Issues Tracking
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• Open Issues
  – None

• New Issues
Interregional Planning Update
• March 30 IPSAC Webex
  – Market efficiency modeling / benchmarking
  – Environmental regulation impact review
  – Draft NCSP
  – PJM / NYISO short circuit study
  – Redlined Northeast Protocol posted for comment
  – PJM / NYISO initial discussions – PJM RTEP upgrades on border in PN area
  – Continued market efficiency model improvements
• Weekly communication developing a joint MISO/PJM market efficiency model
  – PJM/MISO protocol study 2nd half 2012
• PJM review of MISO 2011 cross-border work – results consistent with MISO
  • Wheatland - Breed 345kV (AEP - IPL)
  • Albers - Kenosha 138kV (WEC)
  • Burr Oak 345/138kV (NIPS)
  • Granville – Butler 138kV (WEC)
• PJM review of MISO MVP wind impacts
• Joint off-shore wind reliability analysis
  – 6 month timeline
  – 3 off shore injection scenarios into Dominion and NC POI
    • 3 GW, 5 GW, 10 GW
    • Dominion, Morehead City, Southport
  – 2027 60% load level
  – Thermal and voltage
  – Identify upgrades as necessary
Generation Deactivation Notification (Retirements) Update
<table>
<thead>
<tr>
<th>Unit</th>
<th>Trans Zone</th>
<th>Requested Deactivation Date</th>
<th>PJM Reliability Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chesapeake 1 &amp; 2, Yorktown 1</td>
<td>DOM</td>
<td>12/31/2014</td>
<td>Reliability Analysis complete. Impacts identified. Upgrades expected to be completed by June 2015.</td>
</tr>
<tr>
<td>Chesapeake 3 &amp; 4</td>
<td>DOM</td>
<td>12/31/2015</td>
<td>Reliability Analysis complete. Impacts identified. Upgrades expected to be completed by June 2016.</td>
</tr>
<tr>
<td>Bergen 3; Burlington 8; National Park 1; Mercer 3; Sewaren 6</td>
<td>PSEG</td>
<td>6/1/2015</td>
<td>Reliability Analysis Complete. Impacts identified and expected to be resolved in three - four years. Working with affected TO to finalize upgrade schedule.</td>
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<tr>
<td>Armstrong 1 &amp; 2; Ashtabula 5; Bayshore 2-4; Eastlake 1-5; Lake Shore 18; R Paul Smith 3 &amp; 4;</td>
<td>AP</td>
<td>9/1/2012</td>
<td>Reliability analysis complete. Impacts identified and expected to be resolved by June 2016. Further refinement of the reliability analysis, required upgrades, and generator deactivation schedule continues. Unit will deactivate as scheduled. See posting - FE Generator Deactivation Study Results and Required Upgrades.</td>
</tr>
<tr>
<td>Walter C Beckjord 1</td>
<td>DEOK</td>
<td>5/1/2012</td>
<td>Reliability Analysis complete - no impacts identified.</td>
</tr>
<tr>
<td>Walter C Beckjord 2-6</td>
<td>DEOK</td>
<td>4/1/2015</td>
<td>Reliability Analysis complete - impacts identified - upgrades scheduled to be completed by June 2014</td>
</tr>
<tr>
<td>Albright 1-3; Rivesville 5 &amp; 6; Willow Island 1 &amp; 2</td>
<td>APS</td>
<td>9/1/2012</td>
<td>Reliability Analysis complete - impacts identified - upgrades scheduled to be completed by May 2013. Thus generator can be allowed to deactivate as scheduled on 9/1/2012 assuming all upgrades are still on track to be completed as scheduled.</td>
</tr>
<tr>
<td>New Castle 3-5; New Castle Diesels A &amp; B</td>
<td>ATSI</td>
<td>4/16/2015</td>
<td>Reliability Analysis complete - impacts identified - upgrades scheduled to be completed by June 2015. Thus generator can be allowed to deactivate as scheduled.</td>
</tr>
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<td>Unit</td>
<td>Trans Zone</td>
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</tr>
<tr>
<td>Portland 1 &amp; 2; Glen Gardner CT 1-8</td>
<td>MetEd</td>
<td>1/7/2015</td>
<td>Reliability Analysis complete - impacts identified - upgrades and operating procedures expected to be in place by May 2015 to allow generators to deactivate as scheduled.</td>
</tr>
<tr>
<td>Elrama 1-4</td>
<td>DUQ</td>
<td>6/1/2012</td>
<td>Reliability Analysis complete - impacts identified - upgrades scheduled to be completed by June 2014. Evaluating options.</td>
</tr>
<tr>
<td>Shawville 1-4; Titus 1-3</td>
<td>PenElec</td>
<td>4/16/2015</td>
<td>Reliability Analysis complete - impacts identified - upgrades and operating procedures expected to be in place by May 2015 to allow generators to deactivate as scheduled.</td>
</tr>
<tr>
<td>Niles 1 &amp; 2</td>
<td>ATSI</td>
<td>6/1/2012</td>
<td>Reliability Analysis complete - impacts identified - upgrades scheduled to be completed by June 2014. Evaluating options.</td>
</tr>
<tr>
<td>Fisk Street 19, Crawford 7 &amp; 8</td>
<td>ComEd</td>
<td>12/31/2012</td>
<td>Reliability Analysis Complete. No impacts identified.</td>
</tr>
<tr>
<td>Conesville 3</td>
<td>AEP</td>
<td>12/31/2012</td>
<td>Reliability Analysis complete - impacts identified - upgrades scheduled to be completed by June 2014. PJM continues to finalize details of required upgrades and completion dates.</td>
</tr>
<tr>
<td>Big Sandy 1; Clinch River 3; Glen Lyn 5 &amp; 6; Kammer 1-3; Kanawha River 1 &amp; 2; Muskingum River 1-4; Pickway 5; Sporn 1-4; Tanner Creek 1-3</td>
<td>AEP</td>
<td>6/1/2015</td>
<td>Reliability Analysis complete - impacts identified - upgrades scheduled to be completed by June 2015.</td>
</tr>
<tr>
<td>Unit</td>
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</tr>
<tr>
<td>Avon Lake 7 &amp; 9</td>
<td>ATSI</td>
<td>4/16/2015</td>
<td>Reliability Analysis complete - impacts identified - upgrades scheduled to be completed by May 2015</td>
</tr>
<tr>
<td>Sewaren 1-4</td>
<td>PSEG</td>
<td>6/1/2015</td>
<td>Reliability Analysis complete. No impacts expected with PSEG contemplating re-use of Capacity Rights for a new generation project</td>
</tr>
<tr>
<td>Cedar 1 &amp; 2; Deepwater 1 &amp; 6; Missouri Ave CT B, C &amp; D</td>
<td>AE</td>
<td>5/31/2015</td>
<td>Reliability Analysis complete - impacts identified - upgrades scheduled to be completed by May 2015</td>
</tr>
<tr>
<td>Hutchings 1 &amp; 2</td>
<td>Dayton</td>
<td>6/1/2015</td>
<td>Reliability Analysis underway</td>
</tr>
</tbody>
</table>
AEP Retirement Notifications
Conesville 3

Requested deactivation date: 12/31/2012

Big Sandy 1; Clinch River 3; Glen Lyn 5 & 6; Kammer 1-3; Kanawha River 1 & 2; Muskingum River 1-4; Pickway 5; Sporn 1-4; Tanner Creek 1-3

Requested deactivation date: 6/1/2015
**Assumptions:**

- Mountaineer 765/345 kV transformer in service (b1948)
- (4) 765 kV breakers installed at Kammer (b1962)

Both also identified for previous deactivation studies
AEP Transmission Zone

- Overload on Waterford – Muskingum River 345 kV line in generation deliverability and N-1-1 analysis involving a combination of outages including loss of Belmont – Kammer 765 kV and/or Marysville – Flatlick 765 kV line
- Proposed Solution: Reconductor or rebuild Sporn – Waterford – Muskingum River 345 kV line
- Estimated Project Cost: $200M
- Expected in-service date: 6/1/2015
• Overload on Don Marquis 345/138 kV #2 transformer for the loss of Don Marquis 345/138 kV #1 transformer and Don Marquis – North Fork 345 kV line.

• Proposed Solution: Loop Conesville – Bixby 345 kV Circuit into Ohio Central

• Estimated Project Cost: $15M

• Expected in-service date: 6/1/2015
Address several overloads for various contingencies under generation deliverability and N-1-1 analysis including:

- West Bellaire – Brues 138 kV line
- Brues – Brues 2 138 kV line section
- Bethlehem – County Line 138 kV line
- Belpre – Degussa 138 kV line
- Natirum – George Washington 138 kV line
- Newcomerstown – South Coshocton

Proposed Solution: Establish Burger 345/138 kV station

Estimated Project Cost: $35M

Expected in-service date: 6/1/2015
• Address several overloads for various contingencies under generation deliverability and N-1-1 analysis including:
  – Carbondale – Carbondale Tap 138 kV
  – Amos – Dalewood 138 kV
  – Chemical #1 – Ortin 138 kV
  – Amos – Poca 138 kV
  – Chemical #1 – Ortin 138 kV
  – Amos – Tackett Creek 138 kV
  – Cabin Creek – South Ridge 138 kV
  – Capitol – Chemical #2
  – Amos – Turner #2
• Proposed Solution: Rebuild Amos – Kanawah River 138 kV corridor
• Estimated Project Cost: $150M
• Expected in-service date: 6/1/2015
• Address overload on existing:
  – Muskingum River 345/138 kV transformers
  – Kanawah River 345/138 kV transformers
  – North Crown City – Thiven 138 kV
  – Addison – Thiven 138 kV
  – North Crown City – Windsor 138 kV
• Proposed Solution: Add 345/138 kV Transformer at Sporn, Kanawha River & Muskingum River stations
• Estimated Project Cost: $30M
• Expected in-service date: 6/1/2015
- Address overload on Tri State – Darrah 138 kV, and Tri State – Kenova 138 kV lines for N-1-1 analysis. Also, addresses overload on Tri State – Chadwick 138 kV for generation deliverability analysis.
- Proposed Solution: Terminate Tristate – Kyger Creek 345 kV line at Sporn
- Estimated Project Cost: $10M
- Expected in-service date: 6/1/2015
• Hillview - Newcomerstown 138 kV line loads to 101.1% of its rating of 191 MVA for the single contingency '05KAMMER-05SCANTO-05SCANTE-765-345' followed by 'BASE CASE'.

• Proposed Solution: Advance existing baseline project B1737 (Sag study of Newcomerstown - Hillview 138 kV line and upgrade terminal equipment).

• Estimated Project Cost: $0.2M

• Expected in-service date: 12/31/2012
Ohio Central - Prep Plant Tap 138 kV line loads to 101.7% of its rating of 446 MVA for the single contingency '05KAMMER-05SCANTO-05SCANTE-765-345' followed by '02GALION-05OHIOCT-05MUSKNG-05OH-345-1N2'  

Proposed Solution: Advance existing baseline project B1474 (Perform a sag study on the Ohio Central – Prep Plant tap 138 kV circuit)  

Estimated Project Cost: $0.04  
Expected in-service date: 12/31/2012
• Prep Plant Tap - Conesville East 138 kV line loads to 101.7% of its rating of 446 MVA for the single contingency of Kammer – South Canton 765 kV facility and associated equipment followed by '02GALION-05OHIOCT-05MUSKNG-05OH-345-1N2'

• Proposed Solution: Advance existing baseline project B1502 (Reconductor the Conesville East – Conesville Prep Plant Tap 138 kV section of the Conesville – Ohio Central)

• Estimated Project Cost: $2M
• Cross Street - Madison 138 kV line loads to 105.6% of its rating of 167 MVA for the single contingency of Rockport – Jefferson 765 kV followed by the Desoto 345/138 kV transformer

• Proposed Solution: Advance existing baseline project B1039 (Perform a sag study for the Madison – Cross Street 138 kV line)

• Estimated Project Cost: $0.15

• Expected in service date:
Generation Deactivation Notification (Retirements) Update

Titus
• The Cartech – Riverview 69kV circuit # 1 overloads for the loss of North Temple – Rosedale 69 KV
• Proposed Solution: Construct a new North Temple - Riverview - Cartech 69 kV line (4.7 miles) with 795 ACSR
• Estimated cost: $4.815M
• Expected in-service date: 6/1/2015
MetEd Transmission Zone

- North Temple – Rosedale 69 kV ck 1 overloads for the loss of North Temple – Riverview 69 KV
- Proposed Solution: Construct a new North Temple - Riverview - Cartech 69 kV line (4.7 miles) with 795 ACSR
- Estimated cost: $4.815M
- Expected in-service date: 6/1/2015
• Middletown Jct - Swatara Hill 69kV ck 1 overloads for the loss of Wood Street Tap – Middletown 69 KV
• Proposed Solution: Upgrade 4/0 and 350 Cu substation conductors at the Middletown Junction terminal of the Middletown Junction - Swatara Hill 69 kV line
• Estimated cost: TBD
• Expected in-service date: 6/1/2014
Wood Street Tap – Middletown 69kV ck 1 overloads for the loss of Middletown Jct - Swatra Hill 69 KV

Proposed Solution: Upgrade 4/0 Cu substation conductor at the Middletown terminal of the Middletown - Wood Street Tap 69 kV substation

Estimated cost: $0.0312M

Expected in-service date: 6/1/2014
- Muhlenburg – Rosedale 69kV ck 1 overloads for the loss of North Temple - Riverview 69 KV
- Proposed Solution: Construct a new North Temple - Riverview - Cartech 69 kV line (4.7 miles) with 795 ACSR.
- Estimated cost: TBD
- Expected in-service date: 6/1/2015
• Baldy - Lyons 69kV ckt 1 overloads for the loss of East Topton - Lyons 69 KV
• Proposed Solution: Upgrade an OC protection relay at the Baldy 69 kV substation.
• Estimated cost: $0.0537M
• Expected in-service date: 6/1/2014
Generation Deactivation Notification (Retirements) Update

Avon
(All under review)
- Howard to Brookside 138 kV line overloaded for tower contingency 'C5-TWL-CR040'
- Proposed Solution: Perform a sag study and replace bus and risers at AEP Howard station.
- Expected cost is $0.5M
- Projected in-service is 12/01/2014.

GenOn Deactivations – Avon 7 & 9
• West Coshocton to Buckhorn (Holmes-Wayne Co-Op) 138 kV line overloads for breaker contingency '1913_C2'

• Proposed Solution: Loop Conesville – Bixby 345 kV circuit into Ohio Central station.

• Expected cost is $15 M

• Projected in-service is 06/01/2015.
• Waterford to Muskingum River 345 kV line overloads for breaker contingency '2856_C2'
• Proposed Solution: Reconductor or rebuild Sporn – Waterford – Muskingum River 345 kV line
• Estimated Project Cost: $200M
• In-service date: 06/01/2015

(Previously identified for Conesville 3; Big Sandy 1; Clinch River 3; Glen Lyn 5 & 6; Kammer 1-3; Kanawha River 1 & 2; Muskingum River 1-4; Pickway 5; Sporn 1-4; Tanner Creek 1-3)
• East Lima to North Woodcock 138 kV line overload for the line with stuck breaker contingency 3141_C2_05FOSTOR 345-B2
• Proposed Solution: Perform a sag study to improve the rating
• Expected cost is $25k
• Projected in-service is 12/01/2014.
Bluebell - Canton Central 138 kV line overloads for N-1-1: B_LINE_SY_48A (S.Canton-Harmon 345kV) + B_LINE_SY_043 (Canton Central-Hanna 345kV)

Proposed Solution: Sag study to improve the rating of the line

Expected AEP cost is $25k

Projected in-service is 12/01/2014.
• Kammer to W.Bellaire 138 kV line overloads for N-1-1: 05KAMMER _05SCANTO _116 + 53_B3
• Proposed Solution: Install 345 kV circuit breakers at West Bellaire
• Expected cost is $5 million
• Projected in-service is 06/01/2015.
• Tilton to W. Bellaire 138 kV line overloads for N-1-1: 242946(05TIDD)-242948(05WBELLA)_1 + 05KAMMER _05SCANTO _116
• Proposed Solution: Sag Study on section 1 (795 ACSR) ~12 mi.
• Expected cost is $50 k.
• Projected in-service is 12/01/2012.
• The Windsor to Tilton 138 kV line is normally overloaded for the loss of Tidd – West Bellaire 138 kV
• Proposed Solution: Advance Baseline project # B1457
• Expected cost is $20 k
• Projected in-service is 12/01/2012.
• Elliot Tap to Poston 138 kV line is normally overloaded for the loss of 37_B2_TOR12_WOM_OP

• Proposed Solution: Rebuild 138 kV tap line

• Expected cost is $8.7 million

• Projected in-service date: 12/31/2014
• Brues to W. Bellaire 138 kV line overloads for N-1-1: 41_B3 + 242946(05TIDD)-242948(05WBELLA)_1
• Proposed Solution: Perform a sag study
• Expected cost is $20 k
• Projected in-service is 12/01/2012.
AEP Transmission Zone

- Dale to W. Canton 138 kV line overloads for N-1-1: B_LINE_SY_48A (S.Canton-Harmon 345kV) + BASE CASE
- Proposed Solution: Advance Baseline project b1861
- Projected in-service is 06/01/2015.

GenOn Deactivations – Avon 7 & 9
• Dale to W. Canton 138 kV line overloads for N-1-1: B_LINE_SY_48A (S.Canton-Harmon 345kV) + BASE CASE
• Proposed Solution: Build new Toronto 345/138 kV substation by looping in the Sammis – Wylie Ridge 345 kV line and tie in four 138 kV lines
• Estimated Project Cost: $41.8M
• Projected in-service is 06/01/2015

(Previously identified for New Castle 3, 4, & 5; New Castle Diesels A & B)
- Tidd to Collier 345 kV line overloads for N-1-1: B_LINE_TIE_027 + B_LINE_TIE_013
- Proposed Solution: Perform sag study
- Estimated Project Cost: $.05M
- Projected in-service is 06/01/2015.

GenOn Deactivations – Avon 7 & 9
• Johnson to Lorain 138 kV line overloads for breaker contingency

• Proposed Solution: Reconductor Johnson-Lorain 138kV with 954 ACSS + Replace wavetrap

• Estimated cost: TBD

• Expected in-service date: 6/1/2015
ATSI Transmission Zone

- Lakeview to Greenfield 138 kV line overloads for tower contingency of Beaver-DB 345kV + DB-Hayes 345kV
- Proposed Solution: Build a new West Fremont-Groton-Hayes 138kV line
- Estimated Project Cost: $45M
- Projected in-service date: 6/1/2018
- Short term: Existing Operating Procedure to open Lakeview-Greenfield from 6/1/2012 through 6/1/2018

(Previously identified for Niles 1 & 2; Elrama 1, 2, 3 & 4)
• Howard to Brookside 138 kV line overloads for the tower contingency Beaver-Davies Bessie 345kV + Beaver-Davies Bessie -Hayes 345kv

• Proposed Solution: Existing ATSI-AEP 138kV Substation (Brubaker Sub) near territory border + 138kV from new substation to Longview approx. 8 miles + Requires AEP project to R/C Howard-Brubaker 138kV with 477 ACS

• Estimated Project Cost: $17.7M
• Expected in-service date: 6/1/2016

(Previously identified for Armstrong 1 & 2; Ashtabula 5; Bayshore 2-4; Eastlake 1-5; Lake Shore 18; R Paul Smith 3 & 4; New Castle 3, 4, & 5; New Castle Diesels A & B)
Barberton – W.Akron 138 kV line overloads for the tower contingency N.Medina-Star 345kV + Juniper-Star 345kV

Proposed Solution: Reconductor Barberton-W.Akron 138kV (7.3mi 605 ACSR w/ 477 ACSS)

Estimated Project Cost: $4.23M
Expected in-service date: 6/1/2016

(Previously identified for Armstrong 1 & 2; Ashtabula 5; Bayshore 2-4; Eastlake 1-5; Lake Shore 18; R Paul Smith 3 & 4)
ATSI Transmission Zone

• Pawnee Q-1 to Leroy Center overloads for the N-1-1 outage of Eastlake - Mayfield 138kV + Perry – Ashtabula - Erie West 345kV
• Estimated Project Cost: $3.3M
• Expected in-service date: 6/1/2015

(Previously identified for Armstrong 1 & 2; Ashtabula 5; Bayshore 2-4; Eastlake 1-5; Lake Shore 18; R Paul Smith 3 & 4)
- Kelsey-Hayes to Ottawa 138 kV line overloads for the breaker contingency Ottawa-W.Frem 138kV + Ottawa-Toussaint-Bayshore 138kV line
- Proposed Solution: Existing W.Fremont-Groton-Hayes 138kV + Operating Procedures until line is complete in 2018
- Estimated Project Cost: $45M
- Projected in-service date: 6/1/2018
- Short term: Existing Operating Procedure to open Lakeview-Greenfield from 6/1/2012 through 6/1/2018

(Previously identified for Niles 1 & 2; Elrama 1, 2, 3 & 4; Avon 7 & 9)
2012 RTEP Baseline Reliability Update
• Generator Deliverability thermal violation of either Chichester – Linwood 230 kV circuit for the loss of the parallel circuit
• Description: Add a 3rd 230kV transmission line between Chichester and Linwood substations and remove the Linwood SPS (B1900)
• Estimated Project Cost: $27M
• Projected In-Service Date: 6/1/2018
2012 RTEP Scenario Analysis
• Renewable Portfolio Standards (RPS)
  – Update of capacity factors / input assumptions
  – Update of RPS nameplate

• At-Risk generation

• High load forecast
2012 RTEP Status Update
• Recent announcement

• EKPC included in the 2012 RTEP

• Expected integration: June 1, 2013
• 2013 Short Circuit Basecase
  – TOs are currently reviewing the 2013 short circuit basecase and results

• 2017 Short Circuit Basecase
  – The 2017 short circuit basecase will be available in mid-June

• Resolution of 2016 basecase short issues is in progress
  – Working w/ PSE&G regarding overdutied breakers that exceed 80kA
• 2016 Stability Cases Creation
  – 2016 Summer Peak and Summer Light Load stability cases will be available in mid-May
  – The 2016 Stability Cases are developed based on SDDWG 2010 series and 2016 RTEP case

• 2012 RTEP Baseline Stability Study
  – Study of 98 plants using 2016 stability cases
  – Analytical work begins mid-May and will end in September

• Sensitivity Stability Studies due to recent Generation Deactivation
  – Revisit several operating guidelines
Questions?

Email: RTEP@pjm.com