2011 ESRPP

Entergy SPP RTO Regional Planning Process
2011 Final Report

May 14, 2012
SPP Interregional Planning
SPP Planning
Entergy Planning

SPP Southwest Power Pool

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Executive Summary

In accordance with FERC Order 890, SPP OATT Attachment O, and Entergy OATT Attachment K, the Entergy SPP RTO Regional Planning Process (ESRPP) was created to identify system enhancements that may relieve regional congestion between Entergy and Southwest Power Pool. The process shares system plans to ensure that they are simultaneously feasible and otherwise use consistent assumptions and data.

The Joint Planning Committee (JPC) was established as part of ESRPP to perform these studies and coordinate regional stakeholder communication. The JPC consists of members of management from SPP and Entergy. The JPC's staff assesses the simultaneous feasibility of the expansion plans, consistency of data and assumptions, and reports any inconsistencies or incompatibilities to the JPC. The JPC will conduct stakeholder requested studies intended to identify system enhancements that may relieve regional congestion. Due to the expected scope of the requested studies and size of the geographical region encompassed, the JPC will perform up to five (5) studies annually, which could encompass both Step 1 and Step 2 evaluations. A Step 1 evaluation will consist of a high level screen of the requested transfer and will be performed during a single year's ESRPP planning cycle. The high level screen will identify transfer constraints and likely transmission enhancements to resolve the identified constraints. The JPC will also provide approximate costs and timelines associated with the identified transmission enhancements to facilitate the stakeholder's determination of whether they have sufficient interest to pursue a Step 2 evaluation. Once a Step 1 evaluation has been completed for a particular transfer, the stakeholders have the option to request a Step 2 evaluation for that transfer to be performed during the subsequent year's ESRPP planning cycle. In the event that the stakeholders request a Step 2 evaluation, the JPC will then perform additional analysis, which may include additional coordination with external processes. The JPC will then develop detailed cost estimates and timelines associated with the final transmission enhancements. The Step 2 evaluation will ensure that sufficient coordination can occur with stakeholders and among the impacted Participating Transmission Owners.

The main objectives of the ESRPP are to improve regional transfer capability, improve regional optimization, and relieve constraining flowgates. These objectives are combined in order to provide a more robust transmission system capable of more economic delivery of power across a regional transmission system.

For the 2011 ESRPP Cycle, three studies were scoped as DC powerflow studies (Step 1 studies). Two studies were scoped for AC analysis (Step 2 studies) and more-detailed facility cost estimates and transmission designs. For the three Step 1 studies, power transfers from Entergy to EMDE, Entergy to Nebraska, and Nebraska to Entergy were performed. All three high level studies showed required upgrades to reach the desired transfer capability. The transfer from Entergy to Nebraska had the least cost ($173.2M) to obtain the desired transfer amount. The Nebraska to Entergy transfer required significant upgrades ($734M) to reach the desired transfer capability. The cost per MW of the 517 MW transfer capability increase from Entergy to EMDE was shown to be $244,139 per MW. The Entergy to Nebraska study allowed an increased transfer of 1084 MW, at $159,644 per MW. The Nebraska to Entergy study allowed an increase transfer of 2759 MW, at

$266,043 per MW. In all, the three high level transfer studies required major transmission improvements to transfer the desired amounts of power across the seam.

Along with the three high level studies, a request was made for supplemental information about the Nebraska to Entergy 3000 MW transfer (Section 4.4). To meet this request, data on what areas the power passed through was provided.

The detailed analysis for the 2011 ESRPP Cycle involved transfer of power between the Entergy Arkansas Independent Power Producers (IPPs) and SPP South as well as between AEPW and Entergy. The cost to construct and design the projects to allow the Entergy Arkansas IPPs to SPP South transfer was $568M. For the AEPW to Entergy transfer, the additional projects needed to increase the transfer capability between the areas will cost $275.7M.

Section 1: Background Information

The ESRPP process was presented to regional stakeholders at the first meeting of the 2011 ESRPP Cycle, on June 16, 2011. This presentation included an overview of the ESRPP process, the 2011 ESRPP Study Scope, and a request for study nominations for the 2011 ESRPP Cycle. Here are the studies that were proposed for inclusion in the 2011 ESRPP Cycle:

Proposed Studies
Arkansas IPPs (Hot Springs, Magnet Cove, and PUPP) to SPP South (AEPW 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

Table 1.1: Proposed Studies

Each ESRPP Regional Participant (company) was allotted five votes. Voting was reserved for representatives for affected systems within the Entergy or SPP RTO regions. The votes could be cast in any manner so that up to all five votes could be cast, e.g. one vote to each study or all five votes to one study. Votes were returned by July 7, 2011 via email. The five studies below were chosen to be studied via the ESRPP 2011 cycle and the results are the subject of this report.

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 (AEPW and OG&E) for 3000 MW (Step 2 Study)
From AEPW to Entergy Arkansas for 700 MW (Increased to 1117 MW to target SEAMS projects) (Step 2 Study)

Table 1.2: Selected Studies

Figure 1.1 below shows the geographic location for each of the 5 studies.

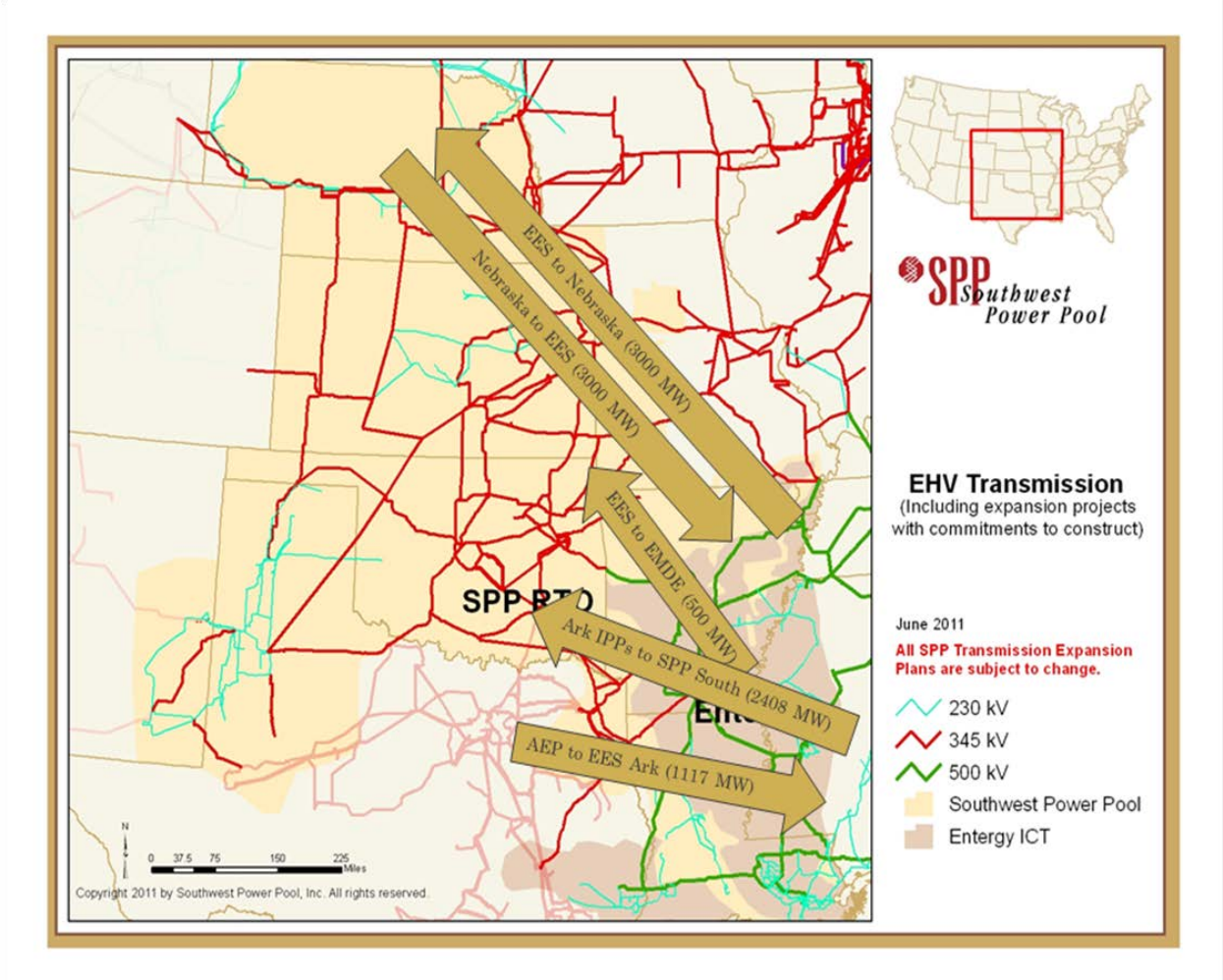


Figure 1.1: Selected Studies

Section 2: Objectives

The Entergy SPP Regional Planning Process (ESRPP) was developed with several key objectives. These objectives are: improve regional transfer capability, improve regional optimization, and relieve constraining flowgates. When combined, these objectives provide a more robust transmission system capable of more economic delivery of power across a regional transmission system. Each objective is discussed in further detail below.

2.1 Improve Transfer Capability

The Entergy transmission system interfaces with 19 balancing authorities, including SPP members. The ESRPP includes potential projects that improve the ability to move power between Entergy and neighboring systems. The projects accomplish this task by providing increased voltage support, increased thermal capacity, and additional paths from generation to load.

2.2 Improve Regional Optimization

The ESRPP projects may be considered for testing and inclusion in the regional expansion plans that Entergy and the SPP Transmission Owners participate in. Also, ESRRP projects can be sponsored for construction by utilities that choose to do so.

2.3 Relieve Constraining Flowgates

Under certain system conditions, flowgates can become constrained during real-time operations. When this occurs, congestion management procedures are instituted, often in the form of Transmission Loading Relief (TLR). TLR procedures have a number of levels and can result in the curtailment of non-firm and firm transmission service. In addition to the operational issues, there are a number of flowgates that frequently constrain the sale of transmission service. The ESRPP includes upgrades that are intended to address some of the current most constraining flowgates, from both a TLR and a transmission service perspective.

Section 3: Models and Assumptions

3.1 Scope

This study was performed according to the study scope as shown below. The study scope outlined the methods for creating the load flow models and for performing the analysis.

- **General Study Assumptions for Step 1 High-Level Analysis**
  - 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)
  - MDWG MOD Model 2017 Summer Peak
  - Incorporate Entergy's 2011 Approved Construction Plan Projects (Update 2)
  - Identical POR/POD Transfer Analyses will be performed for all study projects
  - FCITC Changes from the Base Case will be identified
- **General Study Assumptions for Step 2 Detailed Analysis**
  - Full AC Analysis Contingency Analysis
  - Detailed cost estimates
  - Detailed construction schedule

3.2 Summary of Modeling Methods and Analysis

Per the study scope above, the SPP Model Development Working Group (MDWG) 2017 Summer Peak model, as available from SPP's Model on Demand (MOD) website, was used in this study. The loads in Energy's footprint were updated to match more recent Entergy forecasts. Also, the models were further enhanced by incorporating model corrections, generation dispatch updates, and the Entergy Construction Plan (2011-2013) Update 2.

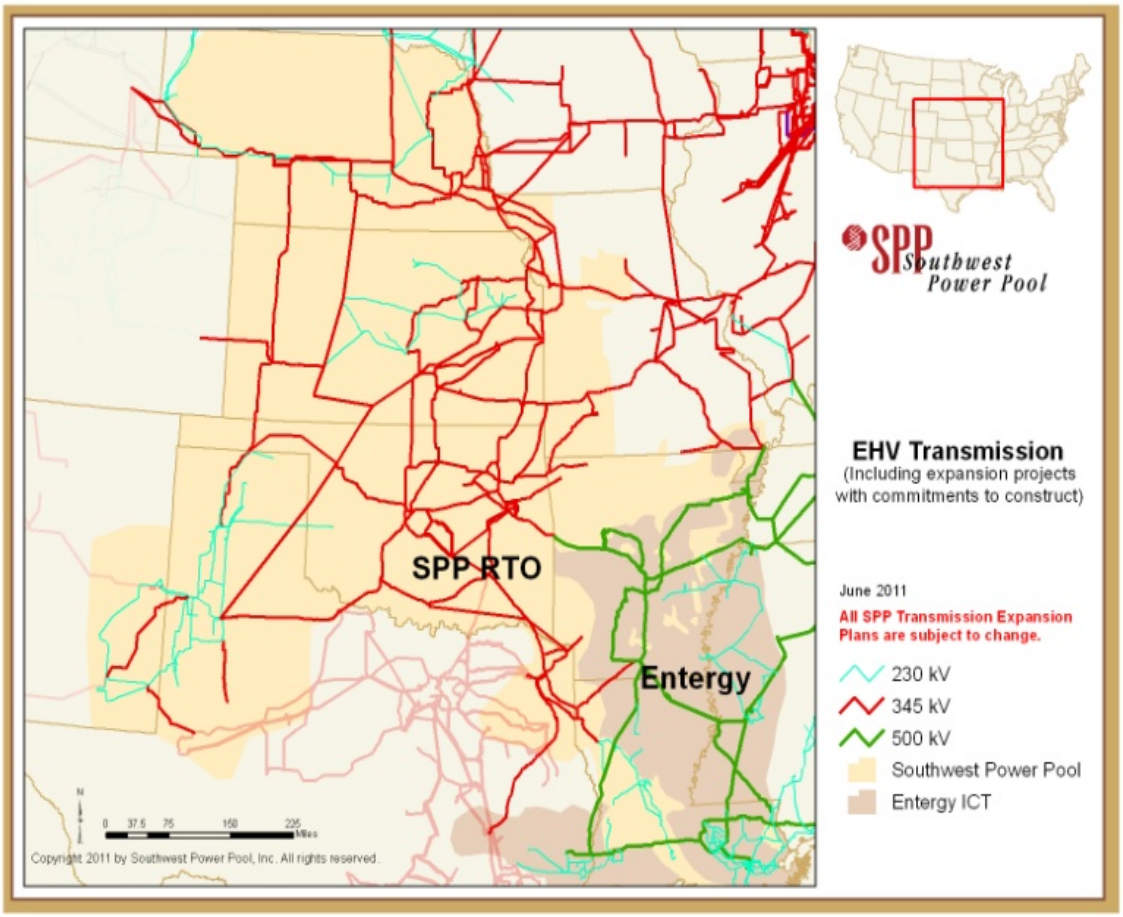


Figure 3.1: An overview of the Entergy and SPP RTO Region.

Section 4: Study Results

Using PSS/MUST 9.2, First Contingency Incremental Transfer Capability (FCITC) analysis was completed for each of the five selected transfer scenarios. Once the FCITC runs were complete, study-team members from SPP Interregional Planning, SPP RTO Planning, and Entergy Transmission Planning performed a joint review of the results. The FCITC transfer reports were examined to verify that the limiting element for each transfer was a valid limiting constraint. This verification process included verification of ratings and topology in the ESRPP power flow model.

Once the model was built and tested, the powerflow analysis and testing of potential projects took place. Results for each of the five studies are shown below. The data presented includes a description of the transfer, a description of the transmission facilities limiting the transfers, a project list, and a map showing the projects.

4.1 Entergy to EMDE 500 MW

Power Transfer

A power transfer of 500 MW was added to the ESRPP powerflow model by scaling all Entergy generation up by 500 MW and scaling all EMDE generation down by 500 MW. Below is a geographic depiction of that transfer.

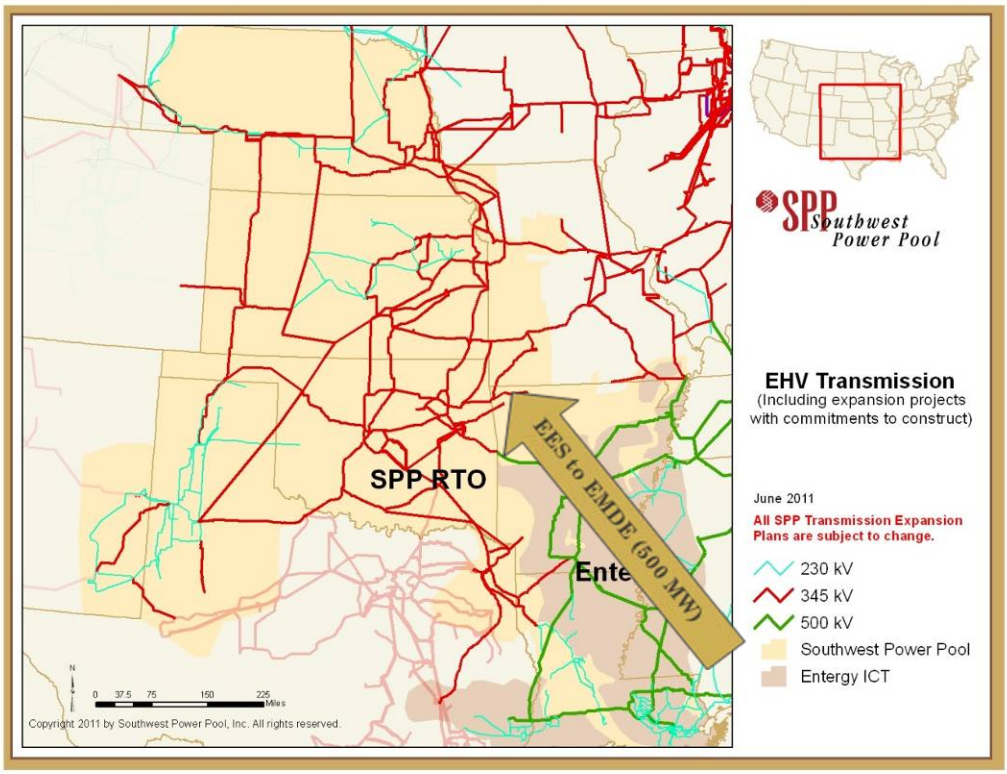


Figure 4.1: 500 MW Power Transfer from Entergy to EMDE

Interregional Transfer Limitations

The contingency analysis showed that this transfer of power was limited by the transmission facility limiting constraints listed in the table below.

FCITC (MW)	Limiting Constraint	Contingency
153	338130 5CALCR 161 338131 5MELBRN 161	C:338145 8ISES% 500 338187 8DELL% 500
198	338130 5CALCR 161 338131 5MELBRN 161	C:337909 8ANO% 500 515305 FTSMITH8 500
235	338130 5CALCR 161 505448 NORFORK5 161	C:338145 8ISES% 500 338187 8DELL% 500
249	338130 5CALCR 161 338131 5MELBRN 161	C:338151 5NEWPO! 161 338173 5NEW-IN 161
271	338130 5CALCR 161 505448 NORFORK5 161	C:337909 8ANO% 500 515305 FTSMITH8 500
317	338138 5MORFLD 161 338142 5ISES-1! 161	C:338145 8ISES% 500 338187 8DELL% 500
332	338130 5CALCR 161 505448 NORFORK5 161	C:338151 5NEWPO! 161 338173 5NEW-IN 161
345	338138 5MORFLD 161 338142 5ISES-1! 161	C:337909 8ANO% 500 515305 FTSMITH8 500
416	338138 5MORFLD 161 338142 5ISES-1! 161	C:338151 5NEWPO! 161 338173 5NEW-IN 161
429	500430 IPAPER 4 138 500530 MANSFLD4 138	C:500250 DOLHILL7 345 507760 SW SHV 7 345
468	338104 5HARR-E! 161 338121 5SUMMIT 161	C:338108 5ST_JOE 161 338110 5HILLTOP% 161
493	338104 5HARR-E! 161 338121 5SUMMIT 161	C:338107 5EVRTON 161 338108 5ST_JOE 161

Table 4.1: Transfer Limitations for Entergy to EMDE for 500 MW

Below is a geographic depiction of these interregional transfer limitations.

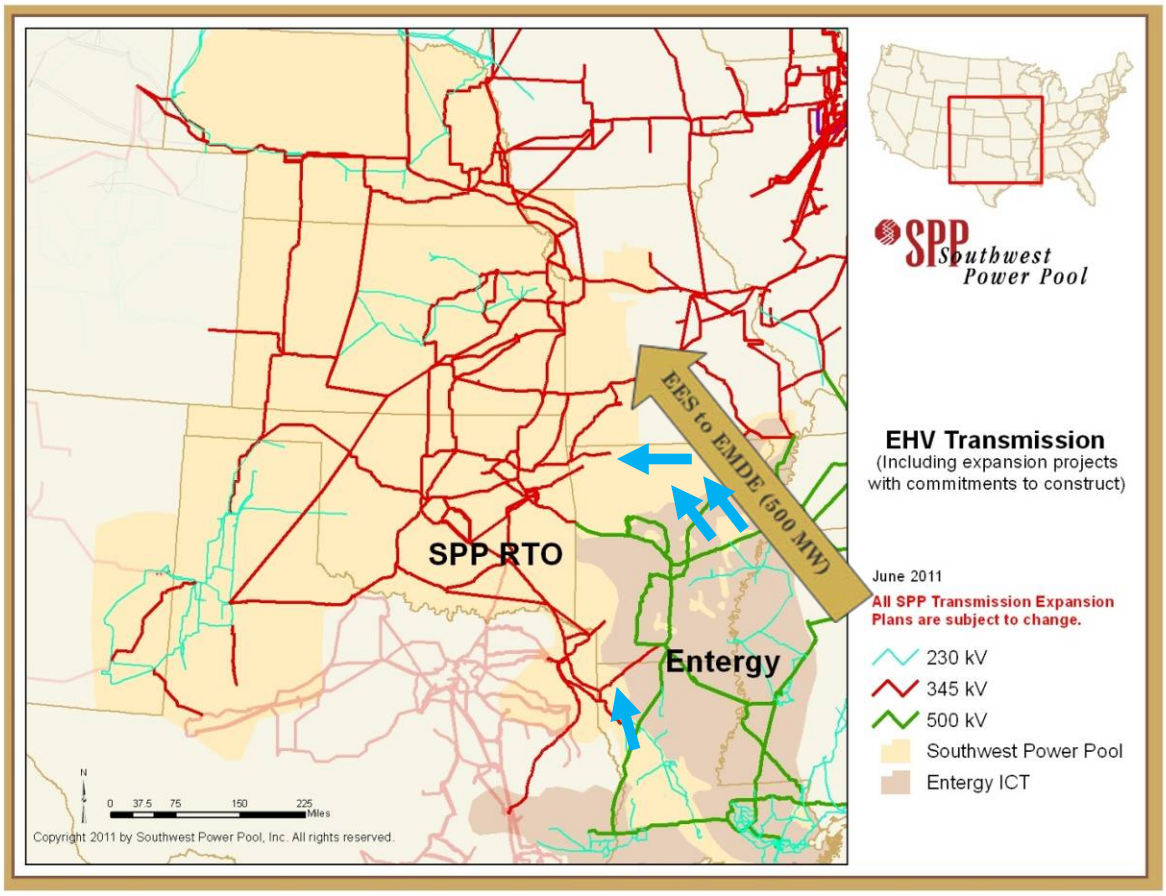


Figure 4.2: Limitations for Entergy to EMDE for 500 MW

ESRRP Projects

To relieve the interregional limiting constraints for this particular transfer, multiple projects were tested in the powerflow models. Here are the transmission projects necessary to facilitate this transfer:

- 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

Below is a geographic depiction of these ESRPP projects.

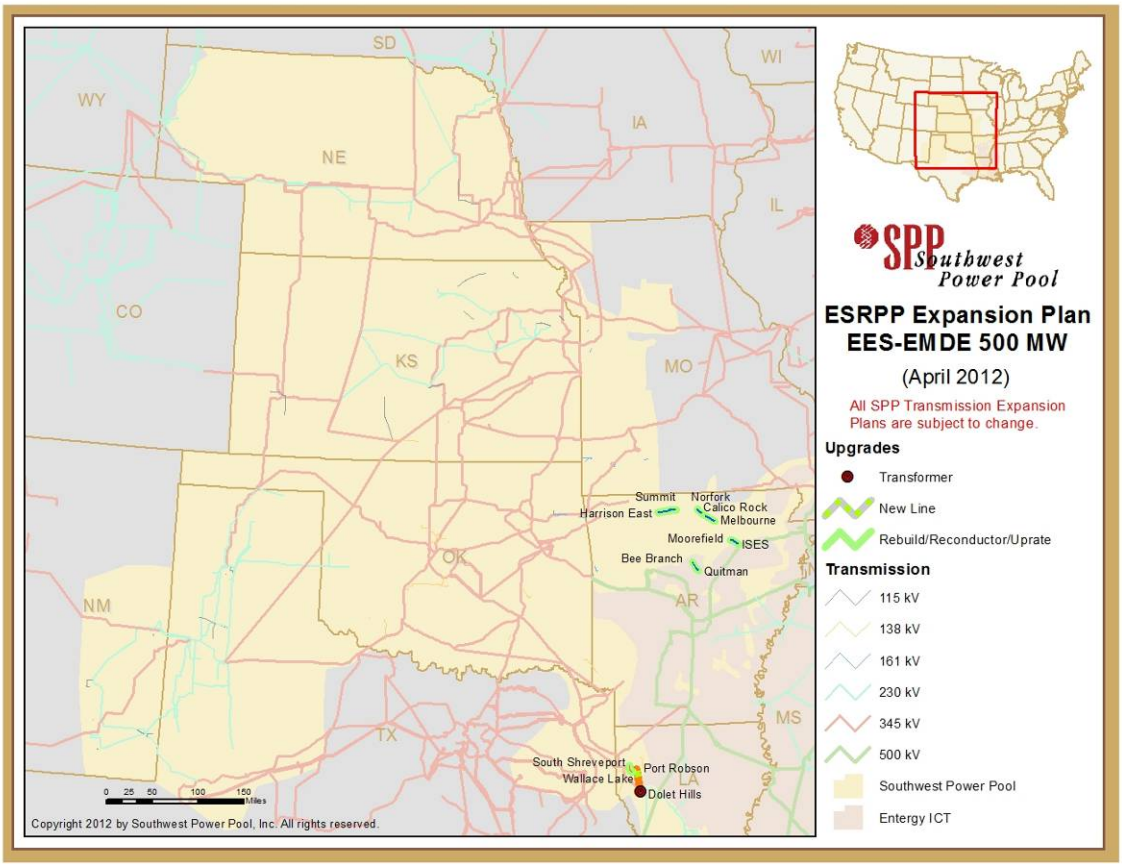


Figure 4.3: ESRPP upgrade projects for Entergy to EMDE for 500 MW

High-Level Planning Cost Estimates

High-level planning cost estimates were developed for each of the transmission facility projects necessary to facilitate this power transfer. The table below describes these project costs.

Description	Line Rating	Upgrade Description	ICT Cost Estimate
*Melbourne-Calico Rock-Norfolk 161kV Line	372 MVA	Reconductor transmission line 8.00 miles	$11.1 M
*Quitman-Bee Branch 161kV Line	223 MVA	Upgrade Switch	$.2 M
Moorefield - ISES 161kV Line	372 MVA	Reconductor transmission line 12.00 mi	$16.6 M
Dolet Hills-Dolet Hills Auto 345 kV	2560 MVA	Build new transmission line 3 miles	$4.6 M
Dolet Hills Auto Substation	675 MVA	New 345/138 kV transformer and new 345/138 kV switching station	$17.5 M

Description	Line Rating	Upgrade Description	ICT Cost Estimate
Dolet Hills-Port Robson 138 kV line	625 MVA	Build new transmission line 25 miles	$19 M
Wallace Lake-South Shreveport 138 kV line	497 MVA	Reconductor transmission line 22.00 miles	$6.3 M
Harrison East to Summit 161 kV line	223 MVA	Build new transmission line 25 miles	$51 M
Total Cost			**$126.3 M**
***Project included in the Entergy 2012-2016 Construction Plan U1**			

Table 4.2: High-Level Planning Costs for Entergy to EMDE for 500 MW

Transfer Capability Increase

Using the cost estimates and the contingency results, a summary of the transfer capability increase benefit provided by these ESRPP projects was compiled in the table below. The transfer capability results are shown without the ESRPP projects (Base Case) and with the ESRPP projects (Change Case).

Transfer	Base Case FCITC Results	Change Case FCITC Results	Difference	Cost per MW ($/MW)
Entergy - EMDE	153 MW	670 MW	517 MW	$244,139

Table 4.3: FCITC Results: Entergy to EMDE for 500 MW

Summary

A power transfer of 500 MW was added to the ESRPP powerflow model by scaling all Entergy generation up by 500 MW and scaling all EMDE generation down by 500 MW. The majority of limiting issues were seen in the central north portion of Arkansas and the north western portion of Louisiana. To relieve the interregional limiting constraints for this particular transfer, multiple projects were tested in the powerflow models. Table 4.2, above, describes the transmission projects necessary to facilitate this transfer. The total project cost is estimated at approximately $126,300,000 and is expected to take approximately 42 months to design and build.

4.2 Entergy to Nebraska for 1500 MW

Power Transfer

A power transfer of 1500 MW was added to the ESRPP powerflow model by scaling all Entergy generation up by 1500 MW and scaling all Nebraska (NPPD, OPPD, and LES) generation down by 1500 MW. Note that the transfer distribution factor cutoff was reduced from the standard 3% to 0.5% per stakeholder feedback. This was deemed reasonable

based on the transfer being over 1000 MW and being between areas more than 350 miles apart. Below is a geographic depiction of that transfer.

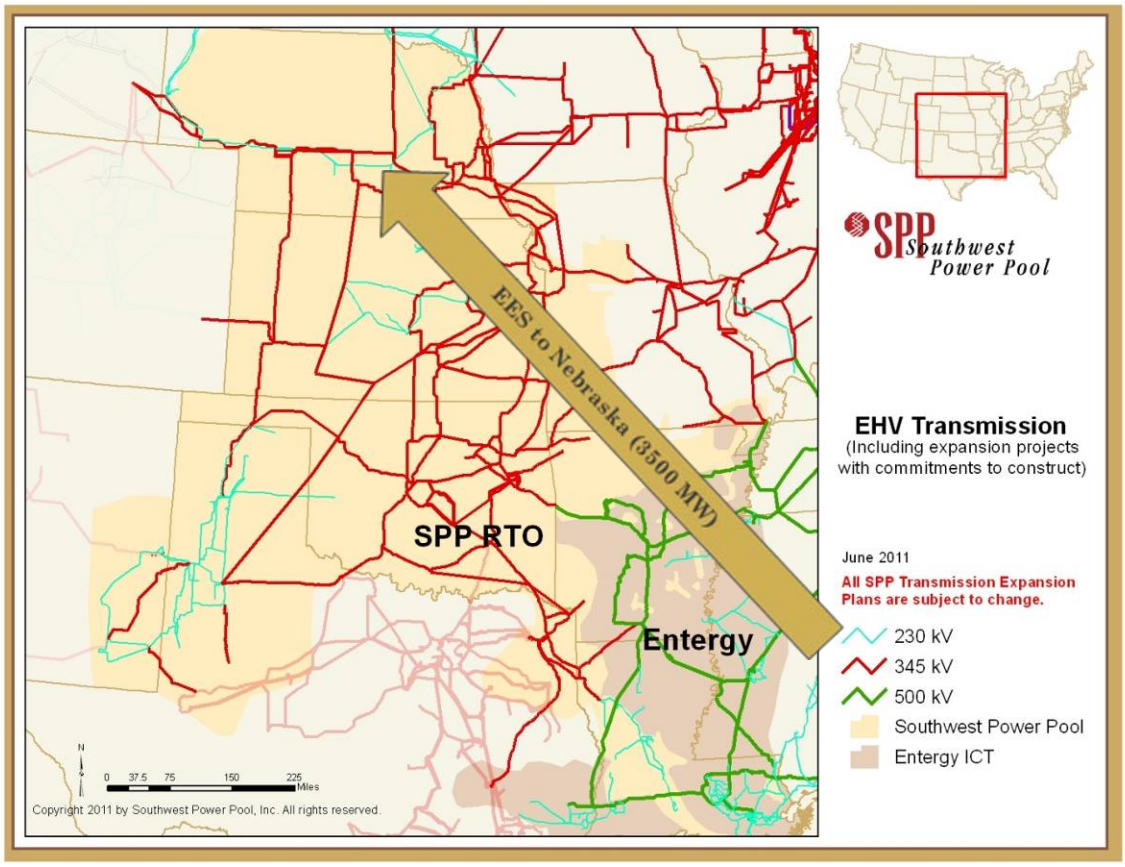


Figure 4.4: 1500 MW Power Transfer from Entergy to Nebraska

Interregional Transfer Limitations

The contingency analysis showed that this transfer of power was limited by the transmission facility limiting constraints listed in the table below.

FCITC (MW)	Limiting Constraint	Contingency
243	338130 5CALCR 161 338131 5MELBRN 161 1	C:338145 8ISES% 500 338187 8DELL% 500 1
335	338130 5CALCR 161 338131 5MELBRN 161 1	C:337909 8ANO% 500 515305 FTSMITH8 500 1
373	338130 5CALCR 161 505448 NORFORK5 161 1	C:338145 8ISES% 500 338187 8DELL% 500 1

FCITC (MW)	Limiting Constraint	Contingency
414	337310 3BEAVER_CRK! 115 500070 BC PST 4 138 1	C:500200 COLFAX 6 230 500770 RODEMR 6 230 1
431	338130 5CALCR 161 338131 5MELBRN 161 1	C:338151 5NEWPO! 161 338173 5NEW-IN 161 1
460	338130 5CALCR 161 505448 NORFORK5 161 1	C:337909 8ANO% 500 515305 FTSMITH8 500 1
467	500430 IPAPER 4 138 500530 MANSFLD4 138 1	C:500250 DOLHILL7 345 507760 SW SHV 7 345 1
505	338138 5MORFLD 161 338142 5ISES-1! 161 1	C:338145 8ISES% 500 338187 8DELL% 500 1
576	338130 5CALCR 161 505448 NORFORK5 161 1	C:338151 5NEWPO! 161 338173 5NEW-IN 161 1
586	338138 5MORFLD 161 338142 5ISES-1! 161 1	C:337909 8ANO% 500 515305 FTSMITH8 500 1
642	337926 5QUITMN! 161 338831 5BEE BR# 161 1	C:338110 5HILLTOP% 161 505508 DARDANE5 161 1
698	337310 3BEAVER_CRK! 115 500070 BC PST 4 138 1	C:337304 6MONTGMERY! 230 500200 COLFAX 6 230 1
721	338138 5MORFLD 161 338142 5ISES-1! 161 1	C:338151 5NEWPO! 161 338173 5NEW-IN 161 1
809	337926 5QUITMN! 161 338831 5BEE BR# 161 1	C:337909 8ANO% 500 515305 FTSMITH8 500 1
841	337705 3CHEETA*% 115 337707 3HS-VIL 115 1	C:337909 8ANO% 500 515305 FTSMITH8 500 1
876	500430 IPAPER 4 138 507765 WALLAKE4 138 1	C:500250 DOLHILL7 345 507760 SW SHV 7 345 1
945	337905 5RUSL-E! 161 337906 5RUSL-N 161 1	C:337909 8ANO% 500 515305 FTSMITH8 500 1
1044	338213 5WALNUT% 161 338705 5HOXIES# 161 1	C:338138 5MORFLD 161 338142 5ISES-1! 161 1
1113	338213 5WALNUT% 161 338705 5HOXIES# 161 1	C:300051 7STFRANCISTP 345 300054 7GOBKNOB 345 1
1127	337926 5QUITMN! 161 338831 5BEE BR# 161 1	C:338138 5MORFLD 161 338142 5ISES-1! 161 1

FCITC (MW)	Limiting Constraint	Contingency
1157	338213 5WALNUT% 161 338705 5HOXIES# 161 1	C:338151 5NEWPO! 161 338173 5NEW-IN 161 1
1170	347946 4PANA 138 348068 4 RAMSEY 138 1	C:346895 7COFFEEN 345 347945 7PANA 345 1
1265	337352 3RINGGOLD 115 337353 4RINGGOLD 138 1	C:500250 DOLHILL7 345 507760 SW SHV 7 345 1
1286	347946 4PANA 138 348306 4TAYLORVL 138 1	C:270796 KINCA; B 345 347962 7PAWNEE 345 1
1298	347946 4PANA 138 348306 4TAYLORVL 138 1	C:347962 7PAWNEE 345 347963 4PAWNEE 138 1
1340	338130 5CALCR 161 338131 5MELBRN 161 1	Base Case
1352	338104 5HARR-E! 161 338121 5SUMMIT 161 1	C:338108 5ST_JOE 161 338110 5HILLTOP% 161 1
1422	338104 5HARR-E! 161 338121 5SUMMIT 161 1	C:338107 5EVRTON 161 338108 5ST_JOE 161 1
1489	338130 5CALCR 161 505448 NORFORK5 161 1	Base Case

Table 4.4: Transfer Limitations for Entergy to Nebraska for 1500 MW

Below is a geographic depiction of these interregional transfer limitations.

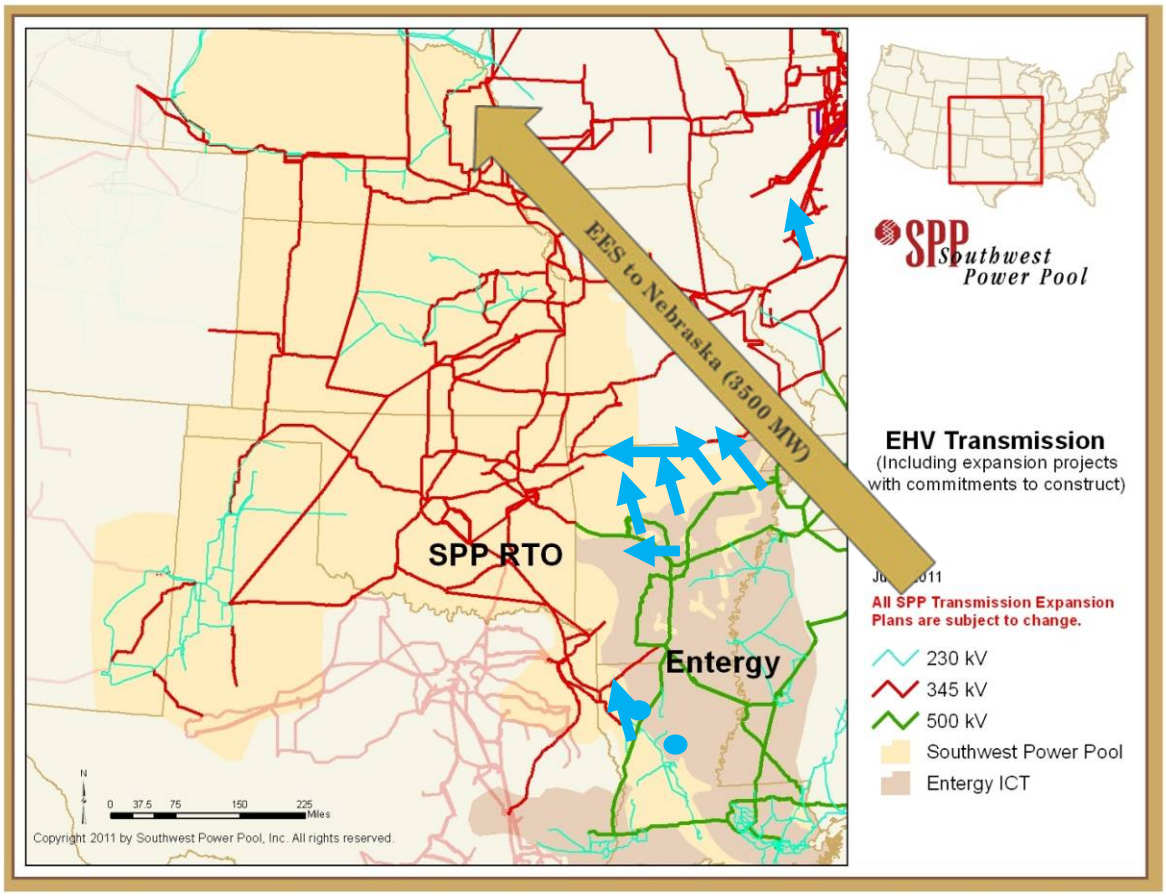


Figure 4.5: Limitations for Entergy to Nebraska for 1500 MW

ESRRP Projects

To relieve the interregional limiting constraints for this particular transfer, multiple projects were tested in the powerflow models. Below are the transmission projects necessary to facilitate this transfer:

- Melbourne – Calico Rock – Norfork 161kV 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
- 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

Below is a geographic depiction of these ESRPP projects.

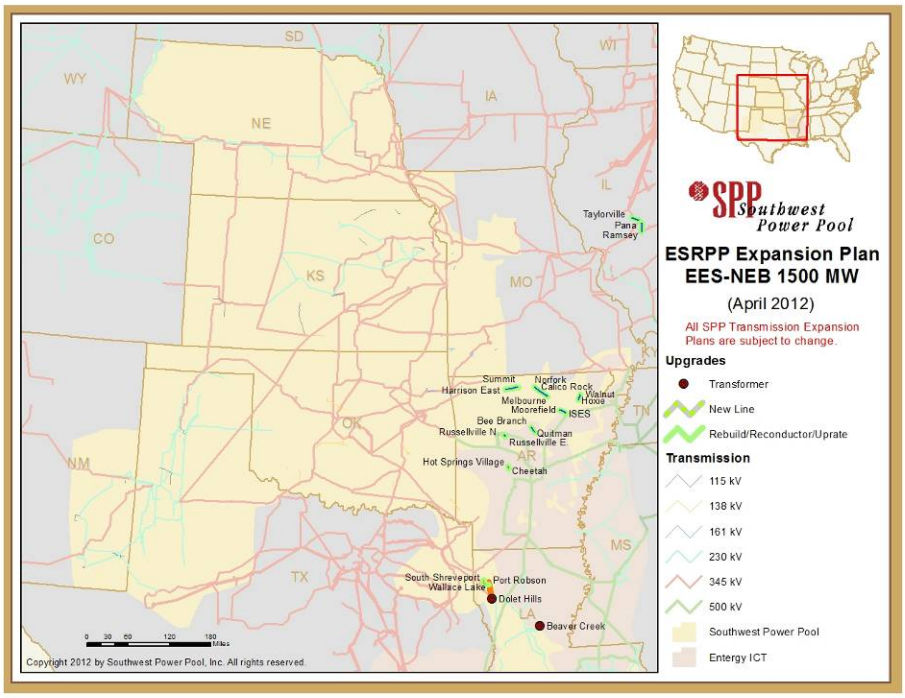


Figure 4.6: ESRPP upgrade projects for Entergy to Nebraska for 1500 MW

High-Level Planning Cost Estimates

High-level planning cost estimates were developed for each of the transmission facility projects necessary to facilitate this power transfer. The table below describes these project costs.

Description	Line Rating	Upgrade Description	ICT Cost Estimate
*Reconductor Melbourne to Calico Rock to Norfolk 161 kV line	335 MVA	Reconductor transmission line 24.75 miles	$34.3 M
Recondutor Russellville North to Russellville East 161 kV line	446 MVA	Reconductor transmission line 3.2 miles	$4.4 M
Recondutor Cheetah to Hot Spring Village 115 kV line	239 MVA	Reconductor transmission line 3.83 miles	$5.3 M
Recondutor Moore Field to ISES 161 kV line	372 MVW	Reconductor transmission line 11.9 miles	$16.5 M
Reconductor Harrison East to Summit 161 kV line	223 MVA	Reconductor transmission line 21.6 miles	$30 M
Reconductor Walnut to Hoxies 161 kV line	310 MVA	Reconductor transmission line 16.32 miles	$22.6 M
*Quitman to Bee Branch 161 kV line Uprate	223 MVA	Replace Switch	$.2 M
Dolet Hills to Dolet Hills Auto_345kV line	2560 MVA	Build new transmission lines 3 Miles	$4.6 M

Description	Line Rating	Upgrade Description	ICT Cost Estimate
Dolet Hills Auto Substation	675 MVA	New 345/138 kV transformer and new 345/138 kV switching station	$17.5 M
Dolet Hills to Port Robson 138 kV line	625 MVA	Build new transmission line 25 miles	$19 M
Rebuild Wallace Lake-South Shreveport 138 kV line	497 MVA	Reconductor transmission line 11 miles	$6.3 M
138/115 kV Autotransformer @ Beaver Creek	93 MVA	New 138/115 kV transformer @ Beaver Creek	$2.9 M
Reconductor Pana to Ramsey 161 kV line	478 MVA	Reconductor transmission line 18 miles	$5.5 M
Reconductor Pana to Taylorville South 161 kV line	382 MVA	Reconductor transmission line 13 miles	$4.1 M
Total Cost			**$173.2 M**
***Project included in the Entergy 2012-2016 Construction Plan U1**			

Table 4.5: High-Level Planning Costs for Entergy to Nebraska for 1500 MW

Transfer Capability Increase

Using the cost estimates and the contingency results, a summary of the transfer capability increase benefit provided by these ESRPP projects was compiled in the table below. The transfer capability results are shown without the ESRPP projects (Base Case) and with the ESRPP projects (Change Case).

Transfer	Base Case FCITC Results	Change Case FCITC Results	Difference	Cost per MW ($/MW)
Entergy - Nebraska	242 MW	1326 MW	1084 MW	**$159,644**

Table 4.6: FCITC Results: Entergy to Nebraska for 1500 MW

Summary

A power transfer of 1500 MW was added to the ESRPP powerflow model by scaling all Entergy generation up by 1500 MW and scaling all Nebraska (NPPD, OPPD, and LES) generation down by 1500 MW. Note that the transfer distribution factor cutoff was reduced from the standard 3% to 0.5% per stakeholder feedback. This was deemed reasonable based on the transfer being over 1000 MW and being between areas more than 350 miles apart. The majority of limiting elements were in the northwest, central, and northern portions of Arkansas and the western portions of Louisiana (around the Shreveport area). To relieve the interregional limiting constraints for this particular transfer, multiple projects were tested in the powerflow models. The above table 4.5 describes the transmission projects necessary to

facilitate this transfer. The total project cost is estimated at approximately $173,200,000 and is expected to take approximately 48 months to design and build.

4.3 Nebraska to Entergy for 3000 MW

Power Transfer

A power transfer of 3000 MW was added to the ESRPP powerflow model by scaling all Entergy generation down by 3000 MW and scaling all Nebraska (NPPD, OPPD, and LES) generation up by 3000 MW. Note that the transfer distribution factor cutoff was reduced from the standard 3% to 0.5% per stakeholder feedback. This was deemed reasonable based on the transfer being over 1000 MW and being between areas more than 350 miles apart. Below is a geographic depiction of that transfer.

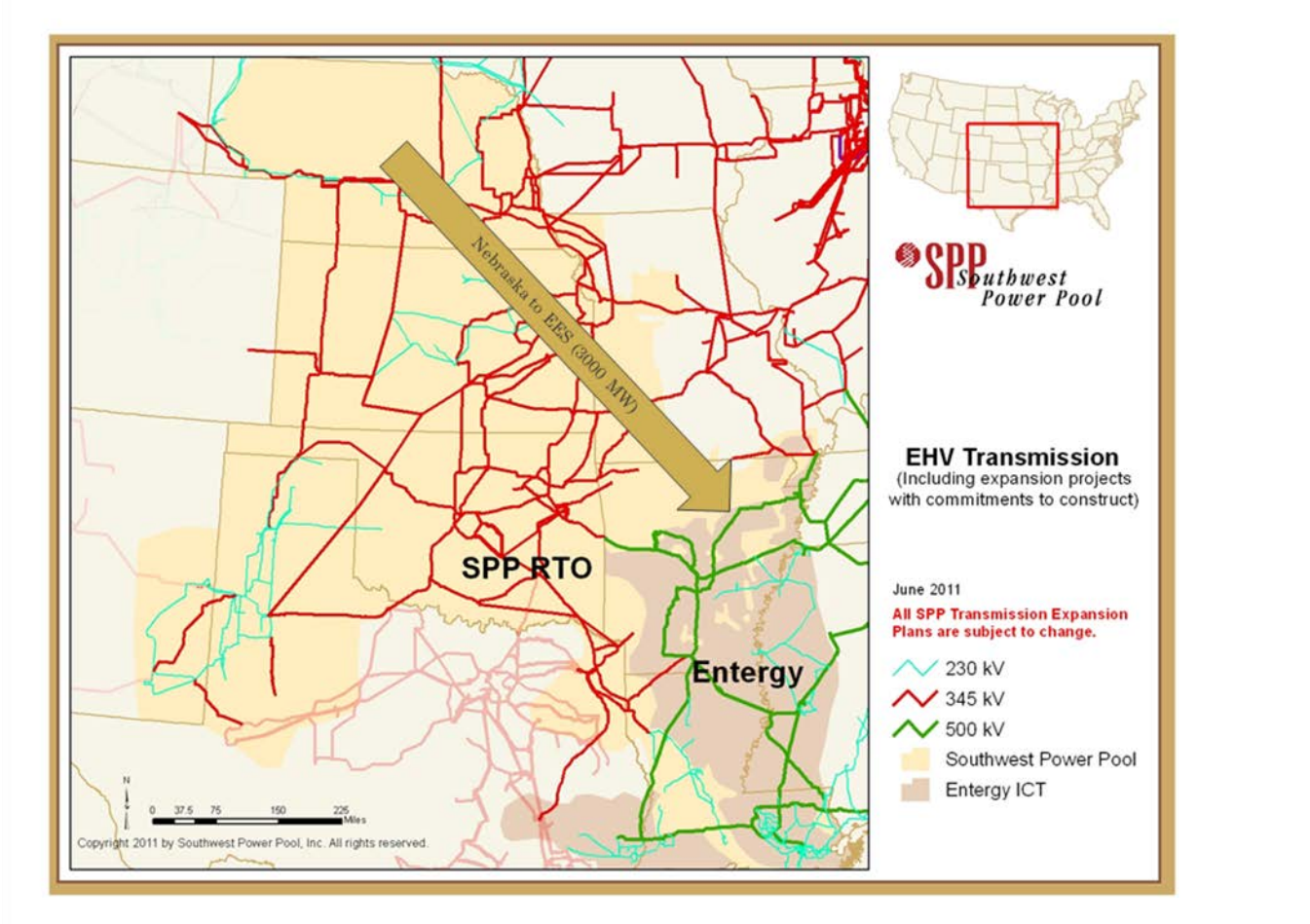


Figure 4.7: 3000 MW Power Transfer from Nebraska to Entergy

Interregional Transfer Limitations

The contingency analysis showed that this transfer of power was limited by the transmission facility limiting constraints listed in the table below.

FCITC (MW)	Limiting Constraint	Contingency
177	335455 4CHAMPAGNE! 138 500720 PLAISAN4 138 1	C:500920 WSTFORK6 230 500940 WELLS 6 230 1
792	500190 COCODR 6 230 500230 COUGH 4 138 1	C:500920 WSTFORK6 230 500940 WELLS 6 230 1
798	640253 KEYSTON7 115 659132 OGALALA7 115 1	C:640183 GENTLMN3 345 640252 KEYSTON3 345 1
1143	334282 4RAYBURN% 138 334330 4JASPER 138 1	C:334320 8CYPRESS% 500 334325 8HARTBRG% 500 1
1225	334026 4GRIMES% 138 334060 4MT.ZION 138 1	C:334026 4GRIMES% 138 334039 4BENTWATER 138 1
1245	334026 4GRIMES% 138 334028 7GRIMES% 345 1	C:334026 4GRIMES% 138 334028 7GRIMES% 345 2
1245	334026 4GRIMES% 138 334028 7GRIMES% 45 2	C:334026 4GRIMES% 138 334028 7GRIMES% 345 1
1657	337144 3GREENBRK 115 337150 3HORN LAKE! 115 1	C:337139 3GETWELL! 115 337140 6GETWELL! 230 1
1704	334026 4GRIMES% 138 334060 4MT.ZION 138 1	C:334039 4BENTWATER 138 334040 4WALDEN 138 1
1926	334026 4GRIMES% 138 334039 4BENTWATER 138 1	C:334026 4GRIMES% 138 334060 4MT.ZION 138 1
1959	640302 OGALALA4 230 659134 SIDNEY 4 230 1	C:640252 KEYSTON3 345 659133 SIDNEY 3 345 1
2074	334058 4L558T485 138 334060 4MT.ZION 138 1	C:334026 4GRIMES% 138 334039 4BENTWATER 138 1
2197	334026 4GRIMES% 138 334039 4BENTWATER 138 1	C:334058 4L558T485 138 334060 4MT.ZION 138 1
2201	334026 4GRIMES% 138 334060 4MT.ZION 138 1	C:334320 8CYPRESS% 500 334325 8HARTBRG% 500 1
2381	Interface 5 6006 GGS	Base Case
2457	334334 4LEACH 138 334335 4TOLEDO% 138 1	C:500220 COOPER 4 138 500480 LEESV 4 138 1
2515	334333 4NEWTONB! 138 334334	C:500220 COOPER 4 138 500480

FCITC (MW)	Limiting Constraint	Contingency
	4LEACH 138 1	LEESV 4 138 1
2548	334026 4GRIMES% 138 334039 4BENTWATER 138 1	C:334057 4HUNTSVL! 138 334058 4L558T485 138 1
2553	334058 4L558T485 138 334060 4MT.ZION 138 1	C:334039 4BENTWATER 138 334040 4WALDEN 138 1
2574	300120 5THMHIL 161 300126 5MOBTAP 161 1	C:300044 7MCCRED 345 300049 7THOMHL 345 1
2632	345408 7OVERTON 345/161 kV Transformer	C:300043 7KINGDM 345 300044 7MCCRED 345 1
2641	334334 4LEACH 138 334335 4TOLEDO% 138 1	C:334320 8CYPRESS% 500 334325 8HARTBRG% 500 1
2714	334333 4NEWTONB! 138 334334 4LEACH 138 1	C:334320 8CYPRESS% 500 334325 8HARTBRG% 500 1
2715	531451 MINGO 7 345/115 kV Transformer	C:531451 MINGO 7 345 531465 SETAB 7 345 1
2745	640287 N.PLATT7 115 640365 STOCKVL7 115 1	C:640183 GENTLMN3 345 640325 REDWILO3 345 1
2945	539656 CLIFTON3 115 539657 CONCORD3 115 1	C:532852 JEC 6 230 532861 EMANHAT6 230 1

Table 4.7: Transfer Limitations for Nebraska to Entergy for 3000 MW

Below is a geographic depiction of these interregional transfer limitations.

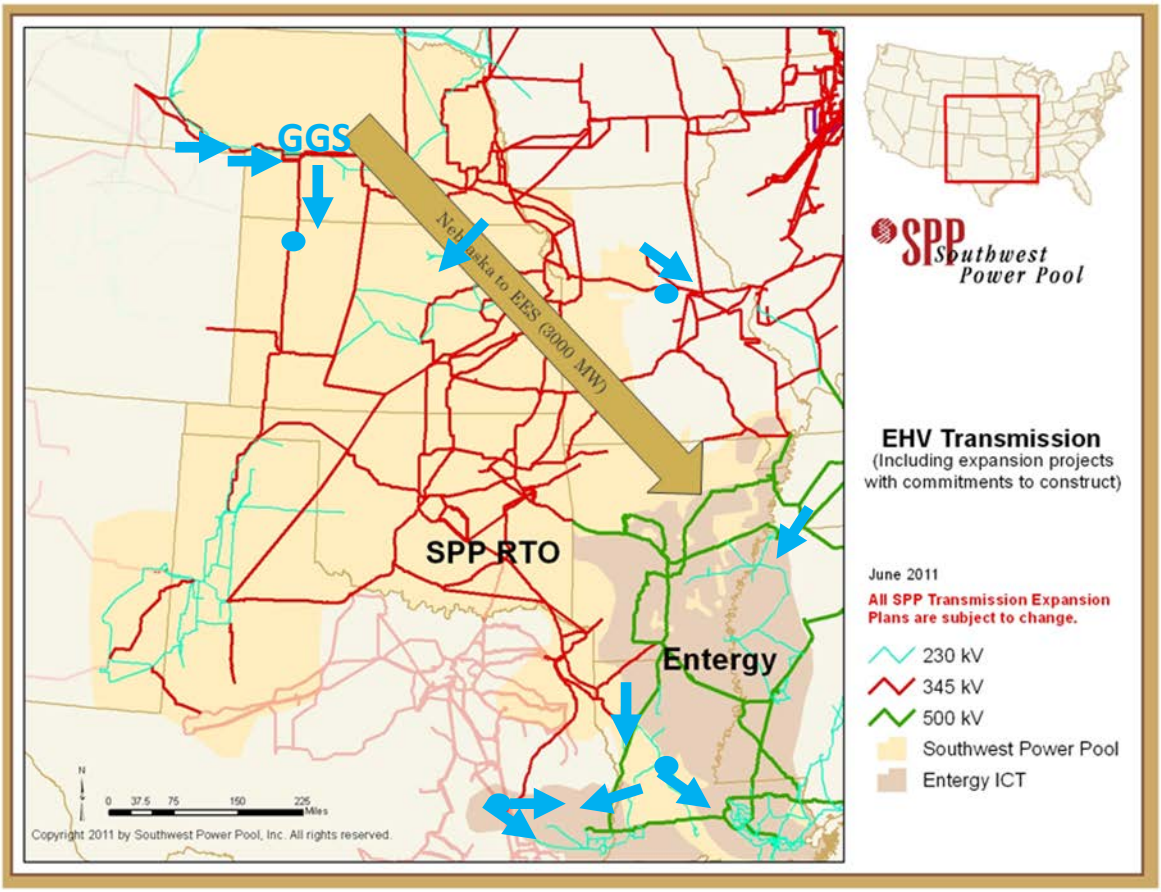


Figure 4.8: Limitations for Nebraska to Entergy for 3000 MW

ESRRP Projects

To relieve the interregional limiting constraints for this particular transfer; multiple projects were tested in the powerflow models. Here are the transmission projects necessary to facilitate this transfer:

- 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
- 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
- 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

Below is a geographic depiction of these ESRPP projects.

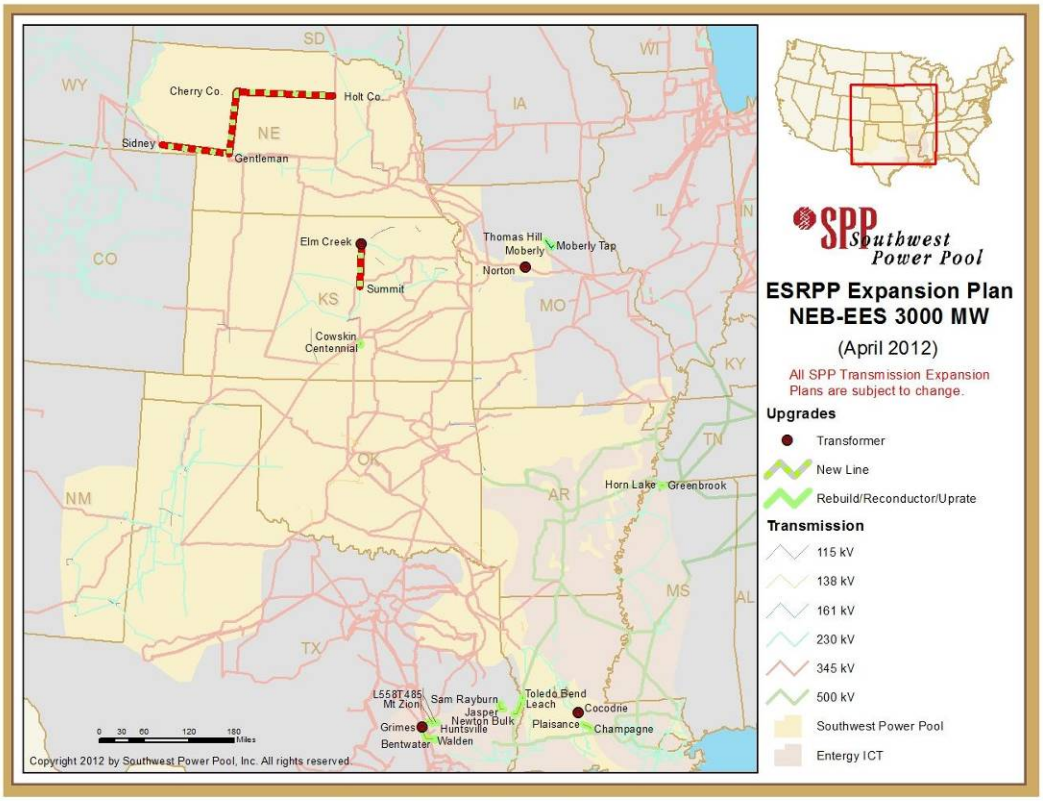


Figure 4.9: ESRPP upgrade projects for Nebraska to Entergy for 3000 MW

High-Level Planning Cost Estimates

High-level planning cost estimates were developed for each of the transmission facility projects necessary to facilitate this power transfer. The table below describes these project costs.

Description	Line Rating	Upgrade Description	ICT Cost Estimate
*Jasper to Sam Rayburn 138 kV line	260 MVA	Reconductor transmission line 14 miles	$17.2 M
Grimes to Bentwater 138 kV line	442 MVA	Reconductor transmission line 26 mile	$32 M
Grimes to Mt. Zion 138 kV line	339 MVA	Reconductor transmission line 19 miles	$23.4 M
Champagne to Plaisance 138 kV line	287 MVA	Upgrade CT's and Relay settings	$.7 M
Grimes 345/138 kV Auto	525 MVA	Add 3rd 345/138 kV Auto at Grimes	$10.7 M
*Leach to Toledo 138 kV line	330 MVA	Reconductor transmission line 2.26 miles	$2.8 M

Description	Line Rating	Upgrade Description	ICT Cost Estimate
Newton Bulk to Leach 138 kV line	330 MVA	Reconductor transmission line 25.03 miles	$30.8 M
L558T485 to Mt. Zion 138 kV line	330 MVA	Reconductor transmission line 5.35 miles	$6.6 M
Huntsville to L558T485 138 kV line	330 MVA	Reconductor transmission line 2.25 miles	$2.8 M
Greenbrook to Horn Lake 138 kV line	330 MVA	Reconductor transmission line 3.24 miles	$4 M
Bentwater to Walden 138 kV line	330 MVA	Reconductor transmission line 3.89 miles	$4.8 M
***Cocodrie 230/138 kV Auto	425 MVA	Add 3rd 230/138 kV Auto at Cocodrie	$13.2 M
Sidney to Gentleman 345 kV line	1792 MVA	Build new transmission line 102 Miles	$158 M
**Gentleman to Cherry County to Holt Co 345 kV lines	1792 MVA	Build new transmission lines 222 Miles	$266.4 M
**Cherry County Substation	N/A	Construct new 345 kV substation.	$6 M
**Holt Co Substation	N/A	Construct new 345 kV substation.	$16.8 M
Thomas Hill-Moberly-Moberly Tap 161 kV line	437 MVA	Reconductor transmission line 13.5 Miles	$9.3 M
Tap Overton-Sibley 345 line, build Norton 345/161 kV substation, add new Norton 345/161 kV transformer	336 MVA	New 345/161 kV transformer and new 345/161 kV switching station	$20.7 M
**Summit-Elm_Creek_345kV line	1793 MVA	Build new transmission lines 60 Miles	$90.7 M
**Elm Creek 345/230 kV Auto and perform bus work	600 MVA	Add 345/230 kV Auto at Elm Creek	$13.4 M
**Cowskin to Centennial 138 kV line	287 MVA	Rebuild transmission line 36.5 Miles	$3.7 M
Total Cost			**$734 M**
***Project included in the Entergy 2012-2016 Construction Plan U1**			
****Project included in the approved 2012 SPP Transmission Expansion Plan**			
*****Project included in CLECO 2011 Transmission Construction Plan**			

Table 4.8: High-Level Planning Costs for Nebraska to Entergy for 3000 MW

Transfer Capability Increase

Using the cost estimates and the contingency results, a summary of the transfer capability increase benefit provided by these ESRPP projects was compiled in the table below. The transfer capability results are shown without the ESRPP projects (Base Case) and with the ESRPP projects (Change Case).

Transfer	Base Case FCITC Results	Change Case FCITC Results	Difference	Cost per MW ($/MW)
Nebraska - Entergy	176 MW	2935 MW	2759 MW	$266,043

Table 4.9: FCITC Results: Nebraska to Entergy for 3000 MW

Summary

A power transfer of 3000 MW was added to the ESRPP powerflow model by scaling all Entergy generation down by 3000 MW and scaling all Nebraska (NPPD, OPPD, and LES) generation up by 3000 MW. Note that the transfer distribution factor cutoff was reduced from the standard 3% to 0.5% per stakeholder feedback. This was deemed reasonable based on the transfer being over 1000 MW and being between areas more than 350 miles apart. The majority of limiting elements were in the Nebraska, Kansas, Texas, and Louisiana area. To relieve the interregional limiting constraints for this particular transfer, multiple projects were tested in the powerflow models. The above table 4.8 describes the transmission projects necessary to facilitate this transfer. The total project cost is estimated at approximately $734,000,000 and is expected to take approximately 48 months to design and build.

4.4 Sensitivities for Nebraska to Entergy for 3000 MW Transfer

Request for Supplemental Information

Supplemental information about the Nebraska to Entergy 3000 MW transfer, other than the transfer limitations information, was requested by ESRPP stakeholders. Stakeholders requested data regarding the areas the flow of power affected. To provide insight into how this power flowed, additional tables and diagrams were developed and included in this report.

The table below lists the sources of the 3000 MW transfer into Entergy.

Source/Sink Areas	
Area	Generation Change (MW)
NPPD 640	2204
OPPD 645	569
LES 650	227
EES 351	-3000

Table 4.10: Source and Sink Areas for Nebraska to Entergy for 3000 MW

This table describes how much power flowed through each of the areas connecting to Nebraska areas on its way to Entergy.

Area Interchange from Nebraska Areas (3000 MW Source)		
From Area	To Area	Flow Change (MW)
NPPD 640	WAPA 652	466
NPPD 640	MEC 635	252
NPPD 640	GMO 540	361
NPPD 640	AECI 330	253
NPPD 640	MIDW 531	344
NPPD 640	SUNC 534	354
OPPD 645	MEC 635	526
OPPD 645	GMO 540	259

Table 4.11: Area Interchange from Nebraska Areas for Nebraska to Entergy for 3000 MW

This table describes how much power flowed through each of the areas connecting to Entergy as the power flowed into Entergy.

Area Interchange to Entergy (3000 MW Sink)		
From Area	To Area	Flow Change (MW)
CLEC 502	EES 351	216
AEPW 520	EES 351	460
OKGE 524	EES 351	454
AECI 330	EES 351	494
TVA 347	EES 351	717

Table 4.12: Area Interchange from areas adjacent to Entergy for Nebraska to Entergy for 3000 MW

Below is a geographic depiction of these area interchange results. Note that for this flow map, only flows that increase more than 200 MW are shown. The conclusion that can be reached from these tables and map is that 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.

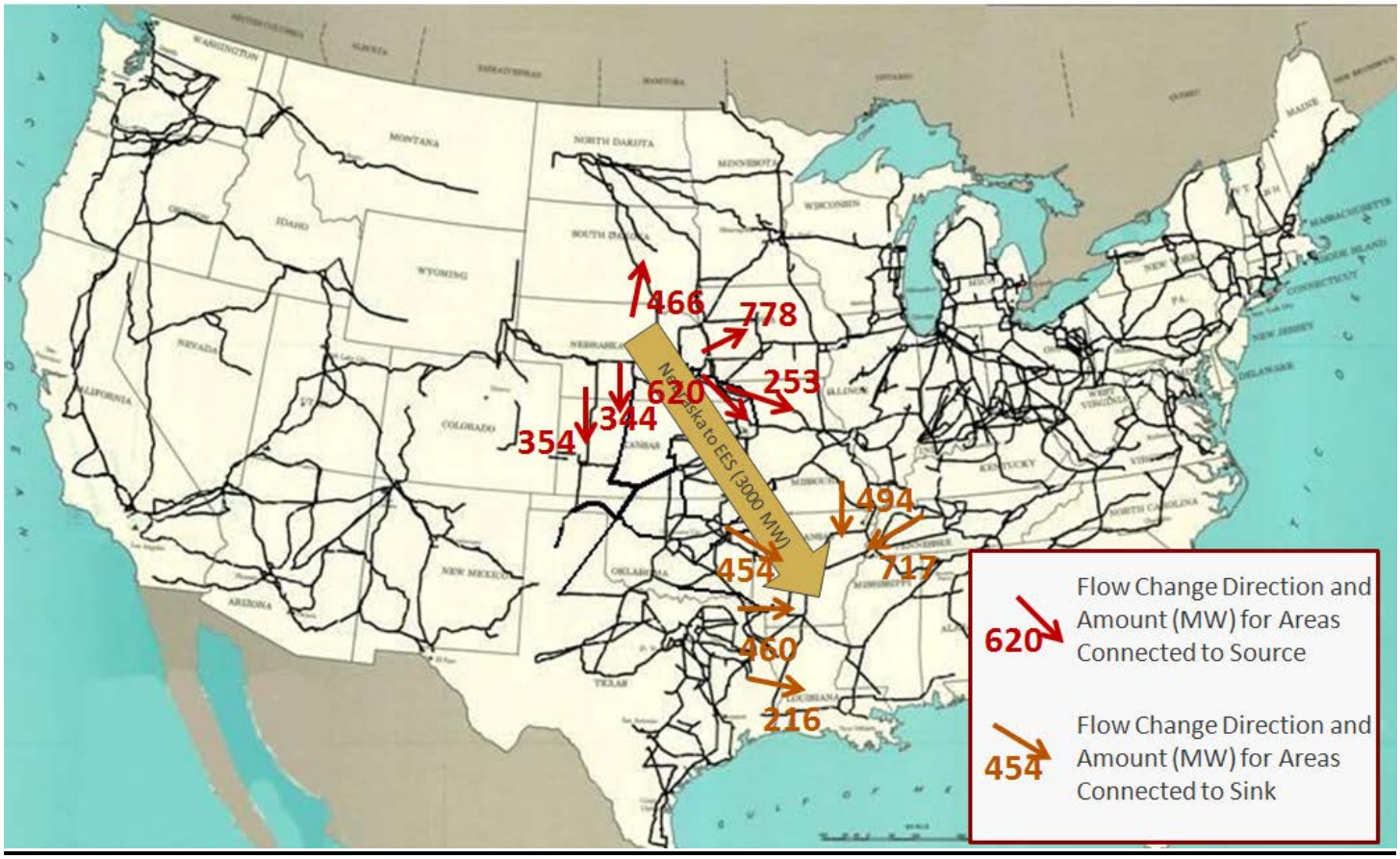


Figure 4.10: Area Interchange Map for Nebraska to Entergy for 3000 MW

Request for Sensitivity Transfer

Besides additional data about the Nebraska to Entergy 3000 MW transfer, a variation of the Nebraska to Entergy 3000 MW transfer was requested by the ESRPP stakeholders. The stakeholders requested that all Balanced Portfolio and Priority Projects be removed from the base case model. The stated goal was to identify how many additional transfer limitations would have been identified if these projects were not in the base case powerflow model. Note that the Balanced Portfolio and Priority Projects are two previously-approved studies consisting primarily of EHV transmission expansion projects.

This table shows how many transfer limitations were observed with and without the Balanced Portfolio and Priority Projects.

Number of Interregional Transfer Limitations	
Before Balanced Portfolio and Priority Projects	With Balanced Portfolio and Priority Projects
65	27

Table 4.13: Number of Limitations for Nebraska to Entergy for 3000 MW Sensitivity

Below is a geographic depiction of these sensitivity results. Note that the red crossed circles indicate projects from the Balanced Portfolio and Priority Projects that were removed from the base case powerflow model. Also, the blue areas are transmission facility transfer limitations.

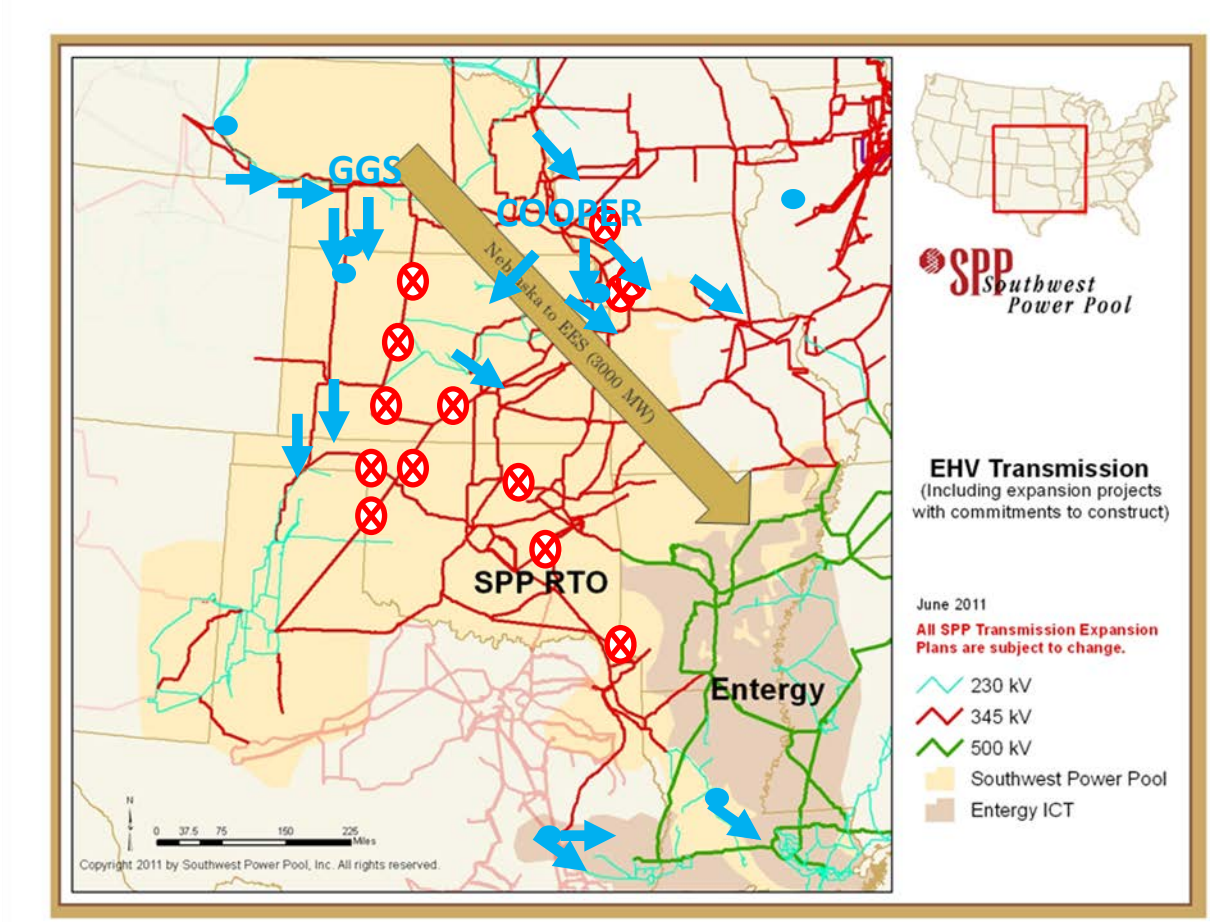


Figure 4.11: Transfer Limitations for Nebraska to Entergy for 3000 MW Sensitivity

Summary

The conclusion that can be reached from this table and map is that there would have been 38 more transfer limitations for the 3000 MW transfer from Nebraska to Entergy had the projects from the Balanced Portfolio and Priority Projects had not been in the base case model. Many of these additional transfer limitations were concentrated in the Kansas City area.

4.5 Arkansas IPPs (Hot Springs, Magnet Cove, and PUPP) to SPP South (AEPW and OG&E) for 2408 MW (Step 2 Study)

Power Transfer

A power transfer of 2408 MW was added to the ESRPP powerflow model by scaling Hot Springs, Magnet Cove, and PUPP generators in Entergy Arkansas up by 2408 MW and scaling SPP South generation down by 2408 MW, while taking into account the generators' minimum and maximum capabilities. Below is a geographic depiction of that transfer.

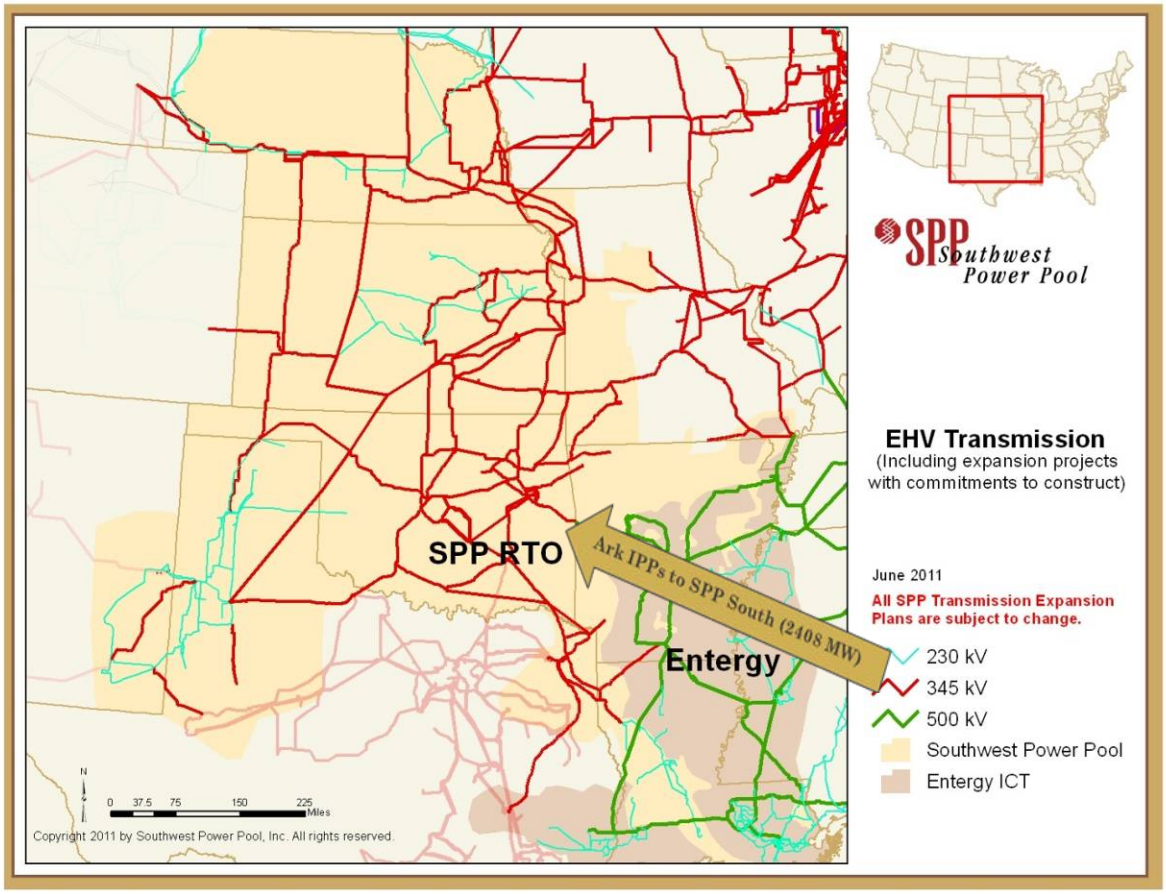


Figure 4.12: Arkansas IPP (Hot Springs, Magnet Cove, and PUPP) to SPP South (AEPW and OG&E) for 2408 MW

Interregional Transfer Limitations

The First Contingency Incremental transfer Capability (FCITC) analysis from Step 1 of the ESRPP process, performed for the 2010 ESRPP Cycle, showed that a number of transmission projects were necessary to facilitate this transfer.

ESRRP Projects

To relieve the interregional limiting constraints for this particular transfer, multiple projects were tested in the powerflow models. Here are the transmission projects necessary to facilitate this transfer per the previously-performed Step 1 Analysis (DC Analysis):

- 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

Engineering Analysis

Below are the results of the AC Contingency analysis and substation design of the projects required to facilitate the 2408 MW transfer from Arkansas IPPs to SPP South.

AC Contingency

The projects listed above from the Step 1 analysis were added to the base case powerflow model for this transfer. With this model, an N-1 contingency scan was completed on the SPP RTO and Entergy Systems. The results of this analysis are shown in Tables 4.14 and 4.15.

It was found that there were relatively few voltage violations on either system. Some preexisting thermal violations were worsened by the transfer and some new violations showed up because of the transfer. Thermal violations with more than 3% increase in flow (over base flow of the limiting element) are reported below. The limiting elements are reported for the worst contingency.

Project 4: Thermal Violations - Arkansas IPPs to SPP South for 2408 MW

Limiting Constraint	Rating	Base Flow (MVA)	Transfer with Interconnection Projects Flow (MVA)	Base Case Contingency % Overload	Transfer with Interconnection Projects % overload	Contingency
300063 5CALIF 161.00 300550 2CALIF 69.000 1	56	62	65	110.71	116.07	543062 SALSBRY5 161 543064 NORTON-5 161 1
300083 5GIBSON 161.00 301291 2GIBSON 69.000 1	56	61	64	108.93	114.29	300084 5GRNFRT 161 300115 5STFRAN 161 1
300113 5SRIVER 161.00 300349 2SRIVER 69.000 1	50	48.4	51	96.80	102.00	300113 5SRIVER 161 300349 2SRIVER 69 2
300123 5WPLAIN 161.00 301123 2WSTPL3 69.000 1	56	60	62	107.14	110.71	300123 5WPLAIN 161 301123 2WSTPL3 69 2
300123 5WPLAIN 161.00 301123 2WSTPL3 69.000 2	56	60	62	107.14	110.71	300123 5WPLAIN 161 301123 2WSTPL3 69 1
300126 5MOBTAP 161.00 345221 5MOBERLY 161.00 1	335	333.1	347	99.43	103.58	300120 5THMHIL 161 543062 SALSBRY5 161 1

Limiting Constraint	Rating	Base Flow (MVA)	Transfer with Interconnection Projects Flow (MVA)	Base Case Contingency % Overload	Transfer with Interconnection Projects % overload	Contingency
300168 5GOBKNOB 161.00 300173 2GOBKNOB 69.000 2	38.5	38.3	40	99.48	103.90	300040 7FLETCH 345 300054 7GOBKNOB 345 1
300718 5CLEVCOV 161.00 505472 TABLE R5 161.00	167	128.1	168	76.71	100.60	338123 5BULLSH* 161 505460 BULL SH5 161 Z1
334099 4CONROE2! 138.00 334103 4PLANTAT 138.00	243	238.4	264	98.11	108.64	334093 4OAKRIDG! 138 334100 4PORTER% 138 1
334099 4CONROE2! 138.00 334104 4CONROE1! 138.00 Z1	287	310	333	108.01	116.03	334093 4OAKRIDG! 138 334100 4PORTER% 138 1
334102 4CEDHILL 138.00 334103 4PLANTAT 138.00	243	251	277	103.29	113.99	334093 4OAKRIDG! 138 334100 4PORTER% 138 1
334118 4SPLENDR! 138.00 334208 4JACINTO% 138.00 1	206	209	218	101.46	105.83	334200 6PORTER% 230 334202 6CHPTSR2 230 1
336800 3BXTRWILSON%115.00 336960 3SE.VICKSBRG115.00 1	161	162	168	100.62	104.35	336804 3VICKSBURG! 115 336962 3W.VICKSBURG 115 1
336806 3E.VICKSBRG+115.00 336808 3EDWARDS 115.00 1	161	150	162	93.17	100.62	336830 8BXTRWILSON% 500 336839 8R.BRASWELL% 500 1
337342 3WINN_PRISON115.00 337343 3WINNFIELD! 115.00 1	77	60.6	79	78.70	102.60	337304 6MONTGOMERY! 230 500170 CLARN 6 230 1
337592 3BAGBY! 115.00 337595 3MACON* 115.00	106	86.8	106	81.89	100.00	338514 3L&D#2! 115 338501 1L&D2U1! 6.9 1

Limiting Constraint	Rating	Base Flow (MVA)	Transfer with Interconnection Projects Flow (MVA)	Base Case Contingency % Overload	Transfer with Interconnection Projects % overload	Contingency
337685 3HSEHVW! 115.00 337734 3HS-IND 115.00 1	176	179	187	101.70	106.25	337686 3ARKLA% 115 337718 3CARPE! 115
337686 3ARKLA% 115.00 337695 3TIGRE * 115.00 1	201	195.9	218	97.46	108.46	337717 3HS-S 115 337718 3CARPE! 115
337695 3TIGRE * 115.00 337697 3PANTH* 115.00 1	201	195.1	217	97.06	107.96	337717 3HS-S 115 337718 3CARPE! 115
337697 3PANTH* 115.00 337706 3HS-FTNLAKE 115.00 1	201	195.1	217	97.06	107.96	337717 3HS-S 115 337718 3CARPE! 115
337705 3CHEETA*% 115.00 337707 3HS-VIL 115.00 1	106	89.2	108	84.15	101.89	337903 5DARDAN 161 505508 DARDANE5 161 1
337716 3HS-W 115.00 337717 3HS-S 115.00 1	120	108.8	124	90.67	103.33	337686 3ARKLA% 115 337695 3TIGRE * 115 1
337717 3HS-S 115.00 337718 3CARPE! 115.00 1	159	162	177	101.89	111.32	337686 3ARKLA% 115 337695 3TIGRE * 115 1
337731 3HS-E* 115.00 337733 3HS-UC 115.00 1	176	167.6	176	95.23	100.00	337686 3ARKLA% 115 337718 3CARPE! 115 1
337733 3HS-UC 115.00 337734 3HS-IND 115.00 1	176	175.7	184	99.83	104.55	337686 3ARKLA% 115 337718 3CARPE! 115 1
337818 3LR-S! 115.00 337821 3LR-ROK 115.00 1	298	289.7	306	97.21	102.68	337804 3MABEL! 115 337831 3CGLENN 115 1
337823 3LR-W! 115.00 337839 3LR-PALM 115.00 1	159	154.8	160	97.36	100.63	338484 3NLR-LV! 115 338485 3NLR-WG 115 1
337926 5QUITMN! 161.00 338831 5BEE BR# 161.00	167	151.6	188	90.78	112.57	338110 5HILLTOP% 161 505508 DARDANE5

Limiting Constraint	Rating	Base Flow (MVA)	Transfer with Interconnection Projects Flow (MVA)	Base Case Contingency % Overload	Transfer with Interconnection Projects % overload	Contingency
						161 1
338104 5HARR-E! 161.00 338121 5SUMMIT 161.00 1	156	137.7	172	88.27	110.26	338108 5ST_JOE 161 338110 5HILLTOP% 161 1
338130 5CALCR 161.00 338131 5MELBRN 161.00 1	148	150	156.8	101.35	105.95	344224 7CALAWY 1 345 344225 1CAL G1 25 1
338138 5MORFLD 161.00 338142 5ISES-1! 161.00 1	310	275.5	335	88.87	108.06	532797 WOLFCRK7 345 532751 WCGS U1 25 1
338169 5TRUMAN 161.00 338707 5TRUM-W# 161.00 1	148	165	179	111.49	120.95	338151 5NEWPO! 161 338173 5NEW-IN 161 1
338213 5WALNUT% 161.00 338705 5HOXIES# 161.00 1	167	154.9	174	92.75	104.19	338138 5MORFLD 161 338142 5ISES-1! 161 1
338215 5THAY-S! 161.00 338216 2THAY-S! 69.000 1	50	47.1	52	94.20	104.00	301107 5KOSH 161 301124 5COXCRK 161
338514 3L&D#2! 115.00 338501 1L&D2U1! 6.9000 1	36	34.8	36	96.67	100.00	337619 3WOODW-S! 115 337621 3PB-WAT 115 1
344360 4CLARK N 138.00 345480 4PERI 138.00 1	143	137.8	148	96.36	103.50	300051 7STFRANCISTP 345 300054 7GOBKNOB 345 1
500430 IPAPER 4 138.00 500530 MANSFLD4 138.00 1	219	201.8	253	92.15	115.53	500250 DOLHILL7 345 507760 SW SHV 7 345 1
500430 IPAPER 4 138.00 507765 WALLAKE4 138.00 1	209	179.3	230	85.79	110.05	500250 DOLHILL7 345 507760 SW SHV 7 345 1
505588 STIGLER5 161.00 300877 2STIGLER 69.000	50	43.5	62	87.00	124.00	505570 EUFAULA5 161 505588 STIGLER5 161

Table 4.14: Thermal Violations – Arkansas IPPs to SPP South for 2408 MW

Project 4: Voltage Violations - Arkansas IPPs to SPP South for 2408 MW

Bus	Area	Base Voltage (pu)	Transfer with Interconnection Projects Voltage (pu)	Contingency
337574 3CARMEL* 115.00	351 EES	0.95	0.918	338657 3GLENDL# 115 338660 3PNBRG# 115 1
337574 3CARMEL* 115.00	351 EES	0.979	0.915	337578 3MONT-S 115 337579 3MONT-E! 115 1
337575 3WARR-W 115.00	351 EES	0.945	0.913	338657 3GLENDL# 115 338660 3PNBRG# 115 1
337575 3WARR-W 115.00	351 EES	0.974	0.91	337578 3MONT-S 115 337579 3MONT-E! 115 1
337576 3WARR-E 115.00	351 EES	0.949	0.916	338657 3GLENDL# 115 338660 3PNBRG# 115 1
337576 3WARR-E 115.00	351 EES	0.98	0.913	337578 3MONT-S 115 337579 3MONT-E! 115 1
337577 3WILMAR 115.00	351 EES	0.916	0.904	337578 3MONT-S 115 337579 3MONT-E! 115 1
300062 5CROSSWAY 161.00	330 AECI	0.912	0.906	300062 5CROSSWAY 161 301159 5HOLMAN 161 1
301149 5STEELV 161.00	330 AECI	0.922	0.911	300112 5SALEM 161 301149 5STEELV 161 1
303302 3MNDENLG 115.00	332 LAGN	0.911	0.902	303302 3MNDENLG 115 337361 3MINDEN! 115 1
303310 3TRUS 115.00	332 LAGN	0.933	0.916	303310 3TRUS 115 337371 3VIENNA_LA! 115 1

Table 4.15: Voltage Violations – Arkansas IPPs to SPP South for 2408MW

To address the thermal and voltage violations seen as a result of the transfer, additional projects were proposed by affected the Transmission Owners. The scheduled construction durations provided for the projects are high level estimates and a detailed schedule will be prepared upon project approval. The transmission projects identified by the Transmission Owners are listed below (Duration In Months):

Tasks:	Definition	Regulatory & Permitting	Substation Work	T-Line Work	Less Parallel Tasks	Total Duration
Upgrade Calico Rock to Norfork 161 kV section	6	12	2	16	4	**32**
Upgrade Melbourne to Calico Rock 161 kV section	6	12	4	24	8	**38**

Tasks:	Definition	Regulatory & Permitting	Substation Work	T-Line Work	Less Parallel Tasks	Total Duration
Upgrade Quitman to Bee Branch 161 kV terminal equipment	4	N/A	10	N/A	N/A	**14**
Upgrade Cheetah to Hot Springs Village 115 kV section	6	12	4	24	8	**38**
Upgrade Cedar Hill to Plantation 138 kV section	4	9	2	6	2	**19**
Upgrade Plantation to Conroe 138 kV section	4	9	3	6	3	**19**
Upgrade Truman to AECC Truman West 161 kV section	6	12	2	16	4	**32**
Upgrade East Vicksburg to Edwards 115 kV section	4	5	5	5	5	**14**
Upgrade Little Rock South to Little Rock Creek 115kV section	6	10	12	9	6	**31**
Upgrade terminal equipment on Hot Springs Industrial to Hot Springs Union Carbide 115kV section	5	4	16	N/A	N/A	**25**
Upgrade terminal equipment on Hot Springs EHV to Hot Springs Industrial 115kV section	4	4	9	N/A	2	**15**
Upgrade terminal equipment on Hot Springs Union Carbide to Hot Springs East 115 kV section	5	6	8	N/A	2	**17**

Tasks:	Definition	Regulatory & Permitting	Substation Work	T-Line Work	Less Parallel Tasks	Total Duration
Upgrade Jacinto to Splendora 138 kV section	4	9	3	9	3	**22**
Upgrade Splendora to Apollo 138 kV section	4	7	3	5	3	**16**
Upgrade Baxter Wilson to South East Vicksburg 115kV section	4	5	5	3	5	**12**
Upgrade Little Rock West to Little Rock Palm Street 115 kV section	6	6	9	12	6	**27**
Upgrade Harrison East to Summit 161 kV section	6	12	12	24	8	**46**
Upgrade ISES to Moorefield 161 kV section	6	12	10	20	7	**41**
Upgrade Moorefield to Batesville 161 kV section	6	9	N/A	13	N/A	**28**
Upgrade Walnut Ridge to Hoxie South 161 kV section	6	9	6	13	6	**28**
Upgrade Cane River to Winn Prison 115 kV section	4	9	1	14	1	**27**
Upgrade Winn Prison to Winnfield 115 kV section	4	9	1	10	1	**23**
Add 20.4 MVAR capacitor bank at Wilmar	4	2	12	N/A	N/A	**18**

Table 4.16: Duration for Projects is in Months

- Construct new 115 kV line from Hot Springs Hamilton to Carpenter Dam

Tasks	Months
Definition	5
Routing Study	5
Environmental Impact Study	10
Regulatory Approval Process	9
Environmental/ROW Permitting	4
T-Line Design	4
ROW Acquisition	5
Pre Construction Duration	**47**
ROW Clearing	5
T-Line Work	7
Sub Work non-parallel tasks	0
Construction Duration	14
Total Duration	**61 mos.**

- 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 transformers to 84 MVA units
- Tap Overton-Sibley 345 line, build Norton 345/161 kV substation
- Replace 1200A disconnect switches to increase Moberly Tap To Moberly 161 kV line rating to conductor rating of 372 MVA
- 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)

The geographic depictions of the additional projects required in the Entergy footprint are shown below:

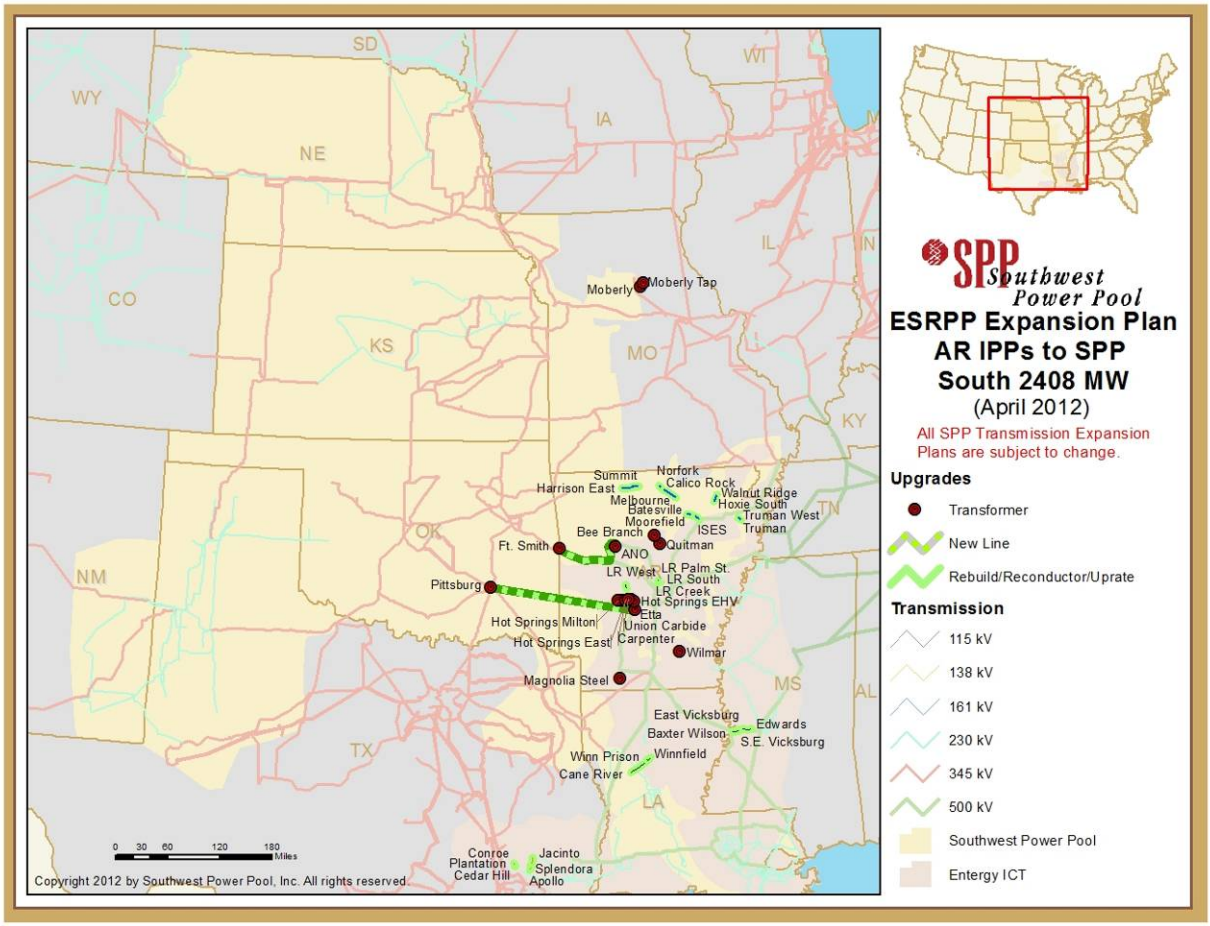
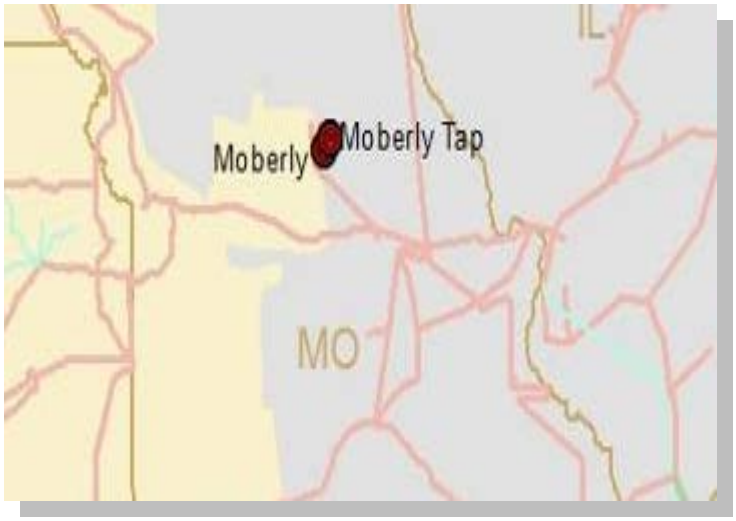


Figure 4.13: Additional projects required in the northern part of EAI


IL
Moberly
Moberly Tap
MO


Summit
Norfork
Calico Rock
Harrison East
Walnut Ridge
Hoxie South
Melbourne
Batesville
Truman West
Moorefield
ISES
Truman
Bee Branch
Quitman
Ft. Smith
ANO
LR Palm St.
LR West
LR South
Pittsburg
LR Creek
Hot Springs EHV
Etta
Hot Springs Milton
Union Carbide
Carpenter
Hot Springs East
Wilmar
Magnolia Steel
MS
East Vicksburg
Edwards
Baxter Wilson
S.E. Vicksburg
Winn Prison
Winnfield
Cane River


Conroe
Jacinto
Plantation
Splendora
Cedar Hill
Apollo

The projects identified as Step1 projects and the additional projects required to address the thermal and voltage violations from the initial N-1 AC contingency analysis were tested. An N-1 contingency scan was performed on the SPP RTO and Entergy Systems to see if any violations remained.

With these projects, a few thermal and voltage violations remained. The thermal violations with more than 3% increase in flow as a result of the transfer are reported below.

Project 4: Remaining Thermal Violations - Arkansas IPPs to SPP South for 2408 MW

Limiting Constraint	Rating	Base Flow (MVA)	Transfer with Interconnection Projects Flow (MVA)	Base Case Contingency % Overload	Transfer with Interconnection Projects % overload	Contingency
300082 5GEORGE 161.00 300531 2GEORGE 69.000 1	56	62.00	64.000	110.71	114.29	300105 5NORTON 161 300540 2NORTON 69 1
300124 5HOLDEN 161.00 300336 2HOLDEN 69.000 1	56	70.00	72.000	125.00	128.57	300110 5PITTSV 161 300124 5HOLDEN 161 1
543063 SWAVRLY5 161.00 543094 SWAVRLY2 69.000 1	22	20.20	24.000	91.82	109.09	541232 LEX161 5 161 541264 LEX69 2 69 1

Table 4.17: Remaining Thermal Violations – Arkansas IPPs to SPP South for 2408 MW

Project 4: Remaining Voltage Violations - Arkansas IPPs to SPP South for 2408 MW

Bus	Area	Base Voltage (pu)	Transfer with Interconnection Projects Voltage (pu)	Contingency
300062 5CROSSWAY 161.00	330 AECI	0.912	0.904	300062 5CROSSWAY 161 301159 5HOLMAN 161 1
301149 5STEELV 161.00	330 AECI	0.922	0.917	300112 5SALEM 161 301149 5STEELV 161 1
303302 3MNDENLG 115.00	332 LAGN	0.911	0.902	303302 3MNDENLG 115 337361 3MINDEN! 115 1
303310 3TRUS 115.00	332 LAGN	0.933	0.918	303310 3TRUS 115 337371 3VIENNA_LA! 115 1

Table 4.18: Remaining Voltage Violations – Arkansas IPPs to SPP South for 2408 MW

Planning Cost Estimate

The cost estimates developed were made based on limited information and are to be considered as an Entergy Class 5 (-50% +100%) estimate**.**

S. No	Name of the Project	Estimate
1	Construct Etta to Pittsburg 500 kV line	$196,430,000
1A	Provide new 500 kV terminal at Etta	$ 9,625,000
2	Install two 500/345 kV autos at Pittsburg.	$30,380,000
2A	Provide new 500 kV Ring bus at Pittsburg	$13,540,000
3	Construct 2nd ANO to Fort Smith 500kV line	$191,800,000
3A	Provide new 500 kV Terminal at ANO	$9,549,000
4	Install 2nd 500/345 kV Auto at Fort Smith	$15,190,000
5	Upgrade RSS – Pecan Creek 345 kV line	$305,000
6	Upgrade Calico Rock to Norfork 161 kV section	$6,375,000
7	Upgrade Melbourne to Calico Rock 161 kV section	$12,665,000
8	Upgrade Quitman to Bee Branch 161 kV terminal equipment	$131,000
9	Upgrade Cheetah to Hot Springs Village 115 kV section	$14,297,000
10	Construct new 115 kV line from Hot Springs Hamilton to Carpenter Dam (239 MVA)	$8 016,000
10A	Construct new Hot Springs Hamilton Substation	$3,776,000
10B	Construct new 115 kV Terminal at Hot Springs Milton (176 MVA)	$47,000
10C	Construct new 115 kV line from HS Milton to HS Hamilton	$7,796,000
10D	Construct new 115 kV terminal at Carpenter Dam	$4,123,000
10F	Upgrade Mt Pine to Breaker Station	$4,644,000
11	Upgrade Cedar Hill to Plantation 138 kV section.	$2,098,000
12	Upgrade Plantation to Conroe 138 kV section.	$3,148,000
13	Upgrade Truman to AECC Truman West 161 kV section	$6,388,000
14	Upgrade East Vicksburg to Edwards 115 kV section. (Cost includes TGU for EMI)	$16,926,000
15	Upgrade Little Rock South to Little Rock Creek 115kV section	$4,760,000
16	Upgrade terminal equipment on Hot Springs Industrial to Hot Springs Union Carbide 115kV section	$398,000
17	Upgrade terminal equipment on Hot Springs EHV to Hot Springs Industrial 115kV section	$111,000
18	Upgrade Jacinto to Splendora 138 kV section	$11,475,000
19	Upgrade Splendora to Apollo 138 kV section	$2,241,000
20	Upgrade Baxter Wilson to South East Vicksburg 115kV section. (Cost includes TGU for EMI)	$7,417,000
21	Upgrade Little Rock West to Little Rock Palm Street 115 kV section	$5,070,000
22	Upgrade terminal equipment on Hot Springs Union Carbide to Hot Springs East 115kV section	$93,000

S. No	Name of the Project	Estimate
23	Upgrade Harrison East to Summit 161 kV section	$17,004,000
24	Upgrade ISES to Moorefield 161 kV section	$3,501,000
25	Upgrade Moorefield to Batesville 161 kV section	$3,480,000
26	Upgrade Walnut Ridge to Hoxie South 161 kV section	$5,500,000
27	Upgrade Cane River to Winn Prison 115 kV section	$10,447,000
28	Upgrade Winn Prison to Winnfield 115 kV section	$4,773,000
29	Add 10.4 MVAR Capacitor bank at Magnolia Steel	$1,000,000
30	Add 20.4 MVAR capacitor bank at Wilmar	$832,000
31	Upgrade Stigler transformer to 84 MVA unit	$2,604,000
32	Upgrade Gobbler Knob transformers to 84 MVA units	$5,208,000
33	Tap Overton-Sibley 345 line, build Norton 345/161 kV sub	$20,730,000
34	Moberly-Moberly Tap 161kV line: Replace 1200A disconnect switches to increase rating to conductor rating of 372 MVA	$155,000
35	Upgrade South River transformers to 112 MVA units	$6,944,000
36	Upgrade West Plain transformers to 112 MVA units	$6,944,000
	Total for all Projects in the Entergy footprint	**$677,936,000**

Table 4.19: Detailed Costs for Arkansas IPP (Hot Springs, Magnet Cove, and PUPP) to SPP South (AEPW and OG&E) for 2408 MW

Summary

The transfer capability was increased between Entergy Arkansas IPPs and SPP south with the addition of these identified projects. A few voltage and thermal violations remain unsolved with the addition of the these projects and might require a few more projects to be added by affected Transmission Operators to completely facilitate this transfer. The total capital cost of all the transmission improvements in the Entergy footprint necessary to support this transfer is a little under $678,000,000. This includes the cost of the upgrades from the step 1 analysis for this transfer, which added up to $467,000,000. All the identified projects are expected to take approximately 96 months to design and build.

4.6 From AEPW to Entergy Arkansas for 1117 MW (Step 2 Study)

Power Transfer

A power transfer of 1117 MW was added to the ESRPP powerflow model by scaling all AEPW generation up by 1117 MW and scaling all Entergy Arkansas generation down by 1117 MW, taking into account the generators' minimum and maximum capabilities.

Below is a geographic depiction of that transfer.

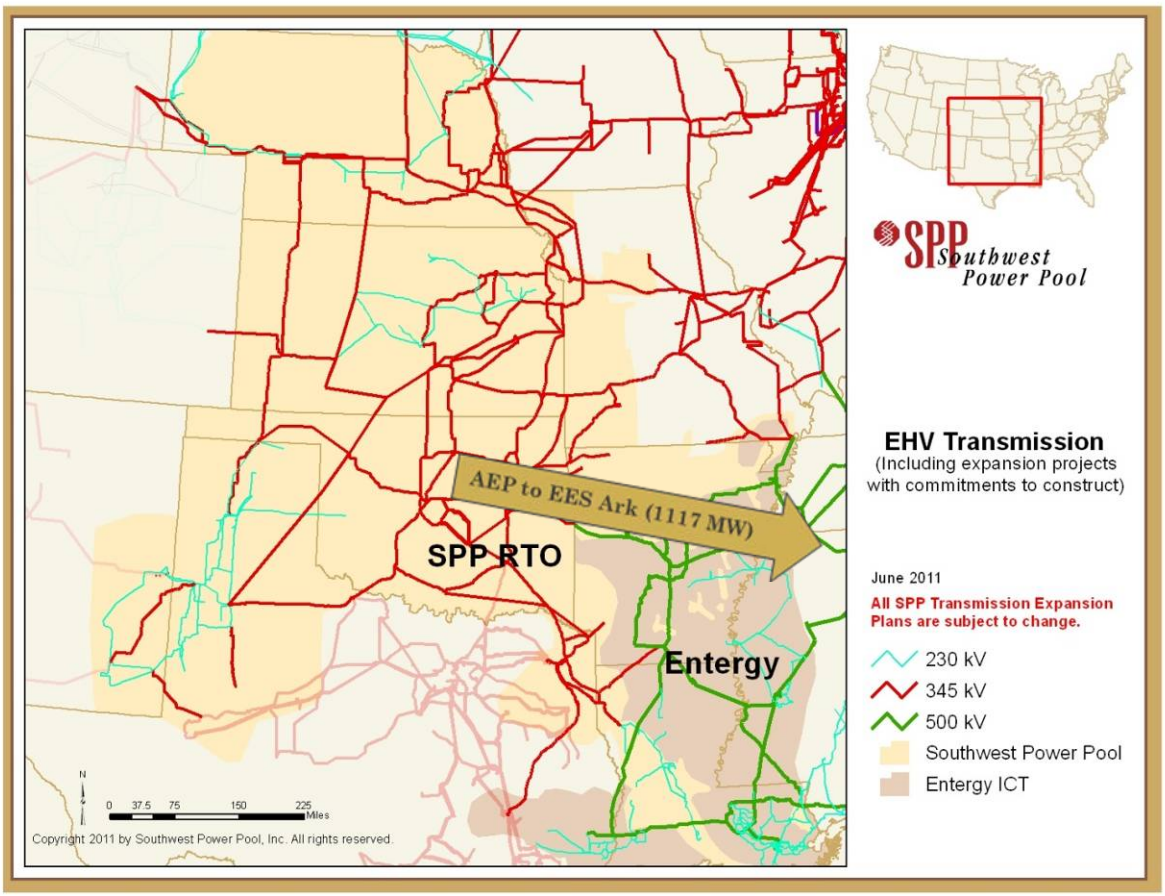


Figure 4.14: AEPW to Entergy Arkansas for 1117 MW

Interregional Transfer Limitations

The First Contingency Incremental transfer Capability (FCITC) analysis from Step 1 of the ESRPP process, performed for the 2010 ESRPP Cycle, showed that a number of transmission projects were necessary to facilitate this transfer.

ESRRP Projects

To relieve the interregional limiting constraints for this particular transfer, multiple projects were tested in the powerflow models. Here are the transmission projects necessary to facilitate this transfer per the previously-performed Step 1 Analysis (DC Analysis):

- Messick Substation
  - 500kV switch station
  - 500/230kV transformer
  - 500/345kV transformer
  - Ties into Mt. Olive-Hartburg 500kV line

- Dolet Hills – Messick 345kV Line
  - Approximately 26.40 miles direct
- Quarry 345kV Substation
  - 345kV switch station
  - 345/138kV transformer
  - Ties into Grimes – Crockett 345kV line
- Quarry – Rivtrin 345kV Line
  - Approximately 8.25 miles direct

Engineering Analysis

Below are the results of the AC Contingency analysis and substation design of the projects required to facilitate the 1117 MW transfer from AEPW to Entergy Arkansas.

AC Contingency

With the projects listed above from the step 1 analysis for this transfer, an N-1 contingency scan was completed on the SPP RTO and Entergy Systems.

There was no material increase or decrease in voltage violations on either system. Some already existing thermal violations were worsened by the transfer and some new violations showed up because of the transfer. Thermal violations with more than 3% increase in flow are reported below. The limiting elements are reported for the worst contingency.

Project 5: Thermal Violations - AEPW to Entergy Arkansas for 1117 MW

Limiting Constraint	Rating	Base Flow (MVA)	Transfer with Interconnection Projects Flow (MVA)	Base Case Contingency % Overload	Transfer with Interconnection Projects % overload	Contingency
300129 5WASHBRN 161 300763 2WASHBRN 69 1	56	66.27	69.01	118.34	123.23	505480 BEAVER 5 161 506932 EUREKA 5 161 1
300168 5GOBKNOB 161 300173 2GOBKNOB 69 2	38.5	38.87	40.29	100.96	104.65	300168 5GOBKNOB 161 300173 2GOBKNOB 69 1
337592 3BAGBY! 115 337595 3MACON* 115 1	106	107.13	111.66	101.07	105.34	337602 3DUMAS% 115 338514 3L&D#2! 115 1

Table 4.20: Thermal Violations – AEPW to Entergy Arkansas for 1117 MW

To address the thermal violations seen as a result of the transfer, additional projects were proposed by affected Transmission Operators. The schedule durations provided for the projects are high level estimates and a detailed schedule will be prepared upon project approval. The transmission projects identified by the Transmission Operators are listed below:

- Construct 230 kV line from Lake Village Bagby to Reed but operate at 115 kV

Tasks	Months
Definition	6
Regulatory & Permitting	19
Substation Work	12
T-Line Work	12
Less Parallel Tasks	10
Total Duration	**36**

- 10.4 MVAR Capacitor bank at Reed
- 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, install a second 56 MVA 161/69 kV transformer at Cassville
- Upgrade Gobbler Knob transformers to 84 MVA units

The projects identified in step1 projects and the additional projects required to address the thermal and voltage violations from the initial N-1 AC contingency analysis were tested again. An N-1 contingency scan was performed on the SPP RTO and Entergy Systems to see if any violations remain.

The geographic depictions of the additional projects required in the Entergy footprint are shown below:

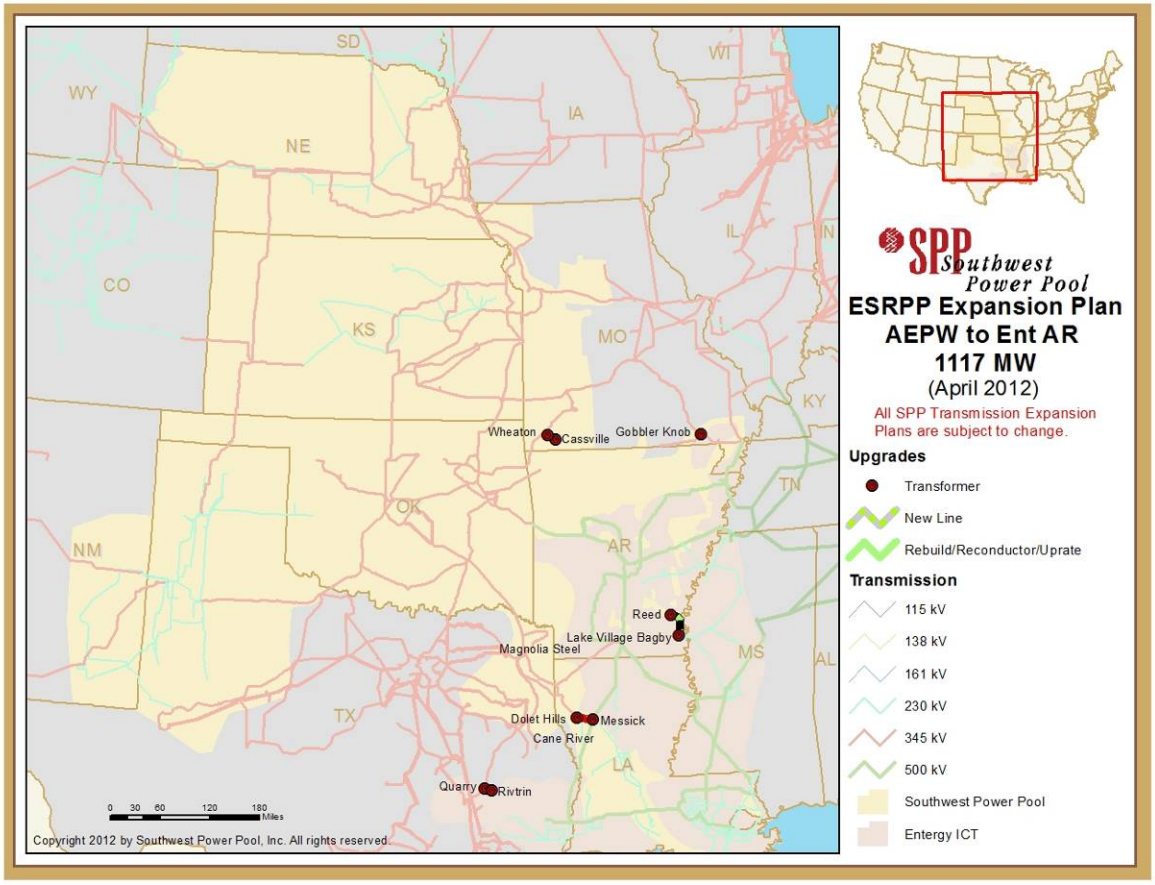
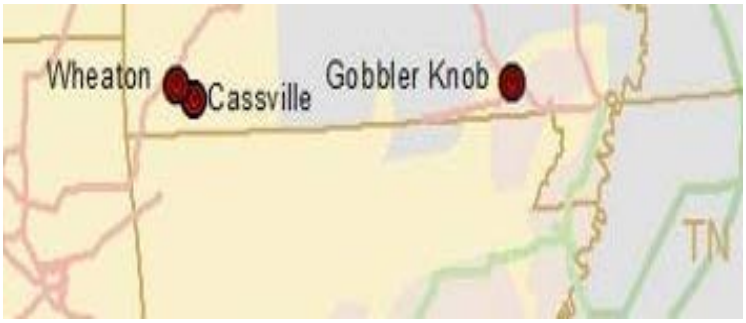


Figure 4.15: AEPW to Entergy Arkansas for 1117 MW Transfer Projects



Per Table 4.20, with these projects, only a few voltage violations were observed.

Project 5: Remaining Voltage Violations - AEPW to Entergy Arkansas for 1117 MW

Bus	Area	Base Voltage (pu)	Transfer with Interconnection Projects Voltage (pu)	Contingency
300682 5CASSVL 161.00	330 AECI	N/A	0.895	302097 5WHEATN 161 302098 7WHEATN 345 1
300682 5CASSVL 161.00	330 AECI	N/A	0.891	300682 5CASSVL 161 302097 5WHEATN 161 1
302097 5WHEATN 161.00	330 AECI	N/A	0.896	302097 5WHEATN 161 302098 7WHEATN 345 1

Table 4.21: Remaining Voltage Violations – AEPW to Entergy Arkansas for 1117 MW

Substation Design

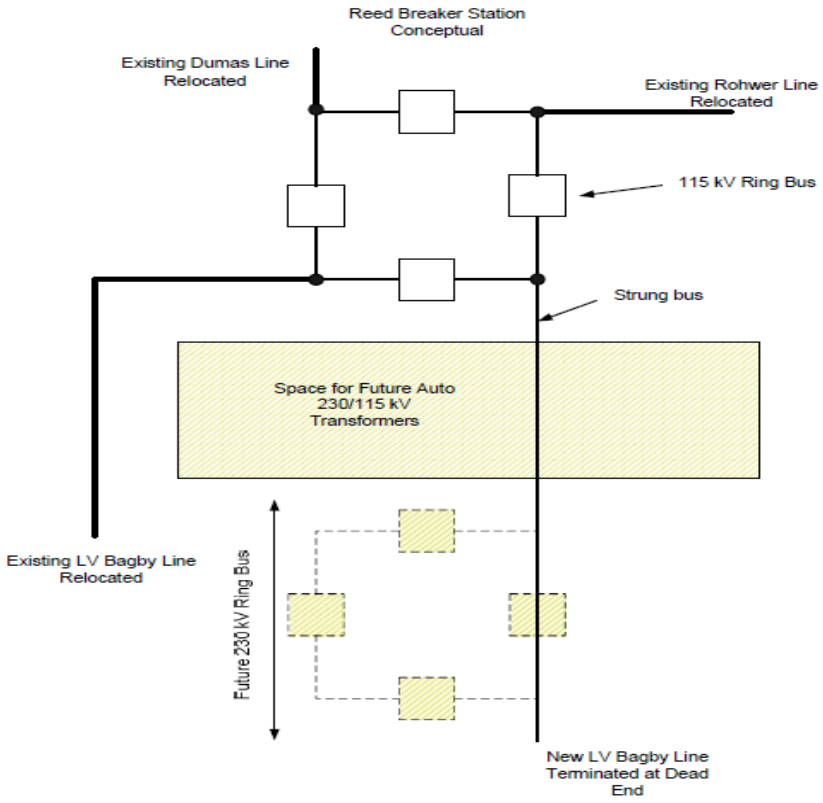


Figure 4.16: Reed Breaker Station

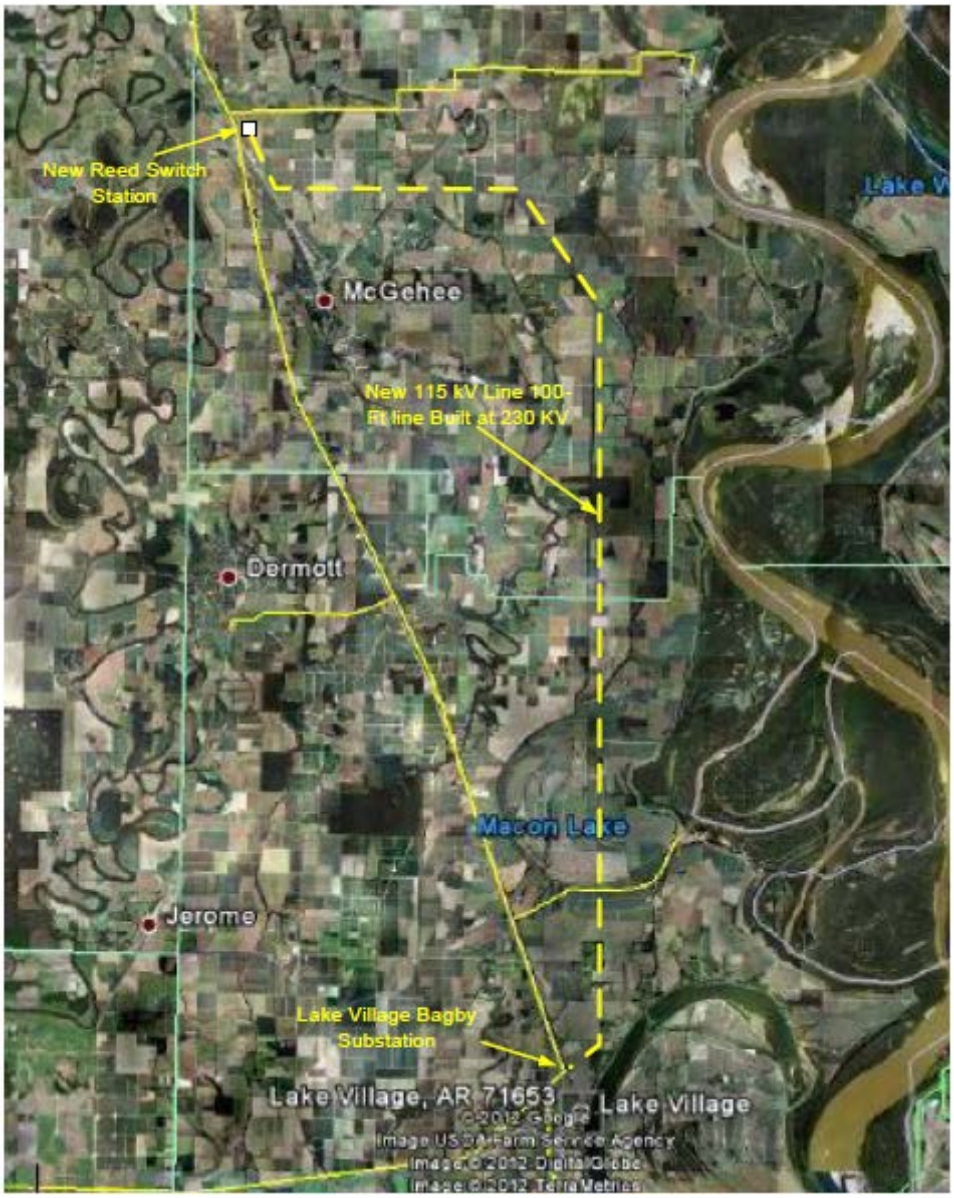


Figure 4.17: Reed Substation layout

Project Cost Summary

The cost estimates developed were made based on limited information and are to be considered as an Entergy Class 5 (-50% +100%) estimate**.**

S. No	Name of Project	Estimate
1	Construct Quarry 345 kV switch station	$14,375,000
2	Install 345/138 kV Auto at Rivitrin, Add 138 kV terminal, Add 345 kV terminal	$33,079,000
3	Construct Quarry to Rivtrin 345 kV line	$20,687,000
4	Construct 500 kV Messick switching station	$3,473,000

S. No	Name of Project	Estimate
5	Install 500/230 kV Auto at Messick switching station	$3,473,000
6	Install 500/345 kV Auto at Messick switching station	$5,377,000
7	Construct Dolet Hills to Messick 345 kV line	$109,480,000
7A	Install Dollet Hills 345 kV terminal	$3,020,000
8	Construct 230 kV line from Lake Village Bagby to Reed Switch Station but operated at 115 kV	$34,544,000
8a	Install new 115 kV terminal at LV Bagby	$1,789,000
8b	Convert Reed to a breaker station	$6,228,000
9	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	$33,962,000
10	Upgrade Gobbler Knob transformers to 84 MVA units	$5,208,000
11	10.4 Mvar Capacitor bank at Reed	$1,000,000
	Total for all Projects	**$275,695,000**

Table 4.22: Detailed Costs for AEPW to Entergy Arkansas for 1117 MW

Summary

The transfer capability was increased between AEPW and Entergy Arkansas with the addition of these identified projects. A few voltage violations remain unsolved with the addition of the these projects and might require a few more projects to be added by affected Transmission Operators to completely facilitate this transfer. The total capital cost of all the transmission improvements in the Entergy footprint necessary to support this transfer is $275,700,000. This includes the cost of the upgrades from the step 1 analysis for this transfer, which added to $190,000,000. All the identified projects are expected to take approximately 49 months to design and build.

Section 5: Report Summary

5.1 From Entergy to EMDE for 500 MW

A power transfer of 500 MW was added to the ESRPP powerflow model by scaling all Entergy generation up by 500 MW and scaling all EMDE generation down by 500 MW. The majority of limiting issues were seen in the central north portion of Arkansas and the north western portion of Louisiana. To relieve the interregional limiting constraints for this particular transfer, multiple projects were tested in the powerflow models. Table 4.2, above, describes the transmission projects necessary to facilitate this transfer. The total project cost is estimated at approximately $126,300,000 and is expected to take approximately 42 months to design and build.

5.2 From Entergy to Nebraska for 1500 MW

A power transfer of 1500 MW was added to the ESRPP powerflow model by scaling all Entergy generation up by 1500 MW and scaling all Nebraska (NPPD, OPPD, and LES) generation down by 1500 MW. Note that the transfer distribution factor cutoff was reduced from the standard 3% to 0.5% per stakeholder feedback. This was deemed reasonable based on the transfer being over 1000 MW and being between areas more than 350 miles apart. The majority of limiting elements were in the northwest, central, and northern portions of Arkansas and the western portions of Louisiana (around the Shreveport area). To relieve the interregional limiting constraints for this particular transfer, multiple projects were tested in the powerflow models. The above table 4.5 describes the transmission projects necessary to facilitate this transfer. The total project cost is estimated at approximately $173,200,000 and is expected to take approximately 48 months to design and build.

5.3 From Nebraska to Entergy for 3000 MW

A power transfer of 3000 MW was added to the ESRPP powerflow model by scaling all Entergy generation down by 3000 MW and scaling all Nebraska (NPPD, OPPD, and LES) generation up by 3000 MW. Note that the transfer distribution factor cutoff was reduced from the standard 3% to 0.5% per stakeholder feedback. This was deemed reasonable based on the transfer being over 1000 MW and being between areas more than 350 miles apart. The majority of limiting elements were in the Nebraska, Kansas, Texas, and Louisiana area. To relieve the interregional limiting constraints for this particular transfer, multiple projects were tested in the powerflow models. The above table 4.8 describes the transmission projects necessary to facilitate this transfer. The total project cost is estimated at approximately $734,000,000 and is expected to take approximately 48 months to design and build.

5.4 Sensitivities for Transfer from Nebraska to Entergy for 3000 MW

The conclusion that can be reached from this table and map is that there would have been 38 more transfer limitations for the 3000 MW transfer from Nebraska to Entergy had the projects from the Balanced Portfolio and Priority Projects had not been in the base case model. Many of the new transfer limitations are concentrated in the Kansas City area.

5.5 Arkansas IPPs (Hot Springs, Magnet Cove, and PUPP) to SPP South (AEPW and OG&E) for 3000 MW

The transfer capability was increased between Entergy Arkansas IPPs and SPP south with the addition of these identified projects. A few voltage and thermal violations remain unsolved with the addition of the these projects and might require a few more projects to be added by affected Transmission Operators to completely facilitate this transfer. The total capital cost of all the transmission improvements in the Entergy footprint necessary to support this transfer is a little under $678,000,000. This includes the cost of the upgrades from the step 1 analysis for this transfer, which added to $467,000,000. All the identified projects are expected to take approximately 96 months to design and build.

5.6 From AEPW to Entergy Arkansas for 700 MW

Transfer capability from AEPW control area to the Entergy Arkansas control area was increased by 1117 MW with the addition of 7 transmission projects spread across EAI and AECI footprints. These projects are required in addition to the projects identified in the step 1 of this transfer study. There were voltage violations which were considered minor in nature. The total cost of the projects in the Entergy footprint identified in the step 2 analyses is estimated to be approximately $43,500,000. The total cost of all projects in the Entergy footprint identified in the step 1 and step 2 analyses for this transfer is approximately $233,500,000. The project with the longest schedule for construction, design, and regulatory work identified for this transfer is 49 months.

Appendix I: AR IPPs to SPP South Project Data

The transmission projects whose class 5 cost estimates are included in this appendix document were identified as upgrades necessary to alleviate thermal and voltage constrains observed in the ESRPP 2011 Step 2 process for the transfer scenario of 2408 MW transfer from Arkansas IPPs to SPP South. The Class 5 estimates provided in this document will be used in the final report for the ESRPP 2011 study and for the fulfillment of Entergy's obligations for the providing these cost estimates for this step 2 study scenario.

A pdf of the class 5 cost estimates will be posted on OASIS under "2011 ESRPP Class 5" at the following location:

http://www.oatioasis.com/EES/EESDocs/EntergySPPRTORegionalPlanningProcess.htm

Appendix II: AEPW to Entergy Arkansas Project Data

The transmission projects whose class 5 cost estimates are included in this appendix document were identified as upgrades necessary to alleviate thermal and voltage constrains observed in the ESRPP 2011 Step 2 process for the transfer scenario of a 1117 MW AEPW to Entergy Arkansas transfer. The Class 5 estimates provided in this document will be used in the final report for the ESRPP 2011 study and for the fulfillment of Entergy's obligations for the providing these cost estimates for this step 2 study scenario.

A pdf of the class 5 cost estimates will be posted on OASIS under "2011 ESRPP Class 5" at the following location:

http://www.oatioasis.com/EES/EESDocs/EntergySPPRTORegionalPlanningProcess.htm