RTEP Studies Update

TOA-AC
September 20, 2018
Overview of 2023 Results

Total of 160 flowgates identified

- 3 included in the window
  - 1 in West region
  - 2 in the South region

- 157 flowgates excluded
  - 126 due to Immediate Need (PJM OA 1.5.8(m)) (Includes Retired Generator related)
  - 26 Below 200kV (PJM OA 1.5.8(n))
  - 5 Substation Equipment (PJM OA 1.5.8(p))
2018 RTEP Proposal Window 1 - Statistics

• Timeline
  – Window Opened: July 2, 2018
  – Window Closed: August 31, 2018
    • Proposal definitions, simulation data and detailed cost data all due at this time
• 7 Proposals received from 2 entities addressing 2 target zones
  – All Transmission Owner Upgrade
  – No greenfield
### 2018 RTEP Proposal Window 1 - Proposals

<table>
<thead>
<tr>
<th>Project ID</th>
<th>Upgrade/Greenfield</th>
<th>Proposing Entity</th>
<th>Project Cost ($M)</th>
<th>Target Zone(s)</th>
<th>kV Level(s)</th>
<th>Analysis Type</th>
<th>FG#</th>
<th>Major Components/Project Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td>Upgrade</td>
<td>DEOK</td>
<td>$0.377</td>
<td>DEOK</td>
<td>138kV</td>
<td>Summer N-1 Load Drop</td>
<td>N1-SLD1</td>
<td>Add redundant relaying to Port Union 138kV Bus 2 to eliminate the contingency driving the reliability criteria violation.</td>
</tr>
<tr>
<td>2A</td>
<td>Upgrade</td>
<td>Dominion</td>
<td>$-</td>
<td>Dominion</td>
<td>69kV</td>
<td>Summer N-1 High Voltage</td>
<td>N1-SVH1, N1-SVH2</td>
<td>This is an operational solution that will remotely open Pentagon TX#1 breaker L122, immediately following the breaker-failure event (2036T2142) at Radnor Substation thus resolving the post contingency high voltage.</td>
</tr>
<tr>
<td>2B</td>
<td>Upgrade</td>
<td>Dominion</td>
<td>$0.481</td>
<td>Dominion</td>
<td>230/69kV</td>
<td>Summer N-1 High Voltage</td>
<td>N1-SVH1, N1-SVH2</td>
<td>Move the existing 230/69kV TX#4 to the vacant 230/69kV TX#2 spot at Pentagon Substation.</td>
</tr>
<tr>
<td>2C</td>
<td>Upgrade</td>
<td>Dominion</td>
<td>$0.597</td>
<td>Dominion</td>
<td>230/69kV</td>
<td>Summer N-1 High Voltage</td>
<td>N1-SVH1, N1-SVH2</td>
<td>Move spare 230/69kV transformer from Jefferson Street Substation to the vacant Transformer #2 bay at Pentagon Substation.</td>
</tr>
<tr>
<td>2D</td>
<td>Upgrade</td>
<td>Dominion</td>
<td>$13.493</td>
<td>Dominion</td>
<td>230kV</td>
<td>Summer N-1 High Voltage</td>
<td>N1-SVH1, N1-SVH2</td>
<td>Construct a 230kV four (4) breaker GIS ring bus in Pentagon Substation and terminate existing Line 2037 and Line 2121.</td>
</tr>
<tr>
<td>2E</td>
<td>Upgrade</td>
<td>Dominion</td>
<td>$3.161</td>
<td>Dominion</td>
<td>69kV</td>
<td>Summer N-1 High Voltage</td>
<td>N1-SVH1, N1-SVH2</td>
<td>Install a 50 MVAR fixed shunt reactor at Pentagon Substation on the 69kV bus.</td>
</tr>
<tr>
<td>2F</td>
<td>Upgrade</td>
<td>Dominion</td>
<td>$12.732</td>
<td>Dominion</td>
<td>230kV</td>
<td>Summer N-1 High Voltage</td>
<td>N1-SVH1, N1-SVH2</td>
<td>A new substation called Cloverleaf with a 230kV variable shunt reactor with a new 230kV underground line roughly 300 feet extending from Cloverleaf Substation to Pentagon substation terminating at the 230kV bus.</td>
</tr>
</tbody>
</table>
RTEP Next Steps

• Continue review of outstanding violations TEAC/SRRTEPs
• Re-evaluate projects from previous RTEP
• TO Criteria Violations
• CIL Study
• Extreme Contingencies
• Sensitivity Studies