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To:	Tennessee Valley Authority Chattanooga, TN	From:	Matthew Dagon, LPG Indianapolis, IN
File:	Notification Identifying Appendix IV Constituents Exceeding Groundwater Protection Standards at the Cumberland Fossil Plant Bottom Ash Pond, Gypsum Storage Area and Dry Ash Stack CCR Unit	Date:	February 13, 2019

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**Reference: Notification Identifying Appendix IV Constituents Exceeding Groundwater Protection Standards at the Cumberland Fossil Plant Bottom Ash Pond, Gypsum Storage Area and Dry Ash Stack CCR Unit Pursuant to 40 CFR 257.95(g)**

In accordance with federal regulations for management of coal combustion residuals (the CCR Rule; 40 CFR 257), the Tennessee Valley Authority (TVA) is monitoring groundwater at the Bottom Ash Pond, Gypsum Storage Area, and Dry Ash Stack CCR unit 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 with a multi-unit monitoring system. Monitoring at the Bottom Ash Pond, Gypsum Storage Area, and Dry Ash Stack is in the Assessment phase.

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 GWPSs. GWPSs for all Appendix IV parameters have been established as required by 40 CFR 257.95(d)(2) and are provided on Table 1 (attached).

Assessment monitoring groundwater sampling was conducted from May to October 2018 (40 CFR 257.95(b) and 257.95(d)). The groundwater monitoring data for the assessment monitoring events were evaluated using statistical procedures as required by 40 CFR 257.93(f) through 257.93(h) and using procedures recommended in the USEPA's Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities (EPA 530/R-09-007; March 2009). The sampling results used to identify potential groundwater protection standards exceedances were obtained during five distinct monitoring events that were performed between May and August of 2018. Comparisons were made against a fixed groundwater protection standard via a confidence interval or confidence interval band. No retesting was conducted and none of the individual compliance point measurements were directly compared against the groundwater protection standard. All of the Appendix IV monitoring data collected both in Year-One and Year-Two were used to construct the confidence interval bands. Cross-sections of each confidence interval band were then compared to the groundwater protection standard for the most recent Assessment Monitoring event in each case for the purpose of identifying any SSLs. A well-constituent pair is considered out of compliance only if its average constituent levels — as estimated via the confidence interval cross-section — currently exceed the groundwater protection standard.

Pursuant to 40 CFR 257.95(g), on January 14, 2019, the SSLs above GWPSs that are presented on Table 1 below were detected.

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**TABLE 1: Statistically Significant Levels (SSLs) Above GWPSs – CUF Bottom Ash Pond, Gypsum Storage Area, and Dry Ash Stack**

Appendix IV Parameter	GWPS (a)	Downgradient wells with Assessment monitoring results above GWPSs (b)	Calculated LCB on the mean (c)	SSL (d) LCB > GWPS
Antimony (mg/l)	0.006	None	NA	NA
Arsenic (mg/l)	0.01	CUF-209	0.0084	No
		CUF-211	0.0095	No
Barium (mg/l)	2	None	NA	NA
Beryllium (mg/l)	0.004	None	NA	NA
Cadmium (mg/l)	0.005	None	NA	NA
Chromium (mg/l)	0.1	None	NA	NA
Cobalt (mg/l)	0.006	CUF-211	0.0059	No
		CUF-212	0.020	<b>Yes</b>
Fluoride (mg/l)	4	None	NA	NA
Lead (mg/l)	0.015	None	NA	NA
Lithium (mg/l)	0.04	93-3	0.044	<b>Yes</b>
Mercury (mg/l)	0.002	None	NA	NA
Molybdenum (mg/l)	0.1	None	NA	NA
Radium-226+228 (pCi/l)	5	None	NA	NA
Selenium (mg/l)	0.05	None	NA	NA
Thallium (mg/l)	0.002	None	NA	NA

NA – Not applicable

(a) GWPSs documented in notice dated 10/15/2018.

(b) Assessment monitoring events May to October 2018 (per 40 CFR 257.95(b) and (d)).

(c) Value of 99% lower confidence band (LCB) on the mean of Appendix IV groundwater sampling events between November 2016 and August 2018. Upper confidence band (UCB) not shown as it is greater than LCB.

(d) SSL is statistically significant level over GWPS.