Transmission Expansion Advisory Committee

Artificial Island
December 9, 2014
Meeting Agenda and Format
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- Evaluation update - PJM
- Project Presentations – Finalist Proposers
- Break
- General Artificial Island Q&A session
Artificial Island Analysis Summary
Recent Activities
Summary of Actions Taken by PJM

- Requested and received supplemental cost proposals from finalist proposing entities
- Conducted meetings with finalist proposing entities and FERC Administrative Law Judge
- Performed additional performance analysis of the TCSC project
- Gathered input from permitting and regulatory entities
- Met with FACTS based device industry representatives
- Performed additional constructability reports
Conducted meetings to ensure PJM has a clear understanding of the terms and conditions of the responses to PJM’s offer

Provided an overview of the process followed at the meetings

Affirmed that meeting formats and durations were the same for all four Proposing Entities

Concluded that all Proposing Entities were treated equally under the process

Performance Analysis Summary
FACTS Device Industry Representative Meetings

- PJM met independently with FACTS based device industry representatives
  - Expand PJM’s understanding of the technology and implementation
    - Typical applications
    - Operation
    - Modeling
    - Failure modes
    - Construction timeframes

- Summary:
  1. TCSC components are employed in the industry with high reliability;
  2. TCSC application is a variant of existing FACTS installations using similar components (see 1 above)
TCSC Performance Analysis

• PJM Simulations

  – Validated the performance of the TCSC under several failure and outage mode scenarios

  • Critical pre-contingency outage conditions
  • Critical faults
  • Assumed combinations of failure modes and outage conditions
  • Performance
# TCSC Outage and Failure Mode Evaluation

## Assumptions

<table>
<thead>
<tr>
<th>TCSC on 5023</th>
<th>TCSC on 5024</th>
<th>SVC at New Freedom</th>
<th>Stability</th>
<th>line outage in pre-contingency</th>
<th>Note</th>
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## TCSC Failure - simulate as 0% compensation

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## SVC outage

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<td>outage</td>
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</table>
– Dominion 1A TCSC project proposal includes double breaker installations at four existing substations

• During study, it was determined that one proposed breaker at Hope Creek could be removed from the project scope with no impact to performance
• Engaged consultant to perform a Sub-Synchronous Resonance (SSR) study
  – Expected to be complete and posted at the end of December
Constructability Analysis Summary
Report was commissioned that compares the permitting challenges between the Red Lion to Artificial Island project against those of the southern Delaware crossing projects.

- Permitting issues identified are consistent with prior constructability reviews and stakeholder comments
- National Environmental Policy Act (NEPA) review potential risk
- Risk factors are such that neither has clear advantage in terms of siting and permitting hurdles to overcome
- Final report has been posted on pjm.com
Report was commissioned to review the Dominion 1A FACTS based device project

- Identified permitting challenges for the proposed project locations
  - Three of the four sites will face significant permitting challenges

- Proposed project cost was evaluated
  - Concluded that the contingency applied could be greater due to some risk factors

- Final report will be posted on pjm.com
Permitting and Regulatory Agency Discussions

• NJ DEP
  – Permitting issues identified are consistent with prior constructability reviews and stakeholder comments

• NRC
  – No concerns raised about the use of FACTS-devices in the vicinity of Artificial Island
  – Nuclear licensee (PSEG Nuclear) will need to perform a 10CFR50.59 Safety Evaluation. If the evaluation concludes that there is a nuclear safety impact and a Technical Specification change is required, then NRC approval is required.
Permitting and Regulatory Agency Discussions

- **US Army Corps of Engineers**
  - Discussed the NEPA process and Army Corps of Engineers’ role
  - Southern Delaware crossing
    - Depth of 70 feet below mean low water required for a submarine cable within the shipping channel (based on 45ft depth in shipping channel and 25 ft. burial depth for cable)
  - Red Lion to Hope Creek line
    - Navigational concerns associated with tower foundations would need to be addressed
  - Identified that both routes face significant routing and permitting hurdles
Non-Incumbent Developers in Delaware

• Questions were raised about the ability of non-incumbent developers to build and operate transmission infrastructure in Delaware

• Delaware issued an order affirming a non-incumbent's ability to construct, own and operate, subject to having to apply for a CPCN for specific project.
Cost Estimate Summary
Estimates are in millions of dollars
Cost Estimates Incorporating Cost Containment/Cap

• Total cost estimates that combine Proposing Entity cost containment numbers with PJM cost estimates
  – Costs estimates provided by Proposing Entities for project components within their cost containment mechanisms utilized
  – PJM cost estimates used for project components outside of proposed cost containment mechanisms
## Cost Estimates Incorporating Cost Containment/Cap

### LS Power 5A
- **Cost Containment**: $146
- **Salem Expansion**: $61.3 - $74.7
- **SVC Cost Estimate**: $71 - $86
- **Project Total**: $278 - $307

### Transource 2B
- **Cost Containment**: $203 - $255
- **New Salem Substation**: $41
- **Salem Expansion**: $14.3 - $17.4
- **SVC Cost Estimate**: $71 - $86
- **Project Total**: $329 - $404

### Dominion 1A
- **Cost Containment**: $0
- **Project Cost Estimate**: $187 - $228

### PSE&G 7K
- **Cost Containment**: $221
- **Red Lion Expansion**: $4.9 - $6.0
- **SVC Cost Estimate**: $71 - $86
- **Project Total**: $297 - $313

### Dominion 1C
- **Cost Containment**: $0
- **Project Cost Estimate**: $211.7 - $257.7
- **SVC Cost Estimate**: $71 - $86
- **Project Total**: $283 - $344
Cost Estimates Incorporating Cost Containment/Cap

- Estimates are in millions of dollars

- Estimates are in millions of dollars

PSE&G 7K  Dominion 1C  LS Power 5A  Transource 2B  Dominion 1A

- Estimates are in millions of dollars
Questions?

Email: RTEP@pjm.com
Appendix
Supplemental Information Summary
Supplemental Information Request Timeline

• 08/12 – Letter sent to Proposing Entity ‘finalists’ to provide opportunity to supplement their proposals

• 09/12 – Supplemental information submitted to PJM by all ‘finalists’

• 09/18 – Redacted versions of the supplemental information is posted to PJM.com

• Oct 22 through Nov 3 – Meetings with FERC Administrative Law Judge and finalists to review and confirm information
LS Power Cost Containment Mechanism

• Costs included under the containment mechanism
  – Permits and government approvals
  – Land acquisition
  – Environmental assessment and mitigation
  – Engineering
  – Equipment, supplies and other material procurement
  – All development and construction activities
$146 Million

Physical scope of work included under proposed mechanism
- Aerial or submarine line
- New substation located near the existing 230kV right-of-way in Delaware

Physical scope of work not included under proposed mechanism
- Salem substation modifications
  - New bay position
  - New 500/230kV transformer
- 230kV turning poles cutting the two Delaware transmission lines
LS Power Cost Containment Mechanism

• Costs not included under the containment mechanism
  – Financing costs
  – AFUDC
  – Additions and modifications to the project scope due to
    • “any material change in the enforcement, interpretation of application of any statute, rule, regulation, order or other applicable law existing.”
    • “any Breach or Default by PJM of its obligations under the DEA or any request by PJM to delay or suspend any activities associated with the Project”.
    • “any breach, default, interference or failure to cooperate by any Transmission Owner in connection with the Interconnection Coordination Agreement or interconnection agreement”
Transource Cost Containment Mechanism

• Proposed tiered cost containment mechanism
  – Up to $243 Million: entitled to recover all FERC approved ROE plus incentives
  – Portion from $243 to $299.8 million: forego 50% of any FERC approved ROE incentives
  – Above $299.8 million: forego 100% of any FERC approved ROE incentives

• Physical scope of work included under proposed mechanism
  – 230kV submarine cable from Salem substation to new substation in Delaware
  – New substation located near the existing 230kV right-of-way in Delaware
  – New 500/230kV substation adjacent to Salem substation

• Physical scope of work not included under proposed mechanism
  – Modifications in and near Salem substation
    • New bay position at Salem
  – 230kV turning poles cutting the two Delaware transmission lines
Transource Cost Containment Mechanism

- Transource provided a contingency amount of $52.3 million which is included in the second tier of their cost containment mechanism
  - Some specific contingency items identified (redacted)
  - General 10% project contingency
PSE&G Cost Containment Mechanism

- $221 Million

- Physical scope of work included under proposed mechanism
  - Aerial 500kV line from Hope Creek to Red Lion substations
  - Upgrade work at Hope Creek to create the new line bay

- Physical scope of work not included under proposed mechanism
  - Upgrade work at Red Lion to create the new line bay
PSE&G Cost Containment Mechanism

- Costs included under the containment mechanism
  - All project costs with exceptions as noted below
  - Clarity is needed on what is meant by “all project costs”

- Costs not included under the containment mechanism
  - Costs associated with PJM modifications or additions to the scope of work
  - Costs incurred from the following events deemed outside of the control of PSE&G:
    - Changes in applicable laws and regulations
    - Obtaining governmental approvals and permits
    - Obtaining necessary property rights to construct the Project
    - Environmental permitting, remediation and mitigation
    - Orders of courts or action or in action by governmental agencies
Dominion Supplemental Information

- Dominion did not provide a cost containment mechanism, but rather provided reasons for confidence in their ability to meet cost estimates and elaborated on project management approach and past experience with transmission projects
  - Red Lion to Hope Creek: agreed with PJM’s cost estimate of $242 to $292 million
  - FACTS based solution: provided a revised cost estimate of $174.1 million
    - $86.4 million based upon vendor not-to-exceed budget prices