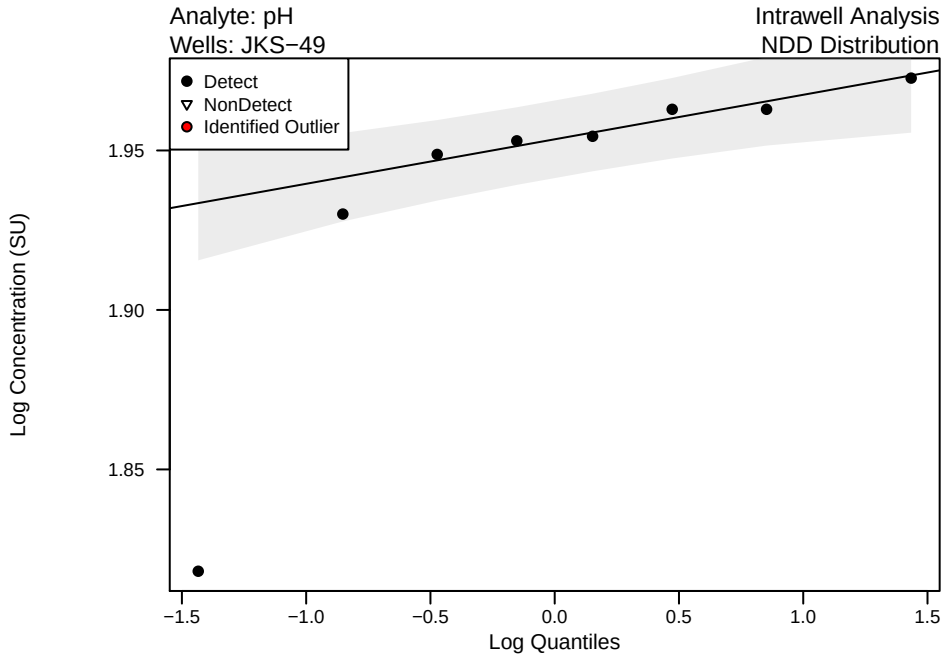
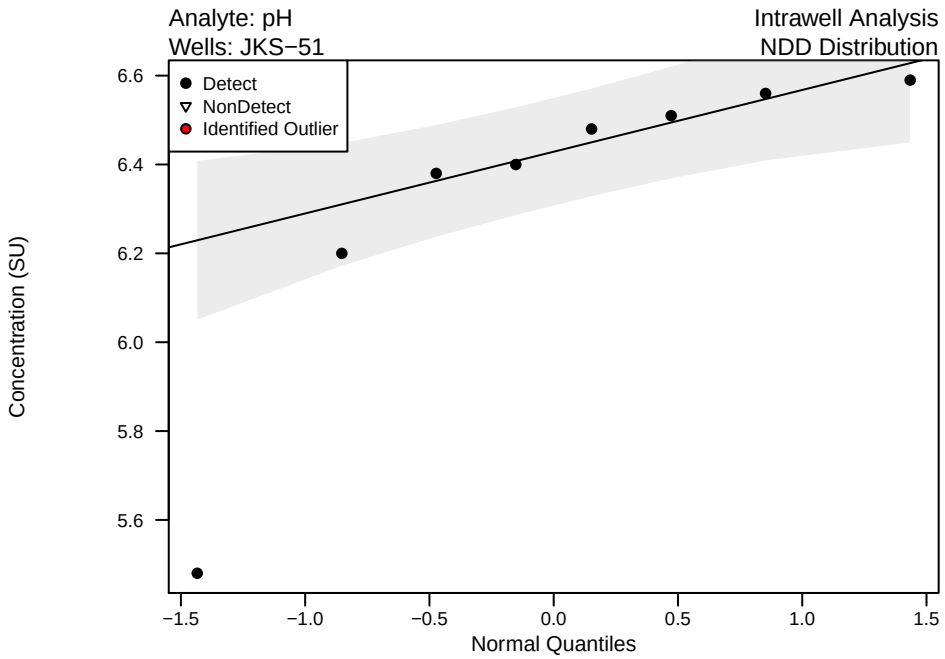
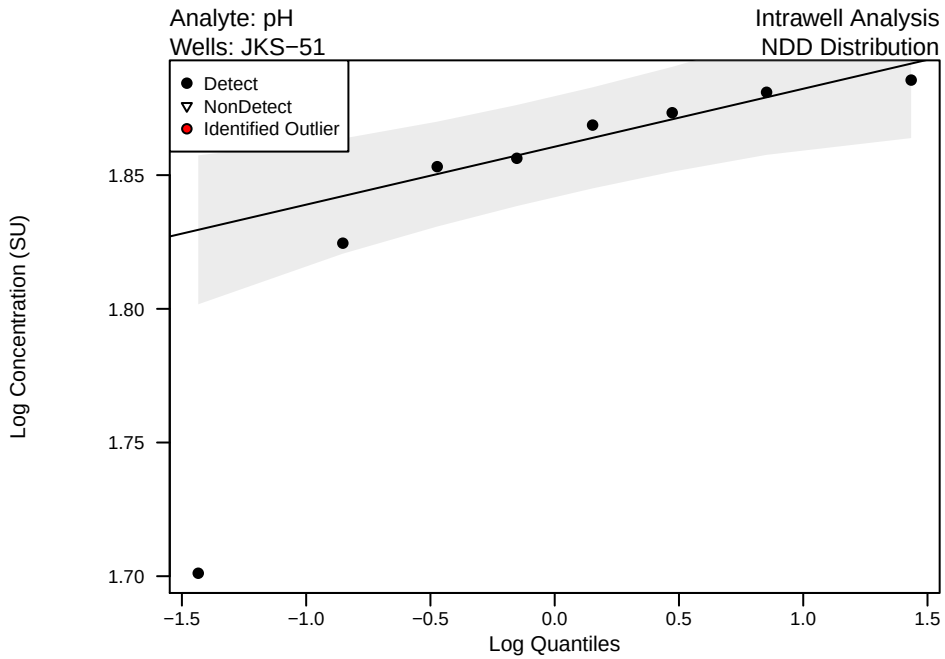
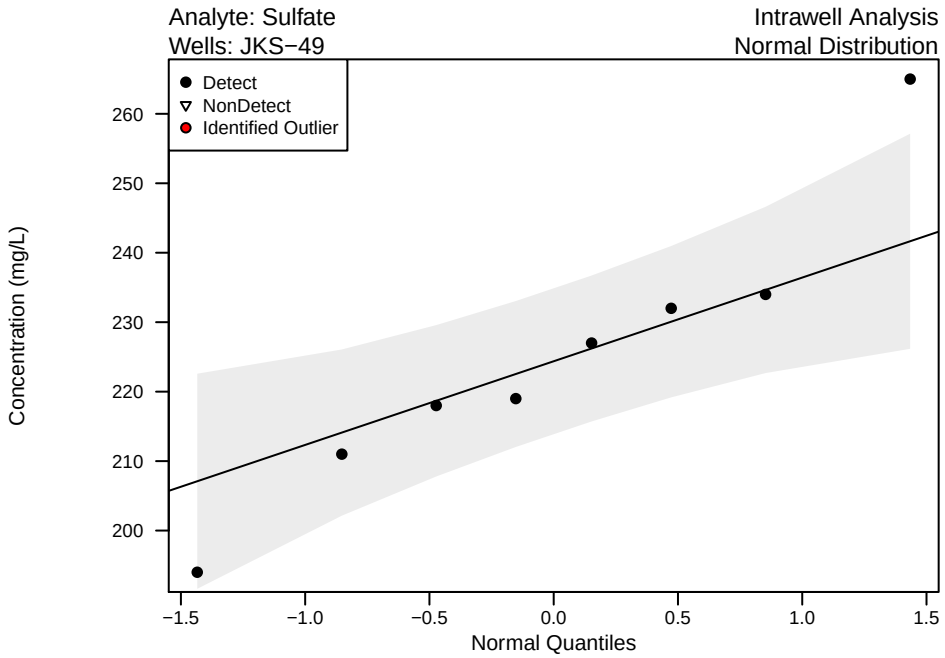




APPENDIX B-FIGURE 2
Unit: Bottom Ash Ponds
QQ Plots of Upgradient Wells







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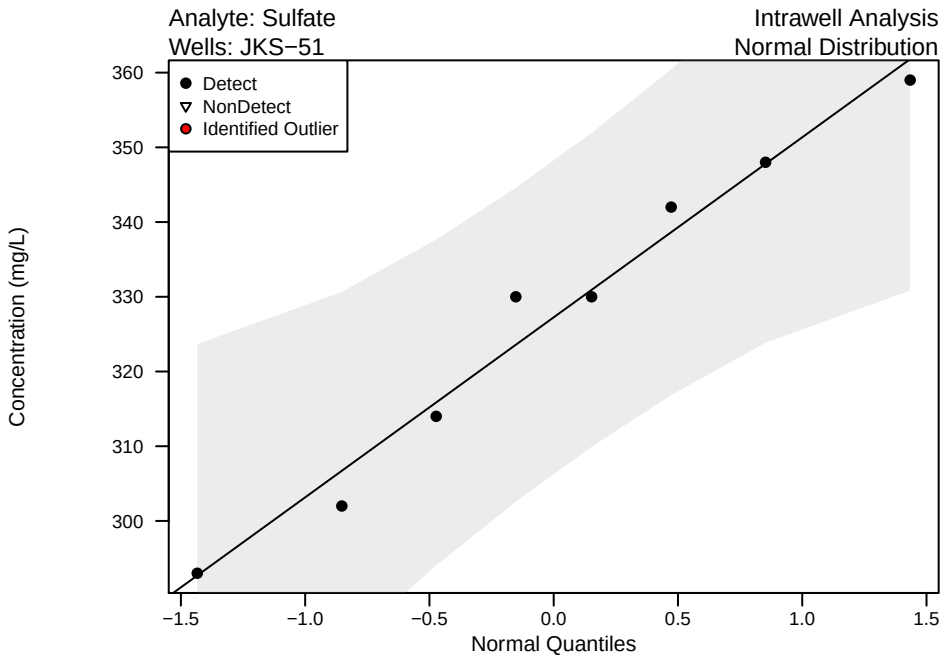
APPENDIX B-FIGURE 2
Unit: Bottom Ash Ponds
QQ Plots of Upgradient Wells



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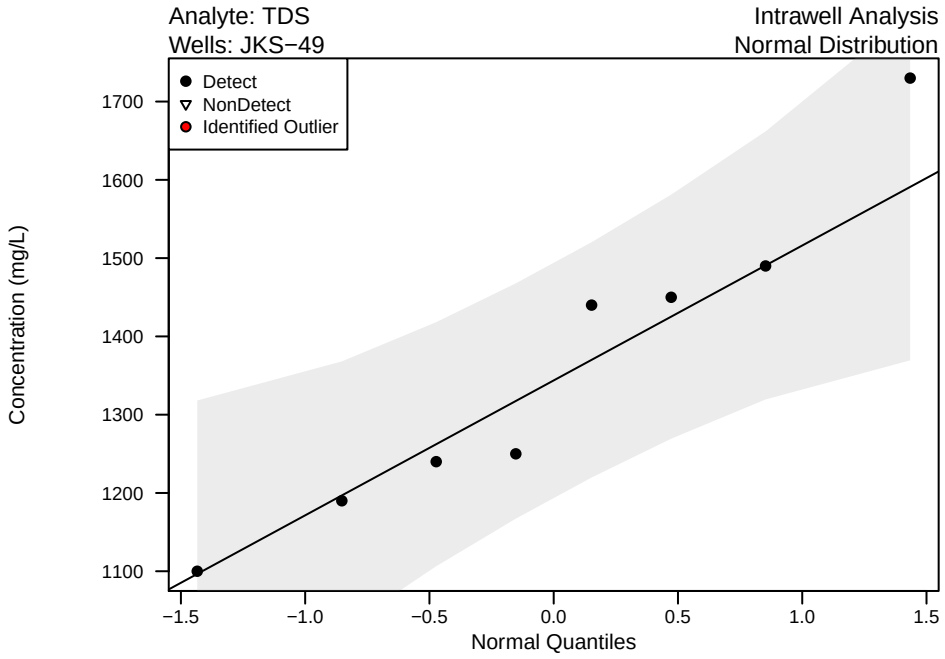

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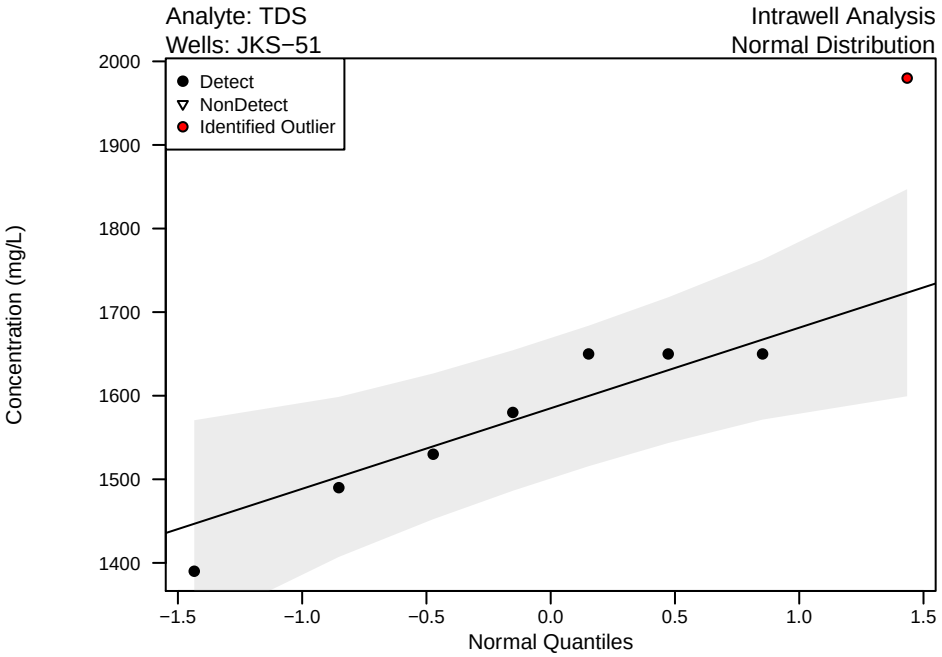
APPENDIX B-FIGURE 2
Unit: Bottom Ash Ponds
QQ Plots of Upgradient Wells



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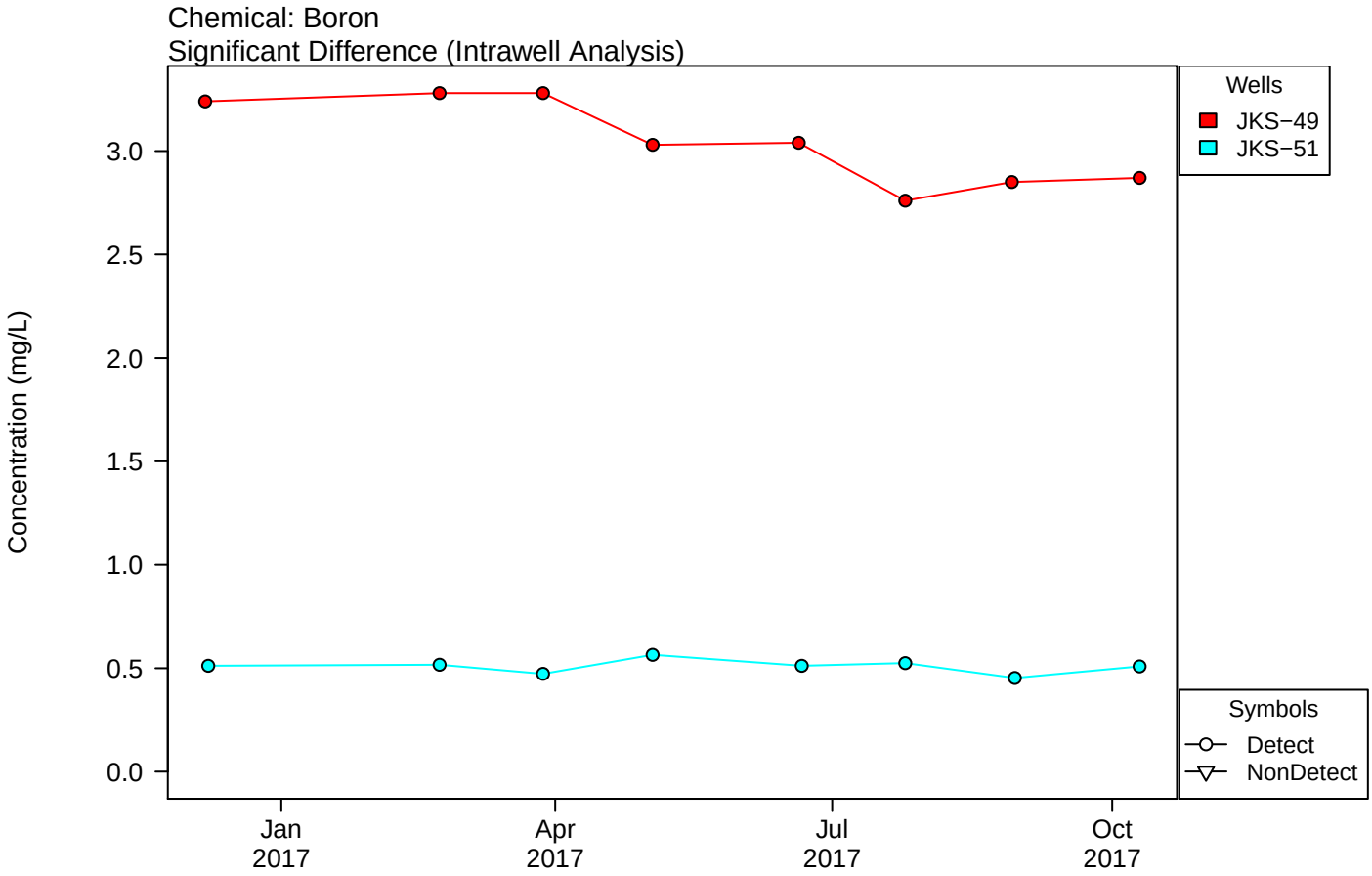
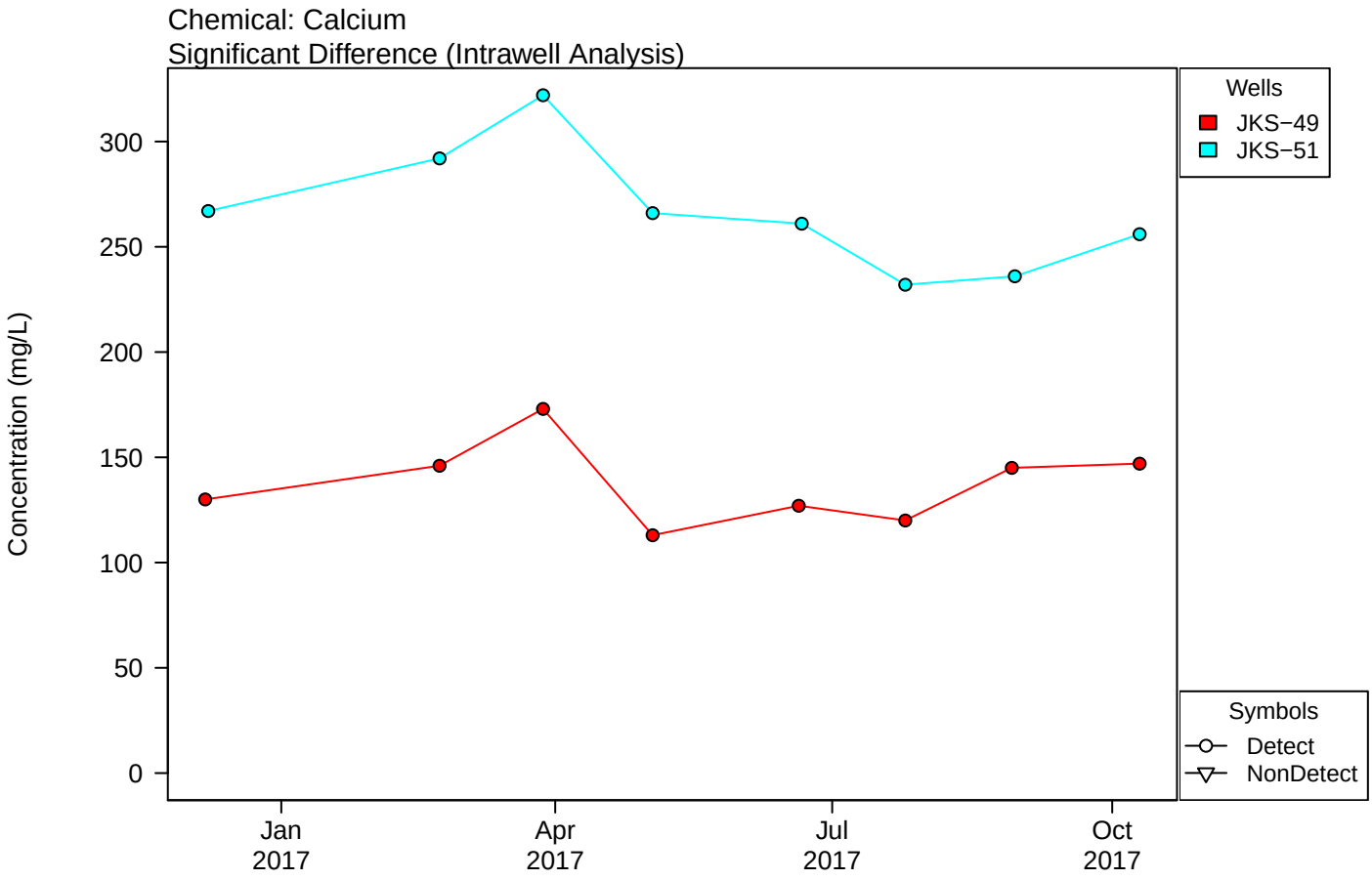
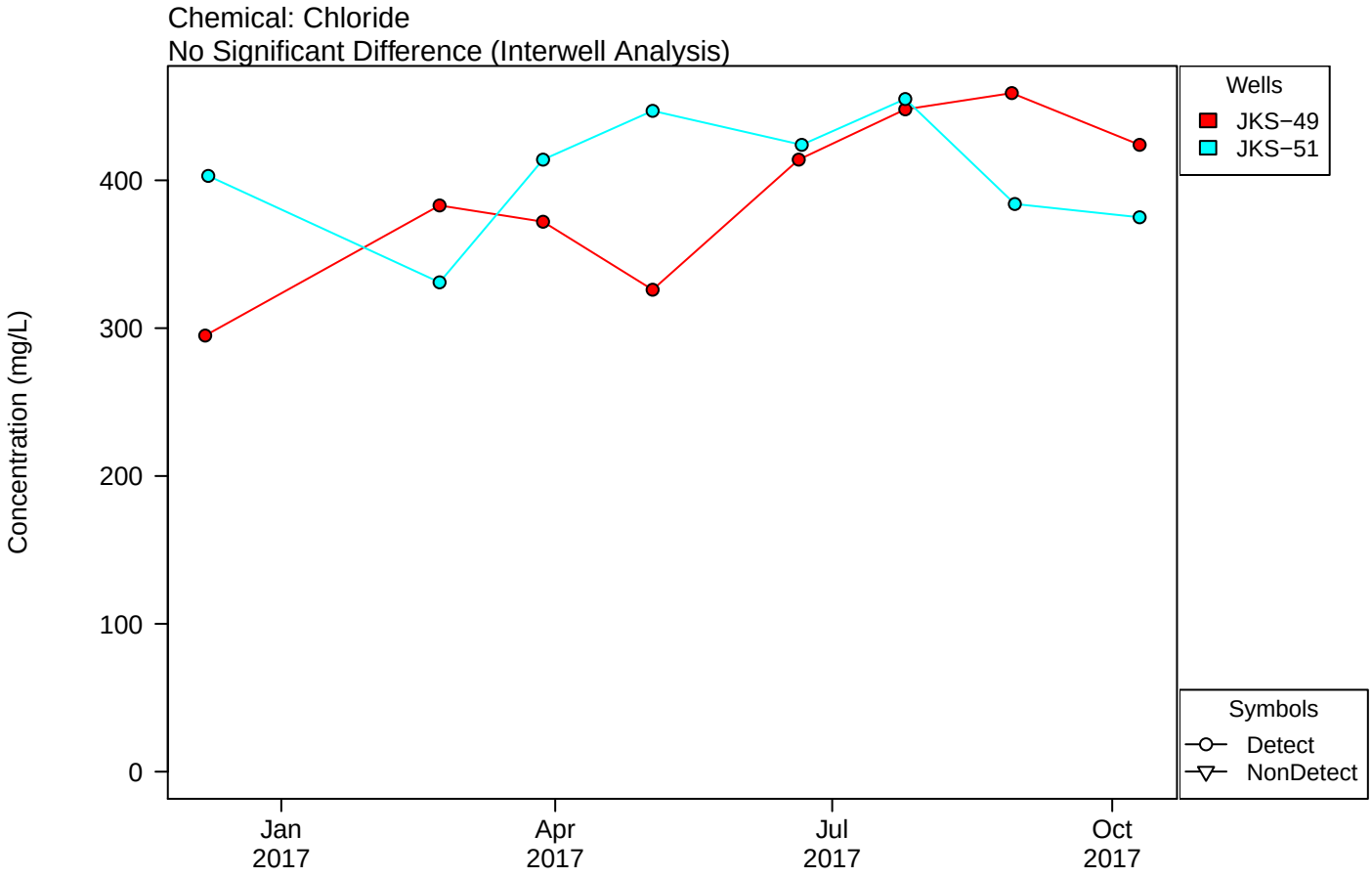
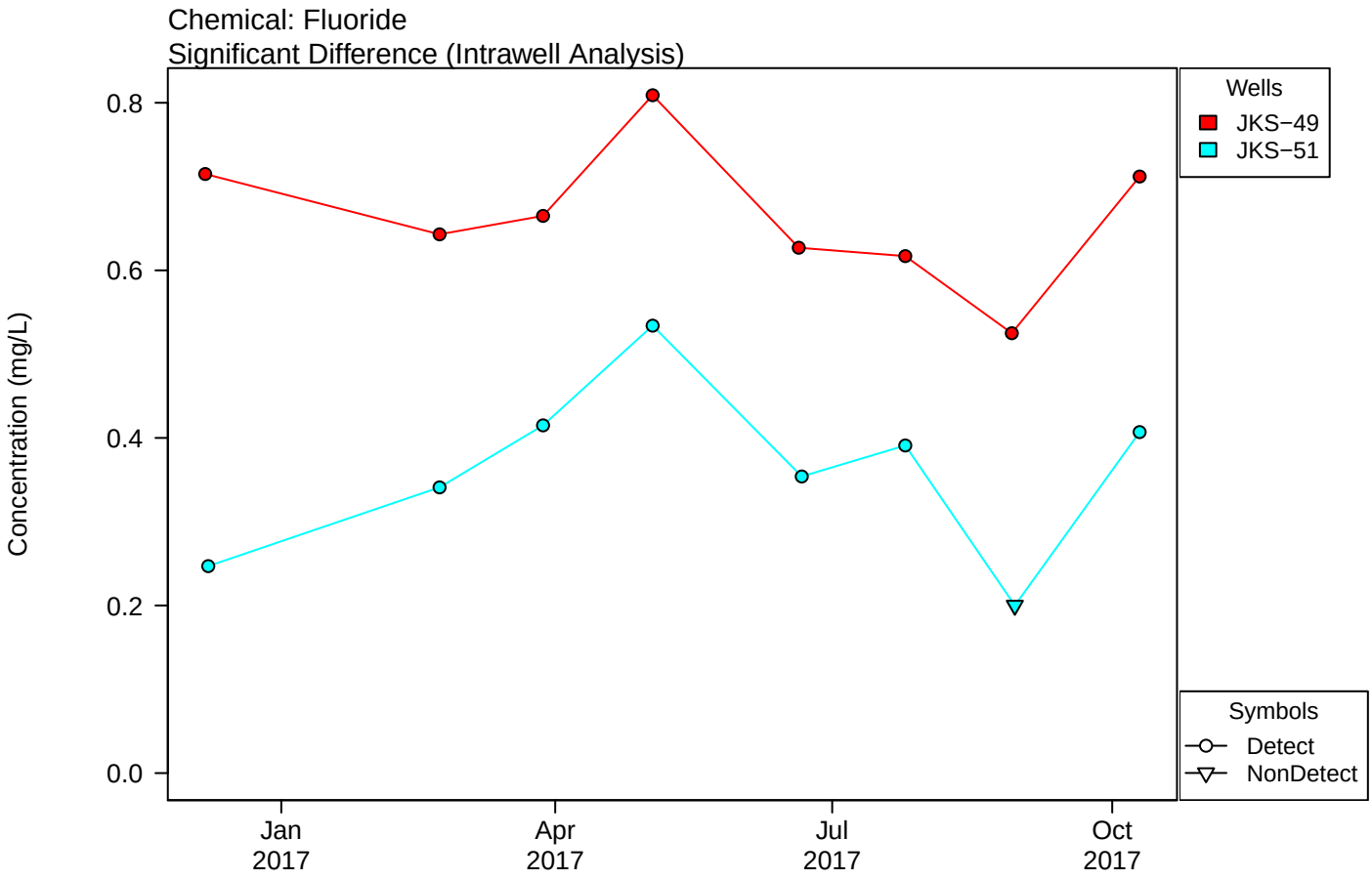
APPENDIX B-FIGURE 3
Unit: Bottom Ash Ponds
Timeseries of Upgradient Wells



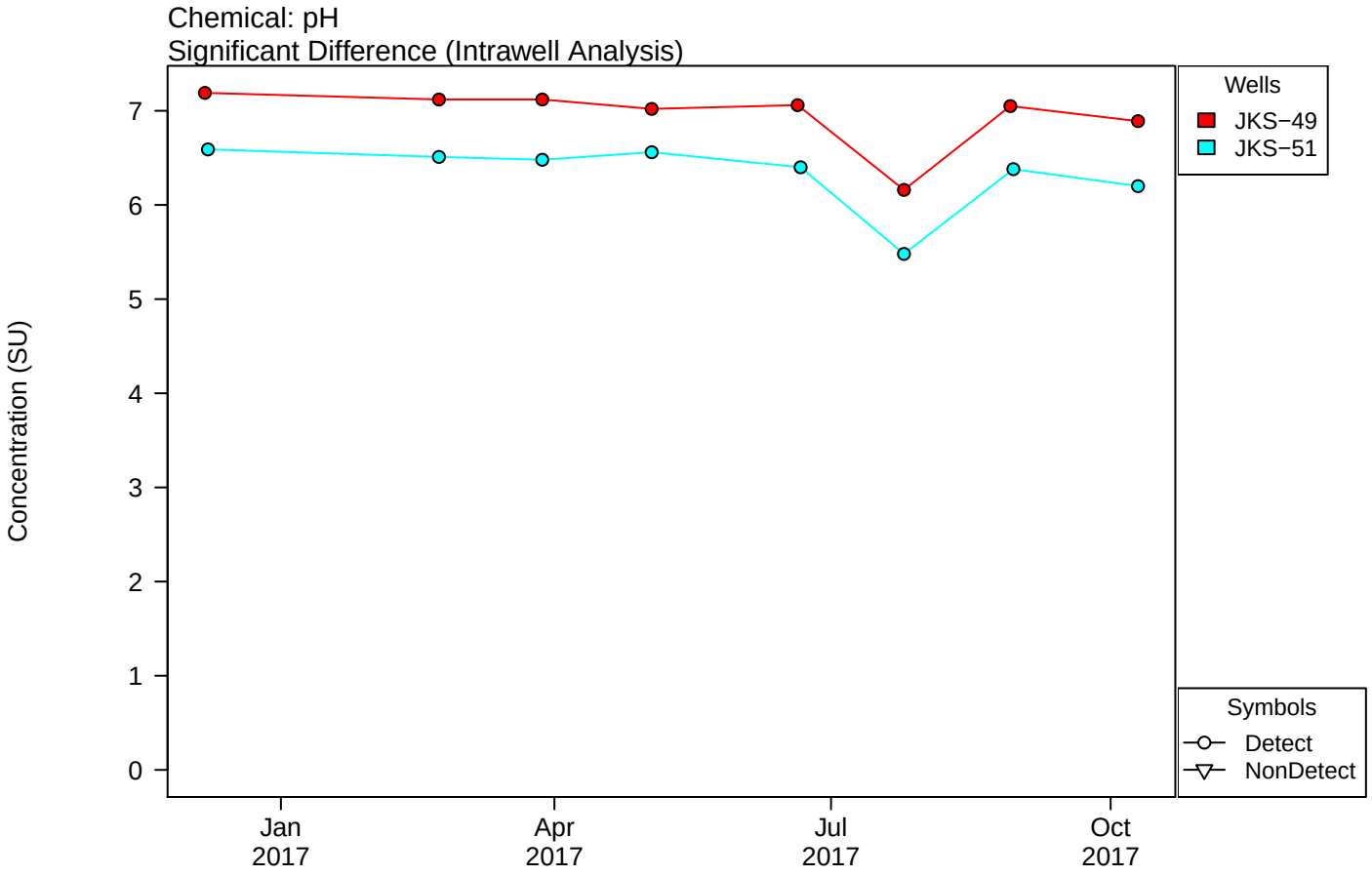


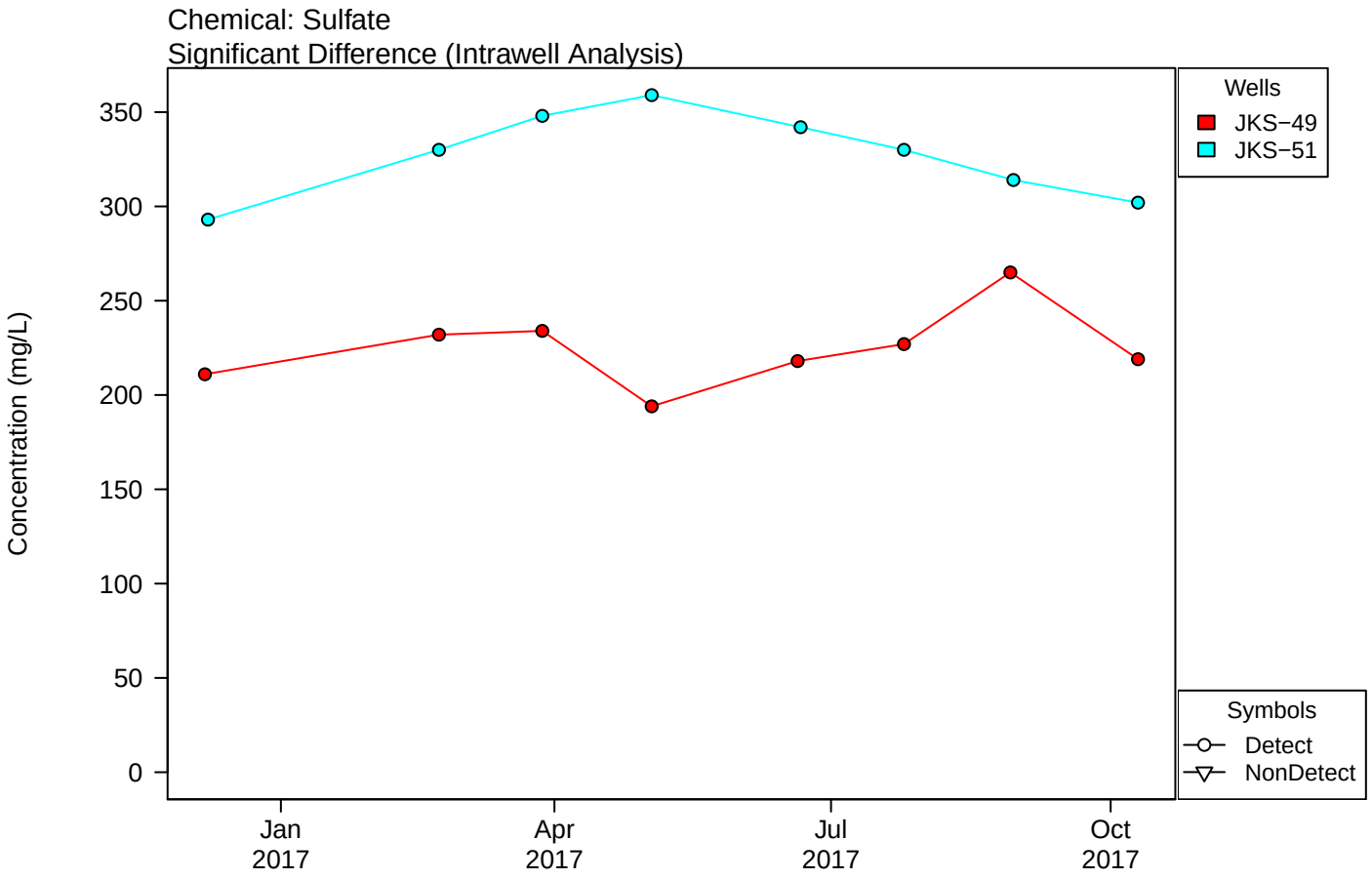
APPENDIX B-FIGURE 3
Unit: Bottom Ash Ponds
Timeseries of Upgradient Wells



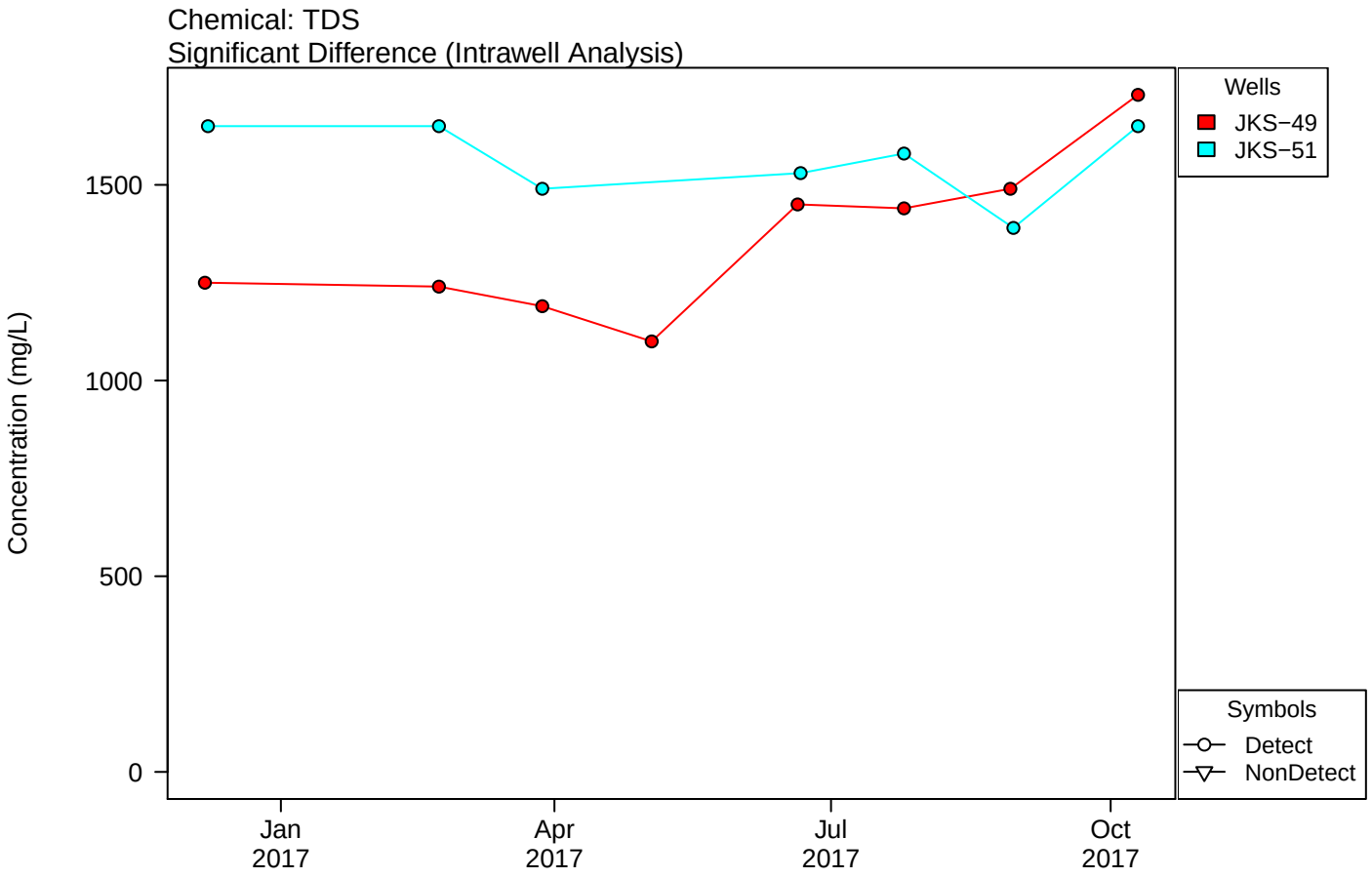


APPENDIX B-FIGURE 3
Unit: Bottom Ash Ponds
Timeseries of Upgradient Wells

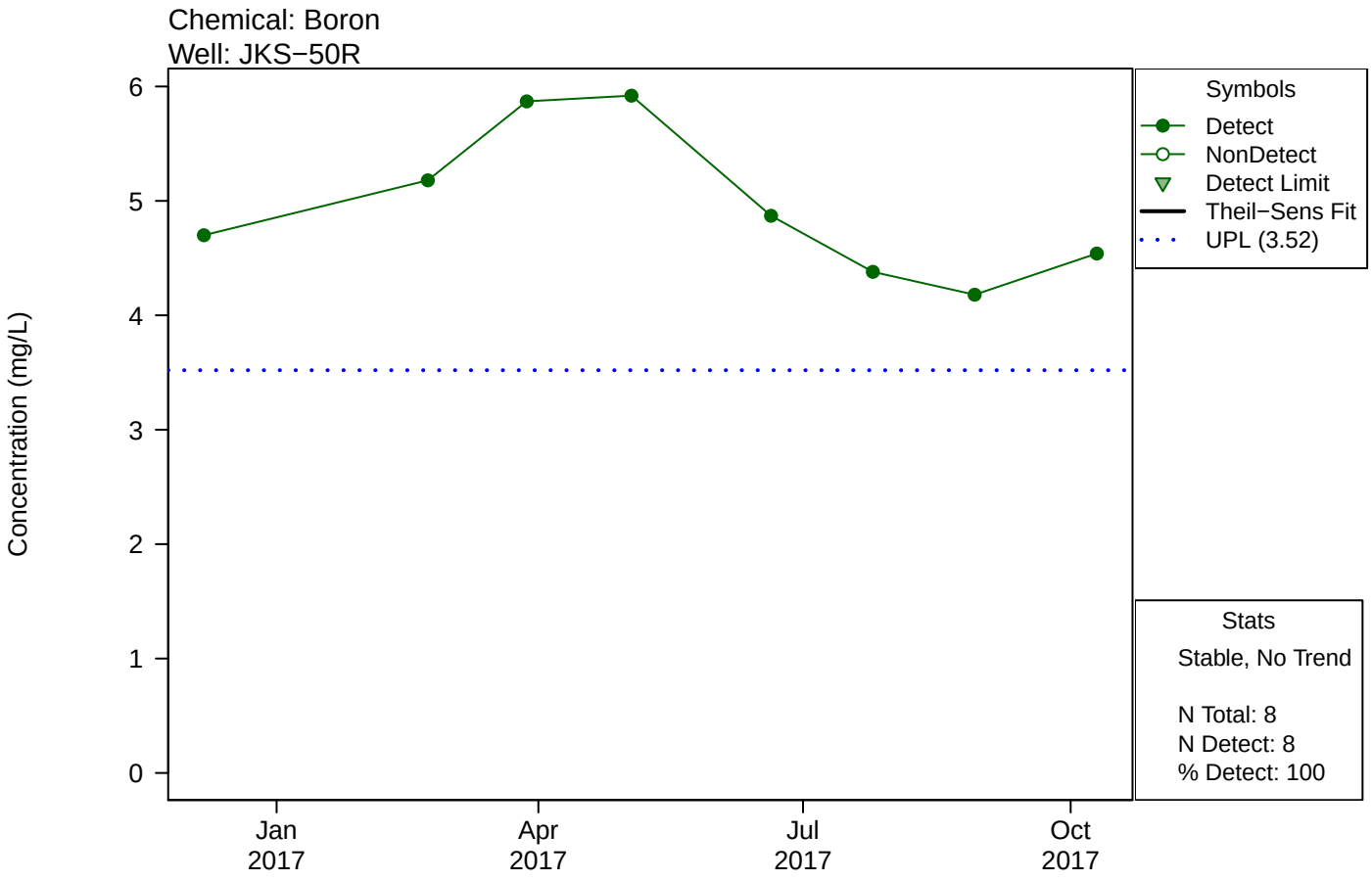


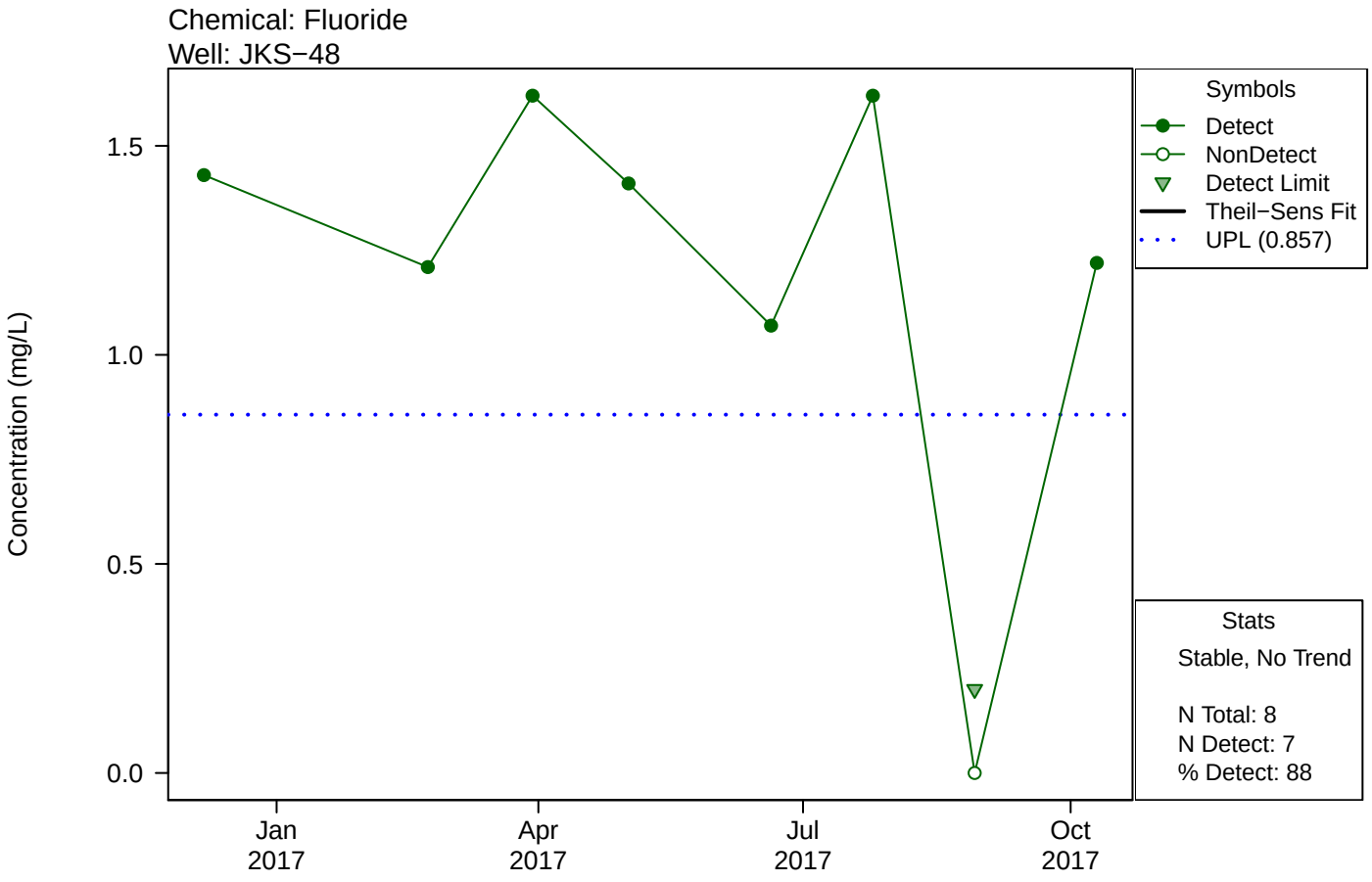


APPENDIX B-FIGURE 3
Unit: Bottom Ash Ponds
Timeseries of Upgradient Wells



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