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27 April 2020

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

Reference: Project No. 0503422

Dear Mr. Malone:

Subject: Written Demonstration – Responses to Potential Statistically Significant Increases
Calaveras Power Station
San Antonio, Texas

Executive Summary

Title 40, Code of Federal Regulations, Part 257 (40 CFR §257) (a.k.a. the Coal Combustion Residual (CCR) Rule) was published in the Federal Register in April 2015 and became effective in October 2015. The CCR Rule allows for continued beneficial use of all CCR. CPS Energy operates active surface impoundments and a landfill primarily for temporary storage and historically for disposal of fly ash and bottom ash.

One of the many requirements of the CCR Rule was for CPS Energy to determine if there are impacts to groundwater from any of the surface impoundments and landfill at the Calaveras Power Station that contain CCR, and post the evaluation to its website on an annual basis. The evaluation of the October 2019 groundwater sample results indicated a potential statistically significant increase (SSI) for a limited number of constituents from the Evaporation Pond (EP), Fly Ash Landfill (FAL), and Bottom Ash Ponds (BAPs). Groundwater sample results from the Sludge Recycle Holding (SRH) Pond did not indicate a potential SSI.

Based on the evidence provided in this Written Demonstration, 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 will continue with a detection monitoring program.

Introduction

CPS Energy owns and operates the Calaveras Power Station that consists of two power plants (J.T Deely and J.K. Spruce) that are subject to regulation under the CCR Rule. Currently, CPS Energy operates three CCR units at the Power Station: Evaporation Pond (EP), Fly Ash Landfill (FAL), and the Sludge Recycle Holding (SRH) Pond. Although the J.T. Deely Power Plant ceased operation at the end of December 2018 and sluiced bottom ash is no longer being received at the Bottom Ash Ponds (BAPs), the BAPs will continue to be monitored until the units have undergone closure. An Annual Groundwater Monitoring and Corrective Action Report (Report) was completed for each of these CCR units. Upper Prediction Limits (UPLs) and Lower Prediction Limits (LPLs) were calculated in each Report for the purpose of determining a potential statistically significant increase (SSI) over background levels. The Reports indicated that a potential SSI over background levels was determined for one or more Appendix III constituents from monitoring wells associated with the EP, FAL, and BAPs. A potential SSI over background levels was not determined from monitoring wells associated with 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 a SSI over the background levels. If a successful demonstration is completed within the 90-day period, the owner or operator may continue with a detection monitoring program. If a successful demonstration is not completed within the 90-day period, the owner or operator must initiate an assessment monitoring program.

General Comments and Terms

- Several groundwater monitoring wells were installed in the northern portion of the property prior to the construction of the EP and FAL (collectively termed Northern CCR Units). The EP was initially constructed as a landfill in 1990 and later converted to the surface impoundment in 1996 and the FAL was constructed in 1992.
- 'historical data' refers to analytical data collected from 1988 through 1992 from monitoring wells that were in existence before the EP and FAL were operated. These monitoring wells are located over one mile north of the BAPs, and although the BAPs were constructed in 1977, the historical data collected from these wells and the current data collected from upgradient wells of the Northern CCR Units is useful in evaluating BAP data.
- 'background monitoring period' refers to the period from December 2016 to October 2017 when eight independent samples were collected from each background and downgradient well within the CCR monitoring well network.

Evaporation Pond (EP)

Downgradient monitoring well results determined to be a potential SSI (i.e., greater than the UPLs or less than the LPLs) for the EP are presented in the following table and are discussed below.

Analyte	Well	LPL	UPL	Sample Date	Value	Unit
Boron	JKS-61	--	1.88	2019-10-22	2.90	mg/L
Fluoride	JKS-36	--	0.382	2019-10-22	1.41	mg/L
Fluoride	JKS-61	--	0.382	2019-10-22	0.48	mg/L
pH	JKS-36	4.58	6.47	2019-10-22	3.66	SU

Boron (JKS-61)

Boron concentrations detected in JKS-61 were previously discussed in the February 2019 *Written Demonstration* and no SSI was determined for boron in this well based on the line of evidence provided below. The boron concentrations detected in JKS-61 during the October 2019 monitoring event (2.90 mg/L) and the February 2020 resampling event (2.30 mg/L) are less than or within the range of boron concentrations (between 2.67 to 3.48 mg/L) detected in upgradient monitoring well

JKS-57 and are in the same order of magnitude (up to 2.27 mg/L) detected in upgradient monitoring well JKS-45 for the other Northern CCR Unit during the background monitoring period. The boron concentrations in these upgradient monitoring wells reflect the natural variability in groundwater quality.

Fluoride (JKS-36 and JKS-61)

Fluoride concentrations detected in JKS-36 and JKS-61 were previously discussed in the April 2018 and February 2019 *Written Demonstrations* and no SSI were determined for fluoride in these wells based on the lines of evidence provided below. The fluoride concentrations detected in JKS-36 and JKS-61 during the October 2019 monitoring event (1.41 mg/L and 0.48 mg/L, respectively) are within the range of fluoride concentrations (between <0.036 mg/L and 1.53 mg/L and between <0.036 mg/L and 0.64 mg/L, respectively) detected in these monitoring wells during the background monitoring period. The historical data from JKS-36 indicate naturally occurring fluoride concentrations up to 1.5 mg/L. In addition, historical data from JKS-43 located in the vicinity of the EP indicate naturally occurring fluoride concentrations up to 1.75 mg/L.

pH (JKS-36)

pH values detected in JKS-36 were previously discussed in the April 2018 and February 2019 *Written Demonstrations* and no SSI was determined for pH in this well based on the lines of evidence provided below. The pH value in JKS-36 during the October 2019 monitoring event (3.66 SU) is within the range of pH values (between 3.24 and 6.98 SU) detected during the background monitoring period. In addition, the historical data from JKS-36 indicate naturally occurring pH values ranging between 3.2 and 4.6 SU.

Fly Ash Landfill (FAL)

Downgradient monitoring well results determined to be a potential SSI (i.e., greater than the UPLs or less than the LPLs) for the FAL are presented in the following table and are discussed below.

Analyte	Well	LPL	UPL	Sample Date	Value	Unit
pH	JKS-31	3.98	6.73	2019-10-22	2.62	SU
pH	JKS-46	3.98	6.73	2019-10-23	2.62	SU

pH (JKS-31 and JKS-46)

pH values detected in JKS-31 and JKS-46 were previously discussed in the April 2018 and February 2019 Written Demonstrations and no SSI was determined for pH in these wells based on the same lines of evidence provided below. The pH value detected in JKS-31 during the October 2019 monitoring event (2.62 SU) is below the range of pH values detected in this well during the background monitoring period (between 3.84 and 6.34 SU); however, the pH value detected in the February 2020 resampling event (4.11 SU) is not a SSI and historical data from JKS-31 indicate naturally occurring pH values ranging between 2.8 and 5.0 SU. The pH values detected in JKS-46 during the October 2019 monitoring event (2.62 SU) and the February 2020 resampling event (3.60 SU) are within the range of pH values detected in this well during the background monitoring period (between 2.1 and 3.6 SU). In addition, historical data from JKS-36, JKS-40, and JKS-43 located in the vicinity of the Northern CCR Units indicate naturally occurring pH values ranging between 2.9 and 4.9 SU.

Note: The FAL is primarily used for storage of fly ash prior to offsite beneficial use and does not store liquid CCR or non-CCR wastestreams.

Bottom Ash Ponds (BAPs)

Downgradient monitoring well results determined to be a potential SSI (i.e., greater than the UPLs or less than the LPLs) for the BAPs are presented in the following table and are discussed below.

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

Boron (JKS-50R and JKS-56)

Boron concentrations detected in JKS-50R and JKS-56 were previously discussed in the February 2019 Written Demonstration and no SSI was determined for boron in these wells based on the lines of evidence provided below. The boron concentrations detected in JKS-50R and JKS-56 during the October 2019 monitoring event (6.93 mg/L and 4.47 mg/L, respectively) and the February 2020 resampling event (6.36 mg/L and 4.04 mg/L, respectively) are in the same order of magnitude detected in upgradient monitoring wells JKS-57 and JKS-45 (up to 3.48 mg/L and 2.27 mg/L, respectively) for the Northern CCR Units during the background monitoring period. The boron concentrations in these upgradient monitoring wells reflect the natural variability in groundwater quality.

For comparison, a study of groundwater contamination from coal power plants across the southeast United States documented a 1 to 2 order of magnitude increase in boron concentrations between background and affected monitoring wells (Harkness et al., 2016). The detections in the wells in the study had boron concentrations of 1 to 6 mg/L, compared to background levels ranging from non-detect to 0.04 mg/L. Another study of affected groundwater from a CCR site in Indiana (Buszka et al., 2007) documented a 2 to 3 order of magnitude increase in boron concentrations between background and affected monitoring wells.

In addition, the statistical analysis shows that no other Appendix III constituents were identified as potential SSIs in JKS-50R or JKS-56. If the elevated boron concentrations were associated with a release, other elevated Appendix III constituent concentrations would also be expected in these wells (Milligan and Ruane, 1980).

Finally, the concentration of boron within the BAPs was considered with respect to concentrations in the surrounding monitoring wells. During two sampling events in February 2018, grab samples of effluent water from the BAPs had reported boron concentrations of 1.03 mg/L and 1.16 mg/L. Because boron is concentrated in coal ash compared to the original coal (Openshaw, 1992), and because boron is one of the more easily leached constituents in coal ash (Izquierdo and Querol, 2012), a low concentration of boron in the effluent indicates that the leachable boron concentration in the bottom ash is relatively low. In February 2018, a grab sample of the bottom ash being sent to the BAPs had a boron concentration of 122 mg/kg, and the toxicity characteristic leaching procedure (TCLP) analysis on this same sample had a boron concentration of 1.1 mg/L. The concentration of boron in the effluent and the leachable concentration of boron in the bottom ash are less than the concentrations in JKS-50R or JKS-56.

Fluoride (JKS-48)

Fluoride concentrations detected in JKS-48 were previously discussed in the February 2019 Written Demonstration and no SSI was determined for fluoride in this well based on the lines of evidence provided below. The fluoride concentration detected in JKS-48 during the October 2019 monitoring event (1.25 mg/L) is within the range of fluoride concentrations (between <0.2 and 1.62 mg/L) detected in this well during the background monitoring period. In addition, historical data from JKS-43 located in the vicinity of the Northern CCR Units indicates naturally occurring fluoride concentrations up to 1.75 mg/L.

Summary

EP – The concentrations of constituents associated with potential SSIs (boron, fluoride and pH) appear to be naturally occurring and reflect natural variability in groundwater quality.

FAL – The concentrations of constituents associated with potential SSIs (pH) appear to be naturally occurring and reflect natural variability in groundwater quality.

BAPs – The concentrations of constituents associated with potential SSIs (boron and fluoride) appear to be naturally occurring and reflect natural variability in groundwater quality. In addition, if the boron concentrations were associated with a release, other elevated Appendix III constituents would be expected and the expectation would be that the detected boron concentrations would be lower based on the effluent water and bottom ash analyses.

Conclusions

Based on the evidence provided in this Written Demonstration, 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.

References

Buszka, P. M., J. Fitzpatrick, L. R. Watson, and R. T. Kay. 2007. Evaluation of Ground-Water and Boron Sources by Use of Boron Stable-Isotope Ratios, Tritium, and Selected Water-Chemistry Constituents near Beverly Shores, Northwestern Indiana, 2004. U.S. Geological Survey Scientific Investigations Report Series 2007-5166.

Harkness, J. S., B. Sulkin, and A. Vengosh. 2016. Evidence for Coal Ash Ponds Leaking in the Southeastern United States. Environmental Science and Technology, v. 50 no. 12, p 6583-6592.

Izquierdo, M. and X. Querol. 2012. Leaching behaviour of elements from coal combustion fly ash: An overview. International Journal of Coal Geology. v. 94. p. 54-66.

Milligan, J. D. and R. J. Ruane. 1980. Effects of Coal-ash Leachate on Ground Water Quality. USEPA Interagency Energy/Environment R&D Program Report, EPA-600/7-80-066.

Openshaw, S. C. 1992. Utilization of Coal Fly Ash. MS Thesis. University of Florida.

Certification

Certification from a qualified professional engineer verifying the accuracy of the information provided in this Written Demonstration is provided in Attachment 1.

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

Yours sincerely,

Walter Zverina
Project Manager

ATTACHMENT 1 CERTIFICATION

WRITTEN DEMONSTRATION CERTIFICATION

Calaveras Power Station
San Antonio, Texas
CPS Energy

CERTIFICATION

I hereby verify the accuracy of the information provided in this *Written Demonstration* in accordance with the requirements of 40 CFR §257.94(e)(2).

STATE OF TEXAS
JEFFERY L. BAUGUSS
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REGISTERED
PROFESSIONAL ENGINEER

4/27/2020

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