Southwest Power Pool, Inc. – Entergy
ENTERGY SPP RTO REGIONAL PLANNING PROCESS MEETING
May 24, 2012
NET CONFERENCE
• A G E N D A •

10:00 AM – 12:00 PM

1. Administrative
   A. Introductions................................................................................................................................... All
   B. SPP Antitrust Guidelines............................................................................................................ Ben Roubique

2. 2011 ESRPP Final Report.................................................................................................................... Eddie Filat

3. Process Overview............................................................................................................................. Eddie Filat

4. 2012 ESRPP Study Scope ................................................................................................................... Eddie Filat

5. Nominate Studies for 2012 ESRPP Cycle......................................................................................... Eddie Filat

6. Other Discussion .................................................................................................................................. All

7. Adjourn
Helping our members work together to keep the lights on... today and in the future
Prohibited Discussions

- Pricing information, especially margin (profit) and internal cost.
- Information and participants’ expectations as to their future prices or internal costs.
- Participant’s marketing strategies.
- How customers and geographical areas are to be divided among competitors.
- Exclusion of competitors from markets.
Prohibited Discussions cont.

- Boycotting or group refusals to deal with competitors, vendors or suppliers.

- No decisions should be made nor any actions taken during SPP activities for the purpose of giving an industry participant or group of participants a competitive advantage over other participants.

- In particular, decisions with respect to setting, revising, or assessing compliance with SPP reliability standards should not be influenced by anti-competitive motivations.
Permitted Discussions

• Reliability matters relating to the bulk power system, including operation and planning matters such as establishing or revising reliability standards, special operating procedures, operating transfer capabilities, and plans for new facilities.

• Matters relating to the impact of reliability standards for the bulk power system on electricity markets, and the impact of electricity market operations on the reliability of the bulk power system.
Permitted Discussions cont

• Proposed filings or other communications with state or federal regulatory authorities or other governmental entities.

• Matters relating to the internal governance, management and operation of SPP, such as nominations for vacant committee positions, budgeting and assessments.

• Procedural matters such as planning and scheduling meetings.

• Any other matters that do not clearly fall within these guidelines should be reviewed with SPP’s General Counsel before being discussed.
Helping our members work together to keep the lights on... today and in the future
Entergy SPP RTO Regional Planning Process

May 24, 2012

Ben Roubique
broubique@spp.org
501.614.3331
Entergy and SPP RTO Region
Objectives for ESRPP

- Improve Regional Transfer Capability
- Improve Regional Optimization
- Relieve Constraining Flowgates
Joint Planning Committee (JPC)

- **JPC Contacts**
  - SPP ICT Planning – Eddie Filat
  - SPP RTO Planning – Tim McGinnis
  - Entergy Technical Services – Samrat Datta

- **JPC Roles and Responsibilities**
  - Develop Study Scope
  - Perform Study Analysis
  - Coordinate Regional Stakeholder Communication
Initial Proposed Studies

- Arkansas IPPs (Hot Springs, Magnet Cove, and PUPP) to SPP South (AEP and OG&E) for 3000 MW (Step 2 Study)
- From AEPW to Entergy Arkansas for 700 MW (Step 2 Study)
- From Entergy Arkansas to AEPW for 700 MW (Step 2 Study)
- From Entergy to OG&E for 1500 MW
- From Entergy to EMDE for 500 MW
- From SPP RTO to Entergy Arkansas for 500 MW
- From Nebraska to Entergy for 3000 MW
- From Entergy to Nebraska for 3000 MW
How studies were selected

- Each Regional Participant was allotted five votes
- Voting was reserved for the affected systems to the Entergy and SPP RTO seam
- 1 vote for each project or all five votes to one project
Final Five Selected Studies

- From Entergy to EMDE for 500 MW
- From Nebraska to Entergy for 3000 MW
- From Entergy to Nebraska for 3000 MW
- Arkansas IPPs (Hot Springs, Magnet Cove, and PUPP) to SPP South (AEP and OG&E) for 3000 MW (Step 2 Study)
- From AEPW to Entergy Arkansas for 700 MW (Step 2 Study)
Regional Study Overview Map
STEP 1 Studies
General Study Assumptions

• MUST DC analysis of FCITC
• Monitored and Contingent Elements
  – 115kV and above elements within:
    ▪ Entergy Zones adjacent to SPP
    ▪ SPP Areas adjacent to Entergy
  – All elements 345kV and above in SPP and Entergy
• N-1 Contingency Scan (no breaker-to-breaker scan)
Model Assumptions

• MDWG 2010 Series 2017 Summer Peak Model

• Modifications to Model
  ▪ Using Entergy’s 2010 series 2017 Summer Peak
    – Added Current Entergy Generation and Loads
    – Added Entergy Topology updates
  ▪ Added Entergy’s Approved Construction Plan Projects (2011 – 2013)
Study Assumptions

• Identical POR/POD Transfer Analyses performed for all study projects
• FCITC Changes from the Base Case were identified
• Performed Transfer analysis using PSS/MUST
• Transfer Analysis Validation
  – Joint Effort (ICT, RTO, Entergy)
Limitations for Entergy to EMDE 500 MW
Project Descriptions-Entergy to EMDE 500 MW

- Calico Rock – Melbourne 161 kV Line
  - Reconductor Transmission Line
- Calico Rock - Norfork 161 kV Line
  - Reconductor Transmission Line
- Moorefield - ISES 161 kV Line
  - Reconductor Transmission Line
- Harrison East - Summit 161 kV Line
  - Reconductor transmission Line
- Quitman – Bee Branch 161 kV Line Uprate
  - Upgrade Switch
- Dolet Hills - Dolet Hills Auto 345 kV Line
  - Construct New transmission Line
- Dolet Hills Auto Substation 345/138 kV Line
  - Construct New 345/138 kV transformer and switching station
- Wallace Lake – South Shreveport 138 kV Line
  - Reconductor transmission Line
- Dolet Hills – Port Robson 138 kV Line
  - Construct New transmission Line
Entergy to EMDE Upgrade Projects
# High Level Planning Cost Estimates

<table>
<thead>
<tr>
<th>Description</th>
<th>Line Rating</th>
<th>Upgrade Description</th>
<th>ICT Cost Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melbourne-Calico Rock-Norfolk 161kV Line</td>
<td>372 MVA</td>
<td>Reconductor transmission line 8.00 miles</td>
<td>$11.1 M</td>
</tr>
<tr>
<td>Quitman-Bee Branch 161kV Line</td>
<td>223 MVA</td>
<td>Upgrade Switch</td>
<td>$.2 M</td>
</tr>
<tr>
<td>Moorefield - ISES 161kV Line</td>
<td>372 MVA</td>
<td>Reconductor transmission line 12.00 mi</td>
<td>$16.6 M</td>
</tr>
<tr>
<td>Dolet Hills-Dolet Hills Auto 345 kV</td>
<td>2560 MVA</td>
<td>Build new transmission line 3 miles</td>
<td>$4.6 M</td>
</tr>
<tr>
<td>Dolet Hills Auto Substation</td>
<td>675 MVA</td>
<td>New 345/138 kV transformer and new 345/138 kV switching station</td>
<td>$17.5 M</td>
</tr>
<tr>
<td>Dolet Hills-Port Robson 138 kV line</td>
<td>625 MVA</td>
<td>Build new transmission line 25 miles</td>
<td>$19 M</td>
</tr>
<tr>
<td>Wallace Lake-South Shreveport 138 kV line</td>
<td>497 MVA</td>
<td>Reconductor transmission line 22.00 miles</td>
<td>$6.3 M</td>
</tr>
<tr>
<td>Harrison East to Summit 161 kV line</td>
<td>223 MVA</td>
<td>Build new transmission line 25 miles</td>
<td>$51 M</td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td></td>
<td></td>
<td><strong>$126.3 M</strong></td>
</tr>
</tbody>
</table>
Transfer Capability Increase

<table>
<thead>
<tr>
<th>Transfer</th>
<th>Base Case FCITC Results</th>
<th>Change Case FCITC Results</th>
<th>Difference</th>
<th>Cost per MW ($/MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entergy - EMDE</td>
<td>153 MW</td>
<td>670 MW</td>
<td>517 MW</td>
<td>$244,139</td>
</tr>
</tbody>
</table>
Entergy to Nebraska 1500 MW
Limitations for Entergy to Nebraska 1500 MW
Projects Descriptions - Entergy to Nebraska 1500 MW

- Melbourne – Calico Rock – Norfork 161 kV Line
  - Reconductor Transmission Line
- Russellville North – Russellville East 161 kV Line
  - Reconductor Transmission Line
- Cheetah – Hot Spring Village 115 kV Line
  - Reconductor Transmission Line
- Moore Field – ISES 161 kV Line
  - Reconductor Transmission Line
- Harrison East – Summit 161 kV Line
  - Reconductor Transmission Line
- Walnut – Hoxies 161 kV Line
  - Reconductor Transmission Line
- Quitman – Bee Branch 161 kV Line Uprate
  - Replace Switch
Project Descriptions Cont.

- Dolet Hills – Dolet Hills Auto 345 kV Line
  - Construct New Transmission Line
- Dolet Hills Auto Substation
  - New 345/138 kV Transformer and Switching Station
- Dolet Hills – Port Robson 138 kV Line
  - Construct New Transmission Line
- Wallace Lake – South Shreveport 138 kV Line
  - Reconductor Transmission Line
- Beaver Creek 138/115 kV Auto
  - New 138/115 kV Transformer
- Pana – Ramsey 161 kV Line
  - Reconductor Transmission Line
- Pana – Taylorville South 161 kV Line
  - Reconductor Transmission Line

Entergy to Nebraska 1500 MW
Entergy to Nebraska 1500 MW Upgrades
<table>
<thead>
<tr>
<th>Description</th>
<th>Line Rating</th>
<th>Upgrade Description</th>
<th>ICT Cost Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Recondutor Melbourne to Calico Rock to Norfolk 161 kV line</td>
<td>335 MVA</td>
<td>Recondutor transmission line 24.75 miles</td>
<td>$34.3 M</td>
</tr>
<tr>
<td>Recondutor Russellville North to Russellville East 161 kV line</td>
<td>446 MVA</td>
<td>Recondutor transmission line 3.2 miles</td>
<td>$4.4 M</td>
</tr>
<tr>
<td>Recondutor Cheetah to Hot Spring Village 115 kV line</td>
<td>239 MVA</td>
<td>Recondutor transmission line 3.83 miles</td>
<td>$5.3 M</td>
</tr>
<tr>
<td>Recondutor Moore Field to ISES 161 kV line</td>
<td>372 MVW</td>
<td>Recondutor transmission line 11.9 miles</td>
<td>$16.5 M</td>
</tr>
<tr>
<td>Recondutor Harrison East to Summit 161 kV line</td>
<td>223 MVA</td>
<td>Recondutor transmission line 21.6 miles</td>
<td>$30 M</td>
</tr>
<tr>
<td>Recondutor Walnut to Hoxies 161 kV line</td>
<td>310 MVA</td>
<td>Recondutor transmission line 16.32 miles</td>
<td>$22.6 M</td>
</tr>
<tr>
<td>*Quitman to Bee Branch 161 kV line Uprate</td>
<td>223 MVA</td>
<td>Replace Switch</td>
<td>$.2 M</td>
</tr>
</tbody>
</table>
## High Level Planning Cost Estimates Cont.

<table>
<thead>
<tr>
<th>Description</th>
<th>Line Rating</th>
<th>Upgrade Description</th>
<th>ICT Cost Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dolet Hills to Dolet Hills Auto_345kV line</td>
<td>2560 MVA</td>
<td>Build new transmission lines 3 Miles</td>
<td>$4.6 M</td>
</tr>
<tr>
<td>Dolet Hills Auto Substation</td>
<td>675 MVA</td>
<td>New 345/138 kV transformer and new 345/138 kV switching station</td>
<td>$17.5 M</td>
</tr>
<tr>
<td>Dolet Hills to Port Robson 138 kV line</td>
<td>625 MVA</td>
<td>Build new transmission line 25 miles</td>
<td>$19 M</td>
</tr>
<tr>
<td>Rebuild Wallace Lake-South Shreveport 138 kV line</td>
<td>497 MVA</td>
<td>Reconductor transmission line 11 miles</td>
<td>$6.3 M</td>
</tr>
<tr>
<td>138/115 kV Autotransformer @ Beaver Creek</td>
<td>93 MVA</td>
<td>New 138/115 kV transformer @ Beaver Creek</td>
<td>$2.9 M</td>
</tr>
<tr>
<td>Reconstructor Pana to Ramsey 161 kV line</td>
<td>478 MVA</td>
<td>Reconductor transmission line 18 miles</td>
<td>$5.5 M</td>
</tr>
<tr>
<td>Reconstructor Pana to Taylorville South 161 kV line</td>
<td>382 MVA</td>
<td>Reconductor transmission line 13 miles</td>
<td>$4.1 M</td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td></td>
<td><strong>$173.2 M</strong></td>
<td></td>
</tr>
</tbody>
</table>

*Project included in the Entergy 2012-2016 Construction Plan U1

Entergy to Nebraska 1500 MW
## Transfer Capability Increase

<table>
<thead>
<tr>
<th>Transfer</th>
<th>Base Case FCITC Results</th>
<th>Change Case FCITC Results</th>
<th>Difference</th>
<th>Cost per MW ($/MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entergy - Nebraska</td>
<td>242 MW</td>
<td>1326 MW</td>
<td>1084 MW</td>
<td>$159,644</td>
</tr>
</tbody>
</table>

Entergy to Nebraska 1500 MW
Nebraska to Entergy 3000 MW
Limitations for Nebraska to Entergy 3000 MW
Jasper – Sam Rayburn 138 kV Line
   - Reconductor Transmission Line
Grimes – Bentwater 138 kV Line
   - Reconductor Transmission Line
Grimes – Mt. Zion 138 kV Line
   - Reconductor Transmission Line
Champagne - Plaisance 138 kV Line
   - Upgrade CT’s and Relay Settings
Grimes 345/138 kV Auto
   - Add 3rd Auto
Leach - Toledo 138 kV Line
   - Reconductor Transmission Line
Newton Bulk - Leach 138 kV Line
   - Reconductor Transmission Line
Project Descriptions Cont.

- L558T485 - Mt. Zion 138 kV Line
  - Reconductor Transmission Line
- Huntsville – L558T485 138 kV Line
  - Reconductor Transmission Line
- Greenbrook – Horn Lake 138 kV Line
  - Reconductor Transmission Line
- Bentwater - Walden 138 kV Line
  - Reconductor Transmission Line
- Cocodrie 230/138 kV Auto
  - Add 3rd Auto
- Sidney – Gentleman 345 kV Line
  - Reconductor Transmission Line
- Gentleman – Cherry County – Hold Co 345 kV Line
  - Construct New Transmission Line
- Cherry County 345 kV Substation
  - Construct New 345 kV Substation

Nebraska to Entergy 3000 MW
Project Descriptions Cont.

- Holt County 345 kV Substation
  - Construct New 345 kV Substation
- Thomas Hill – Moberly – Moberly Tap 161 kV Line
  - Reconductor Transmission Line
- Overton - Sibley 345 kV Line
  - Tap Transmission Line
- Norton 345/161 kV Substation
  - Construct New 345/161 kV Substation
- Summit – Elm Creek 345 kV Line
  - Construct New Transmission Line
- Elm Creek 345/230 kV Station
  - Add New 345/230 kV Auto and Bus Work
- Cowskin – Centennial 138 kV Line
  - Rebuild Transmission Line

Nebraska to Entergy 3000 MW
Nebraska to Entergy 3000 MW Upgrades
## High Level Planning Cost Estimates

<table>
<thead>
<tr>
<th>Description</th>
<th>Facility Rating of Upgrade</th>
<th>Upgrade Description</th>
<th>Cost Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reconductor Jasper to Sam Rayburn 138 kV line</td>
<td>260 MVA</td>
<td>Reconductor transmission line 14 miles</td>
<td>$17.2 M</td>
</tr>
<tr>
<td>Upgrade Grimes to Bentwater 138 kV line</td>
<td>442 MVA</td>
<td>Reconductor transmission line 26 miles</td>
<td>$32 M</td>
</tr>
<tr>
<td>Upgrade Grimes to Mt. Zion 138 kV line</td>
<td>339 MVA</td>
<td>Reconductor transmission line 19 miles</td>
<td>$23.4 M</td>
</tr>
<tr>
<td>Champagne to Plaisance 138 kV line</td>
<td>287 MVA</td>
<td>Upgrade CT's and Relay settings</td>
<td>$.7 M</td>
</tr>
<tr>
<td>Add 3rd 345/138 kV Auto at Grimes</td>
<td>525 MVA</td>
<td>Add 3rd 345/138 kV Auto at Grimes</td>
<td>$10.7 M</td>
</tr>
<tr>
<td>Reconductor Leach to Toledo 138 kV line</td>
<td>330 MVA</td>
<td>Reconductor transmission line 2.26 miles</td>
<td>$2.8 M</td>
</tr>
<tr>
<td>Reconductor Newton Bulk to Leach 138 kV line</td>
<td>330 MVA</td>
<td>Reconductor transmission line 25.03 miles</td>
<td>$30.8 M</td>
</tr>
<tr>
<td>Reconductor L558T485 to Mt. Zion 138 kV line</td>
<td>330 MVA</td>
<td>Reconductor transmission line 5.35 miles</td>
<td>$6.6 M</td>
</tr>
<tr>
<td>Reconductor Huntsville to L558T485 138 kV line</td>
<td>330 MVA</td>
<td>Reconductor transmission line 2.25 miles</td>
<td>$2.8 M</td>
</tr>
<tr>
<td>Reconductor Greenbrook to Horn Lake 138 kV line</td>
<td>330 MVA</td>
<td>Reconductor transmission line 3.24 miles</td>
<td>$4 M</td>
</tr>
<tr>
<td>Reconductor Bentwater to Walden 138 kV line</td>
<td>330 MVA</td>
<td>Reconductor transmission line 3.89 miles</td>
<td>$4.8 M</td>
</tr>
<tr>
<td>Add 3rd 230/138 kV Auto at Cocodrie</td>
<td>425 MVA</td>
<td>Add 3rd 230/138 kV Auto at Cocodrie</td>
<td>$13.2 M</td>
</tr>
</tbody>
</table>

Nebraska to Entergy 3000 MW
### High Level Planning Cost Estimates Cont.

<table>
<thead>
<tr>
<th>Description</th>
<th>Facility Rating of Upgrade</th>
<th>Upgrade Description</th>
<th>Cost Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sidney to Gentleman 345 kV line</td>
<td>1792 MVA</td>
<td>Build new transmission line 102 Miles</td>
<td>$158 M</td>
</tr>
<tr>
<td>Gentleman to Cherry County to Holt Co 345 kV lines</td>
<td>1792 MVA</td>
<td>Build new transmission lines 222 Miles</td>
<td>$266.4 M</td>
</tr>
<tr>
<td>Cherry County Substation</td>
<td>N/A</td>
<td>Construct new 345 kV substation</td>
<td>$6 M</td>
</tr>
<tr>
<td>Holt Co Substation</td>
<td>N/A</td>
<td>Construct new 345 kV substation</td>
<td>$16.8 M</td>
</tr>
<tr>
<td>Reconductor Thomas Hill-Moberly-Moberly Tap 161 kV line</td>
<td>437 MVA</td>
<td>Reconductor transmission line 13.5 Miles</td>
<td>$9.3 M</td>
</tr>
<tr>
<td>Tap Overton-Sibley 345 line, build Norton 345/161 kV substation, add new Norton 345/161 kV transformer</td>
<td>336 MVA</td>
<td>New 345/161 kV transformer and new 345/161 kV switching station</td>
<td>$20.7 M</td>
</tr>
<tr>
<td>Summit-Elm_Creek_345kV line</td>
<td>1793 MVA</td>
<td>Build new transmission lines 60 Miles</td>
<td>$90.7 M</td>
</tr>
<tr>
<td>Add 345/230 kV Auto at Elm Creek and perform bus work</td>
<td>600 MVA</td>
<td>Add 345/230 kV Auto at Elm Creek</td>
<td>$13.4 M</td>
</tr>
<tr>
<td>Rebuild Cowskin to Centennial 138 kV line</td>
<td>287 MVA</td>
<td>Rebuild transmission line 36.5 Miles</td>
<td>$3.7 M</td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td></td>
<td></td>
<td><strong>$734 M</strong></td>
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Nebraska to Entergy 3000 MW
## Transfer Capability Increase

<table>
<thead>
<tr>
<th>Transfer</th>
<th>Base Case FCITC Results</th>
<th>Change Case FCITC Results</th>
<th>Difference</th>
<th>Cost per MW ($/MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nebraska - Entergy</td>
<td>176 MW</td>
<td>2935 MW</td>
<td>2759 MW</td>
<td>$266,043</td>
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</tbody>
</table>
Sensitivities for Nebraska to Entergy 3000 MW
Request for Supplemental Information

• ESRPP stakeholders requested additional information about the Nebraska to Entergy 3000 MW transfer
  – What areas were affected by the flow of power?
  – What additional limitations would occur if the Balanced Portfolio and Priority Projects EHV projects were not in the base case model?

• Study team provided additional tables and maps in the report
# Nebraska to Entergy Source and Sink Area

<table>
<thead>
<tr>
<th>Source/Sink Areas</th>
<th>Area</th>
<th>Generation Change (MW)</th>
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</thead>
<tbody>
<tr>
<td>NPPD 640</td>
<td>2204</td>
<td></td>
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<tr>
<td>OPPD 645</td>
<td>569</td>
<td></td>
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<tr>
<td>LES 650</td>
<td>227</td>
<td></td>
</tr>
<tr>
<td>EES 351</td>
<td>-3000</td>
<td></td>
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</table>
## Flows out of Nebraska

<table>
<thead>
<tr>
<th>From Area</th>
<th>To Area</th>
<th>Flow Change (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPPD 640</td>
<td>WAPA 652</td>
<td>466</td>
</tr>
<tr>
<td>NPPD 640</td>
<td>MEC 635</td>
<td>252</td>
</tr>
<tr>
<td>NPPD 640</td>
<td>GMO 540</td>
<td>361</td>
</tr>
<tr>
<td>NPPD 640</td>
<td>AECI 330</td>
<td>253</td>
</tr>
<tr>
<td>NPPD 640</td>
<td>MIDW 531</td>
<td>344</td>
</tr>
<tr>
<td>NPPD 640</td>
<td>SUNC 534</td>
<td>354</td>
</tr>
<tr>
<td>OPPD 645</td>
<td>MEC 635</td>
<td>526</td>
</tr>
<tr>
<td>OPPD 645</td>
<td>GMO 540</td>
<td>259</td>
</tr>
</tbody>
</table>
Flows into Entergy

<table>
<thead>
<tr>
<th>From Area</th>
<th>To Area</th>
<th>Flow Change (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLEC 502</td>
<td>EES 351</td>
<td>216</td>
</tr>
<tr>
<td>AEPW 520</td>
<td>EES 351</td>
<td>460</td>
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<tr>
<td>OKGE 524</td>
<td>EES 351</td>
<td>454</td>
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<tr>
<td>AECI 330</td>
<td>EES 351</td>
<td>494</td>
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<tr>
<td>TVA 347</td>
<td>EES 351</td>
<td>717</td>
</tr>
</tbody>
</table>
Nebraska to Entergy Area Interchange
Nebraska to Entergy Transfer Limitations

- What additional limitations would occur if the Balanced Portfolio and Priority Projects EHV projects were not in the base case model?
Nebraska to Entergy Sensitivity Conclusions

• What areas were affected by the flow of power?
  – Not all the power flows through the SPP region when power is transferred from Nebraska to Entergy
  – Instead, some of the power flows through other regions such as WAPA, MISO, AECI, and TVA

• What additional limitations would occur if the Balanced Portfolio and Priority Projects EHV projects were not in the base case model?
  – 38 more transfer limitations for the 3000 MW transfer from Nebraska to Entergy without these 345 kV projects
  – Many of these additional transfer limitations were concentrated in the Kansas City area
STEP 2 Studies
Arkansas IPPs – SPP South Step 2 Study

EHV Transmission
(Including expansion projects with commitments to construct)

June 2011
All SPP Transmission Expansion Plans are subject to change.

- 230 kV
- 345 kV
- 500 kV

Southwest Power Pool
Entergy ICT
Project Descriptions Arkansas IPPs – SPP
South Step 2 Study

- Etta – Pittsburg 500kV line
  - Approximately 160 miles direct
- Pittsburg Substation
  - 500kV switchyard
  - Two 500/345kV transformers
- ANO – Fort Smith 500kV Line circuit 2
- 500/345kV transformer @ Fort Smith
- RSS – Pecan Creek 345kV Uprate
  - Replace Wave Trap
- Add 10.4 MVAR Capacitor bank at Magnolia Steel
- Upgrade Gibson Transformer to 84 MVA unit
- Upgrade Stigler Transformer to 84 MVA unit
- Upgrade Gobbler Knob Transformer to 84 MVA unit
Tap Overton-Sibley 345 kV Line, build Norton 345/161 kV substation
Replace 1200A disconnect switches to increase Moberly Tap-Moberly 161 kV Line (372 MVA rating)
Upgrade South River Transformers to 112 MVA units
Upgrade West Plain Transformers to 112 MVA units
Construct Dolet Hills-Port Robson 138 kV Line (28 miles), Dolet Hills 345/138 kV autotransformer, and rebuild Wallace Lake-South Shreveport 138 kV Line (11 miles)
Arkansas IPPs – SPP South Projects
## Arkansas IPPs – SPP South Cost

<table>
<thead>
<tr>
<th>S. No</th>
<th>Name of the Project</th>
<th>Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Construct Etta to Pittsburg 500 kV line</td>
<td>$196,430,000</td>
</tr>
<tr>
<td>1A</td>
<td>Provide new 500 kV terminal at Etta</td>
<td>$9,625,000</td>
</tr>
<tr>
<td>2</td>
<td>Install two 500/345 kV autos at Pittsburg.</td>
<td>$30,380,000</td>
</tr>
<tr>
<td>2A</td>
<td>Provide new 500 kV Ring bus at Pittsburg.</td>
<td>$13,540,000</td>
</tr>
<tr>
<td>3</td>
<td>Construct 2nd ANO to Fort Smith 500kV line</td>
<td>$191,800,000</td>
</tr>
<tr>
<td>3A</td>
<td>Provide new 500 kV Terminal at ANO</td>
<td>$9,549,000</td>
</tr>
<tr>
<td>4</td>
<td>Install 2nd 500/345 kV Auto at Fort Smith</td>
<td>$15,190,000</td>
</tr>
<tr>
<td>5</td>
<td>Upgrade RSS – Pecan Creek 345 kV line</td>
<td>$305,000</td>
</tr>
<tr>
<td>6</td>
<td>Upgrade Calico Rock to Norfork 161 kV section</td>
<td>$6,375,000</td>
</tr>
<tr>
<td>7</td>
<td>Upgrade Melbourne to Calico Rock 161 kV section</td>
<td>$12,665,000</td>
</tr>
<tr>
<td>8</td>
<td>Upgrade Quitman to Bee Branch 161 kV terminal equipment</td>
<td>$131,000</td>
</tr>
<tr>
<td>9</td>
<td>Upgrade Cheetah to Hot Springs Village 115 kV section</td>
<td>$14,297,000</td>
</tr>
<tr>
<td>10</td>
<td>Construct new 115 kV line from Hot Springs Hamilton to Carpenter Dam (239 MVA)</td>
<td>$8,016,000</td>
</tr>
<tr>
<td>10A</td>
<td>Construct new Hot Springs Hamilton Substation</td>
<td>$3,776,000</td>
</tr>
<tr>
<td>10B</td>
<td>Construct new 115 kV Terminal at Hot Springs Milton (176 MVA)</td>
<td>$47,000</td>
</tr>
<tr>
<td>10C</td>
<td>Construct new 115 kV line from HS Milton to HS Hamilton</td>
<td>$7,796,000</td>
</tr>
<tr>
<td>10D</td>
<td>Construct new 115 kV terminal at Carpenter Dam</td>
<td>$4,123,000</td>
</tr>
<tr>
<td>10F</td>
<td>Upgrade Mt Pine to Breaker Station</td>
<td>$4,644,000</td>
</tr>
<tr>
<td>11</td>
<td>Upgrade Cedar Hill to Plantation 138 kV section.</td>
<td>$2,098,000</td>
</tr>
<tr>
<td>12</td>
<td>Upgrade Plantation to Conroe 138 kV section.</td>
<td>$3,148,000</td>
</tr>
<tr>
<td>13</td>
<td>Upgrade Truman to AECC Truman West 161 kV section.</td>
<td>$6,388,000</td>
</tr>
<tr>
<td>14</td>
<td>Upgrade East Vicksburg to Edwards 115 kV section. (Cost includes TGU for EMI)</td>
<td>$16,926,000</td>
</tr>
<tr>
<td>15</td>
<td>Upgrade Little Rock South to Little Rock Creek 115kV section</td>
<td>$4,760,000</td>
</tr>
<tr>
<td>S. No</td>
<td>Name of the Project</td>
<td>Estimate</td>
</tr>
<tr>
<td>-------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>16</td>
<td>Upgrade terminal equipment on Hot Springs Industrial to Hot Springs Union Carbide 115kV section</td>
<td>$398,000</td>
</tr>
<tr>
<td>17</td>
<td>Upgrade terminal equipment on Hot Springs EHV to Hot Springs Industrial 115kV section</td>
<td>$111,000</td>
</tr>
<tr>
<td>18</td>
<td>Upgrade Jacinto to Splendora 138 kV section</td>
<td>$11,475,000</td>
</tr>
<tr>
<td>19</td>
<td>Upgrade Splendora to Apollo 138 kV section</td>
<td>$2,241,000</td>
</tr>
<tr>
<td>20</td>
<td>Upgrade Baxter Wilson to South East Vicksburg 115kV section. (Cost includes TGU for EMI)</td>
<td>$7,417,000</td>
</tr>
<tr>
<td>21</td>
<td>Upgrade Little Rock West to Little Rock Palm Street 115 kV section</td>
<td>$5,070,000</td>
</tr>
<tr>
<td>22</td>
<td>Upgrade terminal equipment on Hot Springs Union Carbide to Hot Springs East 115kV section</td>
<td>$93,000</td>
</tr>
<tr>
<td>23</td>
<td>Upgrade Harrison East to Summit 161 kV section</td>
<td>$17,004,000</td>
</tr>
<tr>
<td>24</td>
<td>Upgrade ISES to Moorefield 161 kV section</td>
<td>$3,501,000</td>
</tr>
<tr>
<td>25</td>
<td>Upgrade Moorefield to Batesville 161 kV section</td>
<td>$3,480,000</td>
</tr>
<tr>
<td>26</td>
<td>Upgrade Walnut Ridge to Hoxie South 161 kV section</td>
<td>$5,500,000</td>
</tr>
<tr>
<td>27</td>
<td>Upgrade Cane River to Winn Prison 115 kV section</td>
<td>$10,447,000</td>
</tr>
<tr>
<td>28</td>
<td>Upgrade Winn Prison to Winnfield 115 kV section</td>
<td>$4,773,000</td>
</tr>
<tr>
<td>29</td>
<td>Add 10.4 MVAR Capacitor bank at Magnolia Steel</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>30</td>
<td>Add 20.4 MVAR capacitor bank at Wilmar</td>
<td>$832,000</td>
</tr>
<tr>
<td>31</td>
<td>Upgrade Stigler transformer to 84 MVA unit</td>
<td>$2,604,000</td>
</tr>
<tr>
<td>32</td>
<td>Upgrade Gobbler Knob transformers to 84 MVA units</td>
<td>$5,208,000</td>
</tr>
<tr>
<td>33</td>
<td>Tap Overton-Sibley 345 line, build Norton 345/161 kV sub</td>
<td>$20,730,000</td>
</tr>
<tr>
<td>34</td>
<td>Moberly-Moberly Tap 161kV line: Replace 1200A disconnect switches to increase rating to conductor rating of 372 MVA</td>
<td>$155,000</td>
</tr>
<tr>
<td>35</td>
<td>Upgrade South River transformers to 112 MVA units</td>
<td>$6,944,000</td>
</tr>
<tr>
<td>36</td>
<td>Upgrade West Plain transformers to 112 MVA units</td>
<td>$6,944,000</td>
</tr>
</tbody>
</table>

Total for all Projects in the Entergy footprint $677,936,000
AEPW – Entergy Arkansas Step 2 Study
AEPW – Entergy Arkansas Step 2 Study
Projects

- Messick Substation
  - 500 kV Switch Station
  - 500/239 kV Transformer
  - 500/345 kV Transformer
  - Ties into Mt. Olive – Hartburg 500 kV Line
- Dolet Hills - Messick 345 kV Line (26.4 miles)
- Quarry 345 kV Substation
  - 345 kV Switch Station
  - 345/138 kV Transformer
  - Ties into Grimes – Crockett 345 kV Line
- Quarry – Rivtrin 345 kV Line (8.25 miles)
AEPW – Entergy Arkansas Step 2 Study Projects Cont.

- Construct 230 kV line from Lake Village Bagby – Reed (operate at 115 kV)
- Install 10.4 MVAR Capacitor bank at Reed
- Build 345/161 kV Substation near Wheaton, rebuild the Wheaton – Cassville 69 kV Line as double circuit 161 kV over 69 kV (15 miles), install a 112 MVA 161/69 kV Transformer at Cassville, and install a second 56 MVA 161/69 kV transformer at Cassville
- Upgrade Gobbler Knob Transformers to 84 MVA units
AEPW – Entergy Arkansas Projects
## AEPW – Entergy Arkansas Project Cost

<table>
<thead>
<tr>
<th>S. No</th>
<th>Name of Project</th>
<th>Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Construct Quarry 345 kV switch station</td>
<td>$14,375,000</td>
</tr>
<tr>
<td>2</td>
<td>Install 345/138 kV Auto at Rivtrin, Add 138 kV terminal, Add 345 kV terminal</td>
<td>$33,079,000</td>
</tr>
<tr>
<td>3</td>
<td>Construct Quarry to Rivtrin 345 kV line</td>
<td>$20,687,000</td>
</tr>
<tr>
<td>4</td>
<td>Construct 500 kV Messick switching station</td>
<td>$3,473,000</td>
</tr>
<tr>
<td>5</td>
<td>Install 500/230 kV Auto at Messick switching station</td>
<td>$3,473,000</td>
</tr>
<tr>
<td>6</td>
<td>Install 500/345 kV Auto at Messick switching station</td>
<td>$5,377,000</td>
</tr>
<tr>
<td>7</td>
<td>Construct Dolet Hills to Messick 345 kV line</td>
<td>$109,480,000</td>
</tr>
<tr>
<td>7A</td>
<td>Install Dollet Hills 345 kV terminal</td>
<td>$3,020,000</td>
</tr>
<tr>
<td>8</td>
<td>Construct 230 kV line from Lake Village Bagby to Reed Switch Station but operated at 115 kV</td>
<td>$34,544,000</td>
</tr>
<tr>
<td>8a</td>
<td>Install new 115 kV terminal at LV Bagby</td>
<td>$1,789,000</td>
</tr>
<tr>
<td>8b</td>
<td>Convert Reed to a breaker station</td>
<td>$6,228,000</td>
</tr>
<tr>
<td>9</td>
<td>Build a 345/161 kV sub near Wheaton, rebuild the Wheaton-Cassville 69 kV line as double circuit 161 over 69 kV (approximately 15 miles), install a 112 MVA 161/69 kV transformer at Cassville</td>
<td>$33,962,000</td>
</tr>
<tr>
<td>10</td>
<td>Upgrade Gobbler Knob transformers to 84 MVA units</td>
<td>$5,208,000</td>
</tr>
<tr>
<td>11</td>
<td>10.4 Mvar Capacitor bank at Reed</td>
<td>$1,000,000</td>
</tr>
</tbody>
</table>

**Total for all Projects**: $275,695,000
Summary

• ESRPP 2011 Report is posted on Entergy’s OASIS:
  

• 2012 ESRPP Study
  
  – Any Step 1 studies from the 2011 cycle can be selected for a Detailed Step 2 Analysis
Questions
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Ph: (501) 688-1691  
tmcginnis@SPP.org
Helping our members work together to keep the lights on... today and in the future
2012 Entergy SPP RTO Regional Planning Process Overview

May 24, 2012

Eddie Filat
efilat@spp.org · 501.688.1708
Background

- **FERC Order 890 – Regional Participation Planning Principle:** identify system enhancements that could relieve “significant and recurring” transmission congestion

- **Open Access Transmission Tariffs**
  - SPP OATT Attachment O
  - Entergy OATT Attachment K
Section VIII Interregional Coordination

1) The Transmission Provider shall undertake to coordinate any studies required to assure the reliable, efficient, and effective operation of the Transmission System with, at a minimum, first-tier adjacent interconnected systems. Such coordination shall include:
   a) Sharing system plans to ensure that such plans are simultaneously feasible and otherwise use consistent assumptions and data; and
   b) Identifying system enhancements that could relieve interregional congestion or integrate new resources on an aggregate basis.

2) The Transmission Provider shall undertake to coordinate any studies with other transmission providers primarily through participation in the agreements listed in Addendum 1 to this Attachment O.

3) On an annual basis, the Transmission Provider shall review the ongoing planning activities under the agreements specified in Addendum 1 to this Attachment O to determine the need for any additional inter-regional studies. The Transmission Provider shall share this review with the stakeholders at a planning summit and solicit input regarding additional interregional studies that should be initiated by the Transmission Provider.
Section 13.1 Regional Planning

- Regional Planning Parties (SPP & Entergy)
  - Share system plans to ensure that they are simultaneously feasible and otherwise use consistent assumptions and data
  - Address requests for Regional Studies
  - Identify any opportunities for regional optimization of the Construction Plan with the construction plans of the Regional Planning Parties
Section 13.1 Regional Planning

- Regional Planning Parties may:
  - Request information from Regional Planning Parties as needed
  - Lead meetings
  - Ensure meetings conform with Standards of Conduct
  - Establish working groups to perform studies
  - Coordinate information exchange with outside agencies
  - Coordinate the various activities related to Regional Planning
  - Meet at least annually
  - Perform dispute resolution as needed
EHV Transmission
(Including expansion projects with commitments to construct)
Information exchange

• Data and Assumptions
  – Each party will share system plans and associated data and assumptions

• Simultaneous Feasibility
  – Each party will assess the simultaneous feasibility of the expansion plans
  – Each party will assess the consistency of data and assumptions and will report any inconsistencies or incompatibilities to the Regional Planning Parties
Regional Studies

• Regional Planning Parties will conduct stakeholder-requested studies

• Step 1 studies will provide a high-level screening to identify constraints and needed upgrades, and approximate costs and timelines

• Based on the results of a Step 1 study, stakeholders may request a Step 2 study be undertaken in the following planning cycle which will provide detailed cost estimates and timelines
Entergy OATT Economic Planning Studies

• Entergy System Studies
  – Customer-requested
• ICT Strategic Transmission Expansion Planning (ISTEP)
• Southeast Interregional Participation Process (SIRPP)
• Entergy SPP RTO Regional Planning Process Regional Studies (ESRPP)
Stakeholder Meetings

• 1\textsuperscript{st} Meeting – 5/24/2012 – Net conference
  • Present 2011 ESRPP Final Report
  • Stakeholders review and discuss scope and nominate studies for 2012

– 2\textsuperscript{nd} Meeting – 8/7/2012 – Entergy Summit
  • Progress Update for Step 1 and 2 studies

– 3\textsuperscript{rd} Meeting – 1\textsuperscript{st} Quarter 2013 – Net conference
  • Presentation and discussion of the final report
Communications

- Sign up for SPC or TWG email exploders
  - [http://www.spp.org/exploder.asp](http://www.spp.org/exploder.asp)

- SPP distribution list for stakeholders to send comments to SPP and Entergy personnel
  - [ESRPP@spp.org](mailto:ESRPP@spp.org)
Questions

Are there any questions?
Helping our members work together to keep the lights on... today and in the future
2012 ESRPP Cycle Study Scope

May 24, 2012

Eddie Filat
efilat@spp.org · 501.688.1708
Overview of Study Assumptions

• Upgrades will be evaluated through powerflow analysis to determine their scope and benefit
• Upgrades will be studied in a long-term Entergy/SPP RTO combined model
• Stakeholders input will be considered during the study process
Powerflow models

• Base Model
  – 2018 Summer Peak Base Case Model (Entergy and SPP RTO MDWG)
  – Includes (approved, proposed, and horizon) 2012-2016 Construction Plan (CP) projects and Board Approved SPP RTO 2012 STEP projects

• Change Model(s)
  – Add transfer and other study project requirements
  – Analyze transfer results
  – Develop and test transmission upgrades to relieve constraints
Contingency Scan

• Entergy Internal Monitored and Contingent Elements:
  – 115 kV and above element ties to Areas outside of Entergy’s footprint
  – 115 kV and above elements within Entergy’s footprint

• SPP Internal Monitored and Contingent Elements:
  – 345 kV and above Transmission elements in Control Areas non-adjacent to Entergy’s footprint
  – 115 kV and above elements in Control Areas adjacent to Entergy’s footprint

• Category A: The model will be evaluated under normal, system-intact conditions

• Category B: N-1 Contingency Scan (not breaker-to-breaker)

• Category C: Limited Multiple Contingency Scan
Step 1 Analysis (High-level)

• Assumptions:
  – The high-level project proposals for 2012 Cycle should increase transfer capability between a Control Area in SPP and a Control Area in Entergy (including Entergy) specifying a transfer amount (POR/POD, MW)
  – Planning-level cost estimates and construction timelines
  – MUST DC analysis of FCITC
Step 2 Analysis (Detailed)

• Assumptions:
  – A 2011 Cycle project can be evaluated in more detail
  – Detailed cost estimates and timelines for the projects will be provided
  – A full AC contingency analysis (N-1) will be performed on the base and change models.
Related information

- ESRPP Background and Objectives
- 2012 ESRPP Cycle Schedule
Stakeholder Meetings

- **1st Meeting – 5/24/2012 – Net conference**
  - Present 2011 ESRPP Final Report
  - Stakeholders review and discuss scope and nominate studies for 2012
- **2nd Meeting – 8/7/2012 – Entergy Summit**
  - Progress Update for Step 1 and 2 studies
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  - Presentation and discussion of the final report
Are there any questions?