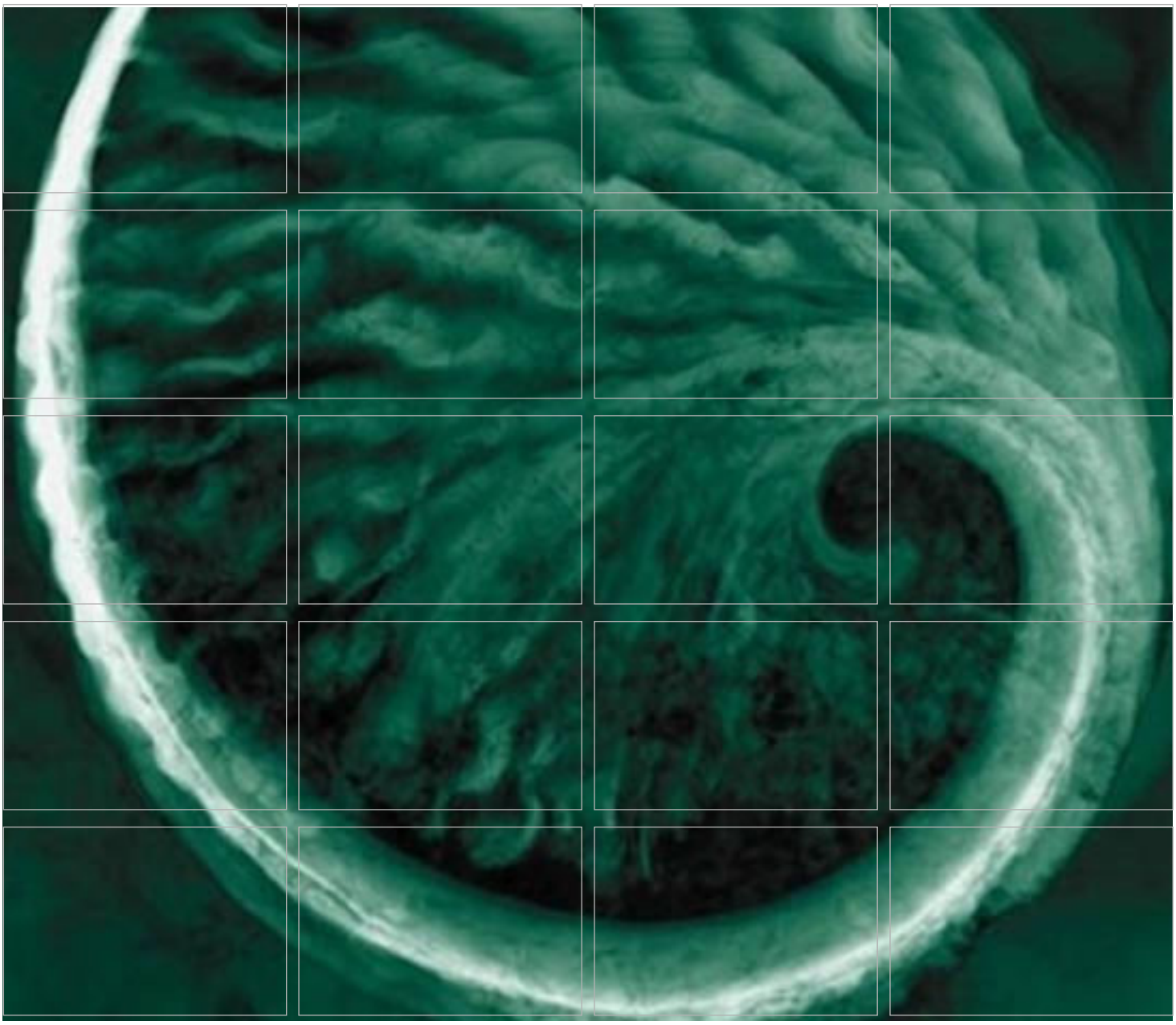

Annual Groundwater Monitoring and Corrective Action Report

CPS Energy
Calaveras Power Station – Fly Ash Landfill
San Antonio, Texas

February 2023

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Calaveras Power Station – Fly Ash Landfill

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February 2023

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1. *CURRENT STATUS SUMMARY*

As required in Title 40, Code of Federal Regulations, Part 257.90, this section provides an overview of the current status of the groundwater monitoring and corrective action program for the Fly Ash Landfill (FAL) located at the CPS Energy Calaveras Power Station:

- At the start of the 2022 annual reporting period, the FAL was operating under the detection monitoring program, as defined in §257.94;
- At the end of the 2022 annual reporting period, the FAL was operating under the detection monitoring program, as defined in §257.94;
- At this time, there was no confirmed statistically significant increase over background for one or more constituents listed in Appendix III pursuant to §257.94(e);
- An assessment monitoring program was not required or initiated for the FAL;
- A remedy was not required or selected pursuant to §257.97 during the 2022 annual reporting period; and
- No remedial activities were initiated or are ongoing pursuant to §257.98 during the 2022 annual reporting period.

2. *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) Subpart D (a.k.a. the CCR Rule). The Power Station is located in unincorporated Bexar County, Texas, approximately 13 miles southeast of San Antonio. Currently, two CCR units are in operation [FAL and Sludge Recycle Holding (SRH) Pond] and two CCR units are undergoing closure [Bottom Ash Ponds (BAPs) and Evaporation Pond (EP)]. This *Annual Groundwater Monitoring and Corrective Action Report* (Report) addresses only the FAL.

This Report was produced by Environmental Resource Management, Inc. (ERM), on behalf of CPS Energy, and summarizes the groundwater monitoring activities for the FAL in 2022 and provides a statistical summary of the findings for samples collected in October 2022. Consistent with the notification requirements of the CCR Rule, this Report will be posted to the operational record and notification will be made to the State of Texas. Additionally, this Report will be placed on the publicly accessible internet site (§257.105(h), §257.106(h), §257.107(h)). 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	Sections 1 and 3
§257.90(e)	Summarize key actions completed	Section 3
§257.90(e)	Describe any problems encountered and actions to resolve problems	Section 3
§257.90(e)	Key activities for upcoming year	Section 5
§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 3
§257.90(e)(3)	Summary of groundwater data, monitoring wells and dates sampled, and whether sample was required under detection or assessment monitoring	Sections 3 and 4, Tables 1 through 3, and Figure 2
§257.90(e)(4)	Narrative discussion of any transition between monitoring programs	Section 5

The FAL is located northeast of the Power Station generating units and is north of the EP. The FAL currently receives fly ash, bottom ash, economizer ash, scrubber sludge from flue gas desulphurization ponds, and flue gas desulphurization gypsum. The FAL was constructed in 1992. The CCR unit location is shown on Figure 1.

3. 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-45 and JKS-57) and four downgradient monitor wells (JKS-31, JKS-33, JKS-46, and JKS-60). As documented in the *2020 Annual Groundwater Monitoring and Corrective Action Report – Fly Ash Landfill* (ERM, 2020), non-proportional changes in water levels were observed during the 2020 monitoring events and a site-wide water level study (Study) was recommended to understand temporal changes in hydrogeology. ERM completed this Study by collecting five rounds of water level measurements at each CCR Unit, which included observations from other on-site monitor wells, from February to October 2021.

As initially documented in the Study, JKS-57 no longer appeared to be a viable background well. Therefore, ERM recommended the installation of one or two new monitor wells located west and/or northwest of the FAL. It was anticipated that the new wells would be designated as background wells for the FAL. However, in July 2022, during the installation of soil borings SB-20220713-01 and SB-20220713-02 on the west side of the FAL, the uppermost groundwater bearing unit (GWBU) was not encountered at either boring location, suggesting that the GWBU may pinch out under the western boundary of the FAL and that JKS-57 is situated on the upgradient edge of the GWBU.

All monitor wells are screened within the uppermost GWBU in the vicinity of the FAL. The uppermost GWBU is approximately 5 to over 25 feet thick and is comprised of clayey/silty sand to well-sorted sand. The uppermost GWBU is located below unconsolidated material (i.e., sands, silts, and low to medium plasticity clays), and above a high plasticity clay (lower confining unit).

The monitor well and soil boring 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. As noted above, the installation of two monitor wells was attempted west of the FAL; however, the uppermost GWBU was not encountered during installation of soil borings SB-20220713-01 and SB-20220713-02. As such, no new monitor wells were installed or decommissioned after the certification of the well network.

3.1 GROUNDWATER OBSERVATIONS

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

Groundwater elevations collected during all the monitoring events are summarized in Table 1. Groundwater elevations and the potentiometric surface for the April and October 2022 monitoring events are shown on Figure 2A and Figure 2B, respectively. For both sampling events, groundwater in the vicinity of the FAL appears to flow radially to the northeast and east from a potentiometric high located at JKS-45. The horizontal gradient is approximately 0.014 feet/foot and 0.018 feet/foot for the April and October 2022 monitoring events, respectively.

3.2 SAMPLING SUMMARY

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

The FAL monitoring wells were sampled by CPS Energy using low flow sampling techniques during the monitoring events. No data gaps were identified during the 2022 semi-annual groundwater monitoring events.

3.3 DATA QUALITY

ERM reviewed field and laboratory documentation to assess the validity, reliability and usability of the analytical results. Samples were sent to San Antonio Testing Laboratory (SATL), located in San Antonio, Texas for analysis. Chain-of-Custody procedures were followed throughout the sample handling process. 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 following data quality review guidance from the Environmental Protection Agency and the Texas Commission on Environmental Quality. A summary of the data usability qualifiers is 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.

4. *STATISTICAL ANALYSIS AND RESULTS*

Consistent with the CCR Rule and with the *Groundwater Sampling and Analysis Program (GSAP)*, a prediction limit approach (40 CFR §257.93(f)) was used to identify potential impacts to groundwater. The steps outlined in the decision framework in the *GSAP* include:

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

Tables and figures generated as part of the statistical analysis, including updating of prediction limits, are provided in Appendix B. The remaining sections of the Report are focused on evaluation of the most recent October 2022 data. Note the April 2022 sampling results were evaluated as discussed in Appendix C. The April 2022 sampling results were evaluated relative to the existing prediction limits.

4.1 *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 tests indicate that:

- One analyte [Chloride] is suitable for interwell analysis, with no significant differences present in upgradient data; and
- Six analytes [Boron, Calcium, Fluoride, pH, Sulfate, Total Dissolved Solids] rely on intrawell analysis, as there are significant differences present in upgradient data.

As discussed in the *GSAP* and presented in the following sections, analytes for interwell analysis utilize a pooled dataset of all upgradient wells, whereas analytes for intrawell analysis utilize individual, separate datasets from each upgradient well.

4.2.1 *ESTABLISHMENT OF UPGRADIENT DATASET*

When evaluating the concentrations of analytes in groundwater, USEPA 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.

4.2.2 *Descriptive Statistics*

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

- There are two upgradient monitoring wells and seven Appendix III constituents for Detection Monitoring.
- There are a total of 13 well-analyte combinations after accounting for interwell versus intrawell analysis.
- 13 well-analyte combinations have detection rates greater than or equal to 50 percent.
- No well-analyte combinations have 100 percent non-detects,
- 11 well-analyte combinations have 100 percent detects.
- Four well-analyte combinations follow a normal distribution (using Shapiro-Wilks Normality Test)
- Two well-analyte combinations follow a log-normal distribution.
- Seven well-analyte combinations have no discernible distribution.

4.2.3 Outlier Determination

Both statistical and visual outlier tests were performed on the upgradient datasets. A total of 13 outliers were initially flagged in the upgradient datasets. Data points identified as both statistical and visual outliers (Appendix B, Table 3 and Appendix B, Figure 2) were reviewed prior to exclusion from the dataset.

Of the 13 data points that were flagged as outliers, 12 were retained in the dataset. After review, it was determined that these values were consistent with natural fluctuations and concentrations detected in other upgradient wells or in the area prior to operation. No analytical or sampling issues were identified during data review; therefore, the 12 outlier values were considered valid and were retained in the upgradient datasets.

4.2.4 Check for Temporal Stability

A trend test was performed for all values in the upgradient wells with 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 results of the trend analysis indicate that:

- There are a total of 13 well-analyte combinations in the upgradient dataset.
- 13 well-analyte combinations meet the data requirements of the trend test.
- Five well-analyte combinations had a significant increasing trend.
- No well-analyte combinations had a significant decreasing trend.
- Eight well-analyte combinations had no significant trend (i.e., concentrations were stable over time).

4.3 ESTABLISHING UPPER PREDICTION LIMITS

A multi-part assessment of the monitoring wells was performed to determine what type of upper prediction limit (UPL) to calculate as a compliance point. A decision framework was applied for each upgradient well based on interwell/intrawell analysis, data availability, and presence of temporal trends. A summary of the UPLs (and LPLs) and the methods used to calculate them are provided in Appendix B, Table 5.

A total of five 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 eight 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 result in each downgradient well. For pH, a final lower prediction limit (LPL) was also identified and used for comparison. For the one analyte with interwell analysis, the upgradient dataset was pooled prior to UPL calculations, resulting in a single UPL value per analyte. For the six analytes with 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 UPLs and LPLs Values

Analysis Type	Analyte	LPL	UPL	Unit
Intrawell	Boron	–	5.16	mg/L
Intrawell	Calcium	–	948	mg/L
Interwell	Chloride	–	5,300	mg/L
Intrawell	Fluoride	–	4.46	mg/L
Intrawell	pH	4.98	7.10	SU
Intrawell	Sulfate	–	8,600	mg/L
Intrawell	Total Dissolved Solids	–	20,500	mg/L

4.4 CONCLUSIONS

The downgradient samples collected during the October 2022 sampling event were used for compliance comparisons. All downgradient wells were below the UPLs and above the LPLs with the following exceptions shown on the table below. Full downgradient results are provided in Appendix B, Table 6.

Potential Exceedances

Analyte	Well	LPL	UPL	Sample Date	Value	Unit
pH	JKS-31	4.98	7.10	2022-10-25	4.08	SU
pH	JKS-46	4.98	7.10	2022-10-25	3.55	SU

Initial exceedances of the UPL may be confirmed with re-testing of the downgradient wells per the 1-of-2 retesting scheme. If the initial exceedance is confirmed with re-testing results in the

same well, the well-analyte pair will be declared a statistically significant increase (SSI) above background. If an SSI is found, a notification or alternate source demonstration will be prepared within 90 days. Any wells with re-testing results at or below the UPL, and at or greater than the LPL, will be considered in compliance and will not require further action. These re-testing results will be reported in the subsequent *Alternative Source Demonstration*.

All downgradient wells with initial exceedances were examined for trends to assess the stability of concentrations. A summary of these trend test results can be found in Appendix B, Table 4. Of the wells with potential SSIs, none of these wells had identifiable trends.

Trends in these wells relative to UPLs, and LPLs for pH, will be monitored closely in future monitoring events. All wells with potential SSIs are plotted in Appendix B, Figure 4. All potential SSIs are within the same order of magnitude of the UPL.

5 RECOMMENDATIONS

Currently, there are no plans to transition between Detection Monitoring and Assessment Monitoring. Consistent with the 1-of-2 retesting approach described in the Unified Guidance (USEPA 2009) and the SAP, initial exceedances may be retested within 90 days. Based on these findings, Detection Monitoring and/or Assessment Monitoring will be initiated as appropriate under §257.94 and §257.95.

6. *REFERENCES*

ERM, 2017. *Groundwater Sampling and Analysis Program.* CPS Energy, Calaveras Power Station, San Antonio, Texas.

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
Fly Ash Landfill

		JKS-45 Upgradient		JKS-57 Upgradient		JKS-58 Water Level Only		JKS-59 Water Level Only	
		TOC Elevation	531.46	TOC Elevation	506.91	TOC Elevation	504.45	TOC Elevation	496.45
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	46.83	484.63	19.89	487.02	18.85	485.60	15.67	480.78
2	2/21/17 to 2/23/17	46.64	484.82	18.95	487.96	15.95	488.50	14.12	482.33
3	3/28/17 to 3/30/17	46.52	484.94	18.20	488.71	15.10	489.35	14.12	482.33
4	5/2/17 to 5/4/17	46.35	485.11	18.80	488.11	16.50	487.95	14.94	481.51
5	6/20/17 to 6/21/17	46.64	484.82	20.23	486.68	18.38	486.07	16.46	479.99
6	7/25/17 to 7/26/17	46.38	485.08	21.16	485.75	15.63	488.82	17.80	478.65
7	8/29/17 to 8/30/17	46.73	484.73	19.44	487.47	19.90	484.55	17.77	478.68
8	10/10/17 to 10/11/17	46.50	484.96	21.67	485.24	20.67	483.78	18.00	478.45
9	4/4/18 to 4/5/18	46.59	484.87	23.22	483.69	21.86	482.59	17.36	479.09
10	10/30/18 to 10/31/18	46.55	484.91	24.65	482.26	21.63	482.82	19.00	477.45
11	4/9/19 to 4/10/19	46.21	485.25	21.09	485.82	17.79	486.66	17.08	479.37
12	10/22/19 to 10/23/19	46.63	484.83	22.61	484.30	20.90	483.55	19.55	476.90
13	4/28/20 to 4/29/20	46.21	485.25	23.97	482.94	22.17	482.28	18.53	477.92
14	10/20/20 to 10/21/20	46.45	485.01	25.68	481.23	23.29	481.16	20.89	475.56
15	4/13/21 to 4/14/21	46.74	484.72	26.89	480.02	23.94	480.51	19.48	476.97
16	10/19/21 to 10/20/21	46.89	484.57	26.02	480.89	21.20	483.25	18.40	478.05
17	4/13/22 to 4/14/22	47.14	484.32	25.55	481.36	22.72	481.73	18.15	478.30
18	10/25/22 to 10/26/22	47.24	484.22	26.76	480.15	23.93	480.52	21.27	475.18

		JKS-31 Downgradient		JKS-33 Downgradient		JKS-46 Downgradient		JKS-60 Downgradient	
		TOC Elevation	507.79	TOC Elevation	498.96	TOC Elevation	499.08	TOC Elevation	495.70
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	27.01	480.44	18.03	480.68	17.61	481.47	17.15	478.55
2	2/21/17 to 2/23/17	26.50	480.95	17.32	481.39	16.30	482.78	16.34	479.36
3	3/28/17 to 3/30/17	25.98	481.47	16.99	481.72	16.10	482.98	15.93	479.77
4	5/2/17 to 5/4/17	26.60	480.85	17.27	481.44	16.70	482.38	15.96	479.74
5	6/20/17 to 6/21/17	26.70	480.75	18.08	480.63	17.98	481.10	16.43	479.27
6	7/25/17 to 7/26/17	26.77	480.68	18.50	480.21	18.80	480.28	17.00	478.70
7	8/29/17 to 8/30/17	26.58	480.87	18.23	480.48	18.91	480.17	17.52	478.18
8	10/10/17 to 10/11/17	26.73	480.72	18.10	480.61	19.37	479.71	17.20	478.50
9	4/4/18 to 4/5/18	26.86	480.59	17.28	481.43	19.65	479.43	16.95	478.75
10	10/30/18 to 10/31/18	26.70	480.75	18.25	480.46	20.54	478.54	17.75	477.95
11	4/9/19 to 4/10/19	25.10	482.35	17.10	481.61	18.90	480.18	16.53	479.17
12	10/22/19 to 10/23/19	27.04	480.41	18.80	479.91	20.45	478.63	18.03	477.67
13	4/28/20 to 4/29/20	26.51	480.94	18.18	480.53	20.22	478.86	17.76	477.94
14	10/20/20 to 10/21/20	27.59	479.86	19.68	479.03	21.55	477.53	19.33	476.37
15	4/13/21 to 4/14/21	27.54	479.91	18.83	479.88	21.29	477.79	18.81	476.89
16	10/19/21 to 10/20/21	27.34	480.11	18.89	479.82	20.20	478.88	18.44	477.26
17	4/13/22 to 4/14/22	27.23	480.56	18.24	480.72	20.81	478.27	17.99	477.71
18	10/25/22 to 10/26/22	28.02	479.77	20.01	478.95	21.90	477.18	20.07	475.63

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

TABLE 2
Groundwater Sampling Summary
CPS Energy - Calaveras Power Station
Fly Ash Landfill

CCR Unit	Well ID	Well Function	Number of Samples Collected in 2016 - 2022	2016 - 2022 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	4/28/20 to 4/29/20	10/20/20 to 10/21/20	4/13/21 to 4/14/21	10/19/21 to 10/20/21	4/13/22 to 4/14/22	10/25/22 to 10/26/22	
Fly Ash Landfill	JKS-31	Downgradient Monitoring	18	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Detection
	JKS-33	Downgradient Monitoring	18	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Detection
	JKS-45	Upgradient Monitoring	18	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Detection
	JKS-46	Downgradient Monitoring	18	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Detection
	JKS-57	Upgradient Monitoring	18	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Detection
	JKS-60	Downgradient Monitoring	18	X	X	X	X	X	X	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
Fly Ash Landfill

		JKS-45 Upgradient																	
	Sample Date	**12/6/16**	**2/23/17**	**3/28/17**	**5/3/17**	**6/20/17**	**7/25/17**	**8/29/17**	**10/10/17**	**4/4/18**	**10/30/18**	**4/10/19**	**10/23/19**	**4/28/20**	**10/21/20**	**4/13/21**	**10/20/21**	**4/13/22**	**10/25/222**
	Task	**Event 1**	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Event 11**	**Event 12**	**Event 13**	**Event 14**	**Event 15**	**Event 16**	**Event 17**	**Event 18**
Constituents	**Unit**	**Dec 2016**	**Feb 2017**	**Mar 2017**	**May 2017**	**Jun 2017**	**Jul 2017**	**Aug 2017**	**Oct 2017**	**Apr 2018**	**Oct 2018**	**Apr 2019**	**Oct 2019**	**Apr 2020**	**Oct 2020**	**Apr 2021**	**Oct 2021**	**Apr 2022**	**Oct 2022**
Appendix III - Detection Monitoring																			
Boron	mg/L	1.65	1.51	2.27	1.11	2.03	1.91	2.02	2.21	2.28	3.24	2.78	2.98	3.01	2.81	2.76	2.94	2.67	2.77
Calcium	mg/L	144	122	184	105	101	103	120	130	128	161 D	195	161 D	141 J	132	146	188	178	152
Chloride	mg/L	196	187	181 J	160	152	0.803	345 JHD	24.8	118	137	167	144	113	98.7	109	130	134	104
Fluoride	mg/L	0.0360 U	0.207	0.334	0.337 JH	0.174 J	0.274 JH	0.0960 U	0.131 JH	0.0360 U	0.0360 U	0.0621 UJ	0.101 J	0.100	0.018 U	0.018 U	0.018 U	0.018 U	0.169
Sulfate	mg/L	623 D	639 D	661	613 X	602 D	2.95 JH	770 JHD	120	662 D	707	874	698	619	564	561	634	651	629
pH - Field Collected	SU	5.41	5.17	3.98	5.62	5.13	5.66	5.82	5.60	5.59	5.70	5.03	5.59	5.85	5.94	5.99	5.93	6.06	6.03
Total dissolved solids	mg/L	1270	1300	1330	1350	1270	1250	1680 JH	1100	1190	741	1350	1320	1590	1260	1360	1390	1550	1320
Appendix IV - Assessment Monitoring																			
Antimony	mg/L	0.000240 U	0.000310 J	0.000400 J	0.00120 U	0.00120 U	0.000240 U	0.000348 J	0.000490 J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Arsenic	mg/L	0.000534 J	0.00216	0.00595	0.00123 U	0.00123 U	0.000346 J	0.00283	0.000618 J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Barium	mg/L	0.0185	0.0436	0.103	0.0128 J	0.0176 J	0.0114	0.0480	0.0142	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Beryllium	mg/L	0.00261 U	0.000383 J	0.000921 J	0.000654 U	0.000654 U	0.000149 J	0.000408 J	0.000229 J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Cadmium	mg/L	0.000147 U	0.000147 U	0.000189 J	0.000734 U	0.000734 U	0.000147 U	0.000147 U	0.000147 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chromium	mg/L	0.00743	0.0152	0.0320	0.00403 J	0.00262 U	0.00313 J	0.0135	0.00272 J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Cobalt	mg/L	0.00506	0.00465	0.00828	0.00346 J	0.00351 J	0.00277	0.00376	0.00358	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Fluoride	mg/L	0.0360 U	0.207	0.334	0.337 JH	0.174 J	0.274 JH	0.0960 U	0.131 JH	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Lead	mg/L	0.000571 J	0.00419	0.0117	0.000758 U	0.000758 U	0.000479 J	0.00482	0.000968 J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Lithium	mg/L	0.0329	0.0601	0.00238 U	0.0600	0.0639	0.0694	0.0935	0.0781	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mercury	mg/L	0.0000263 U	0.0000320 JX	0.0000263 U	0.0000263 U	0.0000300 J	0.0000263 U	0.0000263 U	0.0000263 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Molybdenum	mg/L	0.00105 J	0.00245	0.00372	0.00128 U	0.00128 U	0.000255 U	0.00115 J	0.000271 J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Selenium	mg/L	0.0147	0.0144	0.0174	0.0121	0.0123	0.00990	0.0136	0.0118	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Thallium	mg/L	0.000332 U	0.000332 U	0.000460 J	0.00166 U	0.00166 U	0.000332 U	0.000332 U	0.000332 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Radium-226	pCi/L	4.78 ± 0.890	4.29 ± 0.612	7.63 ± 0.795	3.29 ± 0.485	4.24 ± 0.671	4.34 ± 0.607	3.65 ± 0.553	5.07 ± 0.718	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Radium-228	pCi/L	1.92 ± 1.19	4.59 ± 1.34	2.27 ± 1.19	1.42 ± 0.908	2.84 ± 1.15	1.83 ± 0.868	1.86 ± 0.827	1.66 ± 0.847	NR	NR	NR	NR	NR	NR	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.
F: Relative percent difference exceeded laboratory control limits.
H: Bias in sample result likely to be high.
J: Analyte detected above method (sample) detection limit but below method quantitation limit.
K: Sample analyzed outside of recommended hold time.
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
Fly Ash Landfill

		JKS-57 Upgradient																	
	Sample Date	**12/7/16**	**2/22/17**	**3/28/17**	**5/2/17**	**6/20/17**	**7/25/17**	**8/29/17**	**10/10/17**	**4/4/18**	**10/30/18**	**4/10/19**	**10/23/19**	**4/28/20**	**10/20/20**	**4/13/21**	**10/20/21**	**4/13/22**	**10/26/22**
	Task	**Event 1**	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Event 11**	**Event 12**	**Event 13**	**Event 14**	**Event 15**	**Event 16**	**Event 17**	**Event 18**
Constituents	**Unit**	**Dec 2016**	**Feb 2017**	**Mar 2017**	**May 2017**	**Jun 2017**	**Jul 2017**	**Aug 2017**	**Oct 2017**	**Apr 2018**	**Oct 2018**	**Apr 2019**	**Oct 2019**	**Apr 2020**	**Oct 2020**	**Apr 2021**	**Oct 2021**	**Apr 2022**	**Oct 2022**
Appendix III - Detection Monitoring																			
Boron	mg/L	3.19	3.24	3.17	2.67	3.09	3.08	2.98	3.48	4.49	2.81	3.23	4.14	5.97	3.82	3.74	4.99	4.79	3.46
Calcium	mg/L	349	362	413	--	290	327	337	393	409	401 D	477 D	479 D	622 J	592	742	742	726	968
Chloride	mg/L	70.6	76.2	89.6	130	158	311 D	12.5 JH	185	534 D	3770	119	841	3460	3150	4360	4940	4980	6360
Fluoride	mg/L	3.62	3.32	2.84	2.27	3.42	3.43	0.0960 U	3.28	4.29	2.31	3.03	2.72	4.17	2.99	4.28	0.018 U	0.018 U	3.56
Sulfate	mg/L	2780 D	1980 DX	2090	2470 D	3080	3410 D	450 JH	3610	4260 D	5000	3570	4240	6510	3890	3740	5380	5290	3750
pH - Field Collected	SU	6.73	6.08	5.13	6.63	6.37	6.72	6.60	6.70	6.63	6.35	6.20	6.19	6.49	6.33	6.38	6.68	6.76	6.58
Total dissolved solids	mg/L	4770	3780	3320	4060	5800	5920	850 JH	5850	7390	9750	6000	6700	15100	12200	13300	16000	17200	16600
Appendix IV - Assessment Monitoring																			
Antimony	mg/L	0.00120 U	0.000240 U	0.000240 U	0.000240 U	0.00120 U	0.000240 U	0.000240 U	0.000240 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Arsenic	mg/L	0.00138 J	0.000630 J	0.000654 J	0.000561 J	0.00123 U	0.000480 J	0.000519 J	0.000486 J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Barium	mg/L	0.0311	0.0211	0.0208	0.0174	0.0164 J	0.0149	0.0128	0.0145	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Beryllium	mg/L	0.000654 U	0.000131 U	0.000161 J	0.000131 U	0.000654 U	0.000131 U	0.000131 U	0.000131 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Cadmium	mg/L	0.000734 U	0.000147 U	0.000147 U	0.000147 U	0.000734 U	0.000147 U	0.000147 U	0.000147 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chromium	mg/L	0.00262 U	0.000687 J	0.000525 U	0.000525 U	0.00262 U	0.000739 J	0.000816 J	0.00104 J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Cobalt	mg/L	0.000520 J	0.00232	0.000297 J	0.000449 J	0.000407 J	0.000748 J	0.000195 J	0.000322 J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Fluoride	mg/L	3.62	3.32	2.84	2.27	3.42	3.43	0.0960 U	3.28	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Lead	mg/L	0.000758 U	0.000152 U	0.000152 U	0.000152 U	0.000758 U	0.000152 U	0.000256 J	0.000152 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Lithium	mg/L	0.545	0.287 X	0.00238 U	--	0.533	0.649	0.671	0.733	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mercury	mg/L	0.0000263 U	0.0000300 J	0.0000263 U	0.0000580 J	0.0000263 U	0.0000263 U	0.0000263 U	0.0000263 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Molybdenum	mg/L	0.00128 U	0.000385 J	0.000278 J	0.000255 U	0.00128 U	0.000329 J	0.000283 J	0.000255 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Selenium	mg/L	0.00237 J	0.000664 J	0.000594 J	0.000561 J	0.00227 U	0.000612 J	0.000858 J	0.000697 J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Thallium	mg/L	0.00166 U	0.000332 U	0.000332 U	0.000332 U	0.00166 U	0.000332 U	0.000332 U	0.000332 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Radium-226	pCi/L	0.592 ± 0.325	0.322 ± 0.157	0.519 ± 0.219	0.356 ± 0.176	0.273 ± 0.273	0.338 ± 0.221	0.255 ± 0.176	0.0986 ± 0.153	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Radium-228	pCi/L	1.15 ± 0.895	2.31 ± 1.03	0.794 ± 0.818	2.86 ± 1.27	0.903 ± 0.843	0.786 ± 0.900	1.9 ± 0.894	1.73 ± 1.00	NR	NR	NR	NR	NR	NR	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.
F: Relative percent difference exceeded laboratory control limits.
H: Bias in sample result likely to be high.
J: Analyte detected above method (sample) detection limit but below method quantitation limit.
K: Sample analyzed outside of recommended hold time.
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
Fly Ash Landfill

		JKS-31 Downgradient																	
	Sample Date	**12/8/16**	**2/21/17**	**3/29/17**	**5/2/17**	**6/20/17**	**7/25/17**	**8/29/17**	**10/10/17**	**4/4/18**	**10/30/18**	**4/10/19**	**10/22/19**	**4/28/20**	**10/20/20**	**4/14/21**	**10/20/21**	**4/13/22**	**10/25/22**
	Task	**Event 1**	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Event 11**	**Event 12**	**Event 13**	**Event 14**	**Event 15**	**Event 16**	**Event 17**	**Event 18**
Constituents	**Unit**	**Dec 2016**	**Feb 2017**	**Mar 2017**	**May 2017**	**Jun 2017**	**Jul 2017**	**Aug 2017**	**Oct 2017**	**Apr 2018**	**Oct 2018**	**Apr 2019**	**Oct 2019**	**Apr 2020**	**Oct 2020**	**Apr 2021**	**Oct 2021**	**Apr 2022**	**Oct 2022**
Appendix III - Detection Monitoring																			
Boron	mg/L	0.446	0.580	0.642	0.499	0.573	0.510	0.494	0.553	0.485	0.514	0.557	0.483	0.429	0.379	0.511	0.435	0.460	0.424
Calcium	mg/L	188	384 X	317	--	216	171	230	228	187	208 D	295 D	200 D	171 J	216	286	330	339	163
Chloride	mg/L	223 D	477 D	303 D	317	285 D	0.280 UDXF	0.347 U	288	253 D	256	322	267	272	319	411	467	525	270
Fluoride	mg/L	0.801	0.186 J	0.548	0.865	0.661	0.979 JHXF	0.0960 U	0.735 JH	0.839	0.694	0.791 U	0.784	1.00	0.786	0.742	0.018 U	0.018 U	0.894
Sulfate	mg/L	697 D	1130 D	768 D	875	782 D	1.17 JHDXF	0.160 JH	803	771 D	774	852	819	877	914	1060	1150	1400	887
pH - Field Collected	SU	3.94	4.04	6.34	4.29	3.84	5.14	3.99	3.98	3.74	3.07	3.56	2.62	3.70	3.68	3.96	3.92	4.04	4.08
Total dissolved solids	mg/L	1470	2290	2430	1850	1730	1500	25.0 U	1890	1420	1390	1660	1620	1890	1700	2380	2440	3170	1680
Appendix IV - Assessment Monitoring																			
Antimony	mg/L	0.00120 U	0.000240 U	0.000295 J	0.000301 J	0.00120 U	0.000527 J	0.000240 U	0.000559 J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Arsenic	mg/L	0.00151 J	0.0110	0.00834	0.00501	0.00363 J	0.00134 J	0.00556	0.00279	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Barium	mg/L	0.0167 J	0.0141	0.0198	0.0136	0.0127 J	0.0229	0.0129	0.0122	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Beryllium	mg/L	0.00793 J	0.00851	0.00885	0.00814	0.00865 J	0.00593	0.00827	0.00857	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Cadmium	mg/L	0.000734 U	0.000147 U	0.000147 U	0.000147 U	0.000734 U	0.000147 U	0.000147 U	0.000147 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chromium	mg/L	0.0200 J	0.000663 J	0.000596 J	0.000525 U	0.00262 U	0.000890 J	0.000849 J	0.000760 J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Cobalt	mg/L	0.000440 J	0.0399	0.0623	0.0227	0.0173	0.0113	0.0302	0.0192	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Fluoride	mg/L	0.801	0.186 J	0.548	0.865	0.661	0.979 JHXF	0.0960 U	0.735 JH	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Lead	mg/L	0.000758 U	0.000415 J	0.000223 J	0.000344 J	0.000758 U	0.000348 J	0.00233	0.000580 J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Lithium	mg/L	0.533	0.510	0.00238 U	--	0.572	0.484	0.615	0.590	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mercury	mg/L	0.0000263 U	0.0000263 U	0.0000263 U	0.0000360 J	0.0000263 U	0.0000263 U	0.0000263 U	0.0000263 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Molybdenum	mg/L	0.00128 U	0.000255 U	0.000255 U	0.000255 U	0.00128 U	0.000255 U	0.000255 U	0.000255 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Selenium	mg/L	0.00227 U	0.00163 J	0.00175 J	0.00125 J	0.00227 U	0.00162 J	0.00177 J	0.00155 J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Thallium	mg/L	0.00166 U	0.000332 U	0.000332 U	0.000332 U	0.00166 U	0.000332 U	0.000332 U	0.000332 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Radium-226	pCi/L	2.46 ± 0.574	2.60 ± 0.473	1.44 ± 0.425	1.40 ± 0.338	1.40 ± 0.403	1.28 ± 0.341	1.36 ± 0.399	1.01 ± 0.323	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Radium-228	pCi/L	7.35 ± 1.59	8.16 ± 2.15	5.33 ± 1.47	5.85 ± 1.79	4.63 ± 1.23	4.44 ± 1.37	3.58 ± 1.22	4.96 ± 1.43	NR	NR	NR	NR	NR	NR	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.
F: Relative percent difference exceeded laboratory control limits.
H: Bias in sample result likely to be high.
J: Analyte detected above method (sample) detection limit but below method quantitation limit.
K: Sample analyzed outside of recommended hold time.
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
Fly Ash Landfill

		JKS-33 Downgradient																	
	Sample Date	**12/7/16**	**2/22/17**	**3/28/17**	**5/2/17**	**6/20/17**	**7/26/17**	**8/29/17**	**10/10/17**	**4/5/18**	**10/30/18**	**4/10/19**	**10/22/19**	**4/28/20**	**10/20/20**	**4/13/21**	**10/20/21**	**4/13/22**	**10/25/22**
	Task	**Event 1**	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Event 11**	**Event 12**	**Event 13**	**Event 14**	**Event 15**	**Event 16**	**Event 17**	**Event 18**
Constituents	**Unit**	**Dec 2016**	**Feb 2017**	**Mar 2017**	**May 2017**	**Jun 2017**	**Jul 2017**	**Aug 2017**	**Oct 2017**	**Apr 2018**	**Oct 2018**	**Apr 2019**	**Oct 2019**	**Apr 2020**	**Oct 2020**	**Apr 2021**	**Oct 2021**	**Apr 2022**	**Oct 2022**
Appendix III - Detection Monitoring																			
Boron	mg/L	0.940	1.02	1.05	0.987	1.09	1.01	1.03	1.11	0.990	0.791	1.13	1.18	1.18	1.09	1.09	1.06	1.02	1.11
Calcium	mg/L	564	600	553	--	563	558	567	531	552	385 D	631	553 D	573 J	493	516	504	499	434
Chloride	mg/L	735 D	679 D	731 D	690	692 D	693 D	125 JH	666	786	758	806	773 JLKD	756	751	1560	693	731	683
Fluoride	mg/L	1.86	1.08	1.77	1.36	1.81	1.34	0.480 U	1.69	1.85	1.21	1.23	1.24 JLK	1.68	0.864	0.988	0.018 U	0.018 U	1.26
Sulfate	mg/L	1850 D	1670 D	1780 D	1710	1690 D	1710 D	3170 D	1640	1810	1740	1640	1690 JLKD	1620	1650	3270	1450	1560	1520
pH - Field Collected	SU	6.51	5.90	4.91	6.52	6.15	5.71	6.49	6.49	6.33	6.26	5.98	5.18	6.30	6.23	6.27	6.33	6.55	6.41
Total dissolved solids	mg/L	4000	3990	4310	4410	3750	4070	3580	4320	3970	3320	2650 JLK	4040 JLK	4370	4060	4080	3590	3960	3940
Appendix IV - Assessment Monitoring																			
Antimony	mg/L	0.00120 U	0.000240 U	0.00120 U	0.000240 U	0.00120 U	0.000240 U	0.000240 U	0.000240 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Arsenic	mg/L	0.00123 U	0.000246 U	0.00123 U	0.000257 J	0.00123 U	0.000279 J	0.000316 J	0.000246 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Barium	mg/L	0.0326	0.0318	0.0297	0.0268	0.0279	0.0274	0.0263	0.0264	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Beryllium	mg/L	0.000654 U	0.000131 U	0.000709 J	0.000131 U	0.000654 U	0.000131 U	0.000131 U	0.000131 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Cadmium	mg/L	0.000734 U	0.000147 U	0.000734 U	0.000147 U	0.000734 U	0.000147 U	0.000147 U	0.000147 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chromium	mg/L	0.00262 U	0.000611 J	0.00262 U	0.000525 U	0.00262 U	0.000525 U	0.00113 J	0.00108 J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Cobalt	mg/L	0.000690 J	0.000433 J	0.000487 J	0.000435 J	0.000512 J	0.000731 J	0.000902 J	0.000554 J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Fluoride	mg/L	1.86	1.08	1.77	1.36	1.81	1.34	0.480 U	1.69	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Lead	mg/L	0.000758 U	0.000152 U	0.000758 U	0.000152 U	0.000758 U	0.000152 U	0.000157 J	0.000152 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Lithium	mg/L	0.000476 U	0.000476 U	0.00238 U	--	0.194	0.181	0.255	0.176	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mercury	mg/L	0.0000263 U	0.0000263 U	0.0000263 U	0.0000720 J	0.0000263 U	0.0000263 U	0.0000263 U	0.0000263 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Molybdenum	mg/L	0.00128 U	0.000255 U	0.00128 U	0.000255 U	0.00128 U	0.000255 U	0.000255 U	0.000255 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Selenium	mg/L	0.0314	0.0356	0.0389	0.0368	0.0451	0.0495	0.0546	0.0342	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Thallium	mg/L	0.00166 U	0.000332 U	0.00166 U	0.000332 U	0.00166 U	0.000332 U	0.000332 U	0.000332 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Radium-226	pCi/L	2.04 ± 0.439	1.14 ± 0.328	2.36 ± 0.522	1.81 ± 0.365	1.73 ± 0.428	1.55 ± 0.422	1.37 ± 0.394	2.23 ± 0.491	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Radium-228	pCi/L	2.95 ± 1.16	3.52 ± 1.07	4.69 ± 1.33	3.24 ± 1.26	1.73 ± 0.902	4.11 ± 1.19	1.98 ± 1.01	2.99 ± 1.26	NR	NR	NR	NR	NR	NR	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.
F: Relative percent difference exceeded laboratory control limits.
H: Bias in sample result likely to be high.
J: Analyte detected above method (sample) detection limit but below method quantitation limit.
K: Sample analyzed outside of recommended hold time.
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
Fly Ash Landfill

		JKS-46 Downgradient																	
	Sample Date	**12/6/16**	**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**	**4/10/19**	**10/23/19**	**4/28/20**	**10/20/20**	**4/13/21**	**10/20/21**	**4/13/22**	**10/25/22**
	Task	**Event 1**	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Event 11**	**Event 12**	**Event 13**	**Event 14**	**Event 15**	**Event 16**	**Event 17**	**Event 18**
Constituents	**Unit**	**Dec 2016**	**Feb 2017**	**Mar 2017**	**May 2017**	**Jun 2017**	**Jul 2017**	**Aug 2017**	**Oct 2017**	**Apr 2018**	**Oct 2018**	**Apr 2019**	**Oct 2019**	**Apr 2020**	**Oct 2020**	**Apr 2021**	**Oct 2021**	**Apr 2022**	**Oct 2022**
Appendix III - Detection Monitoring																			
Boron	mg/L	0.902	0.837	0.645	0.799	0.920	0.801	0.788	1.01	0.828	0.702	0.997	1.01	0.864	0.530	0.431	0.797	0.736	0.464
Calcium	mg/L	120	132	145	115	126	117	137	145	140	126 D	212 D	172 D	143 J	107	90.3	207	181	97.3
Chloride	mg/L	11.6	11.8	12.2	10.5	12.6	11.8	327 JHD	11.7	11.6	11.6	13.2	13.0	17.9	23.4	35.5	14.9	14.8	42.2
Fluoride	mg/L	1.51	1.38	1.03	1.59	2.25	2.34	0.460 JH	1.83	2.16	1.68	2.52	2.22	1.61 J	0.764	1.07	0.018 UJ	2.55	1.63
Sulfate	mg/L	700 D	692 D	608 D	677	0.0460 U	780 D	288 JHD	800	864 D	855	1030	1020	1180	734	658	1180	1370	787
pH - Field Collected	SU	3.60	3.55	2.10	3.57	2.96	3.54	3.21	3.20	3.15	3.00	2.85	2.62	3.10	3.01	3.42	3.41	3.45	3.55
Total dissolved solids	mg/L	1160	1040	926	1030	1270	1180	1170 JH	1390	1300	1220	1550	1500	1970	1160	1130	1760	1870	1150
Appendix IV - Assessment Monitoring																			
Antimony	mg/L	0.000240 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	NR	NR	NR	NR	NR	NR
Arsenic	mg/L	0.00190 J	0.00227	0.00144 J	0.00196 J	0.00277 J	0.00253	0.00295	0.00290	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Barium	mg/L	0.0429	0.0356	0.0308	0.0307	0.0364	0.0317	0.0323	0.0331	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Beryllium	mg/L	0.00381 J	0.00362	0.00340	0.00399 J	0.00459 J	0.00415	0.00462	0.00479	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Cadmium	mg/L	0.00110 J	0.000988 J	0.00121 J	0.00120 J	0.00101 J	0.00133 J	0.00141 J	0.00136 J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chromium	mg/L	0.000942 J	0.00140 J	0.00104 J	0.00262 U	0.00262 U	0.00156 J	0.00191 J	0.00202 J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Cobalt	mg/L	0.0303	0.0324	0.0329	0.0367	0.0387	0.0383	0.0412	0.0414	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Fluoride	mg/L	1.51	1.38	1.03	1.59	2.25	2.34	0.460 JH	1.83	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Lead	mg/L	0.0162	0.0134	0.0109	0.0144	0.0192	0.0201	0.0236	0.0257	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Lithium	mg/L	0.0646	0.000476 U	0.00238 U	0.0673	0.0749	0.0799	0.107	0.0863	NR	NR	NR	NR	NR	NR	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	NR	NR	NR	NR	NR	NR
Molybdenum	mg/L	0.000255 U	0.000255 U	0.000255 U	0.00128 U	0.00128 U	0.000255 U	0.000255 U	0.000255 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Selenium	mg/L	0.0255	0.0266	0.0205	0.0247	0.0296	0.0257	0.0298	0.0283	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Thallium	mg/L	0.00293	0.00292	0.00235	0.00263 J	0.00314 J	0.00300	0.00335	0.00345	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Radium-226	pCi/L	3.16 ± 0.701	1.69 ± 0.387	1.80 ± 0.448	1.2 0± 0.315	1.82 ± 0.420	1.40 ± 0.353	1.52 ± 0.375	1.99 ± 0.459	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Radium-228	pCi/L	4.98 ± 1.41	2.17 ± 1.48	2.96 ± 1.24	1.98 ± 0.957	4.39 ± 1.13	2.80 ± 1.05	2.28 ± 1.13	3.82 ± 1.15	NR	NR	NR	NR	NR	NR	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.
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H: Bias in sample result likely to be high.
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K: Sample analyzed outside of recommended hold time.
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
Fly Ash Landfill

		JKS-60 Downgradient																	
	Sample Date	**12/7/16**	**2/22/17**	**3/28/17**	**5/2/17**	**6/20/17**	**7/25/17**	**8/29/17**	**10/10/17**	**4/4/18**	**10/30/18**	**4/10/19**	**10/23/19**	**4/28/20**	**10/20/20**	**4/13/21**	**10/20/21**	**4/13/22**	**10/25/22**
	Task	**Event 1**	**Event 2**	**Event 3**	**Event 4**	**Event 5**	**Event 6**	**Event 7**	**Event 8**	**Event 9**	**Event 10**	**Event 11**	**Event 12**	**Event 13**	**Event 14**	**Event 15**	**Event 16**	**Event 17**	**Event 18**
Constituents	**Unit**	**Dec 2016**	**Feb 2017**	**Mar 2017**	**May 2017**	**Jun 2017**	**Jul 2017**	**Aug 2017**	**Oct 2017**	**Apr 2018**	**Oct 2018**	**Apr 2019**	**Oct 2019**	**Apr 2020**	**Oct 2020**	**Apr 2021**	**Oct 2021**	**Apr 2022**	**Oct 2022**
Appendix III - Detection Monitoring																			
Boron	mg/L	0.655	0.504	0.449	0.456	0.442	0.394	0.436	0.479	0.399	0.334	0.405	0.377	0.325	0.433	0.533	0.579	0.573	0.612
Calcium	mg/L	433	375	290	--	379	336	350	383	363	382 D	501 D	524 D	530 J	380	432	473	438	362
Chloride	mg/L	411 D	311 D	311 D	285	300 D	319 D	287 JHD	352	366 D	202	149 X	183	168	235	281	278	324	278
Fluoride	mg/L	0.0360 U	0.319	0.324	0.421	0.306	0.338 JH	0.0960 U	0.284 JH	0.22 J	0.239 J	0.187 UJ	0.231 J	0.188	0.018 U	0.290	0.018 U	0.018 U	0.371
Sulfate	mg/L	1480 D	999 D	1010 D	976 X	1020 D	818 D	760 JHDX	759	801 D	906	968	1320	1280	963	1080	1130	1200	1220
pH - Field Collected	SU	5.82	5.38	4.21	5.75	6.07	6.44	5.93	5.97	6.09	6.42	5.93	6.23	6.61	6.16	6.21	6.20	6.36	6.19
Total dissolved solids	mg/L	2790	2340	2020	2110	2510	2120	1450 JH	2300	1860	1910	2010	2820	3180	2520	2450	2530	2680	2700
Appendix IV - Assessment Monitoring																			
Antimony	mg/L	0.00120 U	0.000240 U	0.000240 U	0.000240 U	0.00120 U	0.000240 U	0.000240 U	0.000240 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Arsenic	mg/L	0.00123 U	0.000861 J	0.000592 J	0.000366 J	0.00123 U	0.000367 J	0.000381 J	0.000266 J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Barium	mg/L	0.0702	0.0491	0.0465	0.0450	0.0469	0.0454	0.0490	0.0503	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Beryllium	mg/L	0.000654 U	0.000131 U	0.000131 U	0.000131 U	0.000654 U	0.000131 U	0.000131 U	0.000131 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Cadmium	mg/L	0.000774 J	0.000778 J	0.000786 J	0.000695 J	0.000734 U	0.000359 J	0.000608 J	0.000699 J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chromium	mg/L	0.00262 U	0.000743 J	0.000525 U	0.000525 U	0.00262 U	0.000690 J	0.00204 J	0.00100 J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Cobalt	mg/L	0.115	0.0542	0.0423	0.0389	0.0210	0.00896	0.0166	0.0183	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Fluoride	mg/L	0.0360 U	0.319	0.324	0.421	0.306	0.338 JH	0.0960 U	0.284 JH	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Lead	mg/L	0.000758 U	0.000152 U	0.000152 U	0.000152 U	0.000758 U	0.000152 U	0.000152 U	0.000216 J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Lithium	mg/L	0.000476 U	0.000476 U	0.00238 U	--	0.0305	0.0179 J	0.0635	0.0314	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mercury	mg/L	0.0000263 U	0.0000263 U	0.0000263 U	0.0000370 J	0.0000263 U	0.0000263 U	0.0000263 U	0.0000263 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Molybdenum	mg/L	0.00128 U	0.000726 J	0.000622 J	0.000715 J	0.00148 J	0.00162 J	0.00124 J	0.00103 J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Selenium	mg/L	0.00227 U	0.00168 J	0.00132 J	0.00981	0.0390	0.0244	0.00761	0.00745	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Thallium	mg/L	0.00166 U	0.000425 J	0.000412 J	0.000403 J	0.00166 U	0.000332 U	0.000372 J	0.000387 J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Radium-226	pCi/L	3.01 ± 0.578	2.29 ± 0.421	2.74 ± 0.572	1.71 ± 0.378	0.914 ± 0.341	1.57 ± 0.381	1.34 ± 0.378	4.61 ± 0.650	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Radium-228	pCi/L	2.57 ± 1.15	2.62 ± 1.04	0.838 ± 0.826	0.269 ± 0.713	2.24 ± 1.02	0.701 ± 0.850	1.72 ± 0.940	2.48 ± 1.60	NR	NR	NR	NR	NR	NR	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.
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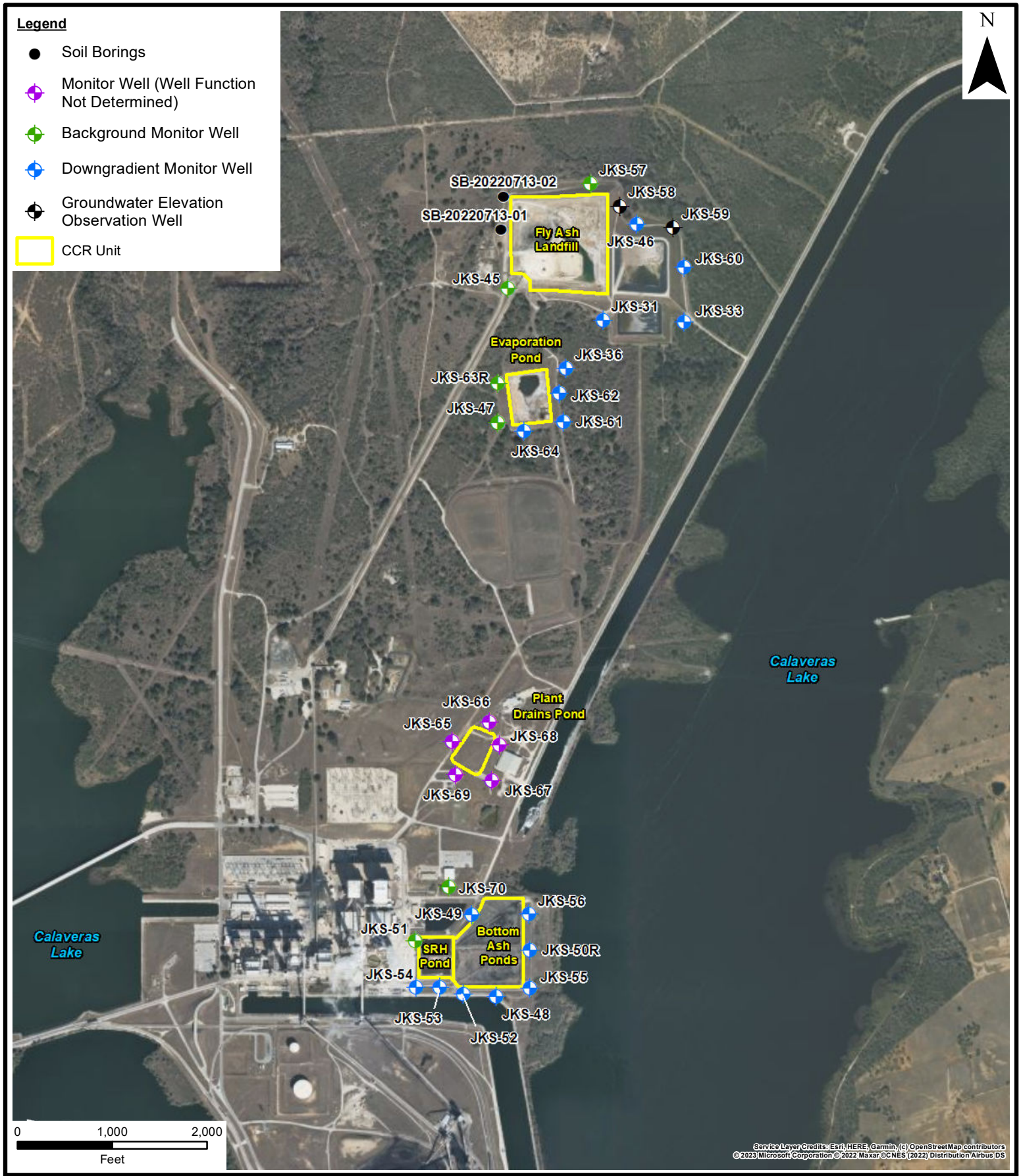
U: Analyte not detected at laboratory reporting limit (Sample Detection Limit).
X: Matrix Spike/Matrix Spike Duplicate recoveries were found to be outside of the laboratory control limits.

Figures



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DATE:	02/16/2023	SCALE:	AS SHOWN	REVISION:	1

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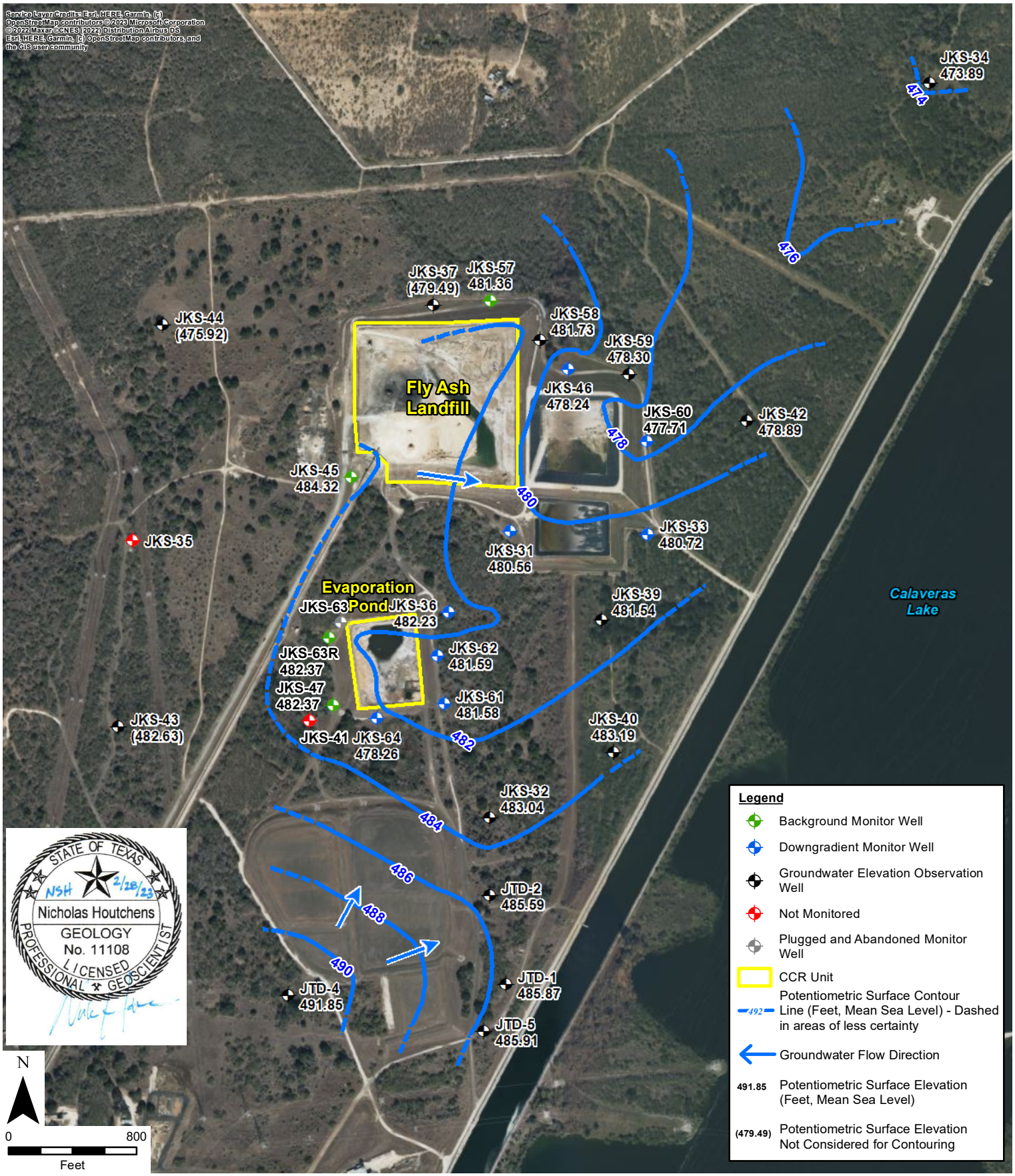
FIGURE 1
CCR WELL NETWORK LOCATION MAP
CPS Energy - Calaveras Power Station
San Antonio, Texas

ERM



Environmental Resources Management

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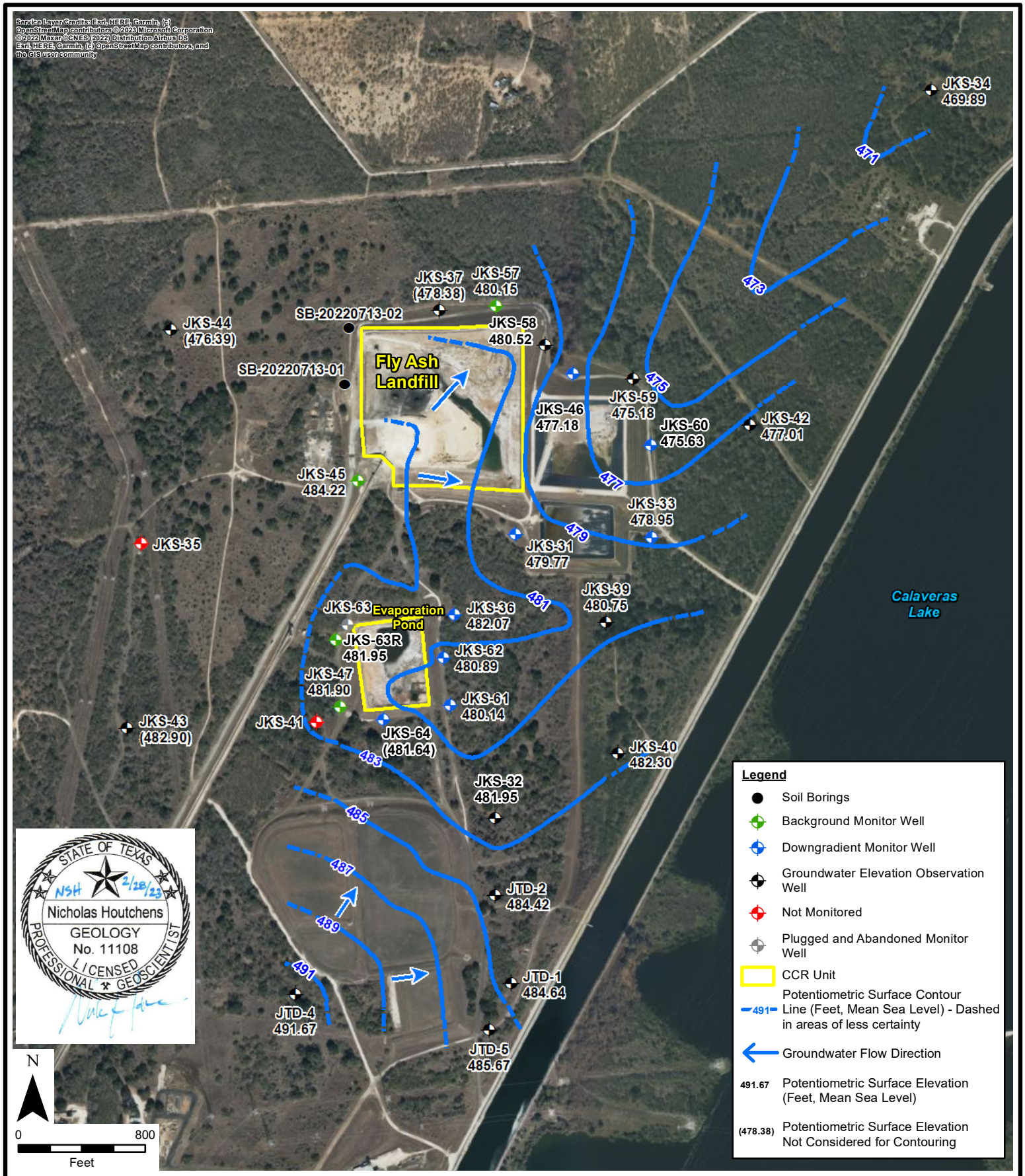
FIGURE 2A
POTENTIOMETRIC SURFACE MAP - April 2022
Northern CCR Units
CPS Energy - Calaveras Power Station
San Antonio, Texas

ERM



Environmental Resources Management

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DATE: 14/02/2023	SCALE: AS SHOWN	REVISION: 0

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FIGURE 2B
POTENTIOMETRIC SURFACE MAP - October 2022
Northern CCR Units
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
Fly Ash Landfill

Analyte	N	N Detect	Percent Detect	DF	statistic	p-value	Conclusion	UPL Type
Boron	34	34	100.00%	1	18.2	<0.001	Significant Difference	Intrawell
Calcium	33	33	100.00%	1	24	<0.001	Significant Difference	Intrawell
Chloride	34	34	100.00%	1	3.46	0.0629	No Significant Difference	Interwell
Fluoride	34	24	70.59%	1	17	<0.001	Significant Difference	Intrawell
pH	36	36	100.00%	1	21.5	<0.001	Significant Difference	Intrawell
Sulfate	34	34	100.00%	1	19.9	<0.001	Significant Difference	Intrawell
Total dissolved solids	34	34	100.00%	1	19.6	<0.001	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
Fly Ash Landfill

Analyte	Well	Units	N	N Detect	Percent Detect	Min ND	Max ND	Min Detect	Median	Mean	Max Detect	SD	CV	Distribution
Boron	JKS-45	mg/L	17	17	100.00%			1.11	2.28	2.37	3.24	0.606	0.25577096	Normal
Boron	JKS-57	mg/L	17	17	100.00%			2.67	3.24	3.62	5.97	0.857	0.23669895	Lognormal
Calcium	JKS-45	mg/L	17	17	100.00%			101	141	142	195	29	0.20408926	Normal
Calcium	JKS-57	mg/L	16	16	100.00%			290	411	494	968	190	0.38392632	Lognormal
Chloride	Pooled	mg/L	34	34	100.00%			0.803	155	910	6360	1680	1.84949147	NDD
Fluoride	JKS-45	mg/L	17	9	52.94%	0.009	0.048	0.1	0.1	0.116	0.337	0.116	0.99568639	NDD
Fluoride	JKS-57	mg/L	17	15	88.24%	0.009	0.048	2.27	3.28	2.92	4.29	1.24	0.42482482	NDD
pH	JKS-45	SU	18	18	100.00%			3.98	5.64	5.56	6.06	0.501	0.09003881	NDD
pH	JKS-57	SU	18	18	100.00%			5.13	6.54	6.42	6.76	0.383	0.05970053	NDD
Sulfate	JKS-45	mg/L	17	17	100.00%			2.95	629	587	874	213	0.36238423	NDD
Sulfate	JKS-57	mg/L	17	17	100.00%			450	3610	3540	6510	1410	0.39675548	Normal
Total dissolved solids	JKS-45	mg/L	17	17	100.00%			741	1320	1300	1680	196	0.15129555	NDD
Total dissolved solids	JKS-57	mg/L	17	17	100.00%			850	6000	8080	16600	4830	0.59798369	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)

Appendix B - Table 3
Potential Outliers in Upgradient Wells
Calaveras Power Station
Fly Ash Landfill

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	Final Outlier Decision	Notes
JKS-57	JKS 57581381-013	04/04/2018	Boron	mg/L	TRUE	4.49	Intrawell	Lognormal		X							
JKS-57	JKS-57-20200429-CCR	04/28/2020	Boron	mg/L	TRUE	5.97	Intrawell	Lognormal		X			X				
JKS-57	JKS-57-20211020-CCR	10/20/2021	Boron	mg/L	TRUE	4.99	Intrawell	Lognormal		X			X				
JKS-45	JKS-45561478-015	08/29/2017	Chloride	mg/L	TRUE	345	Interwell	NDD	X								
JKS-57	JKS 57558406-015	07/25/2017	Chloride	mg/L	TRUE	311	Interwell	NDD	X								
JKS-57	JKS 57581381-013	04/04/2018	Chloride	mg/L	TRUE	534	Interwell	NDD	X	X	X				0		
JKS-57	JKS 57603951-015	10/30/2018	Chloride	mg/L	TRUE	3770	Interwell	NDD	X	X	X	X	X	X	X		
JKS-57	JKS-57005	10/23/2019	Chloride	mg/L	TRUE	841	Interwell	NDD	X	X	X	X	X	X	0		
JKS-57	JKS-57-20200429-CCR	04/28/2020	Chloride	mg/L	TRUE	3460	Interwell	NDD	X	X	X	X	X	X	0		
JKS-57	JKS-57-20201020-CCR	10/20/2020	Chloride	mg/L	TRUE	3150	Interwell	NDD	X	X	X	X	X	X	0		
JKS-57	JKS-57-20210413-CCR	04/13/2021	Chloride	mg/L	TRUE	4360	Interwell	NDD	X	X	X	X	X	X	0		
JKS-57	JKS-57-20211020-CCR	10/20/2021	Chloride	mg/L	TRUE	4940	Interwell	NDD	X	X	X	X	X	X	0		
JKS-57	JKS-57-20221026-CCR	10/26/2022	Chloride	mg/L	TRUE	6360	Interwell	NDD	X	X	X	X	X	X	0		
JKS-57	JKS-57-20200429-CCR	04/28/2020	Fluoride	mg/L	TRUE	4.17	Intrawell	NDD		X							
JKS-45	JKS-45-WG-20170223	02/23/2017	pH	SU	TRUE	5.17	Intrawell	NDD					X				
JKS-45	JKS-45-WG-20170328	03/28/2017	pH	SU	TRUE	3.98	Intrawell	NDD	X	X	X	X	X	X	0		
JKS-57	JKS-57-WG-20170328	03/28/2017	pH	SU	TRUE	5.13	Intrawell	NDD	X	X	X	X	X	X	0		
JKS-45	JKS-45561478-015	08/29/2017	Sulfate	mg/L	TRUE	770	Intrawell	NDD		X			X				
JKS-45	JKS45620556-016	04/09/2019	Sulfate	mg/L	TRUE	874	Intrawell	NDD	X	X	X	X	X	X	0		
JKS-45	JKS-45561478-015	08/29/2017	Total dissolved solids	mg/L	TRUE	1680	Intrawell	NDD	X	X	X	X	X	X	0		
JKS-45	JKS-45-20200429-CCR	04/28/2020	Total dissolved solids	mg/L	TRUE	1590	Intrawell	NDD	X	X	X	X	X	X	0		

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
Fly Ash Landfill

Analyte	UPL Type	Well	N	Num Detects	Percent Detect	p-value	tau	Conclusion
Boron	Intrawell	JKS-45	17	17	100.00%	0.00128	0.559	Increasing Trend
Boron	Intrawell	JKS-57	17	17	100.00%	0.0518	0.353	Stable, No Trend
Calcium	Intrawell	JKS-45	17	17	100.00%	0.0527	0.347	Stable, No Trend
Calcium	Intrawell	JKS-57	16	16	100.00%	<0.001	0.762	Increasing Trend
Chloride	Interwell	JKS-45, JKS-57	33	33	100.00%	0.11	0.195	Stable, No Trend
Fluoride	Intrawell	JKS-45	17	9	52.94%	0.0665	-0.347	Stable, No Trend
Fluoride	Intrawell	JKS-57	17	15	88.24%	0.967	0.00738	Stable, No Trend
pH	Intrawell	JKS-45	18	18	100.00%	<0.001	0.59	Increasing Trend
pH	Intrawell	JKS-57	18	18	100.00%	0.762	0.0525	Stable, No Trend
Sulfate	Intrawell	JKS-45	17	17	100.00%	0.968	-0.0147	Stable, No Trend
Sulfate	Intrawell	JKS-57	17	17	100.00%	0.00128	0.559	Increasing Trend
Total dissolved solids	Intrawell	JKS-45	17	17	100.00%	0.433	0.141	Stable, No Trend
Total dissolved solids	Intrawell	JKS-57	17	17	100.00%	<0.001	0.75	Increasing 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 (α=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
Fly Ash Landfill

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	Increasing Trend	JKS-45	17	17	100.00%		4.39	mg/L	None	No		NP Detrended UPL			
Boron	Intrawell	Stable, No Trend	JKS-57	17	17	100.00%		5.16	mg/L				95% UPL (t)		X	
Calcium	Intrawell	Stable, No Trend	JKS-45	17	17	100.00%		194	mg/L				95% UPL (t)			
Calcium	Intrawell	Increasing Trend	JKS-57	16	16	100.00%		948	mg/L	None	No		NP Detrended UPL		X	
Chloride	Interwell	Stable, No Trend	JKS-45, JKS-57	33	33	100.00%		5300	mg/L				95% UPL		X	
Fluoride	Intrawell	Stable, No Trend	JKS-45	17	9	52.94%		0.384	mg/L				95% UPL (t)			
Fluoride	Intrawell	Stable, No Trend	JKS-57	17	15	88.24%		4.46	mg/L				95% UPL (t)		X	
pH	Intrawell	Increasing Trend	JKS-45	18	18	100.00%	4.98	6.73	SU	None	No		NP Detrended UPL	X		
pH	Intrawell	Stable, No Trend	JKS-57	18	18	100.00%	5.73	7.1	SU				95% UPL (t)		X	
Sulfate	Intrawell	Stable, No Trend	JKS-45	17	17	100.00%		874	mg/L				95% UPL			
Sulfate	Intrawell	Increasing Trend	JKS-57	17	17	100.00%		8600	mg/L	None	No		NP Detrended UPL		X	
Total dissolved solids	Intrawell	Stable, No Trend	JKS-45	17	17	100.00%		1650	mg/L				95% UPL (t)			
Total dissolved solids	Intrawell	Increasing Trend	JKS-57	17	17	100.00%		20500	mg/L	None	No		NP Detrended UPL		X	

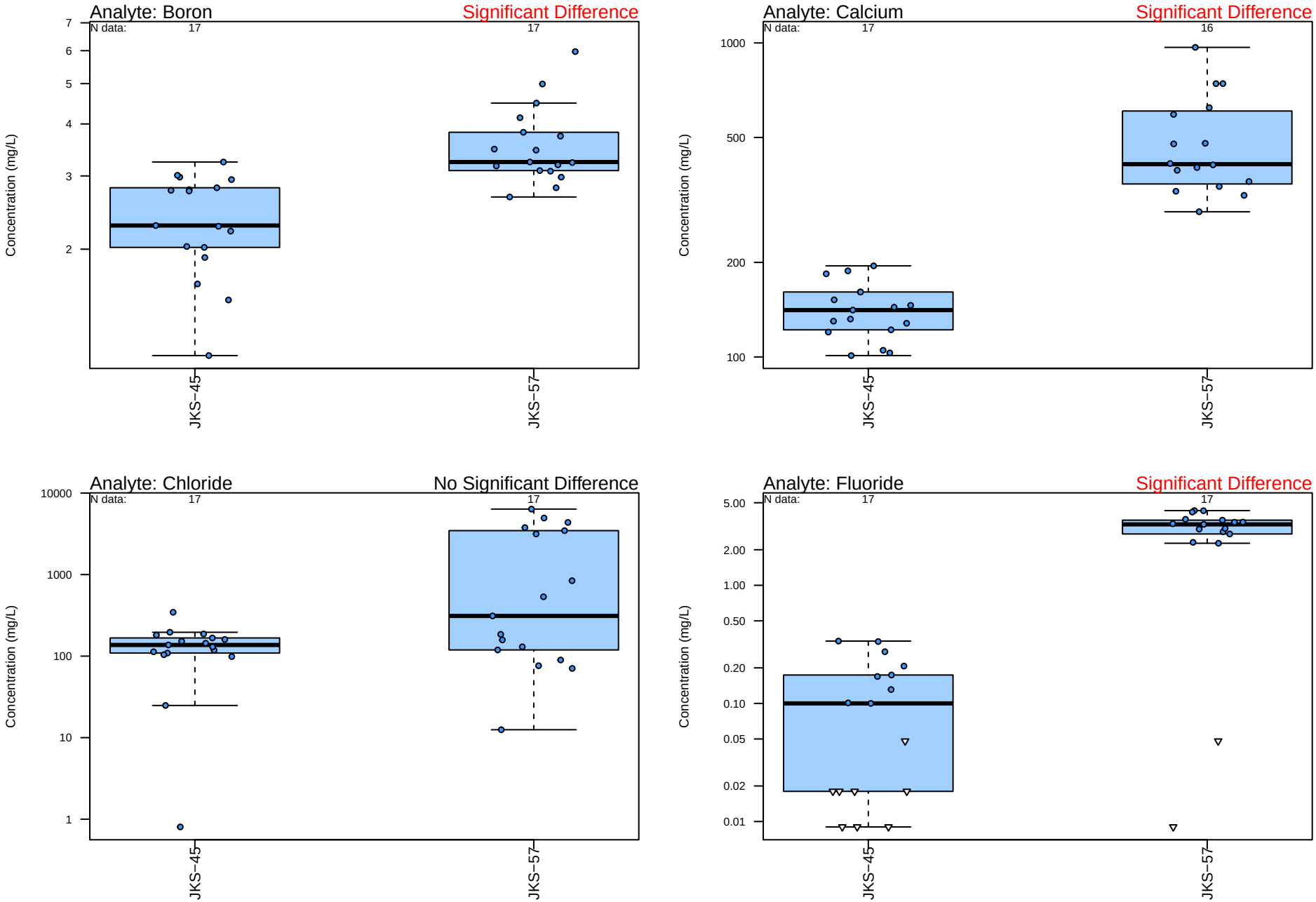
Notes
Non-detects were substituted with a value of half the detection limit for calculations
UPL: upper prediction limit
LPL: Lower prediction limit. These were only calculated for pH
UPLs were constructed with a site wide false positive rate of 0.1 and a 1 of 2 retesting.
UPLs were calculated using Sanitas Software.
SU: Standard units
NP: non parametric
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
Comparisons of Downgradient Wells to UPLs
Calaveras Power Station
Fly Ash Landfill

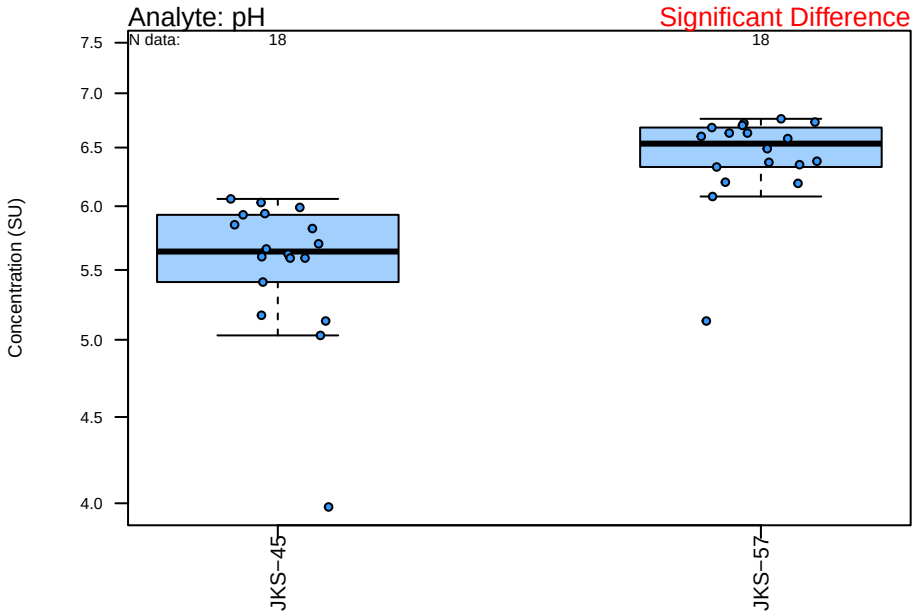
Analyte	Well	LPL	UPL	Units	Recent Date	Observation	Qualifier	Obs > UPL	Notes	Mann Kendall p-value	Mann Kendall tau	WRS p-value	WRS Conclusion	Exceed Median	Overall Conclusion
Boron	JKS-31		5.16	mg/L	10/25/2022	0.424						1	NS		No Exceedance
Boron	JKS-33		5.16	mg/L	10/25/2022	1.11						1	NS		No Exceedance
Boron	JKS-46		5.16	mg/L	10/25/2022	0.464						1	NS		No Exceedance
Boron	JKS-60		5.16	mg/L	10/25/2022	0.612						1	NS		No Exceedance
Calcium	JKS-31		948	mg/L	10/25/2022	163						1	NS		No Exceedance
Calcium	JKS-33		948	mg/L	10/25/2022	434						1	NS		No Exceedance
Calcium	JKS-46		948	mg/L	10/25/2022	97.3						1	NS		No Exceedance
Calcium	JKS-60		948	mg/L	10/25/2022	362						1	NS		No Exceedance
Chloride	JKS-31		5300	mg/L	10/25/2022	270						1	NS		No Exceedance
Chloride	JKS-33		5300	mg/L	10/25/2022	683						1	NS		No Exceedance
Chloride	JKS-46		5300	mg/L	10/25/2022	42.2						1	NS		No Exceedance
Chloride	JKS-60		5300	mg/L	10/25/2022	278						1	NS		No Exceedance
Fluoride	JKS-31		4.46	mg/L	10/25/2022	0.894						1	NS		No Exceedance
Fluoride	JKS-33		4.46	mg/L	10/25/2022	1.26						1	NS		No Exceedance
Fluoride	JKS-46		4.46	mg/L	10/25/2022	1.63						1	NS		No Exceedance
Fluoride	JKS-60		4.46	mg/L	10/25/2022	0.371						1	NS		No Exceedance
pH	JKS-31	4.98	7.1	SU	10/25/2022	4.08		X	Trend Test: Stable, No Trend	0.255	-0.197	0.00133	**	X	Both Exceedance
pH	JKS-33	4.98	7.1	SU	10/25/2022	6.41						1	NS		No Exceedance
pH	JKS-46	4.98	7.1	SU	10/25/2022	3.55		X	Trend Test: Stable, No Trend	0.705	-0.0656	<0.001	***	X	Both Exceedance
pH	JKS-60	4.98	7.1	SU	10/25/2022	6.19						1	NS		No Exceedance
Sulfate	JKS-31		8600	mg/L	10/25/2022	887						1	NS		No Exceedance
Sulfate	JKS-33		8600	mg/L	10/25/2022	1520						1	NS		No Exceedance
Sulfate	JKS-46		8600	mg/L	10/25/2022	787						1	NS		No Exceedance
Sulfate	JKS-60		8600	mg/L	10/25/2022	1220						1	NS		No Exceedance
Total dissolved solids	JKS-31		20500	mg/L	10/25/2022	1680						1	NS		No Exceedance
Total dissolved solids	JKS-33		20500	mg/L	10/25/2022	3940						1	NS		No Exceedance
Total dissolved solids	JKS-46		20500	mg/L	10/25/2022	1150						1	NS		No Exceedance
Total dissolved solids	JKS-60		20500	mg/L	10/25/2022	2700						1	NS		No Exceedance

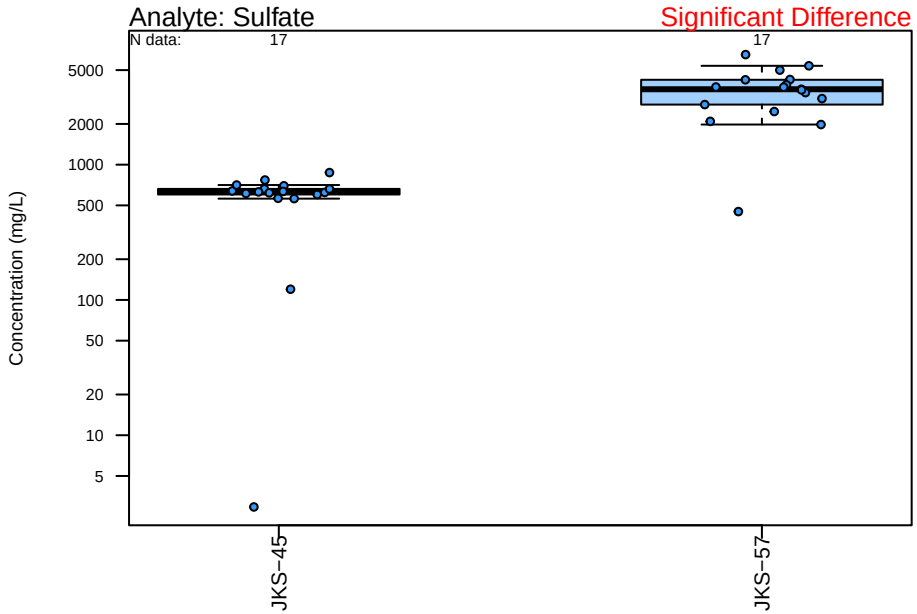
Notes
Non-detects were substituted with a value of zero for trend calculations
UPL: Upper Prediction Limit
ND: Not detected
SU: Standard units
tau: Kendall's tau statistic
Obs > UCL: Exceed 'X' indicates that the most recent observed value is higher than the UPL (or out of range of the LPL and UPL in the case of pH.)
Obs > UCL: Exceed 'X0' indicates that the two most recent values are higher than the UPL, but the upgradient well is 100% ND.
Obs > UCL: 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).
WRS: Wilcoxon Rank Sum test comparing if median of downgradient well is larger than the UPL (for pH, also checks if median is less than LPL)
WRS p-value: A one-sided p-value describing the probability of the H0 (UPL/LPL) being true (a=0.05)
Overall: UPL Exceedance - most recent sampling event exceeds the UPL, but median of the well is not greater than UPL
Overall: WRS Exceedance - most recent sampling event does not exceed the UPL, but median of the well is greater than UPL
Overall: Both Exceedance - most recent sampling event exceeds the UPL and median of the well is larger than the UPL

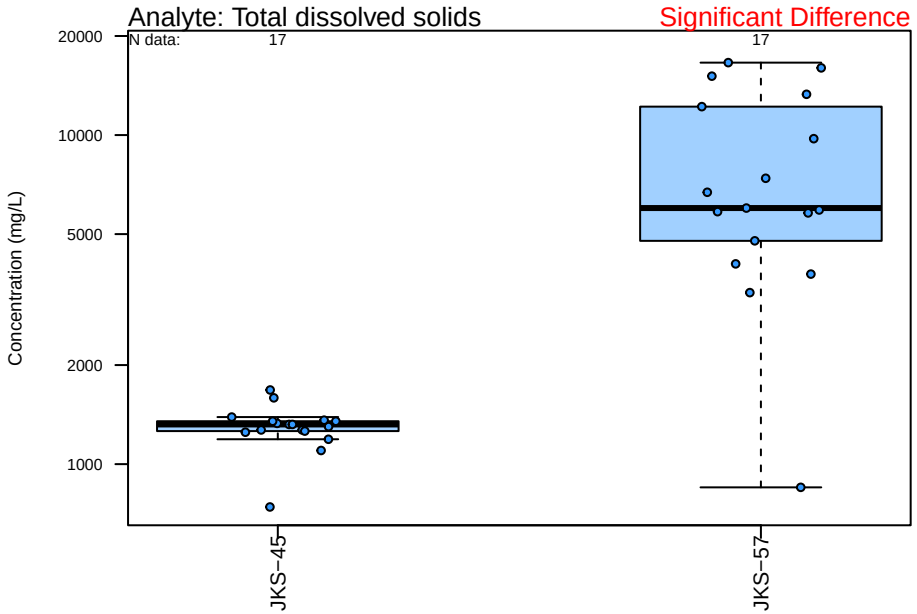
Appendix B − Figure 1
Unit: Fly Ash Landfill
Boxplots of Upgradient Wells



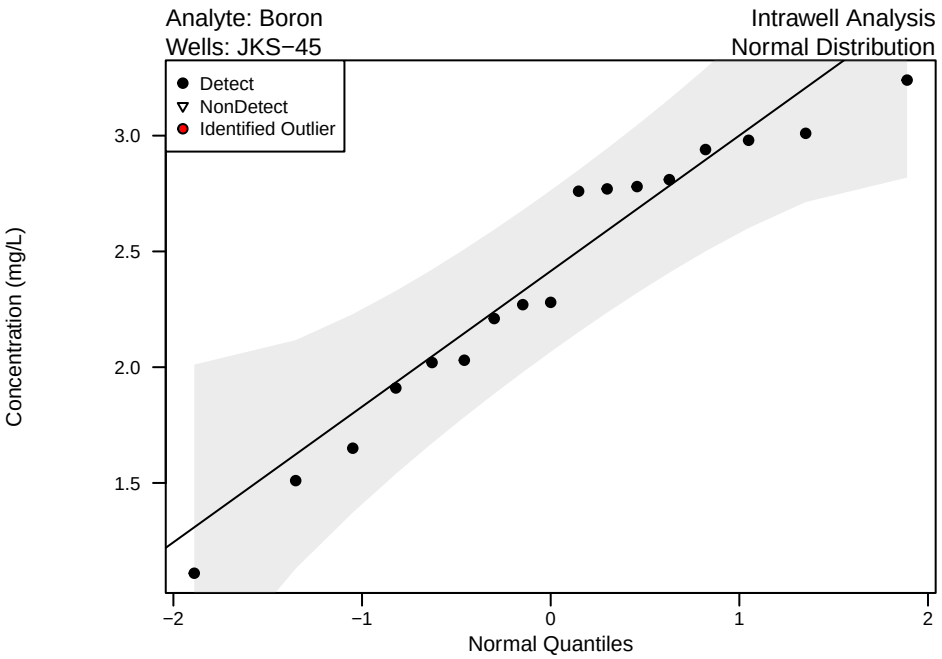
Appendix B − Figure 1
Unit: Fly Ash Landfill
Boxplots of Upgradient Wells







Appendix B − Figure 2
Unit: Fly Ash Landfill
QQ Plots of Upgradient Wells



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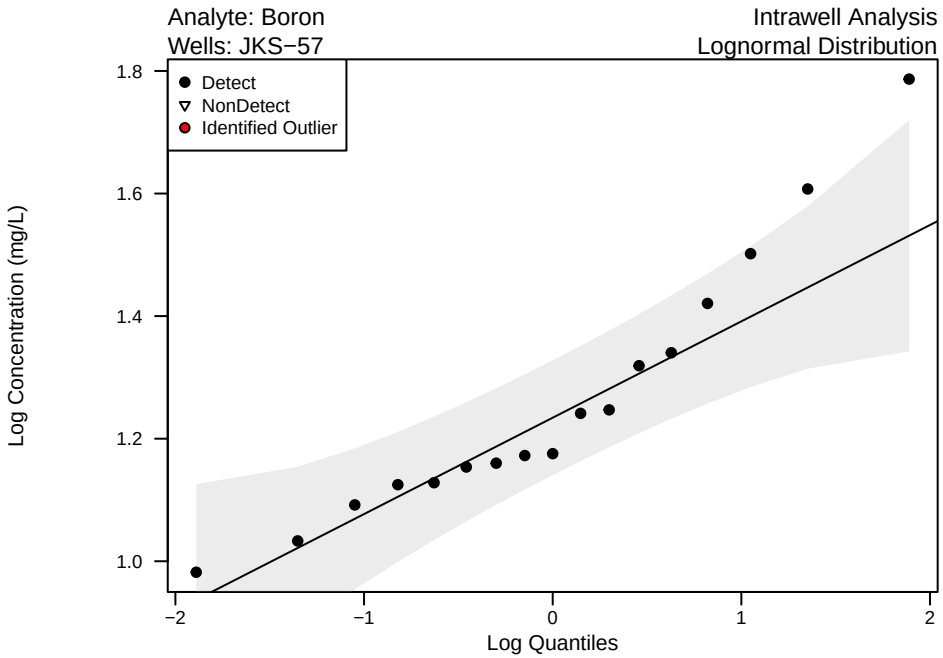

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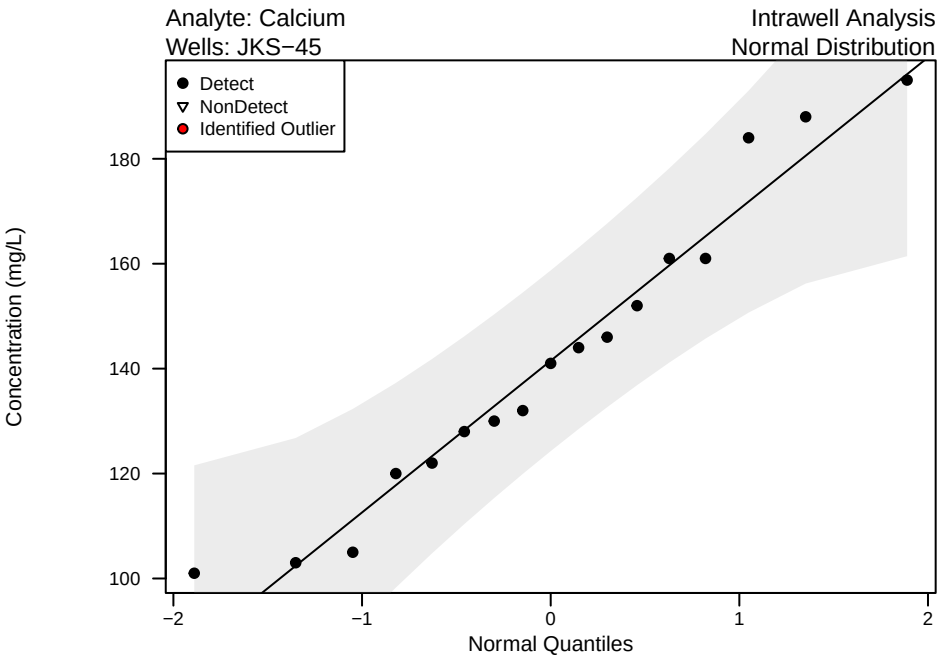
Unit: Fly Ash Landfill
QQ Plots of Upgradient Wells



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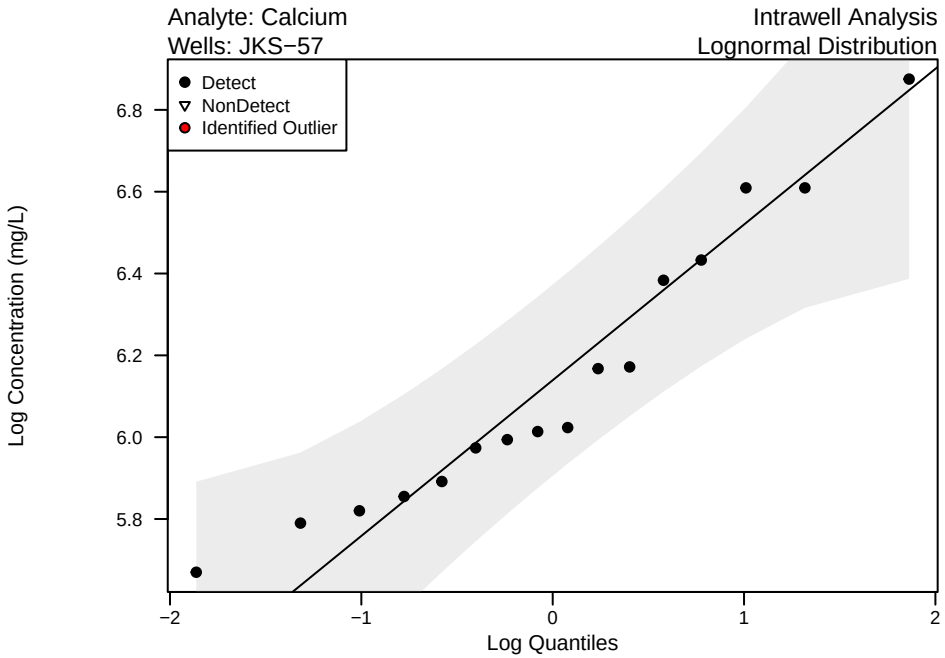

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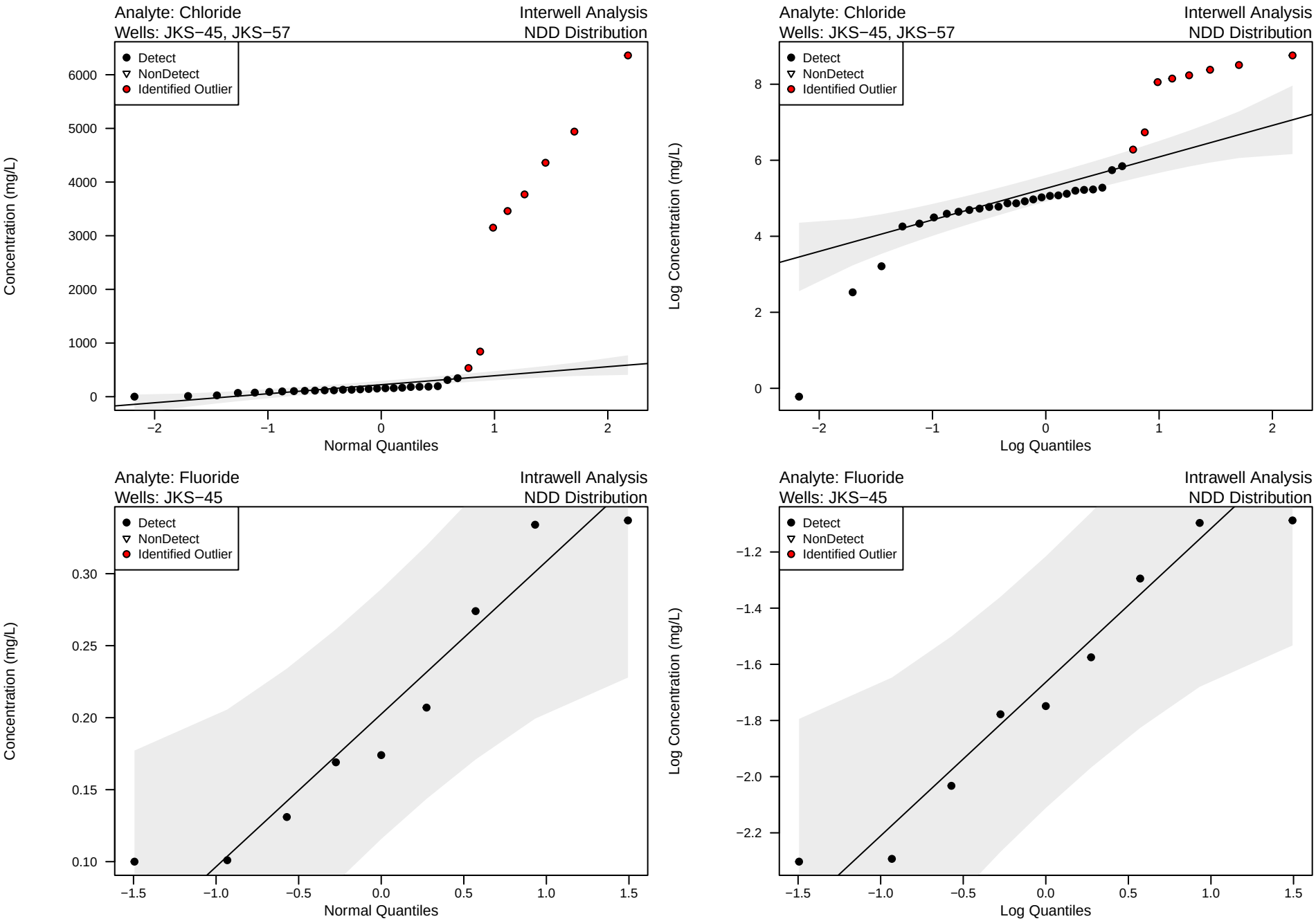
Unit: Fly Ash Landfill
QQ Plots of Upgradient Wells



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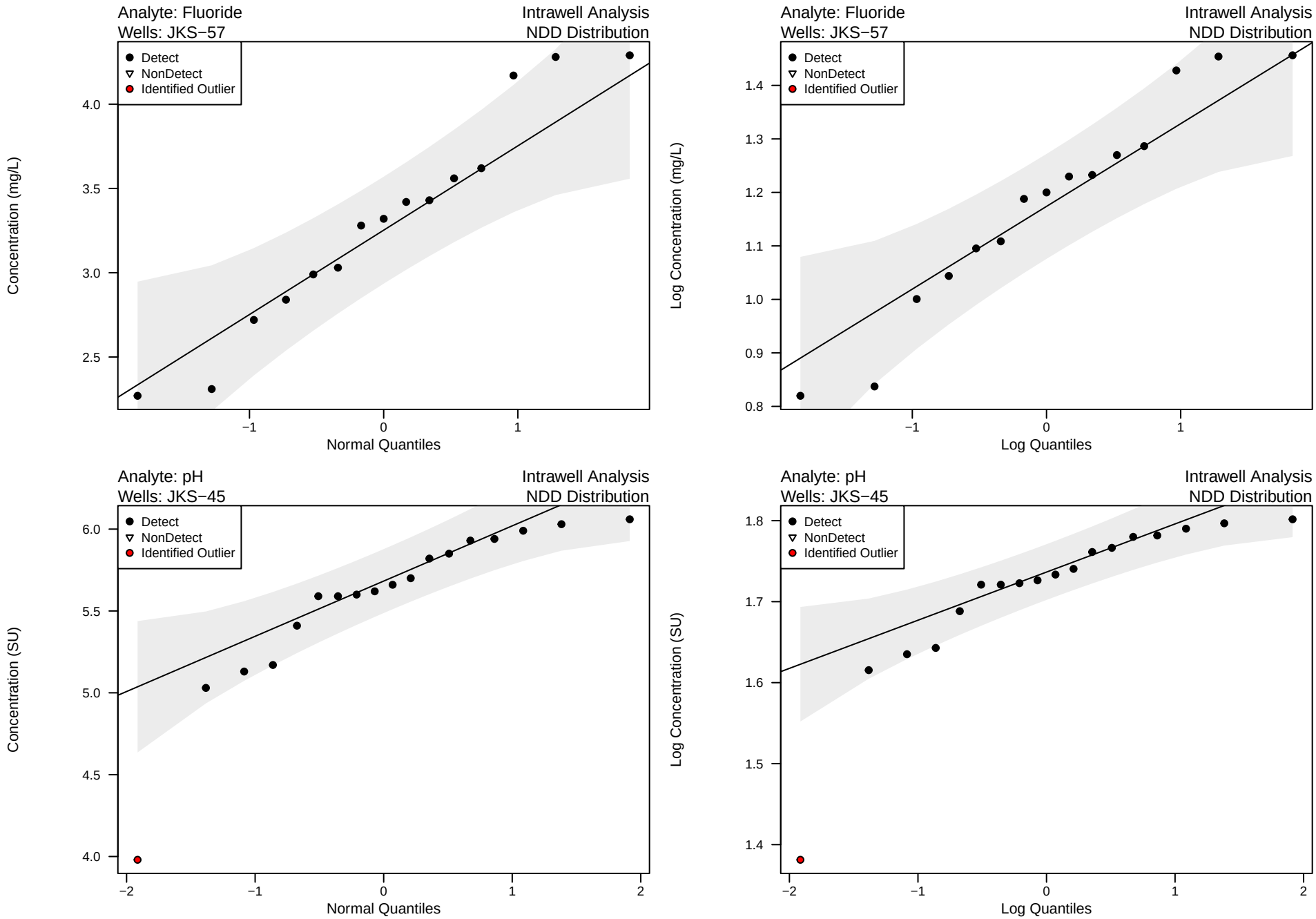
Unit: Fly Ash Landfill
QQ Plots of Upgradient Wells



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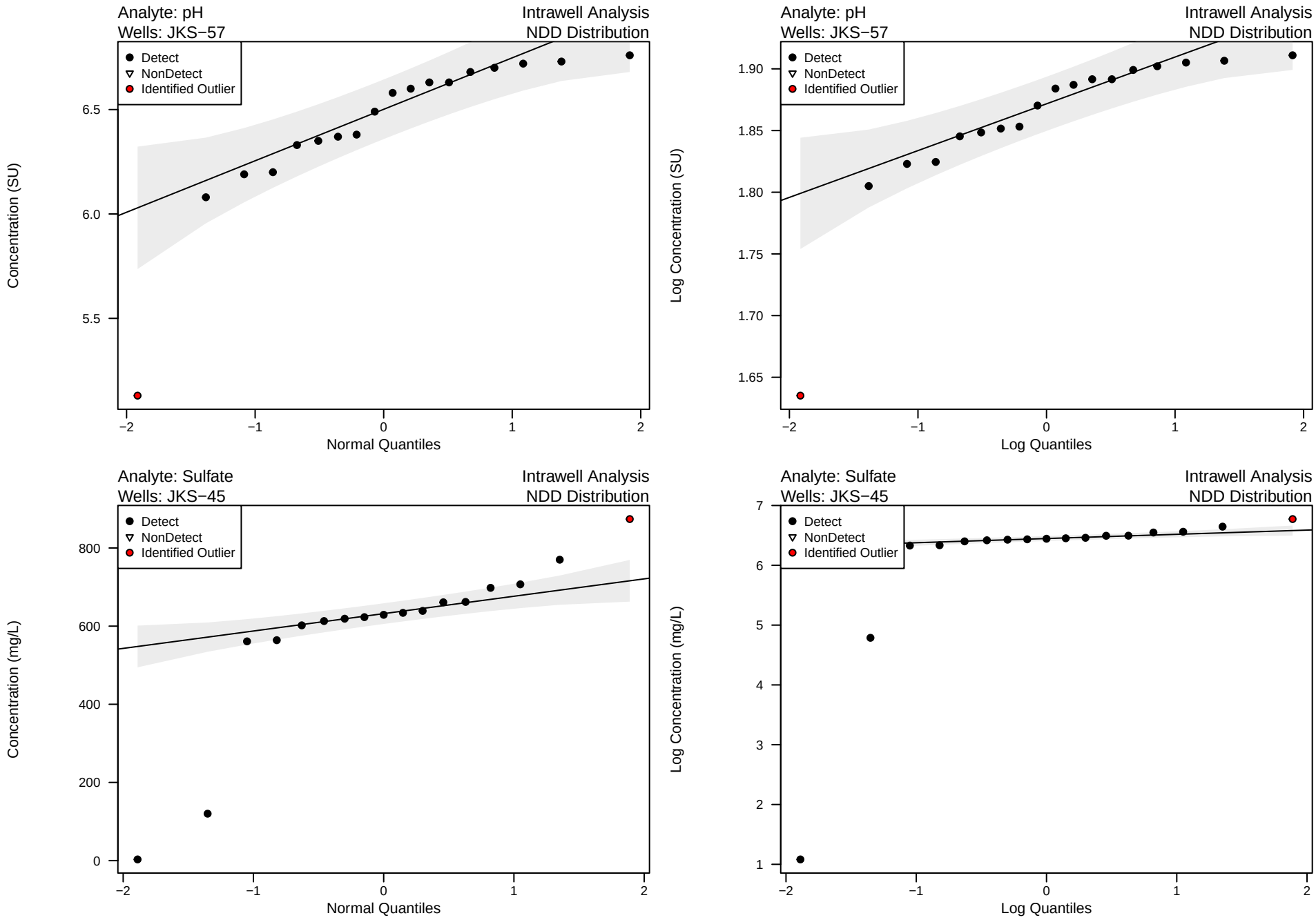

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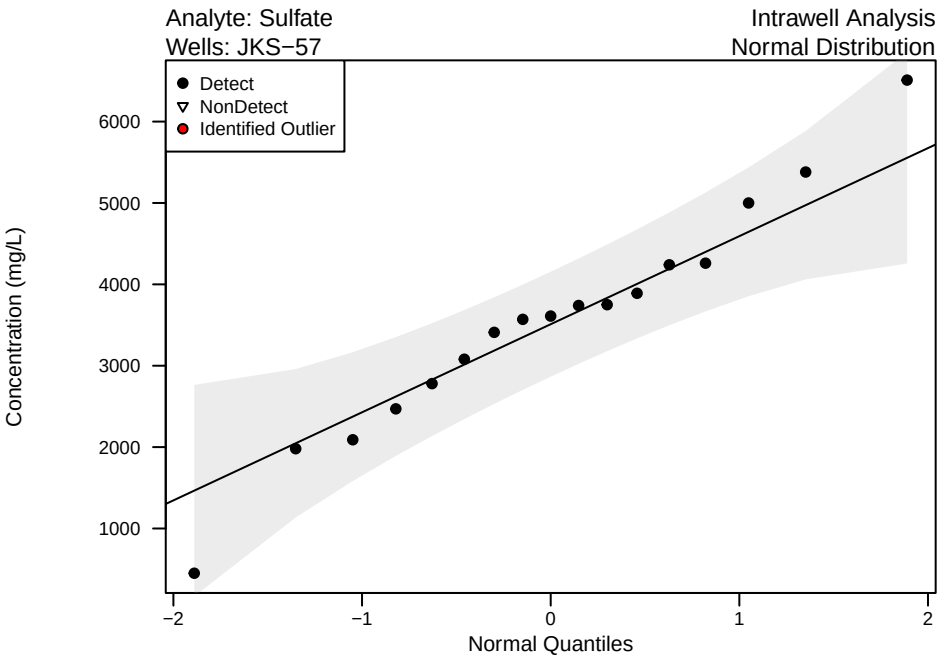
Unit: Fly Ash Landfill
QQ Plots of Upgradient Wells



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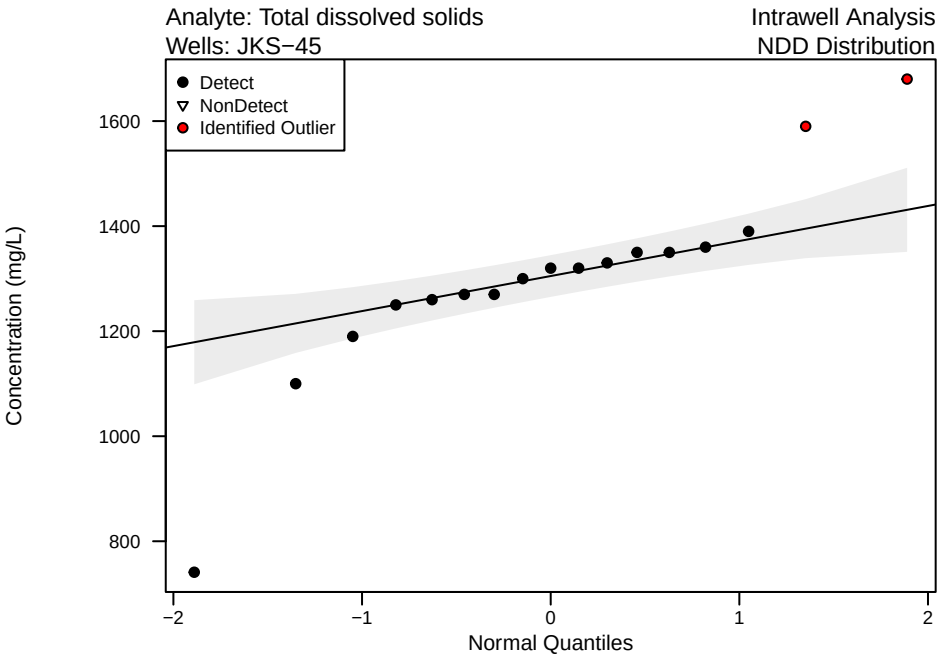
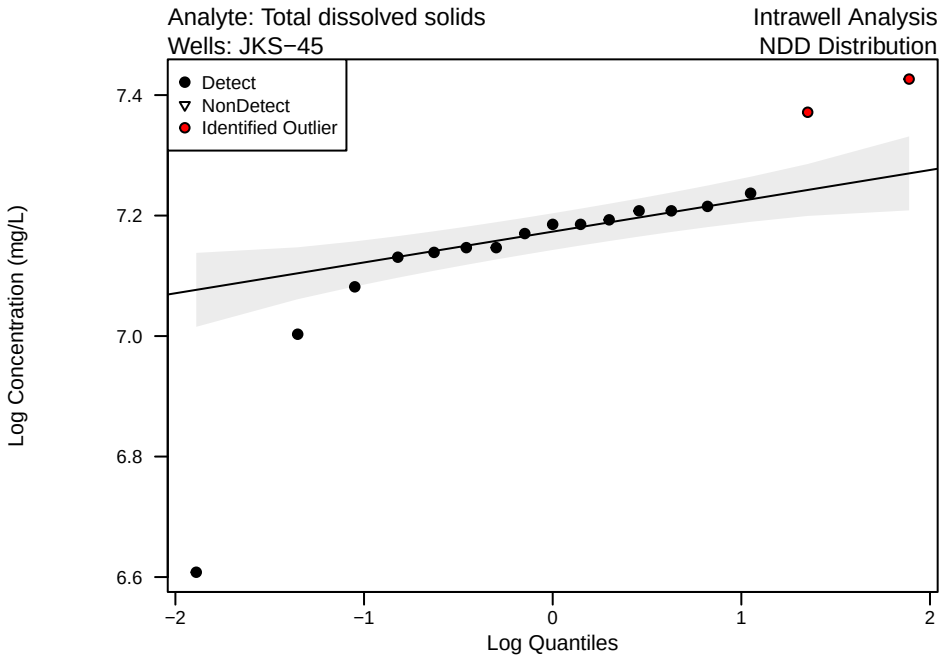
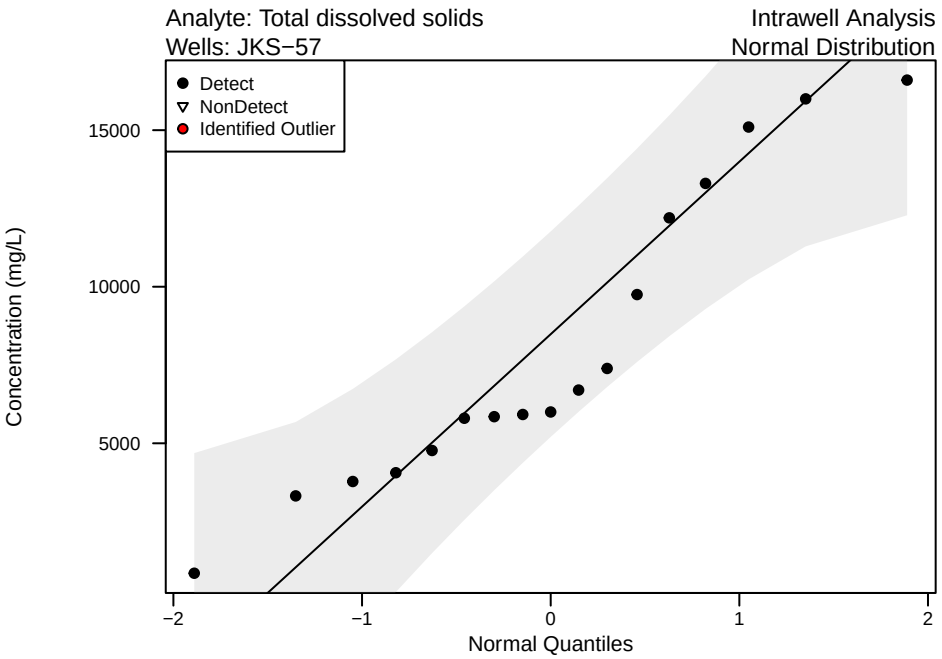




Appendix B − Figure 2
Unit: Fly Ash Landfill
QQ Plots of Upgradient Wells



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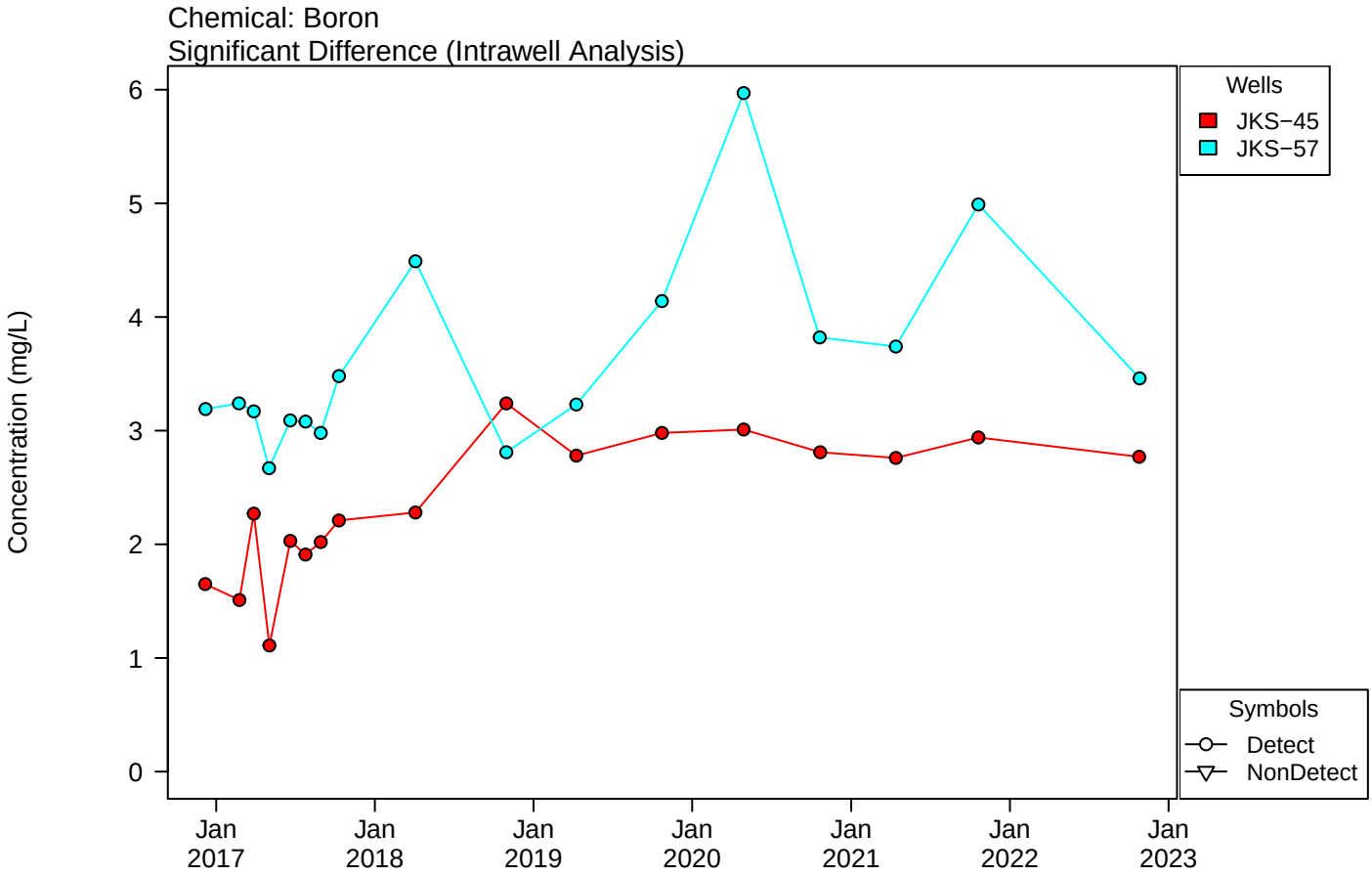
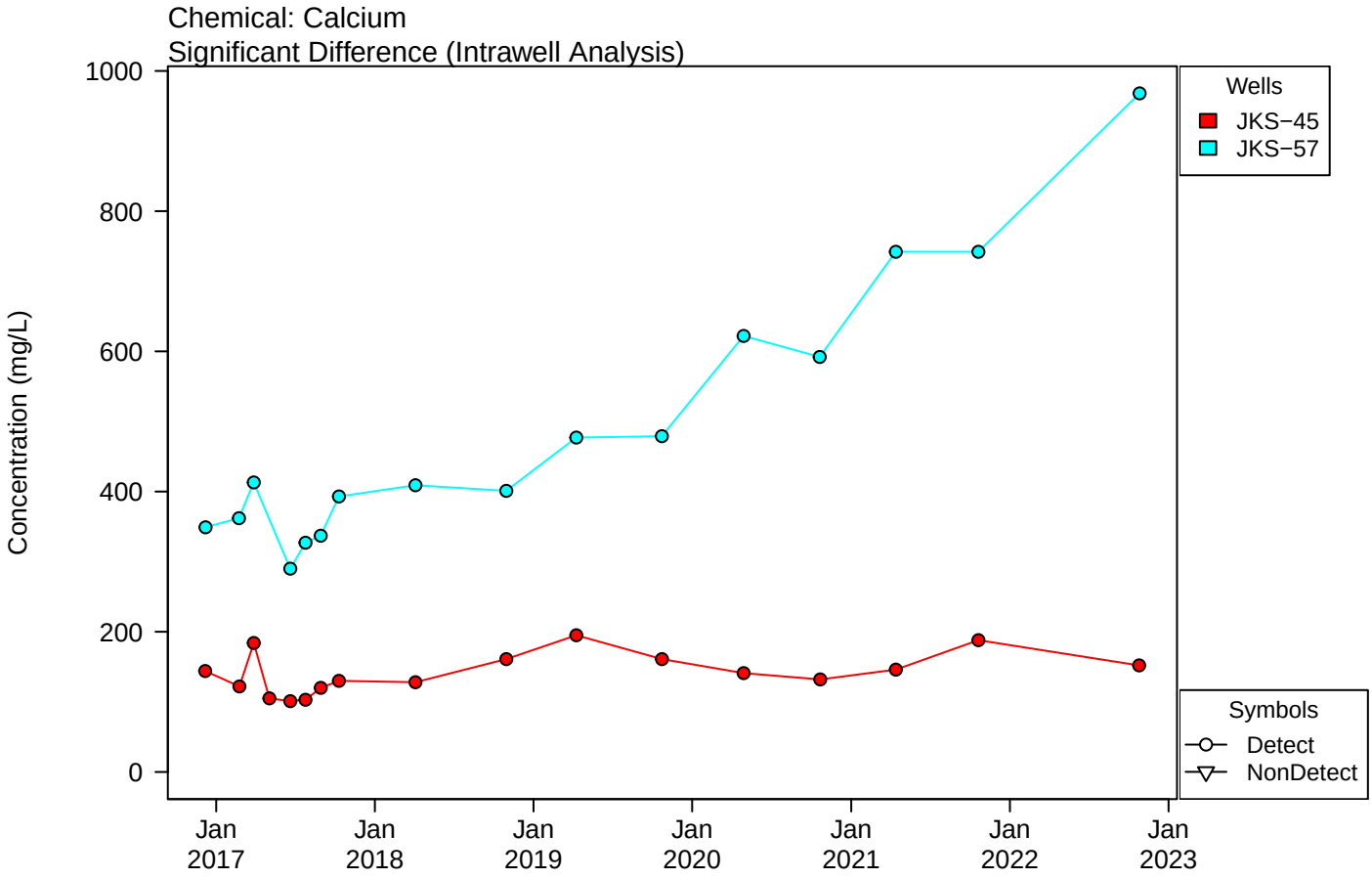
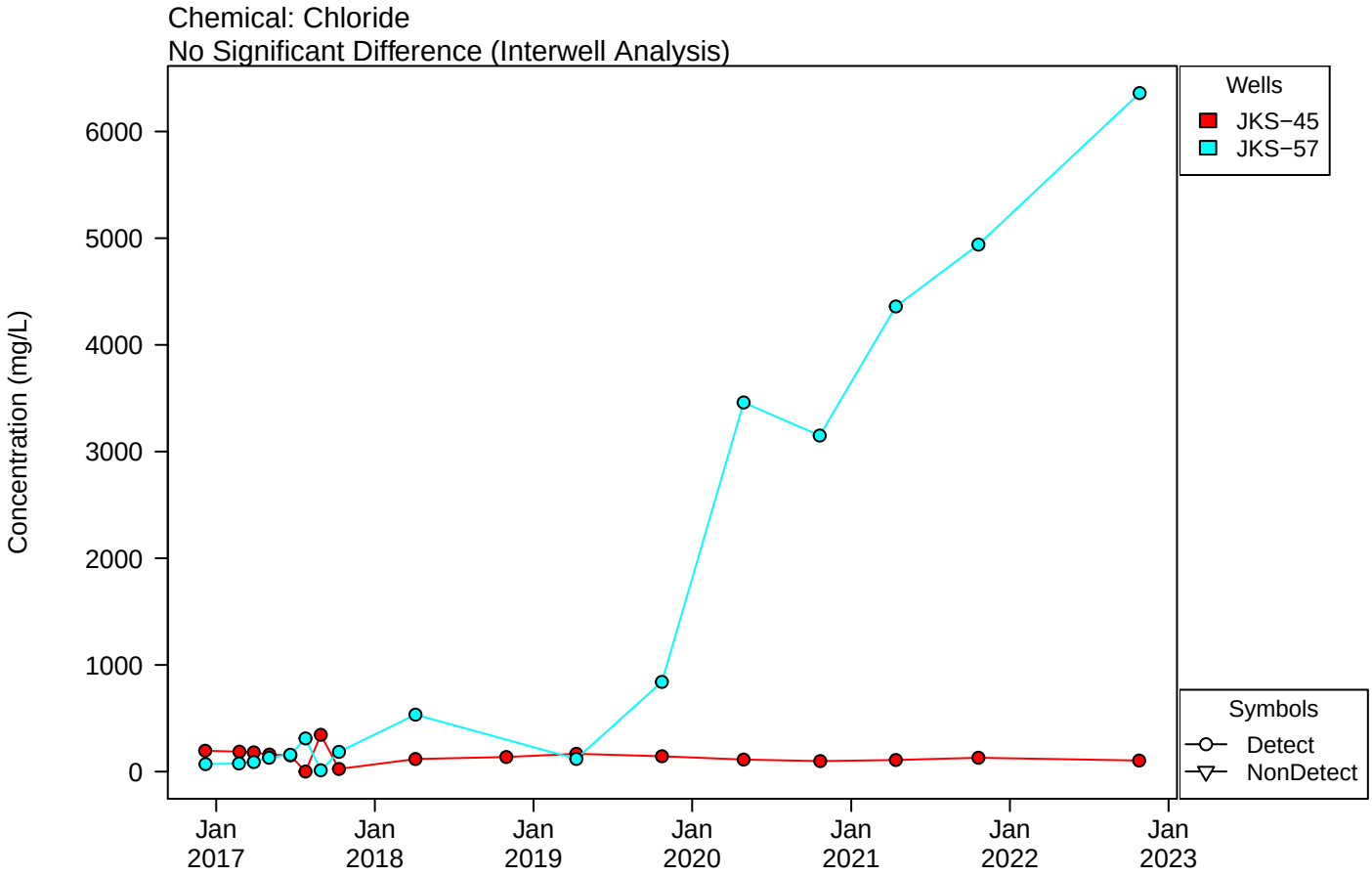
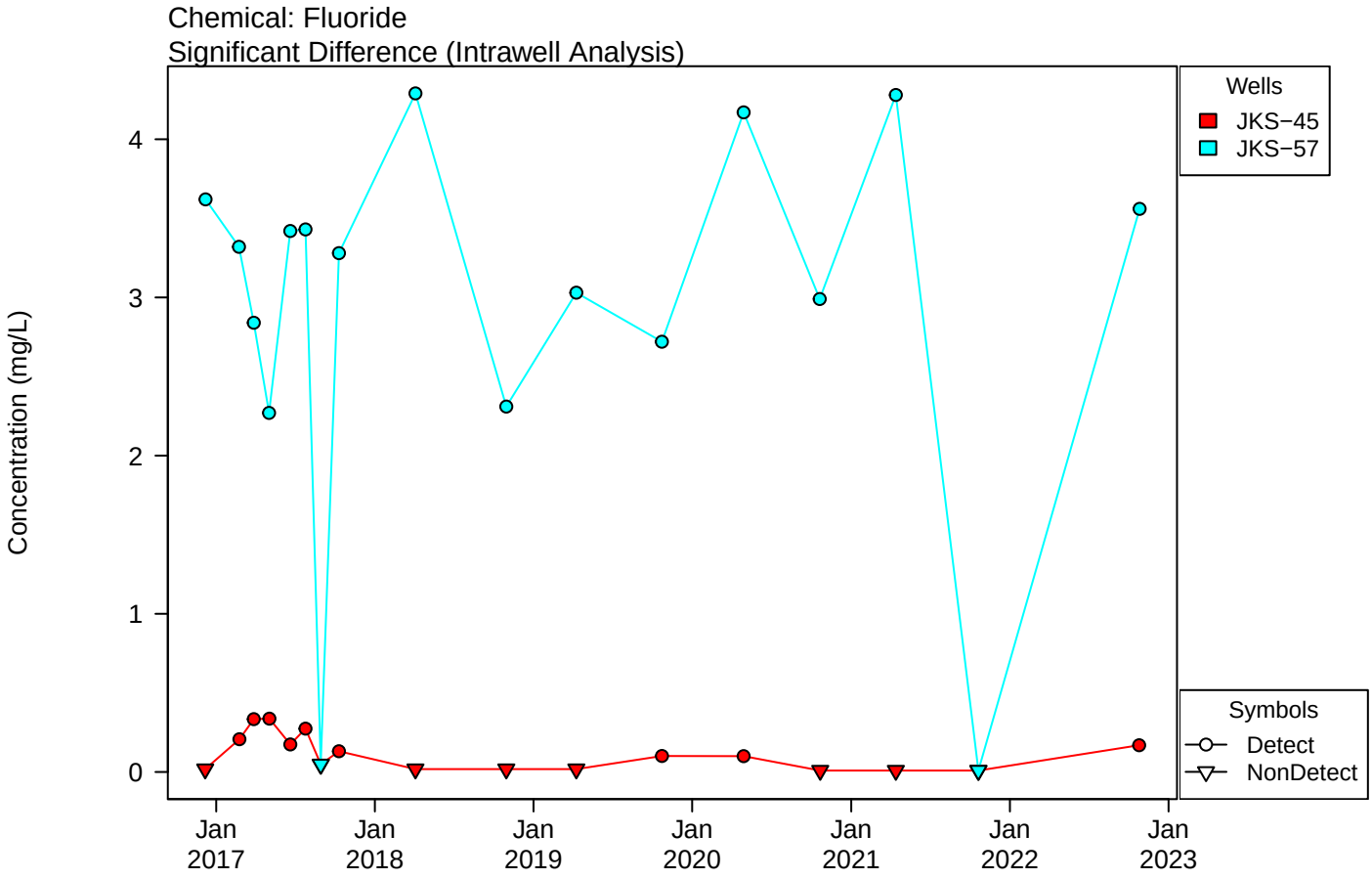
Appendix B − Figure 3
Unit: Fly Ash Landfill
Timeseries of Upgradient Wells





Appendix B − Figure 3
Unit: Fly Ash Landfill
Timeseries of Upgradient Wells





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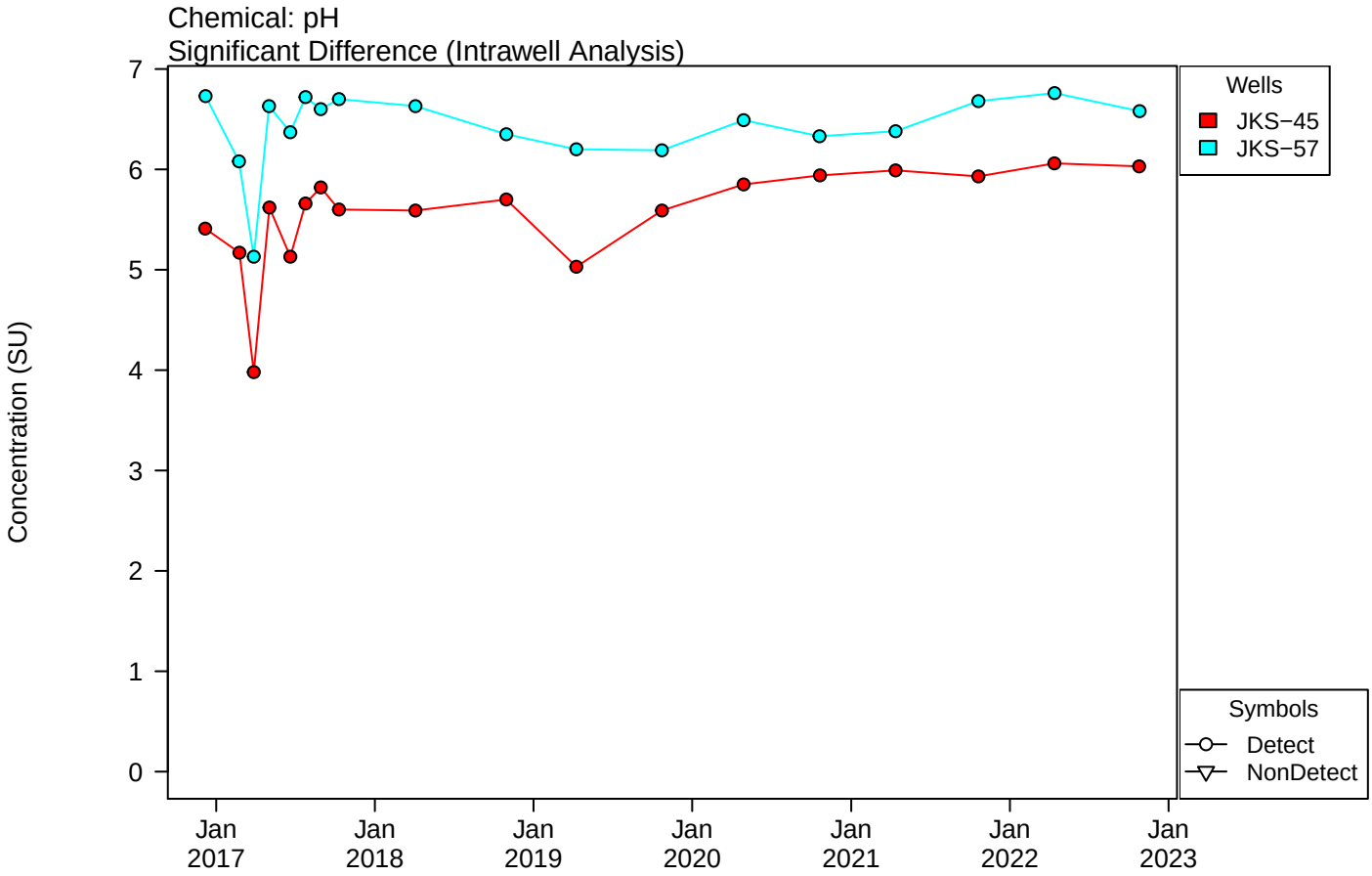
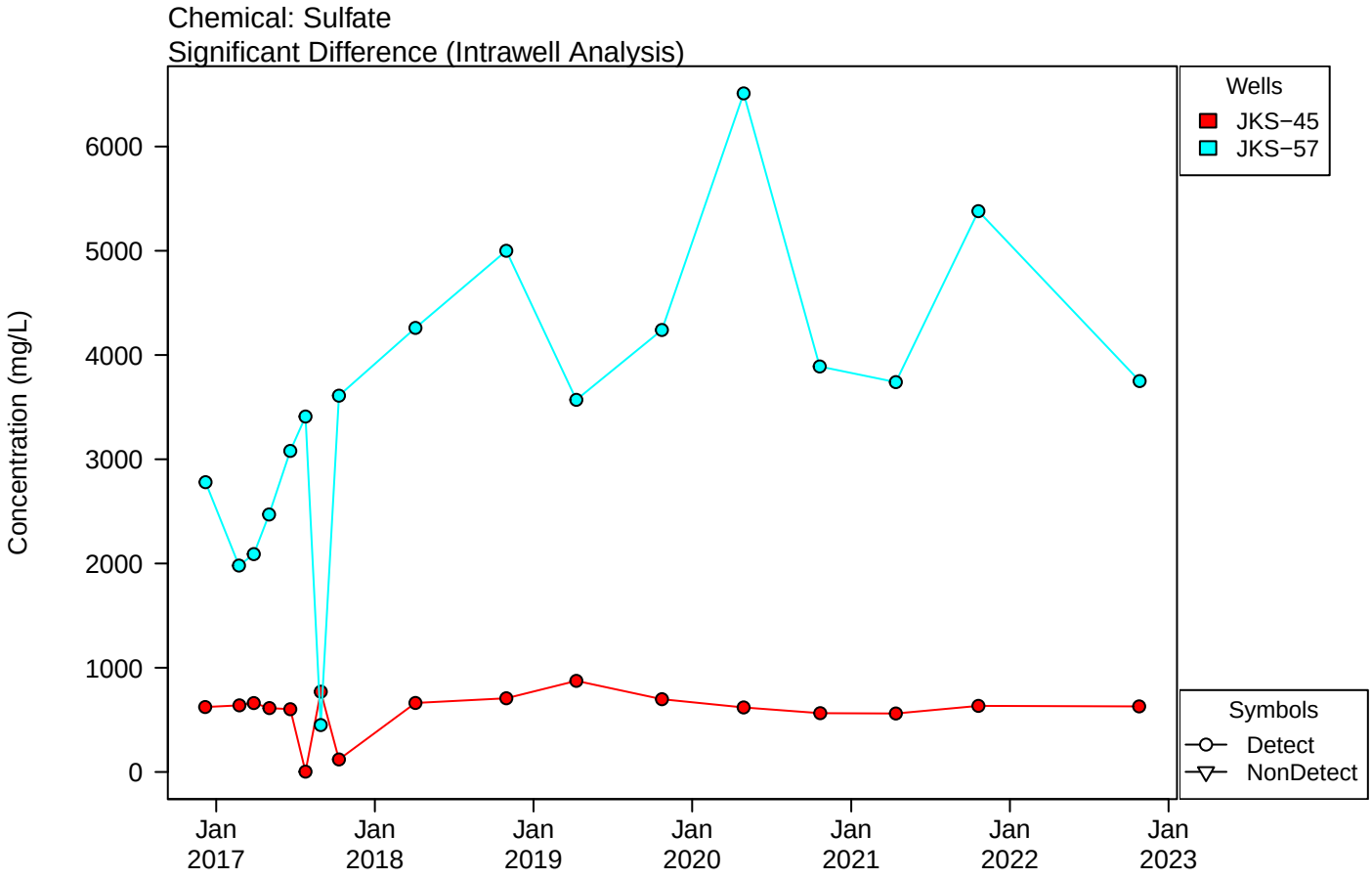
Unit: Fly Ash Landfill
Timeseries of Upgradient Wells





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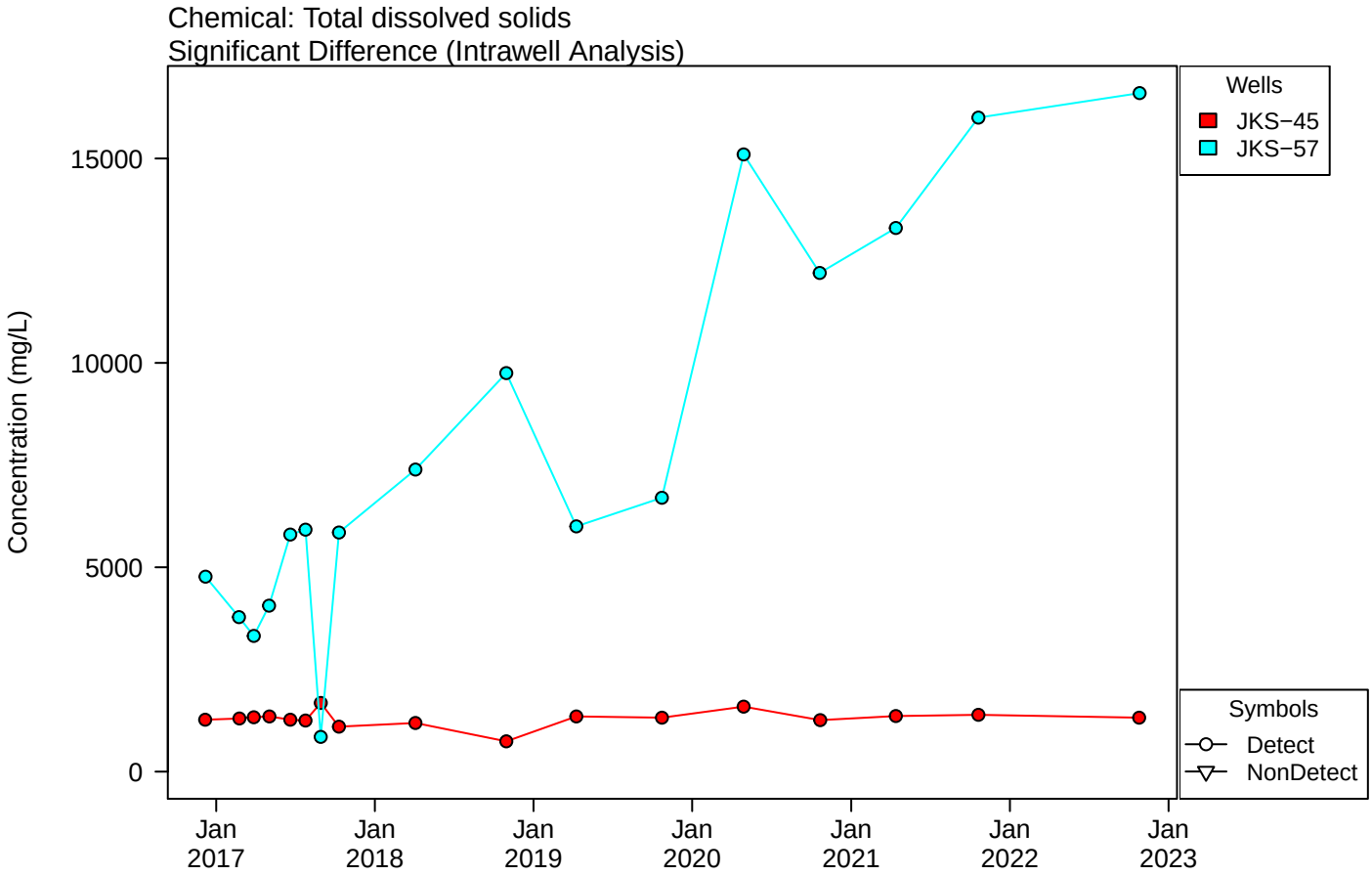
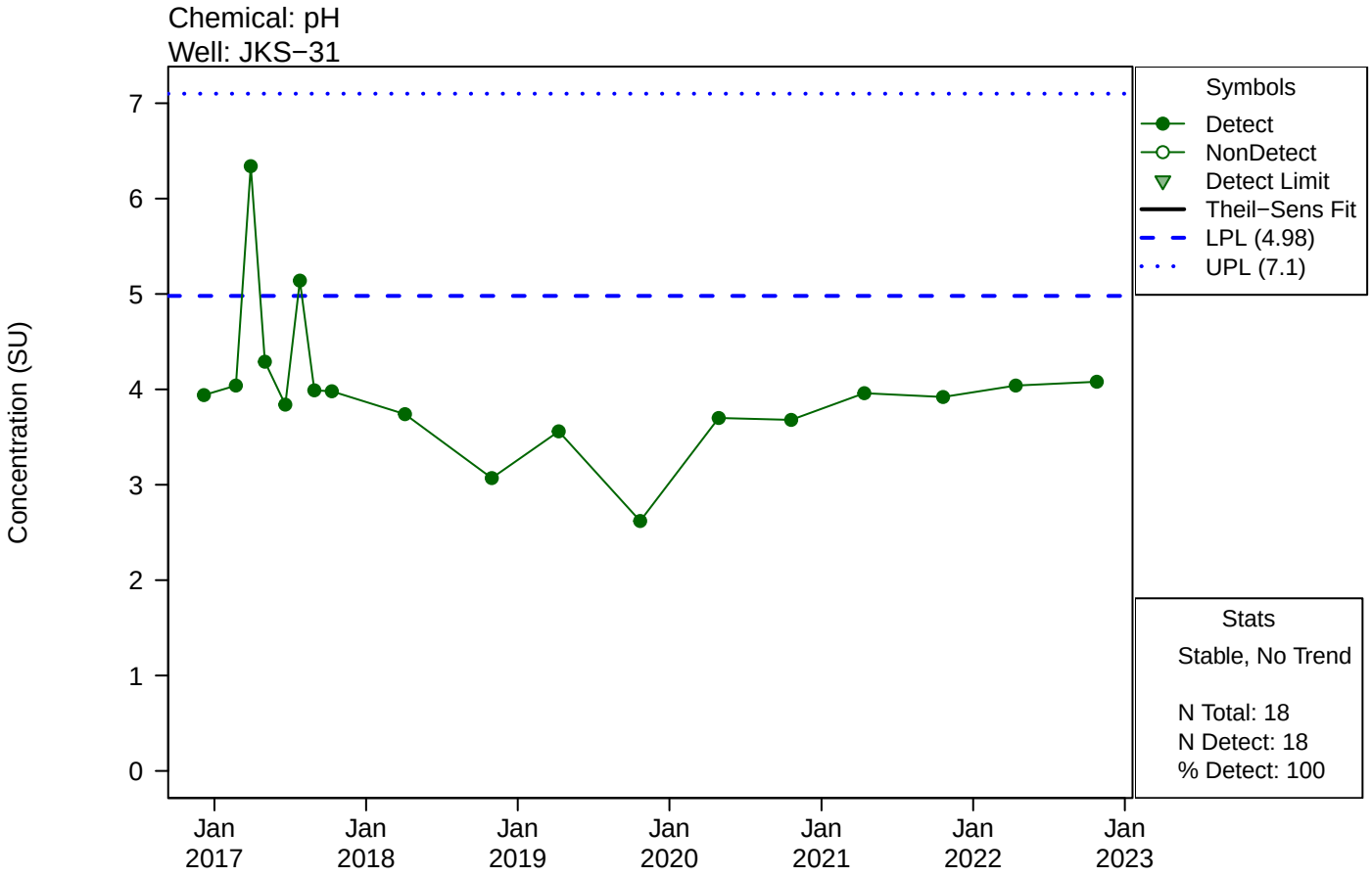
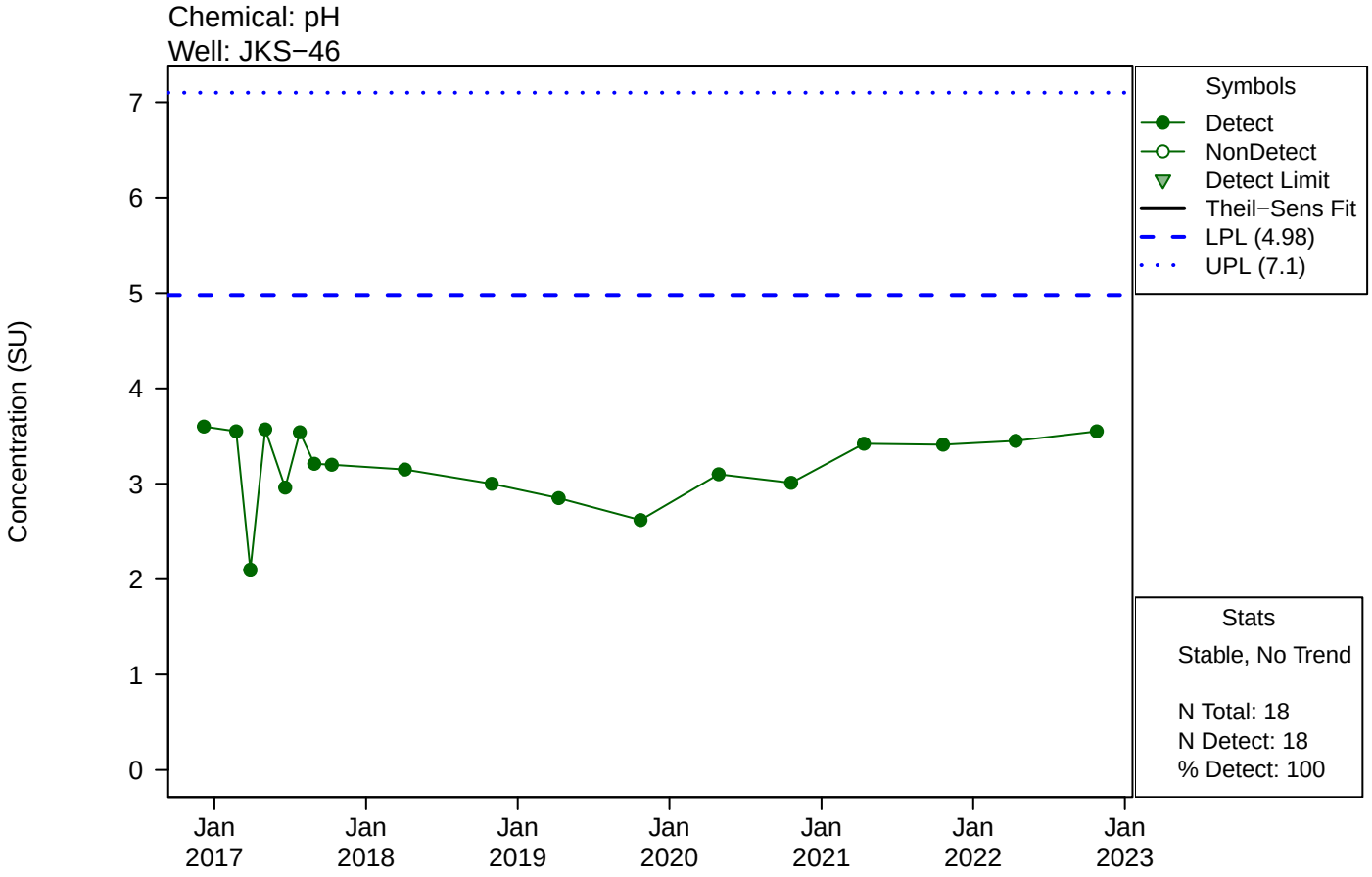


Appendix B − Figure 4
Unit: Fly Ash Landfill
Trend Analysis of Downgradient Wells with Exceedances





April 2022 Groundwater Sampling Results

Appendix C

ERM

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September 20, 2022

Mr. Michael Malone
CPS Energy
500 McCullough Avenue
San Antonio, Texas 78215

Reference: 0636109

Subject: April 2022 Groundwater Sampling Event
Calaveras Power Station CCR Units
San Antonio, Texas

Introduction

Title 40 Code of Federal Regulations, Part 257, (40 CFR §257) Subpart D [a.k.a. 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 *2017 Annual Groundwater Monitoring and Corrective Action Report* for each CCR unit, the downgradient monitoring well results from the October 2016 sampling event were compared to Upper Prediction Limits (UPLs) and Lower Prediction Limits (LPLs). UPLs and LPLs were calculated in the *Annual Groundwater Monitoring and Corrective Action Reports* for the purpose of determining a potential statistically significant increase (SSI) over background levels. In the subsequent *2018*, *2019, 2020, and 2021 Annual Groundwater Monitoring and Corrective Action Reports* for each CCR unit, the downgradient monitoring well results from the October 2017, October 2018, October 2019, and October 2021 sampling events 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 data collected from the previous year. The April 2022 groundwater sample results were compared to the updated UPLs and LPLs and the evaluations of the sample results indicated a potential SSI for a limited number of constituents from the EP, FAL, and BAPs. No potential SSIs were identified for any constituents from the 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 groundwater quality. The CCR Rule also indicates that the owner or operator must complete the written demonstration within 90 days of detecting an 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 previous four *Annual Groundwater Monitoring and Corrective Action Reports*, CPS Energy prepared five *Written Demonstrations – Responses to Potential Statistically Significant Increases*[1] (dated 4 April 2018; 27 February 2019; 27 April 2020; 18 June 2021; and 26 April 2022, respectively). Based on the evidence provided in the *Written/ Alternative Source 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 Events Summary

The first semiannual groundwater sampling event for 2022 was conducted on April 13 through April 14, 2022. 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. Monitoring wells were gauged and then sampled by CPS Energy using low flow sampling techniques during the sampling event. The groundwater samples were analyzed for Appendix III constituents.

For each CCR unit, the downgradient monitoring well results from the April 2022 sampling event were compared to the updated UPLs and LPLs recalculated in their respective *2021 Annual Groundwater Monitoring and Corrective Action Report*. The April 2022 groundwater sample results for the downgradient monitoring wells in each CCR unit are summarized in Attachment 1.

Although the evaluations of the April 2022 groundwater sample results indicate a potential SSI for a limited number of constituents, the constituents associated with the potential SSIs are the same constituents, detected at similar concentrations, which were previously identified in one or all of the *Written/ Alternative Source Demonstrations*. The evaluations of the April 2022 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; and pH in JKS-36, JKS-61, and JKS-62. As previously presented in the *Written/ Alternative Source 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 2022 concentrations were within the range of naturally occurring concentrations identified in the *Written/ Alternative Source Demonstrations*.

FAL – The constituents associated with potential SSIs include pH in JKS-31 and JKS-46. As previously presented in the *Written/ Alternative Source Demonstrations*, the concentrations of pH appear to reflect natural variation in groundwater quality in the vicinity of the CCR unit. The reported April 2022 concentrations were within the range of naturally occurring concentrations identified in the *Written/ Alternative Source Demonstrations*.

BAPs – The constituents associated with potential SSIs include boron in JKS-50R and JKS-56. As previously presented in the *Written/ Alternative Source Demonstrations*, the concentrations of boron appear to reflect natural variation in groundwater quality in the vicinity of the CCR unit. The

[1] The term *'Written Demonstration'* was historically used for a document that provided responses to potential SSIs. Starting with the 26 April 2022 document, the term *'Alternative Source Demonstration'* was used for these types of documents.

reported April 2022 concentrations were within the range of naturally occurring concentrations identified in the *Written/ Alternative Source Demonstrations*.

Conclusions

Based on the April 2022 groundwater sample results and the evidence provided in one or all of the *Written/ Alternative Source Demonstrations*, 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 2022.

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

Sincerely,

Environmental Resources Management Southwest, Inc.

Nicholas Houtchens
Senior Geologist

ATTACHMENT 1 APRIL 2022 GROUNDWATER SAMPLE RESULTS

April 2022 Groundwater Sample Results
CCR Unit: Evaporation Pond
CPS Energy Calaveras Power Station
San Antonio, TX

			CCR Unit	EP	EP	EP
			Well Designation	Downgradient	Downgradient	Downgradient
			Well ID	JKS-36	JKS-61	JKS-62
			Sample Date	4/13/2022	4/13/2022	4/13/2022
			Sample Type Code	N	N	N
Constituent	Units	2021 LPL - EP	2021 UPL - EP			
Boron	mg/L	--	1.80	0.556	1.83	0.609
Calcium	mg/L	--	1,410	260	144	165
Chloride	mg/L	--	3,320	295	248	313
Fluoride	mg/L	--	0.364	1.71	0.363	0.328
pH, Field	SU	4.58	6.26	6.78	6.83	6.89
Sulfate	mg/L	--	2,120	769	420	199
Total Dissolved Solids	mg/L	--	9,620	2,200	1,410	1,160

NOTES:

Shaded results either exceed of the Upper Prediction Limit (UPL) or are below the Lower Prediction Limit (LPL) for this CCR unit.
Sample Type Code: N - Normal

April 2022 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-46	JKS-60
			Sample Date	4/13/2022	4/13/2022	4/13/2022	4/13/2022	4/13/2022
			Sample Type Code	N	N	N	FD	N
Constituent	Units	2021 LPL - FAL	2021 UPL - FAL					
Boron	mg/L	--	5.77	0.460	1.02	0.736	0.765	0.573
Calcium	mg/L	--	794	339	499	181	196	438
Chloride	mg/L	--	1,850	525	731	14.8	15.2	324
Fluoride	mg/L	--	4.29	0.018 U	0.018 U	2.55	3.09	0.018 U
pH, Field	SU	4.87	6.73	4.04	6.55	3.45	3.45	6.36
Sulfate	mg/L	--	7,810	1,400	1,560	1,370	1,290	1,200
Total Dissolved Solids	mg/L	--	18,800	3,170	3,960	1,870	1,890	2,680

NOTES:

Shaded results either exceed of the Upper Prediction Limit (UPL) or are below the Lower Prediction Limit (LPL) for this CCR unit.
Sample Type Code: N - Normal; FD - Field Duplicate
U: Analyte not detected at laboratory reporting limit (Sample Detection Limit).

April 2022 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	4/13/2022	4/14/2022	4/13/2022	4/13/2022	4/14/2022	4/13/2022
			Sample Type Code	N	N	N	FD	N	N
Constituent	Units	2021 LPL - BAP	2021 UPL - BAP						
Boron	mg/L	--	2.63	2.23	6.28	1.84	1.81	0.778	3.83
Calcium	mg/L	--	386	124	128	161	178	131	110
Chloride	mg/L	--	638	481	70.0	381	378	443	100
Fluoride	mg/L	--	0.894	0.810	0.284	0.418	0.491	0.557	0.367
pH, Field	SU	5.48	7.31	6.94	6.66	6.97	6.97	6.84	6.81
Sulfate	mg/L	--	485	199	189	299	296	178	121
Total Dissolved Solids	mg/L	--	2,500	1,480	887	1,470	1,520	1,370	838

NOTES:

Shaded results either exceed of the Upper Prediction Limit (UPL) or are below the Lower Prediction Limit (LPL) for this CCR unit.
Sample Type Code: N - Normal; FD - Field Duplicate

April 2022 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	4/13/2022	4/13/2022	4/13/2022	4/13/2022
			Sample Type Code	N	FD	N	N
Constituent	Units	2021 LPL - SRH	2021 UPL - SRH				
Boron	mg/L	--	2.64	1.84	1.81	1.68	1.16
Calcium	mg/L	--	377	161	178	115	149
Chloride	mg/L	--	640	381	378	403	472
Fluoride	mg/L	--	0.894	0.418	0.491	0.263	0.473
pH, Field	SU	5.48	7.31	6.97	6.97	6.82	6.84
Sulfate	mg/L	--	487	299	296	274	446
Total Dissolved Solids	mg/L	--	2,440	1,470	1,520	1,330	1,680

NOTES:

Shaded results either exceed of the Upper Prediction Limit (UPL) or are below the Lower Prediction Limit (LPL) for this CCR unit.
Sample Type Code: N - Normal; FD - Field Duplicate