



PID 233
Feasibility Study Report
150 MW Plant

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Section – A

Energy Resource Interconnection Service

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I. Introduction

This Energy Resource Interconnection Service (ERIS) is based on PID 233 150MW request for interconnection on Entergy's transmission system between Marshall and Botkinburg substations located at PID-233 161kV 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. NRIS analysis will be performed during the system impact study.

The Feasibility 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 Feasibility Study was based on information provided by PID 233 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.

II. Short Circuit Analysis / Breaker Rating Analysis

A. 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.

B. Short Circuit Analysis

The method used to determine if any short circuit problems would be caused by the addition of the PID-233 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-233 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-233 generation. Any breakers identified to be upgraded through this comparison are mandatory upgrades.

C. Analysis Results

The results of the short circuit analysis indicates that the additional generation due to PID 233 generation causes no 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 233 plant **with and without priors**. Priors included are: 215, 216, 217, 222, 223, 224, 228, 231 and 234.

D. Problem Resolution

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

III. Load Flow Analysis

A. Model Information

The load flow analysis was performed based on the projected 2014 summer peak load flow model. 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 2014 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 proposed 150MW generation and the 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 requesting generator as the source and adjacent control area as sink. (Note: Refer to NRIS [Section – B], if applicable, for details of dispatch within Entergy system)

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 PID 233.

B. Load Flow Analyses

i) 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.

ii) 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.

iii) 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.

C. Analysis Results

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

Table II-C Summary of Results for PID-233 – ERIS Load Flow Study

Interface		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.	2014 summer peak	0	0	0	150

AMRN	Ameren Transmission	2014 summer peak	0	0	0	150
CLEC	CLECO	2014 summer peak	0	0	0	0
AEP-W	American Electric Power - West	2014 summer peak	0	150	0	150
EES	Entergy	2014 summer peak	0	0	0	0
EMDE	Empire District Electric Co	2014 summer peak	0	150	0	150
Lafa	Lafayette Utilities Sustum	2014 summer peak	0	0	0	0
LAGN	Louisiana Generating, LLC	2014 summer peak	0	0	0	0
LEPA	Louisiana Energy & Power Authority	2014 summer peak	0	0	0	0
OKGE	Oklahoma Gas & Electric Company	2014 summer peak	0	150	0	150
SMEPA	South Mississippi Electric Power Assoc.	2014 summer peak	0	0	0	115
SOCO	Southern Company	2014 summer peak	0	0	0	150
SPA	Southwest Power Administration	2014 summer peak	0	150	0	150
TVA	Tennessee Valley Authority	2014 summer peak	0	0	0	150

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

TABLE II-C-1 DETAILS OF SCENARIO 1 RESULTS: (WITHOUT FUTURE PROJECTS AND WITHOUT PENDING TRANSMISSION SERVICE & STUDY REQUEST)

Limiting Element	Est. Cost(\$)	AECI	AEPW	AMRN	CLECO	EES	EMDE	Lafa	LAGN	LEPA	OKGE	SMEPA	SOCO	SPA	TVA
Acadia GSU - Colonial Academy 138kV	6,277,500							X							
Baxter Wilson - Ray Braswell 500kV	4,100,000							X	X	X		X	X		
Bismarck-Hot Springs EHV West 115kV CKT 1	By Others		X												
Bonin - Cecelia 138kV	4,792,000									X					
Bull Shoals - Bull Shoals Dam SPA 161kV	427,500	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Colonial Academy - Richard 138kV	7,957,500							X		X					
Greenwood - Terrebone 115kV	22,094,000							X							
Harrison East - Summit 161kV	17,650,000						X								
Judice - Scott1 138kV	9,700,000									X					
'MANSFLD4 138' TO BUS 'IPAPER 4 138'	By Others		X												
Melborne - Sage 161kV	8,573,000						X							X	
North Crowley - Scott1 138kV	39,707,607							X		X					
Richard - Scott1 138kV	68,006,984							X							
Scott1 - Bonin 138kV	7,410,000							X		X					
Semere - Scott2 138kV	11,361,000							X		X					
Sterlington 500/115kV transformer 2	By Others					X									

TABLE II-C-2 DETAILS OF SCENARIO 2 RESULTS: (WITHOUT FUTURE PROJECTS AND WITH PENDING TRANSMISSION SERVICE & STUDY REQUEST)

Limiting Elements	Est. Cost(\$)	AECI	AEPW	AMRN	CLECO	EES	EMDE	LAFa	LAGN	LEPA	OKGE	SMEPA	SOCO	SPA	TVA
Acadia GSU - Colonial Academy 138kV	6,277,500				X			X		X					
Acadia GSU - Scanlan 138kV	1,455,000				X			X		X					
Addis - Big Cajun 1 230kV	Base Plan									X					
Baxter Wilson - Ray Braswell 500kV	4,100,000	X		X	X	X		X	X	X		X	X		X
Bogalusa - Adams Creek 230kV ckt 2	Base Plan				X	X		X	X	X					
Bonin - Cecelia 138kV	4,792,500									X					
Bull Shoals - Midway AECC 161kV	TBD					X							X		X
Cecelia - Semere 138kV	3,754,350							X		X					
Colonial Academy - Richard 138kV	7,957,500				X			X		X					
Florence - South Jackson 115kV	5,715,000											X			
Habetz - Richard 138kV	3,272,000				X			X		X					
Jaguar - Tap Point Esso 230kV	2,877,500					X				X					
Judice - Meaux 138kV	12,600,000				X					X					
Judice - Scott1 138kV	9,700,000				X					X					
Louisiana Station - Thomas 138kV	2,544,750									X					
McAdams 500/230kV transformer 1	6,560,000				X	X		X	X	X					
Moril - Cecelia 138kV	6,182,500				X					X					
North Crowley - Richard 138kV	3,776,625				X			X		X					
North Crowley - Scott1 138kV	39,707,607				X			X		X					
Port Hudson 230/138 transformer 1	TBD									X					
Port Hudson 230/138 transformer 2	TBD									X					
Richard - Scott1 138kV	68,006,984				X			X		X					
Scott1 - Bonin 138kV	7,410,000							X		X					
Semere - Scott2 138kV	11,361,000				X			X		X					
Sterlington 500/115kV transformer 2	By Others					X									
Willow Glen - Willow Glen 2 500/138kV transformer 1	TBD					X				X					
Willow Glen 500/230kV Transformer	TBD					X				X					

TABLE II-C-3 DETAILS OF SCENARIO 3 RESULTS: (WITH FUTURE PROJECTS AND WITHOUT PENDING TRANSMISSION SERVICE & STUDY REQUEST)

Limiting Element	Est. Cost(\$)	AECI	AEPW	AMRN	CLECO	EES	EMDE	Lafa	LAGN	LEPA	OKGE	SMEPA	SOCO	SPA	TVA
Bonin - Cecelia 138kV	4,792,500									X					
Bull Shoals - Bull Shoals Dam SPA 161kV	427,500	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Colonial Academy - Richard 138kV	7,957,500							X		X					
Greenwood - Terrebone 115kV	22,094,000							X							
Judice - Scott1 138kV	9,700,000									X					
'MANSFLD4 138' TO BUS 'IPAPER 4 138'	By Others		X												
Melborne - Sage 161kV	8,573,000						X								
North Crowley - Scott1 138kV	39,707,607							X		X					
Scott1 - Bonin 138kV	7,410,000							X		X					
Semere - Scott2 138kV	11,361,000							X		X					

TABLE II-C-4 DETAILS OF SCENARIO 4 RESULTS: (WITH FUTURE PROJECTS AND WITH PENDING TRANSMISSION SERVICE & STUDY REQUEST)

Limiting Element	Est. Cost(\$)	AECI	AEPW	AMRN	CLECO	EES	EMDE	LAFA	LAGN	LEPA	OKGE	SMEPA	SOCO	SPA	TVA
Acadia GSU - Colonial Academy 138kV	6,277,500				X			X		X					
Acadia GSU - Scanlan 138kV	1,455,000				X			X		X					
Addis - Big Cajun 1 230kV	Base Plan									X					
Baxter Wilson - Ray Braswell 500kV	4,100,000											X			
Bogalusa - Adams Creek 230kV ckt 2	Base Plan				X	X		X	X	X					
Bonin - Cecelia 138kV	4,792,500									X					
Bonin 230/138kV transformer (LAFA)	By Others							X							
Cecelia - Semere 138kV	3,754,350							X		X					
Colonial Academy - Richard 138kV	7,957,500				X			X		X					
Flander - Habetz 138kV (CLECO/LAFA)	TBD							X							
Habetz - Richard 138kV	3,272,000				X			X		X					
Judice - Meaux 138kV	12,600,000				X					X					
Judice - Scott1 138kV	9,700,000				X					X					
McAdams 500/230kV transformer 1	6,560,000				X	X		X	X	X					
Moril - Cecelia 138kV	6,182,500				X					X					
North Crowley - Richard 138kV	3,776,625				X			X		X					
North Crowley - Scott1 138kV	39,707,607				X			X		X					
Port Hudson 230/138 transformer 1	TBD									X					
Port Hudson 230/138 transformer 2	TBD									X					
Richard - Scott1 138kV	68,006,984				X			X		X					
Scott1 - Bonin 138kV	7,410,000							X		X					
Semere - Scott2 138kV	11,361,000				X			X		X					
Willow Glen - Willow Glen 2 500/138kV transformer 1	TBD									X					
Willow Glen 500/230kV Transformer	TBD									X					

APPENDIX A-B: Approved Projects and Transactions in Study Mode

Year	Approved Future Projects
2009 – 2013	EAI 2009S Conway West – Donaghey
	EAI 2009S Danville – Magazine
	EAI 2009S Gillett Capacitor Bank Approved
	EAI 2009W Donaghey - Conway South
	EAI 2010S SMEPA Approved
	EAI 2011W Aquilla Facility Study
	EAI 2012S Warren East Cap
	EGSL 2009S Install 37.7MVA Cap Bank at Acadia 138kV Sub
	ELL 2009S Amite_South_Area_Improvements_Phase_III
	ELL 2011S Sarepta+Additions
	ELL 2012S Ouichita-To Run First-upg-1478781-3SterlAutos+2BWAutos+splitbus
	ELL 2012S Ouichita-To Run Second Sterlington to NorthBastropVERSION1-Updated
	ELL 2013S Coly-Hammond_230kV
	ELL 2013S Loblolly-Hammond_230kV
	EMI 2008S Liberty-Gloster_Uprate_Line_To_190MVA_newnum
	EMI 2009S Indianola-Greenwood Upggrade Jumpers-Bus
	EMI 2010S Magee_XFMRs_2000A_switches
	ENOI 2009S Paterson Restore Breakers
	ETI 2009F Porter_Tamina_138kV_Replace_Breaker
	ETI 2009S Beaumont_69kV_Improvement_Plan
	ETI 2009S Close_College_Station_138kV_NO_Switch
	ETI 2009S Retap_Newton_Bulk_CT
	ETI 2009W Upgrade_Fawil_Auto
	ETI 2010S WRRIP_Ph_3_Interim_Lewis_Creek_Jacinto_Conversion
	ETI 2011S WRRIP_Ph_3_Interim_Add_Alden_SVC
	ETI 2011S WRRIP_Ph_3_Interim_Upgrade_South_Beaumont_Fontenots_Corner_138kV Solution Set-TVA Affected System

Year	Proposed Projects for prior generator interconnection requests
2012	New Lewis Creek – Conroe 230kV transmission line

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

PID	Substation	MW	In Service Date
PID 211	Lewis Creek	570	6/1/2011
PID 221	Wolfcreek	875	In Service
PID 222	Nine Mile	570	10/1/2012
PID 223	PID-223 Tap	125	10/1/2010
PID 224	PID-224 Tap	100	12/1/2009
PID 228	PID-228 Tap	104	4/30/2011

Prior transmission service requests that were included in this study:

OASIS #		PSE	MW	Begin	End
1648591		Entergy Services (SPO)	1	6/1/2010	6/1/2012
1648592		Entergy Services (SPO)	485	6/1/2010	6/1/2012
1658087		Entergy Services (SPO)	1	6/1/2012	6/1/2042
1658088		SMEPA	21	6/1/2012	6/1/2042
1659378		CLECO Power LLC	100	1/1/2010	1/1/2020
1665288		Merrill Lynch Commodities	15	1/1/2011	1/1/2017
1668149		NRG Power Marketing	30	1/1/2010	1/1/2015
1668165		Entergy Services (SPO)	600	1/1/2013	1/1/2043
1669330		NRG Power Marketing	206	1/1/2013	1/1/2018
1672981		Cargill Power Markets	201	1/1/2011	1/1/2016
1675859		NRG Power Marketing	500	1/1/2011	1/1/2016
1675860		NRG Power Marketing	500	1/1/2010	1/1/2012
1675861		NRG Power Marketing	100	1/1/2011	1/1/2016
1676748		KCPL	206	6/1/2010	6/1/2015
1677749		Entergy Services (SPO)	1	1/1/2013	1/1/2015
1684332		AEP Service Corporation	255	1/1/2010	1/1/2015
1679590		Constellation Energy Commodities Group	25	1/1/2010	1/1/2015
1679986		Cargill Power Markets	104	1/1/2010	1/1/2011
1679987		Cargill Power Markets	104	1/1/2010	1/1/2011
1683020		Cargill Power Markets	103	1/1/2011	1/1/2012
1683021		Cargill Power Markets	103	1/1/2011	1/1/2013
1683024		Cargill Power Markets	103	1/1/2011	1/1/2016
1686850		NRG Power Marketing	75	4/1/2010	4/1/2015
1687235		NRG Power Marketing	15	4/1/2010	4/1/2013
1687236		NRG Power Marketing	15	4/1/2010	4/1/2013

**APPENDIX A-C: DETAILS OF SCENARIO 1
2014
AECI**

Limiting Element	Contingency Element	ATC
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0

AEP-W

Limiting Element	Contingency Element	ATC
'MANSFLD4 138' TO BUS 'IPAPER 4 138'	Contingency of FlowGate 5029 DOLHILL7 345 TO SW SHV 7 345	0
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0
Bismark - Hot Springs EHV West 115kV CKT 1	El Dorado 500/345kV Transformer	109
Bismark - Hot Springs EHV West 115kV CKT 1	El Dorado EHV - Longwood (SWEPCO) 345kV	109

AMRN

Limiting Element	Contingency Element	ATC
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0

CLECO

Limiting Element	Contingency Element	ATC
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0

EES

Limiting Element	Contingency Element	ATC
Sterlington 500/115kV transformer 2	Sterlington 500/115kV transformer 1	0
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0

EMDE

Limiting Element	Contingency Element	ATC
Bull Shoals - Bull Shoals Dam SPA 161kV	Bull Shoals - Lead Hills 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Clevcov - Lead HL 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	ANO - Fort Smith 500kV	0
Melborne - Sage 161kV	Marshall - PID 233 161kV	29
Melborne - Sage 161kV	Marshall - Hilltop 161kV	64
Harrison East - Summit 161kV	St. Joe - Hilltop 161kV	129
Harrison East - Summit 161kV	Everton - St. Joe 161kV	140

Lafa

Limiting Element	Contingency Element	ATC
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0
Semere - Scott2 138kV	Bonin - Labbe 230kV (Lafa)	0
North Crowley - Scott1 138kV	Bonin - Labbe 230kV (Lafa)	0
Semere - Scott2 138kV	Wells (CLECO) - Point Mouton (Lafa) 230kV	0
Semere - Scott2 138kV	Point Des Mouton (Lafa) - Labbe (Lafa) 230kV	0
Scott1 - Bonin 138kV	Bonin - Labbe 230kV (Lafa)	0
North Crowley - Scott1 138kV	Wells (CLECO) - Point Mouton (Lafa) 230kV	0
Colonial Academy - Richard 138kV	Bonin - Labbe 230kV (Lafa)	0
North Crowley - Scott1 138kV	Point Des Mouton (Lafa) - Labbe (Lafa) 230kV	1
Scott1 - Bonin 138kV	Wells (CLECO) - Point Mouton (Lafa) 230kV	28
Colonial Academy - Richard 138kV	Wells (CLECO) - Point Mouton (Lafa) 230kV	55
Scott1 - Bonin 138kV	Point Des Mouton (Lafa) - Labbe (Lafa) 230kV	60
Colonial Academy - Richard 138kV	Point Des Mouton (Lafa) - Labbe (Lafa) 230kV	88
Greenwood - Terrebone 115kV	Webre - Wells 500kV	146
Baxter Wilson - Ray Braswell 500kV	Franklin - Grand Gulf 500kV	149
Acadia GSU - Colonial Academy 138kV	Wells (CLECO) - Point Mouton (Lafa) 230kV	149
Richard - Scott1 138kV	Wells (CLECO) - Point Mouton (Lafa) 230kV	149

LAGN

Limiting Element	Contingency Element	ATC
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0
Baxter Wilson - Ray Braswell 500kV	Franklin - Grand Gulf 500kV	135

LEPA

Limiting Element	Contingency Element	ATC
Semere - Scott2 138kV	Bonin - Labbe 230kV (LAFA)	0
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Semere - Scott2 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
North Crowley - Scott1 138kV	Bonin - Labbe 230kV (LAFA)	0
Scott1 - Bonin 138kV	Bonin - Labbe 230kV (LAFA)	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0
Semere - Scott2 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Bonin - Cecelia 138kV	Colonial Academy - Richard 138kV	0
North Crowley - Scott1 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Bonin - Cecelia 138kV	Acadia GSU - Colonial Academy 138kV	0
Bonin - Cecelia 138kV	Acadia GSU - Scanlan 138kV	0
Colonial Academy - Richard 138kV	Bonin - Labbe 230kV (LAFA)	0
North Crowley - Scott1 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	7
Baxter Wilson - Ray Braswell 500kV	Franklin - Grand Gulf 500kV	100
Judice - Scott1 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	134

OKGE

Limiting Element	Contingency Element	ATC
Bull Shoals - Bull Shoals Dam SPA 161kV	Bull Shoals - Lead Hills 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Clevcov - Lead HL 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0

SMEPA

Limiting Element	Contingency Element	ATC
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0
Baxter Wilson - Ray Braswell 500kV	Franklin - Grand Gulf 500kV	87

SOCO

Limiting Element	Contingency Element	ATC
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0
Baxter Wilson - Ray Braswell 500kV	Franklin - Grand Gulf 500kV	132

SPA

Limiting Element	Contingency Element	ATC
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0
Melborne - Sage 161kV	Marshall - PID 233 161kV	24
Melborne - Sage 161kV	Marshall - Hilltop 161kV	54

TVA

Limiting Element	Contingency Element	ATC
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0

APPENDIX A-D: DETAILS OF SCENARIO 2

2014

AECI

Limiting Element	Contingency Element	ATC
Baxter Wilson - Ray Braswell 500kV	Franklin - Grand Gulf 500kV	0

AEP-W

Limiting Element	Contingency Element	ATC
NONE	NONE	150

AMRN

Limiting Element	Contingency Element	ATC
Baxter Wilson - Ray Braswell 500kV	Franklin - Grand Gulf 500kV	0

CLECO

Limiting Element	Contingency Element	ATC
Bogalusa - Adams Creek 230kV ckt 2	Bogalusa - Adams Creek 230kV ckt 1	0
North Crowley - Scott1 138kV	Richard - Scott1 138kV	0
McAdams 500/230kV transformer 1	Lakeover - McAdams 500kV	0
Richard - Scott1 138kV	North Crowley - Richard 138kV	0
Habetz - Richard 138kV	Bonin - Labbe 230kV (LAFA)	0
Judice - Scott1 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	0
Semere - Scott2 138kV	Wells 500/230kV transformer	0
Richard - Scott1 138kV	North Crowley - Scott1 138kV	0
North Crowley - Scott1 138kV	Wells 500/230kV transformer	0
North Crowley - Richard 138kV	Richard - Scott1 138kV	0
Habetz - Richard 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Colonial Academy - Richard 138kV	Wells 500/230kV transformer	0
Habetz - Richard 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Moril - Cecelia 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	0
Richard - Scott1 138kV	Wells 500/230kV transformer	0
Richard - Scott1 138kV	Colonial Academy - Richard 138kV	0
Judice - Meaux 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	0
Acadia GSU - Colonial Academy 138kV	Wells 500/230kV transformer	0
Richard - Scott1 138kV	Acadia GSU - Colonial Academy 138kV	0
Habetz - Richard 138kV	Acadian - Bonin 230kV (LAFA)	0
Richard - Scott1 138kV	Acadia GSU - Scanlan 138kV	0
Baxter Wilson - Ray Braswell 500kV	Franklin - Grand Gulf 500kV	0
Acadia GSU - Scanlan 138kV	Wells 500/230kV transformer	81

Limiting Element	Contingency Element	ATC
North Crowley - Richard 138kV	Wells 500/230kV transformer	113

EES

Limiting Element	Contingency Element	ATC
Sterlington 500/115kV transformer 2	Sterlington 500/115kV transformer 1	0
Bogalusa - Adams Creek 230kV ckt 2	Bogalusa - Adams Creek 230kV ckt 1	0
McAdams 500/230kV transformer 1	Lakeover - McAdams 500kV	0
Willow Glen 500/230kV Transformer	Coly 500/230kV transformer	0
Willow Glen 500/230kV Transformer	Willow Glen - Willow Glen 2 500/138kV transformer 1	0
Jaguar - Tap Point Esso 230kV	Addis - Big Cajun 1 230kV	0
Willow Glen - Willow Glen 2 500/138kV transformer 1	Willow Glen 500/230kV Transformer	0
Willow Glen 500/230kV Transformer	Jaguar - Tap Point Esso 230kV	0
Baxter Wilson - Ray Braswell 500kV	Franklin - Grand Gulf 500kV	0
Willow Glen 500/230kV Transformer	Addis - Big Cajun 1 230kV	0
Bull Shoals - Midway AECC 161kV	Independence SES - Moorefield 161kV	145

EMDE

Limiting Element	Contingency Element	ATC
NONE	NONE	150

Lafa

Limiting Element	Contingency Element	ATC
Bogalusa - Adams Creek 230kV ckt 2	Bogalusa - Adams Creek 230kV ckt 1	0
McAdams 500/230kV transformer 1	Lakeover - McAdams 500kV	0
Semere - Scott2 138kV	Bonin - Cecelia 138kV	0
Semere - Scott2 138kV	Bonin - Labbe 230kV (Lafa)	0
North Crowley - Scott1 138kV	Bonin - Labbe 230kV (Lafa)	0
Semere - Scott2 138kV	Flander - Hopkins 138kV (CLECO/Lafa)	0
North Crowley - Scott1 138kV	Richard - Scott1 138kV	0
Colonial Academy - Richard 138kV	Bonin - Labbe 230kV (Lafa)	0
Semere - Scott2 138kV	Richard - Wells 500kV	0
Semere - Scott2 138kV	Richard - Scott1 138kV	0
Semere - Scott2 138kV	North Crowley - Richard 138kV	0
Acadia GSU - Colonial Academy 138kV	Bonin - Labbe 230kV (Lafa)	0
Colonial Academy - Richard 138kV	Bonin - Cecelia 138kV	0
North Crowley - Scott1 138kV	Richard - Wells 500kV	0
Richard - Scott1 138kV	Bonin - Labbe 230kV (Lafa)	0
North Crowley - Scott1 138kV	Colonial Academy - Richard 138kV	0
North Crowley - Scott1 138kV	Wells (CLECO) - Point Mouton (Lafa) 230kV	0
North Crowley - Scott1 138kV	Acadia GSU - Colonial Academy 138kV	0

Limiting Element	Contingency Element	ATC
North Crowley - Scott1 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Richard - Scott1 138kV	North Crowley - Richard 138kV	0
Acadia GSU - Scanlan 138kV	Bonin - Labbe 230kV (LAFA)	0
Colonial Academy - Richard 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Colonial Academy - Richard 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	0
Habetz - Richard 138kV	Bonin - Labbe 230kV (LAFA)	0
Colonial Academy - Richard 138kV	Richard - Scott1 138kV	0
Richard - Scott1 138kV	North Crowley - Scott1 138kV	0
Colonial Academy - Richard 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
North Crowley - Richard 138kV	Bonin - Labbe 230kV (LAFA)	0
North Crowley - Richard 138kV	Richard - Scott1 138kV	0
Acadia GSU - Colonial Academy 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Richard - Scott1 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Acadia GSU - Colonial Academy 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Richard - Scott1 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Acadia GSU - Scanlan 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Acadia GSU - Colonial Academy 138kV	Richard - Scott1 138kV	0
Acadia GSU - Colonial Academy 138kV	Bonin - Cecelia 138kV	0
North Crowley - Richard 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Habetz - Richard 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Acadia GSU - Scanlan 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Richard - Scott1 138kV	Wells 500/230kV transformer	0
Acadia GSU - Colonial Academy 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	0
Semere - Scott2 138kV	Base Case	0
Scott1 - Bonin 138kV	Bonin - Labbe 230kV (LAFA)	0
North Crowley - Richard 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Habetz - Richard 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Baxter Wilson - Ray Braswell 500kV	Franklin - Grand Gulf 500kV	0
Habetz - Richard 138kV	Acadian - Bonin 230kV (LAFA)	0
Cecelia - Semere 138kV	Bonin - Labbe 230kV (LAFA)	0
Scott1 - Bonin 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	9
Acadia GSU - Scanlan 138kV	Richard - Scott1 138kV	11
Acadia GSU - Scanlan 138kV	Wells 500/230kV transformer	33
Scott1 - Bonin 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	41
North Crowley - Richard 138kV	Wells 500/230kV transformer	41
Cecelia - Semere 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	54
Acadia GSU - Scanlan 138kV	Habetz - Richard 138kV	55
North Crowley - Scott1 138kV	Base Case	76
Habetz - Richard 138kV	Flander - Acadian 230kV (LAFA)	88
Cecelia - Semere 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	88
Habetz - Richard 138kV	Wells 500/230kV transformer	119

LAGN

Limiting Element	Contingency Element	ATC
Bogalusa - Adams Creek 230kV ckt 2	Bogalusa - Adams Creek 230kV ckt 1	0
McAdams 500/230kV transformer 1	Lakeover - McAdams 500kV	0
Baxter Wilson - Ray Braswell 500kV	Franklin - Grand Gulf 500kV	0

LEPA

Limiting Element	Contingency Element	ATC
Addis - Big Cajun 1 230kV	Jaguar - Tap Point Esso 230kV	0
North Crowley - Scott1 138kV	Richard - Scott1 138kV	0
North Crowley - Scott1 138kV	Bonin - Labbe 230kV (LAFA)	0
Semere - Scott2 138kV	Bonin - Labbe 230kV (LAFA)	0
Addis - Big Cajun 1 230kV	Coly - McKnight 500kV	0
North Crowley - Scott1 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Semere - Scott2 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Addis - Big Cajun 1 230kV	Willow Glen - Webre 500kV	0
North Crowley - Scott1 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
McAdams 500/230kV transformer 1	Lakeover - McAdams 500kV	0
Semere - Scott2 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Colonial Academy - Richard 138kV	Bonin - Labbe 230kV (LAFA)	0
Richard - Scott1 138kV	Bonin - Labbe 230kV (LAFA)	0
Richard - Scott1 138kV	North Crowley - Richard 138kV	0
Semere - Scott2 138kV	Bonin - Cecelia 138kV	0
Colonial Academy - Richard 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Semere - Scott2 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	0
North Crowley - Scott1 138kV	Coughlin - Plaisance 138kV (CLECO)	0
Richard - Scott1 138kV	North Crowley - Scott1 138kV	0
Bonin - Cecelia 138kV	Colonial Academy - Richard 138kV	0
Semere - Scott2 138kV	Richard - Wells 500kV	0
Colonial Academy - Richard 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Bogalusa - Adams Creek 230kV ckt 2	Bogalusa - Adams Creek 230kV ckt 1	0
Acadia GSU - Colonial Academy 138kV	Bonin - Labbe 230kV (LAFA)	0
Richard - Scott1 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
North Crowley - Richard 138kV	Richard - Scott1 138kV	0
Bonin - Cecelia 138kV	Acadia GSU - Colonial Academy 138kV	0
Willow Glen 500/230kV Transformer	Coly 500/230kV transformer	0
Habetz - Richard 138kV	Bonin - Labbe 230kV (LAFA)	0
Richard - Scott1 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
North Crowley - Richard 138kV	Bonin - Labbe 230kV (LAFA)	0
Jaguar - Tap Point Esso 230kV	Addis - Big Cajun 1 230kV	0
Acadia GSU - Colonial Academy 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Scott1 - Bonin 138kV	Bonin - Labbe 230kV (LAFA)	0
Bonin - Cecelia 138kV	Acadia GSU - Scanlan 138kV	0
Willow Glen 500/230kV Transformer	Willow Glen - Willow Glen 2 500/138kV	0

Limiting Element	Contingency Element	ATC
	transformer 1	
Acadia GSU - Scanlan 138kV	Bonin - Labbe 230kV (LAFA)	0
Judice - Scott1 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	0
Acadia GSU - Colonial Academy 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Semere - Scott2 138kV	Terrebone 230/115kV transformer	0
Colonial Academy - Richard 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	0
Colonial Academy - Richard 138kV	Bonin - Cecelia 138kV	0
North Crowley - Richard 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Habetz - Richard 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Acadia GSU - Scanlan 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Richard - Scott1 138kV	Wells 500/230kV transformer	0
Port Hudson 230/138 transformer 2	Port Hudson 230/138 transformer 1	0
Colonial Academy - Richard 138kV	Richard - Wells 500kV	0
Port Hudson 230/138 transformer 1	Port Hudson 230/138 transformer 2	0
Acadia GSU - Scanlan 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
North Crowley - Richard 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Habetz - Richard 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Richard - Scott1 138kV	Colonial Academy - Richard 138kV	0
Willow Glen - Willow Glen 2 500/138kV transformer 1	Willow Glen 500/230kV Transformer	0
Bonin - Cecelia 138kV	Scanlan - Scott2 138kV	0
Moril - Cecelia 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	0
Bonin - Cecelia 138kV	Semere - Scott2 138kV	0
Acadia GSU - Colonial Academy 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	0
Judice - Meaux 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	0
Acadia GSU - Colonial Academy 138kV	Bonin - Cecelia 138kV	0
Habetz - Richard 138kV	Acadian - Bonin 230kV (LAFA)	0
Willow Glen 500/230kV Transformer	Jaguar - Tap Point Esso 230kV	0
Acadia GSU - Colonial Academy 138kV	Richard - Wells 500kV	0
Judice - Scott1 138kV	Acadian - Bonin 230kV (LAFA)	0
Baxter Wilson - Ray Braswell 500kV	Franklin - Grand Gulf 500kV	0
Willow Glen 500/230kV Transformer	Addis - Big Cajun 1 230kV	0
Judice - Scott1 138kV	Moril - Cecelia 138kV	0
Cecelia - Semere 138kV	Bonin - Labbe 230kV (LAFA)	0
Louisiana Station - Thomas 138kV	Big Cajun 2 - Webre 500kV	17

OKGE

Limiting Element	Contingency Element	ATC
NONE	NONE	150

SMEPA

Limiting Element	Contingency Element	ATC
Florence - South Jackson 115kV	Choctaw - West Point 500kV (TVA)	0
Baxter Wilson - Ray Braswell 500kV	Franklin - Grand Gulf 500kV	0
Florence - South Jackson 115kV	Bogalusa - Franklin 500kV	75
Florence - South Jackson 115kV	Bogalusa - Adams Creek 500/230kV transformer	75

SOCO

Limiting Element	Contingency Element	ATC
Baxter Wilson - Ray Braswell 500kV	Franklin - Grand Gulf 500kV	0
Bull Shoals - Midway AECC 161kV	Independence SES - Moorefield 161kV	148

SPA

Limiting Element	Contingency Element	ATC
NONE	NONE	150

TVA

Limiting Element	Contingency Element	ATC
Baxter Wilson - Ray Braswell 500kV	Franklin - Grand Gulf 500kV	0
Bull Shoals - Midway AECC 161kV	Independence SES - Moorefield 161kV	146

**APPENDIX A-E: DETAILS OF SCENARIO 3
2014
AECI**

Limiting Element	Contingency Element	ATC
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0

AEP-W

Limiting Element	Contingency Element	ATC
'MANSFLD4 138' TO BUS 'IPAPER 4 138'	Contingency of FlowGate 5029 DOLHILL7 345 TO SW SHV 7 345	0
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0

AMRN

Limiting Element	Contingency Element	ATC
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0

CLECO

Limiting Element	Contingency Element	ATC
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0

EES

Limiting Element	Contingency Element	ATC
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0

EMDE

Limiting Element	Contingency Element	ATC
Bull Shoals - Bull Shoals Dam SPA 161kV	Bull Shoals - Lead Hills 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Clevcov - Lead HL 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	ANO - Fort Smith 500kV	0
Melborne - Sage 161kV	Marshall - PID 233 161kV	25
Melborne - Sage 161kV	Marshall - Hilltop 161kV	61

Lafa

Limiting Element	Contingency Element	ATC
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0
Semere - Scott2 138kV	Bonin - Labbe 230kV (Lafa)	0
North Crowley - Scott1 138kV	Bonin - Labbe 230kV (Lafa)	0
Semere - Scott2 138kV	Wells (CLECO) - Point Mouton (Lafa) 230kV	0
Semere - Scott2 138kV	Point Des Mouton (Lafa) - Labbe (Lafa) 230kV	0
Scott1 - Bonin 138kV	Bonin - Labbe 230kV (Lafa)	0
North Crowley - Scott1 138kV	Wells (CLECO) - Point Mouton (Lafa) 230kV	0
Colonial Academy - Richard 138kV	Bonin - Labbe 230kV (Lafa)	2
North Crowley - Scott1 138kV	Point Des Mouton (Lafa) - Labbe (Lafa) 230kV	5
Scott1 - Bonin 138kV	Wells (CLECO) - Point Mouton (Lafa) 230kV	29
Colonial Academy - Richard 138kV	Wells (CLECO) - Point Mouton (Lafa) 230kV	58
Scott1 - Bonin 138kV	Point Des Mouton (Lafa) - Labbe (Lafa) 230kV	61
Colonial Academy - Richard 138kV	Point Des Mouton (Lafa) - Labbe (Lafa) 230kV	92
Greenwood - Terrebone 115kV	Webre - Wells 500kV	146

LAGN

Limiting Element	Contingency Element	ATC
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0

LEPA

Limiting Element	Contingency Element	ATC
Semere - Scott2 138kV	Bonin - Labbe 230kV (LAFA)	0
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Semere - Scott2 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
North Crowley - Scott1 138kV	Bonin - Labbe 230kV (LAFA)	0
Scott1 - Bonin 138kV	Bonin - Labbe 230kV (LAFA)	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0
Semere - Scott2 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Bonin - Cecelia 138kV	Colonial Academy - Richard 138kV	0
North Crowley - Scott1 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Bonin - Cecelia 138kV	Acadia GSU - Colonial Academy 138kV	0
Bonin - Cecelia 138kV	Acadia GSU - Scanlan 138kV	0
Colonial Academy - Richard 138kV	Bonin - Labbe 230kV (LAFA)	3
North Crowley - Scott1 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	21
Judice - Scott1 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	145

OKGE

Limiting Element	Contingency Element	ATC
Bull Shoals - Bull Shoals Dam SPA 161kV	Bull Shoals - Lead Hills 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Clevcov - Lead HL 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0

SMEPA

Limiting Element	Contingency Element	ATC
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0

SOCO

Limiting Element	Contingency Element	ATC
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0

SPA

Limiting Element	Contingency Element	ATC
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0

TVA

Limiting Element	Contingency Element	ATC
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0

APPENDIX A-F: DETAILS OF SCENARIO 4 2014

AECI

Limiting Element	Contingency Element	ATC
NONE	NONE	150

AEP-W

Limiting Element	Contingency Element	ATC
NONE	NONE	150

AMRN

Limiting Element	Contingency Element	ATC
NONE	NONE	150

CLECO

Limiting Element	Contingency Element	ATC
North Crowley - Scott1 138kV	Richard - Scott1 138kV	0
McAdams 500/230kV transformer 1	Lakeover - McAdams 500kV	0
Richard - Scott1 138kV	North Crowley - Richard 138kV	0
Habetz - Richard 138kV	Bonin - Labbe 230kV (LAFA)	0
Judice - Scott1 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	0
Semere - Scott2 138kV	Wells 500/230kV transformer	0
Bogalusa - Adams Creek 230kV ckt 2	Bogalusa - Adams Creek 230kV ckt 1	0
Richard - Scott1 138kV	North Crowley - Scott1 138kV	0
North Crowley - Scott1 138kV	Wells 500/230kV transformer	0
North Crowley - Richard 138kV	Richard - Scott1 138kV	0
Habetz - Richard 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Colonial Academy - Richard 138kV	Wells 500/230kV transformer	0
Habetz - Richard 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Moril - Cecelia 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	0
Richard - Scott1 138kV	Wells 500/230kV transformer	0
Richard - Scott1 138kV	Colonial Academy - Richard 138kV	0
Judice - Meaux 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	0
Acadia GSU - Colonial Academy 138kV	Wells 500/230kV transformer	0
Richard - Scott1 138kV	Acadia GSU - Colonial Academy 138kV	0
Habetz - Richard 138kV	Acadian - Bonin 230kV (LAFA)	0
Richard - Scott1 138kV	Acadia GSU - Scanlan 138kV	0
Acadia GSU - Scanlan 138kV	Wells 500/230kV transformer	95
North Crowley - Richard 138kV	Wells 500/230kV transformer	131

EES

Limiting Element	Contingency Element	ATC
Willow Glen 500/230kV Transformer	Coly 500/230kV transformer	0
McAdams 500/230kV transformer 1	Lakeover - McAdams 500kV	0
Bogalusa - Adams Creek 230kV ckt 2	Bogalusa - Adams Creek 230kV ckt 1	0
Willow Glen 500/230kV Transformer	Willow Glen - Willow Glen 2 500/138kV transformer 1	0
Willow Glen - Willow Glen 2 500/138kV transformer 1	Willow Glen 500/230kV Transformer	30

EMDE

Limiting Element	Contingency Element	ATC
NONE	NONE	150

LAGN

Limiting Element	Contingency Element	ATC
McAdams 500/230kV transformer 1	Lakeover - McAdams 500kV	0
Bogalusa - Adams Creek 230kV ckt 2	Bogalusa - Adams Creek 230kV ckt 1	0

LAFA

Limiting Element	Contingency Element	ATC
McAdams 500/230kV transformer 1	Lakeover - McAdams 500kV	0
Semere - Scott2 138kV	Bonin - Cecelia 138kV	0
Semere - Scott2 138kV	Bonin - Labbe 230kV (LAFA)	0
Bogalusa - Adams Creek 230kV ckt 2	Bogalusa - Adams Creek 230kV ckt 1	0
North Crowley - Scott1 138kV	Bonin - Labbe 230kV (LAFA)	0
Semere - Scott2 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	0
North Crowley - Scott1 138kV	Richard - Scott1 138kV	0
Semere - Scott2 138kV	Richard - Wells 500kV	0
Colonial Academy - Richard 138kV	Bonin - Labbe 230kV (LAFA)	0
Semere - Scott2 138kV	Richard - Scott1 138kV	0
Semere - Scott2 138kV	North Crowley - Richard 138kV	0
North Crowley - Scott1 138kV	Richard - Wells 500kV	0
Acadia GSU - Colonial Academy 138kV	Bonin - Labbe 230kV (LAFA)	0
Colonial Academy - Richard 138kV	Bonin - Cecelia 138kV	0
Richard - Scott1 138kV	Bonin - Labbe 230kV (LAFA)	0
North Crowley - Scott1 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
North Crowley - Scott1 138kV	Colonial Academy - Richard 138kV	0
North Crowley - Scott1 138kV	Acadia GSU - Colonial Academy 138kV	0
North Crowley - Scott1 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Richard - Scott1 138kV	North Crowley - Richard 138kV	0

Limiting Element	Contingency Element	ATC
Acadia GSU - Scanlan 138kV	Bonin - Labbe 230kV (LAFA)	0
Colonial Academy - Richard 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Colonial Academy - Richard 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	0
Habetz - Richard 138kV	Bonin - Labbe 230kV (LAFA)	0
Colonial Academy - Richard 138kV	Richard - Scott1 138kV	0
Richard - Scott1 138kV	North Crowley - Scott1 138kV	0
Colonial Academy - Richard 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
North Crowley - Richard 138kV	Bonin - Labbe 230kV (LAFA)	0
North Crowley - Richard 138kV	Richard - Scott1 138kV	0
Acadia GSU - Colonial Academy 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Richard - Scott1 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Acadia GSU - Colonial Academy 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Richard - Scott1 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Acadia GSU - Scanlan 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Acadia GSU - Colonial Academy 138kV	Richard - Scott1 138kV	0
Acadia GSU - Colonial Academy 138kV	Bonin - Cecelia 138kV	0
North Crowley - Richard 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Habetz - Richard 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Acadia GSU - Scanlan 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Semere - Scott2 138kV	Base Case	0
Acadia GSU - Colonial Academy 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	0
Richard - Scott1 138kV	Wells 500/230kV transformer	0
Scott1 - Bonin 138kV	Bonin - Labbe 230kV (LAFA)	0
North Crowley - Richard 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Habetz - Richard 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Habetz - Richard 138kV	Acadian - Bonin 230kV (LAFA)	0
Cecelia - Semere 138kV	Bonin - Labbe 230kV (LAFA)	0
Scott1 - Bonin 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	9
Acadia GSU - Scanlan 138kV	Richard - Scott1 138kV	14
Acadia GSU - Scanlan 138kV	Wells 500/230kV transformer	39
Scott1 - Bonin 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	41
North Crowley - Richard 138kV	Wells 500/230kV transformer	47
Cecelia - Semere 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	56
Acadia GSU - Scanlan 138kV	Habetz - Richard 138kV	57
North Crowley - Scott1 138kV	Base Case	79
Cecelia - Semere 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	90
Habetz - Richard 138kV	Flander - Acadian 230kV (LAFA)	90
Habetz - Richard 138kV	Wells 500/230kV transformer	125

LEPA

Limiting Element	Contingency Element	ATC
Addis - Big Cajun 1 230kV	Jaguar - Tap Point Esso 230kV	0
North Crowley - Scott1 138kV	Richard - Scott1 138kV	0
North Crowley - Scott1 138kV	Bonin - Labbe 230kV (LAFA)	0
Semere - Scott2 138kV	Bonin - Labbe 230kV (LAFA)	0
Addis - Big Cajun 1 230kV	Coly - McKnight 500kV	0
North Crowley - Scott1 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Semere - Scott2 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
North Crowley - Scott1 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
McAdams 500/230kV transformer 1	Lakeover - McAdams 500kV	0
Semere - Scott2 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Addis - Big Cajun 1 230kV	Willow Glen - Webre 500kV	0
Colonial Academy - Richard 138kV	Bonin - Labbe 230kV (LAFA)	0
Richard - Scott1 138kV	Bonin - Labbe 230kV (LAFA)	0
Richard - Scott1 138kV	North Crowley - Richard 138kV	0
Semere - Scott2 138kV	Bonin - Cecelia 138kV	0
Colonial Academy - Richard 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Semere - Scott2 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	0
Willow Glen 500/230kV Transformer	Coly 500/230kV transformer	0
North Crowley - Scott1 138kV	Coughlin - Plaisance 138kV (CLECO)	0
Richard - Scott1 138kV	North Crowley - Scott1 138kV	0
Semere - Scott2 138kV	Richard - Wells 500kV	0
Bonin - Cecelia 138kV	Colonial Academy - Richard 138kV	0
Colonial Academy - Richard 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Acadia GSU - Colonial Academy 138kV	Bonin - Labbe 230kV (LAFA)	0
Richard - Scott1 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
North Crowley - Richard 138kV	Richard - Scott1 138kV	0
Bonin - Cecelia 138kV	Acadia GSU - Colonial Academy 138kV	0
Habetz - Richard 138kV	Bonin - Labbe 230kV (LAFA)	0
Richard - Scott1 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
North Crowley - Richard 138kV	Bonin - Labbe 230kV (LAFA)	0
Acadia GSU - Colonial Academy 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Scott1 - Bonin 138kV	Bonin - Labbe 230kV (LAFA)	0
Bonin - Cecelia 138kV	Acadia GSU - Scanlan 138kV	0
Acadia GSU - Scanlan 138kV	Bonin - Labbe 230kV (LAFA)	0
Judice - Scott1 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	0
Acadia GSU - Colonial Academy 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Willow Glen 500/230kV Transformer	Willow Glen - Willow Glen 2 500/138kV transformer 1	0
Semere - Scott2 138kV	Terrebone 230/115kV transformer	0
Colonial Academy - Richard 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	0
Colonial Academy - Richard 138kV	Bonin - Cecelia 138kV	0
Habetz - Richard 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
North Crowley - Richard 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Acadia GSU - Scanlan 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0

Limiting Element	Contingency Element	ATC
Bogalusa - Adams Creek 230kV ckt 2	Bogalusa - Adams Creek 230kV ckt 1	0
Colonial Academy - Richard 138kV	Richard - Wells 500kV	0
Richard - Scott1 138kV	Wells 500/230kV transformer	0
Acadia GSU - Scanlan 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
North Crowley - Richard 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Habetz - Richard 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Port Hudson 230/138 transformer 2	Port Hudson 230/138 transformer 1	0
Port Hudson 230/138 transformer 1	Port Hudson 230/138 transformer 2	0
Bonin - Cecelia 138kV	Scanlan - Scott2 138kV	0
Moril - Cecelia 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	0
Bonin - Cecelia 138kV	Semere - Scott2 138kV	0
Acadia GSU - Colonial Academy 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	0
Judice - Meaux 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	0
Acadia GSU - Colonial Academy 138kV	Bonin - Cecelia 138kV	0
Habetz - Richard 138kV	Acadian - Bonin 230kV (LAFA)	0
Acadia GSU - Colonial Academy 138kV	Richard - Wells 500kV	0
Judice - Scott1 138kV	Acadian - Bonin 230kV (LAFA)	0
Judice - Scott1 138kV	Moril - Cecelia 138kV	0
Cecelia - Semere 138kV	Bonin - Labbe 230kV (LAFA)	0
Willow Glen - Willow Glen 2 500/138kV transformer 1	Willow Glen 500/230kV Transformer	18

OKGE

Limiting Element	Contingency Element	ATC
NONE	NONE	150

SMEPA

Limiting Element	Contingency Element	ATC
Baxter Wilson - Ray Braswell 500kV	Franklin - Grand Gulf 500kV	115

SOCO

Limiting Element	Contingency Element	ATC
NONE	NONE	150

SPA

Limiting Element	Contingency Element	ATC
NONE	NONE	150

TVA

Limiting Element	Contingency Element	ATC
NONE	NONE	150