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To: Tennessee Valley Authority  
Chattanooga, TN

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File: Updated GWPS and SSLs at the  
Johnsonville Fossil Plant Active Ash 2  
Pond CCR Unit

Date: December 22, 2022

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**Reference: End of Year Update on Statistically Significant Levels (SSLs) (40 CFR § 257.95(g)) - CCR Rule Groundwater Monitoring - Johnsonville Fossil Plant, Active Ash 2 Pond CCR Unit**

In accordance with the federal regulations for management of coal combustion residuals (CCR Rule; 40 CFR Part 257, Subpart D), the Tennessee Valley Authority (TVA) is currently conducting Assessment Monitoring at the Active Ash 2 Pond CCR Unit at its Johnsonville Fossil Plant (JOF) in New Johnsonville, Tennessee. The Active Ash Pond 2 consists of one CCR surface impoundment subject to the CCR Rule with a single-unit groundwater monitoring system.

As required by the CCR Rule, the owner or operator of a CCR unit shall establish groundwater protection standards (GWPS) for Appendix IV parameters detected during Assessment Monitoring and determine if one or more Appendix IV parameters are detected at statistically significant levels (SSLs) above their GWPS. GWPS for all Appendix IV parameters were originally established and documented in a notice dated October 15, 2018, as required by 40 CFR § 257.95(d)(2) and are provided on Table 1.

As part of ongoing Assessment Monitoring, the second semiannual assessment monitoring event for 2022 occurred August 2-4, 2022, with the additional “resample” event occurring September 13-15, 2022. This technical memorandum presents GWPS and lower confidence bands (LCBs) that have been updated with data collected during the second semiannual monitoring event and resample event for 2022, as well as any identified SSLs after incorporating the additional data collected in 2022<sup>1</sup>. The identification of SSLs was performed as a two-step process:

1. Historical sampling results (November 2016 through September 2022) for Appendix IV parameters from each downgradient well were compared directly to the GWPS. If all sample concentrations were below the updated GWPS, no SSLs over the GWPS were identified.
2. Where the direct comparison indicated a concentration above the GWPS, further statistical analysis was performed to identify levels statistically greater than the GWPS, using procedures recommended in the United States Environmental Protection Agency (USEPA) Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities (EPA 530/R-09-007, March 2009). Comparisons were made against a fixed GWPS via LCBs. For each situation where a parameter concentration was greater than the GWPS in step one, the 99% LCB of the fitted line in that monitoring well was calculated using CCR Rule monitoring data collected from November 2016 through September 2022. As recommended in the Unified Guidance, where the 99% LCB exceeds the GWPS at the last sampling event, an SSL was identified for the constituent/well pair.

Based on the statistical analysis performed in 2022, there continues to be an SSL above the GWPS for cobalt in wells 10-AP3 and JOF-103. TVA will continue to conduct groundwater monitoring and reporting pursuant to 40 CFR § 257.95.

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<sup>1</sup> Previously, TVA has provided notification of SSLs for the second semiannual assessment monitoring sampling in the Annual Groundwater Monitoring and Corrective Action Reports.

Reference: End of Year Update on Statistically Significant Level (SSLs) at the Johnsonville Fossil Plant - Active Ash 2 Pond CCR Unit

**TABLE 1: Statistically Significant Levels Above GWPS - JOF Active Ash 2 Pond CCR Unit**

Appendix IV Parameter	GWPS (a)	Updated GWPS (b)	Downgradient wells with analytical results above GWPS (c)	Updated LCBs (d)	SSL LCB > GWPS (e)
Antimony (µg/L)	6	6	JOF-104	0.73	<b>No</b>
Arsenic (µg/L)	10	10	None	NA	NA
Barium (µg/L)	2,000	2,000	None	NA	NA
Beryllium (µg/L)	4	4	None	NA	NA
Cadmium (µg/L)	5	5	10-AP3	4.26	<b>No</b>
			JOF-103	3.12	<b>No</b>
Chromium (µg/L)	100	100	None	NA	NA
Cobalt (µg/L)	6	6	10-AP3	25.4	<b>Yes</b>
			JOF-103	42.6	<b>Yes</b>
Fluoride (mg/L)	4	4	None	NA	NA
Lead (µg/L)	15	15	None	NA	NA
Lithium (µg/L)	40	40	JOF-103	7.51	<b>No</b>
Mercury (µg/L)	2	2	None	NA	NA
Molybdenum (µg/L)	100	100	None	NA	NA
Radium-226+228 (pCi/L)	5	5	None	NA	NA
Selenium (µg/L)	50	50	None	NA	NA
Thallium (µg/L)	2	2	None	NA	NA

NA – Not applicable

- (a) GWPS documented in notice dated October 15, 2018 [reported in milligrams per liter (µg/L) except fluoride (mg/L) and radium 226+228 (pCi/L)]
- (b) GWPS updated as of November 28, 2022, with results from two additional sampling events collected on August 2-4, 2022, and September 13-15, 2022 [reported in µg/L except fluoride (mg/L) and radium 226+228 (pCi/L)]
- (c) Downgradient wells with analytical results above GWPS November 2016 through September 2022 (per 40 CFR § 257.95(b) and (d))
- (d) Most recent value of 99% LCB on the mean of Appendix IV groundwater sampling events between November 2016 and September 2022. Upper confidence band (UCB) not shown as it is greater than LCB [reported in µg/L].
- (e) SSL: “statistically significant level” over GWPS occurs when the updated LCB value at the last sampling event exceeds the updated GWPS