Draft System Impact Study
PID 289
425 MW Plant

Prepared by:

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Rev	Issue Date	Description of Revision	Revised By	Project Manager
0	10/15/2012	Post Draft System Impact Study	EC	BR

Contents

Executive Summary

This System Impact Study is the second step of the interconnection process and is based on the PID 289 request for interconnection on Entergy's transmission system located at the Jacinto 230kV substation. PID 289 will be a new facility and will consist of the addition of one (1) 230kV transmission line from the customer's facility to the Jacinto 230kV substation. The study evaluates connection of 425MW to the Entergy Transmission System.

Requestor for PID 289 requested NRIS and ERIS. Under ERIS, a load flow analysis was performed. The load flow study was performed on the latest available 2017 Summer Peak Case, using PSS/E and MUST software by Siemens Power Technologies International (Siemens-PTI). The short circuit study was performed on the Entergy system short circuit model using ASPEN software. Under NRIS, the analysis was performed on the 2017-2021 summer and winter models. These models included Entergy's latest Construction Plan upgrades. The proposed in-service date is January 1, 2017.

This report is organized in two sections, namely, Energy Resource Interconnection Service (ERIS) and Network Resource Interconnection Service (NRIS).

Results of the System Impact Study indicated that under ERIS the additional generation due to PID 289 generator **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 PID 289 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. Detailed cost estimates, accelerated costs and solutions for the limiting elements will be provided in the facilities study.

Estimated NRIS Project Planning Upgrades

Results of the System Impact Study indicated that under NRIS the upgrades listed below would be required for interconnection on Entergy's transmission system at the proposed POI.

Limiting Element	Planning Estimate for Upgrade*
Apollo – Porter 138kV	20,415,000
Apollo - Splendora 138kV	Included in 2012 ICT BP
Caney Creek - Lewis Creek SES 138kV	1,200,000
Champagne - Plaisance (CLECO) 138kV	Included in 2012 ICT BP
Cleveland - Jacinto 138kV	Included in 2012 ICT BP
Cleveland - Tarkington 138kV	11,500,000
Colonial Academy - Richard 138kV	13,000,000
Jacinto - Splendora 138kV	Included in 2012 ICT BP
Lacon - Lewis Creek SES 138kV	61,000

*The costs of the upgrades are planning estimates only. Detailed cost estimates, accelerated costs and solutions for the limiting elements will be provided in the facilities study.

Energy Resource Interconnection Service

1. Introduction

This Energy Resource Interconnection Service (ERIS) is based on a request for 425MW interconnection on Entergy's transmission system at the Jacinto 230kV 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. A short circuit analysis is performed to determine if the generation would cause the available fault current to surpass the fault duty of existing equipment within the Entergy transmission system.

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

2.1 Model Information

The short circuit analysis was performed on the Entergy system short circuit model using ASPEN software. This model includes all generators interconnected to the Entergy system or interconnected to an adjacent system and having an impact on this interconnection request, IPP's with signed IOAs, and approved future transmission projects on the Entergy transmission system.

2.2 Short Circuit Analysis

The method used to determine if any short circuit problems would be caused by the addition of the PID 289 generation is as follows:

Three-phase and single-phase to ground faults were simulated on the Entergy base case short circuit model and the worst case short circuit level was determined at each station. The PID 289 generator was then modeled in the base case to generate a revised short circuit model. The base case short circuit results were then compared with the results from the revised model to identify any breakers that were under-rated as a result of additional short circuit contribution from PID 289 generation. Any breakers identified to be upgraded through this comparison are mandatory upgrades.

2.3 Analysis Results

The results of the short circuit analysis indicated that the additional generation due to PID 289 generation caused no increase in short circuit current such that they exceeded the fault interrupting capability of the high voltage circuit breakers within the vicinity of the PID 289 plant **with and without priors**. Priors included are: 247 and 287.

2.4 Problem Resolution

As a result of the short circuit analysis findings, no resolution was required.

3. Load Flow Analysis

3.1 Model Information

The load flow analysis was performed based on the projected 2017 summer peak load flow model. Approved future transmission projects in the 2012 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 2017 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 PID 289 generation interconnection point was modeled at the Jacinto 230kV 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.

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 PID-289 – 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	-107	-134	-110	-152
AEP-W	American Electric Power - West	2017	-547	-465	-543	-466
AMRN	Ameren Transmission	2017	-108	-139	-111	-158
CLEC	CLECO	2017	-118	396	-121	421
EAI	Entergy Arkansas	2017	-109	-115	-113	-131
EES	Entergy	2017	-116	396	425	425
EES SYS LOAD	Entergy System Load	2017	-97	411	-100	425
EMDE	Empire District Electric Co	2017	-962	379	-955	-820
EMI	Entergy Mississippi	2017	-114	-819	-117	408
LAFA	Lafayette Utilities System	2017	-860	-950	-792	-922
LAGN	Louisiana Generating, LLC	2017	-128	394	-132	425
LEPA	Louisiana Energy & Power Authority	2017	-1614	-1984	-890	-1079
OKGE	Oklahoma Gas & Electric Company	2017	-809	-688	-802	-689
SMEPA	South Mississippi Electric Power Assoc.	2017	-748	-759	-119	209
SOCO	Southern Company	2017	-112	415	-115	402

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
SPA	Southwest Power Administration	2017	-1038	-884	-1030	-885
TVA	Tennessee Valley Authority	2017	-110	-151	-113	-172

Network Resource Interconnection Service

4. Introduction

A Network Resource Interconnection Services (NRIS) study was requested to serve 425MW of Entergy network load. The expected in service date for this NRIS generator is January 1, 2017. The tests were performed with only confirmed transmission reservations and existing network generators and with transmission service requests in study mode.

Two tests were performed; a deliverability to generation test and a deliverability to load test. The deliverability to generation (DFAX) test ensures that the addition of this generator will not impair the deliverability of existing network resources and units already designated as NRIS while serving network load. The deliverability to load test determines if the tested generator will reduce the import capability level to certain load pockets (Amite South, WOTAB and Western Region) on the Entergy system. A more detailed description for these two tests is described in Appendix H.

It is understood that the NRIS status provides the Interconnection Customer with the capability to deliver the output of the Generating Facility into the Transmission System. NRIS in and of itself does not convey any right to deliver electricity to any specific customer or Point of Delivery

5. Analysis

5.1 Models

The models used for this analysis are the 2017-2021 summer and winter peak cases developed in 2012.

The following modifications were made to the base cases to reflect the latest information available:

- Non-Firm IPPs within the local region of the study generator were turned off and other non-firm IPPs outside the local area were increased to make up the difference.
- Confirmed firm transmission reservations were modeled for the year 2017.
- Approved transmission reliability upgrades for 2012 - 2016 were included in the base case. These upgrades can be found at Entergy's OASIS web page http://www.oatioasis.com/EES/EESDocs/Disclaimer.html under approved future projects.
- Added one (1) 230kV transmission lines, rated at 212MVA, from the customer's desired interconnection point to Jacinto 230kV substation.

5.2 Contingencies and Monitored Elements

Single contingency analyses on Entergy's transmission facilities (including tie lines) 69kV and above were considered. All transmission facilities on Entergy transmission system above 100kV were monitored.

Power Factor Consideration / Criteria

Entergy, consistent with the FERC Large Generator Interconnection Procedures (LGIP) requires the customer to be capable of supplying at least 0.33 MVAR (*i.e.*, 0.95 lagging power factor) and absorbing at least 0.33 MVAR (*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.

The customer meets the criteria as stated above.

5.3 Generation used for the transfer

The Customer's generators were used as the source for the deliverability to generation test.

5.4 Results

5.4.1 Deliverability to Generation (DFAX) Test

The deliverability to generation (DFAX) test ensures that the addition of this generator will not impair the deliverability of existing network resources and units already designated as NRIS while serving network load. A more detailed description for these two tests is described in Appendix H.

5.4.2 Constraints

Study Case	Study Case with Priors
Acadia GSU - Colonial Academy 138kV	Acadia GSU - Colonial Academy 138kV
Apollo - Splendora 138kV	Addis - Big Cajun 1 230kV
Big Cajun 2 - Fancy Point 500kV	Big Cajun 2 - Fancy Point 500kV
Caney Creek - Lewis Creek SES 138kV	Caney Creek - Lewis Creek SES 138kV
Champagne - Plaisance (CLECO) 138kV	Champagne - Plaisance (CLECO) 138kV
Cleveland - Jacinto 138kV	Colonial Academy - Richard 138kV
Coley Creek - Pelican Road 138kV	Goree - Lewis Creek SES 138kV
Colonial Academy - Richard 138kV	Jacinto - Splendora 138kV
Goree - Lewis Creek SES 138kV	Lacon - Lewis Creek SES 138kV
Jacinto - Splendora 138kV	Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade
Lacon - Lewis Creek SES 138kV	
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	
Shepherd - Coley Creek 138kV	

5.4.3 DFAX Study Case Results

Limiting Element	Contingency Element	ATC
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	-1151
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-575
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-575
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-525
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-523
Apollo - Splendora 138kV	China - China/Porter 230kV Series Compensation	63

Limiting Element	Contingency Element	ATC
Apollo - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	63
Apollo - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	114
Apollo - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	117
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	135
Cleveland - Jacinto 138kV	China - China/Porter 230kV Series Compensation	145
Cleveland - Jacinto 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	145
Cleveland - Jacinto 138kV	Porter - China/Porter 230kV Series Compensation	156
Cleveland - Jacinto 138kV	Porter 230/138/13.8kV 3 Winding Transformer	156
Coley Creek - Pelican Road 138kV	Cypress - Honey 138kV	161
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	164
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	164
Champagne - Plaisance (CLECO) 138kV	Webre - Wells 500kV	190
Shepherd - Coley Creek 138kV	Cypress - Honey 138kV	246
Cleveland - Jacinto 138kV	Cheek - South Beaumont 138kV	265
Cleveland - Jacinto 138kV	Dayton Bulk - Cheek 138kV	314
Cleveland - Jacinto 138kV	China 230/138kV transformer 1	343
Coley Creek - Pelican Road 138kV	Bragg - Honey 138kV	354
Coley Creek - Pelican Road 138kV	Bragg - Menard 138kV	399

5.4.4 DFAX Study Case with Priors Results

Limiting Element	Contingency Element	ATC
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	-1802
Champagne - Plaisance (CLECO) 138kV	Webre - Wells 500kV	-326
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-43
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-43
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-8
Caney Creek - Lewis Creek SES 138kV	Alden - Lewis Creek SES 138kV	37
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	62
Colonial Academy - Richard 138kV	Richard - Wells 500kV	81
Big Cajun 2 - Fancy Point 500kV	Webre - Bayou Laboutte 500kV ckt1	177

Limiting Element	Contingency Element	ATC
Lacon - Lewis Creek SES 138kV	Coley Creek - Pelican Road 138kV	196
Lacon - Lewis Creek SES 138kV	Shepherd - Coley Creek 138kV	221
Addis - Big Cajun 1 230kV	Webre - Bayou Laboutte 500kV ckt1	259
Goree - Lewis Creek SES 138kV	Lacon - Lewis Creek SES 138kV	340
Acadia GSU - Colonial Academy 138kV	Richard - Wells 500kV	416

5.4.5 Deliverability to Load Test

The deliverability to load test determines if the tested generator will reduce the import capability level to certain load pockets (Amite South, WOTAB and Western Region) on the Entergy system. A more detailed description for these two tests is described in Appendix E.

A. Amite South: Passed

B. WOTAB: Passed

C. Western Region: Passed

6. Required Upgrades for NRIS

6.1 Preliminary Estimates of Direct Assignment of Facilities and Network Upgrades

Limiting Element	Planning Estimate for Upgrade*
Apollo – Porter 138kV	20,415,000
Apollo - Splendora 138kV	Included in 2012 ICT BP
Caney Creek - Lewis Creek SES 138kV	1,200,000
Champagne - Plaisance (CLECO) 138kV	Included in 2012 ICT BP
Cleveland - Jacinto 138kV	Included in 2012 ICT BP
Cleveland – Tarkington 138kV	11,500,000
Colonial Academy - Richard 138kV	13,000,000
Jacinto - Splendora 138kV	Included in 2012 ICT BP
Lacon - Lewis Creek SES 138kV	61,000

*The costs of the upgrades are planning estimates only. Detailed cost estimates, accelerated costs and solutions for the limiting elements will be provided in the facilities study.

7. Interconnection Facilities

The Interconnection Customer's designated Point of Interconnection (POI) is the Jacinto 230 kV substation. The estimated cost of interconnection facilities is $9.0 Million. This cost is based on parametric estimating techniques for a "typical" site. Cost may significantly change based on specific project parameters that are not known at this time. Costs specific to this interconnection will be developed during the Facilities Study. The interconnection customer is responsible for constructing all facilities needed to deliver generation to the POI.

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):
   X A proposed new Large Generating Facility.
   _____ An increase in the generating capacity or a Material Modification of an existing Generating Facility.

3. The type of interconnection service requested (check one):
   _____ Energy Resource Interconnection Service
   X Network Resource Interconnection Service

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

5. 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; Connecting to Jacinto 230 kV

   b. Maximum summer at 36 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; 400 MW summer/425 MW Winter

   c. General description of the equipment configuration; 1x1 combined cycle

   d. Commercial Operation Date: 1 / 1 / 2017 (Day, Month, and Year);

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

   f. Approximate location of the proposed Point of Interconnection (optional); and
   Connecting to Jacinto 230 kV substation

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

6. Applicable deposit amount as specified in the LGIP.

$10,000

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:

Antione Lucas

9. Representative of Interconnection Customer to contact:

10. This Interconnection Request is submitted by:

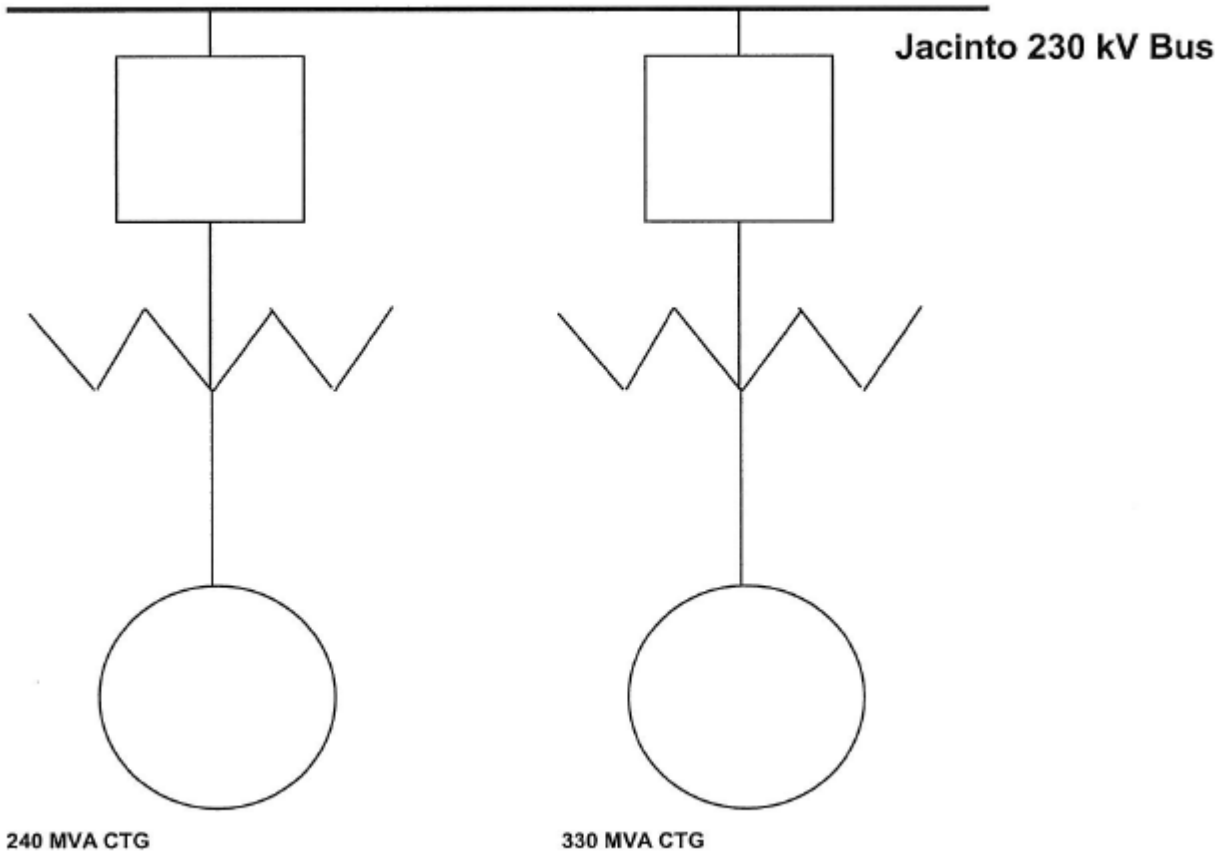
Name of Interconnection Customer: _____

By (Signature) _____

Name (type or print): _____

Title: _____

Date: 2/2/2012


Jacinto 230 kV Bus
240 MVA CTG
330 MVA CTG

Attachment A to Appendix 1
Interconnection Request

LARGE GENERATING FACILITY DATA

UNIT RATINGS

kVA 330000 °F 40°C Voltage 18kV
Power Factor 0.85
Speed (RPM) 3600 Connection (e.g. Wye) wye
Short Circuit Ratio 0.53 Frequency, Hertz 60
Stator Amperes at Rated kVA 10,586 Field Volts 575
Max Turbine MW _____ °F _____

COMBINED TURBINE-GENERATOR-EXCITER INERTIA DATA

Inertia Constant, H = 3.41 kW sec/kVA
Moment-of-Inertia, WR^2 = _____ lb. $ft.^2$

REACTANCE DATA (PER UNIT-RATED KVA)

	DIRECT AXIS		QUADRATURE AXIS	
Synchronous – saturated	X_{dv}	2.014	X_{qv}	1.946
Synchronous – unsaturated	X_{di}	2.014	X_{qi}	1.946
Transient – saturated	X'_{dv}	0.26	X'_{qv}	
Transient – unsaturated	X'_{di}	0.346	X'_{qi}	0.552
Subtransient – saturated	X''_{dv}	0.189	X''_{qv}	0.185
Subtransient – unsaturated	X''_{di}	0.249	X''_{qi}	0.245
Negative Sequence – saturated	$X2_v$	0.181		
Negative Sequence – unsaturated	$X2_i$	0.238		
Zero Sequence – saturated	$X0_v$	0.108		
Zero Sequence – unsaturated	$X0_i$	0.14		
Leakage Reactance	Xl_m	0.204		

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Vice President, Transmission

Effective: July 13, 2007

Issued on: July 13, 2007

FIELD TIME CONSTANT DATA (SEC)

Open Circuit	T'_{do}	4.251	T'_{qo}	0.364
Three-Phase Short Circuit Transient	T'_{d3}	0.549	T'_{q}	0.364
Line to Line Short Circuit Transient	T'_{d2}	0.854		
Line to Neutral Short Circuit Transient	T'_{d1}	1.093		
Short Circuit Subtransient	T''_{d}	0.023	T''_{q}	0.023
Open Circuit Subtransient	T''_{do}	0.032	T''_{qo}	0.069

ARMATURE TIME CONSTANT DATA (SEC)

Three Phase Short Circuit	T_{a3}	0.405
Line to Line Short Circuit	T_{a2}	0.405
Line to Neutral Short Circuit	T_{a1}	0.35

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	0.003
Negative	R_2	0.015
Zero	R_0	0.007

Rotor Short Time Thermal Capacity I_2^2t = 10
Field Current at Rated kVA, Armature Voltage and PF = 1,597.7 amps
Field Current at Rated kVA and Armature Voltage, 0 PF = 1949.9 amps
Three Phase Armature Winding Capacitance = 1.917 microfarad
Field Winding Resistance = 0.361 ohms 125 °C
Armature Winding Resistance (Per Phase) = 0.00116 ohms 100 °C

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Vice President, Transmission

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Attachment A to Appendix 1
Interconnection Request

LARGE GENERATING FACILITY DATA

UNIT RATINGS

kVA 248,000 °F _____ Voltage 16.5 kV
Power Factor 0.85
Speed (RPM) 3600 Connection (e.g. Wye) _____
Short Circuit Ratio 0.52 Frequency, Hertz _____
Stator Amperes at Rated kVA _____ Field Volts _____
Max Turbine MW _____ °F _____

COMBINED TURBINE-GENERATOR-EXCITER INERTIA DATA

Inertia Constant, H = 7.22 kW sec/kVA
Moment-of-Inertia, WR^2 = _____ lb. ft.^{2}

REACTANCE DATA (PER UNIT-RATED KVA)

		DIRECT AXIS		QUADRATURE AXIS
Synchronous – saturated	X_{dv}	1.8425	X_{qv}	1.7908
Synchronous – unsaturated	X_{di}	1.9611	X_{qi}	1.9061
Transient – saturated	X'_{dv}	0.2224	X'_{qv}	0.3921
Transient – unsaturated	X'_{di}	0.2527	X'_{qi}	0.4456
Subtransient – saturated	X''_{dv}	0.1694	X''_{qv}	0.167
Subtransient – unsaturated	X''_{di}	0.1965	X''_{qi}	0.1937
Negative Sequence – saturated	$X2_v$	0.1682		
Negative Sequence – unsaturated	$X2_i$	0.1951		
Zero Sequence – saturated	$X0_v$	0.1013		
Zero Sequence – unsaturated	$X0_i$	0.1066		
Leakage Reactance	Xl_m	0.1585		

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FIELD TIME CONSTANT DATA (SEC)

Open Circuit	T'_{do}	9.867	T'_{qo}	1.096
Three-Phase Short Circuit Transient	T'_{d3}	1.119	T'_{q}	0.226
Line to Line Short Circuit Transient	T'_{d2}	1.81		
Line to Neutral Short Circuit Transient	T'_{d1}	2.176		
Short Circuit Subtransient	T''_{d}	0.035	T''_{q}	0.054
Open Circuit Subtransient	T''_{do}	0.046	T''_{qo}	0.082

ARMATURE TIME CONSTANT DATA (SEC)

Three Phase Short Circuit	T_{a3}	0.685
Line to Line Short Circuit	T_{a2}	0.685
Line to Neutral Short Circuit	T_{a1}	0.594

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	0.00218
Negative	R_2	0.01805
Zero	R_0	0.00142

Rotor Short Time Thermal Capacity I_2^2t = _____
Field Current at Rated kVA, Armature Voltage and PF = 1641 amps
Field Current at Rated kVA and Armature Voltage, 0 PF = _____ amps
Three Phase Armature Winding Capacitance = _____ microfarad
Field Winding Resistance = 0.141 ohms 75 °C
Armature Winding Resistance (Per Phase) = _____ ohms _____ °C

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)
150 / 250 kVA

Voltage Ratio(Generator Side/System side/Tertiary)
16.5 / 230 / _____ kV

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

Fixed Taps Available 2x +/- 2.5%.

Present Tap Setting N/A

IMPEDANCE

Positive Z_1 (on self-cooled kVA rating) 10% on 150 MVA Base % _____ X/R

Zero Z_0 (on self-cooled kVA rating) _____ % _____ X/R

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
PID 247	Stowell 138kV	149	6/1/2011
PID 287	Lewis Creek 138kV	340	5/1/2017

Prior transmission service requests that were included in this study:

OASIS #	PSE	MW	Begin	End
74846159	AEPM	600	1/1/2015	1/1/2020
76523750	SRMPA	180	6/1/2012	6/1/2018
76523753	SRMPA	30	6/1/2012	6/1/2016
76523754	EWOM	45	6/1/2012	6/1/2016
76600643	Horizon Wind	100	3/1/2014	3/1/2019

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	EES SYS LOAD	EMDE	EMI	LAFA	LAGN	LEPA	OKGE	SMEPA	SOCO	SPA	TVA
Champagne - Plaisance (CLECO) 138kV	Included in 2012 ICT BP										X		X					
Cleveland - Jacinto 138kV	Included in 2012 ICT BP	X	X	X	X	X	X	X		X		X		X	X	X	X	X
Conroe Bulk2 - Plantation 138kV	Included in 2012 ICT BP		X	X										X				
Coughlin (CLECO) - Plaisance 138kV (CLECO)	Other Ownership										X		X					
Fancy Point - Port Hudson 230kV ckt 1													X					
Fancy Point - Port Hudson 230kV ckt 2	210,000												X					
Florence - South Jackson 115kV - Supplemental Upgrade	Committed to by Others														X			
Greenwood - Terrebonne 115kV	12,700,000												X					
International Paper - Mansfield 138kV (CLECO)	Other Ownership		X	X					X					X			X	
International Paper - Wallake 138kV (CLECO)	Other Ownership		X	X					X					X			X	
Jacinto - Splendora 138kV	Included in 2012 ICT BP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Jackson Miami - Rex Brown-W 115kV	2,800,000														X			
Plantation - Cedar Hill 138kV	Included in 2012 ICT BP		X	X										X				
Ray Braswell - West Jackson 115kV	Included in 2012 ICT BP														X			
South Jackson - West Jackson 115kV	6,300,000														X			
Terrebonne - Coteau 115kV	5,000,000												X					
Vatican - Scott1 138kV	Included in 2012 ICT BP												X					
Winnfield - Jeldwen (CLECO) 115kV	6,806,800					X												
Winnfield 230/115kV transformer	6,560,000	X	X	X		X			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	EES SYS LOAD	EMDE	EMI	LAFA	LAGN	LEPA	OKGE	SMEPA	SOCO	SPA	TVA
Caney Creek – Lewis Creek SES 138kV	1,200,000							X										
Champagne - Plaisance (CLECO) 138kV	Included in 2012 ICT BP										X		X					
Cleveland - Tarkington 138kV	11,500,000			X	X	X	X	X		X		X			X	X		X
Coughlin (CLECO) - Plaisance 138kV (CLECO)	Other Ownership										X		X					
Dodson – Jeld Wen (CLECO) 115kV	2,432,400					X												
Florence - South Jackson 115kV - Supplemental Upgrade	Committed to by Others														X			
Greenwood - Terrebonne 115kV	12,700,000												X					
International Paper - Mansfield 138kV (CLECO)	Other Ownership		X						X					X			X	
International Paper - Wallake 138kV (CLECO)	Other Ownership		X						X					X			X	
Jacinto - Splendora 138kV	Included in 2012 ICT BP		X					X						X				
Jackson Miami - Rex Brown-W 115kV	2,800,000														X			
Lacon - Lewis Creek SES 138kV	60,000		X															
Montgomery - Winnfield 230kV	32,848,200	X	X	X		X								X			X	X

Limiting Elements	Est. Cost	AECI	AEPW	AMRN	CLECO	EAI	EES	EES SYS LOAD	EMDE	EMI	LAFA	LAGN	LEPA	OKGE	SMEPA	SOCO	SPA	TVA
Ray Braswell - West Jackson 115kV	Included in 2012 ICT BP														X			
South Jackson - West Jackson 115kV	6,3 00,000														X			
Terrebonne - Coteau 115kV	5,000,000												X					
Vatican - Scott1 138kV	Included in 2012 ICT BP												X					
Winnfield - Jeldwen (CLECO) 115kV	6,806,800					X												
Winnfield 230/115kV transformer	6,560,000	X	X	X		X			X					X			X	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 SYS LOAD	EMDE	EMI	LAFA	LAGN	LEPA	OKGE	SMEPA	SOCO	SPA	TVA
Champagne - Plaisance (CLECO) 138kV	Included in 2012 ICT BP									X		X					
Cleveland - Jacinto 138kV	Included in 2012 ICT BP	X	X	X	X	X	X		X		X		X	X	X	X	X
Coughlin (CLECO) - Plaisance 138kV (CLECO)	Other Ownership									X		X					
Fancy Point - Port Hudson 230kV ckt 1												X					
Fancy Point - Port Hudson 230kV ckt 2	210,000											X					
Florence - South Jackson 115kV - Supplemental Upgrade	Committed to by Others													X			
Greenwood - Terrebonne 115kV	12,700,000											X					
International Paper - Mansfield 138kV (CLECO)	Other Ownership		X					X					X			X	
International Paper - Wallake 138kV (CLECO)	Other Ownership		X					X					X			X	
Jacinto - Splendora 138kV	Included in 2012 ICT BP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Jackson Miami - Rex Brown-W 115kV	2,800,000													X			
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Committed to by Others													X			
Terrebonne - Coteau 115kV	5,000,000											X					
Winnfield - Jeldwen (CLECO) 115kV	6,806,800					X											
Winnfield 230/115kV transformer	6,560,000	X	X	X		X		X					X			X	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	EES SYS LOAD	EMDE	EMI	LAFA	LAGN	LEPA	OKGE	SMEPA	SOCO	SPA	TVA
Champagne - Plaisance (CLECO) 138kV	Included in 2012 ICT BP										X		X					
Coughlin (CLECO) - Plaisance 138kV (CLECO)	Other Ownership										X		X					
Dodson – Jeld Wen (CLECO) 115kV	2,432,400					X												
Florence - South Jackson 115kV - Supplemental Upgrade	Committed to by Others														X			
Goree - Lewis Creek SES 138kV	27,240,000		X															
Greenwood - Terrebonne 115kV	12,700,000												X					
International Paper - Mansfield 138kV (CLECO)	Other Ownership		X						X					X			X	
International Paper - Wallake 138kV (CLECO)	Other Ownership		X						X					X			X	
Jacinto - Splendora 138kV	Included in 2012 ICT BP		X															
Jackson Miami - Rex Brown-W 115kV	2,800,000														X			
Lacon - Lewis Creek SES 138kV	61,000	X	X	X	X	X		X		X				X	X	X	X	X
Montgomery - Winnfield 230kV	32,848,200	X	X	X		X								X			X	X
Scott1 - Bonin (LAFA) 138kV	6,250,000										X							
Terrebonne - Coteau 115kV	5,000,000												X					
Winnfield - Jeldwen (CLECO) 115kV	6,806,800					X												
Winnfield 230/115kV transformer	6,560,000	X	X	X		X			X					X			X	X

APPENDIX D: DETAILS OF SCENARIO 1 - 2017

AECI

Limiting Element	Contingency Element	ATC
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-107
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-107
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-62
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-60
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	-3
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	368
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	397
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	397

AEP-W

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-547
International Paper - Wallake 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-312
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	-138
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-94
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-94
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-55
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-53
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	-3
Conroe Bulk2 - Plantation 138kV	Oak Ridge - Porter 138kV	166
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	349
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	376
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	377

AMRN

Limiting Element	Contingency Element	ATC
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-108
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-108
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-63
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-61
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	-4
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	370
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	398
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	398

CLECO

Limiting Element	Contingency Element	ATC
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-118
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-118
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-69
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-67
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	380
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	410
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	410

EAI

Limiting Element	Contingency Element	ATC
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-109
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-109
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-64
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-62
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	-3
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	372
Winnfield - Jeldwen (CLECO) 115kV	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	397
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	401
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	401

EES

Limiting Element	Contingency Element	ATC
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-116
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-116
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-68
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-66
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	370
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	399
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	399

EMDE

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-962
International Paper - Wallake 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-549
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-104
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-104
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-61
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-59
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	-3

EMI

Limiting Element	Contingency Element	ATC
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-114
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-114
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-67
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-65
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	378
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	407
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	408

EES System Load

Limiting Element	Contingency Element	ATC
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-97
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-97
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-57
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-55
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	348
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	375
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	376

LAFA

Limiting Element	Contingency Element	ATC
Champagne - Plaisance (CLECO) 138kV	Cocodrie (CLECO) - Vil Plat (CLECO) 230kV	-860

Limiting Element	Contingency Element	ATC
Champagne - Plaisance (CLECO) 138kV	Vil Plat (CLECO) - West Fork (CLECO) 230kV	-684
Champagne - Plaisance (CLECO) 138kV	West Fork - Wells 230kV	-595
Coughlin (CLECO) - Plaisance 138kV (CLECO)	Cocodrie (CLECO) - Vil Plat (CLECO) 230kV	-390
Coughlin (CLECO) - Plaisance 138kV (CLECO)	Vil Plat (CLECO) - West Fork (CLECO) 230kV	-215
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-128
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-128
Coughlin (CLECO) - Plaisance 138kV (CLECO)	West Fork - Wells 230kV	-125
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-75
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-72
Champagne - Plaisance (CLECO) 138kV	Colfax (CLECO) - Rodemacher 230kV	69

LAGN

Limiting Element	Contingency Element	ATC
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-128
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-128
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-75
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-72
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	395

LEPA

Limiting Element	Contingency Element	ATC
Vatican - Scott1 138kV	Coughlin (CLECO) - Plaisance 138kV (CLECO)	-1614
Champagne - Plaisance (CLECO) 138kV	Cocodrie (CLECO) - Vil Plat (CLECO) 230kV	-1002
Champagne - Plaisance (CLECO) 138kV	Vil Plat (CLECO) - West Fork (CLECO) 230kV	-798
Champagne - Plaisance (CLECO) 138kV	West Fork - Wells 230kV	-694
Coughlin (CLECO) - Plaisance 138kV (CLECO)	Cocodrie (CLECO) - Vil Plat (CLECO) 230kV	-455
Champagne - Plaisance (CLECO) 138kV	Vatican - Scott1 138kV	-333
Coughlin (CLECO) - Plaisance 138kV (CLECO)	Vil Plat (CLECO) - West Fork (CLECO) 230kV	-250
Coughlin (CLECO) - Plaisance 138kV (CLECO)	West Fork - Wells 230kV	-146

Limiting Element	Contingency Element	ATC
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-123
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-123
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-72
Fancy Point - Port Hudson 230kV ckt 1	Fancy Point - Port Hudson 230kV ckt 2	-70
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-69
Fancy Point - Port Hudson 230kV ckt 2	Fancy Point - Port Hudson 230kV ckt 1	26
Champagne - Plaisance (CLECO) 138kV	Colfax (CLECO) - Rodemacher 230kV	58
Champagne - Plaisance (CLECO) 138kV	Colfax (CLECO) - Montgomery 230kV	141
Terrebonne - Coteau 115kV	Raceland - Coteau 115kV	143
Greenwood - Terrebonne 115kV	Bayou Sales (CLECO) - Teche 138kV (CLECO)	158

OKGE

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-809
International Paper - Wallake 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-462
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	-184
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-102
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-102
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-59
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-58
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	-3
Conroe Bulk2 - Plantation 138kV	Oak Ridge - Porter 138kV	220
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	361
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	389
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	389

SMEPA

Limiting Element	Contingency Element	ATC
Ray Braswell - West Jackson 115kV	South Jackson 230/115kV transformer 1	-748
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-116
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-116
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-68
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-66
Jackson Miami - Rex Brown-W 115kV	South Jackson 230/115kV transformer 1	170

Limiting Element	Contingency Element	ATC
Florence - South Jackson 115kV - Supplemental Upgrade	Bogalusa - Adams Creek 500/230kV transformer	210
Florence - South Jackson 115kV - Supplemental Upgrade	Bogalusa - Franklin 500kV	210
South Jackson - West Jackson 115kV	South Jackson 230/115kV transformer 1	228
Florence - South Jackson 115kV - Supplemental Upgrade	South Jackson - Poplar Spring 115kV	316
Florence - South Jackson 115kV - Supplemental Upgrade	Georgetown - Poplar Spring 115kV	338
Florence - South Jackson 115kV - Supplemental Upgrade	Angie - Adams Creek 230kV	340
Florence - South Jackson 115kV - Supplemental Upgrade	Georgetown - Silver Creek 115kV	344
Florence - South Jackson 115kV - Supplemental Upgrade	CHATOM (PS) - EWAYNE (SMEPA) 230kV	355
Florence - South Jackson 115kV - Supplemental Upgrade	Angie (SOCO) - Hattiesburg SW (SOCO) 230kV	356
Florence - South Jackson 115kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	360
Florence - South Jackson 115kV - Supplemental Upgrade	Ellicott (SOCO) - BarryCC2 (SOCO) 230kV	366
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	380
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	409
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	410

SOCO

Limiting Element	Contingency Element	ATC
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-112
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-112
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-65
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-63
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	375
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	404
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	404

SPA

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-1038
International Paper - Wallake 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-593
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-105
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-105
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series	-62

Limiting Element	Contingency Element	ATC
	Compensation	
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-60
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	-3
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	366
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	395
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	395

TVA

Limiting Element	Contingency Element	ATC
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-110
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-110
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-64
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-62
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	-4
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	373
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	402
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	402

APPENDIX E: DETAILS OF SCENARIO 2 – 2017

AECI

Limiting Element	Contingency Element	ATC
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	-134
Montgomery - Winnfield 230kV	Clarence (CLECO) - Montgomery 230kV	368

AEP-W

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-465
International Paper - Wallake 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-231
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	-120
Montgomery - Winnfield 230kV	Clarence (CLECO) - Montgomery 230kV	330
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	386
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	386
Lacon - Lewis Creek SES 138kV	Coley Creek - Pelican Road 138kV	408
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	413
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	414

AMRN

Limiting Element	Contingency Element	ATC
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	-139
Montgomery - Winnfield 230kV	Clarence (CLECO) - Montgomery 230kV	383
Cleveland - Tarking 138kV	Porter - New Caney 138kV	423

CLECO

Limiting Element	Contingency Element	ATC
Cleveland - Tarking 138kV	Porter - New Caney 138kV	396

EAI

Limiting Element	Contingency Element	ATC
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	-115
Winnfield - Jeldwen (CLECO) 115kV	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	281
Dodson - Jeldwen (CLECO) 115kV	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	312
Montgomery - Winnfield 230kV	Clarence (CLECO) - Montgomery 230kV	317
Cleveland - Tarking 138kV	Porter - New Caney 138kV	422

EES

Limiting Element	Contingency Element	ATC
Cleveland - Tarking 138kV	Porter - New Caney 138kV	396

EES System Load

Limiting Element	Contingency Element	ATC
Cleveland - Tarking 138kV	Porter - New Caney 138kV	379
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	397
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	397
Caney Creek - Lewis Creek SES 138kV	Alden - Lewis Creek SES 138kV	415

EMDE

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-819
International Paper - Wallake 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-406
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	-129

EMI

Limiting Element	Contingency Element	ATC
Cleveland - Tarking 138kV	Porter - New Caney 138kV	411

LAFA

Limiting Element	Contingency Element	ATC
Champagne - Plaisance (CLECO) 138kV	Cocodrie (CLECO) - Vil Plat (CLECO) 230kV	-950
Champagne - Plaisance (CLECO) 138kV	Vil Plat (CLECO) - West Fork (CLECO) 230kV	-774
Champagne - Plaisance (CLECO) 138kV	West Fork - Wells 230kV	-683
Coughlin (CLECO) - Plaisance 138kV (CLECO)	Cocodrie (CLECO) - Vil Plat (CLECO) 230kV	-486
Coughlin (CLECO) - Plaisance 138kV (CLECO)	Vil Plat (CLECO) - West Fork (CLECO) 230kV	-309
Coughlin (CLECO) - Plaisance 138kV (CLECO)	West Fork - Wells 230kV	-218
Champagne - Plaisance (CLECO) 138kV	Colfax (CLECO) - Rodemacher 230kV	-44
Champagne - Plaisance (CLECO) 138kV	Colfax (CLECO) - Montgomery 230kV	56

LAGN

Limiting Element	Contingency Element	ATC
Cleveland - Tarking 138kV	Porter - New Caney 138kV	394

LEPA

Limiting Element	Contingency Element	ATC
Vatican - Scott1 138kV	Coughlin (CLECO) - Plaisance 138kV (CLECO)	-1984
Champagne - Plaisance (CLECO) 138kV	Cocodrie (CLECO) - Vil Plat (CLECO) 230kV	-1158
Champagne - Plaisance (CLECO) 138kV	Vil Plat (CLECO) - West Fork (CLECO) 230kV	-943
Champagne - Plaisance (CLECO) 138kV	West Fork - Wells 230kV	-832
Coughlin (CLECO) - Plaisance 138kV (CLECO)	Cocodrie (CLECO) - Vil Plat (CLECO) 230kV	-592
Champagne - Plaisance (CLECO) 138kV	Vatican - Scott1 138kV	-480
Coughlin (CLECO) - Plaisance 138kV (CLECO)	Vil Plat (CLECO) - West Fork (CLECO) 230kV	-377
Coughlin (CLECO) - Plaisance 138kV (CLECO)	West Fork - Wells 230kV	-266
Champagne - Plaisance (CLECO) 138kV	Colfax (CLECO) - Rodemacher 230kV	-39
Champagne - Plaisance (CLECO) 138kV	Colfax (CLECO) - Montgomery 230kV	50
Terrebonne - Coteau 115kV	Raceland - Coteau 115kV	140
Coughlin (CLECO) - Plaisance 138kV (CLECO)	Vatican - Scott1 138kV	156
Greenwood - Terrebonne 115kV	Bayou Sales (CLECO) - Teche 138kV (CLECO)	157

OKGE

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-688
International Paper - Wallake 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-341
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	-125
Montgomery - Winnfield 230kV	Clarence (CLECO) - Montgomery 230kV	345
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	416
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	416

SMEPA

Limiting Element	Contingency Element	ATC
Ray Braswell - West Jackson 115kV	South Jackson 230/115kV transformer 1	-759
Jackson Miami - Rex Brown-W 115kV	South Jackson 230/115kV transformer 1	200
Florence - South Jackson 115kV - Supplemental Upgrade	Bogalusa - Franklin 500kV	215
Florence - South Jackson 115kV - Supplemental Upgrade	Bogalusa - Adams Creek 500/230kV transformer	215
South Jackson - West Jackson 115kV	South Jackson 230/115kV transformer 1	217
Florence - South Jackson 115kV - Supplemental Upgrade	South Jackson - Poplar Spring 115kV	321

Limiting Element	Contingency Element	ATC
Florence - South Jackson 115kV - Supplemental Upgrade	Angie - Adams Creek 230kV	343
Florence - South Jackson 115kV - Supplemental Upgrade	Georgetown - Poplar Spring 115kV	344
Florence - South Jackson 115kV - Supplemental Upgrade	Georgetown - Silver Creek 115kV	350
Florence - South Jackson 115kV - Supplemental Upgrade	Angie (SOCO) - Hattiesburg SW (SOCO) 230kV	360
Florence - South Jackson 115kV - Supplemental Upgrade	CHATOM (PS) - EWAYNE (SMEPA) 230kV	360
Florence - South Jackson 115kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	367
Florence - South Jackson 115kV - Supplemental Upgrade	Ellicott (SOCO) - BarryCC2 (SOCO) 230kV	371
Cleveland - Tarking 138kV	Porter - New Caney 138kV	408

SOCO

Limiting Element	Contingency Element	ATC
Cleveland - Tarking 138kV	Porter - New Caney 138kV	415

SPA

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-884
International Paper - Wallake 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-438
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	-128
Montgomery - Winnfield 230kV	Clarence (CLECO) - Montgomery 230kV	353

TVA

Limiting Element	Contingency Element	ATC
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	-151
Montgomery - Winnfield 230kV	Clarence (CLECO) - Montgomery 230kV	416
Cleveland - Tarking 138kV	Porter - New Caney 138kV	418

APPENDIX F: DETAILS OF SCENARIO 3 - 2017

AECI

Limiting Element	Contingency Element	ATC
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-110
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-110
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-65
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-63
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	20
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	371
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	400
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	400

AEP-W

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-543
International Paper - Wallake 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-308
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-97
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-97
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-58
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-56
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	18
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	353
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	380
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	380

AMRN

Limiting Element	Contingency Element	ATC
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-111
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-111
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-66
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-64
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	21

Limiting Element	Contingency Element	ATC
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	373
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	401
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	402

CLECO

Limiting Element	Contingency Element	ATC
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-121
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-121
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-72
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-70
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	384
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	413
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	413

EAI

Limiting Element	Contingency Element	ATC
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-113
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-113
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-67
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-65
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	17
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	376
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	404
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	405
Winnfield - Jeldwen (CLECO) 115kV	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	425

EES System Load

Limiting Element	Contingency Element	ATC
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-100
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-100
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-60
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-58
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	351

Limiting Element	Contingency Element	ATC
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	379
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	379

EES

Limiting Element	Contingency Element	ATC
NONE	NONE	425

EMDE

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-955
International Paper - Wallake 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-542
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-107
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-107
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-64
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-62
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	19

EMI

Limiting Element	Contingency Element	ATC
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-117
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-117
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-70
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-68
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	382
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	411
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	411

LAFA

Limiting Element	Contingency Element	ATC
Champagne - Plaisance (CLECO) 138kV	Cocodrie (CLECO) - Vil Plat (CLECO) 230kV	-792
Champagne - Plaisance (CLECO) 138kV	Vil Plat (CLECO) - West Fork (CLECO) 230kV	-604
Champagne - Plaisance (CLECO) 138kV	West Fork - Wells 230kV	-508
Coughlin (CLECO) - Plaisance 138kV	Cocodrie (CLECO) - Vil Plat (CLECO) 230kV	-282

Limiting Element	Contingency Element	ATC
(CLECO)		
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-131
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-131
Coughlin (CLECO) - Plaisance 138kV (CLECO)	Vil Plat (CLECO) - West Fork (CLECO) 230kV	-93
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-78
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-76
Coughlin (CLECO) - Plaisance 138kV (CLECO)	West Fork - Wells 230kV	3

LAGN

Limiting Element	Contingency Element	ATC
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-132
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-132
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-78
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-76
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	399

LEPA

Limiting Element	Contingency Element	ATC
Champagne - Plaisance (CLECO) 138kV	Cocodrie (CLECO) - Vil Plat (CLECO) 230kV	-890
Champagne - Plaisance (CLECO) 138kV	Vil Plat (CLECO) - West Fork (CLECO) 230kV	-678
Champagne - Plaisance (CLECO) 138kV	West Fork - Wells 230kV	-570
Coughlin (CLECO) - Plaisance 138kV (CLECO)	Cocodrie (CLECO) - Vil Plat (CLECO) 230kV	-316
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-126
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-126
Coughlin (CLECO) - Plaisance 138kV (CLECO)	Vil Plat (CLECO) - West Fork (CLECO) 230kV	-105
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-75
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-73
Fancy Point - Port Hudson 230kV ckt 1	Fancy Point - Port Hudson 230kV ckt 2	-10
Coughlin (CLECO) - Plaisance 138kV (CLECO)	West Fork - Wells 230kV	3
Fancy Point - Port Hudson 230kV ckt 2	Fancy Point - Port Hudson 230kV ckt 1	88
Terrebonne - Coteau 115kV	Raceland - Coteau 115kV	148

Limiting Element	Contingency Element	ATC
Greenwood - Terrebonne 115kV	Bayou Sales (CLECO) - Teche 138kV (CLECO)	158

OKGE

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-802
International Paper - Wallake 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-455
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-105
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-105
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-62
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-60
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	19
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	364
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	392
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	392

SMEPA

Limiting Element	Contingency Element	ATC
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-119
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-119
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-71
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-69
Florence - South Jackson 115kV - Supplemental Upgrade	Bogalusa - Adams Creek 500/230kV transformer	203
Florence - South Jackson 115kV - Supplemental Upgrade	Bogalusa - Franklin 500kV	203
Florence - South Jackson 115kV - Supplemental Upgrade	South Jackson - Poplar Spring 115kV	309
Jackson Miami - Rex Brown-W 115kV	South Jackson 230/115kV transformer 1	329
Florence - South Jackson 115kV - Supplemental Upgrade	Georgetown - Poplar Spring 115kV	332
Florence - South Jackson 115kV - Supplemental Upgrade	Angie - Adams Creek 230kV	334
Florence - South Jackson 115kV - Supplemental Upgrade	Georgetown - Silver Creek 115kV	338
Florence - South Jackson 115kV - Supplemental Upgrade	CHATOM (PS) - EWAYNE (SMEPA) 230kV	349

Limiting Element	Contingency Element	ATC
Florence - South Jackson 115kV - Supplemental Upgrade	Angie (SOCO) - Hattiesburg SW (SOCO) 230kV	350
Florence - South Jackson 115kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	353
Florence - South Jackson 115kV - Supplemental Upgrade	Ellicott (SOCO) - BarryCC2 (SOCO) 230kV	359
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	367
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	383
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	413
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	413

SOCO

Limiting Element	Contingency Element	ATC
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-115
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-115
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-68
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-67
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	379
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	408
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	408

SPA

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-1030
International Paper - Wallake 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-585
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-108
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-108
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-65
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-63
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	19
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	370
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	398
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	398

TVA

Limiting Element	Contingency Element	ATC
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	-113
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	-113
Jacinto - Splendora 138kV	Porter - China/Porter 230kV Series Compensation	-68
Jacinto - Splendora 138kV	Porter 230/138/13.8kV 3 Winding Transformer	-66
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	22
Cleveland - Jacinto 138kV	Jacinto - Peach Creek 230kV	377
Cleveland - Jacinto 138kV	Lewis Creek - Peach Creek 230kV	405
Cleveland - Jacinto 138kV	Lewis Creek 230/138kV transformer	406

APPENDIX G: DETAILS OF SCENARIO 4 - 2017

AECI

Limiting Element	Contingency Element	ATC
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	-152
Montgomery - Winnfield 230kV	Clarence (CLECO) - Montgomery 230kV	347
Lacon - Lewis Creek SES 138kV	Coley Creek - Pelican Road 138kV	387
Lacon - Lewis Creek SES 138kV	Shepherd - Coley Creek 138kV	407
Lacon - Lewis Creek SES 138kV	Lewis Creek SES - Egypt 138kV	424

AEP-W

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-466
International Paper - Wallake 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-232
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	-137
Montgomery - Winnfield 230kV	Clarence (CLECO) - Montgomery 230kV	311
Lacon - Lewis Creek SES 138kV	Coley Creek - Pelican Road 138kV	351
Lacon - Lewis Creek SES 138kV	Shepherd - Coley Creek 138kV	370
Lacon - Lewis Creek SES 138kV	Lewis Creek SES - Egypt 138kV	370
Goree - Lewis Creek SES 138kV	Lacon - Lewis Creek SES 138kV	420
Jacinto - Splendora 138kV	China/Porter - China/Porter 230kV Series Compensation ckt 2	422
Jacinto - Splendora 138kV	China - China/Porter 230kV Series Compensation	422

AMRN

Limiting Element	Contingency Element	ATC
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	-158
Montgomery - Winnfield 230kV	Clarence (CLECO) - Montgomery 230kV	361
Lacon - Lewis Creek SES 138kV	Coley Creek - Pelican Road 138kV	390
Lacon - Lewis Creek SES 138kV	Shepherd - Coley Creek 138kV	411

CLECO

Limiting Element	Contingency Element	ATC
Lacon - Lewis Creek SES 138kV	Coley Creek - Pelican Road 138kV	421

EAI

Limiting Element	Contingency Element	ATC
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	-131
Winnfield - Jeldwen (CLECO) 115kV	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	280
Montgomery - Winnfield 230kV	Clarence (CLECO) - Montgomery 230kV	299
Dodson - Jeldwn (CLECO) 115kV	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	311

Limiting Element	Contingency Element	ATC
Lacon - Lewis Creek SES 138kV	Coley Creek - Pelican Road 138kV	394
Lacon - Lewis Creek SES 138kV	Shepherd - Coley Creek 138kV	415

EES

Limiting Element	Contingency Element	ATC
NONE	NONE	425

EES System Load

Limiting Element	Contingency Element	ATC
Lacon - Lewis Creek SES 138kV	Coley Creek - Pelican Road 138kV	425

EMDE

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-820
International Paper - Wallake 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-408
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	-147

EMI

Limiting Element	Contingency Element	ATC
Lacon - Lewis Creek SES 138kV	Coley Creek - Pelican Road 138kV	408

LAFA

Limiting Element	Contingency Element	ATC
Champagne - Plaisance (CLECO) 138kV	Cocodrie (CLECO) - Vil Plat (CLECO) 230kV	-922
Champagne - Plaisance (CLECO) 138kV	Cocodrie (CLECO) - Vil Plat (CLECO) 230kV	-908
Champagne - Plaisance (CLECO) 138kV	Vil Plat (CLECO) - West Fork (CLECO) 230kV	-739
Champagne - Plaisance (CLECO) 138kV	Vil Plat (CLECO) - West Fork (CLECO) 230kV	-732
Champagne - Plaisance (CLECO) 138kV	West Fork - Wells 230kV	-634
Coughlin (CLECO) - Plaisance 138kV (CLECO)	Cocodrie (CLECO) - Vil Plat (CLECO) 230kV	-489
Coughlin (CLECO) - Plaisance 138kV (CLECO)	Cocodrie (CLECO) - Vil Plat (CLECO) 230kV	-419
Coughlin (CLECO) - Plaisance 138kV (CLECO)	Vil Plat (CLECO) - West Fork (CLECO) 230kV	-319
Coughlin (CLECO) - Plaisance 138kV (CLECO)	Vil Plat (CLECO) - West Fork (CLECO) 230kV	-229
Coughlin (CLECO) - Plaisance 138kV (CLECO)	West Fork - Wells 230kV	-131
Champagne - Plaisance (CLECO) 138kV	Colfax (CLECO) - Rodemacher 230kV	85

Limiting Element	Contingency Element	ATC
Scott1 - Bonin (CLECO) 138kV	Cocodrie (CLECO) - Vil Plat (CLECO) 230kV	154

LAGN

Limiting Element	Contingency Element	ATC
NONE	NONE	425

LEPA

Limiting Element	Contingency Element	ATC
Champagne - Plaisance (CLECO) 138kV	Cocodrie (CLECO) - Vil Plat (CLECO) 230kV	-1079
Champagne - Plaisance (CLECO) 138kV	Vil Plat (CLECO) - West Fork (CLECO) 230kV	-857
Champagne - Plaisance (CLECO) 138kV	West Fork - Wells 230kV	-743
Coughlin (CLECO) - Plaisance 138kV (CLECO)	Cocodrie (CLECO) - Vil Plat (CLECO) 230kV	-490
Coughlin (CLECO) - Plaisance 138kV (CLECO)	Vil Plat (CLECO) - West Fork (CLECO) 230kV	-267
Coughlin (CLECO) - Plaisance 138kV (CLECO)	West Fork - Wells 230kV	-153
Champagne - Plaisance (CLECO) 138kV	Colfax (CLECO) - Rodemacher 230kV	71
Terrebonne - Coteau 115kV	Raceland - Coteau 115kV	144
Greenwood - Terrebonne 115kV	Bayou Sales (CLECO) - Teche 138kV (CLECO)	156

OKGE

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-689
International Paper - Wallake 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-343
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	-143
Montgomery - Winnfield 230kV	Clarence (CLECO) - Montgomery 230kV	325
Lacon - Lewis Creek SES 138kV	Coley Creek - Pelican Road 138kV	372
Lacon - Lewis Creek SES 138kV	Shepherd - Coley Creek 138kV	392
Lacon - Lewis Creek SES 138kV	Lewis Creek SES - Egypt 138kV	402

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

Limiting Element	Contingency Element	ATC
Florence - South Jackson 115kV - Supplemental Upgrade	South Jackson - Poplar Spring 115kV	316
Florence - South Jackson 115kV - Supplemental Upgrade	Georgetown - Poplar Spring 115kV	339
Florence - South Jackson 115kV - Supplemental Upgrade	Angie - Adams Creek 230kV	339
Florence - South Jackson 115kV - Supplemental Upgrade	Georgetown - Silver Creek 115kV	345
Florence - South Jackson 115kV - Supplemental Upgrade	CHATOM (PS) - EWAYNE (SMEPA) 230kV	355
Florence - South Jackson 115kV - Supplemental Upgrade	Angie (SOCO) - Hattiesburg SW (SOCO) 230kV	355
Jackson Miami - Rex Brown-W 115kV	South Jackson 230/115kV transformer 1	358
Florence - South Jackson 115kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	362
Florence - South Jackson 115kV - Supplemental Upgrade	Ellicott (SOCO) - BarryCC2 (SOCO) 230kV	366
Lacon - Lewis Creek SES 138kV	Coley Creek - Pelican Road 138kV	413

SOCO

Limiting Element	Contingency Element	ATC
Lacon - Lewis Creek SES 138kV	Coley Creek - Pelican Road 138kV	402
Lacon - Lewis Creek SES 138kV	Shepherd - Coley Creek 138kV	424

SPA

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-885
International Paper - Wallake 138kV (CLECO)	Dolet Hills (CLECO) - S.W. Shreveport 345kV (CLECO)	-440
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	-146
Montgomery - Winnfield 230kV	Clarence (CLECO) - Montgomery 230kV	333
Lacon - Lewis Creek SES 138kV	Coley Creek - Pelican Road 138kV	383
Lacon - Lewis Creek SES 138kV	Shepherd - Coley Creek 138kV	404
Lacon - Lewis Creek SES 138kV	Lewis Creek SES - Egypt 138kV	419

TVA

Limiting Element	Contingency Element	ATC
Winnfield 230/115kV transformer	Clarence (CLECO) - Montgomery 230kV	-172
Montgomery - Winnfield 230kV	Clarence (CLECO) - Montgomery 230kV	392
Lacon - Lewis Creek SES 138kV	Coley Creek - Pelican Road 138kV	397
Lacon - Lewis Creek SES 138kV	Shepherd - Coley Creek 138kV	419

APPENDIX H: Deliverability Tests for Network Resource

Interconnection Service Resources

Overview

Entergy will develop a two-part deliverability test for customers (Interconnection Customers or Network Customers) seeking to qualify a Generator as an NRIS resource: (1) a test of deliverability "from generation", that is out of the Generator to the aggregate load connected to the Entergy Transmission system; and (2) a test of deliverability "to load" associated with sub-zones. This test will identify upgrades that are required to make the resource deliverable and to maintain that deliverability for a five year period.

The "From Generation" Test for Deliverability

In order for a Generator to be considered deliverable, it must be able to run at its maximum rated output without impairing the capability of the aggregate of previously qualified generating resources (whether qualified at the NRIS or NITS level) in the local area to support load on the system, taking into account potentially constrained transmission elements common to the Generator under test and other adjacent qualified resources. For purposes of this test, the resources displaced in order to determine if the Generator under test can run at maximum rated output should be resources located outside of the local area and having insignificant impact on the results. Existing Long-term Firm PTP Service commitments will also be maintained in this study procedure.

The "To Load" Test for Deliverability

The Generator under test running at its rated output cannot introduce flows on the system that would adversely affect the ability of the transmission system to serve load reliably in import-constrained sub-zones. Existing Long-term Firm PTP Service commitments will also be maintained in this study procedure.

Required Upgrades

Entergy will determine what upgrades, if any, will be required for an NRIS applicant to meet deliverability requirements pursuant to Appendix E.

Description of Deliverability Test

Each NRIS resource will be tested for deliverability at peak load conditions, and in such a manner that the resources it displaces in the test are ones that could continue to contribute to the resource adequacy of the control area in addition to the studied resources. The study will also determine if a unit applying for NRIS service impairs the reliability of load on the system by reducing the capability of the transmission system to deliver energy to load located in import-constrained sub-zones on the grid. Through the study, any transmission upgrades necessary for the unit to meet these tests will be identified.

Deliverability Test Procedure

The deliverability test for qualifying a generating unit as a NRIS resource is intended to ensure that 1) the generating resource being studied contributes to the reliability of the system as a whole by being able to, in conjunction with all other Network Resources on the system, deliver energy to the aggregate load on the transmission system, and 2) collectively all load on the system can still be reliably served with the inclusion of the generating resource being studied.

The tests are conducted for “peak” conditions (both a summer peak and a winter peak) for each year of the 5-year planning horizon commencing in the first year the new unit is scheduled to commence operations.

Deliverability of Generation

The intent of this test is to determine the deliverability of a NRIS resource to the aggregate load on the system. It is assumed in this test that all units previously qualified as NRIS and NITS resources are deliverable. In evaluating the incremental deliverability of a new resource, a test case is established. In the test case, all existing NRIS and NITS resources are dispatched at an expected level of generation (as modified by the DFAX list units as discussed below). Peak load withdrawals are also modeled as well as net imports and exports. The output from generating resources is then adjusted so as to “balance” overall load and generation. This sets the baseline for the test case in terms of total system injections and withdrawals.

Incremental to this test case, injections from the proposed new generation facility are then included, with reductions in other generation located outside of the local area made to maintain system balance.

Generator deliverability is then tested for each transmission facility. There are two steps to identify the transmission facilities to be studied and the pattern of generation on the system:

1) Identify the transmission facilities for which the generator being studied has a 3% or greater distribution factor.

2) For each such transmission facility, list all existing qualified NRIS and NITS resources having a 3% or greater distribution factor on that facility. This list of units is called the Distribution Factor or DFAX list.

For each transmission facility, the units on the DFAX list with the greatest impact are modeled as operating at 100% of their rated output in the DC load flow until, working down the DFAX list, a 20% probability of all units being available at full output is reached (e.g. for 15 generators with a Forced Outage Rate of 10%, the probability of all 15 being available at 100% of their rated output is 20.6%). Other NRIS and NITS resources on the system are modeled at a level sufficient to serve load and net interchange.

From this new baseline, if the addition of the generator being considered (coupled with the matching generation reduction on the system) results in overloads on a particular transmission facility being examined, then it is not “deliverable” under the test.

Deliverability to Load

The Entergy transmission system is divided into a number of import constrained sub-zones for which the import capability and reliability criteria will be examined for the purposes of testing a new NRIS resource. These sub-zones can be characterized as being areas on the Entergy transmission system for which transmission limitations restrict the import of energy necessary to supply load located in the sub-zone.

The transmission limitations will be defined by contingencies and transmission constraints on the system that are known to limit operations in each area, and the sub-zones will be defined by the generation and load busses that are impacted by the contingent transmission lines. These sub-zones may change over time as the topology of the transmission system changes or load grows in particular areas.

An acceptable level of import capability for each sub-zone will have been determined by Entergy Transmission based on their experience and modeling of joint transmission and generating unit contingencies. Typically the acceptable level of transmission import capacity into the sub-zones will be that which is limited by first-contingency conditions on the transmission system when generating units within the sub-region are experiencing an abnormal level of outages and peak loads.

The "deliverability to load" test compares the available import capability to each sub-zone that is required for the maintaining of reliable service to load within the sub-zone both with and without the new NRIS resource operating at 100% of its rated output. If the new NRIS resource does not reduce the sub-zone import capability so as to reduce the reliability of load within the sub-zone to an unacceptable level, then the deliverability to load test for the unit is satisfied. This test is conducted for a 5-year planning cycle. When the new NRIS resource fails the test, then transmission upgrades will be identified that would allow the NRIS unit to operate without degrading the sub-zone reliability to below an acceptable level.

Other Modeling Assumptions

Modeling of Other Resources

Generating units outside the control of Entergy (including the network resources of others, and generating units in adjacent control areas) shall be modeled assuming "worst case" operation of the units – that is, a pattern of dispatch that reduces the sub-zone import capability, or impact the common limiting flowgates on the system to the greatest extent for the "from generation" deliverability test.

Must-run Units

Must-run units in the control area will be modeled as committed and operating at a level consistent with the must-run operating guidelines for the unit.

Base-line Transmission Model

The base-line transmission system will include all transmission upgrades approved and committed to by Entergy Transmission over the 5-year planning horizon. Transmission line ratings will be net of TRM and current CBM assumptions will be maintained.