
To: Tennessee Valley Authority
Chattanooga, TN

From: Matthew Dagon, LPG
Indianapolis, IN

File: Updated GWPS and SSLs at the
Cumberland Fossil Plant Bottom Ash
Pond, Gypsum Storage Area, and
Dry Ash Stack CCR Units

Date: July 15, 2021

Reference: Update on Statistically Significant Levels (SSLs) (40 CFR § 257.95(g)) - CCR Rule Groundwater Monitoring - Cumberland Fossil Plant, Bottom Ash Pond, Gypsum Storage Area & Dry Ash Stack CCR Units

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, Gypsum Storage Area, and Dry Ash Stack CCR Units at its Cumberland Fossil Plant (CUF) in Cumberland City, Tennessee. The Bottom Ash Pond, Gypsum Storage Area, and Dry Ash Stack are all subject to the CCR Rule and share a common, multiunit 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 first semiannual assessment monitoring event for 2021 occurred January 19-20, 2021, with the additional "resample" event occurring March 1, 2021. This technical memorandum presents GWPS and lower confidence bands (LCBs) that have been updated with data collected during the first semiannual monitoring event and resample event for 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 (November 2016 through March 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 November 2016 through March 2021. Note that monitoring well 93-3 was incorporated into the monitoring well network and sampled beginning in June 2018. 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, there continues to be an SSL above the GWPS for cobalt in well CUF-212, lithium in well 93-3, and molybdenum in well CUF-209. These are the same SSLs at the same wells as previously identified. However, there is an additional SSL above the GWPS for cobalt in well CUF-211. TVA will continue to conduct groundwater monitoring and reporting pursuant to 40 CFR § 257.95.

July 15, 2021

Tennessee Valley Authority

Page 2 of 2

Reference: Update on Statistically Significant Levels (SSLs) at the Cumberland Fossil Plant - Bottom Ash Pond, Gypsum Storage Area & Dry Ash Stack CCR Units

TABLE 1: Statistically Significant Levels Above GWPS - CUF Bottom Ash Pond, Gypsum Storage Area & Dry Ash Stack CCR Units

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	CUF-209	0.00003	No
			CUF-211	0.00974	No
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	CUF-211	0.001	No
Chromium (mg/l)	0.1	0.1	None	NA	NA
Cobalt (mg/l)	0.006	0.006	CUF-211	0.0062	Yes
			CUF-212	0.0231	Yes
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	93-3	0.063	Yes
Mercury (mg/l)	0.002	0.002	None	NA	NA
Molybdenum (mg/l)	0.1	0.1	CUF-209	0.614	Yes
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 10/15/2018 [reported in milligrams per liter (mg/L)]
- (b) GWPS updated as of 06/16/2021 with results from two additional sampling events collected on January 19-20, 2021 and March 1, 2021 [reported in mg/L]
- (c) Downgradient wells with analytical results above GWPS November 2016 through March 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 November 2016 and March 2021. Upper confidence band (UCB) not shown as it is greater than LCB.
- (e) SSL: “statistically significant level” over GWPS occurs when the updated LCB value at the last sampling event exceeds the updated GWPS