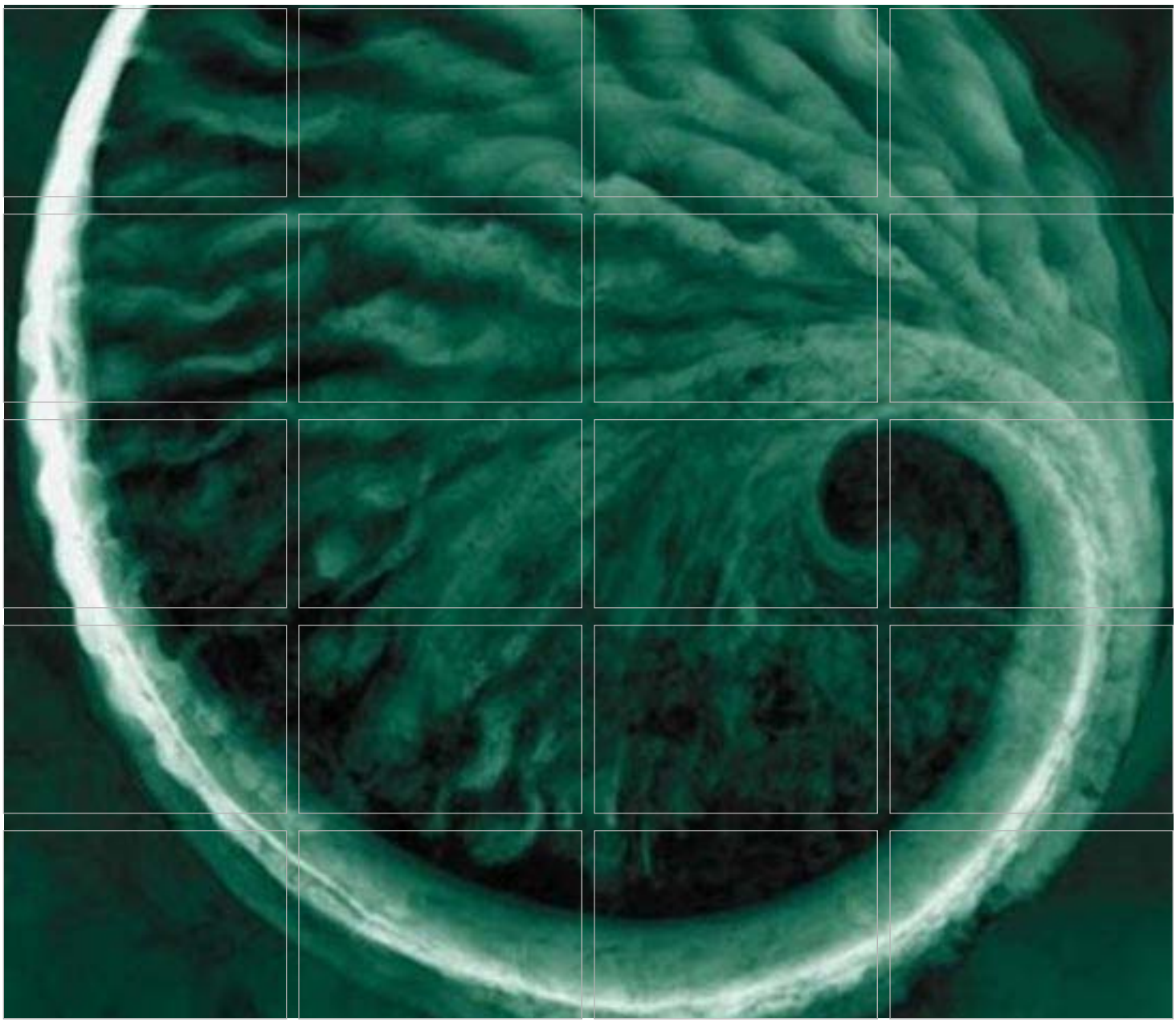

# Annual Groundwater Monitoring and Corrective Action Report

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

January 2018

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Calaveras Power Station – Fly Ash Landfill

# Annual Groundwater Monitoring and Corrective Action Report

January 2018

Project No. 0337367
San Antonio, Texas


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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: Fly Ash Landfill, Bottom Ash Ponds, Evaporation Pond, and the Sludge Recycle Holding Pond. This Annual Groundwater Monitoring and Corrective Action Report (Report) addresses the Fly Ash Landfill. 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 Fly Ash Landfill 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 record 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, and Figure 2 |
| §257.90(e)(4) | Narrative discussion of any transition between monitoring programs | Section 4 |

The Fly Ash Landfill is located northeast of the Power Station generating units and is north of the Evaporation Pond. The Fly Ash Landfill currently receives fly ash, bottom ash, economizer ash, scrubber sludge from flue gas desulphurization ponds, and flue gas desulphurization gypsum. The Fly Ash Landfill was constructed in 1992. 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 monitoring wells (JKS-45 and JKS-57) and four downgradient monitoring wells (JKS-31, JKS-33, JKS-46, and JKS-60). All monitoring wells are screened within the uppermost groundwater bearing unit (GWBU). 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 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 groundwater 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 flow in the vicinity of the Fly Ash Landfill appears to flow towards Lake Calaveras (southeast to east). The horizontal gradient is approximately 0.007 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 Fly Ash Landfill 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:

- Calcium and lithium were not analyzed from the samples collected at monitoring wells JKS-31, JKS-33, JKS-57, and JKS-60 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 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 Fly Ash Landfill (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;
- 11 well-analyte combinations have 100 percent detects;
- 9 well-analyte combinations follow a normal distribution (using Shapiro-Wilks Normality Test); and
- Four 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 outliers (Appendix B, Table 3 and Appendix B, Figure 2) were reviewed before they were excluded from the dataset. A total of one outlier was initially flagged in the upgradient datasets. The outlier value was likely the result of seasonal fluctuations and was within the range of values found in nearby upgradient wells. No analytical or sampling issues were identified during data review; therefore, the outlier value was considered valid and was retained in the dataset.

### *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 summarize the results of the trend analysis:

- 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; and
- 13 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 upper prediction limit (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.

The 13 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 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 calculations are provided in Appendix B, Table 5.

Final UPL and LPL Values

| Analysis Type | Analyte | LPL | UPL | Unit |
|---|---|---|---|---|
| Intrawell | Boron | -- | 3.62 | mg/L |
| Intrawell | Calcium | -- | 450 | mg/L |
| Interwell | Chloride | -- | 314 | mg/L |
| Intrawell | Fluoride | -- | 3.62 | mg/L |
| Intrawell | pH | 4.02 | 6.73 | SU |
| Intrawell | Sulfate | -- | 4,680 | mg/L |
| Intrawell | TDS | -- | 8,040 | 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 |
|---|---|---|---|---|---|---|
| Calcium | JKS-33 | -- | 450 | 2017-10-10 | 531 | mg/L |
| Chloride | JKS-33 | -- | 314 | 2017-10-10 | 666 | mg/L |
| Chloride | JKS-60 | -- | 314 | 2017-10-10 | 352 | mg/L |
| pH | JKS-31 | 4.02 | 6.73 | 2017-10-10 | 3.98 | SU |
| pH | JKS-46 | 4.02 | 6.73 | 2017-10-10 | 3.20 | SU |

All initial exceedances of the UPL and LPL 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, or at or above the LPL, 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 wells with potential SSIs have significant trends.

## *4. RECOMMENDATIONS*

Currently, there are no plans to transition between detection monitoring and 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
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 (1) | 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 |

| | | JKS-31 Downgradient | | JKS-33 Downgradient | | JKS-46 Downgradient | | JKS-60 Downgradient | |
|---|---|---|---|---|---|---|---|---|---|
| | | TOC Elevation | 507.45 | TOC Elevation | 498.71 | TOC Elevation | 499.08 | TOC Elevation | 495.7 |
| 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 (1) | 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 |

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
Fly Ash Landfill

| 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 | |
| Fly Ash Landfill | JKS-31 | Downgradient Monitoring | 8 | X | X | X | X | X | X | X | X | Detection |
| | JKS-33 | Downgradient Monitoring | 8 | X | X | X | X | X | X | X | X | Detection |
| | JKS-45 | Background Monitoring | 8 | X | X | X | X | X | X | X | X | Detection |
| | JKS-46 | Downgradient Monitoring | 8 | X | X | X | X | X | X | X | X | Detection |
| | JKS-57 | Background Monitoring | 8 | X | X | X | X | X | X | X | X | Detection |
| | JKS-60 | 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
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** |
| | **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 | 1.65 | 1.51 | 2.27 | 1.11 | 2.03 | 1.91 | 2.02 | 2.21 |
| Calcium | mg/L | 144 | 122 | 184 | 105 | 101 | 103 | 120 | 130 |
| Chloride | mg/L | 196 | 187 | 181 J | 160 | 152 | 0.803 | 345 JH | 24.8 |
| Fluoride | mg/L | < 0.200 | 0.207 | 0.334 | 0.337 JH | 0.174 | 0.274 JH | < 0.200 | 0.131 JH |
| Sulfate | mg/L | 623 | 639 | 661 | 613 | 602 | 2.95 JH | 770 JH | 120 |
| pH - Field Collected | Std | 5.41 | 5.17 | 3.98 | 5.62 | 5.13 | 5.66 | 5.82 | 5.60 |
| Total dissolved solids | mg/L | 1270 | 1300 | 1330 | 1350 | 1270 | 1250 | 1680 JH | 1100 |
| **Appendix IV - Assessment Monitoring** | | | | | | | | | |
| Antimony | mg/L | < 0.00200 | 0.000310 | 0.000400 | < 0.0100 | < 0.0100 | < 0.00200 | 0.000348 | 0.000490 |
| Arsenic | mg/L | 0.000534 | 0.00216 | 0.00595 | < 0.0100 | < 0.0100 | 0.000346 | 0.00283 | 0.000618 |
| Barium | mg/L | 0.0185 | 0.0436 | 0.103 | 0.0128 | 0.0176 | 0.0114 | 0.0480 | 0.0142 |
| Beryllium | mg/L | < 0.0400 | 0.000383 | 0.000921 | < 0.0100 | < 0.0100 | 0.000149 | 0.000408 | 0.000229 |
| Cadmium | mg/L | < 0.00200 | < 0.00200 | 0.000189 | < 0.0100 | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 |
| Chromium | mg/L | 0.00743 | 0.0152 | 0.0320 | 0.00403 | < 0.0200 | 0.00313 | 0.0135 | 0.00272 |
| Cobalt | mg/L | 0.00506 | 0.00465 | 0.00828 | 0.00346 | 0.00351 | 0.00277 | 0.00376 | 0.00358 |
| Fluoride | mg/L | < 0.200 | 0.207 | 0.334 | 0.337 JH | 0.174 | 0.274 JH | < 0.200 | 0.131 JH |
| Lead | mg/L | 0.000571 | 0.00419 | 0.0117 | < 0.0100 | < 0.0100 | 0.000479 | 0.00482 | 0.000968 |
| Lithium | mg/L | 0.0329 | 0.0601 | < 0.100 | 0.0600 | 0.0639 | 0.0694 | 0.0935 | 0.0781 |
| Mercury | mg/L | < 0.000200 | 0.0000320 | < 0.000200 | < 0.000200 | 0.0000300 | < 0.000200 | < 0.000200 | < 0.000200 |
| Molybdenum | mg/L | 0.00105 | 0.00245 | 0.00372 | < 0.0100 | < 0.0100 | < 0.00200 | 0.00115 | 0.000271 |
| Selenium | mg/L | 0.0147 | 0.0144 | 0.0174 | 0.0121 | 0.0123 | 0.00990 | 0.0136 | 0.0118 |
| Thallium | mg/L | < 0.00200 | < 0.00200 | 0.000460 | < 0.0100 | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 |
| 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 |
| 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 |

NOTES:
(1) Constituent list from Appendix III and IV of the USEPA 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
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** |
| | **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 | 3.19 | 3.24 | 3.17 | 2.67 | 3.09 | 3.08 | 2.98 | 3.48 |
| Calcium | mg/L | 349 | 362 | 413 | -- | 290 | 327 | 337 | 393 |
| Chloride | mg/L | 70.6 | 76.2 | 89.6 | 130 | 158 | 311 | 12.5 JH | 185 |
| Fluoride | mg/L | 3.62 | 3.32 | 2.84 | 2.27 | 3.42 | 3.43 | < 0.200 | 3.28 |
| Sulfate | mg/L | 2780 | 1980 | 2090 | 2470 | 3080 | 3410 | 450 JH | 3610 |
| pH - Field Collected | Std | 6.73 | 6.08 | 5.13 | 6.63 | 6.37 | 6.72 | 6.60 | 6.70 |
| Total dissolved solids | mg/L | 4770 | 3780 | 3320 | 4060 | 5800 | 5920 | 850 JH | 5850 |
| **Appendix IV - Assessment Monitoring** | | | | | | | | | |
| Antimony | mg/L | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 |
| Arsenic | mg/L | 0.00138 | 0.000630 | 0.000654 | 0.000561 | < 0.0100 | 0.000480 | 0.000519 | 0.000486 |
| Barium | mg/L | 0.0311 | 0.0211 | 0.0208 | 0.0174 | 0.0164 | 0.0149 | 0.0128 | 0.0145 |
| Beryllium | mg/L | < 0.0100 | < 0.00200 | 0.000161 | < 0.00200 | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 |
| Cadmium | mg/L | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 |
| Chromium | mg/L | < 0.0200 | 0.000687 | < 0.00400 | < 0.00400 | < 0.0200 | 0.000739 | 0.000816 | 0.00104 |
| Cobalt | mg/L | 0.000520 | 0.00232 | 0.000297 | 0.000449 | 0.000407 | 0.000748 | 0.000195 | 0.000322 |
| Fluoride | mg/L | 3.62 | 3.32 | 2.84 | 2.27 | 3.42 | 3.43 | < 0.200 | 3.28 |
| Lead | mg/L | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 | < 0.0100 | < 0.00200 | 0.000256 | < 0.00200 |
| Lithium | mg/L | 0.545 | 0.287 | < 0.100 | -- | 0.533 | 0.649 | 0.671 | 0.733 |
| Mercury | mg/L | < 0.000200 | 0.0000300 | < 0.000200 | 0.0000580 | < 0.000200 | < 0.000200 | < 0.000200 | < 0.000200 |
| Molybdenum | mg/L | < 0.0100 | 0.000385 | 0.000278 | < 0.00200 | < 0.0100 | 0.000329 | 0.000283 | < 0.00200 |
| Selenium | mg/L | 0.00237 | 0.000664 | 0.000594 | 0.000561 | < 0.0100 | 0.000612 | 0.000858 | 0.000697 |
| Thallium | mg/L | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 |
| 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 |
| 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 | 1.90 ± 0.894 | 1.73 ± 1.00 |

NOTES:
(1) Constituent list from Appendix III and IV of the USEPA 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
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** |
| **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 | 0.446 | 0.580 | 0.642 | 0.499 | 0.573 | 0.510 | 0.494 | 0.553 |
| Calcium | mg/L | 188 | 384 | 317 | -- | 216 | 171 | 230 | 228 |
| Chloride | mg/L | 223 | 477 | 303 | 317 | 285 | < 2.00 | < 0.200 | 288 |
| Fluoride | mg/L | 0.801 | 0.186 | 0.548 | 0.865 | 0.661 | 0.979 JH | < 0.200 | 0.735 JH |
| Sulfate | mg/L | 697 | 1130 | 768 | 875 | 782 | 1.17 JH | 0.160 JH | 803 |
| pH - Field Collected | Std | 3.94 | 4.04 | 6.34 | 4.29 | 3.84 | 5.14 | 3.99 | 3.98 |
| Total dissolved solids | mg/L | 1470 | 2290 | 2430 | 1850 | 1730 | 1500 | < 25.0 | 1890 |
| **Appendix IV - Assessment Monitoring** | | | | | | | | | |
| Antimony | mg/L | < 0.0100 | < 0.00200 | < 0.00200 | 0.000301 | < 0.0100 | 0.000527 | < 0.00200 | 0.000559 |
| Arsenic | mg/L | 0.00151 | 0.0110 | 0.00834 | 0.00501 | 0.00363 | 0.00134 | 0.00556 | 0.00279 |
| Barium | mg/L | 0.0167 | 0.0141 | 0.0198 | 0.0136 | 0.0127 | 0.0229 | 0.0129 | 0.0122 |
| Beryllium | mg/L | 0.00793 | 0.00851 | 0.00885 | 0.00814 | 0.00865 | 0.00593 | 0.00827 | 0.00857 |
| Cadmium | mg/L | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 |
| Chromium | mg/L | 0.0200 | 0.000663 | < 0.00400 | < 0.00400 | < 0.0200 | 0.000890 | 0.000849 | 0.000760 |
| Cobalt | mg/L | 0.000440 | 0.0399 | 0.0623 | 0.0227 | 0.0173 | 0.0113 | 0.0302 | 0.0192 |
| Fluoride | mg/L | 0.801 | 0.186 | 0.548 | 0.865 | 0.661 | 0.979 | < 0.200 | 0.735 JH |
| Lead | mg/L | < 0.0100 | 0.000415 | < 0.00200 | 0.000344 | < 0.0100 | 0.000348 | 0.00233 | 0.000580 |
| Lithium | mg/L | 0.533 | 0.510 | < 0.100 | -- | 0.572 | 0.484 | 0.615 | 0.590 |
| Mercury | mg/L | < 0.000200 | < 0.000200 | < 0.000200 | 0.0000360 | < 0.000200 | < 0.000200 | < 0.000200 | < 0.000200 |
| Molybdenum | mg/L | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 |
| Selenium | mg/L | < 0.0100 | 0.00163 | < 0.00200 | 0.00125 | < 0.0100 | 0.00162 | 0.00177 | 0.00155 |
| Thallium | mg/L | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 |
| 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 |
| 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 |

NOTES:
(1) Constituent list from Appendix III and IV of the USEPA 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
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** |
| | **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 | 0.940 | 1.02 | 1.05 | 1.01 | 1.14 | 1.01 | 1.03 | 1.11 |
| Calcium | mg/L | 564 | 600 | 553 | -- | 563 | 558 | 567 | 531 |
| Chloride | mg/L | 735 | 679 | 731 | 690 | 692 | 693 | 125 JH | 666 |
| Fluoride | mg/L | 1.86 | 1.08 | 1.77 | 1.39 | 1.81 | 1.34 | < 1.00 | 1.69 |
| Sulfate | mg/L | 1850 | 1670 | 1780 | 1710 | 1690 | 1710 | 3170 | 1640 |
| pH - Field Collected | Std | 6.51 | 5.90 | 4.91 | 6.52 | 6.15 | 5.71 | 6.49 | 6.49 |
| Total dissolved solids | mg/L | 4000 | 3990 | 4310 | 4410 | 4240 | 4070 | 3580 | 4320 |
| **Appendix IV - Assessment Monitoring** | | | | | | | | | |
| Antimony | mg/L | < 0.0100 | < 0.00200 | < 0.0100 | < 0.00200 | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 |
| Arsenic | mg/L | < 0.0100 | < 0.00200 | < 0.0100 | 0.000259 | < 0.0100 | 0.000279 | 0.000316 | < 0.00200 |
| Barium | mg/L | 0.0326 | 0.0318 | 0.0297 | 0.0282 | 0.0821 | 0.0274 | 0.0263 | 0.0264 |
| Beryllium | mg/L | < 0.0100 | < 0.00200 | 0.000709 | < 0.00200 | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 |
| Cadmium | mg/L | < 0.0100 | < 0.00200 | < 0.0100 | < 0.00200 | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 |
| Chromium | mg/L | < 0.0200 | 0.000611 | < 0.0200 | < 0.00400 | < 0.0200 | < 0.00400 | 0.00113 | 0.00108 |
| Cobalt | mg/L | 0.000690 | 0.000433 | 0.000487 | 0.000435 | 0.00627 | 0.000731 | 0.000902 | 0.000554 |
| Fluoride | mg/L | 1.86 | 1.08 | 1.77 | 1.39 | 1.81 | 1.34 | < 1.00 | 1.69 |
| Lead | mg/L | < 0.0100 | < 0.00200 | < 0.0100 | < 0.00200 | < 0.0100 | < 0.00200 | 0.000157 | < 0.00200 |
| Lithium | mg/L | < 0.0200 | < 0.0200 | < 0.100 | -- | 0.194 | 0.181 | 0.255 | 0.176 |
| Mercury | mg/L | < 0.000200 | < 0.000200 | < 0.000200 | < 0.000200 | < 0.000200 | < 0.000200 | < 0.000200 | < 0.000200 |
| Molybdenum | mg/L | < 0.0100 | < 0.00200 | < 0.0100 | < 0.00200 | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 |
| Selenium | mg/L | 0.0314 | 0.0356 | 0.0389 | 0.0368 | 0.0474 | 0.0495 | 0.0546 | 0.0342 |
| Thallium | mg/L | < 0.0100 | < 0.00200 | < 0.0100 | < 0.00200 | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 |
| 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 |
| 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 |

NOTES:
(1) Constituent list from Appendix III and IV of the USEPA 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
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** |
| **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 | 0.902 | 0.852 | 0.645 | 0.799 | 0.920 | 0.816 | 0.789 | 1.01 |
| Calcium | mg/L | 120 | 133 | 145 | 115 | 126 | 117 | 137 | 148 |
| Chloride | mg/L | 11.6 | 11.8 | 12.2 | 10.5 | 12.6 | 11.9 | 327 JH | 11.7 |
| Fluoride | mg/L | 1.51 | 1.38 | 1.11 | 1.59 | 2.25 | 2.34 | 1.40 J | 1.83 |
| Sulfate | mg/L | 700 | 692 | 608 | 677 | < 0.200 | 780 | 450 JH | 800 |
| pH - Field Collected | Std | 3.60 | 3.55 | 2.10 | 3.57 | 2.96 | 3.54 | 3.21 | 3.20 |
| Total dissolved solids | mg/L | 1160 | 1110 | 926 | 1030 | 1270 | 1320 | 1170 JH | 1390 |
| **Appendix IV - Assessment Monitoring** | | | | | | | | | |
| Antimony | mg/L | < 0.00200 | < 0.00200 | < 0.00200 | < 0.0100 | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 |
| Arsenic | mg/L | 0.00190 | 0.00227 | 0.00149 | 0.00196 | 0.00277 | 0.00253 | 0.00295 | 0.00299 |
| Barium | mg/L | 0.0429 | 0.0356 | 0.0319 | 0.0307 | 0.0364 | 0.0317 | 0.0323 | 0.0334 |
| Beryllium | mg/L | 0.00381 | 0.00362 | 0.00340 | 0.00399 | 0.00459 | 0.00417 | 0.00462 | 0.00486 |
| Cadmium | mg/L | 0.00110 | 0.000988 | 0.00123 | 0.00120 | 0.00101 | 0.00134 | 0.00141 | 0.00136 |
| Chromium | mg/L | 0.000942 | 0.00151 | 0.00104 | < 0.0200 | < 0.0200 | 0.00156 | 0.00204 | 0.00202 |
| Cobalt | mg/L | 0.0303 | 0.0324 | 0.0329 | 0.0367 | 0.0387 | 0.0387 | 0.0412 | 0.0425 |
| Fluoride | mg/L | 1.51 | 1.38 | 1.11 | 1.59 | 2.25 | 2.34 | 1.40 J | 1.83 |
| Lead | mg/L | 0.0162 | 0.0134 | 0.0111 | 0.0144 | 0.0192 | 0.0201 | 0.0236 | 0.0271 |
| Lithium | mg/L | 0.0646 | < 0.0200 | < 0.100 | 0.0673 | 0.0749 | 0.0799 | 0.107 | 0.0896 |
| Mercury | mg/L | < 0.000200 | < 0.000200 | < 0.000200 | < 0.000200 | < 0.000200 | < 0.000200 | < 0.000200 | < 0.000200 |
| Molybdenum | mg/L | < 0.00200 | < 0.00200 | < 0.00200 | < 0.0100 | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 |
| Selenium | mg/L | 0.0255 | 0.0266 | 0.0215 | 0.0247 | 0.0296 | 0.0266 | 0.0298 | 0.0290 |
| Thallium | mg/L | 0.00293 | 0.00292 | 0.00244 | 0.00263 | 0.00314 | 0.00300 | 0.00335 | 0.00358 |
| Radium-226 | pCi/L | 3.16 ± 0.701 | 1.69 ± 0.387 | 1.80 ± 0.448 | 1.20 ± 0.315 | 1.82 ± 0.420 | 1.40 ± 0.353 | 1.52 ± 0.375 | 1.99 ± 0.459 |
| 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 |

NOTES:
(1) Constituent list from Appendix III and IV of the USEPA 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
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** |
| **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 | 0.655 | 0.504 | 0.449 | 0.456 | 0.442 | 0.394 | 0.436 | 0.479 |
| Calcium | mg/L | 433 | 375 | 290 | -- | 379 | 336 | 350 | 383 |
| Chloride | mg/L | 411 | 311 | 311 | 285 | 300 | 319 | 287 JH | 352 |
| Fluoride | mg/L | < 0.200 | 0.319 | 0.324 | 0.421 | 0.306 | 0.338 JH | < 0.200 | 0.284 JH |
| Sulfate | mg/L | 1480 | 999 | 1010 | 976 | 1020 | 818 | 760 JH | 759 |
| pH - Field Collected | Std | 5.82 | 5.38 | 4.21 | 5.75 | 6.07 | 6.44 | 5.93 | 5.97 |
| Total dissolved solids | mg/L | 2790 | 2340 | 2020 | 2110 | 2510 | 2120 | 1450 JH | 2300 |
| **Appendix IV - Assessment Monitoring** | | | | | | | | | |
| Antimony | mg/L | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 |
| Arsenic | mg/L | < 0.0100 | 0.000861 | 0.000592 | 0.000366 | < 0.0100 | 0.000367 | 0.000381 | 0.000266 |
| Barium | mg/L | 0.0715 | 0.0491 | 0.0465 | 0.0450 | 0.0469 | 0.0454 | 0.0490 | 0.0503 |
| Beryllium | mg/L | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 |
| Cadmium | mg/L | 0.000774 | 0.000778 | 0.000786 | 0.000695 | < 0.0100 | 0.000359 | 0.000608 | 0.000699 |
| Chromium | mg/L | < 0.0200 | 0.000743 | < 0.00400 | < 0.00400 | < 0.0200 | 0.000690 | 0.00204 | 0.00100 |
| Cobalt | mg/L | 0.115 | 0.0542 | 0.0423 | 0.0389 | 0.0210 | 0.00896 | 0.0166 | 0.0183 |
| Fluoride | mg/L | < 0.200 | 0.319 | 0.324 | 0.421 | 0.306 | 0.338 JH | < 0.200 | 0.284 JH |
| Lead | mg/L | < 0.0100 | < 0.00200 | < 0.00200 | < 0.00200 | < 0.0100 | < 0.00200 | < 0.00200 | 0.000216 |
| Lithium | mg/L | < 0.0200 | < 0.0200 | < 0.100 | -- | 0.0305 | 0.0179 | 0.0635 | 0.0314 |
| Mercury | mg/L | < 0.000200 | < 0.000200 | < 0.000200 | 0.0000370 | < 0.000200 | < 0.000200 | < 0.000200 | < 0.000200 |
| Molybdenum | mg/L | < 0.0100 | 0.000726 | 0.000622 | 0.000715 | 0.00148 | 0.00162 | 0.00124 | 0.00103 |
| Selenium | mg/L | < 0.0100 | 0.00168 | 0.00132 | 0.00981 | 0.0390 | 0.0244 | 0.00761 | 0.00745 |
| Thallium | mg/L | < 0.0100 | 0.000425 | 0.000412 | 0.000403 | < 0.0100 | < 0.00200 | 0.000372 | 0.000387 |
| 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 |
| 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 |

NOTES:
(1) Constituent list from Appendix III and IV of the USEPA 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 |

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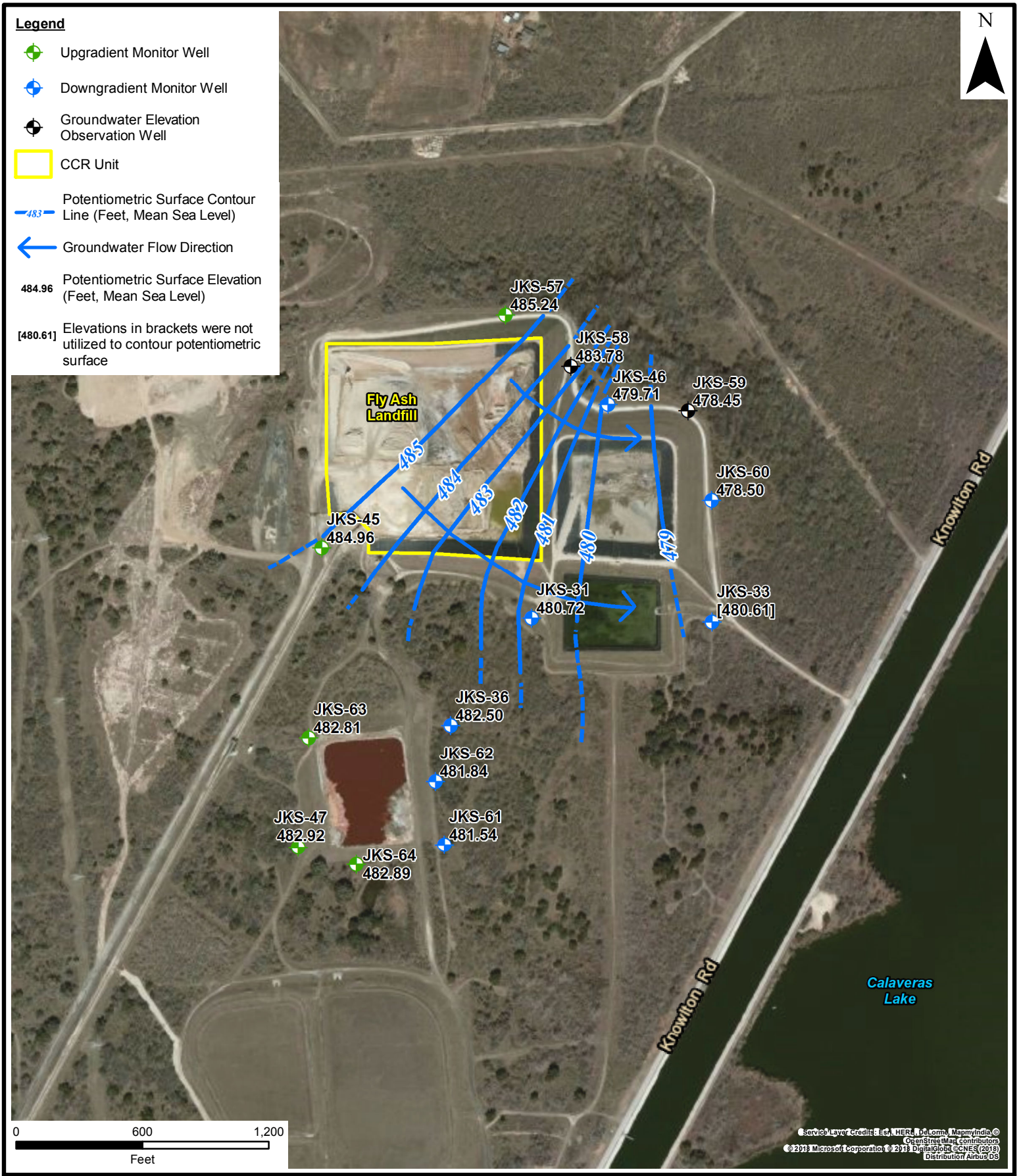
FIGURE 1
CCR WELL NETWORK LOCATION MAP
CPS Energy - Calaveras Power Station
San Antonio, Texas

ERM




# Environmental Resources Management

| | | | | | |
|---|---|---|---|---|---|
| DESIGN: | NH | DRAWN: | EFC | CHKD.: | WZ |
| DATE: | 1/10/2018 | SCALE: | AS SHOWN | REVISION: | 1 |

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FIGURE 2
POTENTIOMETRIC SURFACE MAP - OCTOBER 2017
Fly Ash Landfill CCR Unit
CPS Energy - Calaveras Power Station
San Antonio, Texas

ERM

**Laboratory Data Packages**

*Appendix A*

**(*Data Packages Available Upon Request*)**

# Statistical Analysis Tables and Figures

*Appendix B*

APPENDIX B-TABLE 1
Kruskal-Wallis Test Comparisons of Upgradient Wells
CPS Energy - Calaveras Power Station
Fly Ash Landfill

| 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 | 15 | 15 | 1 | 1 | 10.5 | 0.00119 | Significant Difference | Intrawell |
| Chloride | 16 | 16 | 1 | 1 | 0.706 | 0.401 | No Significant Difference | Interwell |
| Fluoride | 16 | 13 | 0.8125 | 1 | 8.09 | 0.00446 | Significant Difference | Intrawell |
| pH | 16 | 16 | 1 | 1 | 7.18 | 0.00736 | Significant Difference | Intrawell |
| Sulfate | 16 | 16 | 1 | 1 | 7.46 | 0.00632 | Significant Difference | Intrawell |
| TDS | 16 | 16 | 1 | 1 | 6.36 | 0.0117 | 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
Fly Ash Landfill

| Analyte | Well | Units | N | Num Detects | Percent Detect | Min ND | Max ND | Min Detect | Median | Mean | Max Detect | SD | CV | Distribution |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Boron | JKS-45 | mg/L | 8 | 8 | 1 | | | 1.11 | 1.965 | 1.84 | 2.27 | 0.392 | 0.212887 | Normal |
| Boron | JKS-57 | mg/L | 8 | 8 | 1 | | | 2.67 | 3.13 | 3.11 | 3.48 | 0.232 | 0.074422 | Normal |
| Calcium | JKS-45 | mg/L | 8 | 8 | 1 | | | 101 | 121 | 126 | 184 | 27.6 | 0.21927 | Normal |
| Calcium | JKS-57 | mg/L | 7 | 7 | 1 | | | 290 | 349 | 353 | 413 | 41.2 | 0.116799 | Normal |
| Chloride | Pooled | mg/L | 16 | 16 | 1 | | | 0.803 | 155 | 142 | 345 | 97.1 | 0.681614 | Normal |
| Fluoride | JKS-45 | mg/L | 8 | 6 | 0.75 | 0.2 | 0.2 | 0.131 | 0.1905 | 0.207 | 0.337 | 0.098 | 0.473394 | Normal |
| Fluoride | JKS-57 | mg/L | 8 | 7 | 0.875 | 0.2 | 0.2 | 2.27 | 3.3 | 2.78 | 3.62 | 1.17 | 0.419031 | NDD |
| pH | JKS-45 | SU | 8 | 8 | 1 | | | 3.98 | 5.505 | 5.3 | 5.82 | 0.585 | 0.110323 | NDD |
| pH | JKS-57 | SU | 8 | 8 | 1 | | | 5.13 | 6.615 | 6.37 | 6.73 | 0.548 | 0.086044 | NDD |
| Sulfate | JKS-45 | mg/L | 8 | 8 | 1 | | | 2.95 | 618 | 504 | 770 | 280 | 0.55507 | NDD |
| Sulfate | JKS-57 | mg/L | 8 | 8 | 1 | | | 450 | 2625 | 2480 | 3610 | 1010 | 0.405797 | Normal |
| TDS | JKS-45 | mg/L | 8 | 8 | 1 | | | 1100 | 1285 | 1320 | 1680 | 164 | 0.12464 | Normal |
| TDS | JKS-57 | mg/L | 8 | 8 | 1 | | | 850 | 4415 | 4290 | 5920 | 1720 | 0.400326 | 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
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 | Notes | Final Outlier Determination |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| JKS-57 | JKS 57565194-013 | 10/10/2017 | Boron | mg/L | TRUE | 3.48 | Intrawell | Normal | | X | | | X | | | | Not an outlier |
| JKS-45 | JKS-45549648-002 | 3/28/2017 | Calcium | mg/L | TRUE | 184 | Intrawell | Normal | | X | | | | | | | Not an outlier |
| JKS-57 | JKS 57558406-015 | 7/25/2017 | Chloride | mg/L | TRUE | 311 | Interwell | Normal | | X | | | | | | | Not an outlier |
| JKS-45 | JKS-45561478-015 | 8/29/2017 | TDS | mg/L | TRUE | 1680 | Intrawell | Normal | X | X | X | X | X | X | 0 | | Outlier retained, falls within range of values from other upgradient wells |

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
Fly Ash Landfill

| Analyte | UPL Type | Well | N | Num Detects | Percent Detect | p-value | tau | Conclusion |
|---|---|---|---|---|---|---|---|---|
| Boron | Intrawell | JKS-45 | 8 | 8 | 1 | 0.399 | 0.286 | Stable, No Trend |
| Boron | Intrawell | JKS-57 | 8 | 8 | 1 | 0.548 | -0.214 | Stable, No Trend |
| Calcium | Intrawell | JKS-45 | 8 | 8 | 1 | 0.548 | -0.214 | Stable, No Trend |
| Calcium | Intrawell | JKS-57 | 7 | 7 | 1 | 1 | 0.0476 | Stable, No Trend |
| Chloride | Interwell | JKS-45, JKS-57 | 16 | 16 | 1 | 0.964 | -0.00851 | Stable, No Trend |
| Fluoride | Intrawell | JKS-45 | 8 | 6 | 0.75 | 0.708 | -0.109 | Stable, No Trend |
| Fluoride | Intrawell | JKS-57 | 8 | 7 | 0.875 | 0.399 | -0.286 | Stable, No Trend |
| pH | Intrawell | JKS-45 | 8 | 8 | 1 | 0.275 | 0.357 | Stable, No Trend |
| pH | Intrawell | JKS-57 | 8 | 8 | 1 | 0.72 | 0.143 | Stable, No Trend |
| Sulfate | Intrawell | JKS-45 | 8 | 8 | 1 | 0.399 | -0.286 | Stable, No Trend |
| Sulfate | Intrawell | JKS-57 | 8 | 8 | 1 | 0.275 | 0.357 | Stable, No Trend |
| TDS | Intrawell | JKS-45 | 8 | 8 | 1 | 0.708 | -0.109 | Stable, No Trend |
| TDS | Intrawell | JKS-57 | 8 | 8 | 1 | 0.548 | 0.214 | 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
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 | Stable, No Trend | JKS-45 | 8 | 8 | 1 | | 2.69 | mg/L | None | No | 0.00438 | Param Intra 1 of 2 | | | |
| Boron | Intrawell | Stable, No Trend | JKS-57 | 8 | 8 | 1 | | 3.62 | mg/L | None | No | 0.00438 | Param Intra 1 of 2 | | X | |
| Calcium | Intrawell | Stable, No Trend | JKS-45 | 8 | 8 | 1 | | 186 | mg/L | None | No | 0.00438 | Param Intra 1 of 2 | | | |
| Calcium | Intrawell | Stable, No Trend | JKS-57 | 7 | 7 | 1 | | 450 | mg/L | None | No | 0.00438 | Param Intra 1 of 2 | | X | |
| Chloride | Interwell | Stable, No Trend | JKS-45, JKS-57 | 16 | 16 | 1 | | 314 | mg/L | None | No | 0.00438 | Param Inter 1 of 2 | | X | |
| Fluoride | Intrawell | Stable, No Trend | JKS-45 | 8 | 6 | 0.75 | | 0.392 | mg/L | Kaplan-Meier | No | 0.00438 | Param Intra 1 of 2 | | | |
| Fluoride | Intrawell | Stable, No Trend | JKS-57 | 8 | 7 | 0.875 | | 3.62 | mg/L | None | No | 0.0222 | NP Intra (normality) 1 of 2 | | X | |
| pH | Intrawell | Stable, No Trend | JKS-45 | 8 | 8 | 1 | 4.02 | 6.57 | SU | None | No | 0.00219 | Param Intra 1 of 2 | X | | |
| pH | Intrawell | Stable, No Trend | JKS-57 | 8 | 8 | 1 | 5.13 | 6.73 | SU | None | No | 0.0444 | NP Intra (normality) 1 of 2 | | X | |
| Sulfate | Intrawell | Stable, No Trend | JKS-45 | 8 | 8 | 1 | | 1110 | mg/L | None | No | 0.00438 | Param Intra 1 of 2 | | | |
| Sulfate | Intrawell | Stable, No Trend | JKS-57 | 8 | 8 | 1 | | 4680 | mg/L | None | No | 0.00438 | Param Intra 1 of 2 | | X | |
| TDS | Intrawell | Stable, No Trend | JKS-45 | 8 | 8 | 1 | | 1680 | mg/L | None | No | 0.00438 | Param Intra 1 of 2 | | | |
| TDS | Intrawell | Stable, No Trend | JKS-57 | 8 | 8 | 1 | | 8040 | mg/L | None | No | 0.00438 | Param Intra 1 of 2 | | X | |

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.

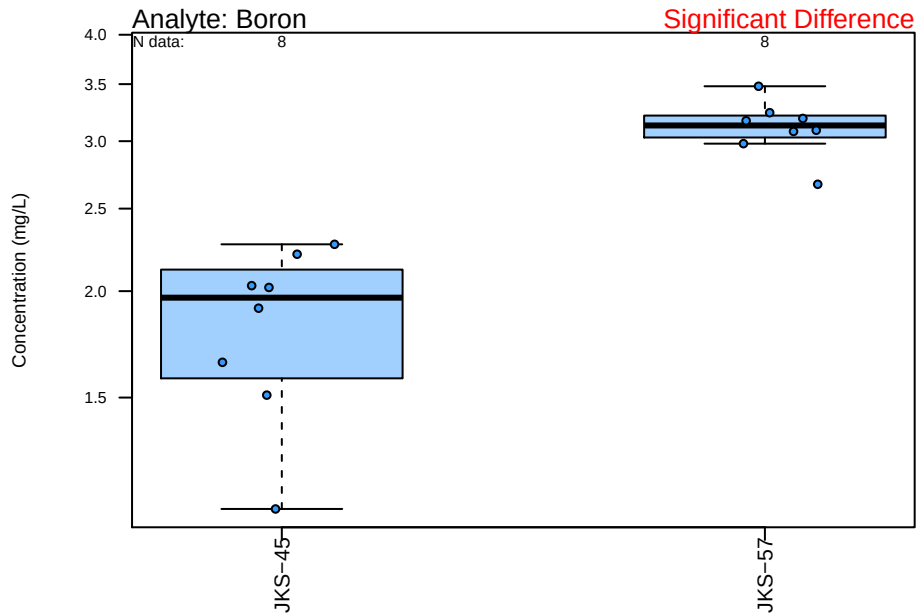
APPENDIX B-TABLE 6
Comparison of Downgradient Wells to UPLs/LPLs
CPS Energy - Calaveras Power Station
Fly Ash Landfill

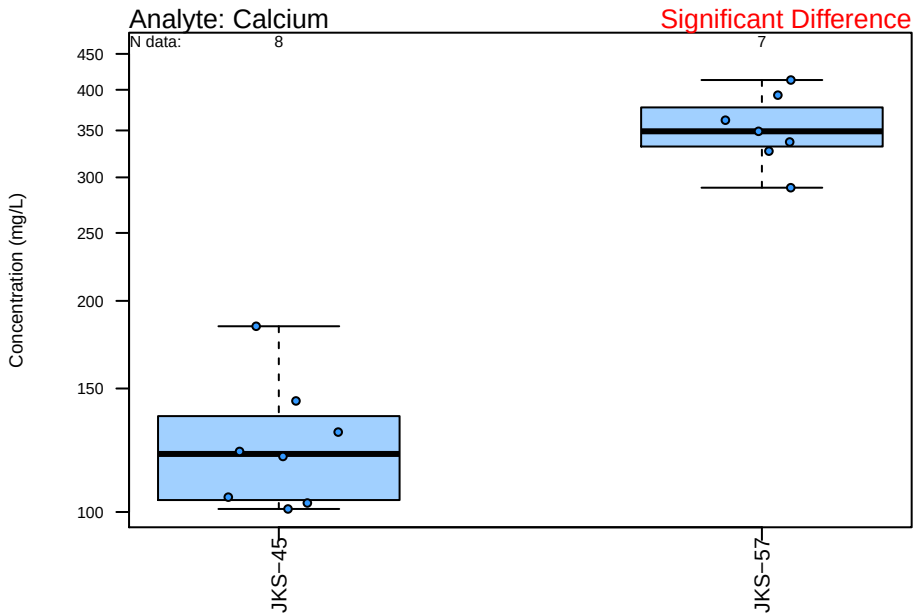
| Analyte | Well | LPL | UPL | Units | Recent Date | Observation | Qualifier | Obs > UPL | Notes | Mann Kendall p-value | Mann Kendall tau |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Boron | JKS-31 | | 3.62 | mg/L | 10/10/17 | 0.553 | | | | | |
| Boron | JKS-33 | | 3.62 | mg/L | 10/10/17 | 1.11 | | | | | |
| Boron | JKS-46 | | 3.62 | mg/L | 10/10/17 | 1.01 | | | | | |
| Boron | JKS-60 | | 3.62 | mg/L | 10/10/17 | 0.479 | | | | | |
| Calcium | JKS-31 | | 450 | mg/L | 10/10/17 | 228 | | | | | |
| Calcium | JKS-33 | | 450 | mg/L | 10/10/17 | 531 | | X | Trend Test: Stable, No Trend | 0.381 | -0.333 |
| Calcium | JKS-46 | | 450 | mg/L | 10/10/17 | 145 | | | | | |
| Calcium | JKS-60 | | 450 | mg/L | 10/10/17 | 383 | | | | | |
| Chloride | JKS-31 | | 314 | mg/L | 10/10/17 | 288 | | | | | |
| Chloride | JKS-33 | | 314 | mg/L | 10/10/17 | 666 | | X | Trend Test: Stable, No Trend | 0.179 | -0.429 |
| Chloride | JKS-46 | | 314 | mg/L | 10/10/17 | 11.7 | | | | | |
| Chloride | JKS-60 | | 314 | mg/L | 10/10/17 | 352 | | X | Trend Test: Stable, No Trend | 0.708 | -0.109 |
| Fluoride | JKS-31 | | 3.62 | mg/L | 10/10/17 | 0.735 | | | | | |
| Fluoride | JKS-33 | | 3.62 | mg/L | 10/10/17 | 1.69 | | | | | |
| Fluoride | JKS-46 | | 3.62 | mg/L | 10/10/17 | 1.83 | | | | | |
| Fluoride | JKS-60 | | 3.62 | mg/L | 10/10/17 | 0.284 | | | | | |
| pH | JKS-31 | 4.02 | 6.73 | SU | 10/10/17 | 3.98 | | X | Trend Test: Stable, No Trend | 0.905 | -0.0714 |
| pH | JKS-33 | 4.02 | 6.73 | SU | 10/10/17 | 6.49 | | | | | |
| pH | JKS-46 | 4.02 | 6.73 | SU | 10/10/17 | 3.2 | | X | Trend Test: Stable, No Trend | 0.275 | -0.357 |
| pH | JKS-60 | 4.02 | 6.73 | SU | 10/10/17 | 5.97 | | | | | |
| Sulfate | JKS-31 | | 4680 | mg/L | 10/10/17 | 803 | | | | | |
| Sulfate | JKS-33 | | 4680 | mg/L | 10/10/17 | 1640 | | | | | |
| Sulfate | JKS-46 | | 4680 | mg/L | 10/10/17 | 800 | | | | | |
| Sulfate | JKS-60 | | 4680 | mg/L | 10/10/17 | 759 | | | | | |
| TDS | JKS-31 | | 8040 | mg/L | 10/10/17 | 1890 | | | | | |
| TDS | JKS-33 | | 8040 | mg/L | 10/10/17 | 4320 | | | | | |
| TDS | JKS-46 | | 8040 | mg/L | 10/10/17 | 1390 | | | | | |
| TDS | JKS-60 | | 8040 | mg/L | 10/10/17 | 2300 | | | | | |

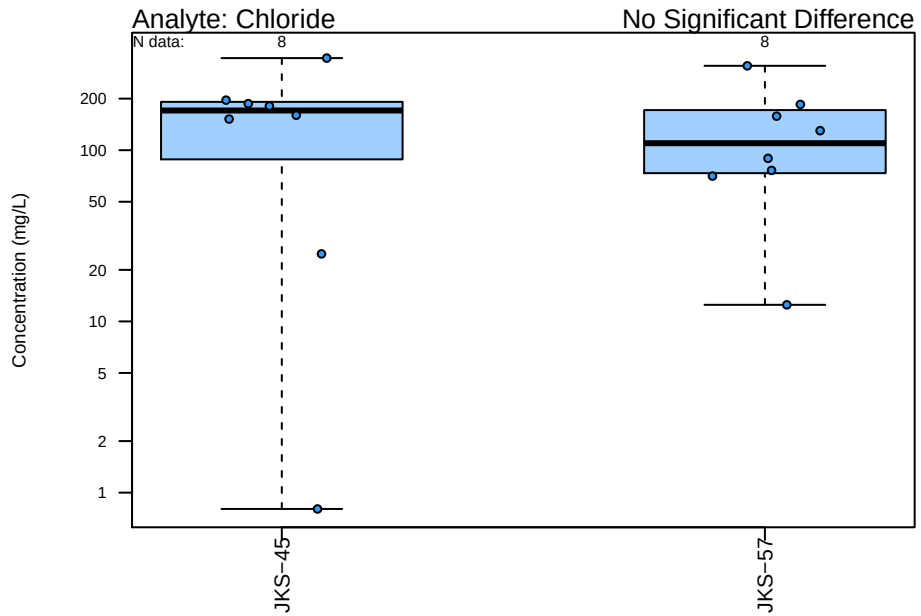
NOTES:

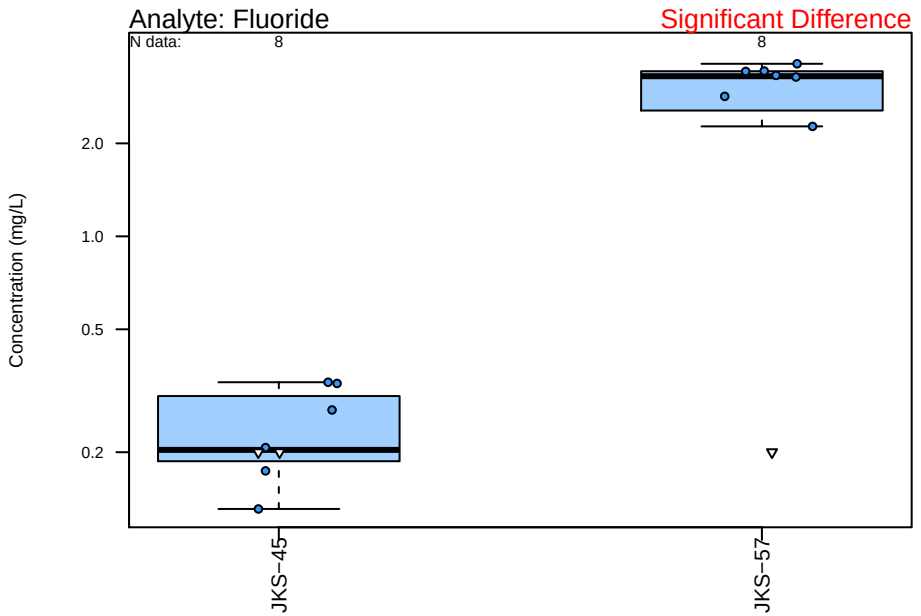
UPL: Upper Prediction Limit
ND: Not detected
SU: Standard units
tau: Kendall's tau statistic
p-value: A two-sided p-value describing the probability of the H0 being true (a=0.05)
Exceed 'X' indicates that the most recent observed value is higher than the UPL (or out of range of the LPL and UPL in the 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: Fly Ash Landfill Boxplots**
**of Upgradient Wells**

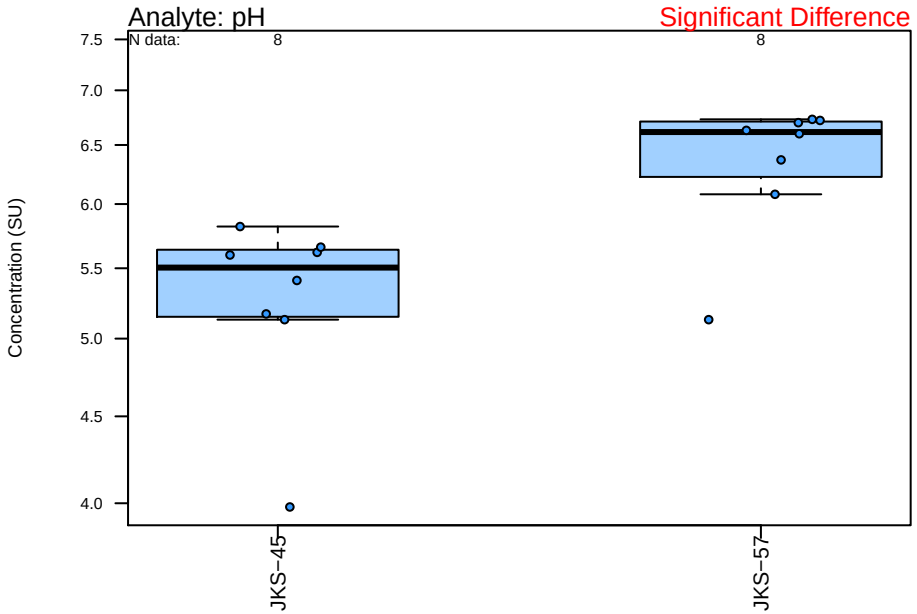


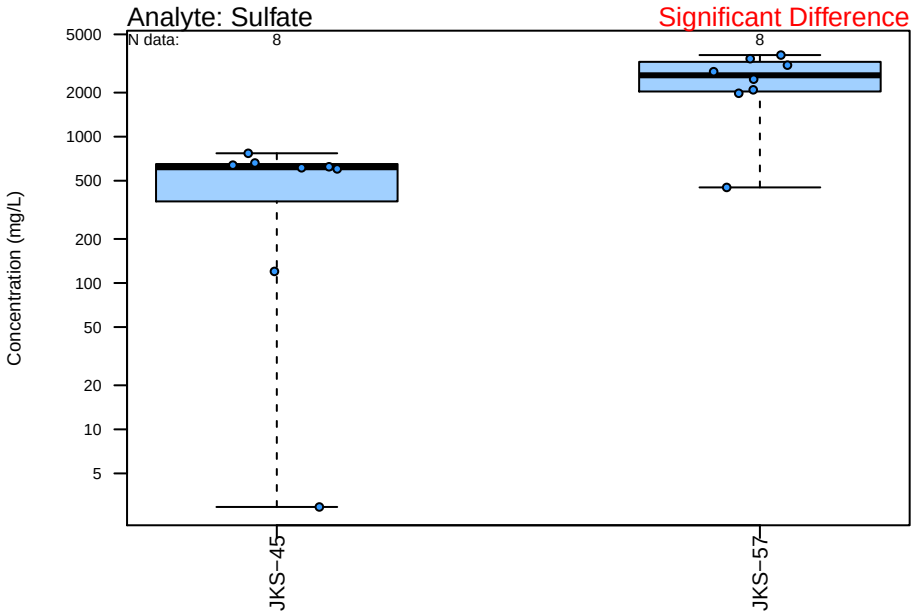



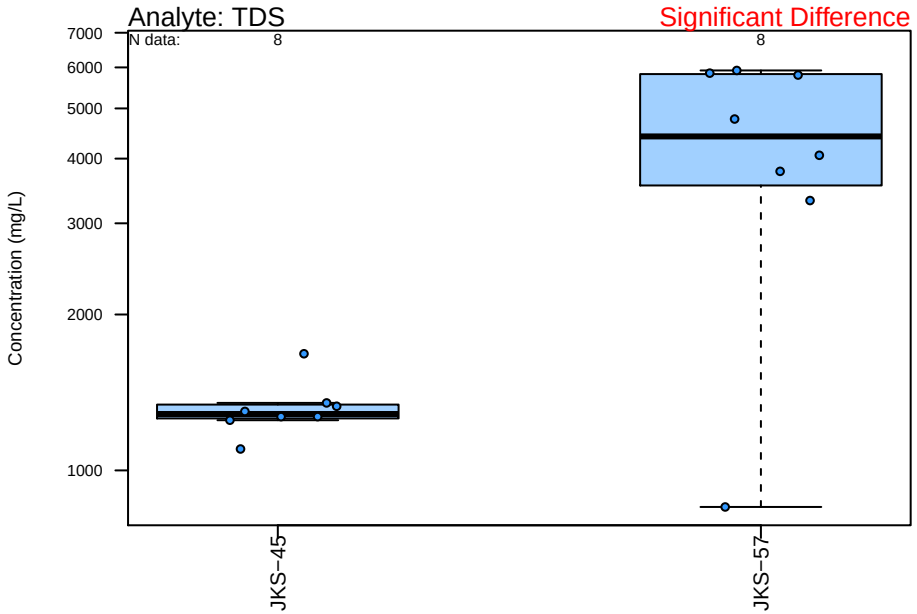



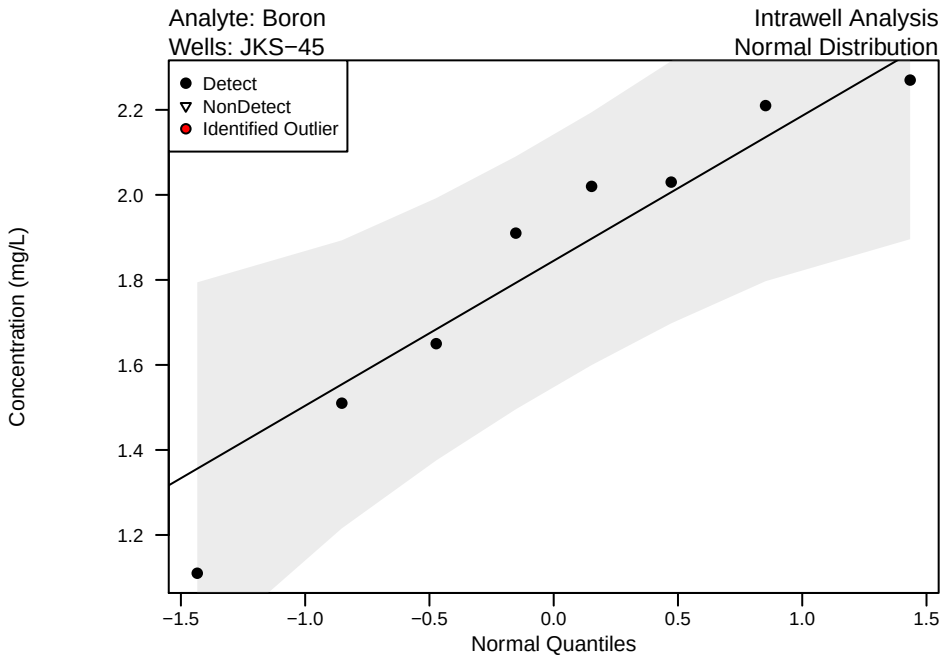
**APPENDIX B-FIGURE 1**
**Unit: Fly Ash Landfill Boxplots**
**of Upgradient Wells**



**APPENDIX B-FIGURE 2**
**Unit: Fly Ash Landfill**
**QQ Plots of Upgradient Wells**

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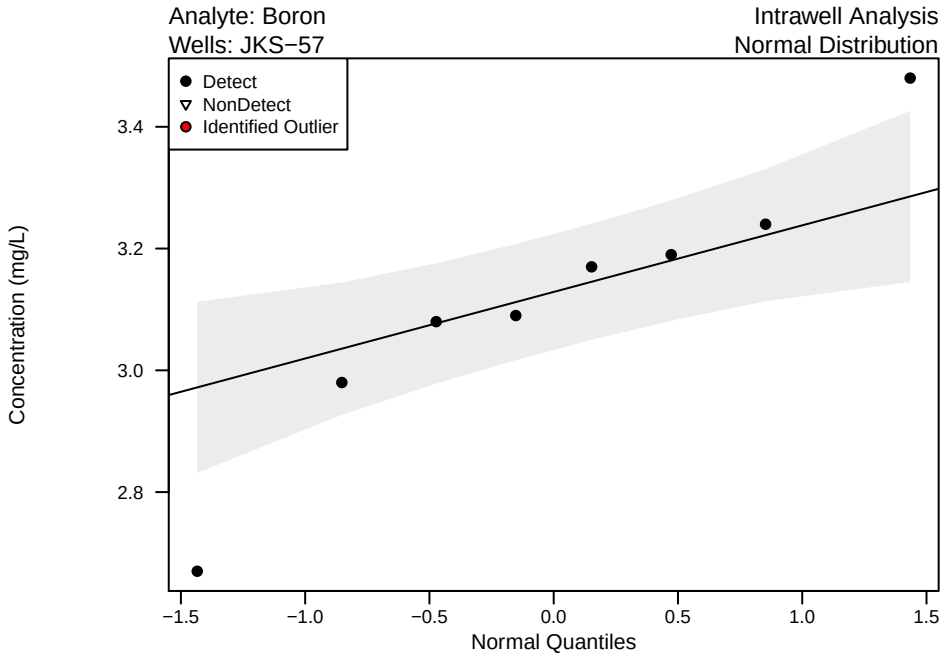


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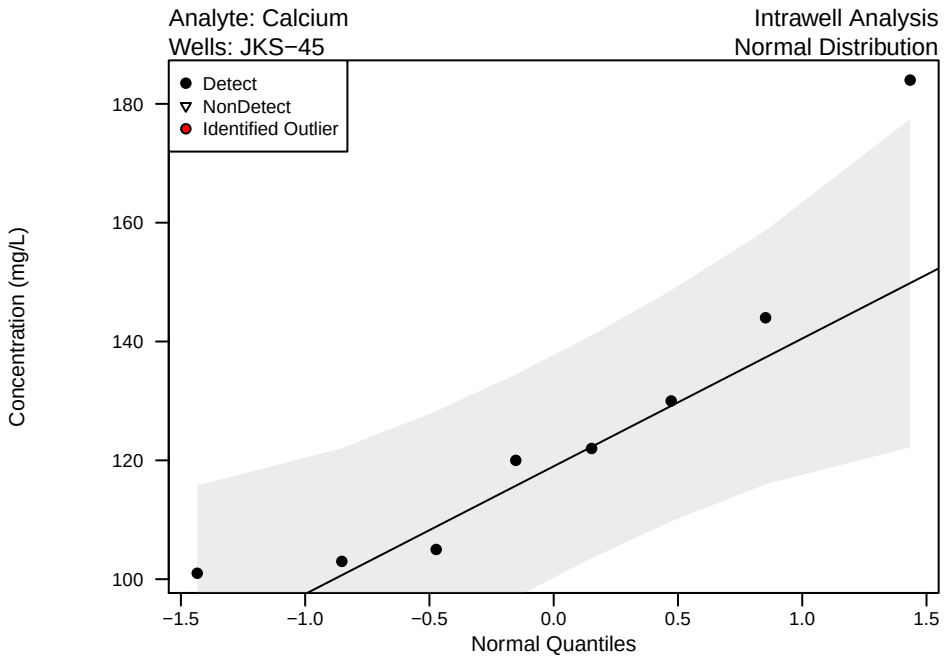
not Lognormal/NDD distribution.

**APPENDIX B-FIGURE 2**
**Unit: Fly Ash Landfill**
**QQ Plots of Upgradient Wells**

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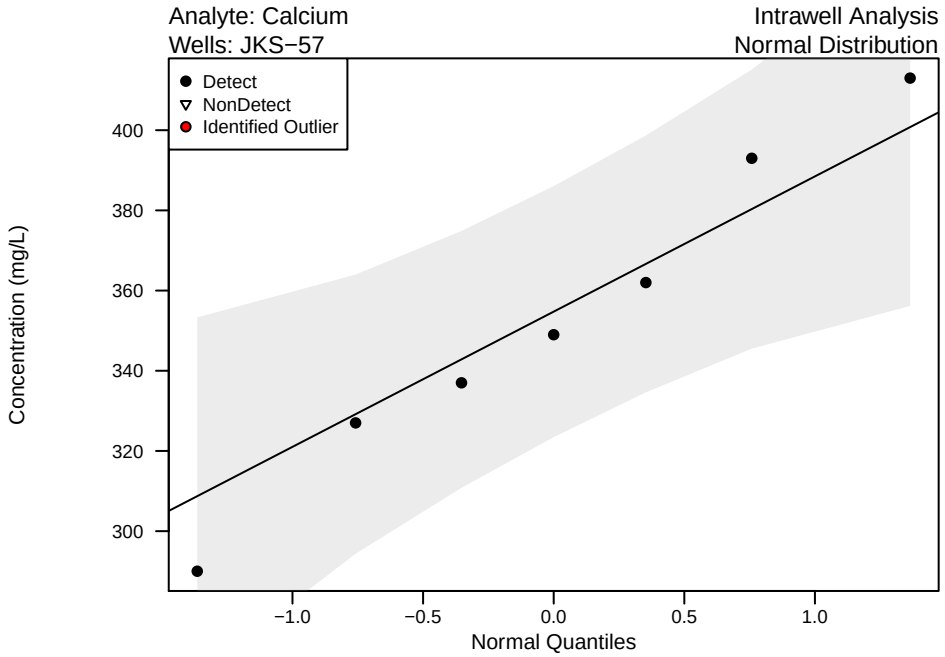


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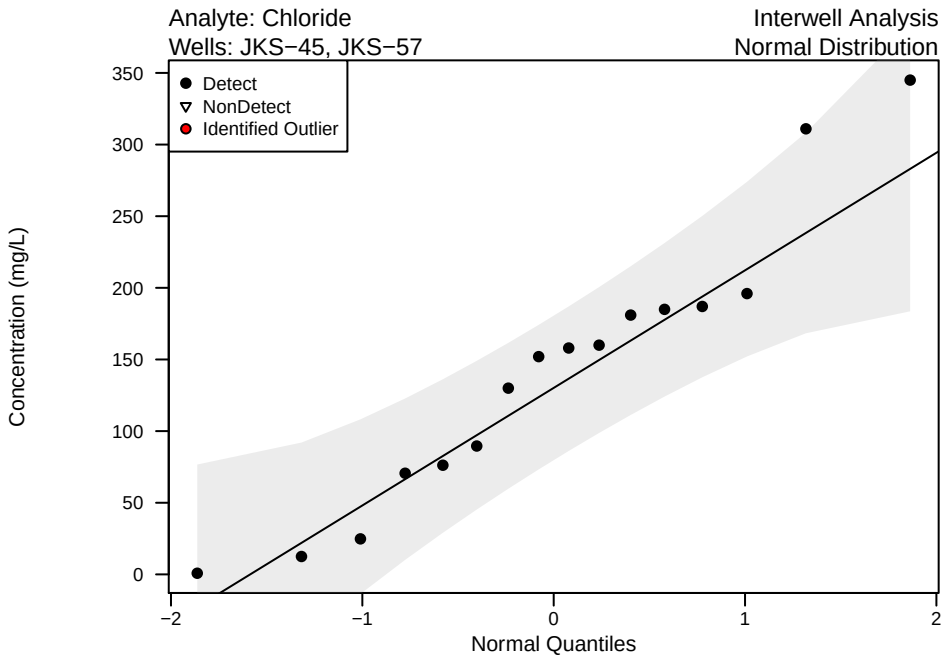
**APPENDIX B-FIGURE 2**
**Unit: Fly Ash Landfill**
**QQ Plots of Upgradient Wells**

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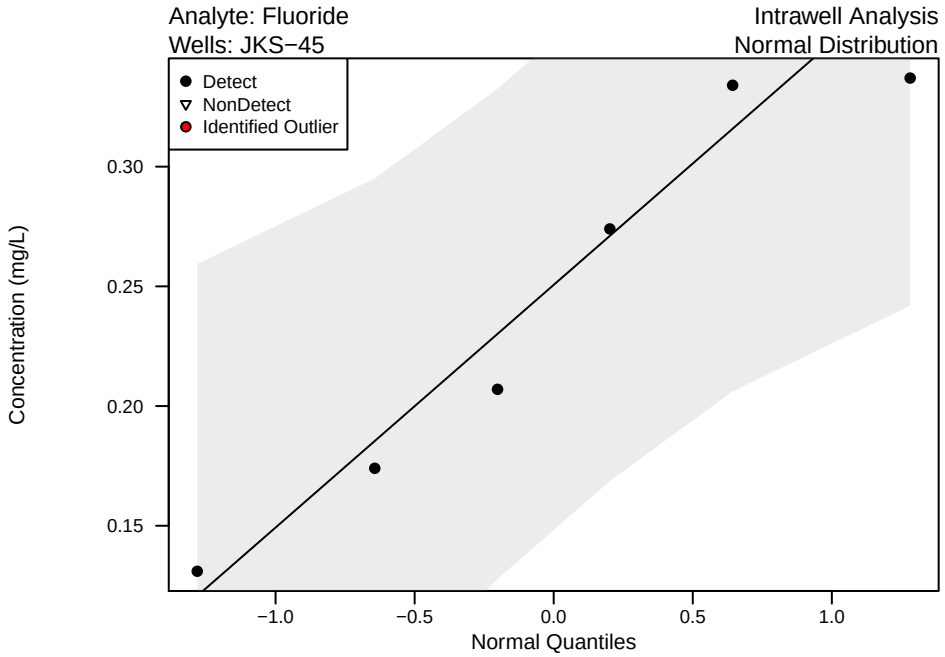


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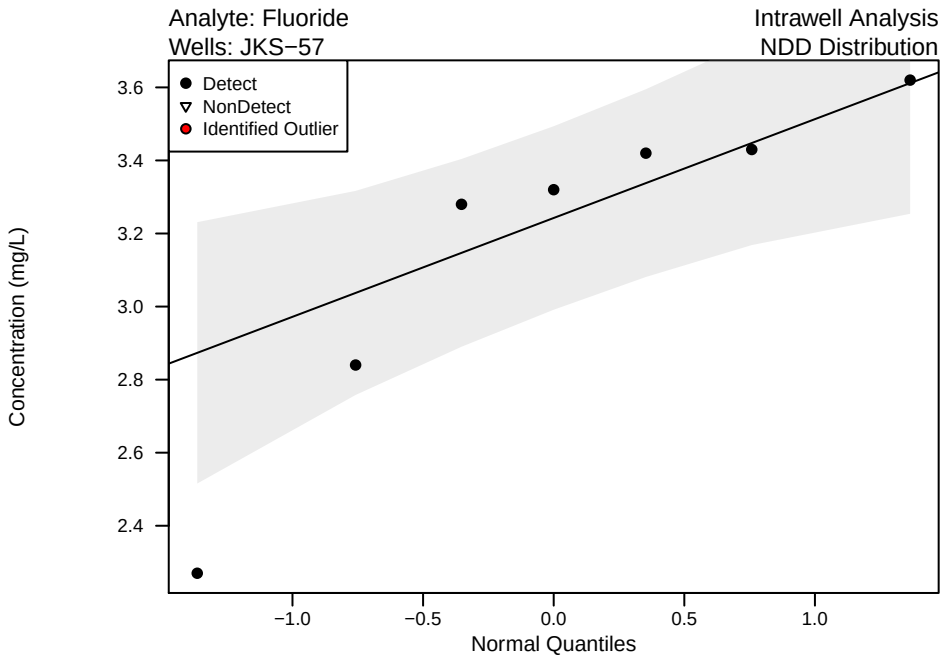
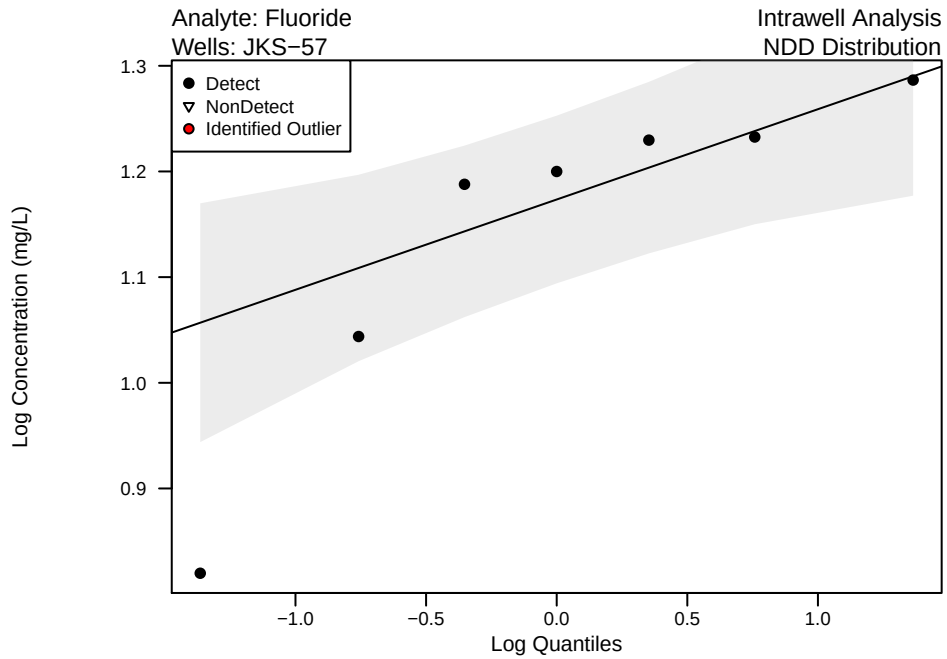
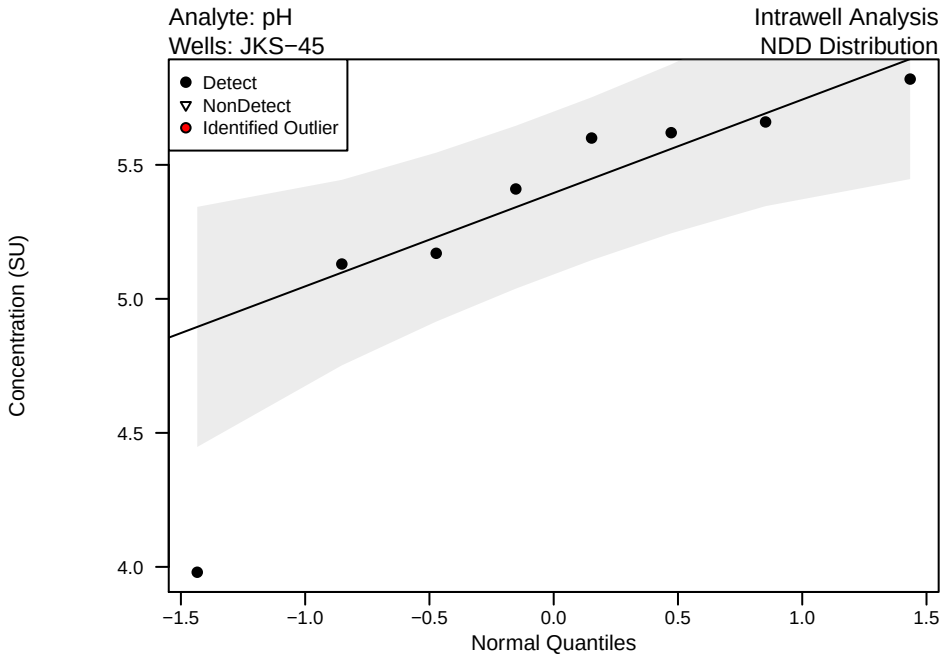
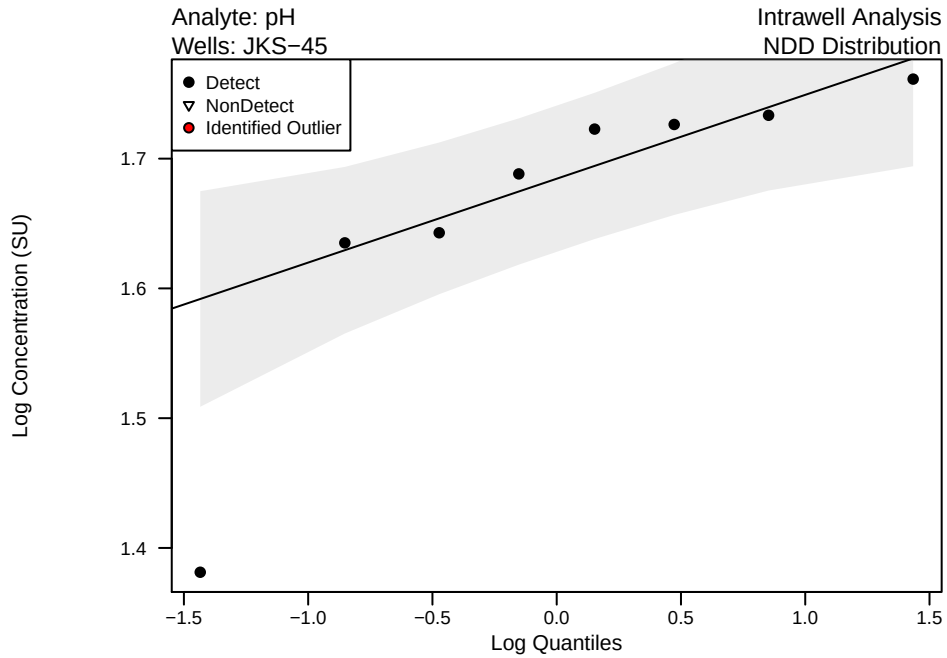
not Lognormal/NDD distribution.

**APPENDIX B-FIGURE 2**
**Unit: Fly Ash Landfill**
**QQ Plots of Upgradient Wells**

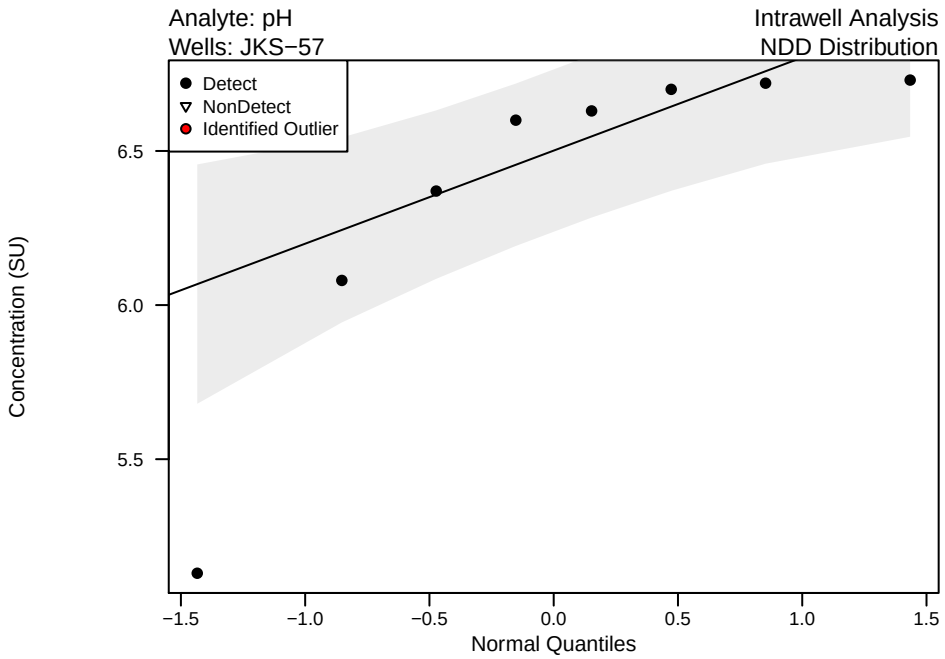


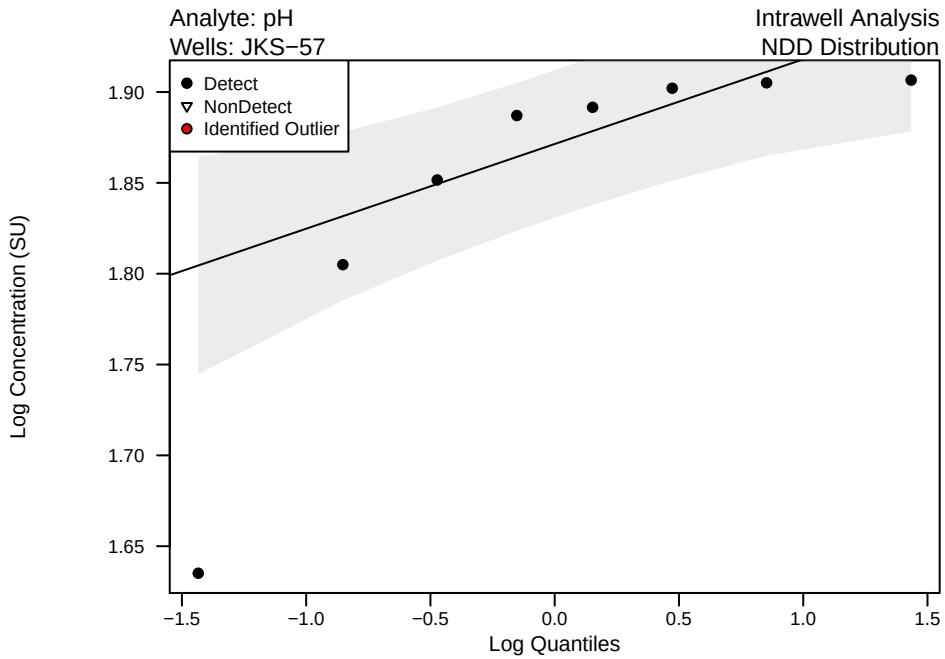



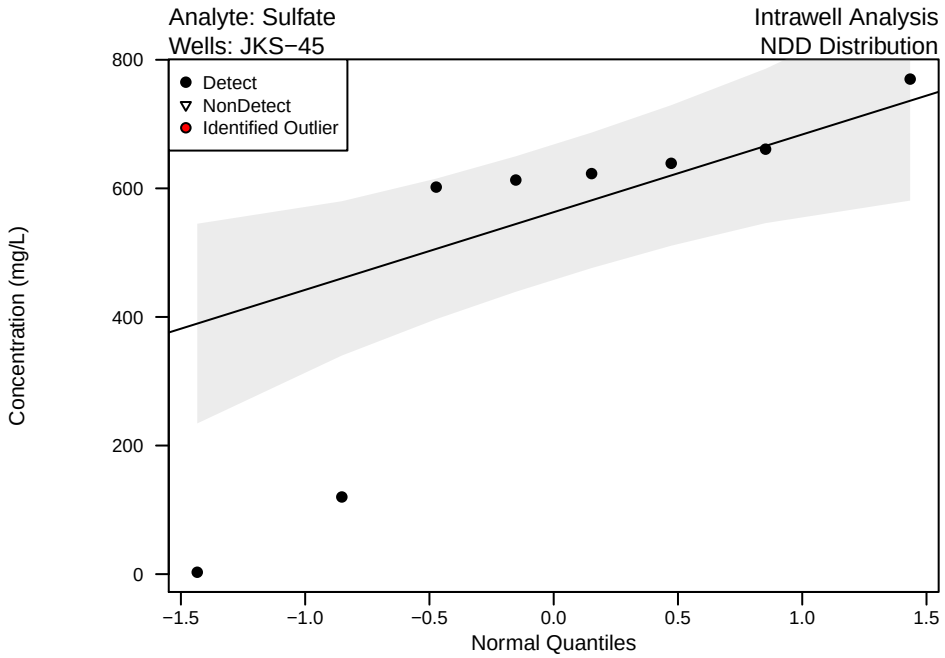



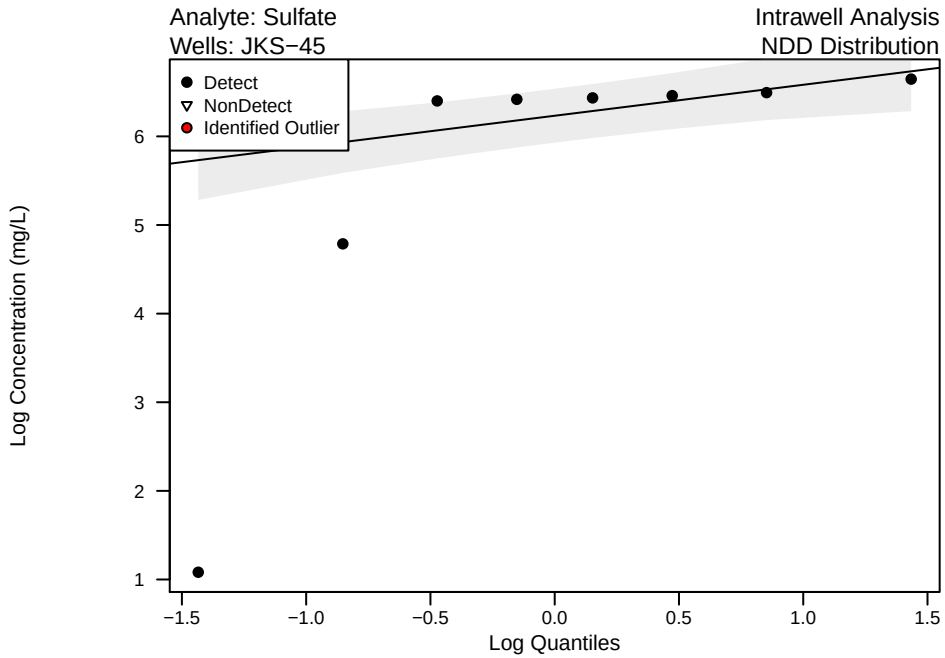



**APPENDIX B-FIGURE 2**
**Unit: Fly Ash Landfill**
**QQ Plots of Upgradient Wells**

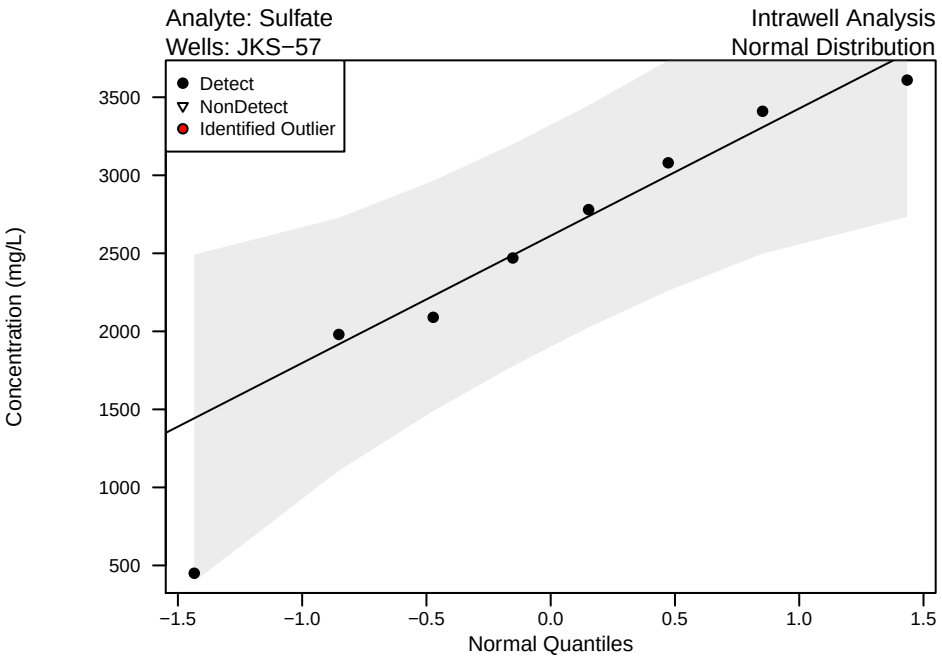


**APPENDIX B-FIGURE 2**
**Unit: Fly Ash Landfill**
**QQ Plots of Upgradient Wells**

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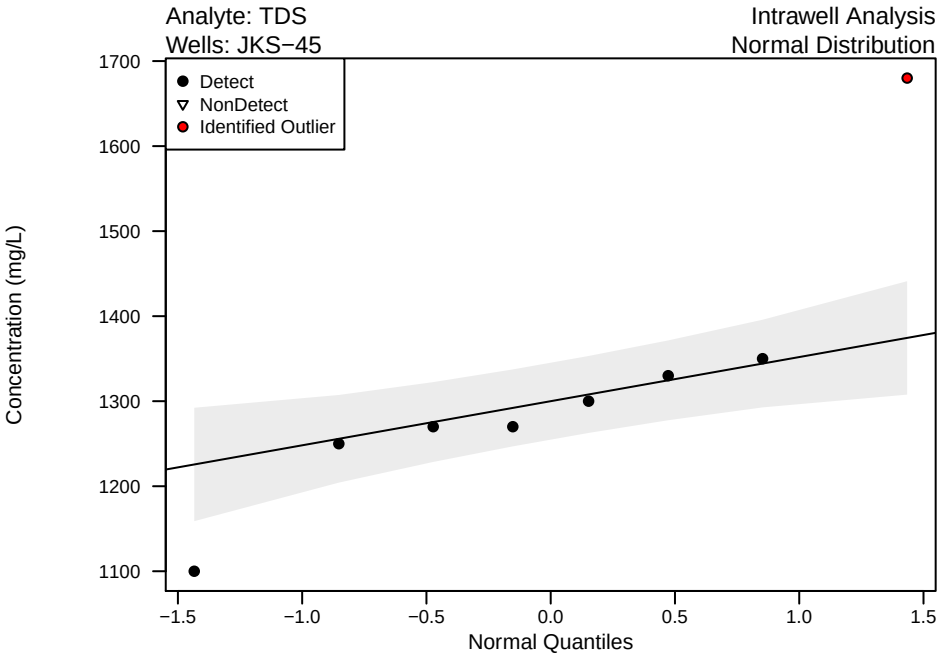


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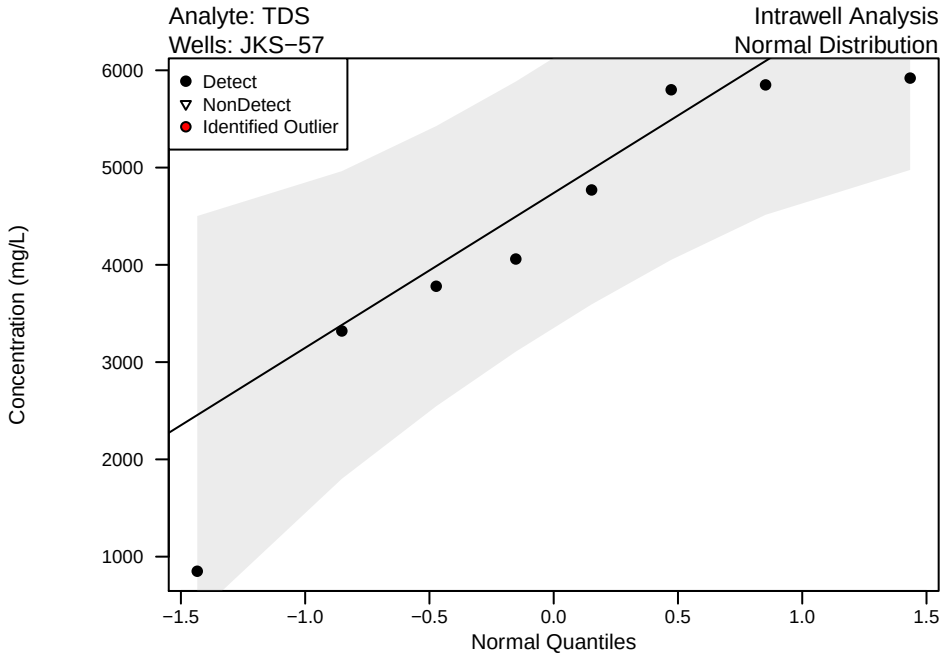
**APPENDIX B-FIGURE 2**
**Unit: Fly Ash Landfill**
**QQ Plots of Upgradient Wells**

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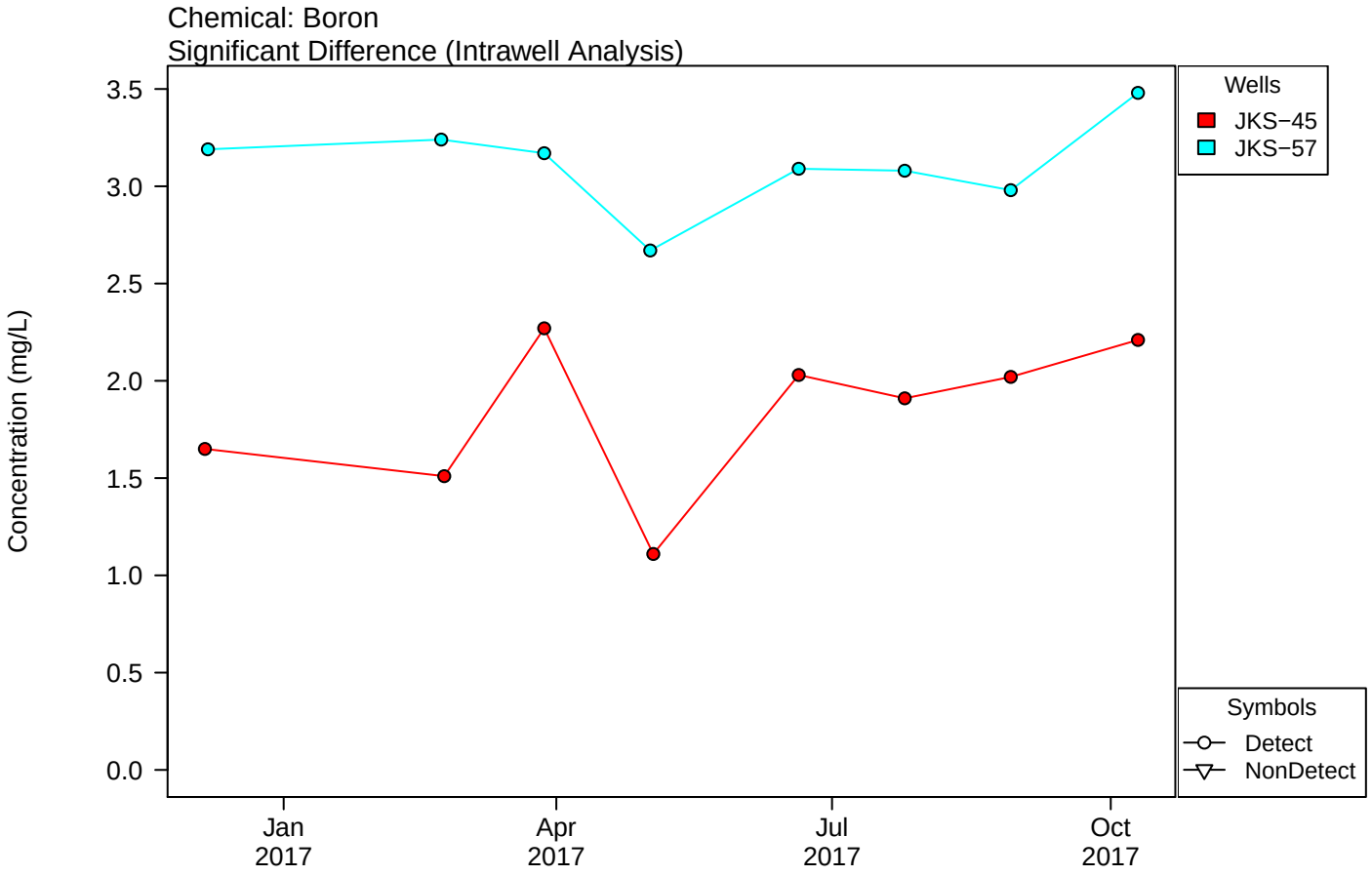
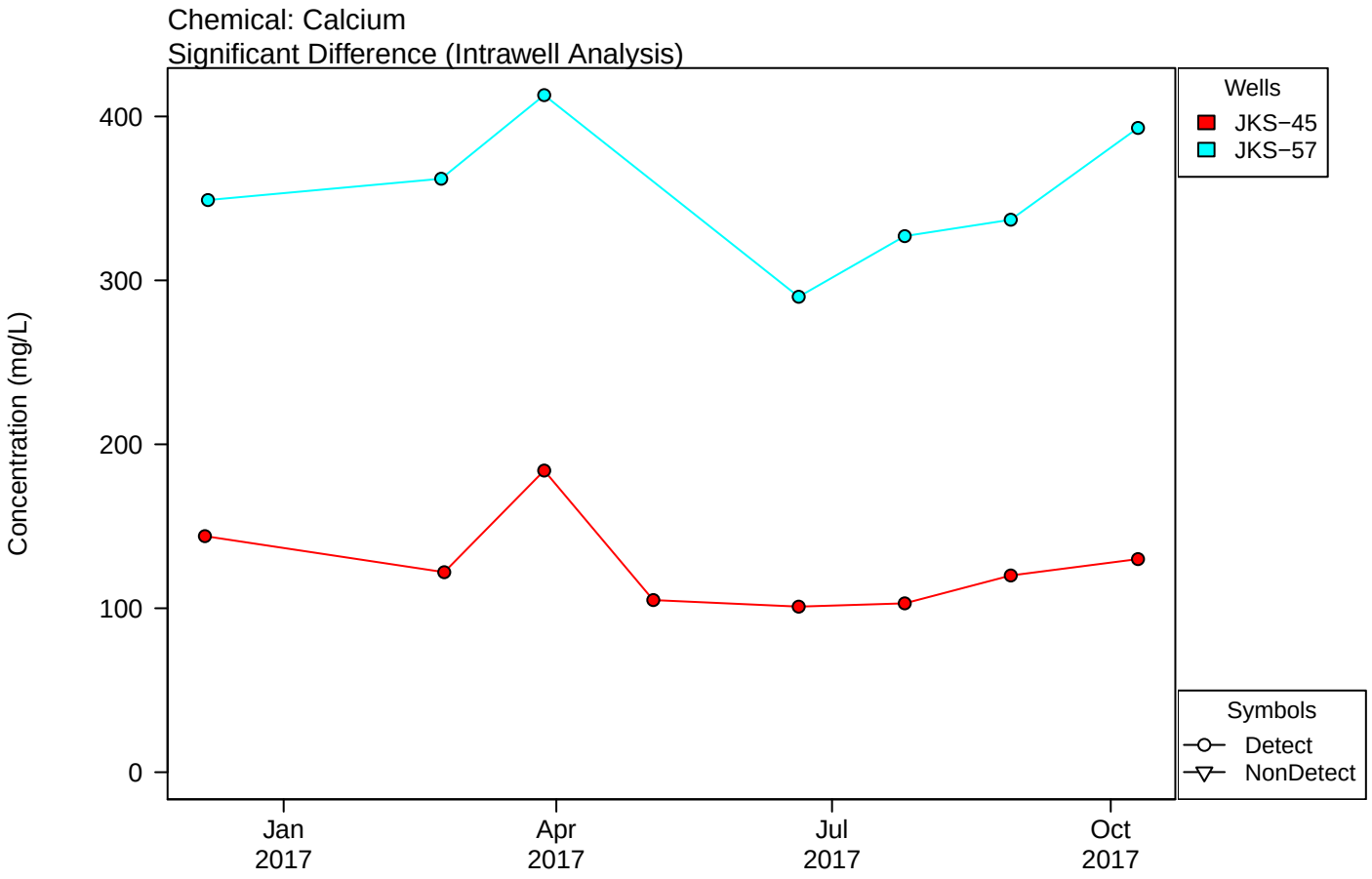
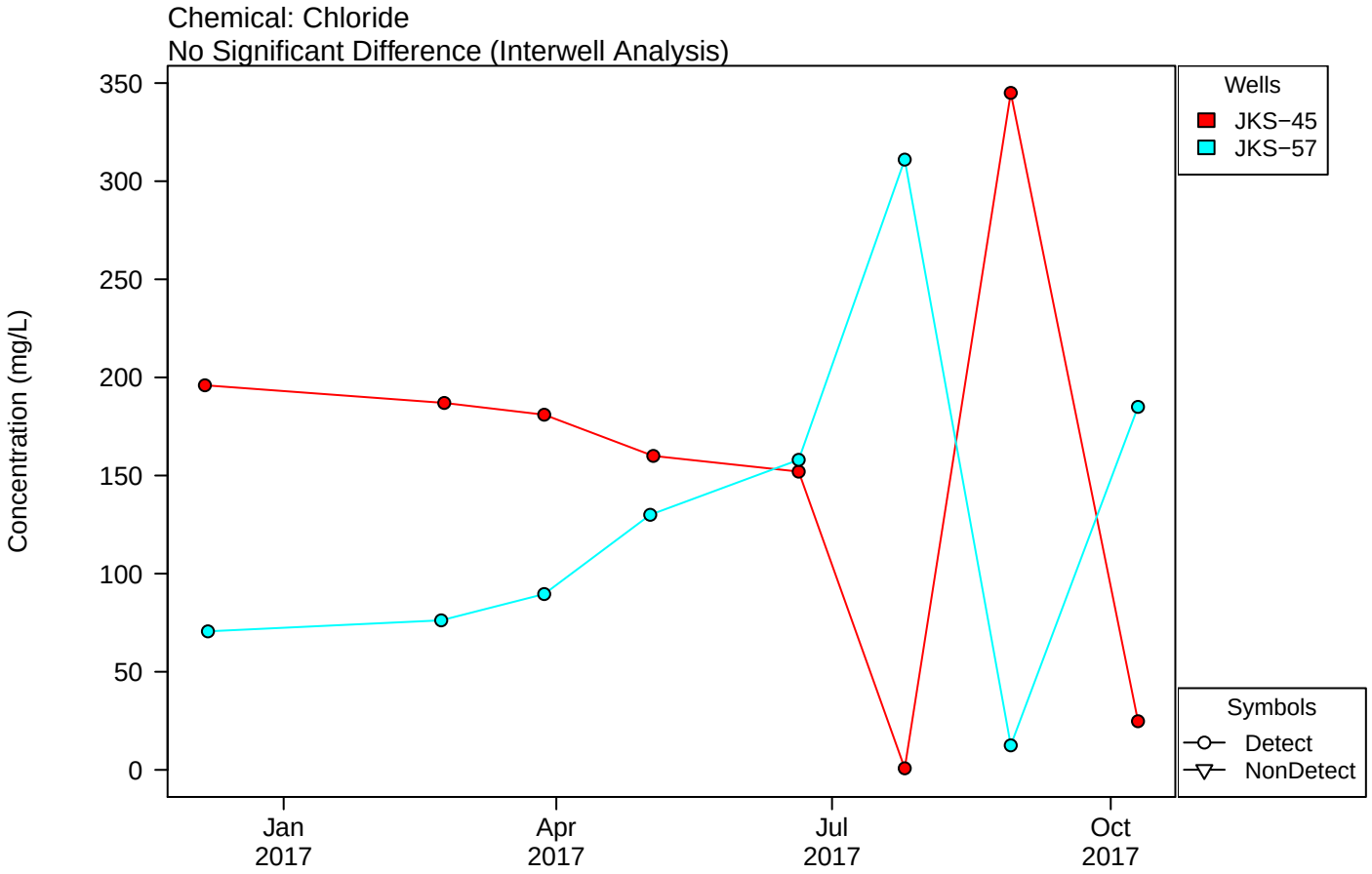
not Lognormal/NDD distribution.

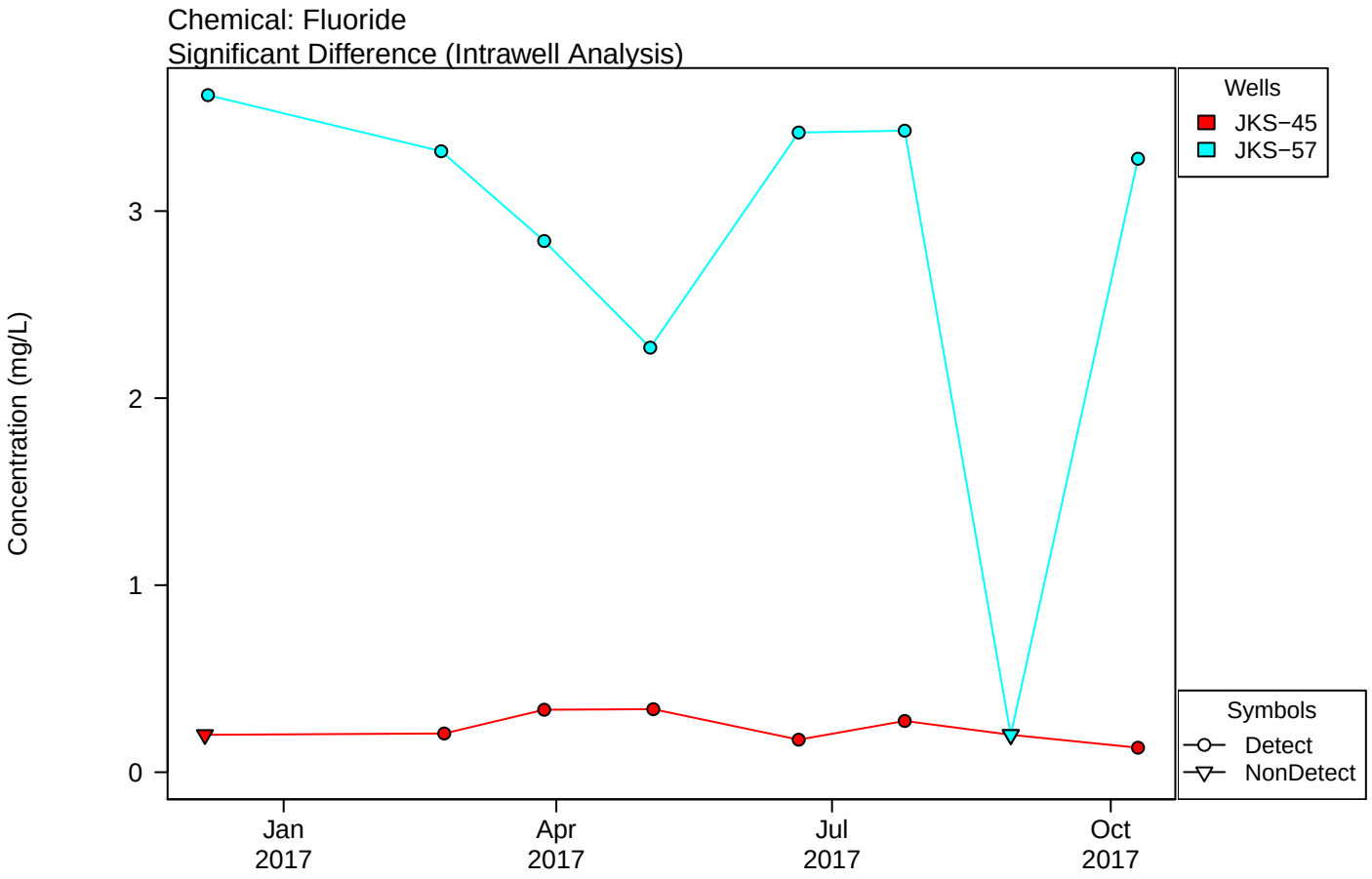
**APPENDIX B-FIGURE 3**
**Unit: Fly Ash Landfill**
**Timeseries of Upgradient Wells**



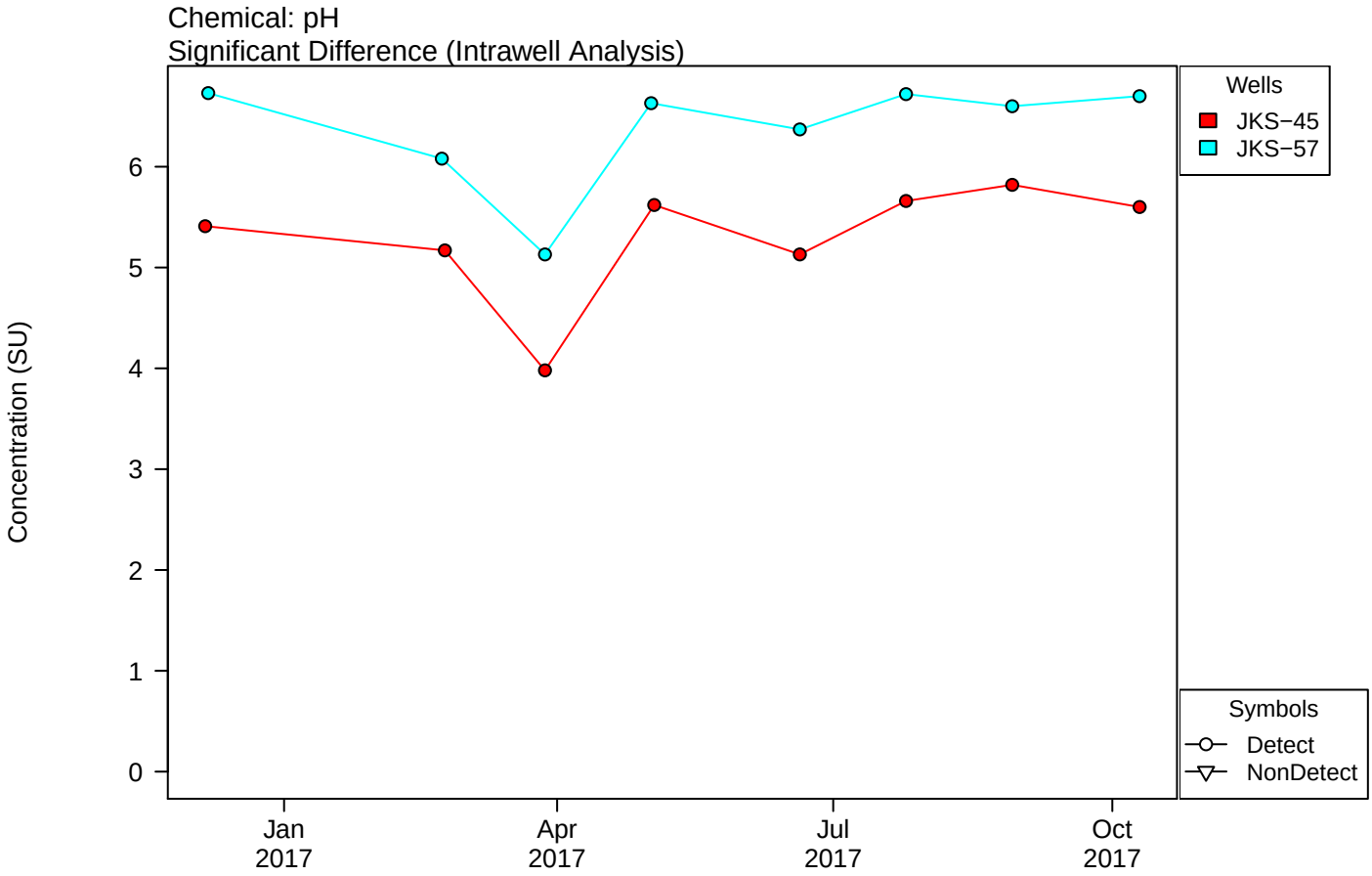



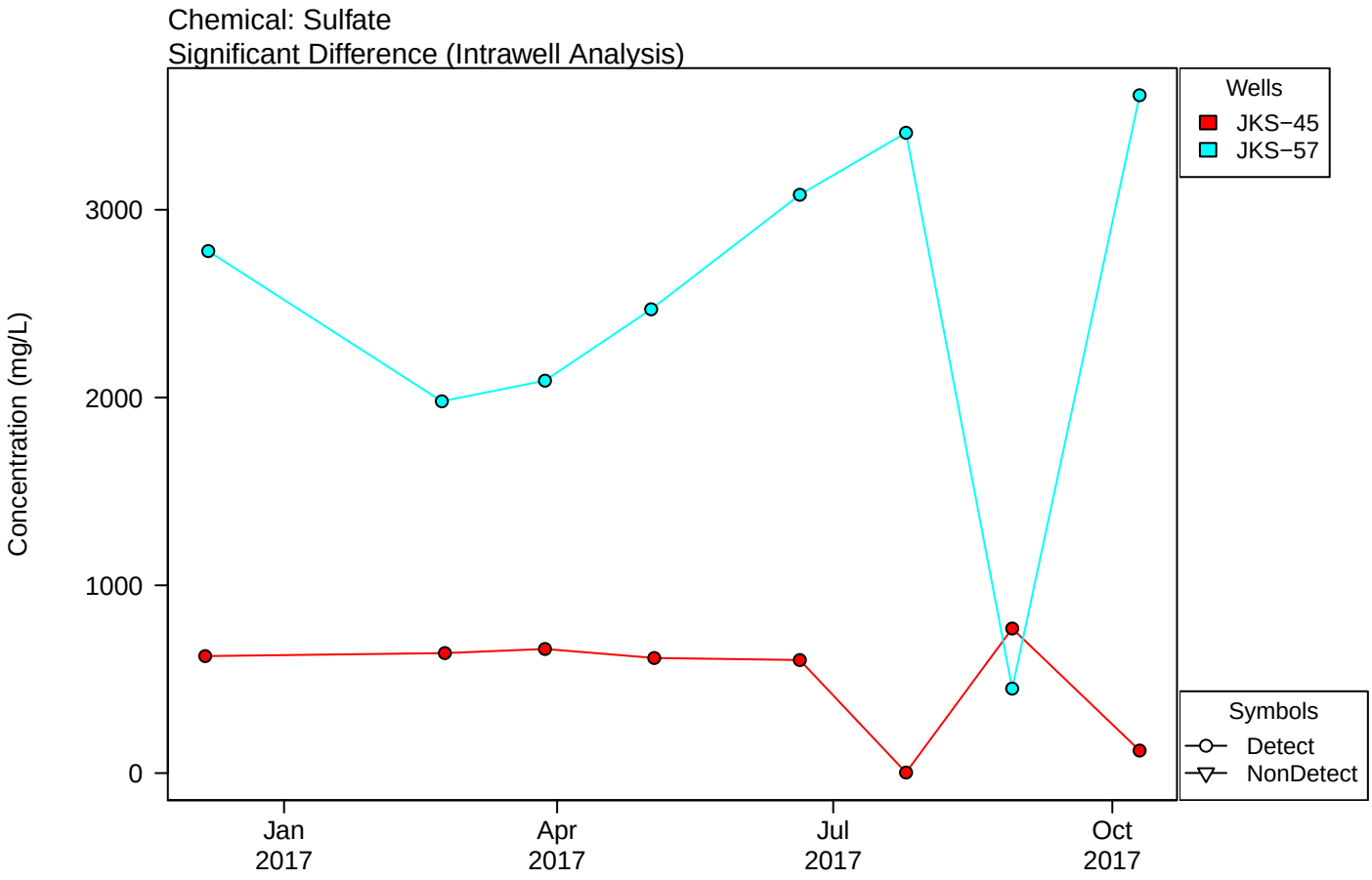
**APPENDIX B-FIGURE 3**
**Unit: Fly Ash Landfill**
**Timeseries of Upgradient Wells**



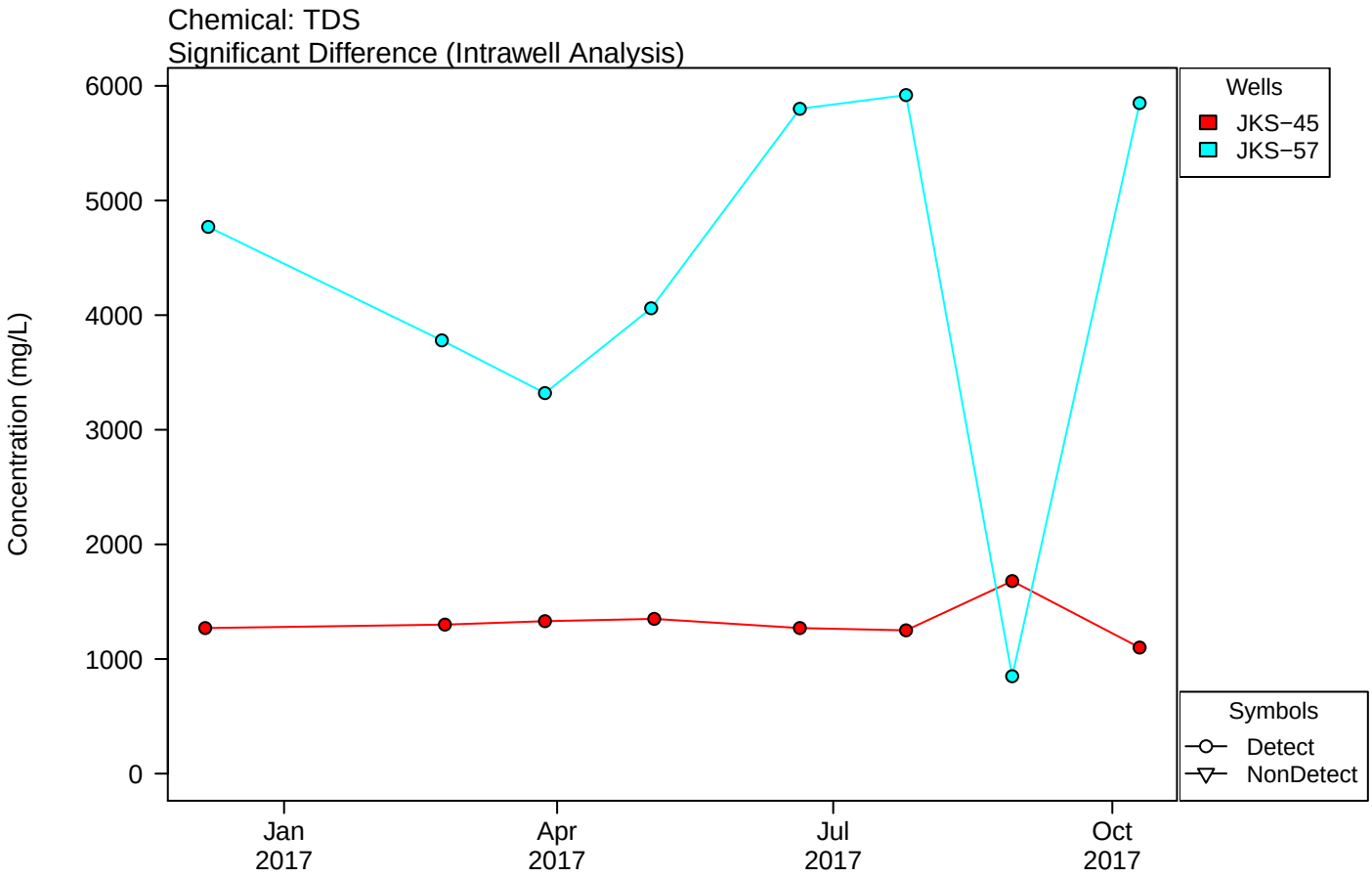



**APPENDIX B-FIGURE 3**
**Unit: Fly Ash Landfill**
**Timeseries of Upgradient Wells**

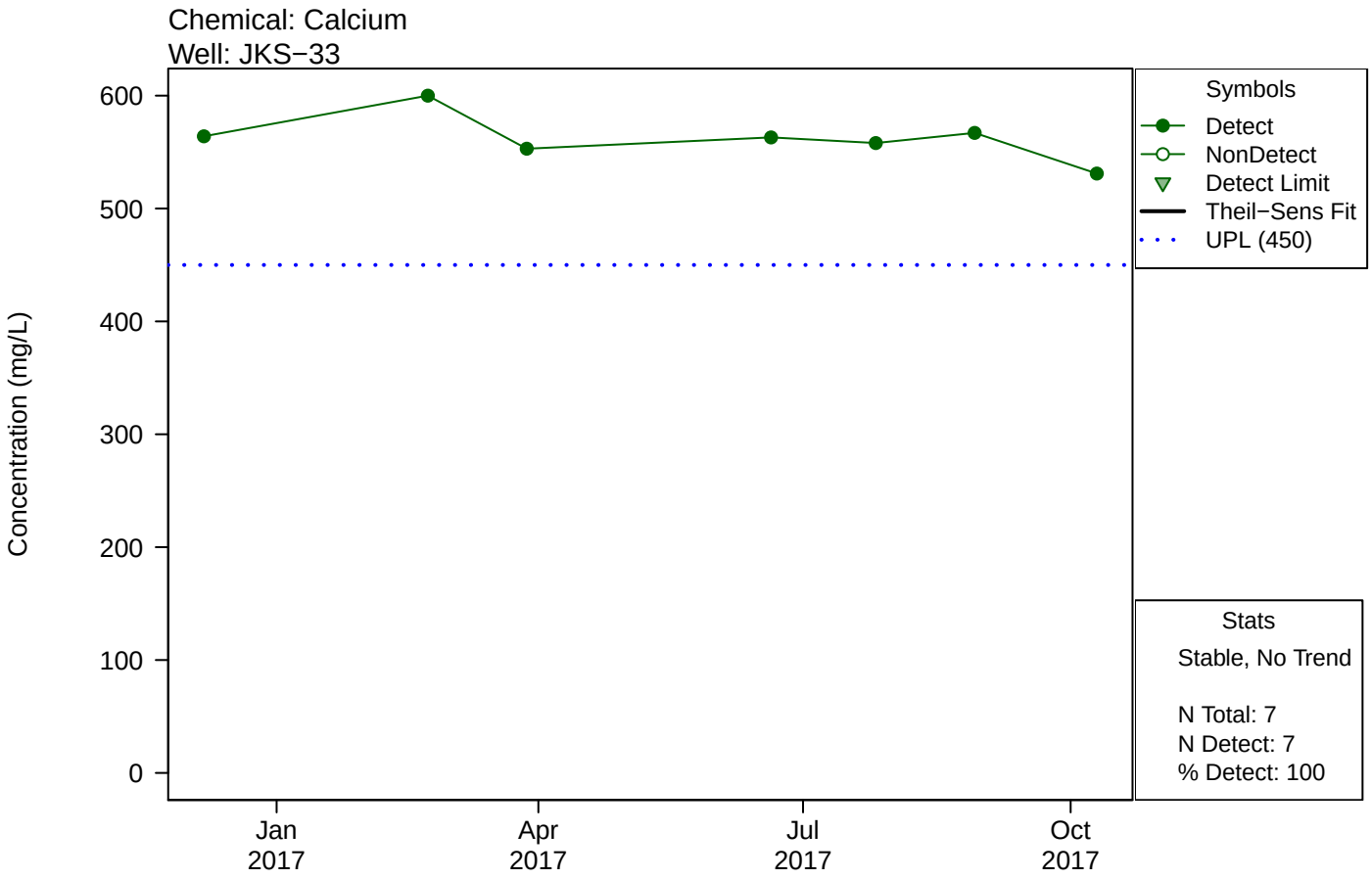


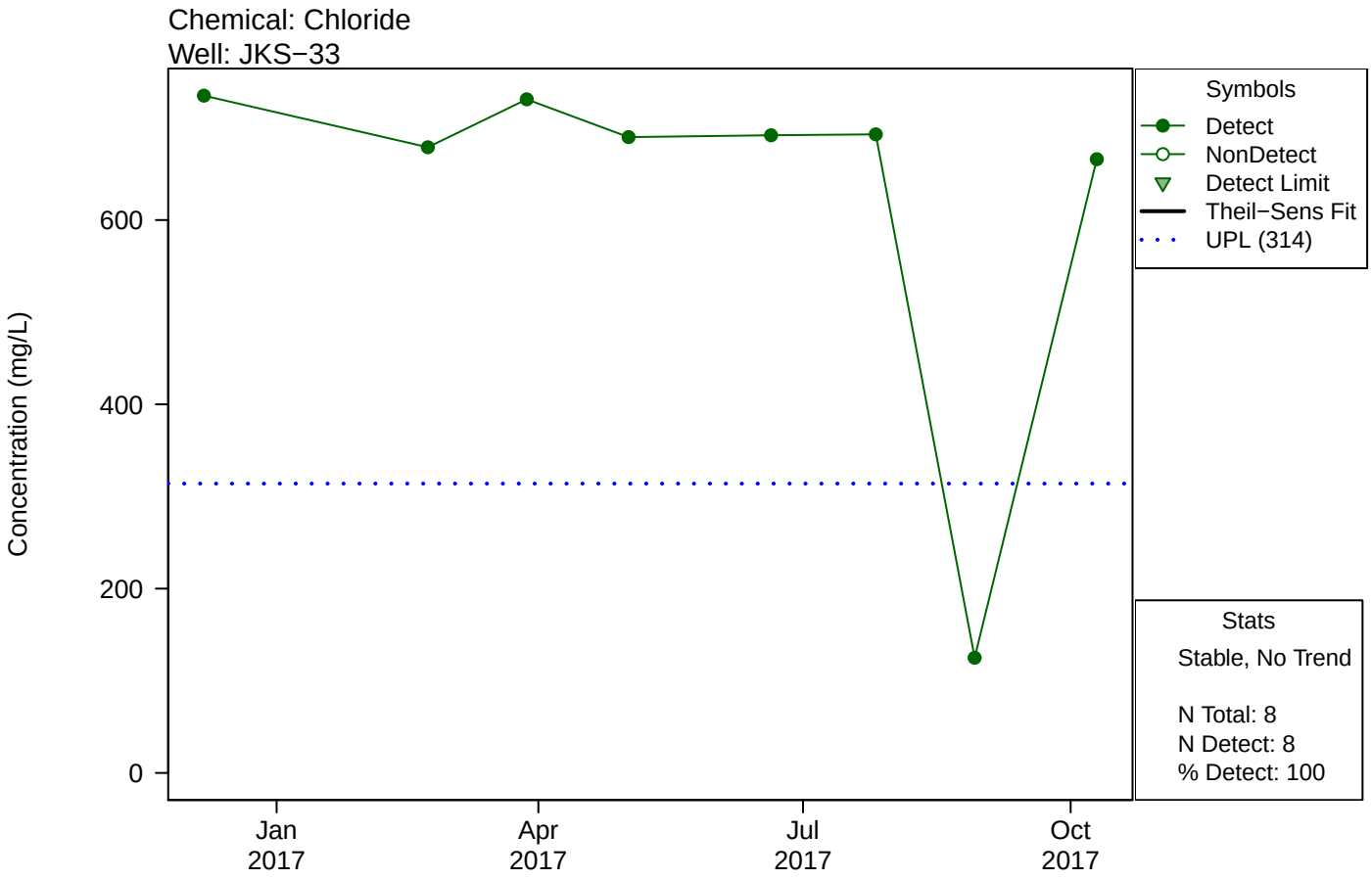



**APPENDIX B-FIGURE 3**
**Unit: Fly Ash Landfill**
**Timeseries of Upgradient Wells**



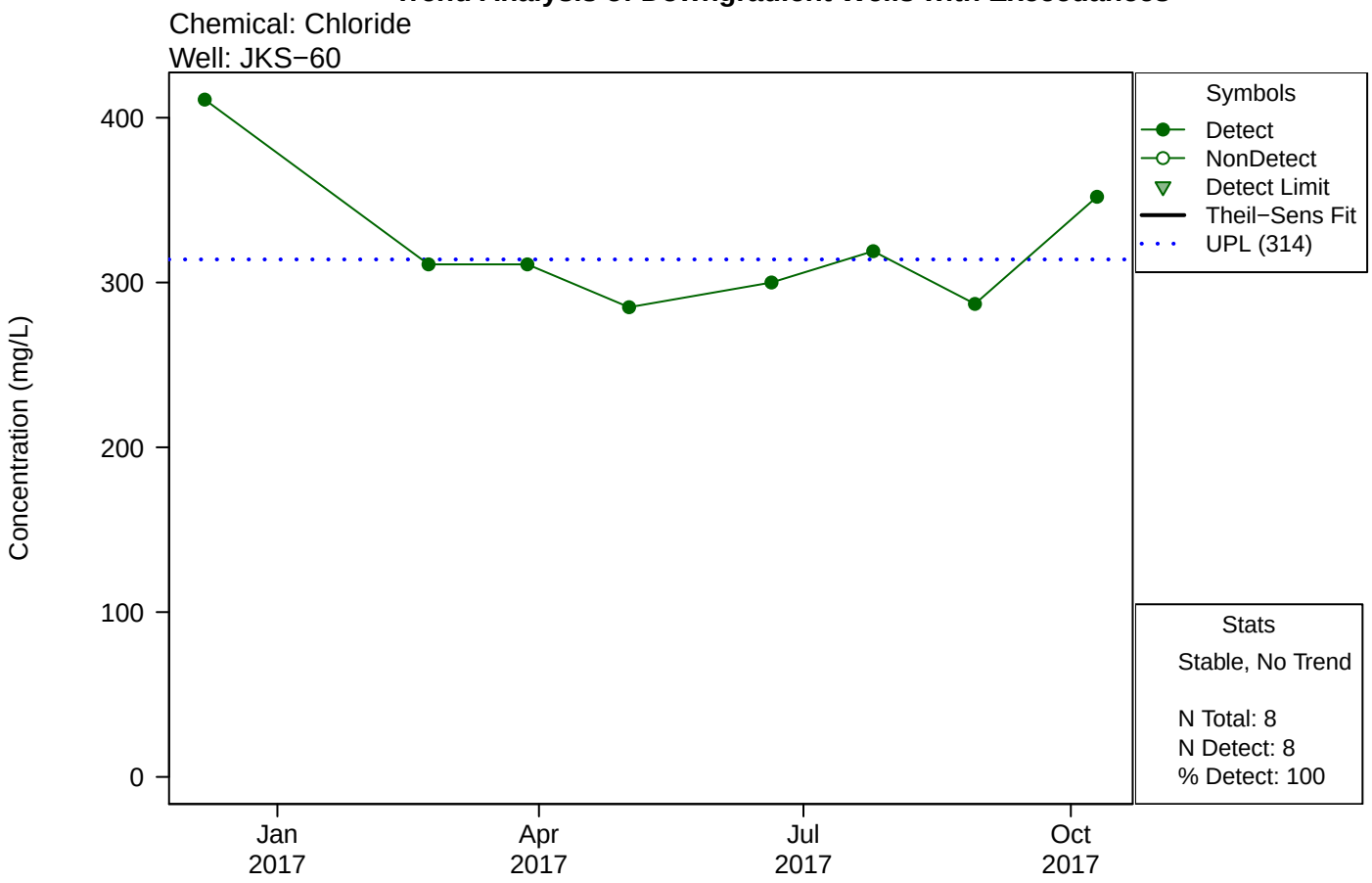
**APPENDIX B-FIGURE 4**
**Unit: Fly Ash Landfill**
**Trend Analysis of Downgradient Wells with Exceedances**

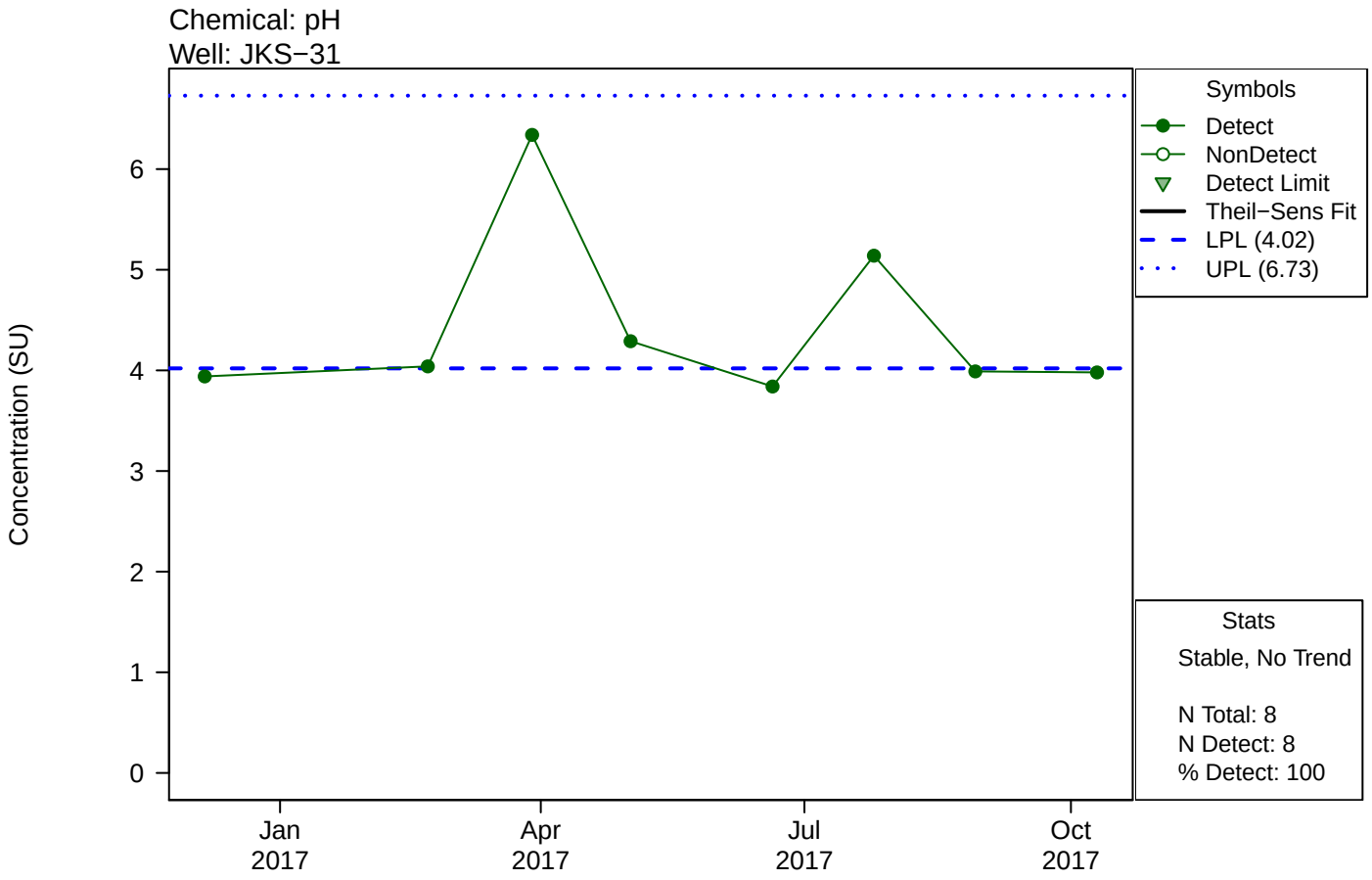


**APPENDIX B-FIGURE 4**
**Unit: Fly Ash Landfill**

**Trend Analysis of Downgradient Wells with Exceedances**



**APPENDIX B-FIGURE 4**
**Unit: Fly Ash Landfill**
**Trend Analysis of Downgradient Wells with Exceedances**