Ash Impoundment Closures: 
*An Encyclopedia of Options*

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CONFERENCE: 2015 World of Coal Ash – (www.worldofcoalash.org)

KEYWORDS: CCR Rule, ash impoundments, closures, groundwater, investigation, corrective action, geosynthetics, redevelopment

OVERVIEW
The available options to successfully close your next ash impoundment (i.e., pond, landfill, etc.) are vast. Many questions arise such as:

- Where do I start?
- Is closing my impoundment the right choice?
- What regulatory challenges may I encounter?
- What closure strategies are available and "combat tested"?
- What new, innovative strategies are emerging?
- Is there a beneficial reuse option available?
- Are there other options available that may minimize the impact to my bottom line?
Contaminants of Concerns

Contaminants of Concern for Coal Combustion Residual operations are listed below and presented in Figure 1:

- Antimony,
- Arsenic,
- Barium,
- Beryllium,
- Cadmium,
- Chromium,
- Cobalt,
- Fluoride,
- Lead,
- Lithium,
- Mercury,
- Molybdenum,
- Selenium,
- Thallium,
- Radium 226 and 228 combined

Figure 1 – Contaminants of Concern
Possible Sources

- CCR Landfills
  - Leachate(As,B,Cr+6,Cu,Mo,Sn,Tl,V)
- Ash Ponds
  - Boiler blowdown(Al, Fe)
  - Ash sluice water(As, Se, V)
  - Cooling tower blowdown (Fe, high pH)
  - Coal Pile Runoff(As, Cr, Cu, Fe, Mn, low pH)
  - Miscellaneous sumps
  - FGD(As,B,Cr+6,Cu,Mo,Tl,V)

Ash Pond Closure Goals and Options
Owners should firmly understand the primary goals for ash pond closures prior to selecting a specific closure option. These primary goals are:

- Completion of closure activities in a safe manner
- Regulatory compliance
- Long-term reduction of environmental and engineering risk
- Controlling short-term (capital) and long-term (maintenance) costs

In addition to the primary goals, ash pond closures scenarios are generally divided into two main categories:

- In-place Closure (minimal to no removal of CCR’s)
- Clean Closure (complete removal of CCR’s and any impacted soils)

Table 1 below presents a general overview of ash pond closure options and related services require for each option. Options 1-3 are “In-Place Closures”, while Option 4 is considered a “Clean Closure”
Table 1  
Ash Pond Closure Option Summary 

<table>
<thead>
<tr>
<th>Option 1: Inactive Closure</th>
<th>Option 2: Repair/Reline</th>
<th>Option 3: Redevelopment</th>
<th>Option 4: Off-Site Disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Treatability Study</td>
<td>✓ Treatability Study</td>
<td>✓ Treatability Study</td>
<td>✓ Treatability Study</td>
</tr>
<tr>
<td>✓ Beneficial Reuse Study</td>
<td>✓ Design Solution</td>
<td>✓ Determine Plant Optimization and best intended use</td>
<td></td>
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<tr>
<td>✓ Dewatering</td>
<td>✓ Develop Sequencing and Segmenting (S&amp;S) Plan</td>
<td>✓ Develop S&amp;S Plan</td>
<td></td>
</tr>
<tr>
<td>✓ Cap and Cover</td>
<td>✓ Removal and Dewatering of existing CCPs</td>
<td>✓ Removal and Dewatering of existing CCPs</td>
<td></td>
</tr>
<tr>
<td>✓ CCR Removal</td>
<td>✓ Installation of Liner and Leachate Collection (LC) Systems</td>
<td>✓ Installation of Liner and LC Systems</td>
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</tr>
<tr>
<td>✓ Combination of Stabilization and Cap/Cover</td>
<td>✓ CQA</td>
<td>✓ CQA</td>
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<tr>
<td>✓ Beneficial Reuse Study</td>
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<tr>
<td>✓ E/I/C’s</td>
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</tbody>
</table>

Conclusion
Ash Pond Closures require a myriad of complicated decisions prior to moving forward. Once an owner has determined path forward to include an ash pond closure, there are fundamental goals and numerous options dependent upon those goals to evaluate. There isn’t a “one size fits all” solution and careful evaluation and care should be exercised by qualified technical staff.

REFERENCES

None