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To: Tennessee Valley Authority  
Chattanooga, TN

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File: Updated GWPS and SSLs at the  
Johnsonville Fossil Plant Active Ash 2  
Pond CCR Unit

Date: October 2019

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**Reference: Update on Statistically Significant Levels (SSLs)  
CCR Rule Groundwater Monitoring  
Johnsonville Fossil Plant, Active Ash 2 Pond**

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 Active Ash 2 Pond CCR unit at its Johnsonville Fossil Plant (JOF) in New Johnsonville, Tennessee. The Active Ash Pond 2 consists of one CCR 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 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 April 2-3, 2019, with the additional “resample” event occurring July 8-10, 2019. This technical memorandum presents GWPSs and lower confidence bands (LCBs) that have been updated with data collected during the first semiannual 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 July 8-10, 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 July 8-10, 2019. 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 2019, there continues to be an SSL above the GWPS for cobalt in wells 10-AP3 and JOF-103. These are the same SSLs at the same wells as were previously identified. TVA will continue to conduct groundwater monitoring and reporting pursuant to 40 CFR 257.95.

Reference: Update on Statistically Significant Level (SSLs) at the Johnsonville Fossil Plant - Active Ash 2 Pond

**TABLE 1: Statistically Significant Levels (SSLs) Above GWPSs  
JOF Active Ash 2 Pond**

| 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            | 10-AP3  | 0.00412          | <b>No</b>          |
|                        |          |                  | JOF-103   | 0.00122          | <b>No</b>          |
| Chromium (mg/l)        | 0.1      | 0.1              | None  | NA               | NA                 |
| Cobalt (mg/l)          | 0.006    | 0.006            | 10-AP3  | 0.0292           | <b>Yes</b>         |
|                        |          |                  | JOF-103   | 0.0458           | <b>Yes</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             | JOF-103   | 0.00686          | <b>No</b>          |
| 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 09/17/2019 with additional sample results collected on April 2-3, 2019 and July 8-10, 2019.
- (c) Downgradient wells with analytical results above GWPS November 2016 through July 8-10, 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 July 8-10, 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.