
To: Tennessee Valley Authority
Chattanooga, TN

From: Matthew Dagon, LPG
Indianapolis, IN

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

Date: July 9, 2021

**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 § 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 2021 occurred January 12-15, 2021 with the additional “resample” event occurring February 9-11, 2021. This technical memorandum presents GWPS and lower confidence bands (LCBs) that have been updated with the sample collected as part of the first semiannual assessment monitoring event of 2021, as well as any identified SSLs after incorporating the additional data collected in 2021. The identification of SSLs was performed as a two-step process:

1. Historical sampling results (January 2019 through February 2021) 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 February 2021. 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 2021, no SSLs above the GWPS were identified during the assessment monitoring event in 2021, which is consistent with the assessment monitoring results for 2019 and 2020. 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 (mg/l)	0.006	0.006	None	NA	NA
Arsenic (mg/l)	0.01	0.01	None	NA	NA
Barium (mg/l)	2	2	None	NA	NA
Beryllium (mg/l)	0.004	0.004	None	NA	NA
Cadmium (mg/l)	0.005	0.005	None	NA	NA
Chromium (mg/l)	0.1	0.1	None	NA	NA
Cobalt (mg/l)	0.006	0.006	None	NA	NA
Fluoride (mg/l)	4	4	None	NA	NA
Lead (mg/l)	0.015	0.015	None	NA	NA
Lithium (mg/l)	0.04	0.04	None	NA	NA
Mercury (mg/l)	0.002	0.002	None	NA	NA
Molybdenum (mg/l)	0.1	0.1	None	NA	NA
Radium-226+228 (pCi/l)	5	5	None	NA	NA
Selenium (mg/l)	0.05	0.05	None	NA	NA
Thallium (mg/l)	0.002	0.002	None	NA	NA

NA – Not applicable

- (a) GWPS documented in notice dated 4/14/2020 [reported in milligrams per liter (mg/L)]
- (b) GWPS updated as of 5/26/2021 with two additional sample results collected on January 12-15, 2021 and February 9-11, 2021 [reported in mg/L]
- (c) Downgradient wells with analytical results above GWPS January 2019 through February 2021 (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 February 2021. 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 (mg/l)	0.006	0.006	None	NA	NA
Arsenic (mg/l)	0.01	0.01	None	NA	NA
Barium (mg/l)	2	2	None	NA	NA
Beryllium (mg/l)	0.004	0.004	None	NA	NA
Cadmium (mg/l)	0.005	0.005	None	NA	NA
Chromium (mg/l)	0.1	0.1	None	NA	NA
Cobalt (mg/l)	0.006	0.006	None	NA	NA
Fluoride (mg/l)	4	4	None	NA	NA
Lead (mg/l)	0.015	0.015	None	NA	NA
Lithium (mg/l)	0.04	0.04	None	NA	NA
Mercury (mg/l)	0.002	0.002	None	NA	NA
Molybdenum (mg/l)	0.1	0.1	None	NA	NA
Radium-226+228 (pCi/l)	5	5	None	NA	NA
Selenium (mg/l)	0.05	0.05	None	NA	NA
Thallium (mg/l)	0.002	0.002	None	NA	NA

NA – Not applicable

- (f) GWPS documented in notice dated 4/14/2020 [reported in milligrams per liter (mg/L)]
- (g) GWPS updated as of 5/26/2021 with two additional sample results collected on January 12-15, 2021 and February 9-11, 2021 [reported in mg/L]
- (h) Downgradient wells with analytical results above GWPS January 2019 through February 2021 (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 February 2021. 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