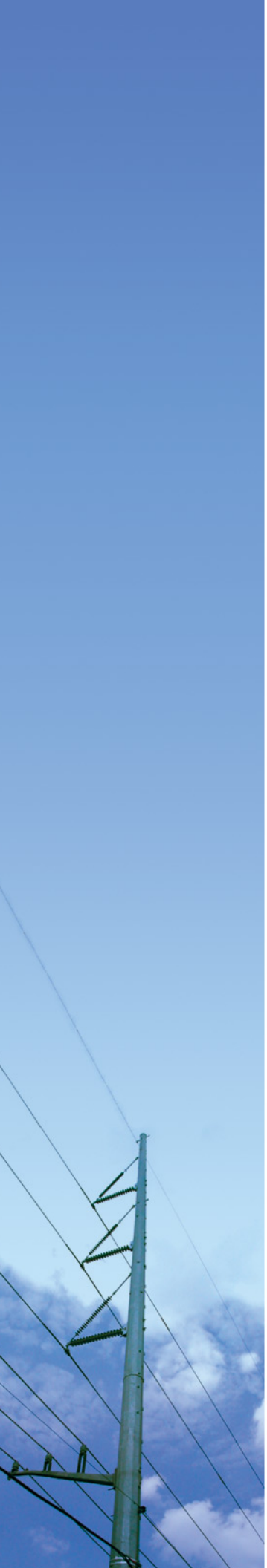

ESRPP

Entergy SPP RTO Regional Planning Process

2009 Step 1 High-Level Analysis Report

ICT Planning
SPP Planning
Entergy Planning

Revision	Issue Date	Description of Revision
0	2/19/10	Posted on Oasis
1		

SPP Southwest Power Pool

Table of Contents

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. Each party that is part of the JPC assesses the simultaneous feasibility of the expansion plans and the 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. Up to five high-level studies may be requested annually in order to provide a high-level screening to identify constraints and needed upgrades as well as approximate costs and timelines. Based on the results of these high-level studies, stakeholders may request more detailed studies to be undertaken in the following planning cycle in order to provide detailed cost estimates and timelines.

Background

At the first ESRPP meeting on May 22, 2009 in Grapevine, TX, the ESRPP process was presented to regional stakeholders. This presentation included an overview of the ESRPP, a timeline of milestones, meetings that would occur during this study process, and a review of other Entergy studies that were ongoing.

Also at this first meeting, the stakeholder group selected the studies that would be candidates for the ESRPP 2009 Step 1 High-Level Analysis.

Proposed Projects

1. ***Turk - Fulton - El Dorado 345kV***
2. ***4 GW Wind from SPP to Entergy***
3. ***Balanced Portfolio 3e "adjusted" follow-up***
4. ***Re-evaluate of Ozarks plan***
5. ***Osage Creek – ISES 345 or 500kV***
6. ***Turk - McNeill 345kV***
7. ***Messick 500/230kV transformer***
8. ***Spadra - Russellville 161 kV***
9. ***Flint Creek - Chamber Springs - Fort Smith – ANO 345kV***
10. ***Flint Creek - Chamber Springs - Fort Smith - NW Texarkana 345kV***
11. ***Osage Creek - Cox Creek - Gobbler Knob 345kV***

Each ESRPP Regional Participant (company) was allotted five votes. Voting was reserved for the affected systems to the Entergy and SPP RTO seam. The votes could be cast in any manner, e.g. one vote to each project or all five votes to one project. Because of the extensive scope of projects 2 and 4, each of these studies did count as 3 of the 5 Regional Studies. To vote for either of these projects required that a participant cast a minimum of 3 of 5 votes to that project. Votes were returned by June 19, 2009 via email.

Selected Projects for Further Study

1. ***Turk – McNeil 345kV Line***
2. ***Spadra – Russellville 161kV Line***
3. ***Turk – Fulton – El Dorado 345kV Line***
4. ***Messick 500/230 kV Auto***
5. ***Flint Creek – Chamber Springs – Fort Smith – ANO 345kV Line***

These five projects were chosen to be studied via the ESRPP 2009 Step 1 High Level Analysis and the results are the subject of this report. Figure 1 below shows the geographic location for each of the 5 projects.

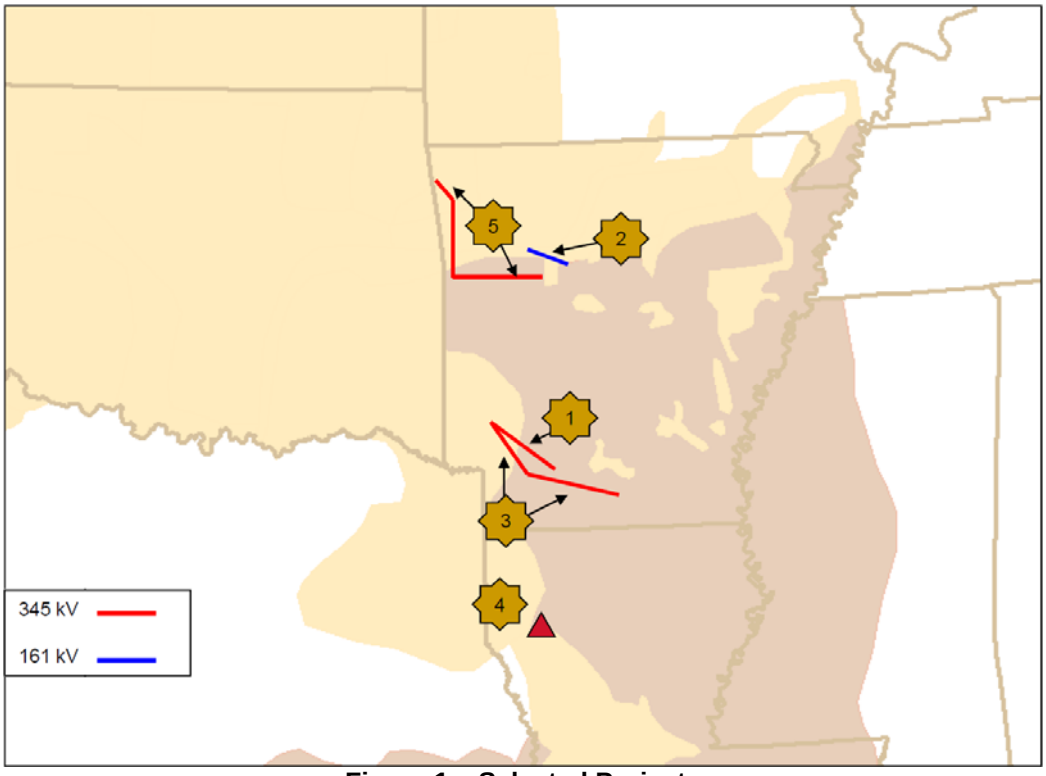

Figure 1 – Selected Projects

Objectives

The ESRPP was developed with several key objectives driving the projects that compose the Regional Planning process. Those objectives are: improve regional transfer capability, improve regional optimization, and relieve constraining flowgates. These objectives combine in order to 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.

Improve Regional Transfer Capability

The Entergy transmission system interfaces with 19 control areas, including SPP members. The ESRPP includes projects that improve the ability to move power between Entergy and neighboring systems.

Improve Regional Optimization

The ESRPP projects are designed to increase reliability and transfer capability across the seam. The projects accomplish this task by providing increased voltage support, increased thermal capacity, and additional paths from generation to load.

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.

Models and Assumptions

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 2014 Summer Peak
- Incorporate Entergy's Construction Plan Projects
- Identical POR/POD Transfer Analyses will be performed for all study projects
- FCITC Changes from the Base Case will be identified

Summary of Modeling Methods and Analysis

Per the study scope above, the SPP Model Development Working Group (MDWG) 2014 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 (2009-2011). Note that based on stakeholder feedback, analysis was performed on additional transfers beyond those defined in the scope. The additional transfers, Entergy Oil & Gas Units and Entergy Arkansas are included in Figure 2. Entergy Oil & Gas Units are primarily located in the south region of Entergy's footprint.

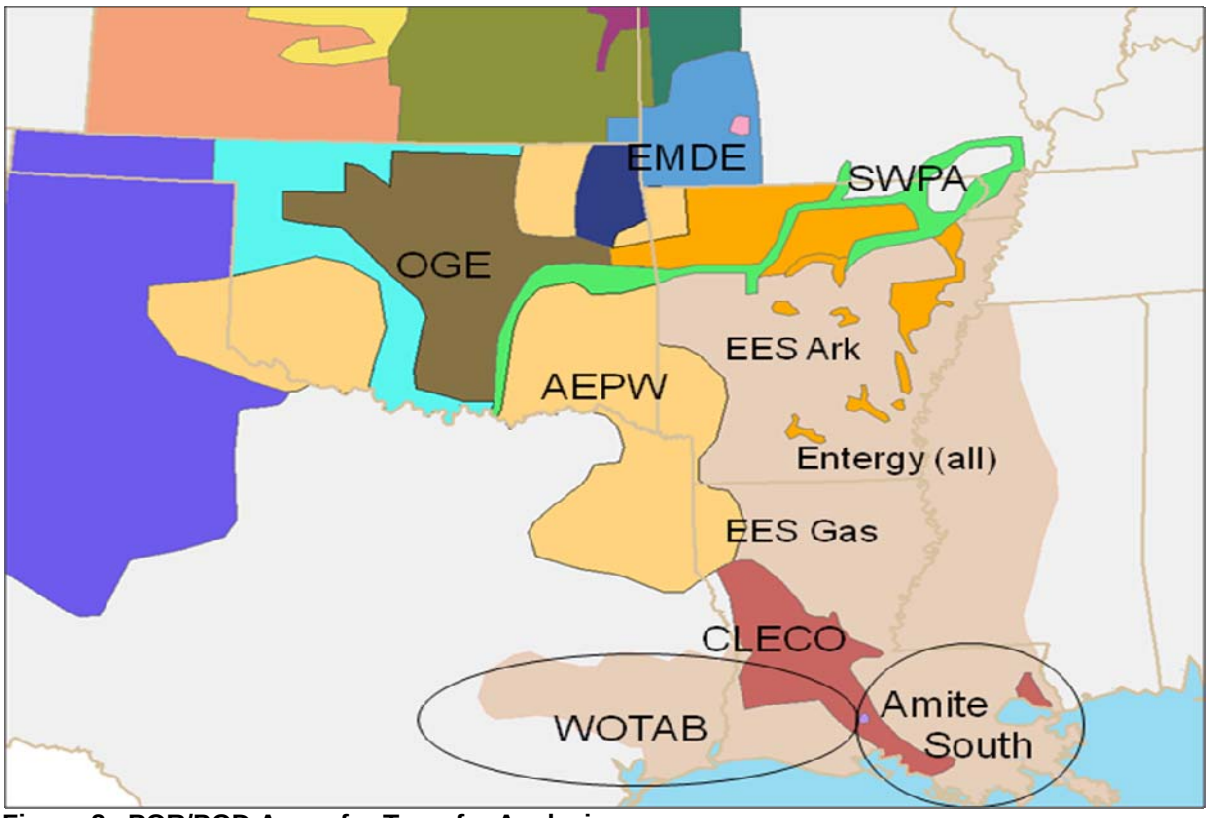

Figure 2 –POR/POD Areas for Transfer Analysis.

Study Results

Using PSS/MUST 9.2, First Contingency Incremental Transfer Capability (FCITC) analysis was completed for each of the five selected projects. Once the FCITC runs were complete, ICT Planning, SPP Planning, and Entergy 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 checks of ratings and topology in the ESRPP power flow model.

This results section includes a description of the major elements of each project, a map showing the project and adjacent topology, a table of changes in FCITC, a listing of transfers showing increased transfer capability with the first limiting element of the transfer, and a Powerworld one-line diagram illustrating the increased transfer capability of a selected POR/POD pair.

Turk-McNeil 345kV

Description

Major Elements:

- Turk – McNeil 345kV line
  - o Approximately 45 miles direct
- McNeil substation
  - o 345kV switchyard
  - o 500/345kV transformer
- Turk substation 345kV terminal equipment

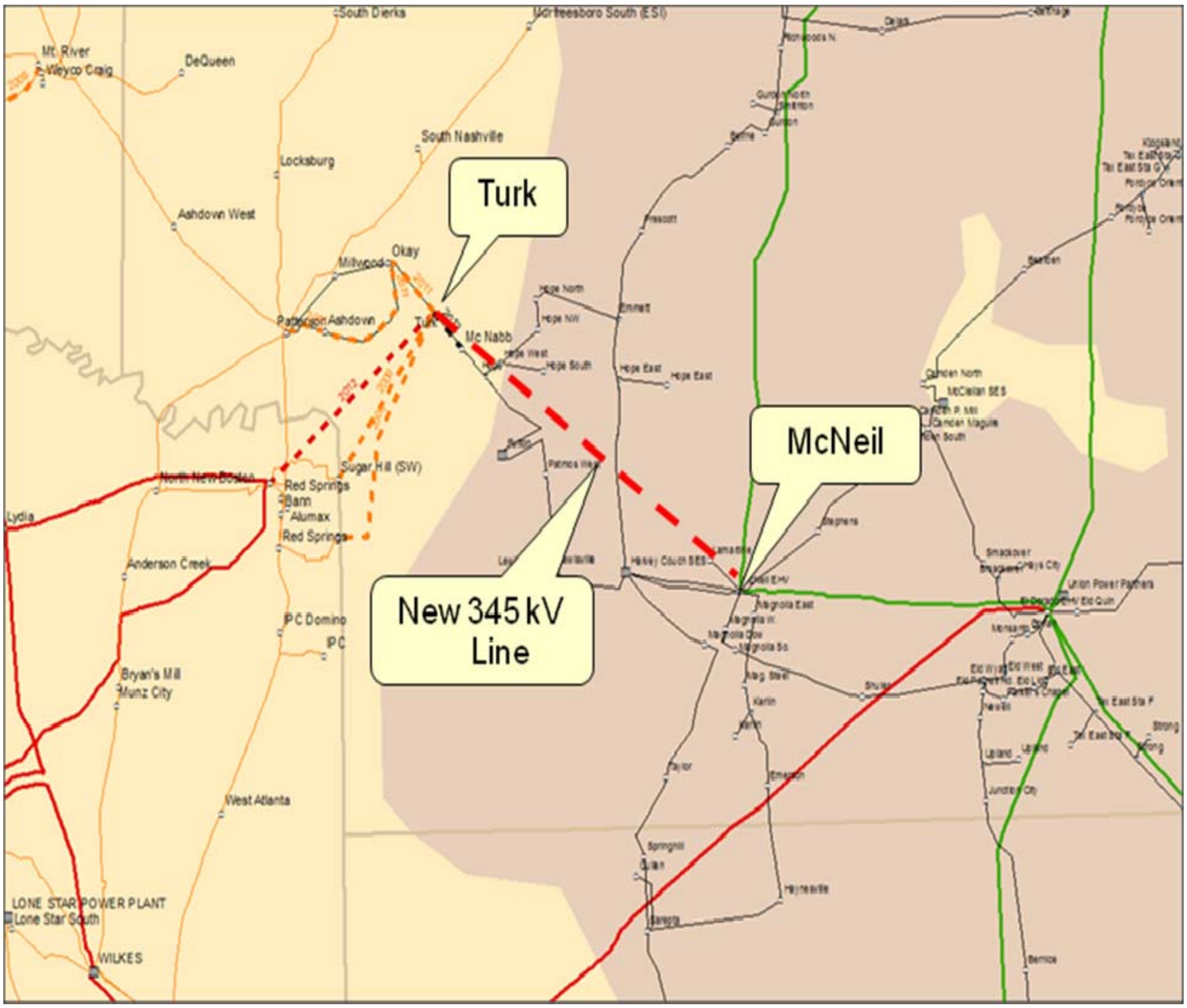

Figure 3 – Turk-McNeil 345kV

High-Level Planning Cost Estimate

Description	Line Rating	Upgrade Description	ICT Cost Estimate
Turk – McNeil 345kV line	(1959MVA) ~1800A	Build new transmission line 45 miles	$60,750,000
McNeil 500/345kV substation	(1959MVA)	New 500/345kV transformer and new 345kV switchyard	$25,000,000
Turk 345kV substation		Build new 345kV bus with breakers and switches	$10,000,000
Total Cost			$95,750,000

Table 1 – Detailed Costs for Turk-McNeil

Engineering Analysis

1. Values shown below in the table are differences between the Base Model and the Change Model (with the project included)
2. All values are in MW
3. Changes in FCITC values less than 100 MW were considered to have no benefit
4. The values shown in paranthesis represent FCITC in MW with project included

Project 1		AEPW	CLECO	EMDE	OGE	SPP	SWPA
Amite South	POR	No Benefit	No Benefit	No Benefit	817 (-435)	No Benefit	No Benefit
	POD	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit
Entergy Arkansas	POR	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit
	POD	347 (2040)	No Benefit	No Benefit	No Benefit	200 (2926)	No Benefit
Entergy Oil & Gas Units	POR	No Benefit	No Benefit	No Benefit	No Benefit	130 (-1172)	No Benefit
	POD	No Benefit	No Benefit	No Benefit	No Benefit	121 (1660)	No Benefit
Entergy	POR	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit
	POD	111 (1342)	No Benefit	No Benefit	No Benefit	178 (1962)	No Benefit
WOTAB	POR	161 (256)	No Benefit	No Benefit	No Benefit	126 (209)	No Benefit
	POD	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit

Table 2 – FCITC Results for Turk-McNeil

The following transfers shown in the table above have positive results:

- From → To
  - 1st Limiting Element

- Amite South → OGE
  - Sterlington 500/115kV transformer FTO Sterlington – El Dorado 500kV
- AEPW → Entergy Arkansas
  - Grimes – Mt. Zion 138kV FTO Grimes – Walden 138kV
- AEPW → Entergy
  - Grimes – Mt. Zion 138kV FTO Grimes – Walden 138kV
- Entergy Oil & Gas Units → SPP
  - Belle Point – Little Gypsy 230kV FTLO Tezcuco – Waterford 230kV
- SPP → Entergy Arkansas
  - West Gardner – Stilwell 345kV FTLO Stilwell – Lacygne 345kV
- SPP → Entergy Oil & Gas Units
  - Grimes – Mt. Zion 138kV FTO Grimes – Walden 138kV
- SPP → Entergy
  - Grimes – Mt. Zion 138kV FTO Grimes – Walden 138kV
- WOTAB → AEPW
  - Russellville East – Russellville North FTLO ANO – Ft. Smith 500kV
- WOTAB → SPP
  - Russellville East – Russellville North FTLO ANO – Ft. Smith 500kV

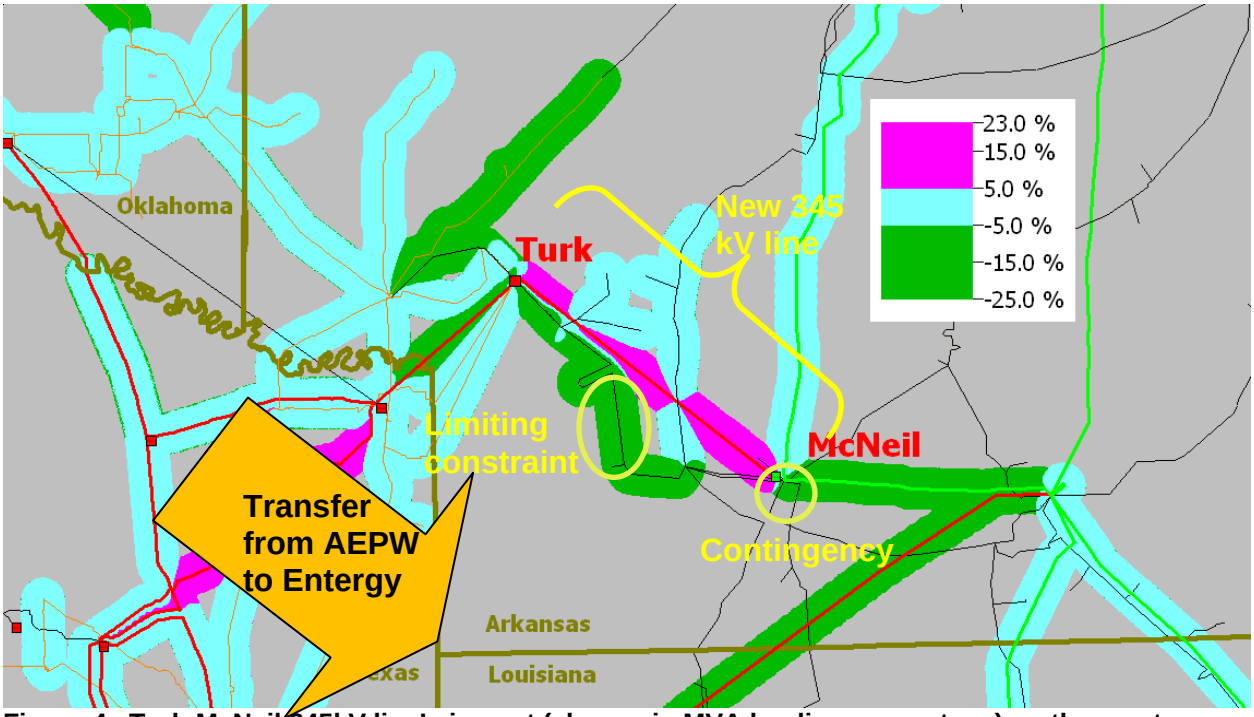

Figure 4 –Turk-McNeil 345kV line's impact (change in MVA loading percentage) on the most limiting constraint for the transfer from AEPW to EES.

This Powerworld one-line diagram (Figure 4) shows that when performing a transfer from AEPW to Entergy, with Turk to McNeil 345kV line added to the base case, the transfer's most limiting constraint Patmos West to Fulton 115kV line has more than a 5% decrease in MVA loading during the outage of McNeil 500/115kV transformer.

Summary

Transfer capability was increased in multiple directions by this new 345kV line between Entergy's McNeil substation and American Electric Power's Hempstead substation. Also, positive changes were seen for nine of the studied POR/POD pairs and involved multiple entities. The total project cost is estimated at approximately $95,750,000 and is expected to take approximately 4 years to design and build.

Spadra- Russellville 161kV

Description

Major Elements:

- Little Spadra-Russellville East 161kV line
  - Approximately 30 miles direct
- Little Spadra terminal equipment
- Russellville East terminal equipment

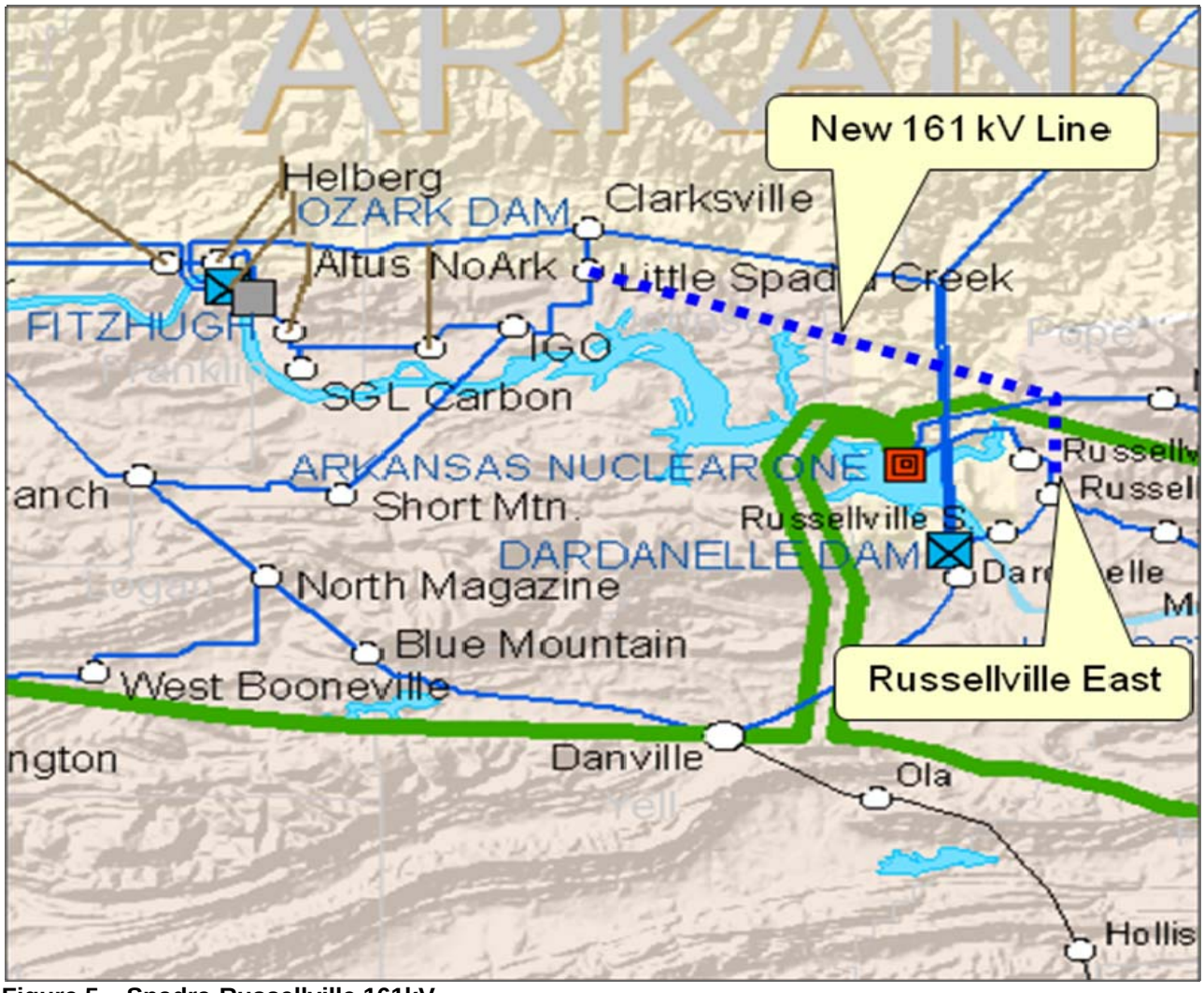

Figure 5 – Spadra-Russellville 161kV

High-Level Planning Cost Estimate

Description	Line Rating	Upgrade Description	ICT Cost Estimate
Little Spadra-Russellville East 161kV line	(448MVA) ~1570A	Build new 161kV transmission line 30 miles	$39,000,000
Little Spadra 161kV substation		Build new 161kV bus with breakers and switches	$5,000,000
Russellville East 161kV substation		Build new 161kV bus with breakers and switches	$5,000,000
Total Cost			$49,000,000

Table 3 – Detailed Costs for Spadra-Russellville 161kV

Engineering Analysis

1. Values shown below in the table are differences between the Base Model and the Change Model (with the project included)
2. All values are in MW
3. Changes in FCITC values less than 100 MW were considered to have no benefit
4. The values shown in paranthesis represent FCITC in MW with project included

Project 2		AEPW	CLECO	EMDE	OGE	SPP	SWPA
Amite South	POR	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit
	POD	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit
Entergy Arkansas	POR	No Benefit	No Benefit	330 (-763)	No Benefit	No Benefit	No Benefit
	POD	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit
Entergy Oil & Gas Units	POR	No Benefit	No Benefit	125 (-919)	No Benefit	No Benefit	No Benefit
	POD	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit
Entergy	POR	No Benefit	No Benefit	118 (-914)	No Benefit	No Benefit	No Benefit
	POD	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit
WOTAB	POR	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit
	POD	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit

Table 4 - FCITC Results: Spadra-Russellville 161kV

The following transfers shown in the table above have positive results:

- From → To
  - o 1st Limiting Element

- Entergy Arkansas → EMDE
  - o Melbourne – Sage 161kV FLO ISES – Dell 500kV
- Entergy Oil & Gas Units → EMDE
  - o Belle Point – Little Gypsy 230kV FTLO Tezcuco – Waterford 230kV
- Entergy → EMDE
  - o Melbourne – Sage 161kV FLO ISES – Dell 500kV

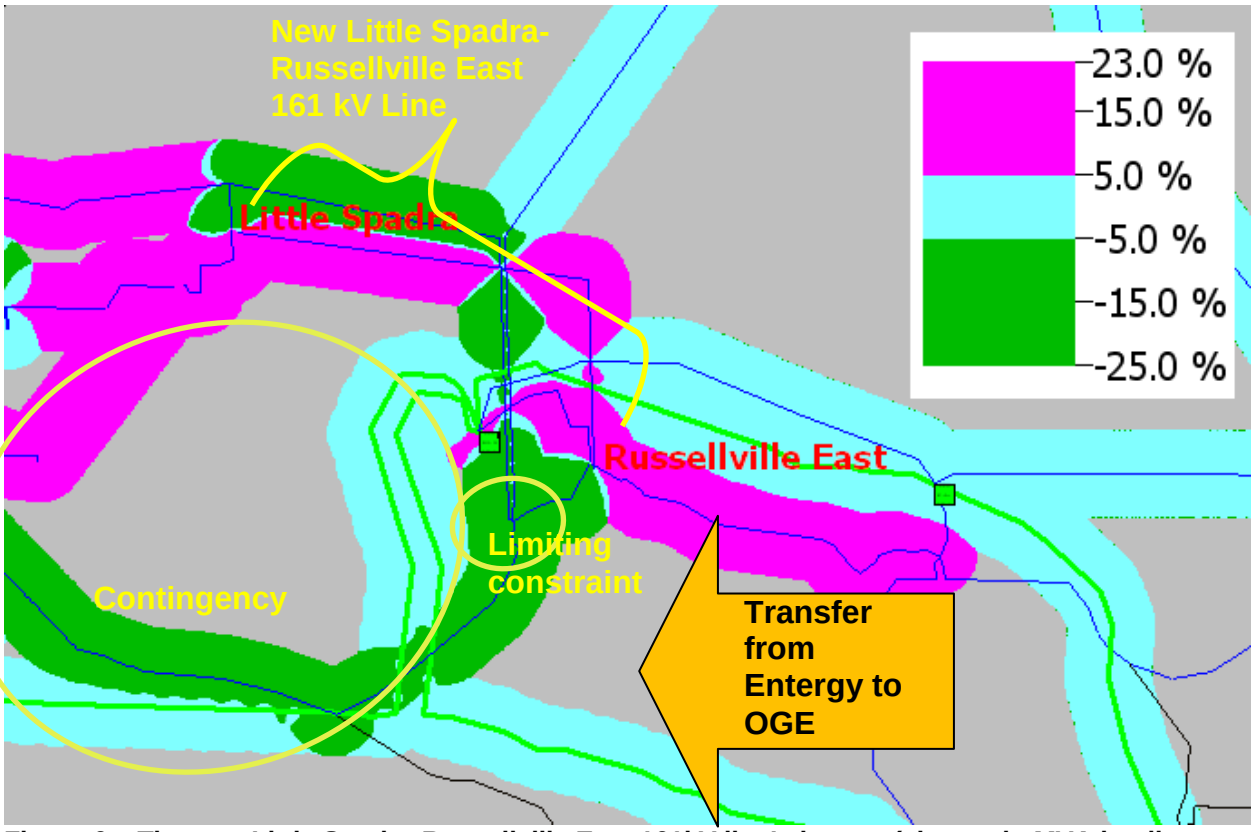

Figure 6 – The new Little Spadra-Russellville East 161kV line's impact (change in MVA loading percentage) on a limiting constraint for the transfer from Entergy to OGE.

This Powerworld one-line diagram (Figure 6) shows that when performing a transfer from Entergy to OGE, with Little Spadra-Russellville East 161kV line added to the base case, the Russellville South to Dardanelle 161kV line has more than a 5% decrease in MVA loading during the outage of ANO to Fort Smith 500kV line. However, there is more than a 5% increase in MVA loading on other limiting elements during these system conditions.

Summary

Transfer capability from south to north was increased by this new 161kV line between Entergy's Russellville East substation and Oklahoma Gas & Electric's Little Spadra substation. However the positive changes were limited to three of the studied POR/POD pairs and only between Entergy and EMDE. The total project cost is estimated at approximately $49,000,000 and is expected to take approximately 2.5 years to design and build.

Turk-Fulton-El Dorado 345kV

Description

Major Elements:

- Turk-Fulton 345kV line
  - o approximately 15 miles direct
- Fulton-El Dorado 345kV line
  - o approximately 65 miles direct
- Fulton substation
  - o 345kV breaker station
  - o 345/115 kV transformer
- El Dorado substation
  - o 2nd 500/345kV transformer
  - o 345 kV terminal equipment
- Turk substation 345kV terminal equipment

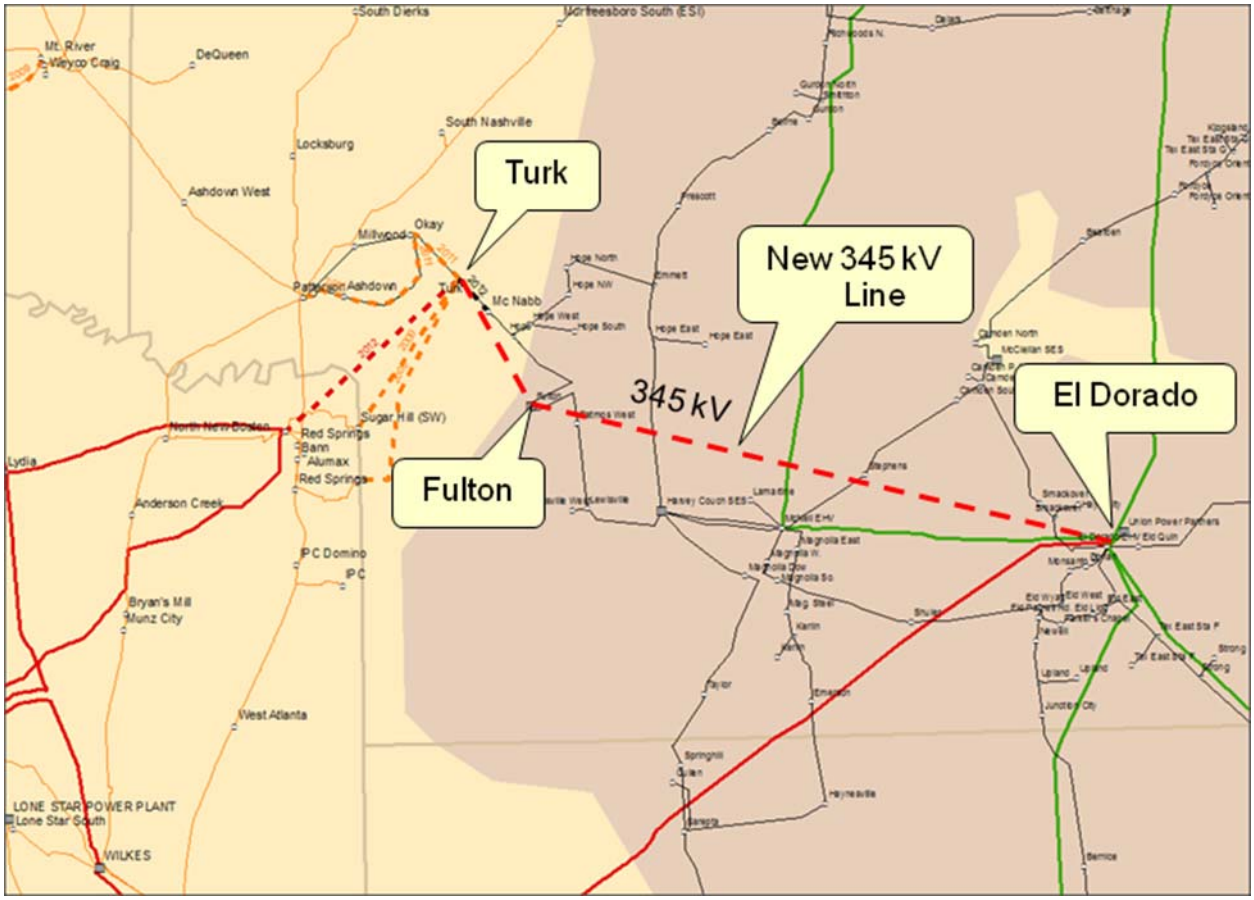

Figure 7 - Turk-Fulton-El Dorado 345kV

High-Level Planning Cost Estimate

Description	Line Rating	Upgrade Description	ICT Cost Estimate
Turk – McNeil 345kV line	(1959MVA) ~1800A	Build new transmission line 45 miles	$60,750,000
Fulton-El Dorado 345kV line	(1959MVA) ~1800A	Build new transmission line 65 miles	$87,750,000
McNeil 500/345kV substation	(1959MVA)	New 500/345kV transformer and new 345 kV switchyard	$25,000,000
El Dorado 500/345kV substation	(1959MVA)	New 500/345kV transformer and new 345 kV switchyard	$25,000,000
Turk 345kV substation		Build new 345kV bus with breakers and switches	$10,000,000
Total Cost			$208,500,000

Table 5 – Detailed Costs for Turk-Fulton-El Dorado 345kV

Engineering Analysis

1. Values shown below in the table are differences between the Base Model and the Change Model (with the project included)
2. All values are in MW
3. Changes in FCITC values less than 100 MW were considered to have no benefit
4. The values shown in paranthesis represent FCITC in MW with project included

Project 3		AEPW	CLECO	EMDE	OGE	SPP	SWPA
Amite South	POR	No Benefit	No Benefit	No Benefit	810 (-442)	No Benefit	No Benefit
	POD	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit
Entergy Arkansas	POR	1416 (190)	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit
	POD	211 (1929)	No Benefit	No Benefit	No Benefit	134 (2859)	No Benefit
Entergy Oil & Gas Units	POR	No Benefit	No Benefit	No Benefit	No Benefit	347 (-905)	No Benefit
	POD	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit
Entergy	POR	113 (199)	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit
	POD	No Benefit	No Benefit	No Benefit	No Benefit	142 (1984)	No Benefit
WOTAB	POR	122 (217)	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit
	POD	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit

Table 6 - FCITC Results: Turk-Fulton-El Dorado 345kV

The following transfers shown in the table above have positive results:

- From → To
  - 1st Limiting Element

- Amite South → OGE
  - Sterlington 500/115kV transformer FTO Sterlington – El Dorado 500kV
- AEPW → Entergy Arkansas
  - Grimes – Mt. Zion 138kV FTO Grimes – Walden 138kV
- Entergy Arkansas → AEPW
  - Russellville East – Russellville North FTLO ANO – Ft. Smith 500kV
- Entergy Oil & Gas Units → SPP
  - Belle Point – Little Gypsy 230kV FTLO Tezcuco – Waterford 230kV
- Entergy → AEPW
  - Russellville East – Russellville North FTLO ANO – Ft. Smith 500kV
- SPP → Entergy
  - Grimes – Mt. Zion 138kV FTO Grimes – Walden 138kV
- SPP → Entergy Arkansas
  - West Gardner – Stilwell 345kV FTLO Stilwell – Lacygne 345kV
- WOTAB → AEPW
  - Russellville East – Russellville North FTLO ANO – Ft. Smith 500kV

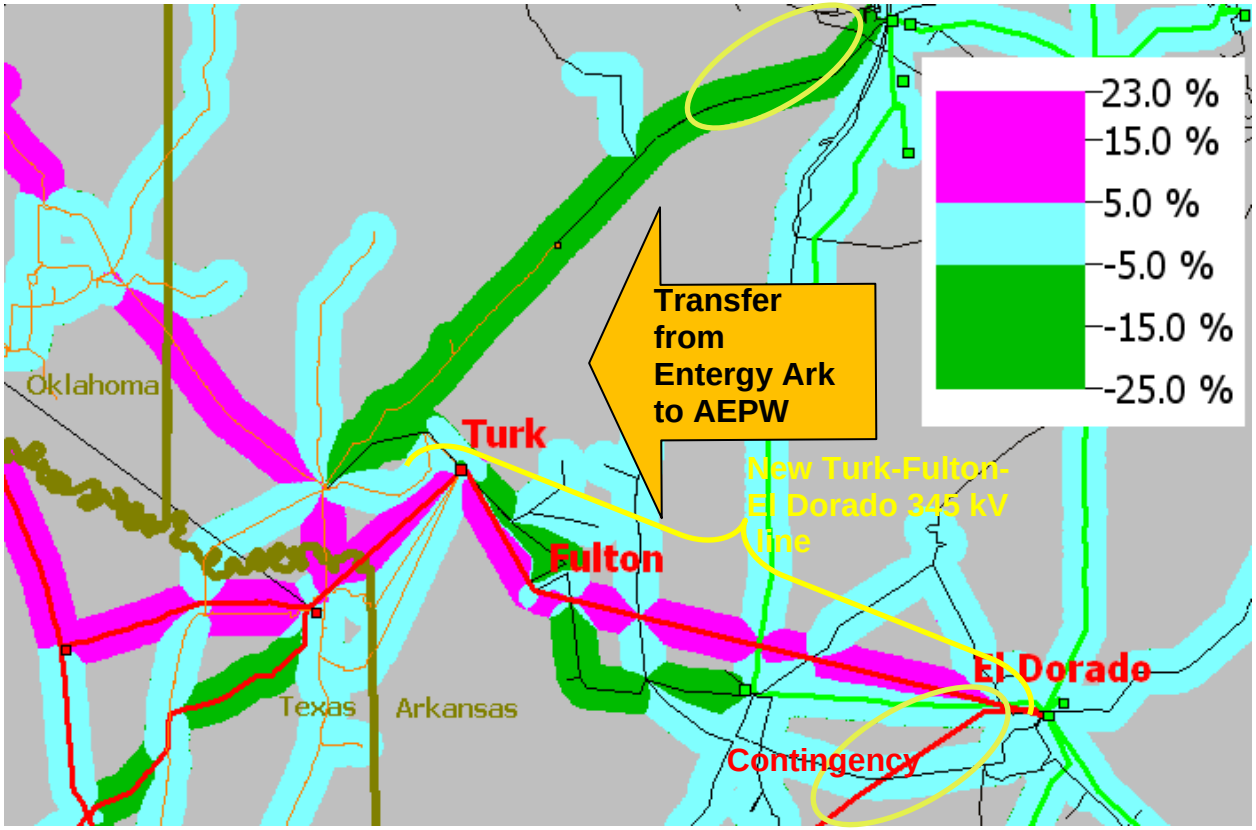

Figure 8 – The Turk-Fulton-El Dorado 345kV line's impact (change in MVA loading percentage) on a limiting constraint for the transfer from Entergy Arkansas to AEPW.

This Powerworld one-line diagram (Figure 8) shows that when performing a transfer from Entergy Arkansas to AEPW, with Turk-Fulton-El Dorado 345kV line added to the base case, the Bismarck to Hot Springs EHV West 115kV line has more than a 5% decrease in MVA loading during the outage of the El Dorado to Longwood 345kV line.

Summary

Transfer capability was increased in multiple directions by these new 345kV lines between Entergy's El Dorado substation, American Electric Power's Fulton substation, and American Electric Power's Hempstead substation. Also, positive changes were seen for eight of the studied POR/POD pairs and involved multiple entities. The total project cost is estimated at approximately $208,500,000 and is expected to take approximately 4 years to design and build.

Messick 500/230kV Transformer

Description

Major Elements:

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

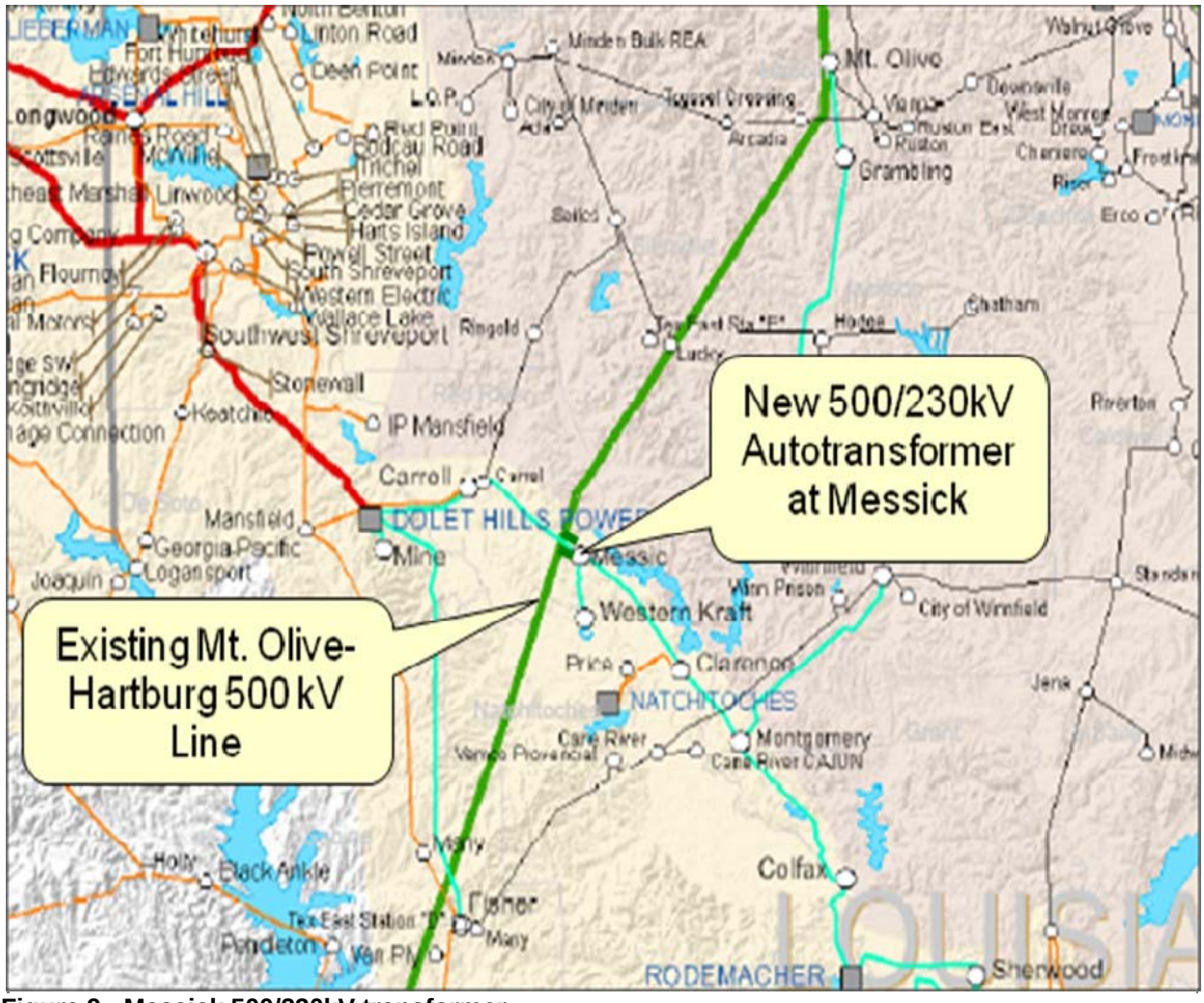

Figure 9 - Messick 500/230kV transformer

High-Level Planning Cost Estimate

Description	Line Rating	Upgrade Description	ICT Cost Estimate
Messick 500/230kV substation	(855MVA)	New 500/230kV transformer and new 500/230kV switching station	$25,000,000
Total Cost			$25,000,000

Table 7 – Detailed Costs for Messick 500/230kV transformer

Engineering Analysis

1. Values shown below in the table are differences between the Base Model and the Change Model (with the project included)
2. All values are in MW
3. Changes in FCITC values less than 100 MW were considered to have no benefit
4. The values shown in paranthesis represent FCITC in MW with project included

Project 4		AEPW	CLECO	EMDE	OGE	SPP	SWPA
Amite South	POR	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit
	POD	No Benefit	145 (135)	No Benefit	No Benefit	No Benefit	No Benefit
Entergy Arkansas	POR	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit
	POD	No Benefit	109 (118)	No Benefit	No Benefit	No Benefit	No Benefit
Entergy Oil & Gas Units	POR	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit
	POD	No Benefit	132 (123)	No Benefit	No Benefit	No Benefit	No Benefit
Entergy	POR	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit
	POD	No Benefit	127 (118)	No Benefit	No Benefit	No Benefit	No Benefit
WOTAB	POR	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit
	POD	No Benefit	172 (160)	No Benefit	No Benefit	No Benefit	No Benefit

Table 8 - FCITC Results: Messick 500/230kV transformer

The following transfers shown in the table above have positive results:

- From → To
  - o 1st Limiting Element

- CLECO → Amite South
  - o Beaver Creek – Jena 115kV FTLO Colfax – Rodemacher 230kV
- CLECO → Entergy Arkansas
  - o Beaver Creek – Jena 115kV FTLO Colfax – Rodemacher 230kV
- CLECO → Entergy Oil & Gas Units
  - o Beaver Creek – Jena 115kV FTLO Colfax – Rodemacher 230kV
- CLECO → Entergy
  - o Beaver Creek – Jena 115kV FTLO Colfax – Rodemacher 230kV
- CLECO → WOTAB
  - o Beaver Creek – Jena 115kV FTLO Colfax – Rodemacher 230kV

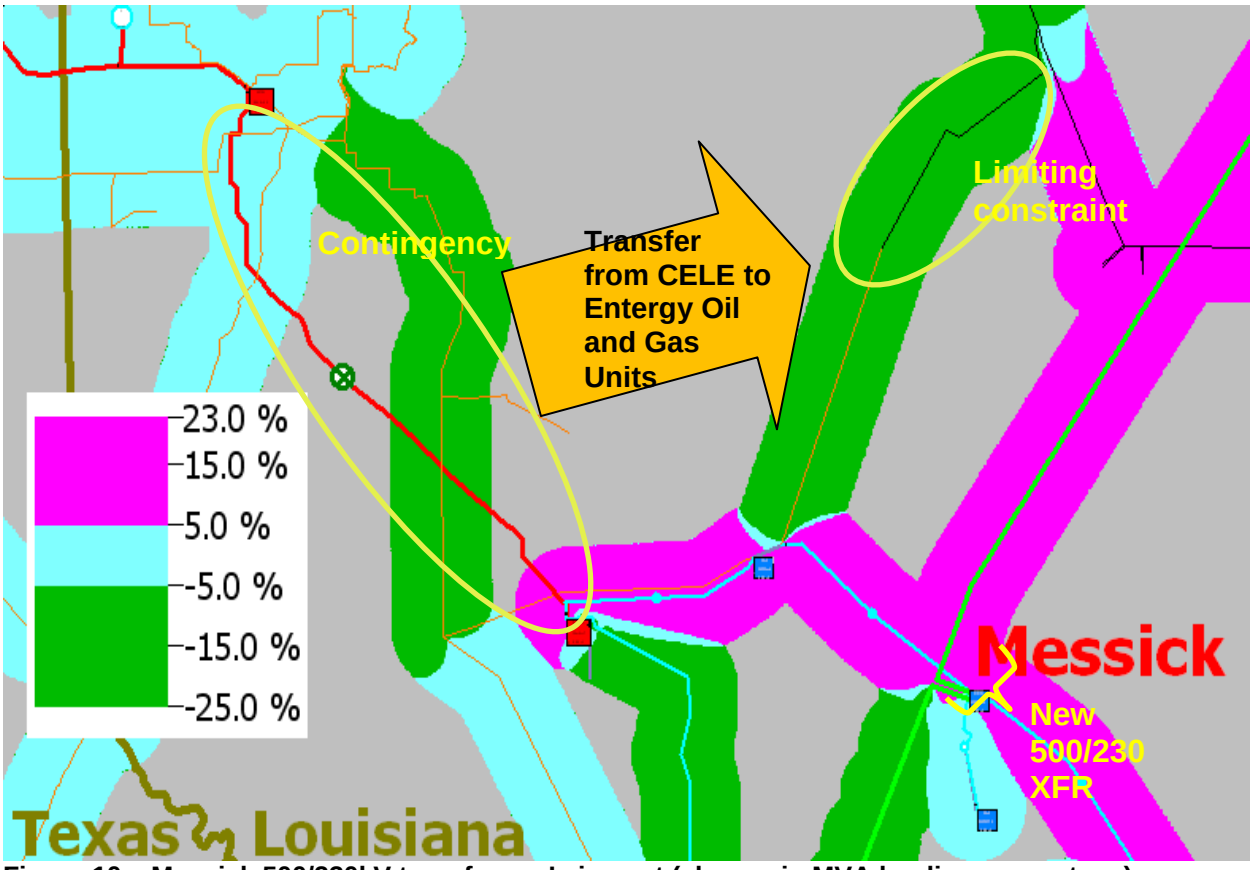

Figure 10 – Messick 500/230kV transformer's impact (change in MVA loading percentage) on a limiting constraint for the transfer from CELE to Entergy Oil and Gas Units.

This Powerworld one-line diagram (Figure 10) shows that when performing a transfer from Cleco to Entergy Oil & Gas Units, with Messick 500/230kV transformer added to the base case, the limiting constraint Sailes to Ringgold 115kV line has more than a 5% decrease in MVA loading during the outage of Dolet Hills to Southwest Shreveport 345kV line.

Summary

Transfer capability from CLECO was increased by this new 500/230kV transformer at Central Louisiana Electric's Messick substation. However, the positive changes were limited to five of the studied POR/POD pairs and only when exporting from CLECO. The total project cost is estimated at approximately $25,000,000 and is expected to take approximately 2 years to design and build.

Flint Creek-Chamber Springs-Fort Smith-ANO 345kV

Description

Major Elements:

- Flint Creek-Chamber Springs 345kV line
  - o approximately 12 miles direct
- Chamber Springs-Fort Smith 345kV line
  - o approximately 60 miles direct
- Fort Smith-ANO 345kV line
  - o approximately 65 miles direct
- Flint Creek substation terminal equipment
- Chamber Springs substation terminal equipment
- Fort Smith substation terminal equipment
- ANO substation
  - o 345kV switching station
  - o 500/345kV transformer

Note: Entergy's ANO substation does not contain any 345kV bus work or lines. Since Oklahoma Gas & Electric's Fort Smith substation is configured to 500kV, we propose that line ANO – Ft Smith be configured at the 500kV level. The new line would run parallel to the existing 500kV Line that is currently in place between these 2 substations. The change from 345kV to 500kV should have minimal effect on the analysis that has been performed below.

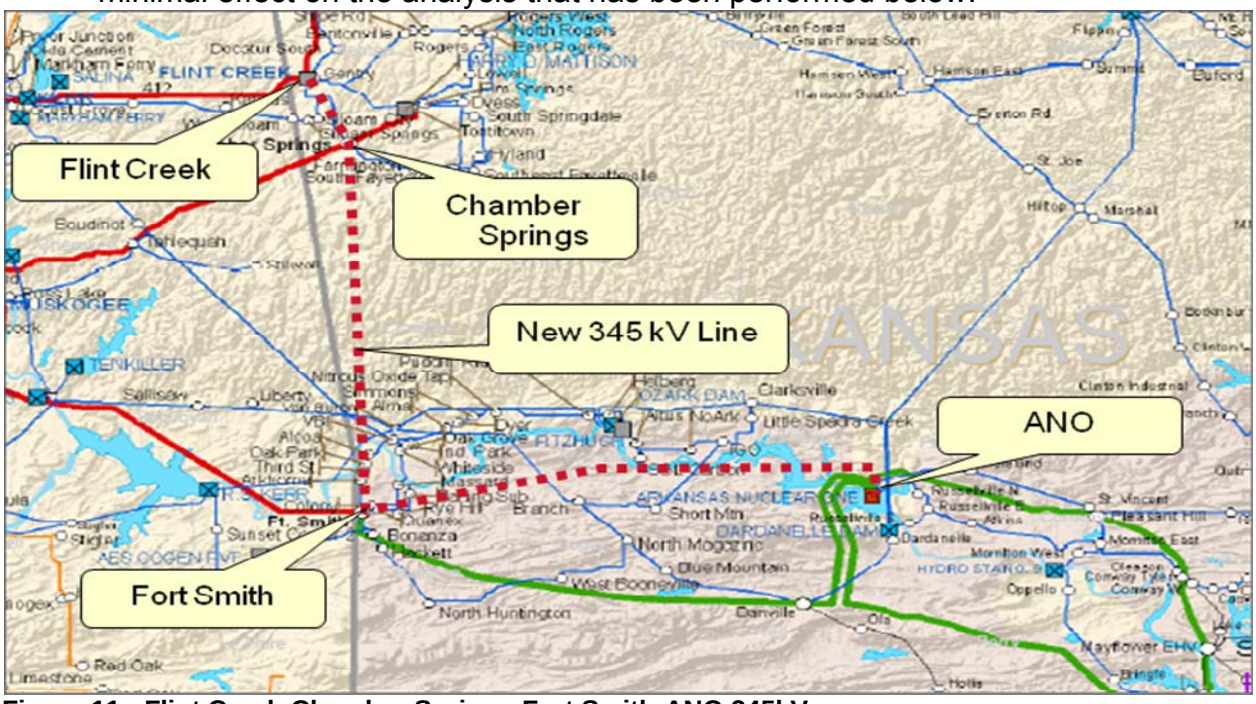

Figure 11 - Flint Creek-Chamber Springs-Fort Smith-ANO 345kV

High-Level Planning Cost Estimate

Description	Line Rating	Upgrade Description	ICT Cost Estimate
Flint Creek - Chamber Springs 345kV line	(1959MVA) ~1800A	Build new transmission line 12 miles	$16,200,000
Chamber Springs - Fort Smith 345kV line	(1959MVA) ~1800A	Build new transmission line 60 miles	$81,000,000
Fort Smith - ANO 345kV line	(1959MVA) ~1800A	Build new transmission line 65 miles	$87,750,000
ANO 500/345kV substation	(1959MVA)	New 500/345kV transformer and new 345 kV switchyard	$25,000,000
Fort Smith 345kV substation		Build new 345kV bus with breakers and switches	$10,000,000
Chamber Springs 345kV substation		Build new 345kV bus with breakers and switches	$10,000,000
Flint Creek 345kV substation		Build new 345kV bus with breakers and switches	$10,000,000
Total Cost			$239,950,000

Table 9 – Detailed Costs for Creek-Chamber Springs-Fort Smith-ANO 345kV

Engineering Analysis

1. Values shown below in the table are differences between the Base Model and the Change Model (with the project included)
2. All values are in MW
3. Changes in FCITC values less than 100 MW were considered to have no benefit
4. The values shown in paranthesis represent FCITC in MW with project included

Project 5		AEPW	CLECO	EMDE	OGE	SPP	SWPA
Amite South	POR	No Benefit	No Benefit	166 (-876)	771 (-481)	No Benefit	155 (-601)
	POD	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit
Entergy Arkansas	POR	1632 (406)	No Benefit	417 (-676)	186 (-981)	182 (-959)	No Benefit
	POD	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit
Entergy Oil & Gas Units	POR	No Benefit	No Benefit	124 (-920)	251 (-910)	345 (-907)	No Benefit
	POD	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit
Entergy	POR	225 (225)	No Benefit	211 (-820)	226 (-914)	2228 (1000)	147 (-574)
	POD	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit
WOTAB	POR	133 (228)	No Benefit	135 (-867)	274 (335)	291 (374)	154 (-597)
	POD	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit	No Benefit

Table 10 - FCITC Results: Flint Creek-Chamber Springs-Fort Smith-ANO 345kV

The following transfers shown in the table above have positive results:

- From → To
  - 1st Limiting Element

- Amite South → EMDE
  - Melbourne – Sage 161kV FLO ISES – Dell 500kV
- Amite South → OGE
  - Sterlington 500/115kV transformer FTO Sterlington – El Dorado 500kV
- Amite South → SWPA
  - Melbourne – Sage 161kV FLO ISES – Dell 500kV
- Entergy Arkansas → AEPW
  - International Paper – Mansfield 138kV FTLO Dolet Hills – SW Shreveport 345kV
- Entergy Arkansas → EMDE
  - Melbourne – Sage 161kV FLO ISES – Dell 500kV
- Entergy Arkansas → OGE
  - Melbourne – Sage 161kV FLO ISES – Dell 500kV
- Entergy Arkansas → SPP
  - Melbourne – Sage 161kV FLO ISES – Dell 500kV
- Entergy Oil & Gas Units → EMDE
  - Belle Point – Little Gypsy 230kV FTLO Tezcuco – Waterford 230kV
- Entergy Oil & Gas Units → OGE
  - Belle Point – Little Gypsy 230kV FTLO Tezcuco – Waterford 230kV
- Entergy Oil & Gas Units → SPP
  - Belle Point – Little Gypsy 230kV FTLO Tezcuco – Waterford 230kV
- Entergy → AEPW
  - International Paper – Mansfield 138kV FTLO Dolet Hills – SW Shreveport 345kV
- Entergy → EMDE
  - Melbourne – Sage 161kV FLO ISES – Dell 500kV
- Entergy → OGE
  - Melbourne – Sage 161kV FLO ISES – Dell 500kV
- Entergy → SPP
  - Fairview – Little Gypsy 230kV FTLO Michoud – Front Street 230kV
- Entergy → SWPA
  - Melbourne – Sage 161kV FLO ISES – Dell 500kV
- WOTAB → AEPW
  - International Paper – Mansfield 138kV FTLO Dolet Hills – SW Shreveport 345kV
- WOTAB → EMDE
  - Melbourne – Sage 161kV FLO ISES – Dell 500kV
- WOTAB → OGE
  - International Paper – Mansfield 138kV FTLO Dolet Hills – SW Shreveport 345kV
- WOTAB → SPP

- International Paper – Mansfield 138kV FTLO Dolet Hills – SW Shreveport 345kV

- WOTAB → SWPA
  - Melbourne – Sage 161kV FLO ISES – Dell 500kV

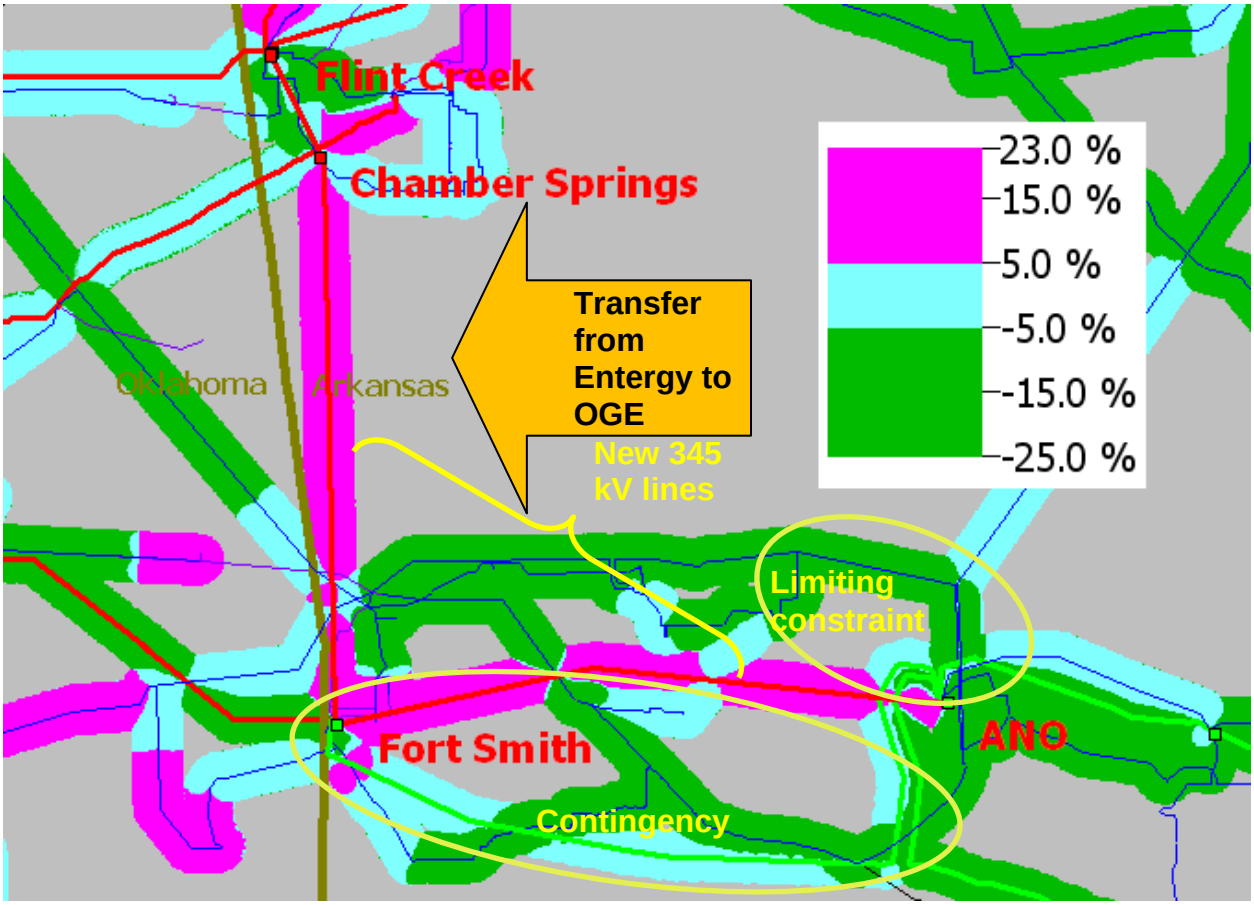

Figure 12 – The Flint Creek-Chamber Springs-Fort Smith-ANO 345kV line's impact (change in MVA loading percentage) on a limiting constraint for the transfer from Entergy to OGE.

This Powerworld one-line diagram (Figure 12) shows that when performing a transfer from Entergy to OGE, with Flint Creek-Chamber Springs-Fort Smith-ANO 345kV line added to the base case, the Dardanelle to Clarksville 161kV line has more than a 5% decrease in MVA loading during the outage of ANO to Fort Smith 500kV line.

Summary

Transfer capability was increased when exporting from Entergy by these new 345kV lines between Entergy's Arkansas Nuclear One substation, Oklahoma Gas & Electric's Ft. Smith substation, American Electric Power's Chamber Springs substation, and American Electric Power's Flint Creek substation. Also, positive changes occurred for twenty of the studied POR/POD pairs and involved multiple entities. The total project cost is estimated at approximately

$239,950,000 and is expected to take approximately 5.5 years to design and build.

Report Summary

Turk – McNeil 345kV
Transfer capability was increased in multiple directions by this new 345kV line between Entergy's McNeil substation and American Electric Power's Hempstead substation. Also, positive changes were seen for nine of the studied POR/POD pairs and involved multiple entities. The total project cost is estimated at approximately $95,750,000 and is expected to take approximately 4 years to design and build.

Spadra – Russellville 161kV Line
Transfer capability from south to north was increased by this new 161kV line between Entergy's Russellville East substation and Oklahoma Gas & Electric's Little Spadra substation. However the positive changes were limited to three of the studied POR/POD pairs and only between Entergy and EMDE. The total project cost is estimated at approximately $49,000,000 and is expected to take approximately 2.5 years to design and build.

Turk – Fulton – El Dorado 345kV Line
Transfer capability was increased in multiple directions by these new 345kV lines between Entergy's El Dorado substation, American Electric Power's Fulton substation, and American Electric Power's Hempstead substation. Also, positive changes were seen for eight of the studied POR/POD pairs and involved multiple entities. The total project cost is estimated at approximately $208,500,000 and is expected to take approximately 4 years to design and build.

Messick 500/230kV Auto
Transfer capability from CLECO was increased by this new 500/230kV transformer at Central Louisiana Electric's Messick substation. However, the positive changes were limited to five of the studied POR/POD pairs and only when exporting from CLECO. The total project cost is estimated at approximately $25,000,000 and is expected to take approximately 2 years to design and build.

Flint Creek – Chamber Springs – Fort Smith – ANO 345kV Line
Transfer capability was increased when exporting from Entergy by these new 345kV lines between Entergy's Arkansas Nuclear One substation, Oklahoma Gas & Electric's Ft. Smith substation, American Electric Power's Chamber Springs substation, and American Electric Power's Flint Creek substation. Also, positive changes occurred for twenty of the studied POR/POD pairs and involved multiple entities. The total project cost is estimated at approximately $239,950,000 and is expected to take approximately 5.5 years to design and build.

Conclusion

Stakeholders will have the opportunity to select any of these projects for more detailed Step 2 analysis in the next ESRPP study cycle. How they are studied will be determined by the scope of the ESRPP 2010 Study.