

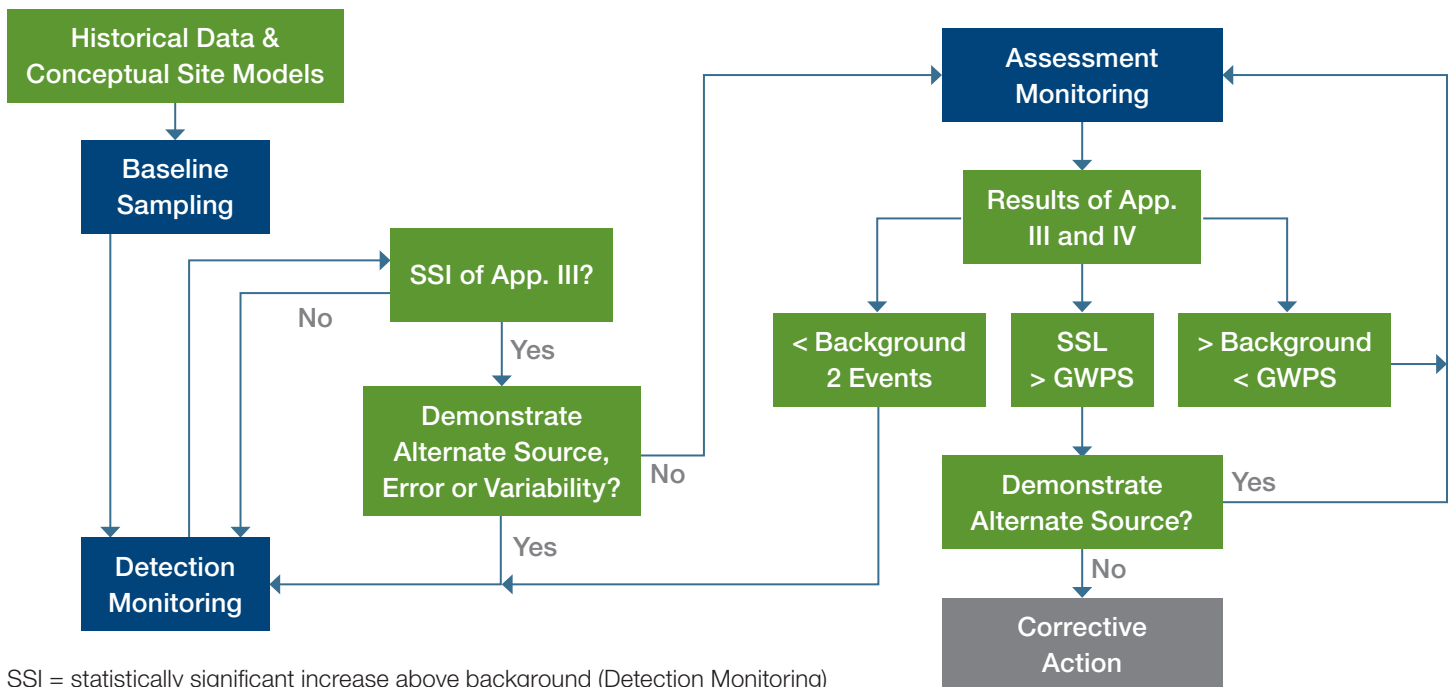
Executive Summary

CCR RULE GROUNDWATER MONITORING REQUIREMENTS



The U.S. Environmental Protection Agency (EPA) published the Coal Combustion Residuals (CCR) Rule [40 CFR 257, Subpart D] on April 17, 2015. This Rule requires groundwater monitoring of 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.

CCR Groundwater Monitoring Phases



SSI = statistically significant increase above background (Detection Monitoring)
 App. III and IV = lists of CCR constituents to be analyzed
 SSL = statistically significant level above GWPS (Assessment Monitoring)
 GWPS = groundwater protection standard

Baseline Sampling

To comply with the CCR Rule, a network of groundwater monitoring wells must be installed at strategic locations around each CCR unit. Based on groundwater flow direction, both upgradient/background and downgradient wells must be installed. The wells enable collection of representative groundwater samples from the uppermost aquifer. This aquifer is defined as the groundwater source nearest the surface that can produce usable quantities of groundwater to supply wells or springs. The number of wells may vary by site. A minimum of eight independent baseline samples must be obtained to support statistical analysis.

Detection Monitoring Program

Samples are tested for seven different constituents that are considered by EPA to be the “leading indicators” of whether contamination is migrating from a CCR unit. These are found in 40 CFR Part 257, Appendix III, “Constituents for Detection Monitoring” and are as follows:

- boron (B)
- calcium (Ca)
- chloride (Cl)
- fluoride (F)
- pH
- sulfate (SO₄)
- total dissolved solids (TDS)

The groundwater results are evaluated using a defined statistical method to determine whether there are statistically significant increases (SSIs) above the natural, or background, concentrations for each constituent in every downgradient well.

- If SSIs are discovered, the data is further evaluated through an Alternate Source Demonstration (ASD) to verify whether there is an alternate source, an error in the sampling or analytical method, or natural variability in groundwater quality. If successful, the CCR unit remains in Detection Monitoring.
- If unsuccessful, the CCR unit moves into Assessment Monitoring within 90 days (see Assessment Monitoring Program discussion below).
- If no SSIs are found, the CCR unit continues in Detection Monitoring.

Assessment Monitoring Program

In Assessment Monitoring, the groundwater sampling is expanded to test for additional constituents, for which TVA must establish site-specific Groundwater Protection Standards (GWPS). “Constituents for Assessment Monitoring” are listed in 40 CFR Part 257, Appendix IV, and are as follows:

- antimony (Sb)
- arsenic (As)
- barium (Ba)
- beryllium (Be)
- cadmium (Cd)
- chromium (Cr)
- cobalt (Co)
- fluoride (F)
- lead (Pb)
- lithium (Li)
- mercury (Hg)
- molybdenum (Mo)
- selenium (Se)
- thallium (Tl)
- radium 226/228 combined (Ra)

During Assessment Monitoring, downgradient concentrations are evaluated for statistically significant levels (SSLs) as compared to the GWPS established for the site. Once a CCR unit enters the Assessment Monitoring Program, there are several possible outcomes:

- If all of the Appendix III and IV constituents are at or below the background levels for two consecutive sample events, then the program returns to Detection Monitoring.
- If any of the Appendix III or IV constituents are above background concentrations, but are below all of the GWPS, then the CCR unit remains in Assessment Monitoring.
- If there is a SSL occurrence for an Appendix IV constituent, an Alternate Source Demonstration (ASD) can be made within 90 days that another source unrelated to the CCR unit was the cause of the SSL occurrence, or that the SSL occurrence was a result of a sampling and analysis error, a statistical evaluation error or a natural groundwater quality variation. A CCR unit can continue under the Assessment Monitoring Program if a successful ASD explaining the SSL occurrence is made.
- If there is a sampling result that cannot be attributed to an alternate source (including sampling error, natural increase in background levels, etc., as described above), an Assessment of Corrective Measures must begin within 90 days. Following completion of the Assessment of Corrective Measures report, the process for selecting a final groundwater remedy begins. A corrective measure remedy must be selected as soon as feasible, and during evaluation, TVA must produce semiannual reports describing the progress made towards selection and implementation of the remedy.

Monitoring continues through the operating life of the CCR unit and through the prescribed post-closure period.

Annual Groundwater Monitoring and Corrective Action reports are prepared for each unit and are posted on the public CCR Rule website. These reports provide the monitoring results from the groundwater monitoring events during the previous calendar year.