PID 228
System Impact Study Report
115 MW Plant

Prepared by:

Southwest Power Pool
Independent Coordinator of Transmission
415 N. McKinley, Suite140
Little Rock, AR 72205

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0	7/2/2009	Posting System Impact Study	BEF	JDH

Executive Summary:

This System Impact Study is the second step of the interconnection process and is based on the PID-228 request for interconnection on Entergy's transmission system. Following the Table of Contents, this report is organized in two sections, namely, Section – A, Energy Resource Interconnection Service (ERIS) and Section – B, Network Resource Interconnection Service (NRIS – Section B).

The Scope for the ERIS section (Section – A) includes load flow (steady state) analysis, transient stability analysis and short circuit analysis as defined in FERC orders 2003, 2003A and 2003B. The NRIS section (Section – B) contains details of load flow (steady state) analysis only, however, transient stability analysis and short circuit analysis of Section – A are also applicable to Section – B. Additional information on scope for NRIS study can be found in Section – B.

PID 228 intends to install a 114.8 MW Gas fired boiler – steam turbine project in the Entergy transmission system. The proposed project will be connected through a tap at 1.25 miles from Paterson 115 kV substation on Claiborne - Paterson 115 kV line in Entergy transmission system. The proposed generation was dispatched to 13 interfaces of Entergy's control area. The load flow study was performed on the latest available 2012 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. The requested in-service date for this facility is April 30, 2011.

Results of the System Impact Study contend that under NRIS, the estimated upgrade cost with priors is $170,069,731 and without priors is $134,665,000. The estimated upgrade cost under ERIS with priors is $0 and without priors is $351,000.

Estimated Project Planning Upgrades for PID 228

Study	Estimated cost With Priors ($)	Estimated cost Without Priors ($)
NRIS	$170,069,731	$134,665,000
ERIS	$0	$351,000

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.

TABLE OF CONTENTS FOR ERIS & NRIS

Section – A

Energy Resource Interconnection Service

I. Introduction

This Energy Resource Interconnection Service (ERIS) is based on PID-228's request for generation interconnection on Entergy's transmission system connected through a tap at 1.25 miles from Paterson 115kV substation on Claiborne – Paterson 115kV line in the Entergy transmission system. Generation will come from an 114.8MW Gas fired boiler – steam turbine unit. 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. A transient stability analysis was conducted to determine if the new units would cause a stability problem on the Entergy system.

This ERIS System Impact Study was based on information provided by PID-228 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.

A. 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-228 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-228 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-228 generation. The breakers identified to be upgraded through this comparison are *mandatory* upgrades.

C. *Analysis Results*

There were no breakers that were found to be under-rated as a result of the additional short circuit current due to PID-228 generator With Priors.

The results of the short circuit analysis indicates that the additional generation due to PID-228 generator causes 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-228 plant Without Priors.

Table I: Underrated Breakers Without Priors Include

Location	Breaker	Duty % w/o PID 228	Max Fault w/o PID-228 (amps)	Duty % w/ PID 228	Max Fault with PID-228 (amps)	Interrupting Rating (amps)
Michoud 115kV	N9803-CO	99.9	50204.4	101.7	51058.5	50205.0

Table I illustrates the station location, worst case fault level, and the number of breakers that were found to be under-rated at the respective locations as a result of the additional short circuit current due to PID-228 generator and includes prior PID's 211, 215, 216, 217, 222, 223 and 224.

D. *Problem Resolution*

Table II illustrates the station location, and the cost associated with upgrading the breakers at each station both for mandatory and optional breaker upgrades.

Table II: Cost of Underrated Breakers Without Priors

Location	Number of Breakers	New Breaker Rating (amps)	Estimated cost of Breaker Upgrades ($)
Michoud 115kV	1	63,000	$351,900

* Price based on 145kV w/63kA Breaker

The impact on breaker rating due to line upgrades will be evaluated during facilities study phase.

The results of the short circuit analysis based upon the current configuration of the Entergy transmission system and Generation Interconnection Study Queue. Therefore, these results are subject to change.

II. Load Flow Analysis

A. Model Information

The load flow analysis was performed based on the projected 2012 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 2012 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 PID-228 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] 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-228. The one-line diagram of PID-228 facilities as modeled in the load flow analysis, and. Customer supplied data are shown in **Appendix A**. The data used to build the load flow and dynamic models are also shown in **Appendix B**. All stability study plots are shown in **Appendix A & C**, posted separately.

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-228 ERIS Load Flow Study

Interface		Summer and winter 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.	2012	0	0	0	0
AMRN	Ameren Transmission	2012	0	0	0	0
CLEC	CLECO	2012	0	0	0	0
AEPW	American Electric Power - West	2012	0	0	0	0
EES	Entergy	2012	0	0	0	0
EDE	Empire District Electric Co	2012	0	0	0	0
LAF	Lafayette Utilities System	2012	0	0	0	0
LAGN	Louisiana Generating, LLC	2012	0	0	0	0
LEPA	Louisiana Energy & Power Authority	2012	0	0	0	0
OGE	Oklahoma Gas & Electric Company	2012	0	0	0	0
SME	South Mississippi Electric Power Assoc.	2012	0	0	0	0
SOCO	Southern Company	2012	0	0	0	0
SPA	Southwest Power Administration	2012	0	0	0	0
TVA	Tennessee Valley Authority	2012	0	0	0	0

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
Belle Point - Gypsy 230kV	Base Plan	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Belle Point - Tezcuco 230kV	TBD	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Bonin - Cecelia 138kV	$4,792,500									X					
Bull Shoals - Bull Shoals Dam SPA 161kV	$427,500						X								
Calico Rock - Melborne 161kV	$24,945,000						X							X	
Colonial Academy - Richard 138kV	$7,957,500							X							
Danville - North Magazine REA 161kV	$10,530,000		X				X				X			X	
Gibson - Humphrey 115kV	$47,327,390	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Greenwood - Humphrey 115kV	$3,838,000	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Greenwood - Terrebone 115kV	$22,850,381	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Harrison East - Everton 161kV	$5,602,000						X								
Judice - Scott1 138kV	$10,000,000									X					
Louisiana Station - Thomas 138kV	$2,544,750				X			X		X					
'MANSFLD4 138' TO BUS 'IPAPER 4 138'	TBD	X	X				X				X			X	
Melborne - Sage 161kV	$7,155,000						X				X			X	
North Crowley - Scott1 138kV	$39,707,607							X		X					
PID 228 - Claiborne 115kV	--	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Pontchartrain Park - Paterson 115kV	TBD	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Raceland - Coteau 115kV	$3,065,000									X					
Scott1 - Bonin 138kV	$7,410,000							X		X					
Semere - Scott2 138kV	$24,345,000							X							
St. Joe - Hilltop 161kV	$3,170,000						X								
Sterlington 500/115kV transformer 2	$18,737,621	X	X	X	X	X	X				X			X	
Tezcuco - Waterford 230kV	TBD	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Vacherie - Waterford 230kV	Base Plan	X	X	X	X	X	X	X	X	X	X	X	X	X	X

TABLE II-C-2 DETAILS OF SCENARIO 2 RESULTS: (WITHOUT 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
Ameila Bulk - Bevil 230kV	TBD					X									
Belle Point - Gypsy 230kV	Base Plan	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Bevil - Cypress 230kV	TBD					X									
Chauvin - Ashland 115kV	$4,606,875									X					
Chauvin - Valentine 115kV	$6,571,125									X					
Convent - Frisco 230kV	$6,257,250	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Conway - Wyandotte 138kV	TBD									X					
Cypress 500/138kV transformer 1	TBD		X		X	X									
Frisco - Tezcuco 230kV ckt 1	TBD	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Frisco - Tezcuco 230kV ckt 2	TBD	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geismar - Wyandotte 138kV	TBD									X					
Gibson - Humphrey 115kV	$21,584,961				X			X		X					
Gonzales - Sorrento 138kV	TBD									X					
Greenwood - Humphrey 115kV	$2,700,000	X	X	X	X	X	X	X	X	X	X		X	X	X
Greenwood - Terrebone 115kV	$22,850,381	X	X	X	X	X	X	X	X	X	X		X	X	X
Hartburg - Inland Orange 230kV	$2,985,000		X		X	X									
Hartburg 500/230kV transformer 1	TBD		X		X	X									
Helbig - McLewis 230kV	$26,740,000		X		X	X									
Inland - McLewis 230kV	$4,912,500		X		X	X									
LaBarre - South Port 230kV	$3,675,000	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Louisiana Station - Thomas 138kV	$2,544,750				X			X		X					
Raceland - Coteau 115kV	$3,065,000				X			X		X					
Scott1 - Bonin 138kV	$7,410,000							X							
Sorrento 138/115kV transformer 1	TBD									X					
Terrebone 230/115kV transformer	$5,250,000									X					
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	TBD	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Vacherie - Waterford 230kV	$7,480,350	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Webre 500/230kV transformer Supplemental Upgrade 9Mile	TBD	X	X	X	X	X	X	X	X	X	X	X	X	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
Belle Point - Gypsy 230kV	Base Plan	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Belle Point - Tezcuco 230kV	TBD	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Bonin - Cecelia 138kV	$4,792,500									X					
Bull Shoals - Bull Shoals Dam SPA 161kV	$427,500						X								
Calico Rock - Melborne 161kV	$24,945,000						X							X	
Colonial Academy - Richard 138kV	$7,957,500							X							
Gibson - Humphrey 115kV	$47,327,390	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Greenwood - Humphrey 115kV	$3,838,000	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Greenwood - Terrebone 115kV	$22,850,381	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Harrison East - Everton 161kV	$5,602,000						X								
Judice - Scott1 138kV	$10,000,000									X					
Louisiana Station - Thomas 138kV	$2,544,750				X			X		X					
'MANSFLD4 138' TO BUS 'IPAPER 4 138'	TBD		X				X				X			X	
Melborne - Sage 161kV	$3,065,000						X				X			X	
North Crowley - Scott1 138kV	$39,707,607							X		X					
Raceland - Coteau 115kV	$3,065,000									X					
Scott1 - Bonin 138kV	$7,410,000							X		X					
Semere - Scott2 138kV	$24,345,000							X							
St. Joe - Hilltop 161kV	$3,170,000						X								
Tezcuco - Waterford 230kV	TBD	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Vacherie - Waterford 230kV	$7,480,350	X	X	X	X	X	X	X	X	X	X	X	X	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
Ameila Bulk - Bevil 230kV	TBD					X									
Belle Point - Gypsy 230kV	Base Plan	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Bevil - Cypress 230kV	TBD					X									
Chauvin - Ashland 115kV	$4,606,875									X					
Chauvin - Valentine 115kV	$6,571,125									X					
Convent - Frisco 230kV	$6,257,250	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Conway - Wyandotte 138kV	TBD									X					
Cypress 500/138kV transformer 1	TBD		X		X	X									
Frisco - Tezcuco 230kV ckt 1	TBD	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Frisco - Tezcuco 230kV ckt 2	TBD	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geismar - Wyandotte 138kV	TBD									X					
Gibson - Humphrey 115kV	$21,584,961				X			X		X					
Gonzales - Sorrento 138kV	TBD									X					
Greenwood - Humphrey 115kV	$2,700,000	X	X	X	X	X	X	X	X	X	X		X	X	X
Greenwood - Terrebone 115kV	$22,850,381	X	X	X	X	X	X	X	X	X	X		X	X	X
Hartburg - Inland Orange 230kV	$2,985,000		X		X	X									
Hartburg 500/230kV transformer 1	TBD		X		X	X									
Helbig - McLewis 230kV	$26,740,000		X		X	X									
Inland - McLewis 230kV	$4,912,500		X		X	X									
LaBarre - South Port 230kV	$3,675,000	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Louisiana Station - Thomas 138kV	$2,544,750				X			X		X					
Raceland - Coteau 115kV	$3,065,000				X			X		X					
Scott1 - Bonin 138kV	$7,410,000							X							
Sorrento 138/115kV transformer 1	TBD									X					
Terrebone 230/115kV transformer	$5,250,000									X					
Tezcuco - Bayou Steel 230kV Supplemental Upgrade	--	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Vacherie - Waterford 230kV	$7,480,350	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Webre 500/230kV transformer Supplemental Upgrade 9Mile		X	X	X	X	X	X	X	X	X	X	X	X	X	X

DETAILS OF SCENARIO 1

2012

AECI

Limiting Element	Contingency Element	ATC
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
'MANSFLD4 138' TO BUS 'IPAPER 4 138'	Contingency of FlowGate 5029 DOLHILL7 345 TO SW SHV 7 345	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Sterlington 500/115kV transformer 2	Eldorado EHV - Sterlington 500kV	0
PID 228 - Claiborne 115kV	Pontchartrain Park - Paterson 115kV	91
Pontchartrain Park - Paterson 115kV	PID 228 - Claiborne 115kV	91
Tezcuco - Waterford 230kV	Waterford - Willow Glen 500kV	109
Tezcuco - Waterford 230kV	Waterford 500/230 transformer kV	109

AEP-W

Limiting Element	Contingency Element	ATC
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Danville - North Magazine REA 161kV	ANO - Fort Smith 500kV	0
'MANSFLD4 138' TO BUS 'IPAPER 4 138'	Contingency of FlowGate 5029 DOLHILL7 345 TO SW SHV 7 345	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Sterlington 500/115kV transformer 2	Eldorado EHV - Sterlington 500kV	0
PID 228 - Claiborne 115kV	Pontchartrain Park - Paterson 115kV	91
Pontchartrain Park - Paterson 115kV	PID 228 - Claiborne 115kV	91
Tezcuco - Waterford 230kV	Waterford - Willow Glen 500kV	108
Tezcuco - Waterford 230kV	Waterford 500/230 transformer kV	108

AMRN

Limiting Element	Contingency Element	ATC
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Sterlington 500/115kV transformer 2	Eldorado EHV - Sterlington 500kV	0
PID 228 - Claiborne 115kV	Pontchartrain Park - Paterson 115kV	91
Pontchartrain Park - Paterson 115kV	PID 228 - Claiborne 115kV	91
Tezcuco - Waterford 230kV	Waterford - Willow Glen 500kV	109
Tezcuco - Waterford 230kV	Waterford 500/230 transformer kV	109

CLECO

Limiting Element	Contingency Element	ATC
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Louisiana Station - Thomas 138kV	Webre - Wells 500kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Sterlington 500/115kV transformer 2	Eldorado EHV - Sterlington 500kV	0
PID 228 - Claiborne 115kV	Pontchartrain Park - Paterson 115kV	91
Pontchartrain Park - Paterson 115kV	PID 228 - Claiborne 115kV	91
Tezcuco - Waterford 230kV	Waterford - Willow Glen 500kV	113
Tezcuco - Waterford 230kV	Waterford 500/230 transformer kV	113

EES

Limiting Element	Contingency Element	ATC
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Sterlington 500/115kV transformer 2	Eldorado EHV - Sterlington 500kV	0
PID 228 - Claiborne 115kV	Pontchartrain Park - Paterson 115kV	91
Pontchartrain Park - Paterson 115kV	PID 228 - Claiborne 115kV	91

EMDE

Limiting Element	Contingency Element	ATC
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	St. Joe - Hilltop 161kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Everton - St. Joe 161kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
'MANSFLD4 138' TO BUS 'IPAPER 4 138'	Contingency of FlowGate 5029 DOLHILL7 345 TO SW SHV 7 345	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Bull Shoals - Bull Shoals Dam SPA 161kV	Harrison East - Everton 161kV	0
Melborne - Sage 161kV	Dell - Independence SES 500kV	0
Melborne - Sage 161kV	ANO - Fort Smith 500kV	0
St. Joe - Hilltop 161kV	Bull Shoals - Bull Shoals Dam SPA 161kV	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Danville - North Magazine REA 161kV	ANO - Fort Smith 500kV	0
Melborne - Sage 161kV	Newport - Newport Industrial 161kV	0
St. Joe - Hilltop 161kV	Bull Shoals - Flippin 161kV	0
Melborne - Sage 161kV	Newport AB - Newport Industrial 161kV	0
Melborne - Sage 161kV	Cash - Newport AB 161kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Melborne - Sage 161kV	Cash - Jonesboro 161kV	0
Melborne - Sage 161kV	Sansouci - Shelby (TVA) 500kV	0
Melborne - Sage 161kV	Sage - Guion 161kV	0
Melborne - Sage 161kV	Newport - Swifton 161kV	0
St. Joe - Hilltop 161kV	Flippin - Summit 161kV	0
Harrison East - Everton 161kV	Bull Shoals - Bull Shoals Dam SPA 161kV	0

Limiting Element	Contingency Element	ATC
Melborne - Sage 161kV	Mountain View - Guion 161kV	0
Sterlington 500/115kV transformer 2	Eldorado EHV - Sterlington 500kV	0
Harrison East - Everton 161kV	Bull Shoals - Flippin 161kV	27
PID 228 - Claiborne 115kV	Pontchartrain Park - Paterson 115kV	91
Pontchartrain Park - Paterson 115kV	PID 228 - Claiborne 115kV	91
Calico Rock - Melborne 161kV	ANO - Fort Smith 500kV	97
St. Joe - Hilltop 161kV	Harrison East - Summit 161kV	104
Tezcuco - Waterford 230kV	Waterford - Willow Glen 500kV	109
Tezcuco - Waterford 230kV	Waterford 500/230 transformer kV	109

LAFA

Limiting Element	Contingency Element	ATC
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Semere - Scott2 138kV	Bonin - Labbe 230kV (LAFA)	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	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
Louisiana Station - Thomas 138kV	Webre - Wells 500kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Scott1 - Bonin 138kV	Bonin - Labbe 230kV (LAFA)	0
North Crowley - Scott1 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Colonial Academy - Richard 138kV	Bonin - Labbe 230kV (LAFA)	1
North Crowley - Scott1 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	3
Scott1 - Bonin 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	24
Scott1 - Bonin 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	56
Colonial Academy - Richard 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	61
PID 228 - Claiborne 115kV	Pontchartrain Park - Paterson 115kV	91
Pontchartrain Park - Paterson 115kV	PID 228 - Claiborne 115kV	91
Colonial Academy - Richard 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	97
Tezcuco - Waterford 230kV	Waterford - Willow Glen 500kV	112
Tezcuco - Waterford 230kV	Waterford 500/230 transformer kV	112

LAGN

Limiting Element	Contingency Element	ATC
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
PID 228 - Claiborne 115kV	Pontchartrain Park - Paterson 115kV	91
Pontchartrain Park - Paterson 115kV	PID 228 - Claiborne 115kV	91
Tezcuco - Waterford 230kV	Waterford - Willow Glen 500kV	99
Tezcuco - Waterford 230kV	Waterford 500/230 transformer kV	99

LEPA

Limiting Element	Contingency Element	ATC
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Scott1 - Bonin 138kV	Bonin - Labbe 230kV (LAFA)	0
North Crowley - Scott1 138kV	Bonin - Labbe 230kV (LAFA)	0
Bonin - Cecelia 138kV	Colonial Academy - Richard 138kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Bonin - Cecelia 138kV	Acadia - Colonial Academy 138kV	0
North Crowley - Scott1 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Bonin - Cecelia 138kV	Acadia GSU - Scanlan 138kV	0
Louisiana Station - Thomas 138kV	Webre - Wells 500kV	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Judice - Scott1 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	12
North Crowley - Scott1 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	17
Vacherie - Waterford 230kV	Landry - Raceland 230kV	76
Pontchartrain Park - Paterson 115kV	PID 228 - Claiborne 115kV	91
PID 228 - Claiborne 115kV	Pontchartrain Park - Paterson 115kV	91
Raceland - Coteau 115kV	Terrebone 230/115kV transformer	96

OKGE

Limiting Element	Contingency Element	ATC
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Melborne - Sage 161kV	ANO - Fort Smith 500kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
'MANSFLD4 138' TO BUS 'IPAPER 4 138'	Contingency of FlowGate 5029 DOLHILL7 345 TO SW SHV 7 345	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Danville - North Magazine REA 161kV	ANO - Fort Smith 500kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Sterlington 500/115kV transformer 2	Eldorado EHV - Sterlington 500kV	0
PID 228 - Claiborne 115kV	Pontchartrain Park - Paterson 115kV	91
Pontchartrain Park - Paterson 115kV	PID 228 - Claiborne 115kV	91
Tezcuco - Waterford 230kV	Waterford - Willow Glen 500kV	108
Tezcuco - Waterford 230kV	Waterford 500/230 transformer kV	108

SMEPA

Limiting Element	Contingency Element	ATC
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
PID 228 - Claiborne 115kV	Pontchartrain Park - Paterson 115kV	91
Pontchartrain Park - Paterson 115kV	PID 228 - Claiborne 115kV	91

SOCO

Limiting Element	Contingency Element	ATC
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
PID 228 - Claiborne 115kV	Pontchartrain Park - Paterson 115kV	91
Pontchartrain Park - Paterson 115kV	PID 228 - Claiborne 115kV	91
Tezcuco - Waterford 230kV	Waterford - Willow Glen 500kV	112
Tezcuco - Waterford 230kV	Waterford 500/230 transformer kV	112

SPA

Limiting Element	Contingency Element	ATC
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
'MANSFLD4 138' TO BUS 'IPAPER 4 138'	Contingency of FlowGate 5029 DOLHILL7 345 TO SW SHV 7 345	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Danville - North Magazine REA 161kV	ANO - Fort Smith 500kV	0
Melborne - Sage 161kV	Dell - Independence SES 500kV	0
Melborne - Sage 161kV	ANO - Fort Smith 500kV	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Melborne - Sage 161kV	Newport - Newport Industrial 161kV	0
Melborne - Sage 161kV	Newport AB - Newport Industrial 161kV	0
Melborne - Sage 161kV	Cash - Newport AB 161kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Melborne - Sage 161kV	Cash - Jonesboro 161kV	0
Melborne - Sage 161kV	Sansouci - Shelby (TVA) 500kV	0
Melborne - Sage 161kV	Sage - Guion 161kV	0
Melborne - Sage 161kV	Newport - Swifton 161kV	0
Melborne - Sage 161kV	Mountain View - Guion 161kV	0
Sterlington 500/115kV transformer 2	Eldorado EHV - Sterlington 500kV	0
Calico Rock - Melborne 161kV	ANO - Fort Smith 500kV	83
PID 228 - Claiborne 115kV	Pontchartrain Park - Paterson 115kV	91
Pontchartrain Park - Paterson 115kV	PID 228 - Claiborne 115kV	91
Calico Rock - Melborne 161kV	Dell - Independence SES 500kV	91
Tezcuco - Waterford 230kV	Waterford - Willow Glen 500kV	109
Tezcuco - Waterford 230kV	Waterford 500/230 transformer kV	109

TVA

Limiting Element	Contingency Element	ATC
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
PID 228 - Claiborne 115kV	Pontchartrain Park - Paterson 115kV	91
Pontchartrain Park - Paterson 115kV	PID 228 - Claiborne 115kV	91
Tezcuco - Waterford 230kV	Waterford - Willow Glen 500kV	110
Tezcuco - Waterford 230kV	Waterford 500/230 transformer kV	110

APPENDIX A-D: DETAILS OF SCENARIO 2

2012

AECI

Limiting Element	Contingency Element	ATC
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Wells 500/230kV transformer	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Helene - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Gypsy - WESCO 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Polsky Carville - Willow Glen 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0

Limiting Element	Contingency Element	ATC
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
LaBarre - South Port 230kV	Harahan - Kenner 230kV	17
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	20
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	25
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	75
Greenwood - Humphrey 115kV	Webre - Wells 500kV	85
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	99

AEP-W

Limiting Element	Contingency Element	ATC
Hartburg - Inland Orange 230kV	Cypress - Hartburg 500kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Inland - McLewis 230kV	Cypress - Hartburg 500kV	0
Helbig - McLewis 230kV	Cypress - Hartburg 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Helene - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Gypsy - WESCO 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Polsky Carville - Willow Glen 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Wells 500/230kV transformer	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0

Limiting Element	Contingency Element	ATC
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Hartburg 500/230kV transformer 1	Cypress - Hartburg 500kV	0
Cypress 500/138kV transformer 1	Cypress 500/230kV transformer	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
LaBarre - South Port 230kV	Harahan - Kenner 230kV	16
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	20
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	25
Greenwood - Humphrey 115kV	Webre - Wells 500kV	72
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	75
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	97

AMRN

Limiting Element	Contingency Element	ATC
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Wells 500/230kV transformer	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Helene - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Gypsy - WESCO 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Polsky Carville - Willow Glen 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
LaBarre - South Port 230kV	Harahan - Kenner 230kV	17
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	20
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	25
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	76
Greenwood - Humphrey 115kV	Webre - Wells 500kV	88
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	99

CLECO

Limiting Element	Contingency Element	ATC
Hartburg - Inland Orange 230kV	Cypress - Hartburg 500kV	0
Inland - McLewis 230kV	Cypress - Hartburg 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Helbig - McLewis 230kV	Cypress - Hartburg 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Fairview - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Helene - Licar 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Cocodrie - Vil Plat 230kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Vil Plat - West Fork 230kV	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Raceland - Coteau 115kV	Terrebone 230/115kV transformer	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
Louisiana Station - Thomas 138kV	Webre - Wells 500kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
Hartburg 500/230kV transformer 1	Cypress - Hartburg 500kV	0
Cypress 500/138kV transformer 1	Cypress 500/230kV transformer	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0

EES

Limiting Element	Contingency Element	ATC
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Hartburg - Inland Orange 230kV	Cypress - Hartburg 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Inland - McLewis 230kV	Cypress - Hartburg 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Fairview - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Tezcuco 230kV	0
Helbig - McLewis 230kV	Cypress - Hartburg 500kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Bevil - Cypress 230kV	Hartburg 500/230kV transformer 1	0
Bevil - Cypress 230kV	Hartburg - Inland Orange 230kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
Bevil - Cypress 230kV	Inland - McLewis 230kV	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
Ameila Bulk - Bevil 230kV	Hartburg 500/230kV transformer 1	0
Ameila Bulk - Bevil 230kV	Hartburg - Inland Orange 230kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
Bevil - Cypress 230kV	Helbig - McLewis 230kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
Hartburg 500/230kV transformer 1	Cypress - Hartburg 500kV	0
Cypress 500/138kV transformer 1	Cypress 500/230kV transformer	0
Ameila Bulk - Bevil 230kV	Inland - McLewis 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
LaBarre - South Port 230kV	Harahan - Kenner 230kV	16
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	22

Limiting Element	Contingency Element	ATC
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	25
Ameila Bulk - Bevil 230kV	Helbig - McLewis 230kV	54
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	74
Greenwood - Humphrey 115kV	Webre - Wells 500kV	92
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	98
Greenwood - Terrebone 115kV	Richard - Wells 500kV	110

EMDE

Limiting Element	Contingency Element	ATC
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Wells 500/230kV transformer	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Helene - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Gypsy - WESCO 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Polsky Carville - Willow Glen 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
LaBarre - South Port 230kV	Harahan - Kenner 230kV	16
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	20

Limiting Element	Contingency Element	ATC
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	25
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	75
Greenwood - Humphrey 115kV	Webre - Wells 500kV	81
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	98

LAFA

Limiting Element	Contingency Element	ATC
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Fairview - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Helene - Licar 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Raceland - Coteau 115kV	Terrebone 230/115kV transformer	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Wells 500/230kV transformer	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Louisiana Station - Thomas 138kV	Webre - Wells 500kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
LaBarre - South Port 230kV	Harahan - Kenner 230kV	15
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	19
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	24
Greenwood - Humphrey 115kV	Webre - Wells 500kV	32

Limiting Element	Contingency Element	ATC
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	72
Scott1 - Bonin 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	76
Gibson - Humphrey 115kV	Webre - Wells 500kV	87
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	91
Scott1 - Bonin 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	108

LAGN

Limiting Element	Contingency Element	ATC
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Fairview - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Helene - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Polsky Carville - Willow Glen 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
LaBarre - South Port 230kV	Harahan - Kenner 230kV	15
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	18
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	22
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	72
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	90

Limiting Element	Contingency Element	ATC
Greenwood - Humphrey 115kV	Webre - Wells 500kV	92

LEPA

Limiting Element	Contingency Element	ATC
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Wells 500/230kV transformer	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Fairview - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Gypsy - WESCO 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Gypsy - LaPlace 115kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Gonzales - Sorrento 138kV	Conway - Wyandotte 138kV	0
Gonzales - Sorrento 138kV	Geismar - Wyandotte 138kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Louisiana Station - Thomas 138kV	Webre - Wells 500kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
Raceland - Coteau 115kV	Terrebone 230/115kV transformer	0
Sorrento 138/115kV transformer 1	Conway - Wyandotte 138kV	0
Sorrento 138/115kV transformer 1	Geismar - Wyandotte 138kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
Gonzales - Sorrento 138kV	Louisiana Station - Wilbert 138kV	0
Greenwood - Terrebone 115kV	Bayou Sales - WaxLake 138kV (CLECO)	14
LaBarre - South Port 230kV	Harahan - Kenner 230kV	16
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	37
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	37

Limiting Element	Contingency Element	ATC
Greenwood - Humphrey 115kV	Webre - Wells 500kV	41
Louisiana Station - Thomas 138kV	Big Cajun 2 - Webre 500kV	50
Greenwood - Terrebone 115kV	Bayou Sales - Teche 138kV (CLECO)	61
Terrebone 230/115kV transformer	Raceland - Coteau 115kV	69
Chauvin - Valentine 115kV	Coteau - Houma 115kV	72
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	73
Chauvin - Ashland 115kV	Coteau - Houma 115kV	84
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	94
Greenwood - Terrebone 115kV	ELPTAP - Wax Lake 138kV (CLECO)	97
Conway - Wyandotte 138kV	Gonzales - Sorrento 138kV	97
Conway - Wyandotte 138kV	Sorrento 138/115kV transformer 1	97
Geismar - Wyandotte 138kV	Gonzales - Sorrento 138kV	101
Geismar - Wyandotte 138kV	Sorrento 138/115kV transformer 1	101
Gibson - Humphrey 115kV	Webre - Wells 500kV	109

OKGE

Limiting Element	Contingency Element	ATC
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Wells 500/230kV transformer	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Helene - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Gypsy - WESCO 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Polsky Carville - Willow Glen 230kV	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0

Limiting Element	Contingency Element	ATC
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
LaBarre - South Port 230kV	Harahan - Kenner 230kV	16
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	20
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	25
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	75
Greenwood - Humphrey 115kV	Webre - Wells 500kV	78
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	98

SMEPA

Limiting Element	Contingency Element	ATC
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Gypsy - WESCO 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Helene - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Tezcuco 230kV	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
LaBarre - South Port 230kV	Harahan - Kenner 230kV	18
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	22

Limiting Element	Contingency Element	ATC
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	28
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	80
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	110

SOCO

Limiting Element	Contingency Element	ATC
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Helene - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Gypsy - WESCO 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Polsky Carville - Willow Glen 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
LaBarre - South Port 230kV	Harahan - Kenner 230kV	17
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	21
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	26
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	77
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	103
Greenwood - Humphrey 115kV	Webre - Wells 500kV	106

SPA

Limiting Element	Contingency Element	ATC
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Wells 500/230kV transformer	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Helene - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Gypsy - WESCO 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Polsky Carville - Willow Glen 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
LaBarre - South Port 230kV	Harahan - Kenner 230kV	16
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	20
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	25
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	75
Greenwood - Humphrey 115kV	Webre - Wells 500kV	81
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	98

TVA

Limiting Element	Contingency Element	ATC
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Helene - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Gypsy - WESCO 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Polsky Carville - Willow Glen 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Franklin - Mcknight 500kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
LaBarre - South Port 230kV	Harahan - Kenner 230kV	17
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	21
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	26
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	76
Greenwood - Humphrey 115kV	Webre - Wells 500kV	95
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	100
Greenwood - Terrebone 115kV	Richard - Wells 500kV	112

APPENDIX A-E: DETAILS OF SCENARIO 3

2012

AECI

Limiting Element	Contingency Element	ATC
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Tezcuco - Waterford 230kV	Waterford - Willow Glen 500kV	88
Tezcuco - Waterford 230kV	Waterford 500/230 transformer kV	88

AEP-W

Limiting Element	Contingency Element	ATC
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
'MANSFLD4 138' TO BUS 'IPAPER 4 138'	Contingency of FlowGate 5029 DOLHILL7 345 TO SW SHV 7 345	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Tezcuco - Waterford 230kV	Waterford - Willow Glen 500kV	87
Tezcuco - Waterford 230kV	Waterford 500/230 transformer kV	87

AMRN

Limiting Element	Contingency Element	ATC
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Tezcuco - Waterford 230kV	Waterford - Willow Glen 500kV	88
Tezcuco - Waterford 230kV	Waterford 500/230 transformer kV	88

CLECO

Limiting Element	Contingency Element	ATC
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Louisiana Station - Thomas 138kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Waterford - Willow Glen 500kV	91
Tezcuco - Waterford 230kV	Waterford 500/230 transformer kV	91

EES

Limiting Element	Contingency Element	ATC
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Tezcuco - Waterford 230kV	Waterford - Willow Glen 500kV	99
Tezcuco - Waterford 230kV	Waterford 500/230 transformer kV	99

EMDE

Limiting Element	Contingency Element	ATC
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	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
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
'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	Harrison East - Everton 161kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Melborne - Sage 161kV	Dell - Independence SES 500kV	0
Melborne - Sage 161kV	ANO - Fort Smith 500kV	0
St. Joe - Hilltop 161kV	Bull Shoals - Bull Shoals Dam SPA 161kV	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Melborne - Sage 161kV	Newport - Newport Industrial 161kV	0
St. Joe - Hilltop 161kV	Bull Shoals - Flippin 161kV	0
Melborne - Sage 161kV	Newport AB - Newport Industrial 161kV	0
Melborne - Sage 161kV	Cash - Newport AB 161kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Melborne - Sage 161kV	Cash - Jonesboro 161kV	0
Melborne - Sage 161kV	Sansouci - Shelby (TVA) 500kV	0
Melborne - Sage 161kV	Sage - Guion 161kV	0
Melborne - Sage 161kV	Newport - Swifton 161kV	0
St. Joe - Hilltop 161kV	Flippin - Summit 161kV	0
Harrison East - Everton 161kV	Bull Shoals - Bull Shoals Dam SPA 161kV	0
Melborne - Sage 161kV	Mountain View - Guion 161kV	0
Harrison East - Everton 161kV	Bull Shoals - Flippin 161kV	28

Limiting Element	Contingency Element	ATC
Tezcuco - Waterford 230kV	Waterford - Willow Glen 500kV	88
Tezcuco - Waterford 230kV	Waterford 500/230 transformer kV	88
Calico Rock - Melborne 161kV	ANO - Fort Smith 500kV	101
St. Joe - Hilltop 161kV	Harrison East - Summit 161kV	105
Calico Rock - Melborne 161kV	Dell - Independence SES 500kV	111

LAFA

Limiting Element	Contingency Element	ATC
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Semere - Scott2 138kV	Bonin - Labbe 230kV (LAFA)	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Semere - Scott2 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
North Crowley - Scott1 138kV	Bonin - Labbe 230kV (LAFA)	0
Semere - Scott2 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Scott1 - Bonin 138kV	Bonin - Labbe 230kV (LAFA)	0
North Crowley - Scott1 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Colonial Academy - Richard 138kV	Bonin - Labbe 230kV (LAFA)	0
Louisiana Station - Thomas 138kV	Webre - Wells 500kV	0
North Crowley - Scott1 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	6
Scott1 - Bonin 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	26
Colonial Academy - Richard 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	45
Scott1 - Bonin 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	58
Colonial Academy - Richard 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	80
Tezcuco - Waterford 230kV	Waterford - Willow Glen 500kV	90
Tezcuco - Waterford 230kV	Waterford 500/230 transformer kV	90

LAGN

Limiting Element	Contingency Element	ATC
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0

Tezcuco - Waterford 230kV	Waterford - Willow Glen 500kV	80
Tezcuco - Waterford 230kV	Waterford 500/230 transformer kV	80

LEPA

Limiting Element	Contingency Element	ATC
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
North Crowley - Scott1 138kV	Bonin - Labbe 230kV (LAFA)	0
Scott1 - Bonin 138kV	Bonin - Labbe 230kV (LAFA)	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Bonin - Cecelia 138kV	Colonial Academy - Richard 138kV	0
Bonin - Cecelia 138kV	Acadia - Colonial Academy 138kV	0
North Crowley - Scott1 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Bonin - Cecelia 138kV	Acadia GSU - Scanlan 138kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Louisiana Station - Thomas 138kV	Webre - Wells 500kV	0
Judice - Scott1 138kV	Flander - Hopkins 138kV (CLECO/LAFA)	12
North Crowley - Scott1 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	30
Vacherie - Waterford 230kV	Landry - Raceland 230kV	49
Raceland - Coteau 115kV	Terrebone 230/115kV transformer	94

OKGE

Limiting Element	Contingency Element	ATC
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Melborne - Sage 161kV	ANO - Fort Smith 500kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
'MANSFLD4 138' TO BUS 'IPAPER 4 138'	Contingency of FlowGate 5029 DOLHILL7 345 TO SW SHV 7 345	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Tezcuco - Waterford 230kV	Waterford - Willow Glen 500kV	87
Tezcuco - Waterford 230kV	Waterford 500/230 transformer kV	87

SMEPA

Limiting Element	Contingency Element	ATC
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Waterford - Willow Glen 500kV	95
Tezcuco - Waterford 230kV	Waterford 500/230 transformer kV	95

SOCO

Limiting Element	Contingency Element	ATC
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Tezcuco - Waterford 230kV	Waterford - Willow Glen 500kV	90
Tezcuco - Waterford 230kV	Waterford 500/230 transformer kV	90

SPA

Limiting Element	Contingency Element	ATC
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
'MANSFLD4 138' TO BUS 'IPAPER 4 138'	Contingency of FlowGate 5029 DOLHILL7 345 TO SW SHV 7 345	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Melborne - Sage 161kV	Dell - Independence SES 500kV	0
Melborne - Sage 161kV	ANO - Fort Smith 500kV	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Melborne - Sage 161kV	Newport - Newport Industrial 161kV	0

Limiting Element	Contingency Element	ATC
Melborne - Sage 161kV	Newport AB - Newport Industrial 161kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Melborne - Sage 161kV	Cash - Newport AB 161kV	0
Melborne - Sage 161kV	Cash - Jonesboro 161kV	0
Melborne - Sage 161kV	Sansouci - Shelby (TVA) 500kV	0
Melborne - Sage 161kV	Sage - Guion 161kV	0
Melborne - Sage 161kV	Newport - Swifton 161kV	0
Melborne - Sage 161kV	Mountain View - Guion 161kV	0
Calico Rock - Melborne 161kV	ANO - Fort Smith 500kV	87
Tezcuco - Waterford 230kV	Waterford - Willow Glen 500kV	88
Tezcuco - Waterford 230kV	Waterford 500/230 transformer kV	88
Calico Rock - Melborne 161kV	Dell - Independence SES 500kV	92

TVA

Limiting Element	Contingency Element	ATC
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Tezcuco - Waterford 230kV	Waterford - Willow Glen 500kV	89
Tezcuco - Waterford 230kV	Waterford 500/230 transformer kV	89

APPENDIX A-F: DETAILS OF SCENARIO 4

2012

AECI

Limiting Element	Contingency Element	ATC
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Wells 500/230kV transformer	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Helene - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Gypsy - WESCO 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Polsky Carville - Willow Glen 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
LaBarre - South Port 230kV	Harahan - Kenner 230kV	17
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	20
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	25
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	75
Greenwood - Humphrey 115kV	Webre - Wells 500kV	85
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	99

AEP-W

Limiting Element	Contingency Element	ATC
Hartburg - Inland Orange 230kV	Cypress - Hartburg 500kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Inland - McLewis 230kV	Cypress - Hartburg 500kV	0
Helbig - McLewis 230kV	Cypress - Hartburg 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Helene - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Gypsy - WESCO 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Polsky Carville - Willow Glen 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Wells 500/230kV transformer	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Hartburg 500/230kV transformer 1	Cypress - Hartburg 500kV	0
Cypress 500/138kV transformer 1	Cypress 500/230kV transformer	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
LaBarre - South Port 230kV	Harahan - Kenner 230kV	16
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	20
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	25
Greenwood - Humphrey 115kV	Webre - Wells 500kV	72

Limiting Element	Contingency Element	ATC
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	75
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	97

AMRN

Limiting Element	Contingency Element	ATC
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Wells 500/230kV transformer	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Helene - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Gypsy - WESCO 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Polsky Carville - Willow Glen 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
LaBarre - South Port 230kV	Harahan - Kenner 230kV	17
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	20
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	25
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	76
Greenwood - Humphrey 115kV	Webre - Wells 500kV	88
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	99

CLECO

Limiting Element	Contingency Element	ATC
Hartburg - Inland Orange 230kV	Cypress - Hartburg 500kV	0
Inland - McLewis 230kV	Cypress - Hartburg 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Helbig - McLewis 230kV	Cypress - Hartburg 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Fairview - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Helene - Licar 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Cocodrie - Vil Plat 230kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Vil Plat - West Fork 230kV	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Raceland - Coteau 115kV	Terrebone 230/115kV transformer	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
Louisiana Station - Thomas 138kV	Webre - Wells 500kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
Hartburg 500/230kV transformer 1	Cypress - Hartburg 500kV	0
Cypress 500/138kV transformer 1	Cypress 500/230kV transformer	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
LaBarre - South Port 230kV	Harahan - Kenner 230kV	15
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	20
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	24

Limiting Element	Contingency Element	ATC
Greenwood - Humphrey 115kV	Webre - Wells 500kV	36
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	73
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	93
Gibson - Humphrey 115kV	Webre - Wells 500kV	95

EES

Limiting Element	Contingency Element	ATC
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Hartburg - Inland Orange 230kV	Cypress - Hartburg 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Inland - McLewis 230kV	Cypress - Hartburg 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Fairview - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Tezcuco 230kV	0
Helbig - McLewis 230kV	Cypress - Hartburg 500kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Bevil - Cypress 230kV	Hartburg 500/230kV transformer 1	0
Bevil - Cypress 230kV	Hartburg - Inland Orange 230kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
Bevil - Cypress 230kV	Inland - McLewis 230kV	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
Ameila Bulk - Bevil 230kV	Hartburg 500/230kV transformer 1	0
Ameila Bulk - Bevil 230kV	Hartburg - Inland Orange 230kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
Bevil - Cypress 230kV	Helbig - McLewis 230kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
Hartburg 500/230kV transformer 1	Cypress - Hartburg 500kV	0
Cypress 500/138kV transformer 1	Cypress 500/230kV transformer	0
Ameila Bulk - Bevil 230kV	Inland - McLewis 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
LaBarre - South Port 230kV	Harahan - Kenner 230kV	16
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	22

Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	25
Ameila Bulk - Bevil 230kV	Helbig - McLewis 230kV	54
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	74
Greenwood - Humphrey 115kV	Webre - Wells 500kV	92
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	98
Greenwood - Terrebone 115kV	Richard - Wells 500kV	110

EMDE

Limiting Element	Contingency Element	ATC
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Wells 500/230kV transformer	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Helene - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Gypsy - WESCO 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Polsky Carville - Willow Glen 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
LaBarre - South Port 230kV	Harahan - Kenner 230kV	16
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	20
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	25

Limiting Element	Contingency Element	ATC
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	75
Greenwood - Humphrey 115kV	Webre - Wells 500kV	81
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	98

LAFA

Limiting Element	Contingency Element	ATC
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Fairview - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Helene - Licar 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Raceland - Coteau 115kV	Terrebone 230/115kV transformer	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Wells 500/230kV transformer	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Louisiana Station - Thomas 138kV	Webre - Wells 500kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
LaBarre - South Port 230kV	Harahan - Kenner 230kV	15
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	19
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	24
Greenwood - Humphrey 115kV	Webre - Wells 500kV	32
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	72

Limiting Element	Contingency Element	ATC
Scott1 - Bonin 138kV	Wells (CLECO) - Point Mouton (LAFA) 230kV	76
Gibson - Humphrey 115kV	Webre - Wells 500kV	87
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	91
Scott1 - Bonin 138kV	Point Des Mouton (LAFA) - Labbe (LAFA) 230kV	108

LAGN

Limiting Element	Contingency Element	ATC
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Fairview - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Helene - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Polsky Carville - Willow Glen 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
LaBarre - South Port 230kV	Harahan - Kenner 230kV	15
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	18
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	22
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	72
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	90
Greenwood - Humphrey 115kV	Webre - Wells 500kV	92

LEPA

Limiting Element	Contingency Element	ATC
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Wells 500/230kV transformer	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Fairview - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Gypsy - WESCO 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Gypsy - LaPlace 115kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Gonzales - Sorrento 138kV	Conway - Wyandotte 138kV	0
Gonzales - Sorrento 138kV	Geismar - Wyandotte 138kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Louisiana Station - Thomas 138kV	Webre - Wells 500kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
Raceland - Coteau 115kV	Terrebone 230/115kV transformer	0
Sorrento 138/115kV transformer 1	Conway - Wyandotte 138kV	0
Sorrento 138/115kV transformer 1	Geismar - Wyandotte 138kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
Gonzales - Sorrento 138kV	Louisiana Station - Wilbert 138kV	0
Greenwood - Terrebone 115kV	Bayou Sales - WaxLake 138kV (CLECO)	14
LaBarre - South Port 230kV	Harahan - Kenner 230kV	16
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	37
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	37
Greenwood - Humphrey 115kV	Webre - Wells 500kV	41
Louisiana Station - Thomas 138kV	Big Cajun 2 - Webre 500kV	50

Limiting Element	Contingency Element	ATC
Greenwood - Terrebone 115kV	Bayou Sales - Teche 138kV (CLECO)	61
Terrebone 230/115kV transformer	Raceland - Coteau 115kV	69
Chauvin - Valentine 115kV	Coteau - Houma 115kV	72
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	73
Chauvin - Ashland 115kV	Coteau - Houma 115kV	84
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	94
Greenwood - Terrebone 115kV	ELPTAP - Wax Lake 138kV (CLECO)	97
Conway - Wyandotte 138kV	Gonzales - Sorrento 138kV	97
Conway - Wyandotte 138kV	Sorrento 138/115kV transformer 1	97
Geismar - Wyandotte 138kV	Gonzales - Sorrento 138kV	101
Geismar - Wyandotte 138kV	Sorrento 138/115kV transformer 1	101
Gibson - Humphrey 115kV	Webre - Wells 500kV	109

OKGE

Limiting Element	Contingency Element	ATC
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Wells 500/230kV transformer	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Helene - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Gypsy - WESCO 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Polsky Carville - Willow Glen 230kV	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0

Limiting Element	Contingency Element	ATC
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
LaBarre - South Port 230kV	Harahan - Kenner 230kV	16
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	20
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	25
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	75
Greenwood - Humphrey 115kV	Webre - Wells 500kV	78
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	98

SMEPA

Limiting Element	Contingency Element	ATC
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Gypsy - WESCO 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Helene - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Tezcuco 230kV	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
LaBarre - South Port 230kV	Harahan - Kenner 230kV	18
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	22
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	28
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	80
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	110

SOCO

Limiting Element	Contingency Element	ATC
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Helene - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Gypsy - WESCO 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Polsky Carville - Willow Glen 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
LaBarre - South Port 230kV	Harahan - Kenner 230kV	17
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	21
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	26
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	77
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	103
Greenwood - Humphrey 115kV	Webre - Wells 500kV	106

SPA

Limiting Element	Contingency Element	ATC
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Wells 500/230kV transformer	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Helene - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Gypsy - WESCO 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Polsky Carville - Willow Glen 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
LaBarre - South Port 230kV	Harahan - Kenner 230kV	16
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	20
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	25
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	75
Greenwood - Humphrey 115kV	Webre - Wells 500kV	81
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	98

TVA

Limiting Element	Contingency Element	ATC
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Helene - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Gypsy - WESCO 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Polsky Carville - Willow Glen 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Franklin - Mcknight 500kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
LaBarre - South Port 230kV	Claytonia - Gypsy 115kV	0
LaBarre - South Port 230kV	Harahan - Kenner 230kV	17
Convent - Frisco 230kV	Dutch Bayou - Frisco 230kV	21
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	26
LaBarre - South Port 230kV	Pontchartrain Park - Paterson 115kV	76
Greenwood - Humphrey 115kV	Webre - Wells 500kV	95
LaBarre - South Port 230kV	Destrehan - Kenner 230kV	100
Greenwood - Terrebone 115kV	Richard - Wells 500kV	112

III. Transient Stability Analysis

A stability analysis has been performed for System Impact study of PID-228, which is a request for 114.80 MW Gas fired boiler – steam turbine project in the Entergy transmission system. The proposed project will be connected through a tap at 1.25 miles from Paterson 115 kV substation on Claiborne - Paterson 115 kV line in Entergy transmission system.

The objective of this study was to evaluate the impact of proposed PID-228 (114.80 MW) project on system stability and the nearby transmission system and generating stations. The study was performed on 2012 Summer Peak case, provided by SPP/Entergy. Figure 0-1 (following page) shows the location of the proposed PID-228 (114.80 MW) project.

The system was found to be STABLE following all normally cleared 3-phase faults and delayed clearing single-line-to-ground (SLG) faults. Following seven (7) three-phase stuck-breaker faults the system was found to be UNSTABLE in both, WITH and WITHOUT PID-228 project, cases. Following Fault 11a (6+9 cycle 3-phase stuck breaker fault, cleared by tripping Market street 230/115 kV transformer) system was found to be UNSTABLE after interconnection of proposed PID-228 project. The stuck breaker 3-phase faults will be an extreme contingency (NERC Category D). No voltage criteria violation was observed following simulated faults with STABLE system conditions.

The instability following 6+9 cycle 3-phase stuck breaker fault involving loss of Market street 230/115 kV transformer can be mitigated by using a faster clearing time or add a 230/115 kV transformer in parallel to the existing transformer at Market street substation[1].

A sensitivity analysis was performed to investigate the UNSTABLE system conditions following 3-phase stuck breaker faults WITH and WITHOUT PID-228 project. Entergy indicated that the Paterson Unit #3 and Unit #4 (Total 152.4 MW) suffered extensive damage during Hurricane Katrina. Their return to service date is yet to be determined. Hence, the fault resulting in UNSTABLE system conditions were repeated with the Paterson units off-line. The system was found to be UNSTABLE following faults near Michoud 115 kV and 230 kV substations (Faults 5a through 12a, except Fault_11a) in both cases, WITH and WITHOUT PID-228 project. The faults near Paterson 115 kV were found to be STABLE in both cases, WITH and WITHOUT PID-228 project.

Based on the results of stability analysis it can be concluded that proposed PID-228 (114.80 MW) project **does not** adversely impact the stability of the Entergy System in the local area.

The results of this analysis are based on available data and assumptions made at the time of conducting this study. If any of the data and/or assumptions made in developing the study model change, the results provided in this report may not apply.

See Following Page for Figure 0-1

[1] In order for this solution to be effective, the second transformer should be arranged such that the both transformers are not outaged for normally-cleared and stuck-breaker faults, bus faults etc.

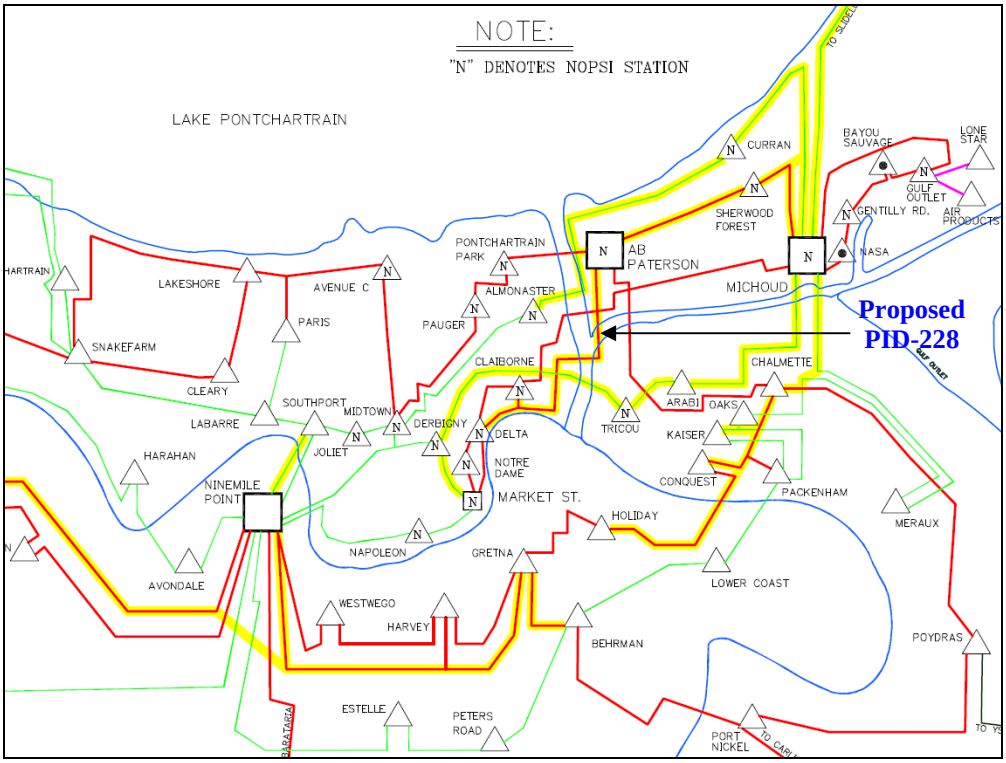


Figure 0-1 PID 228 Project location

B.

A. STABILITY ANALYSIS METHODOLOGY

Using Planning Standards approved by NERC, the following stability definition was applied in the Transient Stability Analysis:

"Power system stability is defined as that condition in which the differences of the angular positions of synchronous machine rotors become constant following an aperiodic system disturbance."

Stability analysis was performed using Siemens-PTI's PSS/E™ dynamics program V30.3.2. Three-phase and single-phase line faults were simulated for the specified duration and synchronous machine rotor angles and wind turbine generator speeds were monitored to check whether synchronism is maintained following fault removal.

Based on the Entergy study criteria, three-phase faults with normal clearing and delayed clearing were simulated. First, three-phase faults with normal clearing were simulated. Next, the stuck breaker three phase fault were simulated. If a three-phase stuck breaker fault was found to be unstable, then a single-line-to-ground (SLG) fault followed by breaker failure was studied. This procedure is being followed since if the units are stable for a more severe fault (such as three phase fault with breaker failure) then the need to study stability for a less severe fault (such as SLG fault with breaker failure) does not arise.

Stability analysis was performed using the PSS/E dynamics program, which only simulates the positive sequence network. Unbalanced faults involve the positive, negative, and zero sequence networks. For unbalanced faults, the equivalent fault admittance must be inserted in the PSS/E positive sequence model between the faulted bus and ground to simulate the effect of the negative and zero sequence networks. For a single-line-to-ground (SLG) fault, the fault admittance equals the inverse of the sum of the positive, negative and zero sequence Thevenin impedances at the faulted bus. Since PSS/E inherently models the positive sequence fault impedance, the sum of the negative and zero sequence Thevenin impedances needs to be added and entered as the fault impedance at the faulted bus.

For three-phase faults, a fault admittance of –j2E9 is used (essentially infinite admittance or zero impedance). For the single phase stuck breaker faults, the fault admittances considered are mentioned in Table B-3.

Transient Voltage Criteria

In addition to criteria for the stability of the machines, Entergy has evaluation criteria for the transient voltage dip as follows:

- 3-phase fault or single-line-ground fault with normal clearing resulting in the loss of a single component (generator, transmission circuit or transformer) or a loss of a single component without fault:
  Not to exceed 20% for more than 20 cycles at any bus
  Not to exceed 25% at any load bus
  Not to exceed 30% at any non-load bus

- 3-phase faults with normal clearing resulting in the loss of two or more components (generator, transmission circuit or transformer), and SLG fault with delayed clearing resulting in the loss of one or more components:
  Not to exceed 20% for more than 40 cycles at any bus
  Not to exceed 30% at any bus

The duration of the transient voltage dip excludes the duration of the fault. The transient voltage dip criteria will not be applied to three-phase faults followed by stuck breaker conditions unless the determined impact is extremely widespread.

The voltages at all local buses (115 kV and above) were monitored during each of the fault cases as appropriate.

As there is no specific voltage dip criteria for three-phase stuck breaker faults, the results of these faults were compared with the most stringent voltage dip criteria of - not to exceed 20 % for more than 20 cycles.

B. *STUDY MODEL DEVELOPMENT*

The study model consists of power flow cases and dynamics databases, developed as follows.

Power Flow Case

A Powerflow case "EN12S08 U1_r1+PID228+Priors+CPupg-1+Pupg12345+PID228-UNCOV.sav" representing the 2012 Summer Peak conditions was provided by SPP/ Entergy.

Two prior-queued projects, PID-223 and PID-224, were added to the base powerflow case. The existing generation of 100 MW at Michoud Unit#1 was offline in the base case provided by SPP/Entergy. For system impact study purpose, the generation in the vicinity of the proposed project is modeled at the maximum output level to bring out the limiting conditions, if any, after the interconnection of the proposed project. Hence, the unit was Michoud Unit#1 was turned ON and was dispatched against White Bluff Unit1 (#337652). Thus a pre-project powerflow case was established and named as 'PRE-PID-228.sav'.

The 114.80 MW of proposed PID-228 was also dispatched against the White Bluff Unit #1. Table 2-1 summarizes the dispatch. Thus a post-project power flow case with PID-228 was established and named as 'POST-PID-228.sav'.

Table B-1: PID-228 project details

System condition	MW	Point of Interconnection	Sink
2012 Summer Peak	114.8	Tap at 1.25 miles from Paterson on Claiborne – Paterson 115 kV line	White Bluff Unit 1 (#337652)

Figure B-1 and Figure B-2 show the PSS/E one-line diagrams for the local area WITHOUT and WITH the PID-228 project, respectively, for 2012 Summer Peak system conditions.

Stability Database

A basecase stability database was provided by SPP/Entergy in a PSSE *.dyr file format ('red11S_newnum.dyr').

To create a dynamic database (a snapshot file) for Pre-PID-228 powerflow case, stability data for PID-223 and PID-224 was appended to the basecase stability database.

The PID-228 project data was appended to the Pre-project dynamic database. The generator was represented by using PSS/E round rotor generator model ('GENROU'). The excitation system was modeled by using 1992 IEEE type ST1A model ('ESST1A'). The governor system for the plant was modeled by using 1973 IEEE standard turbine-governor model ('IEESGO'). The power system stabilizer was by using 1992 IEEE type PSS2A dual-input signal stabilizer model ('PSS2A').

The data provided at the Interconnection Request for PID-228 is included in Appendix A. The PSS/E power flow data for PID-228, used for this study, are included in Appendix B.

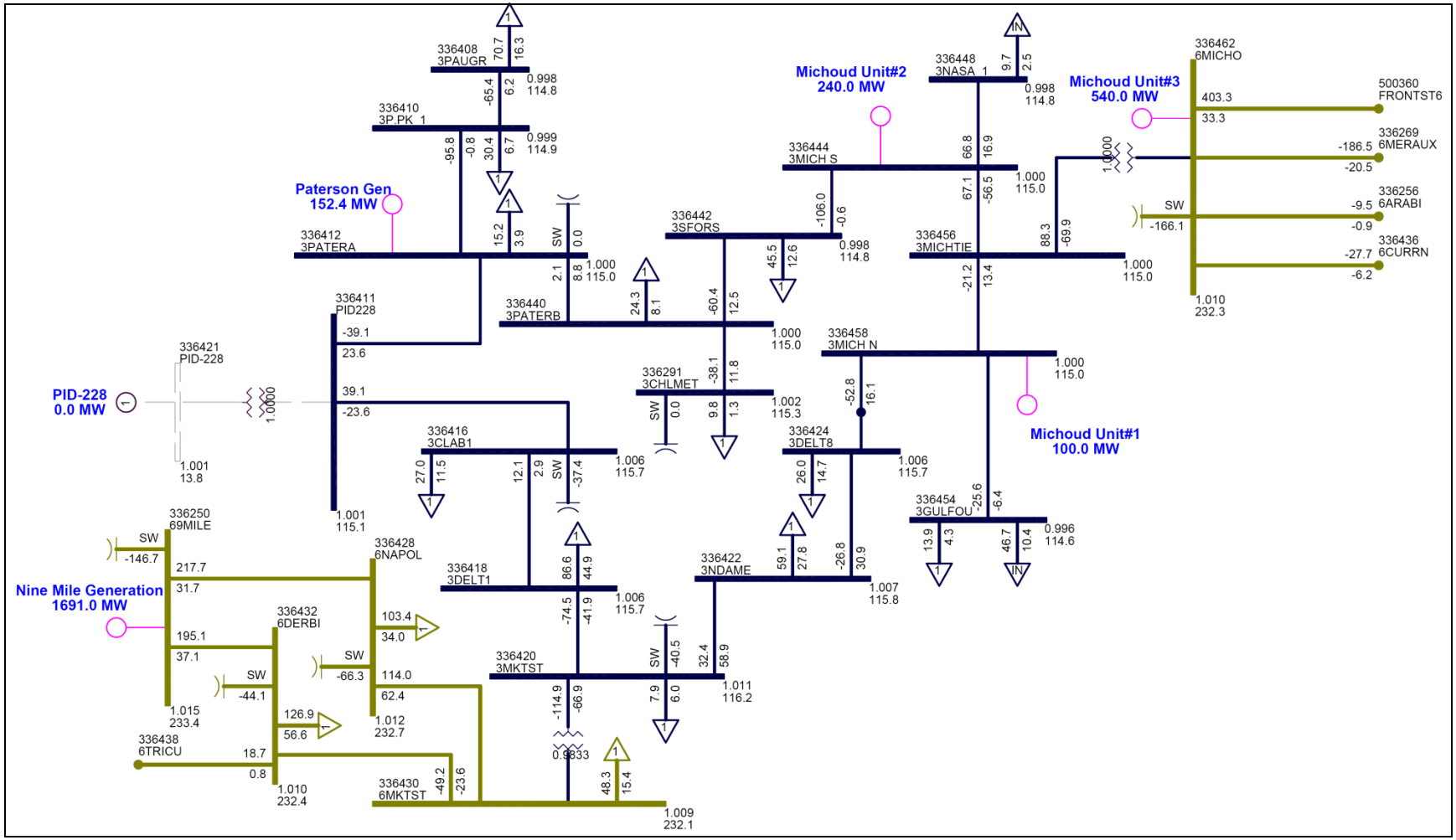


Figure B-1 One-line Diagram of the local area <u>without</u> PID-228 (2012 Summer Peak)

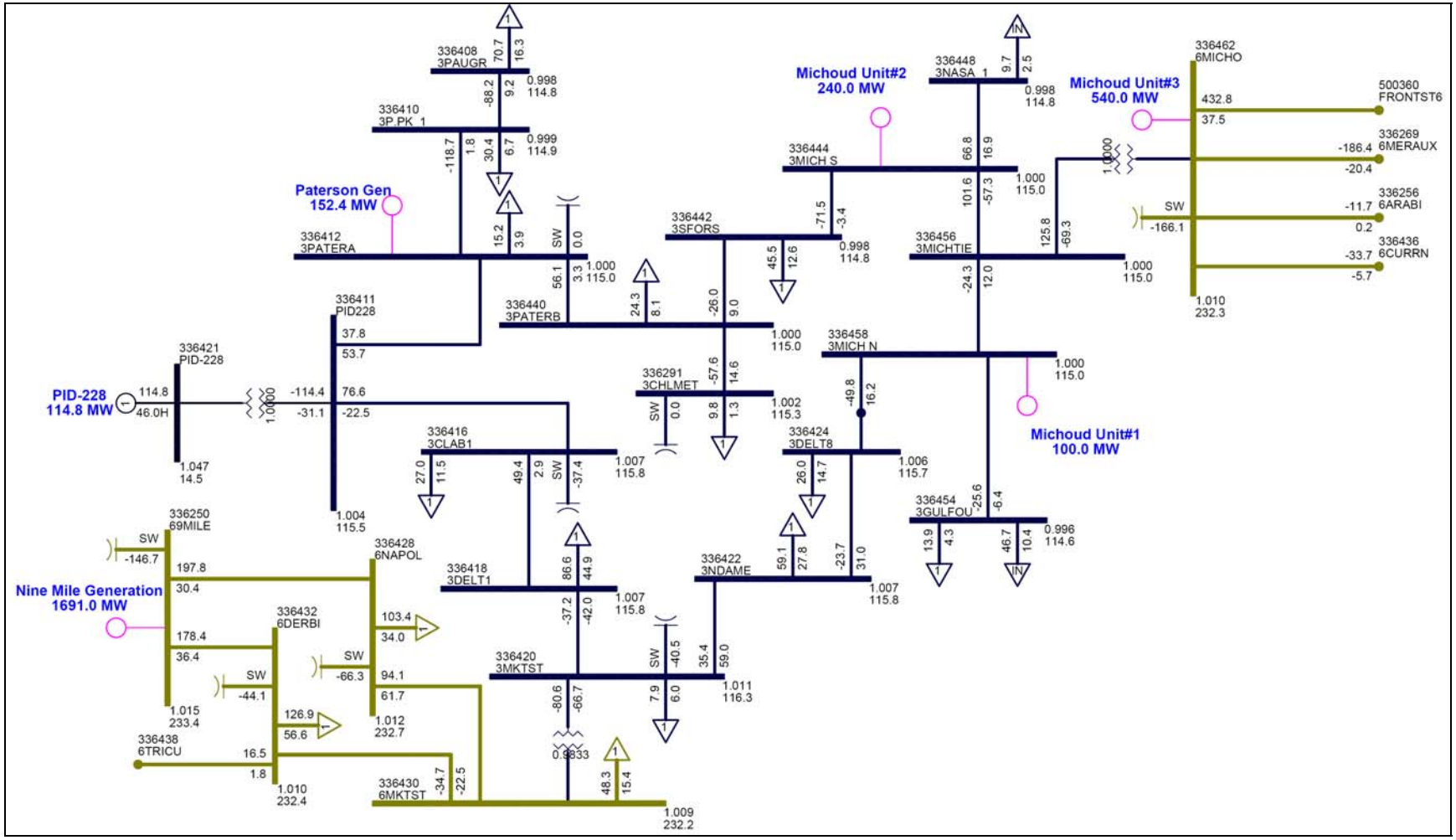


Figure B-2 One-line Diagram of the local area <u>with</u> PID-228 (2012 Summer Peak)

C. STABILITY SIMULATIONS

Stability simulations were run to examine the transient behavior of the proposed PID-228 project on the Entergy system. Stability analysis was performed using the following procedure. First, three-phase faults with normal clearing were simulated. Next, the three-phase stuck breaker (3PH-3PH) faults were simulated. Next, the single phase stuck breaker (1PH-1PH) faults were simulated. The fault clearing times used for the simulations are given inTable B-2.

Table B-2: Fault Clearing Times

Contingency at kV level	Normal Clearing	Delayed Clearing
230	6 cycles	6+9 cycles
115	6 cycles	6+9 cycles

The breaker failure scenario was simulated with the following sequence of events:

1) For Three-phase stuck-breaker (3PH-3PH) faults and Single-phase stuck-breaker (1PH-1PH) faults the fault remains in place for 15 cycles. In case of SLG stuck breaker faults, thevenin equivalent admittance of single phase faults was used.

2) The fault is then cleared by back-up clearing. If the system was found to be unstable, then the fault was repeated without the proposed PID-228 project.

All line trips are assumed to be permanent (i.e. no high speed re-closure).

Table B-3 and Table B-4 list all the fault cases that were simulated in this study.

As the proposed PID-228 project is to be interconnected on the existing 115 kV line through a tap, the proposed project PID-228 will be disconnected from the Entergy system for any fault involving loss of the Claiborne – Paterson 115 kV line.

Twelve (12) three phase normally cleared ,twelve (12) three-phase stuck breaker faults and twelve (12) single-phase stuck breaker faults were simulated.

For all cases analyzed, the initial disturbance was applied at t = 0.1 seconds. The breaker clearing was applied at the appropriate time following this fault inception.

Table B-3 List of 3 Phase normally cleared faults simulated for stability analysis

CASE	LOCATION	TYPE	CLEARING TIME (cycles)	TRIPPED FACILITIES
Fault_1	Claiborne - Delta 115 kV line	3PH	6	Claiborne - Delta 115 kV line
Fault_2	Delta - Market street 115 kV	3PH	6	Delta - Market street 115 kV
Fault_3	Market street - Notredame 115 kV	3PH	6	Market street - Notredame 115 kV
Fault_4	Market street 230/115 kV transformer#1 (Fault on 115 kV side)	3PH	6	Market street 230/115 kV transformer#1
Fault_5	Paterson - Pontchartrain Park 115 kV	3PH	6	Paterson - Pontchartrain Park 115 kV
Fault_6	Paterson - Sherwood Forest 115 kV	3PH	6	Paterson - Sherwood Forest 115 kV
Fault_7	Paterson - Chalmette 115 kV	3PH	6	Paterson - Chalmette 115 kV
Fault_8	Michoud - Sherwood Forest 115 kV	3PH	6	Michoud - Sherwood Forest 115 kV
Fault_9	Michoud 230/115 kV (Fault on 115 kV side)	3PH	6	Michoud 230/115 kV
Fault_10	Michoud - Delta 115 kV line	3PH	6	Michoud - Delta 115 kV line
Fault_11	Market street 230/115 kV transformer#1 (Fault on 230 kV side)	3PH	6	Market street 230/115 kV transformer#1
Fault_12	Michoud 230/115 kV (Fault on 230 kV side)	3PH	6	Michoud 230/115 kV

Table B-4 List of 3 Phase Stuck Breaker (3PH-3PH) faults simulated for stability analysis

CASE	LOCATION	TYPE	CLEARING TIME (cycles)		TRIPPED FACILITIES
			PRIMARY	Back-up	
Fault_1a	Claiborne - Delta 115 kV line	3PH	6	9	Claiborne - Delta 115 kV line
Fault_2a	Delta - Market street 115 kV	3PH	6	9	Delta - Market street 115 kV
Fault_3a	Market street - Notredame 115 kV	3PH	6	9	Market street - Notredame 115 kV
Fault_4a	Market street 230/115 kV transformer#1 (Fault on 115 kV side)	3PH	6	9	Market street 230/115 kV transformer#1
Fault_5a	Paterson - Pontchartrain Park 115 kV	3PH	6	9	Paterson - Pontchartrain Park 115 kV
Fault_6a	Paterson - Sherwood Forest 115 kV	3PH	6	9	Paterson - Sherwood Forest 115 kV
Fault_7a	Paterson - Chalmette 115 kV	3PH	6	9	Paterson - Chalmette 115 kV
Fault_8a	Michoud - Sherwood Forest 115 kV	3PH	6	9	Michoud - Sherwood Forest 115 kV
Fault_9a	Michoud 230/115 kV (Fault on 115 kV side)	3PH	6	9	Michoud 230/115 kV
Fault_10a	Michoud - Delta 115 kV line	3PH	6	9	Michoud - Delta 115 kV line
Fault_11a	Market street 230/115 kV transformer#1 (Fault on 230 kV side)		6	9	Market street 230/115 kV transformer#1
Fault_12a	Michoud 230/115 kV (Fault on 230 kV side)	3PH	6	9	Michoud 230/115 kV

Table B-5 List of Stuck Breaker single-line-to-ground (SLG) faults (1PH-1PH) simulated for stability analysis

CASE	LOCATION	TYPE	CLEARING TIME (cycles)		SLG FAULT IMPEDANCE (MVA)	TRIPPED FACILITIES
			PRIMARY	Back-up		
Fault_1b	Claiborne - Delta 115 kV line	3PH	6	9	222.21-j1391.57	Claiborne - Delta 115 kV line
Fault_2b	Delta - Market street 115 kV	3PH	6	9	222.69-j1498.93	Delta - Market street 115 kV
Fault_3b	Market street - Notredame 115 kV	3PH	6	9	233.65-j2084.04	Market street - Notredame 115 kV
Fault_4b	Market street 230/115 kV transformer#1 (Fault on 115 kV side)	3PH	6	9	233.65-j2084.04	Market street 230/115 kV transformer#1
Fault_5b	Paterson - Pontchartrain Park 115 kV	3PH	6	9	286.24-j1797.29	Paterson - Pontchartrain Park 115 kV
Fault_6b	Paterson - Sherwood Forest 115 kV	3PH	6	9	286.24-j1797.29	Paterson - Sherwood Forest 115 kV
Fault_7b	Paterson - Chalmette 115 kV	3PH	6	9	286.24-j1797.29	Paterson - Chalmette 115 kV
Fault_8b	Michoud - Sherwood Forest 115 kV	3PH	6	9	456.56-j4011.39	Michoud - Sherwood Forest 115 kV
Fault_9b	Michoud 230/115 kV (Fault on 115 kV side)	3PH	6	9	456.56-j4011.39	Michoud 230/115 kV
Fault_10b	Michoud - Delta 115 kV line	3PH	6	9	456.56-j4011.39	Michoud - Delta 115 kV line
Fault_11b	Market street 230/115 kV transformer#1 (Fault on 230 kV side)	3PH	6	9	566.91-j4511.08	Market street 230/115 kV transformer#1
Fault_12b	Michoud 230/115 kV (Fault on 230 kV side)	3PH	6	9	480.89-j3849.73	Michoud 230/115 kV

Table B-6 through Table B-8 summarize the results of the stability analysis.

The system was found to be STABLE following all the simulated normally cleared 3-Phase and delayed clearing Single-line-to-ground (SLG) faults (see Table B-6 and Table B-8). Figure B-3 and Figure B-4show the PID-228 Generator parameters and voltage recovery at Delta 115KV following Fault 2 and Fault 2b, involving loss of Delta – Market street 115 kV line.

Following eight (8) 3-phase stuck breaker faults (3PH-3PH) the system was found to be UNSTABLE. Table B-7 summarizes the results for the 3-phase stuck breaker faults WITH and WITHOUT PID-228 project. To determine whether the instability observed is due to the interconnection of the proposed PID-228 project, these faults were repeated on the Pre-project (WITHOUT PID-228 project) case. It can be seen that the system was UNSTABLE following Faults 5a through Fault 12a in both, WITH and WITHOUT PID-228 project, cases, ***except*** for Fault 11a. The impact of the proposed PID-228 project can not be quantified following the 3-phase stuck breaker faults which were resulting in UNSTABLE system conditions before the interconnection of proposed PID-228 project. Fault 1a through 12a (3-phase stuck breaker faults) represent extreme contingencies (NERC Category D[2]).

Fault 11a is a 6+9 cycle 3-Phase stuck-breaker fault on Market street 230 kV substation cleared by tripping Market street 230/115 kV transformer. Following Fault 11a the Paterson Unit#3 and Unit#4 were going out-of-step in Post-PID-228 case (WITH PID-228 case). Figure B-5 and Figure B-6 shows the voltages and machine angles following Fault 11a. The instability following Fault 11a can be mitigated by using a faster clearing time or by adding a 230/115 kV transformer in parallel to the existing transformer at Market street substation[3].

The Fault 11a was repeated with faster clearing time (6+6 cycles). The system found to be STABLE. Figure B-7 shows the post-fault recovery with faster clearing time.

Transient Voltage Recovery

The voltages at all buses in the Entergy system (115 kV and above) were monitored during each of the fault cases as appropriate. No Voltage criteria violation was observed following a normally cleared three-phase fault.

As there are no specific voltage dip criteria for three-phase stuck breaker fault,, the results of these faults were compared with the most stringent voltage dip criteria - not to exceed 20 % for more than 20 cycles. After comparison against the voltage-criteria, no voltage criteria violation was observed following simulated faults with STABLE system conditions.

[2] NERC standard TPL-001-0 System Performance under normal conditions, April 1, 2005.

[3] In order for this solution to be effective, the second transformer should be arranged such that the both transformers are not outaged for normally-cleared and stuck-breaker faults, bus faults etc.

Table B-6 Results of stability analysis - (3-phase normally cleared faults)

CASE	WITHOUT PID-228	WITH PID-228
Fault_1	--	STABLE
Fault_2	--	STABLE
Fault_3	--	STABLE
Fault_4	--	STABLE
Fault_5	--	STABLE
Fault_6	--	STABLE
Fault_7	--	STABLE
Fault_8	--	STABLE
Fault_9	--	STABLE
Fault_10	--	STABLE
Fault_11	--	STABLE
Fault_12	--	STABLE

Table B-7 Results of stability analysis - (3-phase stuck breaker faults)

CASE	WITHOUT PID-228	WITH PID-228
Fault_1a	--	STABLE
Fault_2a	--	STABLE
Fault_3a	--	STABLE
Fault_4a	--	STABLE
Fault_5a	UNSTABLE	UNSTABLE
Fault_6a	UNSTABLE	UNSTABLE
Fault_7a	UNSTABLE	UNSTABLE
Fault_8a	UNSTABLE	UNSTABLE
Fault_9a	UNSTABLE	UNSTABLE
Fault_10a	UNSTABLE	UNSTABLE
Fault_11a	STABLE	UNSTABLE
Fault_12a	UNSTABLE	UNSTABLE

Table B-8 Results of stability analysis - (stuck breaker SLG faults)

CASE	WITHOUT PID-228	WITH PID-228
Fault_1b	--	STABLE
Fault_2b	--	STABLE
Fault_3b	--	STABLE
Fault_4b	--	STABLE
Fault_5b	--	STABLE
Fault_6b	--	STABLE
Fault_7b	--	STABLE
Fault_8b	--	STABLE
Fault_9b	--	STABLE
Fault_10b	--	STABLE
Fault_11b	--	STABLE
Fault_12b	--	STABLE

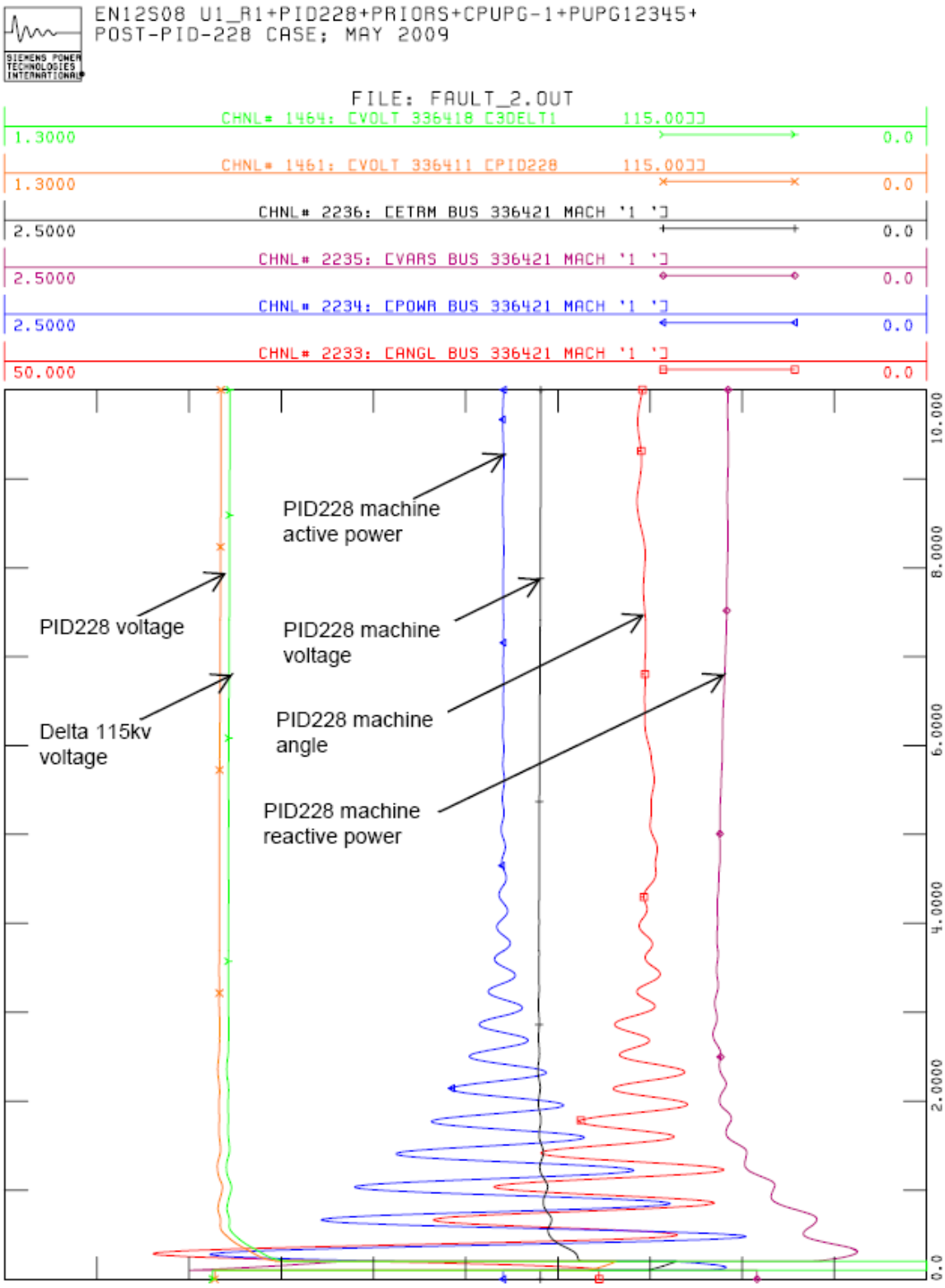


Figure B-3 PID-228 Machine parameters for Fault 2

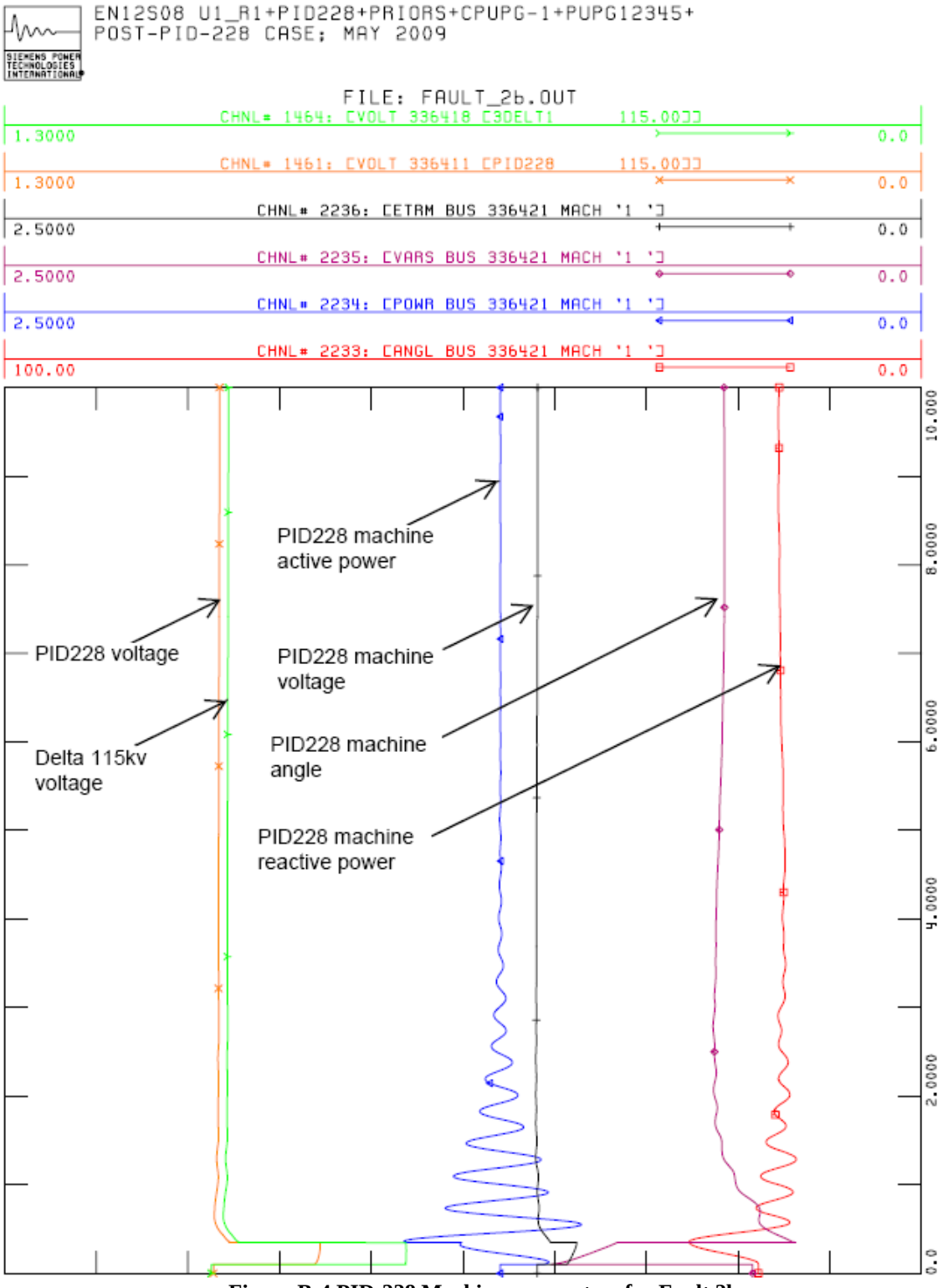


Figure B-4 PID-228 Machine parameters for Fault 2b

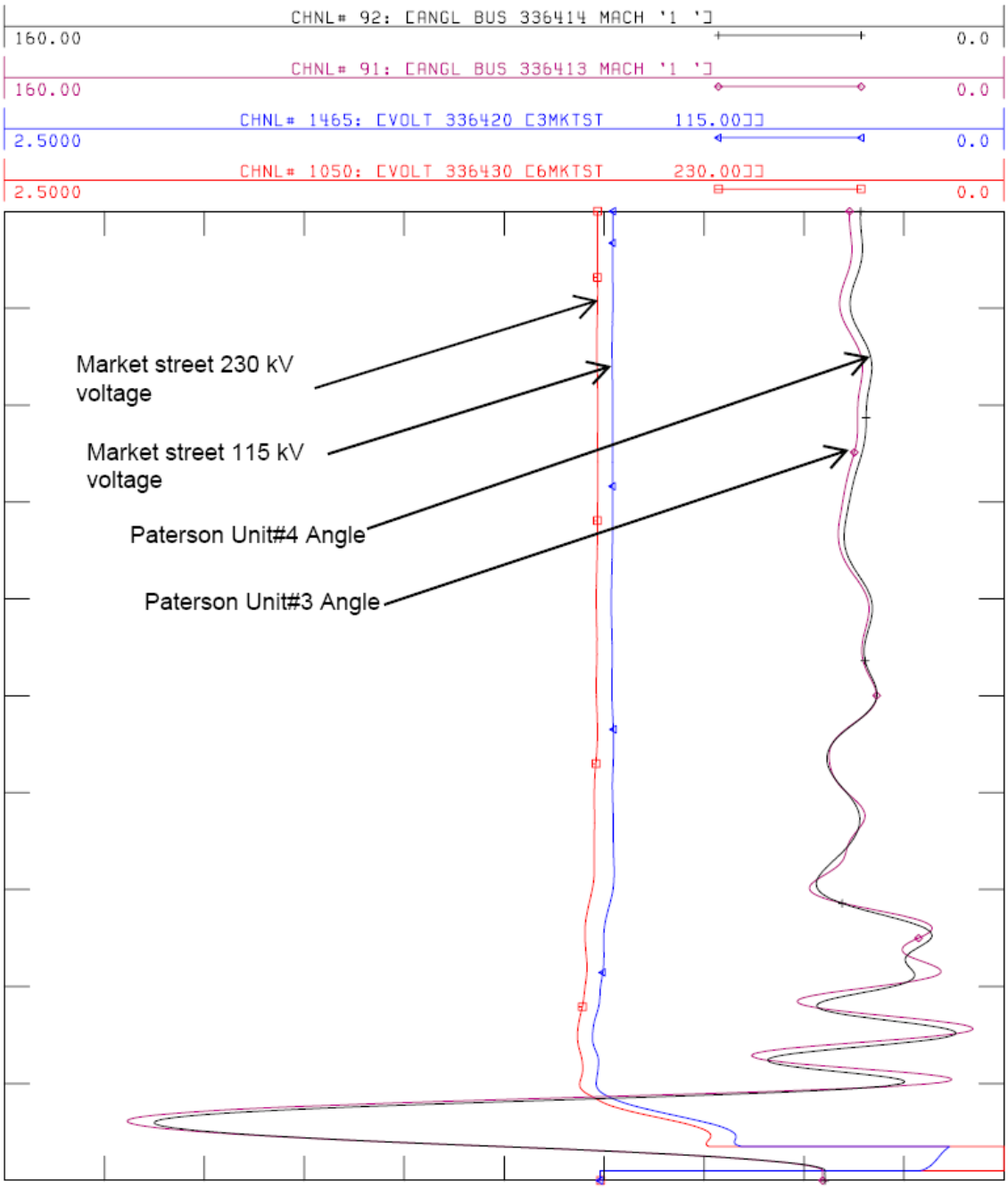


Figure B-5 **Local area voltages and machine angles following Fault 11a (WITHOUT PID-228)**

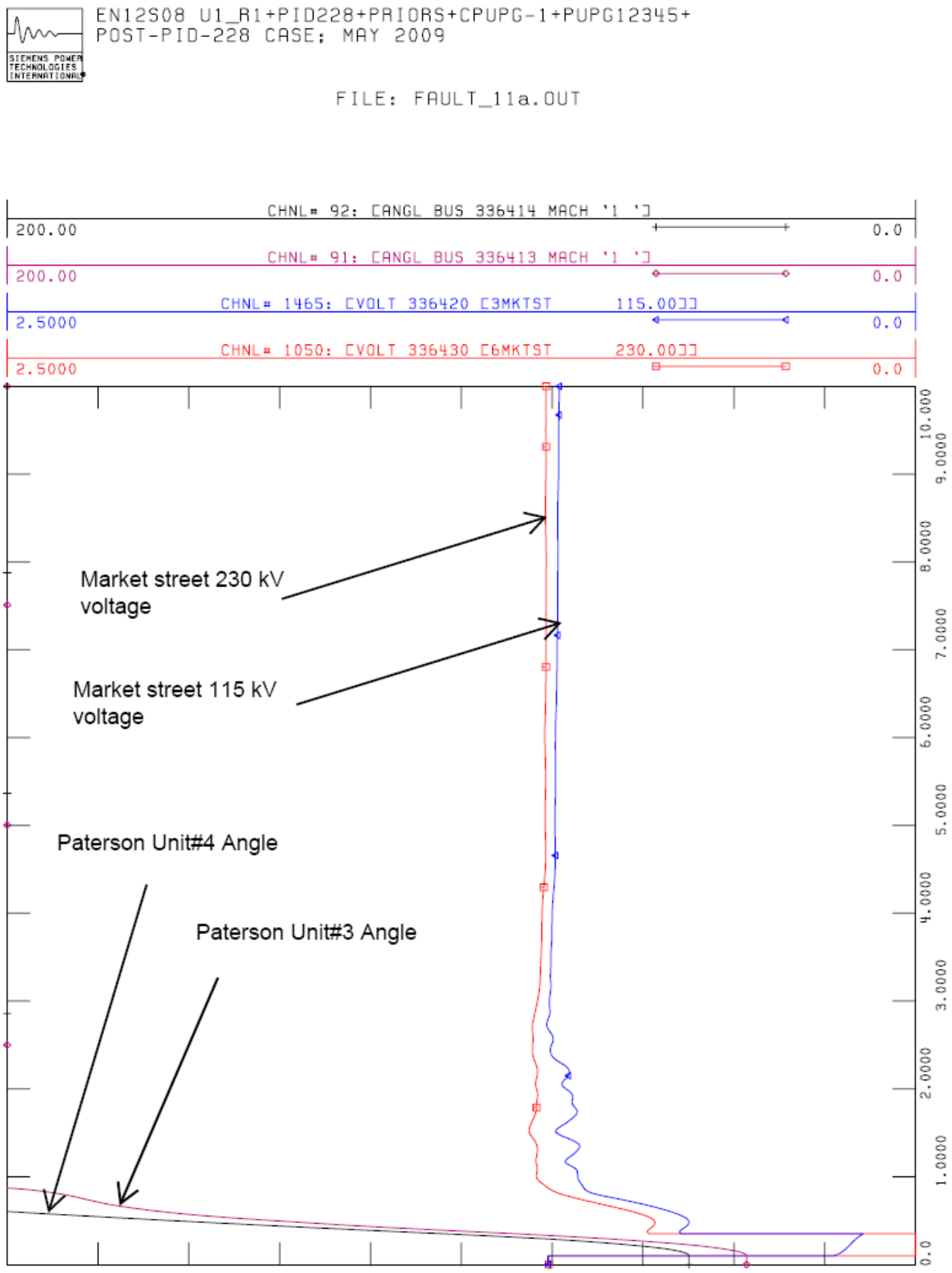


Figure B-6 **Local area voltages and machine angles following Fault 11a (WITH PID-228)**

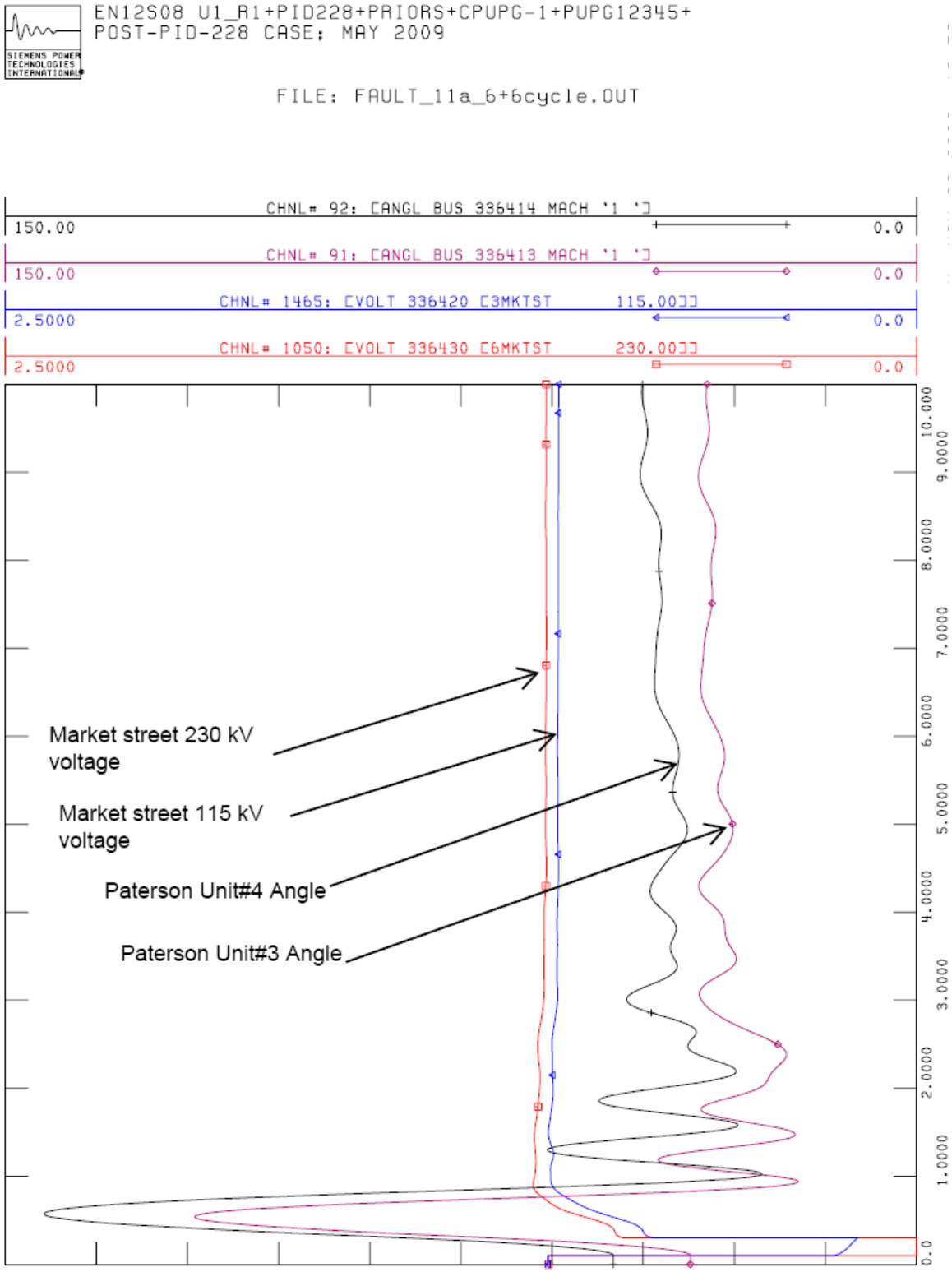


Figure B-7 Local area voltages and machine angles following Fault 11a – faster clearing time (WITH PID-228)

D. Sensitivity Analysis

As discussed in section C,the system was found to be UNSTABLE following the three phase stuck breaker faults in both cases, WITH and WITHOUT PID-228 project. Entergy indicated that the Paterson Unit #3 and Unit #4 (Total 152.4 MW) suffered extensive damage during Hurricane Katrina. Their return to service date is yet to be determined. Hence, a sensitivity analysis was performed with Paterson Unit #3 and #4 off-line. To that end, selected 3-phase stuck breaker faults were repeated.

Table B-9 shows the results of the sensitivity analysis. 0 contains the plots for the simulations of sensitivity analysis.

Table B-9 Results of sensitivity analysis

CASE	WITHOUT PID-228	WITH PID-228
Fault_5a	STABLE	STABLE
Fault_6a	STABLE	STABLE
Fault_7a	STABLE	STABLE
Fault_8a	**UNSTABLE**	**UNSTABLE**
Fault_9a	**UNSTABLE**	**UNSTABLE**
Fault_10a	**UNSTABLE**	**UNSTABLE**
Fault_11a	STABLE	STABLE
Fault_12a	**UNSTABLE**	**UNSTABLE**

The system was found to be STABLE following the 6 + 9 cycles 3-phase stuck breaker faults (Faults_5a through 7a and Fault 11a).

Faults near Michoud 115 kV and 230 kV substations resulted in UNSTABLE system conditions in both cases, WITH and WITHOUT PID-228 project. Hence, the impact of the proposed PID-228 project can not be quantified following these faults.

E. STABILITY CONCLUSIONS

The objective of this study was to evaluate the impact of proposed PID-228 (114.80 MW) project on system stability and the nearby transmission system and generating stations. The study was performed on 2012 Summer Peak case, provided by SPP/Entergy.

The system was found to be STABLE following all normally cleared 3-phase faults and delayed clearing single-line-to-ground (SLG) faults. Following seven (7) three-phase stuck-breaker faults the system was found to be UNSTABLE in both, WITH and WITHOUT PID-228 project, cases. Following Fault 11a (6+9 cycle 3-phase stuck breaker fault, cleared by tripping Market street 230/115 kV transformer) system was found to be UNSTABLE after interconnection of proposed PID-228 project. The stuck breaker 3-phase faults will be an extreme contingency (NERC Category D). No voltage criteria violation was observed following simulated faults with STABLE system conditions.

The instability following 6+9 cycle 3-phase stuck breaker fault involving loss of Market street 230/115 kV transformer can be mitigated by using a faster clearing time or add a 230/115 kV transformer in parallel to the existing transformer at Market street substation[4].

A sensitivity analysis was performed to investigate the UNSTABLE system conditions following 3-phase stuck breaker faults WITH and WITHOUT PID-228 project. Entergy indicated that the Paterson Unit #3 and Unit #4 (Total 152.4 MW) suffered extensive damage during Hurricane Katrina. Their return to service date is yet to be determined. Hence, the fault resulting in UNSTABLE system conditions were repeated with the Paterson units off-line. The system was found to be UNSTABLE following faults near Michoud 115 kV and 230 kV substations (Faults 5a through 12a, except Fault_11a) in both cases, WITH and WITHOUT PID-228 project. The faults near Paterson 115 kV were found to be STABLE in both cases, WITH and WITHOUT PID-228 project.

Based on the results of stability analysis it can be concluded that proposed PID-228 (114.80 MW) project does not adversely impact the stability of the Entergy System in the local area.

The results of this analysis are based on available data and assumptions made at the time of conducting this study. If any of the data and/or assumptions made in developing the study model change, the results provided in this report may not apply.

[4] In order for this solution to be effective, the second transformer should be arranged such that the both transformers are not outaged for normally-cleared and stuck-breaker faults, bus faults etc.

Section – B

Network Resource Interconnection Service

Introduction For NRIS:

A Network Resource Interconnection Services (NRIS) study was requested by PID-228 to serve 115 MW of Entergy network load. The expected in service date for this NRIS generator is 4/30/2011. 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 B-A and Appendix B-B.

Also, 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

IV. Network Analysis:

A. Models

The models used for this analysis is the 2012 summer peak case developed in 2008.

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 2012.
- Approved transmission reliability upgrades for 2008 - 2012 were included in the base case. These upgrades can be found at Entergy's OASIS web page, http://www.entergy.com/etroasis/, under approved future projects.

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 37.7MVAr 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 Ugpgrade 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	Build Acadiana Load Pocket upgrades
	New Bayou Steel – Tezcuco 230kV line
	New Webre – Wells 230kV line
	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

Prior transmission service requests that were included in this study:

OASIS #	PSE	MW	Begin	End
1460900	Louisiana Energy & Power Authority	116	1/1/2009	1/1/2030
1481111	City of Conway	50	2/1/2011	2/1/2046
1481235	Louisiana Energy & Power Authority	50	2/1/2011	2/1/2016
1520043	Municipal Energy Agency of Miss	20	1/1/2011	1/1/2026
1604055	Westar Energy Gen & Mktg	15	6/1/2010	6/1/2015
1609078	City of Conway	10	9/1/2010	9/1/2020
1609079	City of Conway	15	9/1/2010	9/1/2020
1617595	Aquila	75	1/1/2009	1/1/2010
1617596	Aquila	75	1/1/2009	1/1/2010
1617597	Aquila	75	1/1/2009	1/1/2010
1617598	Aquila	75	1/1/2009	1/1/2010
1620327	NRG Power Marketing	15	1/1/2011	1/1/2021
1628473	NRG Power Marketing	100	1/1/2011	1/1/2020
1628474	NRG Power Marketing	100	1/1/2011	1/1/2020
1631134	NRG Power Marketing	103	1/1/2011	1/1/2016
1631135	NRG Power Marketing	206	1/1/2011	1/1/2016
1632265	Merrill Lynch	1	4/1/2009	4/1/2014
1632268	Merrill Lynch	25	4/1/2009	4/1/2014
1632269	Merrill Lynch	15	4/1/2009	4/1/2014
1633695	NRG Power Marketing	100	1/1/2011	1/1/2020
1633701	NRG Power Marketing	20	1/1/2010	1/1/2019
1633702	NRG Power Marketing	20	1/1/2010	1/1/2019
1633703	NRG Power Marketing	20	1/1/2010	1/1/2019
1635561	NRG Power Marketing	300	1/1/2011	1/1/2021
1635749	NRG Power Marketing	155	1/1/2010	1/1/2020
1636313	NRG Power Marketing	75	1/1/2010	1/1/2020

B. Contingencies and Monitored Elements

Single contingency analyses on Entergy's transmission facilities (including tie lines) 115kV and above were considered. All transmission facilities on Entergy transmission system above 100 kV were monitored.

C. Generation used for the transfer

The PID-228 generators were used as the source for the deliverability to generation test.

D. Results

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 B-A and Appendix B-B.

Constraints:

Study Case	Study Case with Priors
Belle Point - Gypsy 230kV	Ameila Bulk - Bevil 230kV
Belle Point - Tezcuco 230kV	Belle Point - Gypsy 230kV
Gibson - Humphrey 115kV	Bevil - Cypress 230kV
Greenwood - Humphrey 115kV	Frisco - Tezcuco 230kV ckt 1
Greenwood - Terrebone 115kV	Frisco - Tezcuco 230kV ckt 2
Tezcuco - Waterford 230kV	Greenwood - Terrebone 115kV
Vacherie - Waterford 230kV	Hartburg - Inland Orange 230kV
	Helbig - McLewis 230kV
	Inland - McLewis 230kV
	LaBarre - South Port 230kV
	Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile
	Vacherie - Waterford 230kV
	Webre 500/230kV transformer Supplemental Upgrade 9Mile

DFAX Study Case Results:

Limiting Element	Contingency Element	ATC(MW)
Belle Point - Gypsy 230kV	Tezcuco - Waterford 230kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Tezcuco - Waterford 230kV	Belle Point - Gypsy 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Greenwood - Humphrey 115kV	Webre - Wells 500kV	0
Belle Point - Tezcuco 230kV	Tezcuco - Waterford 230kV	0
Tezcuco - Waterford 230kV	Belle Point - Tezcuco 230kV	0
Gibson - Humphrey 115kV	Webre - Wells 500kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	17

DFAX Study Case with Priors Results:

Limiting Element	Contingency Element	ATC (MW)
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Webre - Wells 500kV	0
Webre 500/230kV transformer Supplemental Upgrade 9Mile	Richard - Wells 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Tezcuco - Waterford 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Gypsy 230kV	0
Hartburg - Inland Orange 230kV	Cypress - Hartburg 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Daniel - McKnight 500kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Polsky Carville 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Fairview - Gypsy 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	A.A.C. - Licar 230kV	0
Tezcuco - Bayou Steel 230kV Supplemental Upgrade 9Mile	Belle Point - Tezcuco 230kV	0
Vacherie - Waterford 230kV	Raceland - Waterford 230kV	0
Inland - McLewis 230kV	Cypress - Hartburg 500kV	0
Helbig - McLewis 230kV	Cypress - Hartburg 500kV	0
Greenwood - Terrebone 115kV	Webre - Wells 500kV	0
Vacherie - Waterford 230kV	Landry - Raceland 230kV	0
Frisco - Tezcuco 230kV ckt 1	Frisco - Tezcuco 230kV ckt 2	0
Frisco - Tezcuco 230kV ckt 2	Frisco - Tezcuco 230kV ckt 1	0
Bevil - Cypress 230kV	Hartburg 500/230kV transformer 1	0
Vacherie - Waterford 230kV	Landry - Terrebonne 230kV	0
Bevil - Cypress 230kV	Hartburg - Inland Orange 230kV	0
Greenwood - Terrebone 115kV	Richard - Wells 500kV	0
LaBarre - South Port 230kV	Avondale - Nine Mile 230kV	0
LaBarre - South Port 230kV	Front Street - Michoud 230kV	0
Vacherie - Waterford 230kV	Waterford - Willow Glen 500kV	0
Vacherie - Waterford 230kV	Waterford 500/230 transformer kV	0
LaBarre - South Port 230kV	Avondale - Harahan 230kV	0
Bevil - Cypress 230kV	Inland - McLewis 230kV	0
Belle Point - Gypsy 230kV	Bayou Steel - Gypsy 230kV	0
LaBarre - South Port 230kV	Front Street - Slidell 230kV	2
Ameila Bulk - Bevil 230kV	Hartburg 500/230kV transformer 1	28
Ameila Bulk - Bevil 230kV	Hartburg - Inland Orange 230kV	33

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 B-A and Appendix B-B.

Amite South: Passed

WOTAB: Passed

Western Region: Passed

E. Required Upgrades for NRIS

Notation: These are Preliminary Estimates of Direct Assignment of Facilities and Network Upgrades

DFAX Study Case Upgrades Without Priors:

Limiting Element	Planning Estimate for Upgrade
Belle Point - Gypsy 230kV	Build new Bayou Steel – Tezcuco 230kV transmission line $24,991,000
Belle Point - Tezcuco 230kV	
Tezcuco - Waterford 230kV	
Vacherie - Waterford 230kV	
Gibson - Humphrey 115kV	Build new Webre – Wells 230kV line, add 500/230kV transformer at Webre $109,323,000
Greenwood - Humphrey 115kV	
Greenwood - Terrebone 115kV	

DFAX Study Case With Priors:

Limiting Element	Planning Estimate for Upgrade
Belle Point - Gypsy 230kV	Base Plan
Frisco - Tezcuco 230kV ckt 1	Upgrade 0.5 miles 230kV transmission line to at least 822MVA $875,000
Frisco - Tezcuco 230kV ckt 2	Upgrade 0.5 miles 230kV transmission line to at least 822MVA $875,000
LaBarre - South Port 230kV	Upgrade 2.1 miles 230kV transmission line to at least 700MVA $3,675,000
Vacherie - Waterford 230kV	Upgrade 18.47 miles 230kV transmission line to at least 520MVA $7,480,350
Greenwood - Terrebone 115kV	Upgrade 10.16 miles 115kV transmission line to at least 284MVA $22,850,381
Tezcuco - Bayou Steel 230kV	$24,991,000
Webre 500/230kV line & transformer	$109,323,000

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.

APPENDIX A DATA PROVIDED BY CUSTOMER

Attachment A to Appendix 1
Interconnection Request
LARGE GENERATING FACILITY DATA

All generator and transformer data and curves included below is preliminary and taken from similar sized equipment to meet the initial system study modeling needs.

UNIT RATINGS
kVA °F Voltage 126,320 KVA, 75 degF, 13,800 volts
Power Factor 0.85
Speed (RPM) Connection (e.g. Wye) 3600 RPM, Wye
Short Circuit Ratio __0.47__ Frequency, Hertz 60
Stator Amperes at Rated kVA Field Volts _5284 amps, field - 375 volts
Max Turbine MW °F __104 MW, 75 degF

COMBINED TURBINE-GENERATOR-EXCITER INERTIA DATA
Inertia Constant, H = kW sec/kVA 2
Moment-of-Inertia, WR^2 = ____60,000____ lb. ft.^{2}

REACTANCE DATA (PER UNIT-RATED KVA)
DIRECT AXIS QUADRATURE AXIS
Synchronous – saturated X_{dv} X_{qv} __ 1.90, 1.80
Synchronous – unsaturated X_{di} X_{qi} __2.00, 1.80
Transient – saturated X'_{dv} X'_{qv} ____0.2, 0.3
Transient – unsaturated X'_{di} X'_{qi} __0.22, 0.35
Subtransient – saturated X''_{dv} X''_{qv} __0.14, 0.14
Subtransient – unsaturated X''_{di} X''_{qi} __0.17, 0.18
Negative Sequence – saturated $X2_v$ __0.14
Negative Sequence – unsaturated $X2_i$ __0.18
Zero Sequence – saturated $X0_v$ __0.09
Zero Sequence – unsaturated $X0_i$ __0.09
Leakage Reactance Xl_m __0.12

FIELD TIME CONSTANT DATA (SEC)
Open Circuit T'_{do} T'_{qo} __8, 1
Three-Phase Short Circuit Transient T'_{d3} T'_{q} __0.9, 0.2
Line to Line Short Circuit Transient T'_{d2} __0.8
Line to Neutral Short Circuit Transient T'_{d1} _0.9
Short Circuit Subtransient T''_{d} T''_{q} ___0.04, 0.3
Open Circuit Subtransient T''_{do} T''_{qo} __0.05, 0.4

ARMATURE TIME CONSTANT DATA (SEC)
Three Phase Short Circuit T_{a3} __.24_
Line to Line Short Circuit T_{a2} __.24_
Line to Neutral Short Circuit T_{a1} __.20
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 __0.01
Negative R_2 __0.03
Zero R_0 __0.015
Rotor Short Time Thermal Capacity I_2
$_2t$ = _10
Field Current at Rated kVA, Armature Voltage and PF = 900 amps
Field Current at Rated kVA and Armature Voltage, 0 PF = 1000 amps
Three Phase Armature Winding Capacitance = 0.98 microfarad
Field Winding Resistance = __0.35___ ohms _25__ °C
Armature Winding Resistance (Per Phase) = 0.003 ohms 100 °C

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

See attached curves.

GENERATOR STEP-UP TRANSFORMER DATA RATINGS
Capacity Self-cooled/Maximum Nameplate/ kVA
75 MVA/125MVA

Voltage Ratio(Generator Side/System side/Tertiary)
13.8 kV/ 115 kV

Winding Connections (Low V/High V/Tertiary V (Delta or Wye))
Delta/Wye
Fixed Taps Available _____5 (2-1/2%)_____
Present Tap Setting _____3_____

IMPEDANCE
Positive Z_1 (on self-cooled kVA rating) 8% X/R 35
Zero Z_0 (on self-cooled kVA rating) 8% X/R 35

EXCITATION SYSTEM DATA

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

See ESSST1A and PSS2A attached.

GOVERNOR SYSTEM DATA

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

See IEESGO attached.

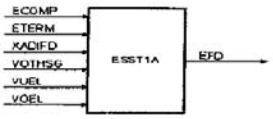
ESST1A

IEEE Type ST1A Excitation System

This model is located at system bus # _____ IBUS,
machine # _____ I,
This model uses CONs starting with # _____ J,

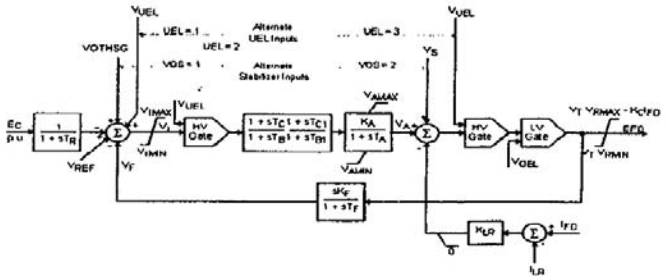
and ICONs starting with # _____ IC.

ICONs	#	Value	Description
IC		1.00	UEL (1,2, or 3)
IC+1		1.00	VOS (1 or 2)



CONs	#	Value	Description
J		0.00	T_R (Seconds)
J+1		0.10	V_{IMAX}
J+2		-0.10	V_{IMIN}
J+3		1.00	T_C (Seconds)
J+4		10.00	T_B (Seconds)
J+5		1.00	T_{C1} (Seconds)
J+6		1.00	T_{B1} (Seconds)
J+7		200.00	K_A
J+8		0.02	T_A (Seconds)
J+9		5.00	V_{AMAX}
J+10		-5.00	V_{AMIN}
J+11		5.00	V_{RMAX}
J+12		-5.00	V_{RMIN}
J+13		0.05	K_C
J+14		0.00	K_F
J+15		1.00	$T_F > 0$ (Seconds)
J+16		5.00	K_{LR}
J+17		2.80	I_{LR}

IBUS, 'ESST1A', I, UEL, VOS, T_R, V_{IMAX}, V_{IMIN}, T_C, T_B, T_{C1}, T_{B1}, K_A, T_A, V_{AMAX}, V_{AMIN}, V_{RMAX}, V_{RMIN}, K_C, K_F, T_F, K_{LR}, I_{LR} /



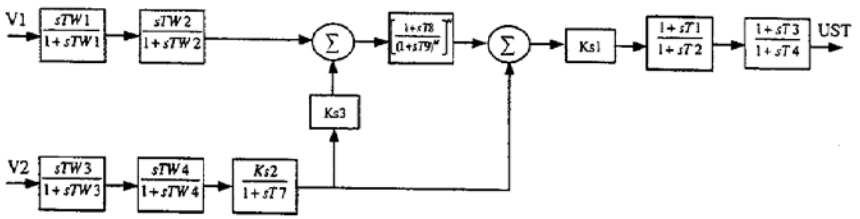


Fig. 4. Block diagram of automation of the power system stabilizer PSS2A

Description	CONS	Parameter	Value	Units
Washout time constant	J	Tw1	2.0	sec
Washout time constant	J+1	Tw2	2.0	sec
Filter time constant	J+2	T6	0.0	sec
Washout time constant	J+3	Tw3	2.0	sec
Filter time constant	J+4	Tw4	0.0	sec
Washout time constant	J+5	T7	2.0	sec
Gain	J+6	KS2	0.2	
Gain	J+7	KS3	1.0	
Ramp-tracking filter time constant	J+8	T8	0.5	sec
Ramp-tracking filter time constant	J+9	T9	0.1	sec
Stabilizer gain	J+10	KS1	10.0	
Phase lead time constant	J+11	T1	0.3	sec
Phase lag time constant	J+12	T2	0.2	sec
Phase lead time constant	J+13	T3	0.2	sec
Phase lag time constant	J+14	T4	0.2	sec
Output limits	J+15	VSTMAX	0.1	pu
Output limits	J+16	VSTMIN	-0.1	pu
Second remote bus number		M	5.0	
Ramp tracking filter order		N	1.0	

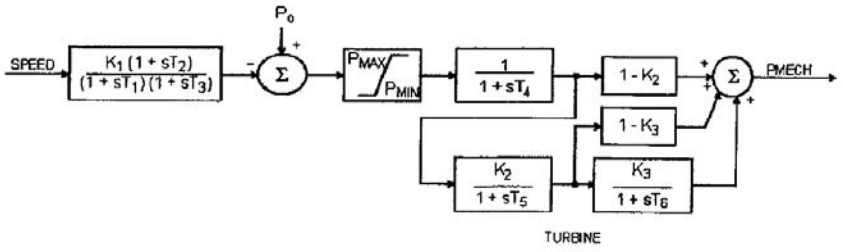
IEESGO

IEEE Standard Governor

This model is located at system bus # _____ IBUS,
machine # _____ I.
This model uses CONs starting with # _____ J.

CONs	#	Value	Description
J		0.0	T_1 Controller Lag(Seconds)
J+1		0.0	T_2 Controller Lead Compensation (Seconds)
J+2		0.5	T_3 Governor Lag(>0) (Seconds)
J+3		0.2	T_4 Delay Due To Steam Inlet Volumes Associated With Steam Chest And Inlet Piping(Seconds)
J+4		0.5	T_5 Reheater Delay Including Hot And Cold Leads(Seconds)
J+5		10.0	T_6 Delay Due To IP-LP Turbine, Cross-Over Pipes,And LP End Hoods(Seconds)
J+6		20.0	K_1 1/Per Unit Regulation
J+7		0.2	K_2 Fraction
J+8		0.6	K_3 Fraction
J+9		1.0	P_{MAX} Upper Power Limit
J+10		0.0	P_{MIN} Lower Power Limit

IBUS, 'IEESGO', I, T_1, T_2, T_3, T_4, T_5, T_6, K_1, K_2, K_3, P_{MAX}, P_{MIN}/

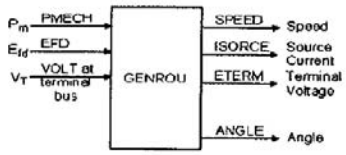


GENROU

Round Rotor Generator Model (Quadratic Saturation)

This model is located at system bus # _____ IBUS,
machine # _____ I,
This model uses CONs starting with # _____ J,

The machine MVA base is _____ for each of
_____ units = _____ MBASE.
ZSORCE for this machine is _____ +j _____ on
the above MBASE.

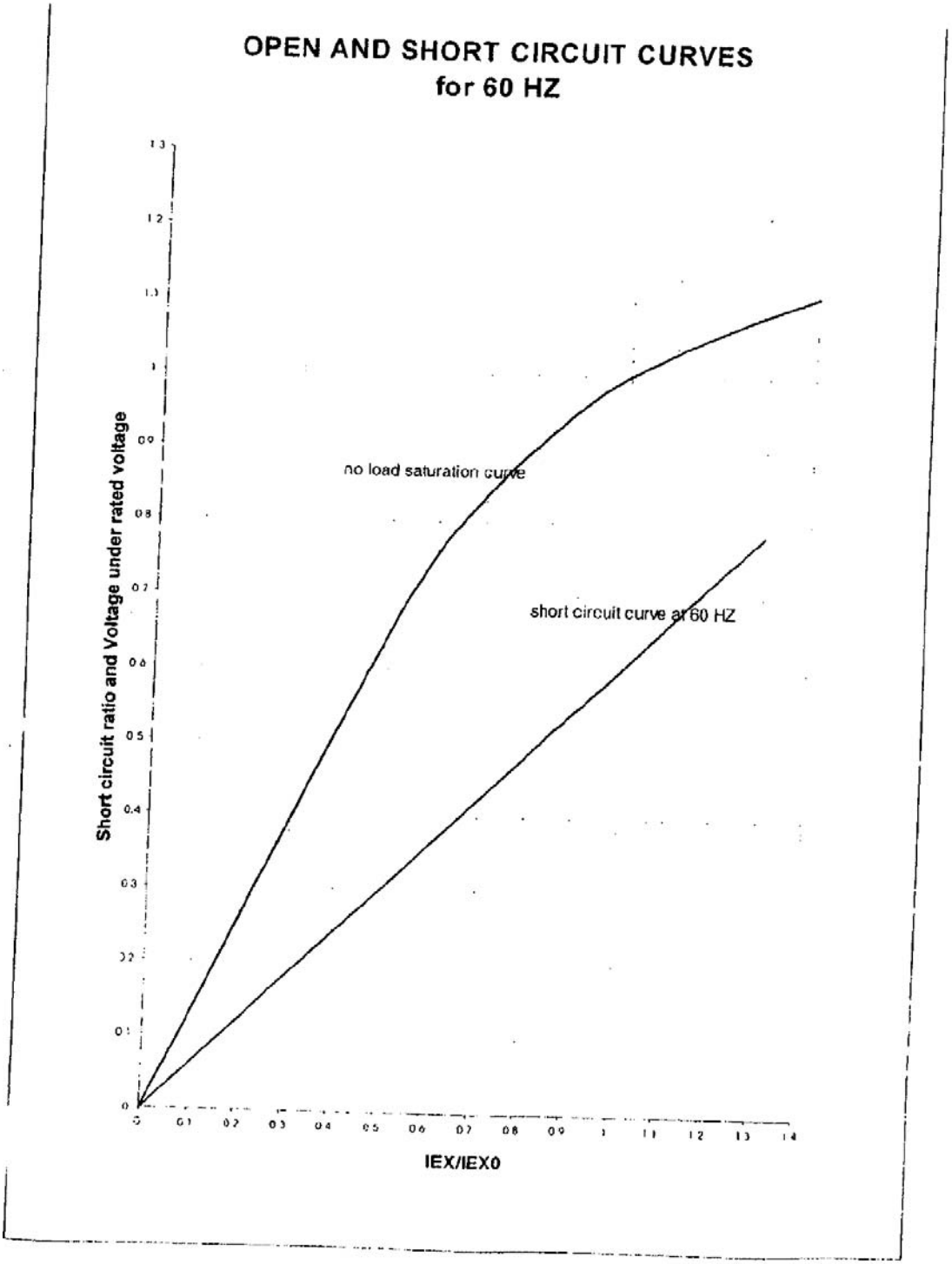


CONs	#	Value	Description
J		8.00	T'_{do} (>0)(Seconds)
J+1		0.05	T''_{do}(>0)(Seconds)
J+2		1.00	T'_{qo}(>0)(Seconds)
J+3		0.40	T''_{qo}(>0)(Seconds)
J+4		2.00	Inertial H
J+5		0.00	Speed Damping D
J+6		1.90	X_d
J+7		1.80	X_q
J+8		0.20	X'_d
J+9		0.30	X'_q
J+10		0.14	X''_d=X''_q
J+11		0.12	X_l
J+12		0.05	S(1.0)
J+13		0.40	S(1.2)

X_d, X_q, X'_d,X'_q, X''_d, X''_q, X_l, H and D are in p.u., machine MVA base.

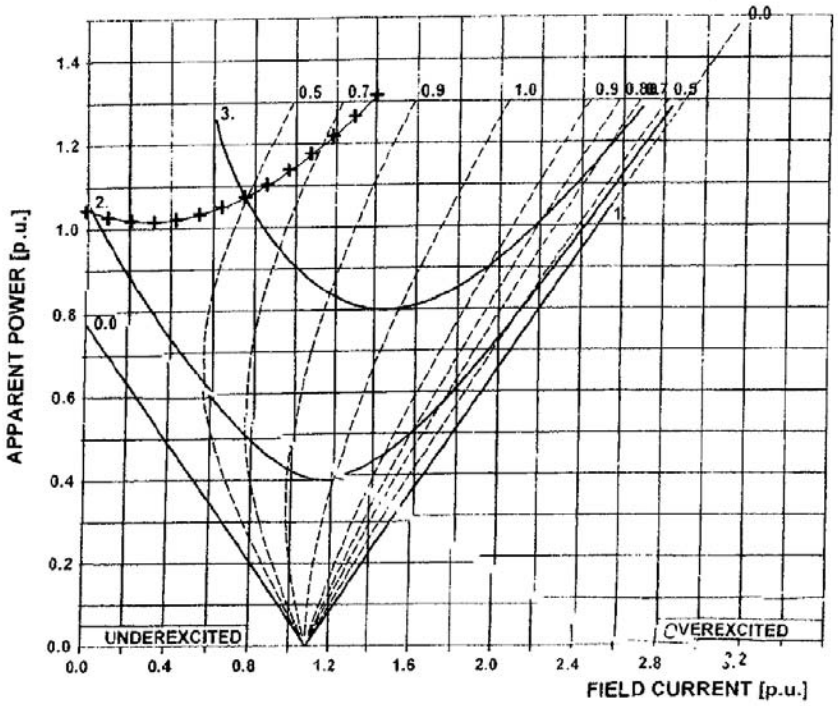
X''_q must be equal to X''_d.

IBUS, 'GENROU', I, T'_{do}, T''_{do}, T'_{qo}, T''_{qo}, H, D, X_d, X_q, X'_d, X'_q, X''_d, X_l, S(1.0), S(1.2)/


OPEN AND SHORT CIRCUIT CURVES
for 60 HZ
Short circuit ratio and Voltage under rated voltage
no load saturation curve
short circuit curve at 60 HZ
IEX/IEX0

V-CURVES

126320 kVA 60 Hz 0.85PF 13800 V



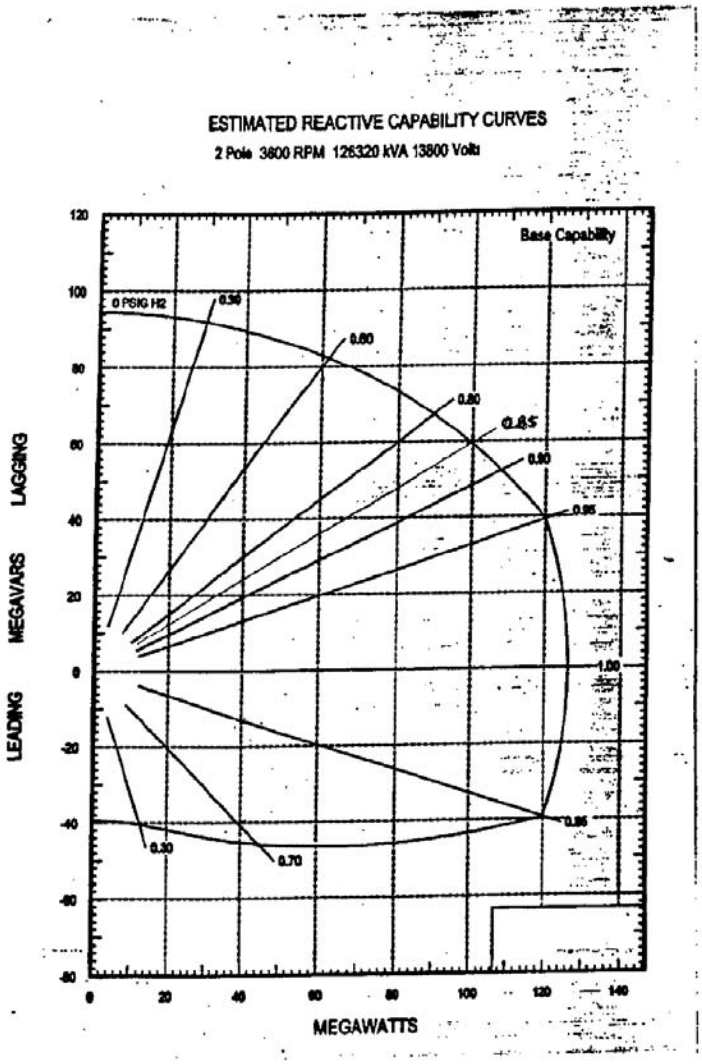
1. ACTIVE OUTPUT [p.u.] = 0.00
2. ACTIVE OUTPUT [p.u.] = 0.40
3. ACTIVE OUTPUT [p.u.] = 0.80

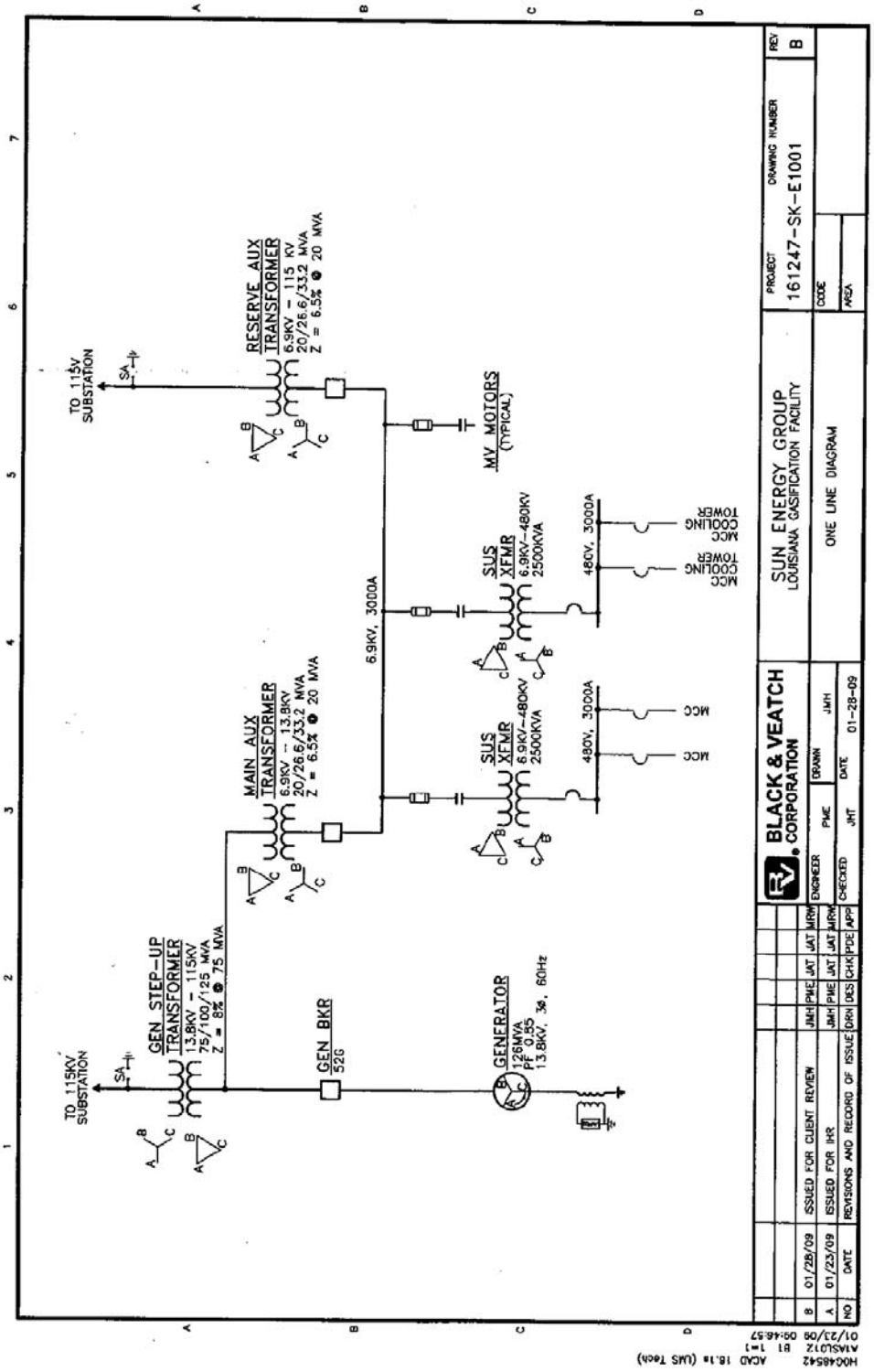
GENERATOR OUTPUT 1 p.u. = 126320 kVA
FIELD CURRENT 1 p.u. = 900 A

+++ PRACTICAL STABILITY LIMIT
--- POWER FACTOR
— ACTIVE OUTPUT

NOTE: $\frac{P}{P_N}$ = 1 IS EQUAL TO p.u. = 0.80

P_N = Nominal active output


ESTIMATED REACTIVE CAPABILITY CURVES
2 Pole 3600 RPM 126320 kVA 13800 Volts
Base Capability
0 PSIG H2
0.50
0.60
0.80
0.85
0.90
0.95
1.00
0.95
0.30
0.70
LEADING MEGAVARS LAGGING
MEGAWATTS
120
100
80
60
40
20
0
-20
-40
-60
-80
0
20
40
60
80
100
120
140


TO 115KV SUBSTATION
GEN STEP-UP TRANSFORMER
13.8KV – 115KV
75/100/125 MVA
Z = 8% @ 75 MVA
GEN BKR
52G
GENERATOR
126MVA
PF 0.85
13.8KV, 3Ø, 60Hz
MAIN AUX TRANSFORMER
6.9KV – 13.8KV
20/26.6/33.2 MVA
Z = 6.5% @ 20 MVA
RESERVE AUX TRANSFORMER
6.9KV – 115 KV
20/26.6/33.2 MVA
Z = 6.5% @ 20 MVA
TO 115KV SUBSTATION
6.9KV, 3000A
MV MOTORS (TYPICAL)
SUS XFMR
6.9KV–480KV
2500KVA
480V, 3000A
MCC
MCC COOLING TOWER
SUS XFMR
6.9KV–480KV
2500KVA
480V, 3000A
MCC
MCC
BLACK & VEATCH CORPORATION
SUN ENERGY GROUP
LOUISIANA GASIFICATION FACILITY
ONE LINE DIAGRAM
PROJECT 161247
DRAWING NUMBER E1001-SK
REV B
CODE
AREA
ENGINEER PME
DRAWN JMH
CHECKED JMT
DATE 01-28-09
B 01/28/09 ISSUED FOR CLIENT REVIEW JMH PME JAT MRW
A 01/23/09 ISSUED FOR IHR JMH PME JAT MRW
NO. DATE REVISIONS AND RECORD OF ISSUE DRN DES CHK PDE APP
H004854Z ACAD 18.1a (UAS Tech)
A1ASL01Z B1 1=1
01/23/09 09:48:57

APPENDIX B LOAD FLOW AND STABILITY DATA IN PSSE FORMAT

Loadflow Data

336421,'PID-228 ', 13.8000, 2, 0.000, 0.000, 351, 130,1.00129, -33.9091, 36
0 / END OF BUS DATA, BEGIN LOAD DATA
0 / END OF LOAD DATA, BEGIN GENERATOR DATA
336421,'1 ', 114.800, -24.352, 46.000, -38.000,1.02000,336411, 126.320, 0.00000, 0.17000, 0.00000, 0.00000,1.00000,1, 100.0, 104.000, 0.000, ,1.0000
0 / END OF GENERATOR DATA, BEGIN BRANCH DATA
0 / END OF BRANCH DATA, BEGIN TRANSFORMER DATA
336411,336421, 0,'1 ',1,2,1, 0.00000, 0.00000,2,' ',1, 1,1.0000
0.00228, 0.07990, 75.00
1.00000, 0.000, 0.000, 125.00, 125.00, 125.00, 0, 0, 1.05000, 0.95000, 1.10000, 0.90000, 5, 0, 0.00000, 0.00000
1.00000, 0.000
0 / END OF TRANSFORMER DATA, BEGIN AREA DATA
0 / END OF AREA DATA, BEGIN TWO-TERMINAL DC DATA
0 / END OF TWO-TERMINAL DC DATA, BEGIN VSC DC LINE DATA
0 / END OF VSC DC LINE DATA, BEGIN SWITCHED SHUNT DATA
0 / END OF SWITCHED SHUNT DATA, BEGIN IMPEDANCE CORRECTION DATA
0 / END OF IMPEDANCE CORRECTION DATA, BEGIN MULTI-TERMINAL DC DATA
0 / END OF MULTI-TERMINAL DC DATA, BEGIN MULTI-SECTION LINE DATA
0 / END OF MULTI-SECTION LINE DATA, BEGIN ZONE DATA
0 / END OF ZONE DATA, BEGIN INTER-AREA TRANSFER DATA
0 / END OF INTER-AREA TRANSFER DATA, BEGIN OWNER DATA
0 / END OF OWNER DATA, BEGIN FACTS DEVICE DATA
0 / END OF FACTS DEVICE DATA

Dynamics Data

PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS/E TUE, MAY 05 2009 13:25
EN12S08 U1_R1+PID228+PRIORS+CPUPG-1+PUPG12345+PID228
PRE-PID-228 CASE; MAY 2009

PLANT MODELS

REPORT FOR ALL MODELS BUS 336421 [PID-228 13.800] MODELS

** GENROU ** BUS X-- NAME --X BASEKV MC C O N S S T A T E S
336421 PID-228 13.800 1 42566-42579 19085-19090

MBASE Z S O R C E X T R A N GENTAP
126.3 0.00000+J 0.17000 0.00000+J 0.00000 1.00000

T'D0 T"D0 T'Q0 T"Q0 H DAMP XD XQ X'D X'Q X"D XL
8.00 0.050 1.00 0.400 2.00 0.00 2.0000 1.8000 0.2200 0.3500 0.1700 0.1200

S(1.0) S(1.2)
0.0500 0.4000

** PSS2A ** BUS X-- NAME --X BASEKV MC C O N S S T A T E S V A R S I C O N S
336421 PID-228 13.800 1 54622-54638 28042-28057 2207-2210 2958-2963

IC1 REMBUS1 IC2 REMBUS2 M N
1 0 3 0 5 1

TW1 TW2 T6 TW3 TW4 T7 KS2 KS3
2.000 2.000 0.000 2.000 0.000 2.000 0.200 1.000

T8 T9 KS1 T1 T2 T3 T4 VSTMAX VSTMIN
0.500 0.100 10.000 0.300 0.200 0.200 0.200 0.100 -0.100

** ESST1A ** BUS X-- NAME --X BASEKV MC C O N S S T A T E S I C O N S
336421 PID-228 13.800 1 100025-100042 41042-41046 3642-3643

UEL VOS TR VIMAX VIMIN TC TB TC1 TB1 KA
1 1 0.000 0.100 -0.100 1.000 10.000 1.000 1.000 200.0

TA VAMAX VAMIN VRMAX VRMIN KC KF TF KLR ILR
0.020 5.000 -5.000 5.000 -5.000 0.050 0.000 1.000 5.000 2.800

** IEESGO ** BUS X-- NAME --X BASEKV MC C O N S S T A T E S VAR
336421 PID-228 13.800 1 129542-129552 50984-50988 7604

T1 T2 T3 T4 T5 T6 K1 K2 K3 PMAX PMIN

0.0 0.000 0.500 0.200 0.50 10.00 20.0 0.20 0.60 1.00 0.00

APPENDIX C PLOTS FOR STABILITY SIMULATIONS

Stability and Sensitivity Plots – Part II of This System Impact Study Report for PID 228

APPENDIX D PLOTS FOR SENSITIVITY ANALYSIS SIMULATIONS

Stability and Sensitivity Plots – Part II of This System Impact Study Report for PID 228

APPENDIX B-A: Deliverability Test for Network Resource Interconnection Service Resources

1. 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.

1.1 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.

1.2 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.

1.3 Required Upgrades.

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

Appendix B-B – NRIS Deliverability Test

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.

1) 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.

2) 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:

1) 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.

2) 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.

3) 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.