Implementing the Proposed CCR Rule and Groundwater Corrective Measures

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OVERVIEW
The United States Environmental Protections Agency released the draft –final proposed Coal Combustion Residual (CCR) Rule on December 19, 2014. At this point most understand "5 W's" (who, what, when, where, and why) of the proposed rule, but are you prepared to answer the "How". This presentation will provide an overview of how coal-fired power generation providers can implement the new CCR Rule and presents a clear pathway to address groundwater corrective measures.

CCR Regulatory Roadmap
Below is the Regulatory Roadmap for the draft-final USEPA CCR Rule relative to Implementing the Groundwater Monitoring and Corrective Action.

- Applicability. § 257.90
- Groundwater monitoring systems. § 257.91
- [Reserved] § 257.92
- Groundwater sampling and analysis requirements. § 257.93
- Detection monitoring program. § 257.94
- Assessment monitoring program. § 257.95
- Assessment of corrective measures. § 257.96
- Selection of remedy. § 257.97
- Implementation of the corrective action program. § 257.98

Details regarding the implementation and technical insight behind the groundwater monitoring and corrective action portios of the rule are provided in the sections below.

Monitoring Compliance Schedule §257.90 - §257.91

Critical elements of this section are:

- Existing CCR landfills and surface impoundments:  
  - within 30 months of effective date of final rule

- New CCR landfills and surface impoundments:
  - before CCR can be disposed in facility

- GW monitoring throughout active life and 30 year post-closure care period unless:
a) can demonstrate reduced period is sufficient to protect human health and environment and is certified by “qualified” P.E.;

b) owner/operator determines longer period is needed to protect human health and environment.

- Must notify state once each year throughout active life and post-closure care period that site is in compliance with GW monitoring and corrective action provisions

Groundwater Monitoring System Design: Minimum Requirements §257.91

- Sufficient number of wells at appropriate locations and depths to sample uppermost aquifer (defined in §257.40 (b))
- Represent background groundwater quality
- Represent groundwater quality at waste boundary in uppermost aquifer
- Minimum number of wells: 1 upgradient and 3 downgradient wells
- Need to report information on Site History, Engineering Design, and Geotechnical Components

Significant Statistical Increase

To be defined as a significant statistical increase (SSI), change in concentration must be large enough, after accounting for sample variability, that result is unlikely to have occurred merely by chance. Adapted from USEPA Unified Guidance (P. 4-6)

What constitutes a statistically significant result depends on the phase of monitoring and the type of statistical test being employed.

Goal of Statistical Analysis

- Determine if statistically significant increase greater than background concentrations for each App III parameter for Detection Monitoring
- Determine if statistically significant increase greater than MCL or alternate criteria concentrations for each App IV parameter for Assessment Monitoring
- Determine if App IV parameters in downgradient wells have been below MCL or alternate criteria for 3 consecutive years after Corrective Action Measure implemented

Detection Monitoring §257.94

- Parameters (Appendix III to Part 257)
  - boron, calcium, chloride, fluoride, pH, sulfate and total dissolved solids (TDS)
  - USEPA selected above based on presence in CCRs and “rapid” migration through subsurface.
  - However, not present in all CCRs and both pH and redox conditions may vary between background and downgradient wells
- Semi-annual sampling (minimum) for active life and through post-closure period.
- Number of Samples:
  - Minimum of 8 samples per background and each downgradient well in first semi-annual event
  - One sample per well in subsequent events
- If statistically significant increase occurs within 14 days, result must be posted on company website with list of parameters and associated exceedances. Must notify state regulatory agency when notice posted.
• If exceedance occurs, establish assessment monitoring program within 90 days unless rationale is provided demonstrating another reason for exceedance exists based on criteria set forth in §257.94 (d)(3).

Assessment Monitoring §257.95
• Parameters (Appendix IV to Part 257) – Al, Sb, As, Ba, Be, B, Cd, Co, Pb, Cr, Cu, F, Fe, Li, Hg, Mo, Se, Tl, Ra 226 & 228 (combined)
• For parameters detected in downgradient wells, need to have minimum of 8 samples to establish background for App IV parameters
• Within 14 days, notify state and post results of detected parameters in downgradient wells on company website
• Within 90 days and then semi-annually afterward, sample for App III and App IV parameters detected in first event, notify state and post results on company website.
• Within 90 days and then annually afterward, sample for all App IV parameters in one sample per downgradient well.
• Establish groundwater protection standards for parameters detected in downgradient wells for first event §257.95 (b) or later events §257.95 (c); Use MCLs if promulgated or other level per criteria in §257.95 (g, h, i)

Corrective Measures Monitoring §257.96
If SSI Exceedance:
• 90 days to initiate assessment
• 90 days to complete assessment
• 180 total days
Criteria:
• Safety
• Costs / Ease to Implement
• Performance
• Reliability
• Potential Impacts to other media
• Control of exposure to residual contamination
• Implementation Schedule and Duration
• Institutional requirements
• O&M Requirements, if any (Author suggestion only)

Selection of Remedy § 257.97
• No Action
• Monitored Natural Attenuation
• Engineering and/or Institutional Controls
• Groundwater Containment
• Groundwater Extraction
• Groundwater Treatment
• Combination of the above

Implementation of Corrective Action Program §257.98
• Based on remedy schedule per §257.95 (d), implement groundwater monitoring program which:
  • Meets requirements of assessment monitoring program (§257.95)
• Indicates effectiveness of corrective action remedy
• Demonstrates compliance with groundwater protection standard that was established for App IV parameters detected in downgradient wells

• Remedies considered complete when:
  – Complies with groundwater protection standards per §257.95 (h) or (i) or at all points within plume beyond monitoring well system of §257.91 (a)
  – Compliance with groundwater protection standards per §257.95 (h) or (i) demonstrated when App IV constituents have not exceeded GWPS for 3 consecutive years using statistical procedures and performance standards in §257.93 (g) or (h)
  – All actions to complete remedy satisfied

• When remedy complete, must notify state within 14 days that certification signed by owner/operator posted on Website

Compliance Schedule Deadlines

A summary of compliance dates is presented on Table 1 at the end of this paper.

References

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Implementation Timeframe (Number of Months after Publication of Rule)</th>
<th>Description of Requirement to be Completed</th>
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<tbody>
<tr>
<td>Location Restrictions (§257.60 - §257.64)</td>
<td>42 months</td>
<td>Complete demonstration for placement above the uppermost aquifer Complete demonstrations for wetlands, fault areas, seismic impact zones, and unstable areas</td>
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<tr>
<td>Design Criteria (§257.71)</td>
<td>18 months</td>
<td>Document whether CCR unit is either a lined or unlined CCR surface impoundment</td>
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<tr>
<td>Structural Integrity (§257.73)</td>
<td>8 months 18 months 24 months</td>
<td>Install permanent marker Compile a history of construction, complete initial hazard potential classification assessment, initial structural stability assessment, and initial safety factor assessment Prepare emergency action plan</td>
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<td>Air Criteria (§257.80)</td>
<td>6 months</td>
<td>Prepare fugitive dust control plan</td>
</tr>
<tr>
<td>Hydrologic and Hydraulic Capacity (§257.82)</td>
<td>18 months</td>
<td>Prepare initial inflow design flood control system plan</td>
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<td>Inspections (§257.83)</td>
<td>6 months 6 months 9 months</td>
<td>Initiate weekly inspections of the CCR unit Initiate monthly monitoring of CCR unit instrumentation Complete the initial annual inspection of the CCR unit</td>
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<td>Groundwater Monitoring and Corrective Action (§257.90 - §257.98)</td>
<td>30 months</td>
<td>Install the groundwater monitoring system; develop the groundwater sampling and analysis program; initiate the detection monitoring program; and begin evaluating the groundwater monitoring data for statistically significant increases over background levels</td>
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<td>Closure and Post-Closure Care (§257.103 - §257.104)</td>
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