SERTP – PJM Biennial Regional Transmission Plan Review

May 8, 2018
Transmission Coordination Between the SERTP and PJM Regions
Interregional Transmission Coordination

Selected points from Tariffs

• Coordinate and share the results of regional transmission plans to identify possible interregional transmission projects that could address transmission needs more efficiently or cost-effectively

• Identify and jointly evaluate (biennially) proposed interregional transmission projects

• Exchange planning data and information at least annually

• Representatives of the SERTP and PJM will meet no less than once per year to facilitate the interregional coordination

• Maintain a website and e-mail list for the communication of information related to the coordinated planning process
  • 1.4 The Office of the Interconnection shall post procedures for coordination and joint evaluation on the Regional Planning website and will coordinate with SERTP
  • 2.1 & 2.2 Post exchanged power flows subject to regional CEII and notify SERTP
Interregional Transmission Coordination

- 3.2 and 3.4 Stakeholder project proposals submitted to both regions
  - Through Regional processes

- 4. Transparency
  - Post procedures
  - Post data (CEII)
  - SERTP updates and PJM Regional input through the TEAC
  - Links to SERTP process and distribution lists
  - Post a list of projects not eligible for consideration, and explanation
PJM Planning Process

SERTP – PJM Biennial Regional Transmission Plan Review

May 8, 2018

- Members: 1032
- Population served (millions): 65
- Peak Load (MW): 165,492
- Generating Capacity (MW): 178,563
- Transmission Lines (Miles): 84,042
- Energy (GWh): 773,822
- Area Served (Sq Miles): 243,417
- States served: 13 + DC
NOTE:

The PJM Board authorized on February 14, 2018, more than $397 million of additional transmission system enhancements identified by PJM and reviewed with TEAC stakeholders in 2017. This brings PJM’s total to more than $35.4 billion since 1999.
RTEP Process Baseline Concept

- Applicable to all facilities 100 kV+ and operationally controlled facilities below 100 kV
- FERC-approved
- 15 year planning horizon
- Planning cycles
  - 12-month cycle: market efficiency
  - 18-month cycle: “annual” baseline
  - 24-month cycle: longer-term projects including market efficiency & reliability
- Comprehensive and Holistic
  - Multi-driver: Reliability, Market Efficiency, Public Policy
- Open, transparent, collaborative stakeholder process
- Compliant with NERC, Local and Regional planning criteria
- Order No. 1000 compliant
Baseline

✓ Exceeds scope required by NERC
✓ Identify violations for multiple deliverability areas, or multiple or severe violations clustered in one specific area
✓ Permits PJM to assess larger-scale, longer lead-time solutions
✓ RTEP process analyses:
  − Normal system, single and multiple contingency analysis
  − Load deliverability and generator deliverability test conditions

As well as...
✓ New service studies (e.g., generator interconnection)
✓ Market efficiency studies
✓ Scenario studies
  − Operational Performance - winter conditions
  − Regulatory Impact - EPA CPP
✓ Interregional analyses
Weather Conditions
✓ Weighted average temperature, humidity & wind speed
✓ 30+ weather stations across PJM

Economic Conditions
✓ Gross Domestic Product
✓ Gross Metropolitan Product
✓ Real personal income
✓ Population
✓ Households
✓ Non-manufacturing employment

End-Use Characteristics
✓ Cooling Equipment saturation and efficiency
✓ Heating Equipment saturation and efficiency
✓ Other Equipment saturation and efficiency

Calendar / Solar Data
✓ Day of week
✓ Month
✓ Weekends / Holidays
✓ Distributed solar generation
RTEP Power Flow Case Development

Year 0

- Year 8 base case
- 24-month long-term Study Cycle
  - New load forecast
  - Latest queued generation
  - Latest generation retirements
  - Latest queued merchant transmission
  - Latest DSR/EE from RPM
  - Latest Transmission from RTEP

Year 1

- Year 7 base case
- Newly approved RTEP upgrades
  - New load forecast
  - Latest queued generation
  - Latest generation retirements
  - Latest queued merchant transmission
  - Latest DSR/EE from RPM

12-month near-term Study Cycle

- Year 5 base case
- Input to retool analyses

www.pjm.com
Transmission system’s capability to deliver energy from aggregate of all capacity resources to an electrical area experiencing a capacity deficiency

Test failure: load is “bottled” inside a defined area

Maintain CETO in defined area to achieve LOLE of 1-event-in-25 years

Area tested for its expected import capability (CETL) up to established transmission facility limits

If CETL < CETO, test fails, additional transmission capability is needed
Strength of the transmission system to ensure that the aggregate of generators in a given area can be reliably transferred to the rest of PJM.

Test determines if transmission limits exist that prevent generation in a defined area to be exported to the rest of PJM ... is generation “bottled” or not.

Also performed for each queued generator interconnection request at System Impact Study step.
NERC Category P3 and P6 / “N-1-1” Analysis

Study Parameters

- ✔ 50/50 non-diversified case
- ✔ Single contingencies
- ✔ Both thermal and voltage limits
Short Circuit Analysis

- Fault or short circuit currents cause high thermal and mechanical stresses on power system equipment
- Circuit breakers clear faults to restore system to a stable operating point and to prevent equipment damage
- Analysis ensures each circuit breaker is rated sufficiently to interrupt system fault currents
- PJM studies the circuit breakers for impacts from planned system changes
- If breaker interrupting capacity < fault current, replacement required
  - Baseline RTEP Analysis
  - System Impact Studies
Light Load Analysis

- Below 50 percent of summer peak in western PJM TO zones (high wind areas)

- Operational challenges
  - Low demand generation dispatch differs markedly from peak
  - Capacitive effects of lightly loaded transmission lines
  - Intermittent source output
  - Thermal overloads, high voltage events

- 2010 creation and approval of new regional light load reliability criteria

- 2011 first implemented and benchmarked in RTEP process
  - Baseline analysis
  - Queued interconnection request studies

- Overall, ensure transmission capable of delivering generating capacity under light load conditions

- Generator Deliverability Study

- Common Mode Voltage Study
Scenario Studies

✓ Reliability tests reasonably defined expected date of criteria violations with minimal risk of fluctuation.

✓ That has changed. Today...

- Public policy and regulatory action -- e.g., EPA CPP
- Operational performance -- e.g., winter peak conditions (polar vortex)
- Market economics – e.g., fuel-of-choice shifts to natural gas
Market Efficiency Analysis

✓ Conduct market simulations to identify congestion in future years
  – Production cost tool
  – TEAC reviewed input parameters and presented to the Board
  – License to commercially available database
  – Hourly security-constrained generation commitment and dispatch
  – Year 1, Year 5, Year 8, Year 11, Year 15

✓ Identify transmission enhancement plans that may realize economic benefit by mitigating congestion
  – Accelerate existing reliability-justified enhancement plans
  – Solutions via RTEP Long Term Window process
    • Stand-alone economic project
    • Multi-driver – expand scope of existing reliability enhancement
  – Benefit-to-cost ratio ≥ 1.25

✓ PJM evaluation of window-submitted proposals
Competitive Solicitation for Solutions

✓ Greater opportunities for transmission development by non-incumbents.

✓ One or more needs: reliability, market efficiency, operational performance, public policy

✓ If included in RTEP, project could be assigned to proposing party to build.

✓ Competitive solicitation window based process project classes:
  - **Long-lead projects:**
    Reliability or market efficiency driven system enhancements in year 6 or beyond – 120 day window
  - **Short-term projects:**
    Reliability driven system enhancements needed in year four or five – 30 day window
  - **Immediate-need projects:**
    Reliability driven system enhancements needed in three years or less; window if possible, likely less than 30 days nominally
RTEP Process Window Proposal Evaluation

Window participants prepare and submit project packages

Variable Proposal window ~30 to ~120 days

PJM Company Evaluation

PJM Constructability Evaluation

PJM Analytical Evaluation

Project(s) presented and reviewed at TEAC

Project Selection

Designated Entity Selection

PJM Recommendation to the PJM Board
Proposal Window Mechanics

✓ Proposal Fee
  - <$20M: No fee
  - $20M - $100M: $5k fee
  - >$100M: $30k fee

✓ Proposal Window Exclusions
  - <200kV may be excluded (thermal only); common contingency and geography exemption
  - Upgrades to existing substation equipment (thermal only) may be excluded; common contingency and geography exemption
  - FERC 715 (TO Criteria) excluded
  - Immediate Need
- PJM Planning Committee
  [http://www.pjm.com/committees-and-groups/committees(pc.aspx](http://www.pjm.com/committees-and-groups/committees(pc.aspx)

- Transmission Expansion Advisory Committee (TEAC)
  [http://www.pjm.com/committees-and-groups/committees(teac.aspx](http://www.pjm.com/committees-and-groups/committees(teac.aspx)

- PJM Interregional Planning

- M-14B: PJM Region Transmission Planning Process
  [http://www.pjm.com/~/media/documents/manuals/m14b.ashx](http://www.pjm.com/~/media/documents/manuals/m14b.ashx)
PJM Regional Transmission Plans Review
2017 RTEP Proposal Window #1
2017 RTEP Proposal Window #1 Statistics

- PJM requested proposals for 40 reliability violation flowgates
  - 32 in the West region
  - 5 in the South (Dominion) region
  - 3 in the MAAC region
- Window Opened: 7/11/2017
- Window Closed: 8/25/2017
- 51 Proposals received from 10 entities addressing 9 target zones
  - 29 Greenfield
  - 22 Transmission Owner Upgrade
Generation Deliverability (Summer) (GD-S126, GD-S585 and GD-S661):

Date Project Presented: 10/12/2017 TEAC & 11/2/2017 TEAC

Problem Statement:

- The Pleasant View – Ashburn 230 kV is overloaded for single contingency loss of the Brambleton – Yardley 230 kV and for a tower line outage loss of the Brambleton – Yardley plus Brambleton – Poland Rd. 230 kV circuits.
- The Ashburn - Beaumeade 230 kV is overloaded for a tower line outage loss of the Brambleton – Yardley plus Brambleton – Poland Rd. 230 kV circuits.

Alternatives considered:

- 2017_1-1A ($4.52 M)
- 2017_1-1B ($7.11 M)
- 2017_1-1C ($3.05 M)
- 2017_1-7C ($9.74 M)

Recommended Solution:

- Split Line #227 Brambleton – Beaumeade 230 kV and terminate into existing Belmont substation. 2017_1-1C (b2962)

Estimated Project Cost: $3.05 M

Required IS date: 6/1/2022

Project Status: Conceptual
Problem Statement:
  • The Possum Point – Woodbridge – Occoquan 230 kV circuit is overloaded for single contingency loss of the Possum Point – Possum Creek - Woodbridge – E.P.G. – Hayfield 230 kV circuit.

Alternatives considered:
  2017_1-1D ($4.49 M)
  2017_1-1E ($4.96 M)
  2017_1-1F ($12.68 M)

Recommended Solution:
  • Reconductor the Woodbridge to Occoquan 230kV line segment of Line 2001 with 1047 MVA conductor and replace line terminal equipment at Possum Point, Woodbridge, and Occoquan. 2017_1-1D (b2963)

Estimated Project Cost: $ 4.49 M

Required IS date: 6/1/2022

Project Status: Conceptual
2017 RTEP Baseline Reliability
Near PJM-SERTP Interface
(Excluded From 2017 RTEP Proposal Window #1)
2017 RTEP Projects Electrically Near the PJM-SERTP Interface (Excluded From 2017 RTEP Proposal Window #1)

• 190 flowgates were identified as reliability criteria violations

• 150 flowgates excluded for various reasons:
  – Immediate need (PJM OA 1.5.8(m))
    (Includes Generator Deactivation related)
  – < 200kV (PJM OA 1.5.8(n))
  – Non-PJM limiting facility
Baseline Reliability – Common Mode Violation
Previously Presented: 8/30/2017 & 9/11/2017 SRTEAC

Problem Statement:
Clinchfield – Fletcher Ridge 138kV line is overloaded for the loss of Broadford – Saltville 138kV line with the stuck breaker at Saltville 138kV (GD-S862)

Recommended Solutions:
Replace the existing 636 ACSR 138 kV Bus at Fletchers Ridge with a larger 954 ACSR conductor (b2937)

Estimated Project Cost: $0.63M

Required ISD: 6/1/2022
Baseline Reliability – Generator Deliverability and Common Mode Violation
Previously Presented: 8/30/2017 & 9/11/2017 SRTEAC

Problem Statement:
Broadford – Wolf Hills 138kV line is overloaded for the loss of the Broadford – Sullivan 500KV line and the Broadford 765/500kV transformer or the loss of the Broadford – Sullivan 500kV line with the breaker stuck at Broadford 765kV. (GD-S70, GD-S114, GD-S755, GD-S802)

Recommended Solutions:
Perform sag mitigation on the Broadford – Wolf Hills 138kV circuit to allow the line to operate to a higher maximum temperature. (b2938)

Estimated Project Cost: $2.6M

Required ISD: 6/1/2022
Baseline Reliability – Winter Generator Deliverability
Previously Presented: 8/30/2017 & 9/11/2017 SRTEAC

Problem Statement:
The Wayne Co – Wayne Co KY 161kV line is overloaded for the loss of the Summer Shade 161kV bus section S11-1039. (GD-W314, GD-W483)

Recommended Solutions:
Upgrade the distance relay on the Wayne Co – Wayne Co KY 161kV line to increase the line winter rating would be 167/167. (b2940)

Estimated Project Cost: $2K

Required ISD: 6/1/2022
Baseline Reliability – Summer Generator Deliverability
Previously Presented: 8/30/2017 & 9/11/2017 SRTEAC

Problem Statement:
JK Smith – Dale 138kV line is overloaded for the loss of the JK Smith – N Clark 345kV line (GD-S174)

Recommended Solutions:
Increase the conductor MOT for the Dale – JK Smith 138kV line to 275°F. The new summer ratings would be 229/296 (b2939)

Estimated Project Cost: $0.4M

Required ISD: 6/1/2022
Non-PJM Limiting Facilities
(Excluded From 2017 RTEP Proposal Window #1)

- Non-PJM limiting facilities are those facilities external to the PJM footprint that are potential issues
- Flowgates listed below are monitored element-contingency pairs
  - **N1-S**: N-1 Thermal (Summer)
  - **N2-S**: N-1-1 Thermal (Summer)
  - **GD-S**: Generation Deliverability & Common Mode Outage (Summer)
  - **GD-W**: Generation Deliverability & Common Mode Outage (Winter)

<table>
<thead>
<tr>
<th>Flowgates</th>
<th>Fr Bus</th>
<th>Fr Name</th>
<th>To Bus</th>
<th>To Name</th>
<th>CKT</th>
<th>KV</th>
<th>Areas</th>
<th>Rating</th>
<th>Reliability Criteria Violation Test Procedure</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1-S80, N1-S81, N1-S82, N2-ST7, GD-S37, GD-S421, GD-S422, GD-W295</td>
<td>360334</td>
<td>5SUMMER SHAD</td>
<td>342811</td>
<td>5SUMM SHAD T</td>
<td>1</td>
<td>161/161</td>
<td>347/320</td>
<td>225</td>
<td>N-1 Thermal, N-1-1 Thermal, Gen Deliv Summer, Gen Deliv Winter</td>
<td>Tie line, limited by TVA</td>
</tr>
<tr>
<td>N2-ST10, GD-S173, GD-S441, GD-S442, GD-S848, GD-S592, GD-S593</td>
<td>360334</td>
<td>5SUMMER SHAD</td>
<td>342814</td>
<td>5SUMM SHADE</td>
<td>1</td>
<td>161/161</td>
<td>347/320</td>
<td>289</td>
<td>N-1-1 Thermal, Gen Deliv Summer</td>
<td>Tie line, limited by TVA</td>
</tr>
<tr>
<td>N2-ST5, N2-ST6, GD-W17, GD-W19, GD-S830, GD-S831, GD-W402, GD-W403, GD-W404, GD-W405</td>
<td>304740</td>
<td>4WALTERS138</td>
<td>242819</td>
<td>05SULVN</td>
<td>1</td>
<td>138/138</td>
<td>341/205</td>
<td>100</td>
<td>N-1-1 Thermal, Gen Deliv Summer, Gen Deliv Winter</td>
<td>Tie line limited by Duke's Walters transformer</td>
</tr>
<tr>
<td>GD-W317, GD-W491</td>
<td>360448</td>
<td>5WOLF CRK HP</td>
<td>342796</td>
<td>5RUSSEL CO J</td>
<td>1</td>
<td>161/161</td>
<td>347/320</td>
<td>335</td>
<td>Gen Deliv Winter</td>
<td>Tie line, limited by TVA</td>
</tr>
<tr>
<td>GD-W360</td>
<td>304223</td>
<td>3ROCKYMONT115T</td>
<td>314554</td>
<td>38TEBRO</td>
<td>1</td>
<td>115/115</td>
<td>340/345</td>
<td>133</td>
<td>Gen Deliv Winter</td>
<td>Tie Line, limited by Duke</td>
</tr>
<tr>
<td>GD-W486</td>
<td>304070</td>
<td>6PERSON230 T</td>
<td>314697</td>
<td>6SEDGE HILL</td>
<td>1</td>
<td>230/230</td>
<td>340/345</td>
<td>770</td>
<td>Gen Deliv Winter</td>
<td>Tie Line, limited by Duke</td>
</tr>
</tbody>
</table>
2018 RTEP Analysis Update
2018 RTEP Analysis Update

- Finalized 2018 Models
- Began 2018 RTEP Analysis

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd week of April</td>
<td>Preliminary case available</td>
</tr>
<tr>
<td>May-June</td>
<td>Post violations</td>
</tr>
<tr>
<td>May/June to July/August</td>
<td>Reliability Window (60 day window)</td>
</tr>
</tbody>
</table>
Generation Deactivation Notifications Near the SERTP Interface
(as of May 1, 2018)
# Dominion Deactivation Status 2017-2018

<table>
<thead>
<tr>
<th>Unit(s)</th>
<th>Transmission Zone</th>
<th>Requested Deactivation Date</th>
<th>PJM Reliability Status</th>
<th>Baseline Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roanoke Valley Unit 1&amp;2 (209 MW)</td>
<td>Dominion</td>
<td>3/1/2017</td>
<td>Reliability analysis complete; no impacts identified.</td>
<td></td>
</tr>
<tr>
<td>Buggs Island 1&amp;2 (138 MW)</td>
<td>Dominion</td>
<td>4/16/2018</td>
<td>Reliability analysis complete; no impacts identified.</td>
<td></td>
</tr>
<tr>
<td>Bremo 3&amp;4 (227 MW)</td>
<td>Dominion</td>
<td>4/16/2018</td>
<td>Reliability analysis complete. New baseline upgrade was issued to resolve the identified issue.</td>
<td>b2989</td>
</tr>
<tr>
<td>Bellemeade CC 1 (265.7 MW)</td>
<td>Dominion</td>
<td>4/16/2018</td>
<td>Reliability analysis complete. New baseline upgrade was issued to resolve the identified issue.</td>
<td>b2990, b2991</td>
</tr>
<tr>
<td>Possum Point 3&amp;4 (317.7 MW)</td>
<td>Dominion</td>
<td>12/1/2018</td>
<td>Reliability analysis complete. No impacts identified.</td>
<td></td>
</tr>
<tr>
<td>Chesterfield 3&amp;4 (262.1 MW)</td>
<td>Dominion</td>
<td>12/1/2018</td>
<td>Reliability analysis complete. New baseline upgrade was issued to resolve the identified issue.</td>
<td>b2990, b2991</td>
</tr>
<tr>
<td>Spruance 1&amp;2 (202 MW)</td>
<td>Dominion</td>
<td>1/12/2019</td>
<td>Reliability analysis complete; no impacts identified.</td>
<td></td>
</tr>
<tr>
<td>Edgecomb NUG (116 MW)</td>
<td>Dominion</td>
<td>10/31/2020</td>
<td>Reliability analysis complete; no impacts identified.</td>
<td></td>
</tr>
</tbody>
</table>
## Dayton Deactivation Status 2017-2018

<table>
<thead>
<tr>
<th>Unit(s)</th>
<th>Transmission Zone</th>
<th>Requested Deactivation Date</th>
<th>PJM Reliability Status</th>
<th>Baseline Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Killen 2 (600 MW)</td>
<td>Dayton</td>
<td>6/1/2018</td>
<td>Reliability analysis complete. Upgrades expected to be completed in future, but interim operating measures identified and unit can deactivate as scheduled.</td>
<td>b2826.1, b2831.2, b2830, b2832, b2826.2, b2879.2, b2879.1, b2878, b2828, b2831.1</td>
</tr>
<tr>
<td>Killen CT (18 MW)</td>
<td>Dayton</td>
<td>6/1/2018</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stuart Diesel 1-4 (9.2 MW)</td>
<td>Dayton</td>
<td>6/1/2018</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stuart 2-4 (1737.4 MW)</td>
<td>Dayton</td>
<td>6/1/2018</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stuart 1 (580.6 MW)</td>
<td>Dayton</td>
<td>9/30/2017</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Problem Statement: N-2 Voltage Outage
• Voltage magnitude and drop violations were identified in the vicinity of Bremo 138 kV substation for the simultaneous loss of the Bremo #9 230/138 kV transformer and several single contingencies.

Recommended Solution:
• Install a second 230 -115 kV Transformer(224 MVA) approximately 1 mile north of Bremo and tie 230 kV Line #2028(Bremo – Charlottesville) and 115 kV Line #91 (Bremo-Sherwood) together. A three breaker 230 kV ring bus will split Line #2028 into two lines and Line #91 will also be split into two lines with a new three breaker 115 kV ring bus. Install a temporary 230-115 kV transformer at Bremo substation for the interim until the new substation is complete. (b2989)

Estimated Project Cost: $27M
Required IS Date: 06/01/2018
Projected IS Date: 06/01/2019
Project Status: Engineering

* Temporary transformer mitigates reliability impacts in the interim
Problem Statement: Generation Deliverability Outage

- Lakeside to Chesterfield 230 kV line is overloaded for the tower contingency tripping the Chesterfield to Southwest 230 kV line and the Basin to Chesterfield 230 kV line.

Recommended Solution:

- Existing baseline upgrade (b2745) previously approved by the PJM Board resolves the issue
- Rebuild 21.32 miles of existing line between Chesterfield – Lakeside 230 kV

Estimated Project Cost: $31.7M

Required IS Date: 06/01/2018
Projected IS Date: 06/01/2020

Project Status: Engineering

* Operating measures identified to mitigate reliability impacts in interim
Problem Statement: Generation Deliverability Outage

- Chaparral to Locks 230 kV line is overloaded for the breaker failure contingency tripping the Carson to Septa 500 kV line and the Carson to Midlothian 500 kV line.

Recommended Solution:
- Replace breaker lead (b2991)

Estimated Project Cost: $0.1M

Required IS Date: 06/01/2018
Projected IS Date: 06/01/2018

Project Status: Engineering
Problem Statement: Generation Deliverability Outage

- Chesterfield to Basin 230 kV line is overloaded for the breaker failure contingency tripping the Carson to Septa 500 kV line and the Carson to Midlothian 500 kV line.

Recommended Solution:

- Replace 0.14 miles of 1109 ACAR with a conductor which will increase the current line rating to approximately 706 MVA. (b2990)

Estimated Project Cost: $0.35M

Required IS Date: 06/01/2018
Projected IS Date: 06/01/2018

Project Status: Engineering
Problem Statement: Generation Deliverability Outage

- Clifty Creek – Miami Fort 138 kV line is overloaded for the tower contingency tripping the 2 Clifty Creek – Dearborn 345 kV lines
- Existing Baseline Upgrade (b2828) previously approved by the PJM Board resolves the issue
  - Install 5% reactors at Miami Fort 138 kV to limit current
- Cost estimate: $1M
- Required IS Date: 06/01/2018
- Projected IS Date: 06/01/2021 (TO determining if acceleration is possible)
Problem Statement: Generation Deliverability Outage

- Nickel – Warren 138 kV line is overloaded for the tower contingency tripping the Todhunter – Rockies Express 138 kV line and the Foster – Garver 345 kV line
- Existing Baseline Upgrade (b2830) previously approved by the PJM Board resolves the issue
  - Expand Garver 345 kV sub to include 138 kV
- Cost estimate: $18.7M
- Required IS Date: 06/01/2018
- Projected IS Date: 06/01/2021 (TO determining if acceleration is possible)
AEP and DEOK Transmission Zones Stuart and Killen Deactivation Upgrades

Problem Statement: Generation Deliverability and Load Deliverability Outage

- Tanners Creek – Miami Fort 345 kV line is overloaded for the loss of the Terminal – East Bend 345 kV line
- Existing Baseline Upgrade (b2831) previously approved by the PJM Board resolves the issue
  - Upgrade Tanners Creek – Miami Fort 345 kV line
- Cost estimate: $7.8M
- Required IS Date: 06/01/2018
- Projected IS Date: 12/01/2021 (TO determining if acceleration is possible)
Problem Statement: Generation Deliverability Outage

- Kyger Creek – Sporn 345 kV circuit 2 is overloaded for the loss of the Kyger Creek – Sporn 345 kV circuit 1
- Existing Baseline Upgrade (b2832) previously approved by the PJM Board resolves the issue
  - Combine 2 existing Kyger Creek – Sporn lines into a single six-wire line
- Cost estimate: $0.3M
- Required IS Date: 06/01/2018
- Projected IS Date: 06/01/2019
Problem Statement: Generation Deliverability Outage

- Jefferson – Clifty Creek 345 kV line is overloaded for the stuck breaker contingency tripping the Greentown – Jefferson 765 kV line and the Hanging Rock – Jefferson 765 kV line
- New Baseline Upgrade (b2878) increase rating of the Jefferson – Clifty Creek 345 kV line
- Cost estimate: $0.1M
- Required IS Date: 06/01/2018
- Projected IS Date: 06/01/2019
Problem Statement: Generation Deliverability Outage

- Spurlock – Stuart 345 kV line is overloaded for the loss of the Silver Grover – Zimmer – Red Bank 345 kV line
- New Baseline Upgrade (b2879) – upgrade Stuart – Spurlock 345 kV line
- Cost estimate: $2.5M
- Required IS Date: 06/01/2018
- Projected IS Date: 12/31/2018
Problem Statement: Ongoing high voltages on the EHV system have been occurring in AEP and surrounding areas under light load conditions

- Existing Baseline Upgrades mitigate high voltage issues
  - **b2826.1**: Install 300 MVAR reactor at Ohio Central 345 kV substation ($5M)
  - **b2826.2**: Install 300 MVAR reactor at West Bellaire 345 kV substation ($5M)

- Cost estimate: $10M
- Required IS Date: 06/01/2018
- Projected IS Date: 09/01/2018
Immediate Need

Due to the timing of the need for the reinforcement an RTEP proposal window is infeasible

Due to the immediate need, the local Transmission Owner will be the Designated Entity

Estimated Project Cost: $39.6M

- B2828: $1M
- B2830: $18.7M
- B2831: $7.8M
- B2832: $0.3M
- B2878: $0.1M
- B2879.1: $0.09M
- B2879.2: $1.61M
- B2826: $10M

PJM is working with affected Transmission Owners to determine what interim operational measures can be taken for the period between the Required In-Service Date and the Projected In-Service Date for those projects that cannot be completed by 06/01/2018

Projected In-Service

- B2828: 06/01/2021
- B2830: 06/01/2021
- B2831: 12/01/2021
- B2832: 06/01/2019
- B2878: 06/01/2019
- B2879.1: 06/01/2018
- B2879.2: 12/31/2018
- B2826: 09/01/2018
PJM Queue Projects Near the SERTP Interface
PJM Queue Projects Near the PJM-SERTP Interface
## PJM Queue Projects Near the PJM-SERTP Interface

<table>
<thead>
<tr>
<th>Queue Number</th>
<th>Project Name</th>
<th>Company</th>
<th>Transmission Owner</th>
<th>County</th>
<th>State</th>
<th>MFO (MW)</th>
<th>Capacity (MW)</th>
<th>Energy (MW)</th>
<th>Project Status</th>
<th>Requested In-Service Date</th>
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<tbody>
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<td>AB2-040</td>
<td>Brink 115kV</td>
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Questions?
Email: RTEP@pjm.com