



Memo

Date: Wednesday, July 01, 2020

To: Pawnee Station Operating Record

From: Matt Rohr, HDR Engineering, Inc.
Molly Reeves, HDR Engineering, Inc.

Subject: Pawnee Station East CCR Landfill

Alternative Source Determination of Statistically Significant Increases over Background per CCR Rule 257.93(h)(2)

On March 31, 2020, Public Service Company of Colorado (PSCo) documented statistically significant increases (SSIs) in downgradient monitoring wells at the Pawnee Station East Landfill Coal Combustion Residuals (CCR) unit (HDR, 2018a). The SSIs were observed for total dissolved solids (TDS) in well PNMW-21 and sulfate and total dissolved solids in wells PNMW-22 and PNMW-23, based on the background threshold values (BTVs) from PNMW-17 (HDR, 2018b).

The objective of this memorandum is to evaluate if the SSIs observed at the East CCR Landfill downgradient CCR wells could be attributable to an alternative source, other than the East CCR Landfill. Pawnee Station has two existing CCR units subject to the CCR Rule: the North CCR Landfill and the East CCR Landfill (**Figure 1**). In addition, Pawnee Station has two former CCR inactive impoundments, the former Bottom Ash Storage Pond (BASP) and the former Ash Water Recovery Pond (AWRP) (**Figure 1**), that have had all CCR removed as confirmed through visual verification and soil confirmatory sampling. The BASP and AWRP were both inactive impoundments when the CCR Rule was published, and both were physically closed in 2017 by removal of CCR, with ongoing groundwater monitoring. The East CCR Landfill was constructed in 2018 in the same footprint as the former BASP, and began taking receipt of ash and other approved waste materials on July 8, 2019.

The BASP was built in 1980 as part of the original site construction. It was constructed with a composite liner and leachate collection system and had been inactive since 2005. During active operation, it was used to receive and settle sluiced bottom ash and then recycle the transport water back to the plant via the AWRP. The East CCR Landfill was constructed with liner and leachate collection systems in accordance with the design requirements of the CCR Rule. Because ash and other waste material was first disposed at the East CCR Landfill in July 2019, the first groundwater sample event for the East Landfill occurred on November 6, 2019.

On June 27, 2019, based upon statistical review of the results of the February 26, 2019 detection monitoring event, PSCo documented SSIs in downgradient monitoring wells and established an assessment monitoring program at the BASP. The downgradient wells for the former BASP are the same as those for the active East CCR Landfill because the footprint of



the two CCR units is the same (**Figure 1**). The SSIs identified for the BASP included sulfate and TDS, the same constituents of interest (COIs) with SSIs documented for the East CCR Landfill. Table 1 provides the timeline for the East CCR Landfill operation and groundwater monitoring program to illustrate that the SSIs documented for the East CCR Landfill are a pre-existing condition of groundwater before CCR was placed in the East CCR Landfill. This timeline demonstrates that the East CCR Landfill has an alternative source, the BASP, which was a CCR source located in the same footprint as the East CCR Landfill prior to landfill cell construction. Therefore, the East CCR Landfill will remain in Detection Monitoring. Detection monitoring for the East CCR Landfill will include sampling upgradient and downgradient wells for the Appendix III COIs. Since all CCR was removed from the BASP and samples from the pond bottom confirmed complete CCR removal, residuals in the groundwater beneath the former BASP/current East CCR Landfill are expected to decrease slowly and may persist in the near term. Therefore, it is expected that these SSIs will continue, and review of future data will be focused on COIs that did not previously have SSIs over background before ash was placed in the East CCR Landfill (boron, calcium, and pH). In addition, the East CCR Landfill detection monitoring data will be reviewed for trends in the Appendix III COIs. Should an increasing trend in concentrations be observed for any Appendix III COI that also has an SSI over background, PSCo will further investigate and either demonstrate an alternate source or establish an assessment monitoring program for the East CCR Landfill.

While PSCo established an assessment monitoring program for the BASP, because source control had already been completed through complete removal of CCR in 2017 groundwater is anticipated to slowly return to concentrations similar to background concentrations that will be monitored in assessment monitoring, allowing for complete clean closure of the BASP, leaving only the East Landfill groundwater monitoring program to continue in detection monitoring.

Summary

The SSIs detected at the East CCR Landfill were detected prior to the first ash placement in the East CCR Landfill, as SSIs from the BASP in the same wells. Therefore, the source of the constituents with SSIs are considered a pre-existing condition in the groundwater before the East CCR Landfill became active. This demonstrates that a source other than the East CCR Landfill caused the SSI observation associated with the East CCR Landfill detection monitoring program. It is anticipated these same constituents may show SSIs for several detection monitoring events into the future; however because the BASP CCR source was removed in 2017, it is anticipated that groundwater concentrations will return to background over time.



Certification

Pawnee East CCR Landfill Alternative Source Demonstration

I hereby certify to the best of my knowledge the accuracy of the information contained in this memorandum and that this alternative source demonstration for the Pawnee East CCR Landfill was prepared in accordance with 40 CFR Part 257.94(e)(2) of the Federal Coal Combustion Residuals (CCR) Rule.

I am duly licensed Professional Engineer under the laws of the State of Colorado.



Matthew Rohr, PE

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License renewal date October 31, 2021



Table 1. Timeline for the BASP and East Landfill Operations and Groundwater Monitoring Programs	
Date	BASP/East Landfill Operations/Monitoring Activity
1980	BASP was constructed
1980-2005	BASP was active
2005-2017	BASP was inactive
March 31, 2017	BASP was clean closed by removal of all CCR and confirmation soil sampling, with ongoing groundwater monitoring
2018	East Landfill was constructed
February 26, 2019	PSCo initiated detection monitoring at the BASP
June 27, 2019	PSCo documented SSIs at the BASP (including sulfate and TDS)
July 8, 2019	Ash was initially placed in the East CCR Landfill
November 6, 2019	PSCo initiated detection monitoring at the East Landfill
March 31, 2020	PSCo documented SSIs at the East Landfill (for sulfate and TDS)
Ongoing until clean closure groundwater conditions are met	Assessment monitoring for the BASP
Ongoing during operation and closure of the East CCR Landfill	Detection monitoring at the East Landfill

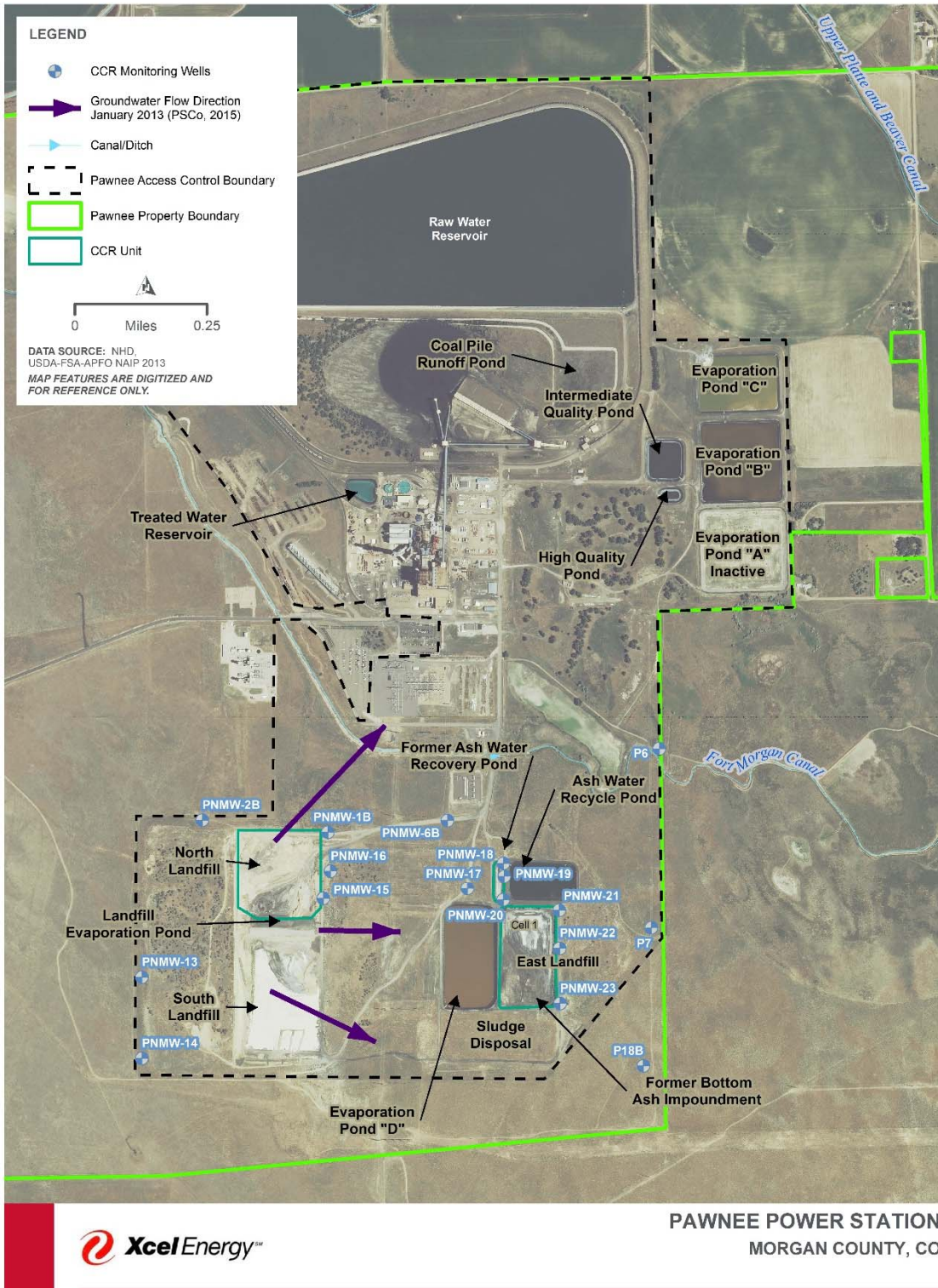


Figure 1. Pawnee Station – CCR unit and monitoring well location map.