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To:	Tennessee Valley Authority Chattanooga, TN	From:	Matthew Dagon, LPG Indianapolis, IN
File:	Updated GWPS and SSLs Colbert Fossil Plant Ash Disposal Area 4	Date:	July 31, 2020

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**Reference: Update on Statistically Significant Levels (SSLs) - CCR Rule Groundwater Monitoring  
Colbert Fossil Plant Ash Disposal Area 4**

In accordance with the federal regulations for management of coal combustion residuals (CCR Rule; 40 CFR § 257, Subpart D)<sup>1</sup>, the Tennessee Valley Authority (TVA) is currently conducting Assessment Monitoring at the Ash Disposal Area 4 CCR unit at its Colbert Fossil Plant (COF) in Tuscumbia, Alabama. The Ash Disposal Area 4 consists of one surface impoundment subject to the CCR Rule with a single-unit monitoring system.

As required by the CCR Rule (40 CFR § 257.95(g)), the owner or operator of a CCR unit shall establish groundwater protection standards (GWPSs) 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. GWPSs 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 2020 occurred January 15-20, 2020, with the additional “resample” event occurring February 11-26, 2020. This technical memorandum presents GWPSs and lower confidence bands (LCBs) that have been updated with the samples collected as part of the first and second monitoring events of 2020, as well as any identified SSLs after incorporating the additional data collected in 2020. The identification of SSLs was performed as a two-step process:

1. Historical sampling results (December 2016 through February 2020) for Appendix IV parameters from each downgradient well were compared directly to the updated GWPS. If all sample concentrations were below the 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 February 2020. 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, there continues to be an SSL above the GWPS for arsenic in well COF-105. However, unlike during 2018 and 2019, there was not an SSL over the GWPS for cobalt in well COF-102. TVA will continue to conduct groundwater monitoring and reporting pursuant to 40 CFR § 257.95.

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<sup>1</sup> The Alabama Department of Environmental Management (ADEM) has adopted a state CCR rule. As the state rule has not been approved by EPA to operate in lieu of the federal CCR Rule, TVA must comply with both the state and federal CCR regulations. This notification also complies with ADEM Admin. Code r. 335-13-15-.06 (6)(g).

Reference: Update on Statistically Significant Levels (SSLs) at the Colbert Fossil Plant - Ash Disposal Area 4 CCR Unit

**TABLE 1: Statistically Significant Levels Above GWPSs - COF Plant - Ash Disposal Area 4**

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	COF-105	0.0296	<b>Yes</b>
			COF-106 <sup>(f)</sup>	0.0	<b>No</b>
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	COF-102	0.0007	<b>No</b>
			COF-104	0.0026	<b>No</b>
			COF-105 <sup>(f)</sup>	0.0	<b>No</b>
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) GWPSs documented in notice dated 10/15/2018

(b) GWPSs updated as of 06/17/2020 with two additional samples collected from Well CA5 on January 15, 2020 and February 26, 2020

(c) Downgradient wells with analytical results above updated GWPS December 2016 through February 2020 (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 December 2016 and February 2020. 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

(f) Negative lower confidence bands were reported as 0.0 mg/L