# *System Impact Study*
# *E002 Big Cajun 2 500 kV*
# *15 MW*

***Prepared by:***

***Midcontinent Independent System Operator***
***Independent Coordinator of Transmission***
***720 City Center Drive***
***Carmel, IN  46032***

| Rev | Issue Date | Description of Revision | Revised By | Project Manager |
|---|---|---|---|---|
| 0 | 12/6/2013 | Posting System Impact Study | BF | BF |

# Contents

*Executive Summary* ____ *3*

*Energy Resource Interconnection Service* ____ *4*

*1. Introduction* ____ *4*

*2. Short circuit Analysis/Breaker Rating Analysis* ____ *4*

**2.1 Model Information** ____ Error! Bookmark not defined.

**2.2 Short Circuit Analysis** ____ Error! Bookmark not defined.

**2.3 Analysis Results** ____ Error! Bookmark not defined.

**2.4 Problem Resolution** ____ Error! Bookmark not defined.

*3. Load Flow Analysis* ____ *4*

**3.1 Model Information** ____ 4

**3.2 Load Flow Analyses** ____ 5

**3.3 Analysis Results** ____ 6

*4. Interconnection Facilities* ____ *7*

*APPENDIX A: DATA PROVIDED BY CUSTOMER* ____ *8*

*APPENDIX B: PRIOR GENERATION INTERCONNECTION AND TRANSMISSION SERVICE REQUESTS IN STUDY MODELS* ____ *17*

*APPENDIX C: ERIS LOAD FLOW – DETAILS OF SCENARIO 1, 2, 3, AND 4* 18

*APPENDIX D: DETAILS OF SCENARIO 1 – 2015* ____ *24*

*APPENDIX E: DETAILS OF SCENARIO 2 – 2015* ____ *28*

*APPENDIX F: DETAILS OF SCENARIO 3 – 2015* ____ *28*

*APPENDIX G: DETAILS OF SCENARIO 4 – 2015* ____ *32*

# Executive Summary

This System Impact Study is the second step of the interconnection process and is based on the E002 request for interconnection on Entergy's transmission system located at the Big Cajun 2 500 kV substation. The study evaluates connection of 15 MW to the Entergy Transmission System.

Requestor for E002 requested ERIS. Under ERIS, a load flow analysis was performed. The load flow study was performed on the latest available 2015 Summer Peak Case, using PSS/E and MUST software by Siemens Power Technologies International (Siemens-PTI). The proposed in-service date is November 17, 2014.

Results of the System Impact Study indicated that under ERIS the additional generation due to E002 **does not** cause an increase in short circuit current such that they exceed the fault interrupting capability of the high voltage circuit breakers within the vicinity of the E002 plant with priors and without priors. Therefore, estimated upgrade costs under ERIS with and without prior is $0. See table below.

**Estimated ERIS Project Planning Upgrade Cost**

| Interconnection Upgrades | Planning Estimate for Upgrade* |
|---|---|
| None* | --- |

*The costs of the upgrades are planning estimates only. Cost estimate may change upon the completion of the pending Stability Study.

# Energy Resource Interconnection Service

## 1. Introduction

This Energy Resource Interconnection Service (ERIS) is based on a request for 15 MW interconnection on Entergy's transmission system at the Big Cajun 2 500 kV substation. The objective of this study is to assess the reliability impact of the new facility on the Entergy transmission system with respect to the steady state and transient stability performance of the system as well as its effects on the system's existing short circuit current capability. It is also intended to determine whether the transmission system meets standards established by NERC Reliability Standards and Entergy's planning guidelines when plant is connected to Entergy's transmission system. If not, transmission improvements will be identified.

The System Impact Study process required a load flow analysis to determine if the existing transmission lines are adequate to handle the full output from the plant for simulated transfers to adjacent control areas. .

This ERIS System Impact Study was based on information provided by the Customer and assumptions made by Entergy's Transmission Technical System Planning group. All supplied information and assumptions are documented in this report. If the actual equipment installed is different from the supplied information or the assumptions made, the results outlined in this report are subject to change.

The load flow results from the ERIS study are for information only. ERIS does not in and of itself convey any transmission service.

## 2. Short circuit Analysis/Breaker Rating Analysis

The Short Circuit Analysis and fault current study was not done for the E002 project. As there are no changes to the generator parameters and GSU transformer parameters, there will be no impact on existing transmission system short circuit levels

## 3. Load Flow Analysis

### 3.1 Model Information

The load flow analysis was performed based on the projected 2015 summer peak load flow model. Approved future transmission projects in the 2013 ICT Base Plan were used in the models for scenarios three and four. These upgrades can be found on Entergy's OASIS web page at http://www.oatioasis.com/EES/EESDocs/Disclaimer.html.

The loads were scaled based on the forecasted loads for the year. All firm power transactions between Entergy and its neighboring control areas were modeled for the year 2015 excluding short-term firm transactions on the same transmission interface. An economic dispatch was carried out on Entergy generating units after the scaling of load and modeling of transactions. The E002 generation interconnection point was modeled at the Big Cajun 2 500kV substation. These associated facilities were then modeled in the case to build a revised case for the load flow analysis. Transfers were simulated between thirteen (13) control areas and Entergy using the requesting generator as the source and adjacent control area as sink.

This study considered the following four scenarios:

| Scenario No. | Approved Future Transmission Projects | Pending Transmission Service & Study Requests |
|---|---|---|
| 1 | Not Included | Not Included |
| 2 | Not Included | Included |
| 3 | Included | Not Included |
| 4 | Included | Included |

The generator step-up transformers, generators, and interconnecting lines were modeled according to the information provided by the Customer.
All ratings were reduced to 95% to account for Entergy's 5% Transmission Reliability Margin.

## 3.2 Load Flow Analyses

### 3.2.1 Load Flow Analysis

With the above assumptions implemented, the First Contingency Incremental Transfer Capability (FCITC) values are calculated. The FCITC depends on various factors – the system load, generation dispatch, scheduled maintenance of equipment, and the configuration of the interconnected system and the power flows in effect among the interconnected systems. The FCITC is also dependent on previously confirmed firm reservations on the interface.

### 3.2.2 Performance Criteria

The criteria for overload violations are as follows:

**A) With All Lines in Service**

- The MVA flow in any branch should not exceed Rate A (normal rating).

**B) Under Contingencies**

- The MVA flow through any facility should not exceed Rate A.

### 3.2.3 Power Factor Consideration / Criteria

Entergy, consistent with the FERC Large Generator Interconnection Procedures (LGIP), requires the customer to be capable of supplying at least 0.33MVAR (*i.e.*, 0.95 lagging power factor) and absorbing at least 0.33MVAR (*i.e.*, 0.95 leading power factor) for every MW of power injected into the grid. In the event that, under normal operating conditions, the customer facility does not meet the prescribed power factor requirements at the point of interconnection, the customer shall take necessary steps, such as the installation of reactive power compensating devices, to achieve the desired power factor

## 3.3 Analysis Results

Summary of the analysis results are documented in following table for each scenario.

**Table 3.3 1: Summary of Results for E002 – ERIS Load Flow Study**

| Interface | Name | Summer Peak Case Used | FCITC Available for Scenario 1 | FCITC Available for Scenario 2 | FCITC Available for Scenario 3 | FCITC Available for Scenario 4 |
|---|---|---|---|---|---|---|
| AECI | Associated Electric Cooperative, Inc. | 2017 | -1362 | -1326 | -1406 | -1698 |
| AEP-W | American Electric Power - West | 2017 | -707 | -689 | -730 | -881 |
| AMRN | Ameren Transmission | 2017 | 15 | -84 | 15 | -246 |
| CLEC | CLECO | 2017 | 15 | -83 | 15 | -7.2 |
| EAI | Entergy Arkansas | 2017 | 15 | -85 | -44 | -295 |
| EES | Entergy | 2017 | 15 | -63 | 15 | -5.5 |
| EES SYS LOAD | Entergy System Load | 2017 | 15 | -67 | 15 | -5.8 |
| EMDE | Empire District Electric Co | 2017 | -1153 | -1123 | -1190 | -1437 |
| EMI | Entergy Mississippi | 2017 | --547 | -545 | -193 | -332 |
| LAFA | Lafayette Utilities System | 2017 | 15 | -85 | 15 | -7.3 |
| LAGN | Louisiana Generating, LLC | 2017 | 15 | 15 | 15 | 15 |
| LEPA | Louisiana Energy & Power Authority | 2017 | 15 | -58 | 15 | -5 |
| OKGE | Oklahoma Gas & Electric Company | 2017 | -982 | -957 | -1014 | -1224 |
| SMEPA | South Mississippi Electric Power Assoc. | 2017 | -327 | -321 | -213 | -399 |
| SOCO | Southern Company | 2017 | 15 | -83 | 15 | -179 |
| SPA | Southwest Power Administration | 2017 | 15 | -84 | 15 | -260 |
| TVA | Tennessee Valley Authority | 2017 | 15 | -84 | 15 | -227 |

# 7. Interconnection Facilities

The Interconnection Customer's designated Point of Interconnection (POI) is the Big Cajun 2 500 kV substation. The interconnection facilities already exist and will be used as-is. Thus, there are no incremental interconnection facilities costs. As such, a Facilities Study is not required to develop a more detailed cost estimate.

# APPENDIX A: DATA PROVIDED BY CUSTOMER

**APPENDIX 1 to LGIP**
**INTERCONNECTION REQUEST FOR A**
**LARGE GENERATING FACILITY**

1. The undersigned Interconnection Customer submits this request to interconnect its Large Generating Facility with Transmission Provider's Transmission System pursuant to a Tariff.

2. This Interconnection Request is for (check one):
   _____ A proposed new Large Generating Facility.
   _X_ An increase in the generating capacity or a Material Modification of an existing Generating Facility.
   The type of interconnection service requested (check one):
   _X_ Energy Resource Interconnection Service
   _____ Network Resource Interconnection Service

3. _____ Check here only if Interconnection Customer requesting Network Resource Interconnection Service also seeks to have its Generating Facility studied for Energy Resource Interconnection Service

4. Interconnection Customer provides the following information:

   a. Address or location or the proposed new Large Generating Facility site (to the extent known) or, in the case of an existing Generating Facility, the name and specific location of the existing Generating Facility;

      Big Cajun II, Unit 2, 10431, Hwy 981, New Roads, LA 70760

   b. Maximum summer at 40 degrees C and winter at -20 degrees C megawatt electrical output of the proposed new Large Generating Facility or the amount of megawatt increase in the generating capacity of an existing Generating Facility;

      15 MW increase

   c. General description of the equipment configuration;

      Natural Gas-fired boiler with GE steam-turbine generator

   d. Commercial Operation Date (Day, Month, and Year);

      November 17, 2014

e. Name, address, telephone number, and e-mail address of Interconnection Customer's contact person;

[redacted]

f. Approximate location of the proposed Point of Interconnection (optional);

**Existing connection is the 500kv switchyard at the Big Cajun II facility in New Roads, LA.**

g. Interconnection Customer Data (set forth in Attachment A)

6. Applicable deposit amount as specified in the LGIP. $10,000.00

7. Evidence of Site Control as specified in the LGIP (check one)

__X__ Is attached to this Interconnection Request
_____ Will be provided at a later date in accordance with this LGIP

8. This Interconnection Request shall be submitted to the representative indicated below:

[To be completed by Transmission Provider]

9. Representative of Interconnection Customer to contact:

[redacted]

10. This Interconnection Request is submitted by:

[redacted]

Date: September 13, 2013

**Attachment A to Appendix 1**
**Interconnection Request**

## LARGE GENERATING FACILITY DATA

### UNIT RATINGS

kVA 685,000 °F 25 Voltage 24,000
Power Factor 0.90
Speed (RPM) 3600 Connection (e.g. Wye) Wye
Short Circuit Ratio 0.5 Frequency, Hertz 60
Stator Amperes at Rated kVA 16,719 Field Volts 455 VDC
Max Turbine MW 569 °F 85

### COMBINED TURBINE-GENERATOR-EXCITER INERTIA DATA

Inertia Constant, H = 2.713 kW sec/kVA
Moment-of-Inertia, $WK^2$ = 6.31x10^6 lb. ft.$^2$

### REACTANCE DATA (PER UNIT-RATED KVA)

| | DIRECT AXIS | | QUADRATURE AXIS | |
|---|---|---|---|---|
| Synchronous – saturated | $X_{dv}$ | 1.78 | $X_{qv}$ | 1.71 |
| Synchronous – unsaturated | $X_{di}$ | 1.78 | $X_{qi}$ | 1.71 |
| Transient – saturated | $X'_{dv}$ | 0.230 | $X'_{qv}$ | N/A |
| Transient – unsaturated | $X'_{di}$ | 0.230 | $X'_{qi}$ | 0.477 |
| Subtransient – saturated | $X''_{dv}$ | 0.192 | $X''_{qv}$ | 0.192 |
| Subtransient – unsaturated | $X''_{di}$ | 0.192 | $X''_{qi}$ | 0.187 |
| Negative Sequence – saturated | $X2_v$ | 0.192 | | |
| Negative Sequence – unsaturated | $X2_i$ | 0.198 | | |
| Zero Sequence – saturated | $X0_v$ | 0.120 | | |
| Zero Sequence – unsaturated | $X0_i$ | 0.120 | | |
| Leakage Reactance | $Xl_m$ | 0.16 | | |

Issued by: Randall Helmick
Vice President, Transmission

Effective: July 13, 2007

Issued on: July 13, 2007

## FIELD TIME CONSTANT DATA (SEC)

| | | | | |
|---|---|---|---|---|
| Open Circuit | $T'_{do}$ | 4.00 | $T'_{qo}$ | 0.531 |
| Three-Phase Short Circuit Transient | $T'_{d3}$ | 0.546 | $T'_{q}$ | |
| Line to Line Short Circuit Transient | $T'_{d2}$ | 0.863 | | |
| Line to Neutral Short Circuit Transient | $T'_{d1}$ | 1.071 | | |
| Short Circuit Subtransient | $T''_{d}$ | 0.023 | $T''_{q}$ | 0.023 |
| Open Circuit Subtransient | $T''_{do}$ | 0.032 | $T''_{qo}$ | 0.052 |

## ARMATURE TIME CONSTANT DATA (SEC)

| | | |
|---|---|---|
| Three Phase Short Circuit | $T_{a3}$ | 0.15 |
| Line to Line Short Circuit | $T_{a2}$ | 0.15 |
| Line to Neutral Short Circuit | $T_{a1}$ | 0.14 |

NOTE: If requested information is not applicable, indicate by marking "N/A."

## MW CAPABILITY AND PLANT CONFIGURATION
## LARGE GENERATING FACILITY DATA

## ARMATURE WINDING RESISTANCE DATA (PER UNIT)

| | | |
|---|---|---|
| Positive | $R_1$ | 0.0037 |
| Negative | $R_2$ | 0.022 |
| Zero | $R_0$ | 0.011 |

Rotor Short Time Thermal Capacity $I_2^2t$ = 8.89
Field Current at Rated kVA, Armature Voltage and PF = 4971 amps
Field Current at Rated kVA and Armature Voltage, 0 PF = 5510 amps
Three Phase Armature Winding Capacitance = 0.5882 microfarad
Field Winding Resistance = 0.0791 ohms 25 °C
Armature Winding Resistance (Per Phase) = 0.001445 ohms 25 °C

Issued by: Randall Helmick
Vice President, Transmission

Effective: July 13, 2007

Issued on: July 13, 2007

## CURVES

Provide Saturation, Vee, Reactive Capability, Capacity Temperature Correction curves.
Designate normal and emergency Hydrogen Pressure operating range for multiple curves.

## GENERATOR STEP-UP TRANSFORMER DATA RATINGS

Capacity Self-cooled/ Maximum Nameplate

915 / 955.8 kVA

Voltage Ratio(Generator Side/System side/Tertiary)

22.9 / 500 / N/A / / kV

Winding Connections (Low V/High V/Tertiary V (Delta or Wye))

Delta / Wye / N/A

Fixed Taps Available 8 rate at +/- 2 1/2 %

Present Tap Setting 500 (center tap) or tap 3

## IMPEDANCE

Positive $Z_1$ (on self-cooled kVA rating) 9.25-A | 9.31-B | 9.38-C % 80 X/R

Zero $Z_0$ (on self-cooled kVA rating) N/A % X/R

Issued by: Randall Helmick
Vice President, Transmission

Effective: July 13, 2007

Issued on: July 13, 2007

## EXCITATION SYSTEM DATA

Identify appropriate IEEE model block diagram of excitation system and power system stabilizer (PSS) for computer representation in power system stability simulations and the corresponding excitation system and PSS constants for use in the model.

## GOVERNOR SYSTEM DATA

Identify appropriate IEEE model block diagram of governor system for computer representation in power system stability simulations and the corresponding governor system constants for use in the model.

## WIND GENERATORS

Number of generators to be interconnected pursuant to this Interconnection Request:
N/A

Elevation: N/A N/A Single Phase N/A Three Phase

Inverter manufacturer, model name, number, and version:
N/A

List of adjustable setpoints for the protective equipment or software:
N/A

Note: A completed General Electric Company Power Systems Load Flow (PSLF) data sheet or other compatible formats, such as IEEE and PTI power flow models, must be supplied with the Interconnection Request. If other data sheets are more appropriate to the proposed device, then they shall be provided and discussed at Scoping Meeting.

## INDUCTION GENERATORS

(*) Field Volts: N/A
(*) Field Amperes: N/A
(*) Motoring Power (kW): N/A
(*) Neutral Grounding Resistor (If Applicable): N/A
(*) $I_2^2t$ or K (Heating Time Constant): N/A
(*) Rotor Resistance: N/A
(*) Stator Resistance: N/A
(*) Stator Reactance: N/A
(*) Rotor Reactance: N/A
(*) Magnetizing Reactance: N/A
(*) Short Circuit Reactance: N/A
(*) Exciting Current: N/A
(*) Temperature Rise: N/A
(*) Frame Size: N/A
(*) Design Letter: N/A
(*) Reactive Power Required In Vars (No Load): N/A
(*) Reactive Power Required In Vars (Full Load): N/A
(*) Total Rotating Inertia, H: N/A Per Unit on KVA Base

Note: Please consult Transmission Provider prior to submitting the Interconnection Request to determine if the information designated by (*) is required

# APPENDIX B: PRIOR GENERATION INTERCONNECTION AND TRANSMISSION SERVICE REQUESTS IN STUDY MODELS

Prior Generation Interconnection NRIS requests that were included in this study:

| PID | Substation | MW | In Service Date |
|---|---|---|---|
| E001 | Moon Lake 230kV | 200 | 12/31/2016 |

Prior transmission service requests that were included in this study:

| OASIS | | PSE | MW | Begin | End |
|---|---|---|---|---|---|
| 78323928 | | NRG | 60 | 1/1/2014 | 1/1/2018 |
| 78678001 | | NRG | 103 | 6/30/2015 | 6/30/2020 |
| 78678006 | | NRG | 409 | 6/30/2015 | 6/30/2020 |
| 78681384 | | NRG | 103 | 6/30/2014 | 6/30/2015 |
| 78737511 | | CRGL | 40 | 1/1/2015 | 1/1/2016 |
| 78737516 | | CRGL | 40 | 1/1/2015 | 1/1/2016 |
| 78737522 | | CRGL | 40 | 1/1/2015 | 1/1/2016 |
| 78547143 | | ENTE | 242 | 1/1/2014 | 1/1/2044 |
| 78673960 | | NRG | 1 | 6/30/2014 | 6/30/2015 |
| 78678000 | | NRG | 1 | 6/30/2015 | 6/30/2020 |
| 78678004 | | NRG | 1 | 6/30/2015 | 6/30/2020 |
| 78681381 | | NRG | 1 | 6/30/2014 | 6/30/2015 |

# APPENDIX C: ERIS LOAD FLOW – DETAILS OF SCENARIO 1, 2, 3, AND 4

***Table 1: Details of Scenario 1 Results (Without Future Projects and Without Pending Transmission Service & Study Request)***

| Limiting Elements | Est. Cost | AECI | AEPW | AMRN | CLECO | EAI | EES | EESLoad | EMDE | EMI | LAFA | LAGN | LEPA | OKGE | SMEPA | SOCO | SPA | TVA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Brookhaven – South Brookhaven 115kV ckt 1 | ICT Baseplan / Entergy CP upgrade | | | | | | | | | X | | | | | | | | |
| Brookhaven – Wesson 115kV ckt 1 | ICT Baseplan / Entergy CP upgrade | | | | | | | | | X | | | | | | | | |
| South Brookhaven-Franklin 115kV ckt 1 | ICT Baseplan / Entergy CP upgrade | | | | | | | | | X | | | | | | | | |
| Wesson – James Road 115kV ckt1 | ICT Baseplan / Entergy CP upgrade | | | | | | | | | X | | | | | | | | |
| Elton Road – SW Jackson 115kV ckt1 | ICT Baseplan / Entergy CP upgrade | | | | | | | | | X | | | | | | | | |
| James Road – Hazelhurst 115kV ckt1 | ICT Baseplan / Entergy CP upgrade | | | | | | | | | X | | | | | | | | |
| Byram – Elton Road 115kV ckt1 | ICT Baseplan / Entergy CP upgrade | | | | | | | | | X | | | | | | | | |
| Baxter Wilson- SE Vicksburg | ICT Baseplan / Entergy CP upgrade | | | | | | | | | X | | | | | | | | |
| Monument – Miami Street 115kV ckt1 | ICT Baseplan / Entergy CP upgrade | | | | | | | | | X | | | | | X | | | |
| Miami Street – Rex Brown 115kV ckt1 | $ 1,761,760 | | | | | | | | | X | | | | | X | | | |
| Florence - South Jackson 115kV - Supplemental Upgrade | FFR Payment | | | | | | | | | | | | | | X | | | |

| Limiting Elements | Est. Cost | AECI | AEPW | AMRN | CLECO | EAI | EES | EESLoad | EMDE | EMI | LAFA | LAGN | LEPA | OKGE | SMEPA | SOCO | SPA | TVA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| International Paper – Mansfield (CLECO) 138kV ckt1 | Other Ownership | X | X | | | | | | X | | | | | X | | | | |
| International Paper – Wall Lake (CLECO) 138kV ckt1 | Other Ownership | X | X | | | | | | X | | | | | X | | | | |

*Table 2: Details of Scenario 2 Results (Without Future Projects and With Pending Transmission Service & Study Request)*

| Limiting Elements | Est. Cost | AECI | AEPW | AMRN | CLECO | EAI | EES | EESSLoad | EMDE | EMI | LAFA | LAGN | LEPA | OKGE | SMEPA | SOCO | SPA | TVA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Port Hudson – Fancy Point 230kV ck1 | $1,880,000 | X | X | X | X | X | X | X | X | X | X | | X | X | X | X | X | X |
| Port Hudson – Fancy Point 230kV ck2 | $1,880,000 | X | X | X | X | X | X | X | X | X | X | | X | X | X | X | X | X |
| Brookhaven – South Brookhaven 115kV ck1 | ICT Baseplan / Entergy CP upgrade | | | | | | | | | X | | | | | | | | |
| Brookhaven – Wesson 115 ck1 | ICT Baseplan / Entergy CP upgrade | | | | | | | | | X | | | | | | | | |
| Brookhaven – Wesson 115 ckt1 | ICT Baseplan / Entergy CP upgrade | | | | | | | | | X | | | | | | | | |
| Elton Road – SW Jackson 115kV ck1 | ICT Baseplan / Entergy CP upgrade | | | | | | | | | X | | | | | | | | |
| James Road – Hazelhurst 115kV ckt1 | ICT Baseplan / Entergy CP upgrade | | | | | | | | | X | | | | | | | | |
| Byram – Elton Road 115kV ckt1 | ICT Baseplan / Entergy CP upgrade | | | | | | | | | X | | | | | | | | |
| Elton Road –SW Jackson 115 ckt1 | ICT Baseplan / Entergy CP upgrade | | | | | | | | | X | | | | | | | | |
| Baxter Wilson – SE Vicksburg 115kV ckt1 | ICT Baseplan / Entergy CP upgrade | | | | | | | | | X | | | | | | | | |
| Monument – Miami Street 115 ckt1 | $2,802,800.00 | | | | | | | | | X | | | | | X | | | |
| Miami Street – Rex Brown W 115kV ckt1 | $1,761,760.00 | | | | | | | | | X | | | | | X | | | |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Florence - South Jackson 115kV - Supplemental Upgrade | FFR Payment | | | | | | | | | | | | | | X | | | |
| International Paper – Mansfield (CLECO) 138kV ck1 | Other Ownership | X | X | | | | | | X | | | | | X | | | | |
| International Paper – Wall Lake (CLECO) 138kV ck1 | Other Ownership | X | X | | | | | | X | | | | | X | | | | |
| South Brookhaven – Franklin 115kV ck1 | ICT Baseplan / Entergy CP upgrade | | | | | | | | | X | | | | | | | | |
| Wesson – James Road 115kV ck1 | ICT Baseplan / Entergy CP upgrade | | | | | | | | | X | | | | | | | | |

*Table 3: Details of Scenario 3 Results (With Future Projects and Without Pending Transmission Service & Study Request)*

| Limiting Elements | Est. Cost | AECI | AEPW | AMRN | CLECO | EAI | EES | EESSLoad | EMDE | EMI | LAFA | LAGN | LEPA | OKGE | SMEPA | SOCO | SPA | TVA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Brookhaven – South Brookhaven 115kV ckt1 | ICT Baseplan / Entergy CP upgrade | | | | | | | | | X | | | | | | | | |
| South Brookhaven – Franklin 115kV ckt1 | ICT Baseplan / Entergy CP upgrade | | | | | | | | | X | | | | | | | | |
| Baxter Wilson – Southeast Vicksburg 115kV ck1 | ICT Baseplan / Entergy CP upgrade | | | | | | | | | X | | | | | | | | |
| Miami Street – Rex Brown West 115kV ckt1 | $1,761,760.00 | | | | | | | | | X | | | | | X | | | |
| Hot Springs EHV West – Hot Springs EHV 500/115 XFR | $8,670,000 | | | | | X | | | | | | | | | | | | |
| Hot Springs EHV East – Hot Springs EHV 500/115 XFR | $8,670,000 | | | | | X | | | | | | | | | | | | |
| International Paper – Mansfield (CLECO) 138kV ck1 | Other Ownership | X | X | | | | | | X | | | | | X | | | | |
| International Paper – Wall Lake (CLECO) 138kV ck1 | Other Ownership | X | X | | | | | | X | | | | | X | | | | |
| Florence - South Jackson 115kV - Supplemental Upgrade | FFR payment | | | | | | | | | | | | | | X | | | |

*Table 4: Details of Scenario 4 Results (With Future Projects and With Pending Transmission Service & Study Request)*

| Limiting Elements | Est. Cost | AECI | AEPW | AMRN | CLECO | EAI | EES | EESSLoad | EMDE | EMI | LAFA | LAGN | LEPA | OKGE | SMEPA | SOCO | SPA | TVA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Baxter Wilson – Southeast Vicksburg 115kV ck1 | ICT Baseplan / Entergy CP upgrade | | | | | | | | | X | | | | | | | | |
| International Paper – Mansfield (CLECO) 138kV ck1 | Other Ownership | X | X | | | | | | X | | | | | X | | | | |
| International Paper – Wall Lake (CLECO) 138kV ck1 | Other Ownership | X | X | | | | | | X | | | | | X | | | | |
| Florence - South Jackson 115kV - Supplemental Upgrade | FFR payment | | | | | | | | | | | | | | X | | | |
| Brookhaven – South Brookhaven 115kV ck1 | ICT Baseplan / Entergy CP upgrade | | | | | | | | | X | | | | | | | | |
| Port Hudson – Fancy Point 230kV ckt1 | $1,880,000 | X | X | X | X | X | X | X | X | X | X | | X | X | X | X | X | X |
| Vacherie-Waterford 230kV ckt1 | $25,779,600.00 | | | | | | | | | | | | 5 | | | | | |
| Michoud – Front Street 230kV ckt1 | $32,155,200.00 | X | X | X | | X | | | | X | | | | X | X | X | X | X |
| South Brookhaven – Franklin 115kV ckt1 | ICT Baseplan / Entergy CP upgrade | | | | | | | | | X | | | | | | | | |
| Miami Street – Rex Brown West 115kV ck1 | $1,761,760.00 | | | | | | | | | X | | | | | X | | | |
| Gerald Andrus SES 230/115 XFR 1 | $6,560,000.00 | | | | | | | | | X | | | | | | | | |
| Hot Springs West 500/115 XFR | $8,670,000 | | | | | X | | | | | | | | | | | | |
| Hot Springs East 500/115 XFR | $8,670,000 | | | | | X | | | | | | | | | | | | |

# APPENDIX D: DETAILS OF SCENARIO 1 – 2015

**AECI**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| International Paper - Mansfield 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -1191 |
| International Paper - Wallake 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -1362 |

**AEPW**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| International Paper - Mansfield 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -618 |
| International Paper - Wallake 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -707 |

**AMRN**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| NONE | NONE | 15 |

**CLECO**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| NONE | NONE | 15 |

**EAI**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| NONE | NONE | 15 |

**EES**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| NONE | NONE | 15 |

**EESSLoad**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| NONE | NONE | 15 |

**EMDE**

| Limiting Element | Contingency Element | ATC |
|---|---|---|

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| International Paper - Mansfield 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -1008 |
| International Paper - Wallake 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -1153 |

**EMI**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Brookhaven - S. Brookhaven 115kV | W.BROOKHAVEN - CALIFORNIA 115KV | -119 |
| Brookhaven - S. Brookhaven 115kV | CALIFORNIA - VAUGHN 115KV | -279 |
| Brookhaven - S. Brookhaven 115kV | VAUGHN - FRANKLIN 115KV | -414 |
| Brookhaven - Wesson 115kV | Byram - Elton Road 115kV | -180 |
| Brookhaven - Wesson 115kV | Elton Road - SW Jackson 115kV | -500 |
| S.Brookhaven - Franklin 115kV | W.BROOKHAVEN - CALIFORNIA 115KV | -29 |
| S.Brookhaven - Franklin 115kV | CALIFORNIA - VAUGHN 115KV | -171 |
| S.Brookhaven - Franklin 115kV | VAUGHN - FRANKLIN 115KV | -293 |
| Wesson - James Rd 115kV | Elton Road - SW Jackson 115kV | -292 |
| James Rd - Hazelhurst 115kV | Elton Road - SW Jackson 115kV | -100 |
| Byram - Elton Road 115kV | Brookhaven - Wesson 115kV | -180 |
| Elton Road - SW Jackson 115kV | Brookhaven - Wesson 115kV | -547 |
| Elton Road - SW Jackson 115kV | Wesson - James Road 115kV | -341 |
| Elton Road - SW Jackson 115kV | Hazelhurst - James Road 115kV | -152 |
| Baxter Wilson - SE Vicksburg 115kV | VICKSBURG -W.VICKSBURG 115KV | -117 |
| Monument - Miami Street 115kV | S.Jackson 230/115kV XFR #1 | -45 |
| Miami Street - Rex Brown West 115kV | S.Jackson 230/115kV XFR #1 | -412 |
| Brookhaven - S. Brookhaven 115kV | W.BROOKHAVEN - CALIFORNIA 115KV | -119 |
| Brookhaven - S. Brookhaven 115kV | CALIFORNIA - VAUGHN 115KV | -279 |
| Brookhaven - S. Brookhaven 115kV | VAUGHN - FRANKLIN 115KV | -414 |
| Brookhaven - Wesson 115kV | Byram - Elton Road 115kV | -180 |
| Brookhaven - Wesson 115kV | Elton Road - SW Jackson 115kV | -500 |
| S.Brookhaven - Franklin 115kV | W.BROOKHAVEN - CALIFORNIA 115KV | -29 |
| S.Brookhaven - Franklin 115kV | CALIFORNIA - VAUGHN 115KV | -171 |
| S.Brookhaven - Franklin 115kV | VAUGHN - FRANKLIN 115KV | -293 |
| Wesson - James Rd 115kV | Elton Road - SW Jackson 115kV | -292 |
| James Rd - Hazelhurst 115kV | Elton Road - SW Jackson 115kV | -100 |
| Byram - Elton Road 115kV | Brookhaven - Wesson 115kV | -180 |
| Elton Road - SW Jackson 115kV | Brookhaven - Wesson 115kV | -547 |
| Elton Road - SW Jackson 115kV | Wesson - James Road 115kV | -341 |
| Elton Road - SW Jackson 115kV | Hazelhurst - James Road 115kV | -152 |
| Baxter Wilson - SE Vicksburg 115kV | VICKSBURG -W.VICKSBURG 115KV | -117 |
| Monument - Miami Street 115kV | S.Jackson 230/115kV XFR #1 | -45 |
| Miami Street - Rex Brown West 115kV | S.Jackson 230/115kV XFR #1 | -412 |

**LAFA**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| NONE | NONE | 15 |

**LAGN**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| NONE | NONE | 15 |

**LEPA**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| NONE | NONE | 15 |

**OKGE**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| International Paper - Mansfield 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -859 |
| International Paper - Wallake 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -782 |

**SMEPA**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Florence - South Jackson 115kV - Supplemental Upgrade | Bogalusa - Adams Creek 500/230kV transformer | -192 |
| Florence - South Jackson 115kV - Supplemental Upgrade | Bogalusa - Franklin 500kV | -192 |
| Florence – South Jackson 115kV – Supplemental Upgrade | Choctaw-WestPoint 500kV | -172 |
| Miami Street – Rex Brown West 115kV | South Jackson 230/115 XFR #1 | -327 |
| Monument – Miami Street 115kV | South Jackson 230/115 XFR #1 | -33 |

**SOCO**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| NONE | NONE | 15 |

**SPA**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| NONE | NONE | 15 |

**TVA**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| NONE | NONE | 15 |

# APPENDIX E: DETAILS OF SCENARIO 2 – 2015

**AECI**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| International Paper - Mansfield 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -1156 |
| International Paper - Wallake 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -1327 |
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | -84 |
| Port Hudson – Fancy Point 230kV #2 | Port Hudson – Fancy Point 230kV #1 | -16 |

**AEPW**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| International Paper - Mansfield 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -600 |
| International Paper - Wallake 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -689 |
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | -85 |
| Port Hudson – Fancy Point 230kV #2 | Port Hudson – Fancy Point 230kV #1 | -17 |

**AMRN**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | -84 |
| Port Hudson – Fancy Point 230kV #2 | Port Hudson – Fancy Point 230kV #1 | -16 |

**CLECO**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | -83 |
| Port Hudson – Fancy Point 230kV #2 | Port Hudson – Fancy Point 230kV #1 | -16 |

**EAI**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | -84 |
| Port Hudson – Fancy Point 230kV #2 | Port Hudson – Fancy Point 230kV #1 | -17 |

**EES**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | -63 |
| Port Hudson – Fancy Point 230kV #2 | Port Hudson – Fancy Point 230kV #1 | -12 |

**EESSLoad**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | -67 |
| Port Hudson – Fancy Point 230kV #2 | Port Hudson – Fancy Point 230kV #1 | -13 |

**EMDE**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| International Paper - Mansfield 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -979 |
| International Paper - Wallake 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -1123 |
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | -85 |
| Port Hudson – Fancy Point 230kV #2 | Port Hudson – Fancy Point 230kV #1 | -17 |

**EMI**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Elton Road – Southwest Jackson 115kV | Brookhaven – Wesson 115kV | -545 |
| Brookhaven – Wesson 115kV | Elton Road – Southwest Jackson 115kV | -498 |
| Brookhaven – S.Brookhaven 115kV | Vaughn – Franklin 115kV | -445 |
| Elton Road – SW Jackson 115kV | Wesson – James Road 115kV | -339 |
| Wesson – James Road 115kV | Elton road – SW Jackson 115kV | -289 |
| South Brookhaven – Franklin 115kV | Vaughn – Franklin 115kV | -320 |
| Brookhaven – S.Brookhaven 115kV | California – Vaughn 115kV | -311 |
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | -82 |
| Port Hudson – Fancy Point 230kV #2 | Port Hudson – Fancy Point 230kV #1 | -16 |
| Brookhaven – S.Brookhaven 115kV | W.Brookhaven – California 115kV | -152 |
| Brookhaven-Wesson 115kV | Byram-Elton Road 115kV | -179 |
| S.Brookhaven-Franklin 115kV | California – Vaughn 115kV | -199 |
| S.Brookhaven-Franklin 115kV | W.Brookhaven – California 115kV | -58 |
| James Road – Hazelhurst 115kV | Elton road – SW Jackson 115kV | -97 |
| Byram-Elton Road 115kV | James Road – Hazelhurst 115kV | -149 |
| Baxter Wilson – SE Vicksburg 115kV | Vicksburg – W.Vicksburg 115kV | -139 |
| Monument – Miami Street 115kV | S.Jackson 230/115kV XFR #1 | -36 |

**LAFA**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | -85 |
| Port Hudson – Fancy Point 230kV #2 | Port Hudson – Fancy Point 230kV #1 | -17 |

**LAGN**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| NONE | NONE | 15 |

**LEPA**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | --58 |
| Port Hudson – Fancy Point 230kV #2 | Port Hudson – Fancy Point 230kV #1 | -11 |

**OKGE**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| International Paper - Mansfield 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -834 |
| International Paper - Wallake 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -957 |
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | -85 |
| Port Hudson – Fancy Point 230kV #2 | Port Hudson – Fancy Point 230kV #1 | -17 |

**SMEPA**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Florence - South Jackson 115kV - Supplemental Upgrade | Bogalusa - Adams Creek 500/230kV transformer | -209 |
| Florence - South Jackson 115kV - Supplemental Upgrade | Bogalusa - Franklin 500kV | -209 |
| Florence – South Jackson 115kV – Supplemental Upgrade | Choctaw-WestPoint 500kV | -251 |
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | -78 |
| Port Hudson – Fancy Point 230kV #2 | Port Hudson – Fancy Point 230kV #1 | -15 |
| Monument-Miami Street 115kV | S.Jackson 230/115kV XFR #1 | -26 |

**SOCO**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | -83 |
| Port Hudson – Fancy Point 230kV #2 | Port Hudson – Fancy Point 230kV #1 | -16 |

**SPA**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | -84 |
| Port Hudson – Fancy Point 230kV #2 | Port Hudson – Fancy Point 230kV #1 | -16 |

**TVA**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | -84 |
| Port Hudson – Fancy Point 230kV #2 | Port Hudson – Fancy Point 230kV #1 | -16 |

# APPENDIX F: DETAILS OF SCENARIO 3 – 2015

**AECI**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| International Paper - Mansfield 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -1235 |
| International Paper - Wallake 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -1406 |

**AEPW**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| International Paper - Mansfield 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -641 |
| International Paper - Wallake 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -730 |

**AMRN**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| NONE | NONE | 15 |

**CLECO**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| NONE | NONE | 15 |

**EAI**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Hot Springs 500/115kV XFR West | Hot Springs 500/115kV XFR East | -34 |
| Hot Springs 500/115kV XFR East | Hot Springs 500/115kV XFR West | -44 |

**EES**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| NONE | NONE | 15 |

**EESSLoad**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| NONE | NONE | 15 |

**EMDE**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| International Paper - Mansfield 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -1045 |
| International Paper - Wallake 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -1190 |

**EMI**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Baxter Wilson 115kV – Southeast Vicksburg 115kV | Vicksburg – West Vicksburg 115kV | -8 |
| Brookhaven – South Brookhaven 115kV line | Vaughn – Franklin 115kV line | -178 |
| Brookhaven – South Brookhaven 115kV line | California – Vaughn 115kV line | -33 |
| S. Brookhaven – Franklin 115kV line | Vaughn – Franklin 115kV line | -78 |
| Miami Street – Rex Brown West 115kV line | S. Jackson 230/115kV XFR #1 | -193 |

**LAFA**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| NONE | NONE | 15 |

**LAGN**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| NONE | NONE | 15 |

**LEPA**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| NONE | NONE | 15 |

**OKGE**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| International Paper - Mansfield 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -890 |
| International Paper - Wallake 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -1014 |

**SMEPA**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Florence - South Jackson 115kV - Supplemental Upgrade | Bogalusa - Adams Creek 500/230kV transformer | -212 |
| Florence - South Jackson 115kV - Supplemental Upgrade | Bogalusa - Franklin 500kV | -212 |

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Florence – South Jackson 115kV – Supplemental Upgrade | Choctaw-WestPoint 500kV | -213 |
| Miami Street – Rex Brown 115kV line | S.Jackson 230/115kV XFR #1 | -151 |

**SOCO**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| NONE | NONE | 15 |

**SPA**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| NONE | NONE | 15 |

**TVA**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| NONE | NONE | 15 |

# APPENDIX G: DETAILS OF SCENARIO 4 – 2015

**AECI**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| International Paper - Mansfield 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -1527 |
| International Paper - Wallake 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -1698 |
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | -7 |
| Michoud-Front Street 230kV | Bogalusa-Adams Creek 230kV | -262 |
| Michoud-Front Street 230kV | Bogalusa-Franklin 500kV | -262 |

**AEPW**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| International Paper - Mansfield 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -792 |
| International Paper - Wallake 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -881 |
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | -7 |
| Michoud-Front Street 230kV | Bogalusa-Adams Creek 230kV | -322 |
| Michoud-Front Street 230kV | Bogalusa-Franklin 500kV | -322 |

**AMRN**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | -7 |
| Michoud-Front Street 230kV | Bogalusa-Adams Creek 230kV | -246 |
| Michoud-Front Street 230kV | Bogalusa-Franklin 500kV | -246 |

**CLECO**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | -7 |

**EAI**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | -7 |
| Michoud-Front Street 230kV | Bogalusa-Adams Creek 230kV | -295 |
| Michoud-Front Street 230kV | Bogalusa-Franklin 500kV | -295 |
| Hot Springs 500/115 XFR West | Hot Springs 500/115 XFR East | -114 |
| Hot Springs 500/115 XFR East | Hot Springs 500/115 XFR West | -124 |

**EES**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Port Hudson-Fancy Point 230kV #1 | Port Hudson-Fancy Point 230kV #2 | -5 |

**EESSLoad**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Port Hudson-Fancy Point 230kV #1 | Port Hudson-Fancy Point 230kV #2 | -5 |

**EMDE**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| International Paper - Mansfield 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -1293 |
| International Paper - Wallake 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -1437 |
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | -7 |
| Michoud-Front Street 230kV | Bogalusa-Adams Creek 230kV | -276 |
| Michoud-Front Street 230kV | Bogalusa-Franklin 500kV | -276 |

**EMI**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Baxter Wilson – Southeast Vicksburg 115kV line | Vicksburg – West Vicksburg 115kV | -332 |
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | -7 |
| Michoud-Front Street 230kV | Bogalusa-Adams Creek 230kV | -269 |
| Michoud-Front Street 230kV | Bogalusa-Franklin 500kV | -269 |
| Brookhaven – South Brookhaven 115kV line | Vaughn – Franklin 115kV line | -266 |
| Brookhaven – South Brookhaven 115kV line | California – Vaughn 115kV line | -123 |
| South Brookhaven – Franklin 115kV line | Vaughn – Franklin 115kV line | -160 |
| Baxter Wilson – Southeast Vicksburg 115kV line | Vicksburg – West Vicksburg 115kV line | -332 |
| Baxter Wilson – Southeast Vicksburg 115kV line | Haining Road – West Vicksburg 115kV line | -55 |
| Miami Street – Rex Brown W 115kV line | S. Jackson 230/115 XFR #1 | -238 |
| Gerald Andrus 230/115kV XFR #1 | Gerald Andrus – Indianola 230kV line | -36 |

**LAFA**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | -7 |

**LAGN**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| None | None | 15 |

**LEPA**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | -5 |
| Vacherie – Waterford 230kV line | Raceland – Waterford 230kV line | 5 |

**OKGE**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| International Paper - Mansfield 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -1100 |
| International Paper - Wallake 138kV (CLECO) | Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO) | -1224 |
| Port Hudson – Fancy Point 230kV #1 | Port Hudson – Fancy Point 230kV #2 | -7 |
| Michoud – Front Street 230kV line | Bogalusa – Franklin 500kV line | -292 |
| Michoud – Front Street 230kV line | Bogalusa – Adams Creek 230kV line | -292 |

**SMEPA**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Florence - South Jackson 115kV - Supplemental Upgrade | Bogalusa - Adams Creek 500/230kV transformer | -257 |
| Florence - South Jackson 115kV - Supplemental Upgrade | Bogalusa - Franklin 500kV | -257 |
| Florence – South Jackson 115kV – Supplemental Upgrade | Choctaw-WestPoint 500kV | -399 |
| Port Hudson – Fancy Point 230kV line #1 | Port Hudson – Fancy Point 230kV line #2 | -7 |
| Michoud – Front Street 230kV line | Bogalusa – Franklin 500kV line | -106 |
| Michoud – Front Street 230kV line | Bogalusa – Adams Creek 230kV line | -106 |
| Miami Street – Rex Brown 115kV line | S.Jackson 230/115 kV XFR #1 | -186 |

**SOCO**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Port Hudson – Fancy Point 230kV line #1 | Port Hudson – Fancy Point 230kV line #2 | -7 |
| Michoud – Front Street 230kV line | Bogalusa – Franklin 500kV line | -179 |
| Michoud – Front Street 230kV line | Bogalusa – Adams Creek 230kV line | -179 |

**SPA**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Port Hudson – Fancy Point 230kV line #1 | Port Hudson – Fancy Point 230kV line #2 | -7 |
| Michoud – Front Street 230kV line | Bogalusa – Franklin 500kV line | -260 |
| Michoud – Front Street 230kV line | Bogalusa – Adams Creek 230kV line | -260 |

**TVA**

| Limiting Element | Contingency Element | ATC |
|---|---|---|
| Port Hudson – Fancy Point 230kV line #1 | Port Hudson – Fancy Point 230kV line #2 | -7 |
| Michoud – Front Street 230kV line | Bogalusa – Franklin 500kV line | -227 |
| Michoud – Front Street 230kV line | Bogalusa – Adams Creek 230kV line | -227 |