Planning and Implementing Schedule Driven CCP Projects at TVA’s Gallatin Fossil Plant

David Skeggs, PE
Rachel Combs, PE
Michael Clemmons

05.05.2015
Agenda
Planning and Implementing Schedule-Driven CCP Projects at TVA’s Gallatin Fossil Plant

1 Overview of TVA’s Gallatin Fossil Plant

2 Projects, Priorities and Schedule

3 North Rail Loop Landfill

4 Haul Road

5 Pond Improvement Projects

6 Lessons Learned

7 Next Steps
### Overview of TVA’s Gallatin Fossil Plant

#### Background

- TVA is investing over $1 billion to install a new dry scrubber at GAF
- Unit 4 scrubber came online in April 2015
- The scrubber will generate approximately 350,000 tons/year of dry CCR material

#### 2010

- To support this investment, TVA begins planning for dry CCR disposal capacity
  - Stantec completes slope stability evaluation of the GAF ash ponds
  - Stantec completes hydraulic evaluation of the GAF ash ponds

#### 2011-present

- TVA has invested over $25M in construction
  - New Class II North Rail Loop (NRL) Disposal Facility
  - New 1.5 mile paved haul road for CCR transport
  - Ash pond stability improvements
  - Two spillway upgrade projects
Projects were all schedule driven:

- Dry CCR disposal and haul road required prior to startup of scrubber system
- TVA made commitments to complete stability improvements and spillway upgrades following USEPA CCR Impoundment Assessment
### North Rail Loop Landfill

#### Schedule

<table>
<thead>
<tr>
<th>Project</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
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<td>New CCR Landfill</td>
<td>Siting Study</td>
<td>Investigation and Design</td>
<td>Obtain Permits</td>
<td>Construct</td>
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</tbody>
</table>

- Siting began in 2010 but was delayed after finding archaeological resources
- To accelerate schedule, completed hydrogeologic investigation and permit design in parallel
- Submitted permit in February 2013

#### Key Project Decision

- Included a “decision point” in project schedule to initiate alternate disposal options if project was delayed
  - Temporary CCR stockpile onsite
  - Offsite trucking of material
<table>
<thead>
<tr>
<th>Project</th>
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<tr>
<td>Temporary CCR Stockpile</td>
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<td>Stockpile CCR</td>
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</tbody>
</table>

- Permit approval was delayed beyond “decision point” in schedule
- Construction schedule was lengthened
- Obtained permit from TDEC June 30, 2014
- Obtained approval for temporary CCR stockpile onsite in August 2014

Planning ahead allowed TVA to meet its objective despite schedule delays
North Rail Loop Landfill
Siting
North Rail Loop Landfill
Design

NRL Landfill
• 52 acres
• 6.9 MCY disposal capacity
• Subtitle D liner system

Cell 1
• 19 acres
• 100,000 cy of rock blasting
• Construction of facility infrastructure
North Rail Loop Landfill
Cell 1 Construction

Cell 1 Under Construction
North Rail Loop Landfill
Cell 1 Construction

Cell 1 Under Construction
Haul Road Project
TVA Gallatin Fossil Plant

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<tbody>
<tr>
<td>Haul Road</td>
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- Landfill delays meant haul road schedule could also be pushed back
- Congestion of scrubber construction (1,000+ workers) made some areas of haul road unavailable for construction

**Key Project Decision**

- To alleviate traffic congestion in scrubber area and take advantage of schedule delay, haul road was split into two projects
  - Bridge Construction
  - Haul Road Construction
# Haul Road Projects
TVA Gallatin Fossil Plant

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<td>Q1</td>
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<tr>
<td>Bridge</td>
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<td>Plan</td>
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<td>Haul Road</td>
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<td>Plan</td>
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</table>

![Haul Road Map](image_url)
Bridge Construction
TVA Gallatin Fossil Plant

After
Haul Road Construction
TVA Gallatin Fossil Plant

Geogrid stabilization and use of bottom ash fill through ash ponds
### Ash Pond Improvement Projects
TVA Gallatin Fossil Plant

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<tr>
<td>Pond A Spillway Upgrade</td>
<td></td>
<td>Plan</td>
<td>Design</td>
<td>Construct</td>
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<tr>
<td>Stability Improvements</td>
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<td>Construct</td>
<td></td>
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<tr>
<td>Pond D Spillway Upgrade</td>
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<td>Design</td>
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- Stability Improvements and spillway upgrades needed to be completed in parallel

### Key Project Decisions
- Develop TSS Contingency Plan to monitor construction-related turbidity
- Include liquidated damages to meet schedule as well as a performance bonus for no environmental releases or incidents.
Ash Pond Improvement Projects
TVA Gallatin Fossil Plant

01 Pond spillway systems designed to pass ½ PMP storm event
  - Pond A water lowered with new siphons to increase storm flow capacity
  - Existing spillways lowered and upgraded to serve as secondary spillway
  - New NPDES Outfall constructed at Pond D Spillway entering Cumberland River

02 Pond A Splitter dike slopes flattened to improve Factors of Safety and site access
Pond A Spillway Upgrade
TVA Gallatin Fossil Plant

Before
Pond A Spillway Upgrade
TVA Gallatin Fossil Plant

After
Pond A Stability Improvements
TVA Gallatin Fossil Plant

Before
Pond A Stability Improvements
TVA Gallatin Fossil Plant
After
Pond D Spillway Upgrade
TVA Gallatin Fossil Plant
Before
Pond D Spillway Upgrade
TVA Gallatin Fossil Plant
Before
Pond D Spillway Upgrade
TVA Gallatin Fossil Plant

After
Pond D Spillway Upgrade
TVA Gallatin Fossil Plant
After
TVA is now evaluating closure options for the 300+ acre Gallatin Ash Ponds. Conducted borrow study to determine soil availability and needs for all projects.
Summary of Lessons Learned
Planning and Implementing Schedule-Driven CCP Projects at TVA’s Gallatin Fossil Plant

01 Plan for schedule delays and develop contingencies to minimize risk

02 Consider completing investigation and design in parallel to accelerate schedule

03 Develop and maintain detailed schedules for all projects to stay on track

04 Team communication is key - hold regular meetings or calls to discuss projects

05 Develop lessons learned from all projects

06 Consider site constraints when multiple projects are being completed in parallel

07 A detailed construction sequence is critical to success of complicated projects

08 Consider contractor reviews during engineering phase

09 Consider liquidated damages tied to schedule completion

10 Consider bonuses for completion of a project without incident

11 A TSS monitoring program can be useful during construction that could impact NPDES outfalls

12 Understand site soil availability for pond closures and other planned projects
Thank you
Please contact us for more information

David Skeggs, PE
Project Manager, AECOM

Rachel Combs
Program Manager, TVA

Michael Clemmons
Project Manager, TVA

919.461.1267
david.skeggs@aecom.com