CCR Surface Impoundment Structural Stability Assessments

ASTSWMO Hazardous Waste Training Conference
June 29, 2010
After the impoundment failure at TVA’s Kingston, TN facility, EPA began a comprehensive review of the structural stability of surface impoundments managing “wet-handled” coal combustion residuals (CCRs).

We appreciate State involvement and assistance in this process.

Multi-phase effort
- Information Requests
- Site Assessments
- Independent reports on the impoundments
- Facility Action Plans to implement any report recommendations to improve structural stability of the impoundments
- Follow-up
Information Requests

- EPA sent information requests, under the authority of CERCLA 104 (e) in March, April, and December 2009, seeking information specifically related to the structural integrity of the impoundments or other units managing “wet-handled CCRs”; for example:
  - The unit’s hazard potential rating using the National Inventory of Dam’s criteria for high, significant, low, or less than low.
  - The year each unit was commissioned and expanded.
  - Was the unit designed by and constructed under the supervision of a professional engineer? Is inspection and monitoring of the unit under the supervision of a professional engineer?
Information Requests (continued)

- When was the unit last inspected by a State or Federal regulatory official?

- Have assessments within the past year uncovered any structural integrity issues? If so, describe actions that have been or are being taken to address these issues.

- When did the company last assess the structural integrity of the unit?

- Surface area/total storage capacity/volume stored/maximum height of the unit.

- Brief history of known spills or unpermitted releases in the last 10 years.
Information Requests (continued)

- Information has been received from 228 facilities related to 629 surface impoundments.

- Of the 629 impoundments, 200 have been assigned a rating using the National Inventory of Dams criteria.

  - 50 units (25%) High Hazard Potential
  - 71 units (36%) Significant Hazard Potential
  - 71 units (36%) Low Hazard Potential
  - 8 units (3%) Less than Low Hazard Potential

The hazard potential ratings do not assess the stability of the units; the ratings assess the potential for loss of life or environmental or economic damage in the event of a failure of the unit.
Of the 629 units, 443 (70%) were designed by a professional engineer.

The units show considerable variation in height:
- 80 (13%) are greater than 50 feet in height
- 133 units (21%) are between 26 and 50 feet in height

Most of the information EPA received has been placed in a database; we have extracted the fields and placed them on our website in both PDF and Microsoft Excel spreadsheets to make it easy to search for aggregate or facility-specific information.
Site Assessments

- EPA used the results of the information requests to prioritize units for site assessments.

- Site assessments have been and are being conducted by contractors who are experts in dam integrity.

- In 2009, EPA assessed all 52 facilities which had units with high or significant hazard potential ratings.

- In late 2009 and early 2010, EPA staff evaluated the unrated units and using Google Earth assigned them a tentative rating. Many have been assigned a significant rating due to their size and proximity to waterbodies.
Site Assessments (continued)

- Currently, we are proceeding to assess the facilities which have units with a significant rating.

- In May 2010, EPA assessed 20 facilities; an additional 17 facility assessments are ongoing and will be completed by July 6. We will conduct additional assessments during the remainder of the year.
Site Assessment Reports

- Site assessment reports – based on
  - Visual assessment
  - Interviews with site personnel
  - Review of geotechnical reports and studies related to design, construction, and operation of impoundments
  - Past inspections

- Reports contain
  - Findings
  - Rating for each unit – satisfactory, fair, poor, or unsatisfactory
  - Recommendations

- Draft reports reviewed by facilities, States, and EPA.

- EPA posts draft reports, all comments received, and the final reports on our web site.
Site Assessment Reports (continued)

- **Ratings and Results for Units Assessed in 2009**

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
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</thead>
<tbody>
<tr>
<td>Satisfactory</td>
<td>68</td>
</tr>
<tr>
<td>Fair</td>
<td>36</td>
</tr>
<tr>
<td>Poor</td>
<td>16</td>
</tr>
<tr>
<td>Unsatisfactory</td>
<td>0</td>
</tr>
<tr>
<td>Total Units Assessed</td>
<td>120</td>
</tr>
</tbody>
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- **Recommendations generally focused on maintenance, other studies, and some additional actions.**
Site Assessment Reports (continued)

- **Maintenance**
  - Regular mowing of impoundments
  - Removal of vegetation
  - Monitoring/filling animal burrows
  - Monitoring piezometers, survey monuments, and inclinometers.

- **Conducting Additional Studies**
  - Liquefaction analysis
  - Rapid draw down analysis
  - Slope stability analysis
  - Hydraulic analysis
Site Assessment Reports (continued)

Other Actions

- Fill in erosion ditches and gullies.
- Ensure proper drainage of surface runoff.
- Conduct borings to inform stability analysis.
- Install piezometers to monitor movement of water through embankment.
- Install survey monuments to measure vertical movement of embankment.
- Install rip-rap at toe of embankment to prevent erosion.
Facility Action Plans

- EPA has asked each facility to develop an action plan detailing how it will implement the recommendations contained in the final report.

- The action plans are posted on our web site.

- Facilities are implementing the recommendations.
  - Monitoring recommendations are generally implemented immediately.
  - Most other recommendations have been completed or will be completed by the end of 2010.
  - Where more extensive studies are recommended, they will be completed by the first half of 2011 at the latest.
Follow-up Actions

- EPA is following up with facilities to ensure that they implement the recommendations contained in the reports.
Additional Information

- All of the information on the site assessments is available on our web site at:

http://www.epa.gov/epawaste/nonhaz/industrial/special/fossil/surveys2