

Paradise Fossil Plant



MUHLENBERG COUNTY, KENTUCKY



QUICK FACTS



EPA CCR Rule Groundwater Monitoring

This fact sheet summarizes groundwater monitoring conducted by TVA for the Paradise Fossil Plant, as required by the U.S. Environmental Protection Agency (EPA) Coal Combustion Residuals (CCR) Rule. The EPA published the CCR Rule on April 17, 2015. It requires companies operating coal-fired power plants to study whether constituents in CCR have been released to groundwater from active, inactive and new CCR impoundments, as well as active and new CCR landfills.

The CCR Rule establishes multiple phases of protective groundwater monitoring including baseline sampling, Detection Monitoring and Assessment Monitoring. Corrective action may be necessary at the completion of this process. For more information on the CCR Rule Groundwater Monitoring requirements, go to www.tva.com/ccr.

Paradise Plant CCR Rule Groundwater Monitoring Network

TVA installed monitoring wells around the CCR management units and implemented a baseline sampling program. After completion of the baseline sampling, TVA began Detection Monitoring. The constituents specified by the CCR Rule for Detection Monitoring are boron, calcium, chloride, fluoride, pH, sulfate, and total dissolved solids (TDS). These seven constituents occur naturally in soils, rock, groundwater and surface water, and can also be present in coal and CCR. They were selected by EPA because they can indicate groundwater conditions that may require further evaluation.

Commissioning Date: 1967

Output: 881 Megawatts
(6 Billion kilowatt-hours per year)

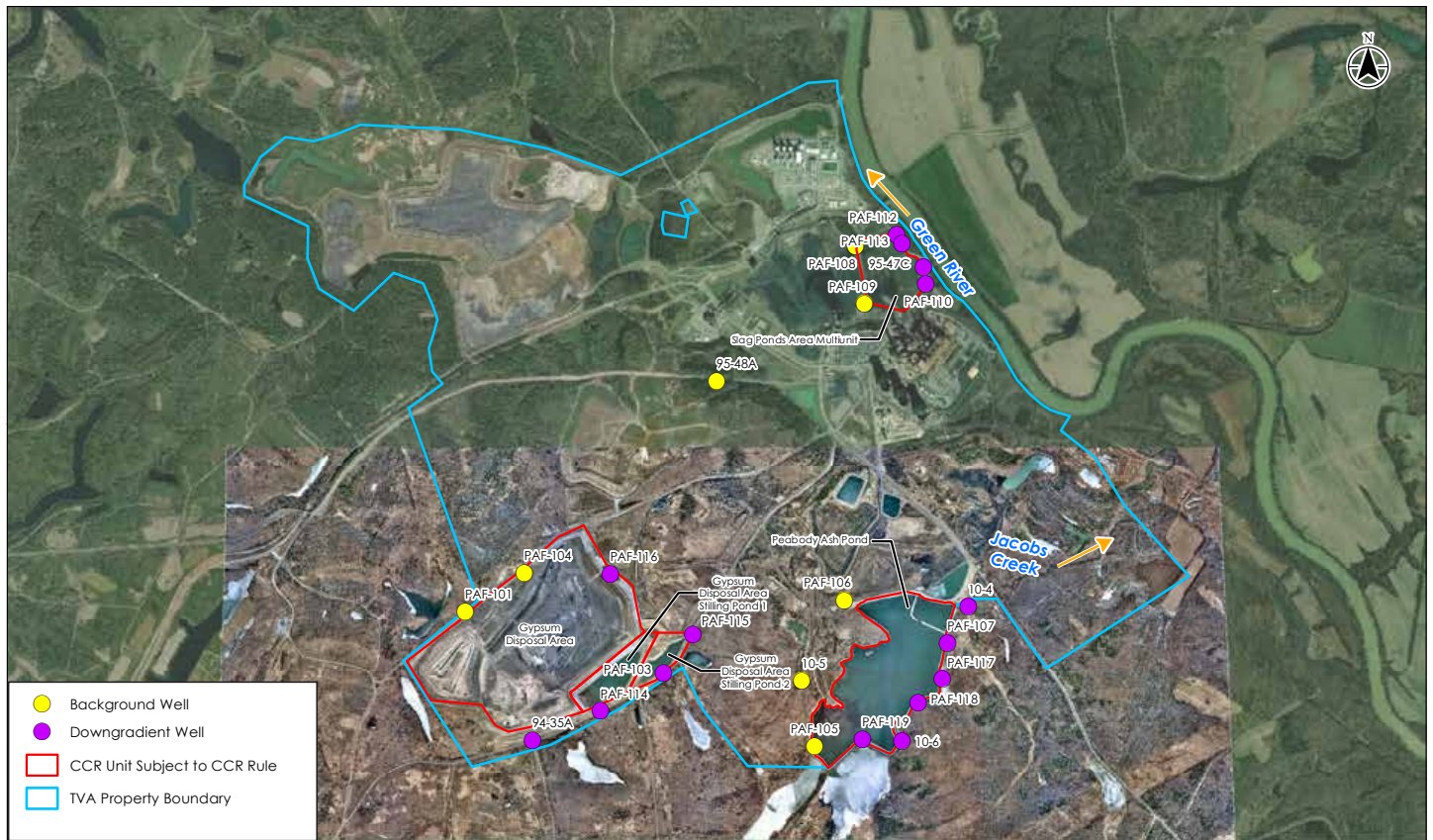
Number of homes powered:
Approximately 400,000 homes

Wet to Dry / Dewatered Conversion Program: Associated activities underway

CCR Units Closed: 152 acres

TVA Wide CCR Conversion Program Total Spend:
Approximately \$1.3 Billion

TVA installed a “background”, or upgradient, well in a location that is not expected to be affected by the management of CCR. Other wells were drilled around the edge of the areas where CCR is managed or already existed and were being monitored. These wells are sometimes referred to as “downgradient wells” and placed in locations to monitor for releases to groundwater. The locations of the wells are shown below.



CCR Rule Detection Monitoring Results for Paradise Fossil Plant

TVA prepared its initial **2017 Annual Groundwater Monitoring and Corrective Action Reports** for the Paradise Fossil Plant, which analyzed the detection monitoring results to determine if there were statistically significant increases (SSIs) over background levels. The reports can be found by clicking on the following hyperlink www.tva.com/ccr. The initial comparison of downgradient wells to upgradient wells shows that concentrations of boron, calcium, chloride, fluoride, pH, sulfate and TDS around the CCR management units may be greater than naturally occurring levels. Data does not reflect the quality of public drinking water supplies, which are regularly tested to confirm they are meeting safe drinking water standards.

2018 Groundwater Monitoring Activities

Since the initial groundwater monitoring results identified SSIs, TVA conducted alternate source demonstrations to determine if the exceedances were the result of another source or the result of an error in the sampling or analytical method, or natural variability in groundwater quality. No alternate source was determined resulting in the facility moving into the Assessment Monitoring phase. The groundwater sampling for this phase is expanded to test for additional constituents, for which TVA has determined groundwater protection standards (GWPS), including antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, fluoride, lead, lithium, mercury, molybdenum, radium, selenium and thallium.

Paradise Fossil Plant CCR Rule Assessment Monitoring Results

The Assessment Monitoring results are contained in the **2018 Groundwater Monitoring and Corrective Action Reports**. The reports can be found at www.tva.com/ccr. Below is the Paradise Assessment Monitoring Results Matrix, which is based on comparative analysis of statistical analysis results versus GWPS. Refer to Appendix A – Statistical Analysis Report of the 2018 Annual Groundwater Monitoring and Corrective Action Reports for more information.

		GROUNDWATER QUALITY MONITORING WELL LOCATIONS													
		Background Wells					Gypsum Disposal Area, Stilling Pond 1 & 2					Slag Ponds Area Multiunit			
Constituent	GWPS mg/L	95-48A	PAF-101	PAF-104	PAF-108	PAF-109	94-35A	PAF-114	PAF-103	PAF-115	PAF-116	PAF-110	95-47C	PAF-113	PAF-112
Antimony	0.006	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Arsenic	0.01	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Barium	2	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Beryllium	0.004	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Cadmium	0.005	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Chromium	0.1	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Cobalt	0.006	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Fluoride	4	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Lead	0.015	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Lithium	0.04	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Mercury	0.002	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Molybdenum	0.1	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Rad226+228	5 pCi/L	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Selenium	0.05	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Thallium	0.002	●	●	●	●	●	●	●	●	●	●	●	●	●	●

		GROUNDWATER QUALITY MONITORING WELL LOCATIONS									
		Background Wells				Peabody Ash Pond					
Constituent	GWPS mg/L	95-48A	10-5	PAF-105	PAF-106	PAF-119	10-6	PAF-118	PAF-117	PAF-107	10-4
Antimony	0.006	●	●	●	●	●	●	●	●	●	●
Arsenic	0.01	●	●	●	●	●	●	●	●	●	●
Barium	2	●	●	●	●	●	●	●	●	●	●
Beryllium	0.004	●	●	●	●	●	●	●	●	●	●
Cadmium	0.005	●	●	●	●	●	●	●	●	●	●
Chromium	0.1	●	●	●	●	●	●	●	●	●	●
Cobalt	0.006	●	●	●	●	●	●	●	●	●	●
Fluoride	4	●	●	●	●	●	●	●	●	●	●
Lead	0.015	●	●	●	●	●	●	●	●	●	●
Lithium	0.04	●	●	●	●	●	●	●	●	●	●
Mercury	0.002	●	●	●	●	●	●	●	●	●	●
Molybdenum	0.1	●	●	●	●	●	●	●	●	●	●
Rad226+228	5 pCi/L	●	●	●	●	●	●	●	●	●	●
Selenium	0.05	●	●	●	●	●	●	●	●	●	●
Thallium	0.002	●	●	●	●	●	●	●	●	●	●

Color Coding Key

- Monitoring data results are below GWPS
- Monitoring data results are below GWPS, but results are 65% or more of the GWPS
- Monitoring data results exceed GWPS (TVA will initiate assessment of corrective measure)

Next Steps for Paradise Fossil Plant CCR Rule Groundwater Monitoring

TVA will continue to monitor and evaluate the groundwater at the Paradise Fossil Plant site. In January 2019 TVA completed an evaluation of whether there were exceedances of GWPS detected at the Peabody Ash Pond and Slag Ponds 2A and 2B and Slag Stilling Pond 2C. During assessment monitoring, two SSLs of Appendix IV constituents were reported above GWPS in downgradient monitoring wells. TVA has since completed an Assessment of Corrective Measures Report to analyze the potential effectiveness of potential corrective measures. This report will be posted to the CCR website on August 14, 2019. A semiannual report describing the progress in selecting and designing the final remedy will be completed in January 2020. Note that there were no SSLs at the Gypsum Storage Area (which remains in assessment monitoring).