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Chattanooga, TN

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File: Updated GWPS and SSLs at the  
Paradise Fossil Plant Gypsum Disposal  
Area CCR Units

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**Reference: Update on Statistically Significant Levels (SSLs) - CCR Rule Groundwater Monitoring  
Paradise Fossil Plant Gypsum Disposal Area CCR Unit**

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 Gypsum Disposal Area CCR Units at its Paradise Fossil Plant (PAF) in Drakesboro, Kentucky. The Gypsum Disposal Area CCR Units include the Gypsum Disposal Area, Gypsum Disposal Area Stilling Pond 1 and the Gypsum Disposal Area Stilling Pond 2. All units are all subject to the CCR Rule and share a common, multiunit groundwater monitoring well network.

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 February 17-19, 2020. This technical memorandum presents GWPSs and lower confidence bands (LCBs) that have been updated with the sample collected as part of the first semiannual assessment monitoring event 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 (November 2016 through February 2020) 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 to 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 in 2020, no SSLs above the GWPS were identified during the assessment monitoring event in 2020, which is consistent with the assessment monitoring results for 2018 and 2019. TVA will continue to conduct groundwater monitoring and reporting pursuant to 40 CFR §. 257.95.

Reference: Update on Statistically Significant Levels (SSLs) at the Paradise Fossil Plant Gypsum Disposal Area CCR Units

**TABLE 1: Statistically Significant Levels Above GWPSs - PAF Gypsum Disposal Area 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)         | 0.0136   | 0.0154           | PAF-116   | 0.0090           | <b>No</b>          |
| Barium (mg/l)          | 2        | 2                | None  | NA               | NA                 |
| Beryllium (mg/l)       | 0.05     | 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)          | 0.0889   | 0.0995           | None  | NA               | NA                 |
| Fluoride (mg/l)        | 4        | 4                | None  | NA               | NA                 |
| Lead (mg/l)            | 0.015    | 0.015            | None  | NA               | NA                 |
| Lithium (mg/l)         | 0.165    | 0.182            | PAF-116   | 0.1127           | <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 07/08/2020 with 3 additional samples, each collected from Wells 95-48A, PAF-101 and PAF-104. Samples were collected between November 2016 and February 2020.
- (c) Downgradient wells with analytical results above GWPS November 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 November 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