Memo

To:	Tennessee Valley Authority Chattanooga, TN	From:	Matthew Dagon, LPG Indianapolis, IN
File:	Updated GWPS and SSLs at the Shawnee Fossil Plant Ash Pond 2 (Main Ash Pond/Stilling Pond) and Consolidated Dry Stack Multiunit CCR Units	Date:	October 2019

Reference: Update on Statistically Significant Levels (SSLs)
CCR Rule Groundwater Monitoring
Shawnee Fossil Plant, Ash Pond 2 (Main Ash Pond/Stilling Pond) and Consolidated Dry Stack Multiunit 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 Ash Pond 2 (Main Ash Pond/Stilling Pond) and Consolidated Dry Stack Multiunit CCR Units at its Shawnee Fossil Plant (SHF) in West Paducah, Kentucky. The Ash Pond 2 (Main Ash Pond / Stilling Pond) and Consolidated Dry Stack are all subject to the CCR Rule with a multi-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 GWPSs. 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 semi-annual assessment monitoring event for 2019 occurred July 30, 2019 through August 1, 2019, with the additional “resample” event occurring August 26-27, 2019. This technical memorandum presents GWPSs and lower confidence bands (LCBs) that have been updated with data collected during the first semi-annual monitoring event and resample event for 2019, as well as any identified SSLs after incorporating the additional data collected in 2019. The identification of SSLs was performed as a two-step process:

1. Historical sampling results (November 2016 through August 26-27, 2019) for Appendix IV parameters from each downgradient well were compared directly to the 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 August 26-27, 2019. As recommended in the Unified Guidance, where the 99% LCB exceeds the GWPS at the last sampling event an SSLs was identified for the constituent/well pair.

Based on the statistical analysis, no SSL above GWPS was identified during the first semi-annual monitoring event conducted in 2019. An SSL over the GWPS for molybdenum in well D-74B was identified in 2018; however, the LCB at the last monitoring event in 2019 was below the GWPS. TVA will continue to conduct groundwater monitoring and reporting pursuant to 40 CFR 257.95.

Reference: Update on Statistically Significant Levels (SSLs) at the Shawnee Fossil Plant, Ash Pond 2 (Main Ash Pond/Stilling Pond) and Consolidated Dry Stack Multi-Unit CCR Unit

TABLE 1: Statistically Significant Levels (SSLs) Above GWPSs SHF Ash Pond 2 (Main Ash Pond/Stilling Pond) and Consolidated Dry Stack Multi-Unit CCR Unit

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	D-74B	0.0018	**No**
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)	0.1053	0.1	D-74B	0.068	**No**
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 10/8/2019 with 2 additional sample results collected on July 30, 2019 through August 1, 2019 and August 26-27, 2019.

(c) Downgradient wells with analytical results above GWPS November 2016 through August 26-27, 2019 (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 August 26-27, 2019. 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.