
To: Tennessee Valley Authority
Chattanooga, TN

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File: Updated GWPS and SSLs at the John
Sevier Fossil Plant Bottom Ash Pond
Vacatur CCR Unit

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**Reference: Update on Statistically Significant Levels (SSLs) - CCR Rule Groundwater Monitoring
John Sevier Fossil Plant Bottom Ash Pond Vacatur 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 Bottom Ash Pond CCR Unit at its John Sevier Fossil Plant (JSF) in Rogersville, Tennessee. The Bottom Ash Pond 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 April 14, 2020, as required by 40 CFR § 257.95(d)(2) and are provided on Tables 1 and 2 for the residuum and bedrock saturated zones, respectively.

As part of ongoing Assessment Monitoring, the first semiannual assessment monitoring event for 2022 occurred January 19-21, 2022, with the additional “resample” event occurring March 1-3, 2022. This technical memorandum presents GWPS and lower confidence bands (LCBs) that have been updated with the data collected as part of the first semiannual monitoring event and resample event for 2022, as well as any identified SSLs after incorporating the additional data collected in 2022. The identification of SSLs was performed as a two-step process:

1. Historical sampling results (January 2019 through March 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 the 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 January 2019 to March 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, no SSLs above the GWPS were identified during the first semiannual assessment monitoring and resample events in 2022, which is consistent with the assessment monitoring results for 2019 through 2021. TVA will continue to conduct groundwater monitoring and reporting pursuant to 40 CFR § 257.95.

Reference: Update on Statistically Significant Levels (SSLs) at the John Sevier Fossil Plant Bottom Ash Pond Vacatur CCR Unit

TABLE 1: Statistically Significant Levels Above GWPS - JSF Bottom Ash Pond CCR Unit - Residuum

| 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 | None | NA | NA |
| 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 | None | NA | NA |
| Chromium (µg/L) | 100 | 100 | None | NA | NA |
| Cobalt (µg/L) | 6 | 6 | None | NA | NA |
| Fluoride (µg/L) | 4,000 | 4,000 | None | NA | NA |
| Lead (µg/L) | 15 | 15 | None | NA | NA |
| Lithium (µg/L) | 40 | 40 | None | NA | NA |
| 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 April 14, 2020 [reported in micrograms per liter (µg/L)]
- (b) GWPS updated as of June 10, 2022, with two additional sample results collected on January 19-21, 2022, and March 1-3, 2022 [reported in µg/L]
- (c) Downgradient wells with analytical results above GWPS January 2019 through March 2022 (per 40 CFR § 257.95(b) and (d))
- (d) Most recent value of 99% lower confidence band (LCB) on the mean of Appendix IV groundwater sampling events between January 2019 and March 2022. Upper confidence band (UCB) not shown as it is greater than LCB [reported in mg/L]
- (e) SSL: “statistically significant level over GWPS” occurs when the updated LCB value at the last sampling event exceeds the updated GWPS

Reference: Update on Statistically Significant Levels (SSLs) at the John Sevier Fossil Plant Bottom Ash Pond Vacatur CCR Unit

TABLE 2: Statistically Significant Levels Above GWPS - JSF Bottom Ash Pond CCR Unit - Bedrock

| Appendix IV Parameter | GWPS (f) | Updated GWPS (g) | Downgradient wells with analytical results above GWPS (h) | Updated LCBs (i) | SSL LCB > GWPS (j) |
|------------------------|----------|------------------|---|------------------|--------------------|
| Antimony (µg/L) | 6 | 6 | None | NA | NA |
| 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 | None | NA | NA |
| Chromium (µg/L) | 100 | 100 | None | NA | NA |
| Cobalt (µg/L) | 6 | 6 | None | NA | NA |
| Fluoride (µg/L) | 4,000 | 4,000 | None | NA | NA |
| Lead (µg/L) | 15 | 15 | None | NA | NA |
| Lithium (µg/L) | 40 | 40 | None | NA | NA |
| 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

- (f) GWPS documented in notice dated April 14, 2020 [reported in micrograms per liter (µg/L)]
- (g) GWPS updated as of June 10, 2022, with two additional sample results collected on January 19-21, 2022, and March 1-3, 2022 [reported in µg/L]
- (h) Downgradient wells with analytical results above GWPS January 2019 through March 2022 (per 40 CFR § 257.95(b) and (d))
- (i) Most recent value of 99% lower confidence band (LCB) on the mean of Appendix IV groundwater sampling events between January 2019 and March 2022. Upper confidence band (UCB) not shown as it is greater than LCB [reported in mg/L]
- (j) SSL: “statistically significant level over GWPS” occurs when the updated LCB value at the last sampling event exceeds the updated GWPS