System Impact Study
PID 257
252 MW Plant

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0	10/31/11	Posting System Impact Study	EC	BR
1	11/28/11	Power Factor Design Wording	BC	BR

Contents

Executive Summary

This System Impact Study is the second step of the interconnection process and is based on the PID 257 request for interconnection on Entergy's transmission system between the Chalkley and Solac 230 kV substations located at PID 257 substation. This report is organized in three sections, namely, Energy Resource Interconnection Service (ERIS), Short Circuit/Breaker Rating Analysis, and Stability Study.

Requestor for PID 257 requested ERIS only; therefore, under ERIS, a load flow analysis was performed. PID 257 will be a new generation unit. The study evaluates connection of 252 MW to the Entergy Transmission System. The load flow study was performed on the latest available 2015 Summer Peak Case, using PSS/E and MUST software by Siemens Power Technologies International (Siemens-PTI). The short circuit study was performed on the Entergy system short circuit model using ASPEN software. The proposed in-service date for ERIS is March 1, 2015.

Results of the System Impact Study indicated that under ERIS the additional generation due to PID 257 generator **does not** cause an increase in short circuit current such that they exceed the fault interrupting capability of the high voltage circuit breakers within the vicinity of the PID 257 plant with priors and without priors. Results also indicated that the system is stable following all simulated three-phase normally cleared and stuck breaker faults. No dynamic voltage problems were noted. Therefore, estimated upgrade costs under ERIS with and without priors is $0.

The estimated cost of interconnection facilities is $9.0 Million; which covers the cost of the construction of a new three element 230 kV ring bus substation at the Customer's point of interconnection. The estimated costs of the interconnection facilities are planning estimates only. Detailed cost estimates, accelerated costs, and solutions for any identified limiting elements will be provided in the Facilities Study.

Estimated ERIS Project Planning Upgrade Cost

Estimated cost With Priors*	Estimated cost Without Priors*
$0	$0

*The costs of the upgrades are planning estimates only. Detailed cost estimates and solutions will be provided in the Facilities Study.

Energy Resource Interconnection Service

1. Introduction

This Energy Resource Interconnection Service (ERIS) is based on the Customer's request for a 252 MW interconnection on Entergy's transmission system between the Chalkley and Solac 230 kV substations located at PID 257 substation, 1.25 miles from Chalkley. The proposed commercial operation date of the project is March 1, 2015. The objective of this study is to assess the reliability impact of the new facility on the Entergy transmission 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 the 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 were adequate to handle the full output from the plant for simulated transfers to adjacent control areas. A short circuit analysis was 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 unit would cause a stability problem on the Entergy system. The load flow results from the ERIS study are for information only. ERIS does not in and of itself convey any transmission service.

This ERIS System Impact Study was based on information provided by the Customer and assumptions made by Entergy's Independent Coordinator of Transmission (ICT) planning group and Entergy's 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.

It was determined that there are no Entergy Transmission System upgrades required for this ERIS request. The estimated cost of interconnection facilities is $9.0 Million; which covers the cost of the construction of a new 230 kV three element ring bus substation cut-in at the Customer's point of interconnection on Entergy's Chalkley – Solac 230 kV transmission line.

2. Short circuit Analysis/Breaker Rating Analysis

2.1 Model Information

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

2.2 Short Circuit Analysis

The method used to determine if any short circuit problems would be caused by the addition of the PID 257 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 257 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 257 generation. Any breakers identified to be upgraded through this comparison are mandatory upgrades.

2.3 Analysis Results

The results of the short circuit analysis indicated that the additional generation due to PID 257 generation caused no increase in short circuit current such that they exceeded the fault interrupting capability of the high voltage circuit breakers within the vicinity of the PID 257 plant **with and without priors. Priors included: 221, 231, 238, 240, 244, 247, 250, 255, and 256.**

2.4 Problem Resolution

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

3. Load Flow Analysis

3.1 Model Information

The load flow analysis was performed based on the projected 2015 summer peak load flow model. Approved future transmission projects in the 2011-2013 ICT Base Plan were used in the models for scenarios three and four. These upgrades can be found on Entergy's OASIS web page at http://www.oatioasis.com/EES/EESDocs/Disclaimer.html

The loads were scaled based on the forecasted loads for the year. All firm power transactions between Entergy and its neighboring control areas were modeled for the year 2015 excluding short-term firm transactions on the same transmission interface. An economic dispatch was carried out on Entergy generating units after the scaling of load and modeling of transactions. The proposed 252 MW 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 the requesting generator as the source and adjacent control areas as the sink. The generator step-up transformers, generators, and interconnecting lines were modeled according to the information provided by the customer.

This study considered the following four scenarios:

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

The generator step-up transformers, generators, and interconnecting lines were modeled according to the information provided by the customer.

3.2 Load Flow Analysis

3.2.1 Load Flow Analysis:

The load flow analysis was performed as a DC analysis using PSS/E and PSS/MUST software by Power Technologies Incorporated (PTI). A Transmission Reliability Margin (TRM) value that effectively reduced line ratings by 5% was used in the model.

With the above assumptions implemented, the First Contingency Incremental Transfer Capability (FCITC) values were 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. The details of each

scenario list each limiting element, the contingency for the limiting element, and the Available Transfer Capacity (ATC). The ATC is equal to the FCITC.

3.2.2 Performance Criteria

The criteria for overload violations are as follows:

A) With All Lines in Service

- The MVA flow in any branch should not exceed Rate A (normal rating).
- Voltage should be greater than 0.95pu.

B) Under Contingencies

- The MVA flow through any facility should not exceed Rate A.
- Voltage should be greater than 0.92pu.

3.2.3 Power Factor Consideration / Criteria

FERC Order 661A describes the power factor design requirements for wind and solar generation plants. A wind or solar generation facility's reactive power requirements are based on the aggregate of all units that feed into a single point on the transmission system. The Transmission Provider's System Impact Study is needed to demonstrate that a specific power factor requirement is necessary to ensure safety or reliability.

This wind generator needs to operate in voltage control mode in order to satisfy the power factor design requirements.

3.3 Analysis Results

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

Table 3.3.1: Summary of Results for PID 257 – ERIS Load Flow Study

Interface		Summer Peak Case Used	FCITC Available for Scenario 1	FCITC Available for Scenario 2	FCITC Available for Scenario 3	FCITC Available for Scenario 4
AECI	Associated Electric Cooperative, Inc.	2015	-1117	-252	-1102	-259
AEPW	American Electric Power West	2015	-1055	-140	-631	-148
AMRN	Ameren Transmission	2015	-2301	-2146	-1167	-274
CLEC	CLECO	2015	252	252	252	252
EES	Entergy	2015	-762	-1301	-591	-42
EMDE	Empire District Electric Co	2015	-982	-222	-977	-230
LAFA	Lafayette Utilities System	2015	-289	-2143	231	-1410
LAGN	Louisiana Generating, LLC	2015	-585	-2268	252	-1594
LEPA	Louisiana Energy & Power Authority	2015	-836	-1003	124	-700
OKGE	Oklahoma Gas & Electric Company	2015	-945	-195	-864	-203
SMEPA	South Mississippi Electric Power Assoc.	2015	-859	-801	94	-533

Interface		Summer Peak Case Used	FCITC Available for Scenario 1	FCITC Available for Scenario 2	FCITC Available for Scenario 3	FCITC Available for Scenario 4
SOCO	Southern Company	2015	-1736	-1635	-1524	-1148
SPA	Southwest Power Administration	2015	-1037	-234	-1027	-241
TVA	Tennessee Valley Authority	2015	-2087	-3360	-1370	-2387

4. Facilities at the Point of Interconnection

The Interconnection Customer's designated Point of Interconnection (POI) is a new 230 kV substation that will be constructed and cut-in on Entergy's Chalkley – Solac 230 kV transmission line. The interconnection customer is responsible for constructing all facilities needed to deliver generation to the POI. The estimated cost for a 230 kV, three element ring bus configuration substation is $9.0 Million. This cost is based on parametric estimating techniques for a "typical" site. Cost may significantly change based on specific project parameters that are not known at this time. Costs specific to this interconnection will be developed during the Facilites Study.

TABLE 3.3.2: DETAILS OF SCENARIO 1 RESULTS: (WITHOUT FUTURE PROJECTS AND WITHOUT PENDING TRANSMISSION SERVICE & STUDY REQUEST)

Limiting Elements	Est. Cost	AECI	AEPW	AMRN	CLECO	EES	EMDE	LAFA	LAGN	LEPA	OKGE	SMEPA	SOCO	SPA	TVA
Acadian - Bonin 230kV (LAFA)	Other Ownership							X							
Bonin - Cecelia 138kV	11,760,000									X					
Carroll 230/138kV transformer (CLECO)	Other Ownership	X	X	X			X				X		X	X	X
Champagne - Plaisance (CLECO) 138kV	Other Ownership							X							
Conroe 1 - Conroe 2 138kV	TBD	X	X	X		X	X				X			X	X
Conroe Bulk2 - Plantation 138kV	2,520,000	X	X	X		X	X				X		X	X	X
Coughlin - Plaisance 138kV (CLECO)	Other Ownership							X		X					
Flander - Acadian 230kV (LAFA)	Other Ownership							X							
Flander - Segura 138kV (CLECO)	Other Ownership									X					
Florence - South Jackson 115kV - Supplemental Upgrade	Committed to by Others											X			
French Settlement - Sorrento 230kV	7,200,000	X	X	X			X				X	X	X	X	X
Greenwood - Terrebone 115kV	8,400,000							X							
Habetz - Richard 138kV	Included in 2011 ICT Base Plan							X		X					
International Paper - Mansfield 138kV (CLECO)	Other Ownership	X	X	X			X				X		X	X	X
International Paper - Wallake 138kV (CLECO)	Other Ownership	X	X	X			X				X		X	X	X
Judice - Scott1 138kV	6,720,000									X					
Lake Conway - Mayflower 115kV	3,360,000													X	
Meaux - Abbeville 138kV	5,880,000									X					
Moril - Cecelia 138kV	21,000,000									X					

Limiting Elements	Est. Cost	AECI	AEPW	AMRN	CLECO	EES	EMDE	LAFA	LAGN	LEPA	OKGE	SMEPA	SOCO	SPA	TVA
Mossville - Roy S. Nelson 138kV	2,520,000					X									
Plantation - Cedar Hill 138kV	1,680,000	X	X	X		X	X				X		X	X	X
Pleasant Hill 500/161kV transformer	Included in 2011 ICT Base Plan						X							X	
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Committed to by Others							X	X	X		X	X		X
Ray Braswell 500/230kV transformer ckt2 - Supplemental Upgrade	Committed to by Others											X			
Semere - Scott2 138kV	13,440,000							X		X					
Toledo - Leesville (CLECO) 138kV	Other Ownership	X	X	X			X				X	X	X	X	X
Toledo - VP Tap 138kV	Included in 2011 ICT Base Plan	X	X	X		X	X		X	X	X	X	X	X	X

TABLE 3.3.3: DETAILS OF SCENARIO 2 RESULTS: (WITHOUT FUTURE PROJECTS AND WITH PENDING TRANSMISSION SERVICE & STUDY REQUEST)

Limiting Elements	Est. Cost	AECI	AEPW	AMRN	CLECO	EES	EMDE	LAFA	LAGN	LEPA	OKGE	SMEPA	SOCO	SPA	TVA
Acadian - Bonin 230kV (LAFA)	Other Ownership							X							
Bonin - Cecelia 138kV	11,760,000									X					
Carlyss - CitCon West 138kV	420,000					X									
Carroll 230/138kV transformer (CLECO)	Other Ownership	X	X	X			X				X		X	X	X
Champagne - Plaisance (CLECO) 138kV	Other Ownership							X	X	X					
Coly - Vignes 230kV - Supplemental Upgrade	Committed to by Others					X				X		X			
Conroe 1 - Conroe 2 138kV	TBD	X	X	X		X	X				X			X	X
Coughlin - Plaisance 138kV (CLECO)	Other Ownership							X	X	X					
Evergreen - PtPlea 230kV	900,000									X					
Flander - Acadian 230kV (LAFA)	Other Ownership							X							
Flander - Segura 138kV (CLECO)	Other Ownership									X					
Florence - South Jackson 115kV - Supplemental Upgrade	Committed to by Others											X			
French Settlement - Sorrento 230kV	7,200,000	X		X			X					X	X	X	X
Habetz - Richard 138kV	Included in 2011 ICT Base Plan							X		X					
International Paper - Mansfield 138kV (CLECO)	Other Ownership	X	X	X			X				X		X	X	X
International Paper - Wallake 138kV (CLECO)	Other Ownership		X				X				X				
Jackson Miami - Jackson Monument Street 115kV	2,520,000											X			

Limiting Elements	Est. Cost	AECI	AEPW	AMRN	CLECO	EES	EMDE	LAFA	LAGN	LEPA	OKGE	SMEPA	SOCO	SPA	TVA
Jackson Miami - Rex Brown 115kV	1,680,000											X			
Judice - Scott1 138kV	6,720,000									X					
Lake Conway - Mayflower 115kV	3,360,000													X	
Meaux - Abbeville 138kV	5,880,000									X					
Moril - Cecelia 138kV	21,000,000									X					
Mossville - Roy S. Nelson 138kV	2,520,000					X									
North Crowley - Scott1 138kV	14,280,000							X							
Plantation - Cedar Hill 138kV	1,680,000	X	X	X		X	X				X		X	X	X
Pleasant Hill 500/161kV transformer	Included in 2011 ICT Base Plan						X							X	
Rapidies (CLECO) - Rodemacher (CLECO) 230kV	Other Ownership							X		X					
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Committed to by Others							X	X	X		X	X		X
Semere - Scott2 138kV	13,440,000							X		X		X			
Toledo - Leesville (CLECO) 138kV	19,320,000		X												
Toledo - VP Tap 138kV	Included in 2011 ICT Base Plan	X	X	X		X	X		X	X	X	X	X	X	X
Willow Glen - PtPlea 230kV	2,700,000									X					

TABLE 3.3.4: 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
Carroll 230/138kV transformer (CLECO)	Other Ownership	X	X	X			X				X		X	X	X
Conroe 1 - Conroe 2 138kV	TBD	X	X	X		X	X				X			X	X
Conroe Bulk2 - Plantation 138kV	2,520,000	X	X	X		X	X				X			X	X
Coughlin - Plaisance 138kV (CLECO)	Other Ownership							X		X					
Florence - South Jackson 115kV - Supplemental Upgrade	Committed to by Others											X			
Greenwood - Terrebone 115kV	8,400,000									X					
International Paper - Mansfield 138kV (CLECO)	Other Ownership	X	X	X			X				X		X	X	X
International Paper - Wallake 138kV (CLECO)	Other Ownership	X	X	X			X				X		X	X	X
Plantation - Cedar Hill 138kV	1,680,000	X	X	X		X	X				X		X	X	X
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Committed to by Others							X		X		X	X		
Ray Braswell 500/230kV transformer ckt2 - Supplemental Upgrade	Committed to by Others											X			

TABLE 3.3.5: 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
Carroll 230/138kV transformer (CLECO)	Other Ownership	X	X	X			X				X		X	X	X
Champagne - Plaisance (CLECO) 138kV	Other Ownership							X	X	X					
Conroe 1 - Conroe 2 138kV	TBD	X	X	X		X	X				X			X	X
Coughlin - Plaisance 138kV (CLECO)	Other Ownership							X	X	X					
Florence - South Jackson 115kV - Supplemental Upgrade	Committed to by Others											X			
International Paper - Mansfield 138kV (CLECO)	Other Ownership	X	X	X			X				X		X	X	X
International Paper - Wallake 138kV (CLECO)	Other Ownership		X				X				X				
Jackson Miami - Rex Brown 115kV	1,680,000											X			
Plantation - Cedar Hill 138kV	1,680,000	X	X	X		X	X				X		X	X	X
Rapidies (CLECO) - Rodemacher (CLECO) 230kV	Other Ownership							X		X					
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Committed to by Others							X	X	X		X	X		X

Stability Study

5. Executive Summary

The purpose of this report is to present the results of the stability analysis performed to evaluate the impact of the proposed PID 257 project on the Entergy's system dynamic performance.

The PID 257 consists of a generation interconnection of 252 MW of wind generation, which will interconnect to the Entergy grid through a tap in the Chalkley - Solac 230 kV line one (1) mile from the Chalkley substation.

Stability models for the PID 257 interconnection request were added to the Entergy's dynamic database, based on the technical documentation provided by the developer.

The stability analysis was performed to determine the ability of the proposed generation facility to remain in synchronism and within applicable planning standards following system disturbances. Three (3) possible types of system faults were considered for the simulations:

- Three-phase faults with stuck breaker
- Three-phase normally cleared faults
- Single-line to ground faults with stuck breaker

Based on the Entergy study criteria, if system is unstable following a three-phase stuck breaker fault, the simulation is then repeated assuming two distict conditions for the same outage: 1) three-phase fault with normal clearing and 2) single-phase stuck breaker fault.

Three-phase faults with stuck breaker conditions (Faults 21 to 34 listed in Table 7-3) were simulated. The stability analysis results show that:

- The PID 257 proposed project, stayed on line following any of the contingencies tested.
- All other synchronous generators in the monitored areas were stable and remained in synchronism with the rest of the Entergy system for the conditions tested.
- Acceptable damping and voltage recovery was observed, within applicable standards, that is, no violations in the voltage dip criteria.

The LVRT tests performed show that the PID 257 wind project meet the FERC Order 661A requirements for low voltage ride through and voltage recovery to pre-fault conditions.

The general conclusion of the stability impact study is that the PID 257 project does not cause detrimental impact on the Entergy system, in terms of dynamic performance. Therefore, PID 257 project is able to deliver its full power output to the Entergy transmission system without compromising the system reliability.

6. Final conclusions

The PID 257 project, consisting of 252 MW of wind generation, was modeled in the Entergy system, interconnecting into the Entergy system through a tap in the Chalkley - Solac 230 kV line. The project was evaluated to determine its impact on the system dynamic performance, as well as to determine its ability to meet FERC Order 661A (low voltage ride through and wind farm recovery to pre-fault voltage).

Stability models for the PID 257 interconnection request were added to the dynamic database, based on the technical documentation provided by the developer. Three-phase faults with stuck breaker (Faults 21 to 34 listed in Table 7-3) were simulated. The stability analysis demonstrates that the interconnection of the proposed PID 257 project **does not** adversely impact the stability of the Entergy System in the study area for the conditions and contingencies tested.

The simulation results obtained also indicate that the generators in the monitored areas were stable and remained in synchronism following all simulated three-phase with stuck breaker faults. No voltage criteria violations were verified following these events.

For the LVRT tests, three-phase faults were simulated at the PID 257 POI with applied time of nine (9) cycles. The results show that the voltages recover without triggering the WTG low voltage protection. The electrical power of the WTG units returns to the pre-fault condition after the transient period, which demonstrates that no wind turbine trips occur due to lack of Low Voltage Ride Trough capability, for the conditions and contingencies tested.

7. Stability Analysis

The study considered the 2015 Summer Peak power flow case with the required interconnection generation request modeled as described in Section 7.2.1. The base case also contains all the significant previous queued projects in the interconnection queue.

The monitored areas in this study are shown in Table 7-1.

Area Number	Area Name
351	EES
332	LAGN
502	CELE

Table 7-1: Areas of Interest

7.1 Stability Analysis Methodology

7.1.1 Stability Simulations

The dynamic simulations were performed using the PSS®E version 30.3.3 with the latest stability database provided by SPP. Three-phase faults with delayed clearing in the neighborhood of PID 257 Point of interconnection were simulated. Any adverse impact on the system stability was documented and further investigated with appropriate solutions to determine whether a static or dynamic VAR device is required or not.

The system performance was evaluated in terms of its the ability, for a given initial operating condition, to regain a state of operating equilibrium after being subjected to a physical disturbance.

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

1) For thre-phase fault or single-line-ground fault with normal clearing resulting in the loss of a single component or even single outage 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
2) For three-phase faults with normal clearing resulting in loss of two or more components (generator, transmission circuit or transformer), and SLG fault with delayed clearing resulting in 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

Notes:

- The time period on which the transient voltage dip is accounted for excludes the duration of the fault.
- The transient voltage dip criteria are not applicable for three-phase stuck-breaker faults unless the determined impact is extremely widespread.

7.1.2 Disturbances for Stability Analysis

Three (3) different system faults were considered for the simulations:

a) Three-phase faults with stuck breaker

b) Three-phase normally cleared faults

c) Single-line to ground faults with stuck breaker

If system presents unstable behavior or poor dynamic performance following a three-phase stuck breaker fault, the simulation is repeated assuming both three-phase fault with normal clearing and a single-phase to ground fault with stuck breaker.

The disturbances evaluated are listed in the following Table 7-2 and Table 7-3 for three-phase faults, normal clearing and three-phase faults and stuck breaker conditions, respectively.

Figure 7-1 to Figure 7-10 shows the substation single line breaker diagrams with indication where the faults are applied for the stability simulations.

Table 7-2: Contingencies Considered for the PID 257 Stability Analysis – Three Phase Faults with Normal Clearing

Fault #	Line on which Fault Occurs	Fault Location (For Simulation)	Fault Type	Fault Clearing (Cycles)		Stuck Breaker	Breaker Clearing		Tripped Facilities
				Primary	Back -up		Primary	Back-up	
FAULT_1	Solac – TapChalkey 230 kV	TapChalkley 230 kV	3 Phase	6	-	None	17430 (Solac), PID 257 breaker	None	Solac - TapChalkey 230 kV line
FAULT_2	Solac - Graywood 230 kV line	Solac 230 kV	3 Phase	6	-	None	17425 (Solac), 27270, 27275 (Graywood)	None	Solac - Grywood 230 kV line
FAULT_3	Solac 230/69 kV transformer 1	Solac 230 kV	3 Phase	6	-	None	17420, 17430, 18300 (Solac)	None	Solac 230 kV- Solac 69 kV Ckt 1 (transformer 1) and Solac - Grywood 230 kV line
FAULT_4	Chalkey - Gillis 230 kV line	Chalkey 230 kV	3 Phase	6	-	None	18240 (Chalkey), 143F (Gillis), 18105 (Moss Bluff)	None	Chalkey - Gillis 230 kV line, Gillins 230/13.8 kV transformer # 1, Gillis - Moss Bluff 230 kV line
FAULT_5	Gillis - Moss Bluff 230 kV line	Gillis 230 kV	3 Phase	6	-	None	18240 (Chalkey), 143F (Gillis), 18105 (Moss Bluff)	None	Chalkey - Gillis 230 kV line, Gillis 230/13.8 kV transformer # 1, Gillis - Moss Bluff 230 kV line
FAULT_6	Moss Bluff - Nelson 230 kV line	Moss Bluff 230 kV	3 Phase	6	-	None	18100 (Moss Bluff), 18205, 18210 (Nelson)	None	Moss Bluff - Nelson 230 kV line
FAULT_7	Nelson - Penton Road 230 kV line	Nelson 230 kV	3 Phase	6	-	None	18145 (Nelson)	None	Nelson - Penton Road 230 kV
FAULT_8	Nelson - Carlyss 230 kV line	Nelson 230 kV	3 Phase	6	-	None	13140, 13025 (Nelson), 13145, 13155 (Carlyss)	None	Nelson - Carlyss 230 kV line
FAULT_9	Nelson - Verdine 230 kV line	Nelson 230 kV	3 Phase	6	-	None	18205, 18190 (Nelson), 18890, 18895 (Verdine)	None	Nelson - Verdine 230 kV line

Fault #	Line on which Fault Occurs	Fault Location (For Simulation)	Fault Type	Fault Clearing (Cycles)		Stuck Breaker	Breaker Clearing		Tripped Facilities
				Primary	Back -up		Primary	Back-up	
FAULT_10	Nelson 230/20 kV Unit number 6 step-up transformer	Nelson 230 kV	3 Phase	6	-	None	18160, 18170	None	Nelson 230 kV - Nelson 20 kV (Unit number 6 transformer), Nelson Unit 6
FAULT_11	Nelson - Richard 500 kV line	Nelson 500 kV	3 Phase	6	-	None	13060, 13105 (Nelson), 13000, 13070 (Richard)	None	Nelson - Richard 500 kV line
FAULT_12	Nelson - Hartburg 500 kV line	Nelson 500 kV	3 Phase	6	-	None	13105, 13110 (Nelson), 13635,13645 (Hartburg)	None	Nelson - Hartbrg 500 kV line
FAULT_13	Carlyss - Big Three 230 kV line	Carlyss 230 kV	3 Phase	6	-	None	13500, 13505 (Carlyss), 13240, 13245 (Sabine)	None	Carlyss - Big Three 230 kV line and Big Three - Sabine 230 kV line
FAULT_14	Carlyss - Boudin 230 kV line	Carlyss 230 kV	3 Phase	6	-	None	13505, 13580 (Carlyss), 27050, 27055 (Boudoin)	None	Carlyss - Boudin 230 kV line
FAULT_15	Calcasieu - Pecan Grove 230 kV line	Pecan Grove 230 kV	3 Phase	6	-	None	27130, 27125 (Calcasieu), 18365 (Pecan Grove)	None	Calcasieu - Pecan Grove 230 kV line
FAULT_16	Calcasieu - Boudoin 230 kV line	Boudoin 230 kV line	3 Phase	6	-	None	27120, 27125 (Calcasieu), 27070,27075 (Boudoin)	None	Calcasieu - Boudoin 230 kV line
FAULT_17	Calcasieu 230/18 kV step-up transformer Dynegy GTG 002 unit	Calcasieu 230 kV	3 Phase	6	-	None	27115, 27130 (Calcasieu)	None	Calcasieu 230 - Dynegy 18 kV transformer (Dynegy GTG - 002 unit)

Fault #	Line on which Fault Occurs	Fault Location (For Simulation)	Fault Type	Fault Clearing (Cycles)		Stuck Breaker	Breaker Clearing		Tripped Facilities
				Primary	Back -up		Primary	Back-up	
FAULT_18	Pecan Grove – PID 256 230 kV line	Pecan Grove 230 kV	3 Phase	6	-	none	18370 (Pecan Grove), 27280, 27285 (Graywood)	None	Pecan Grove -Vincent 230 kV line and Vincent to PID_256 230 kV line
FAULT_19	Pecan Grove –Vincent 230 kV line	Graywood 230 kV	3 Phase	6	-	none	27280, 27285 (Graywood), 18370 (Pecan Grove)	None	Graywood 230 kV - PID_256 kV line
FAULT_20	Solac – Contraband 69 kV line	Solac 69 kV	3 Phase	6	-	None	17415 (Solac), 37310 (Contraband)	None	Solac - Contraband 69 kV line

Table 7-3: Contingencies Considered for the PID 257 Stability Analysis – Three Phase Faults with Delayed Clearing

Fault #	Line on which Fault Occurs	Fault Location (For Simulation)	Fault Type	Fault Clearing (Cycles)		Stuck Breaker	Breaker Clearing		Tripped Facilities
				Primary	Back -up		Primary	Back-up	
FAULT_21	Solac – TapChalkey 230 kV line	Solac 230 kV	3 Phase Stuck Breaker	6	9	17430 (Solac)	PID256 Breaker	18300, 17420 (Solac)	Solac - TapChalkey 230 kV line and Solact 230 - Solac 69 kV ckt 1 (transformer # 1)
FAULT_22	Nelson - Carlyss 230 kV line	Nelson 230 kV	3 Phase Stuck Breaker	6	9	13140 (Nelson)	13025(Nelson), 13145, 13155 (Carlyss)	18210, 13035, 18155, 18165, 18160, 18145 (Nelson)	Nelson - Carlyss 230 kV line and Nelson - Cleco Penton Road 230 kV
FAULT_23	Gillis - Moss Bluff 230 kV line	Gillis 230 kV	3 Phase Stuck Breaker	6	9	18105 (Moss Bluff)	18240 (Chalkey), 143F (Gillis)	4020, 18100, 4010 (Moss Bluff), 18210, 18205 (Nelson)	Chalkey - Gillis 230 kV line, Gillis 230/13.8 kV transformer # 1, Gillis - Moss Bluff 230 kV line, Moss Bluff - Nelson 230 kV line, Moss Bluff 230 -69 kV transformers # 1 and 2
FAULT_24	Carlyss - Big Three 230 kV line	Carlyss 230 kV	3 Phase Stuck Breaker	6	9	13505 (Carlyss)	13500 (Carlyss), 13240, 13245 (Sabine)	13580 (Carlyss), 27050, 27055 (Boudoin)	Carlyss - Big Three 230 kV line, Big Three - Sabine 230 kV line and Carlyss - Boudoin 230 kV line
FAULT_25	Carlyss - Boudoin 230 kV line	Carlyss 230 kV	3 Phase Stuck Breaker	6	9	13580 (Carlyss)	13505 (Carlyss)	13150 (Carlyss)	Carlyss 230/69 kV transformer # 3 and Carlyss - Boudoin 230 kV line
FAULT_26	Carlyss - Big Three 230 kV line	Carlyss 230 kV	3 Phase Stuck Breaker	6	9	13500 (Carlyss)	13505 (Carlyss), 13240, 13245 (Sabine)	13145,13480 (Carlyss), 27010, 27015 (Rose Bluff)	Carlyss - Big Three 230 kV line, Big Three - Sabine 230 kV line and Carlyss - Rose Bluff 230 kV line and Carlyss 230/69 kV transformer # 2

Fault #	Line on which Fault Occurs	Fault Location (For Simulation)	Fault Type	Fault Clearing (Cycles)		Stuck Breaker	Breaker Clearing		Tripped Facilities
				Primary	Back -up		Primary	Back-up	
FAULT_27	Carlyss - Nelson 230 kV line	Carlyss 230 kV	3 Phase Stuck Breaker	6	9	13145 (Carlyss)	13155 (Carlyss)	13500,13480 (Carlyss)	Carlyss - Nelson 230 kV line, Carlyss - Rose Bluff 230 kV line and Carlyss 230/69 kV transformer # 2
FAULT_28	Nelson - Verdine 230 kV line	Nelson 230 kV	3 Phase Stuck Breaker	6	9	18205 (Nelson)	18190 (Nelson), 18890, 18895 (Verdine)	18210 (Nelson), 18100 (Moss Bluff)	Nelson - Verdine 230 kV line and Nelson - Moss Bluff 230 kV
FAULT_29	Solac - Graywood 230 kV line	Solac 230 kV	3 Phase Stuck Breaker	6	9	17425 (Solac)	27270, 27275 (Graywood)	17875, 18300, 190F, 191F (Solac)	Solac - Graywood 230 kV line, Solac 230/69/13.8 kV transformer # 2, Solac 230/34.5 transformer 3
FAULT_30	Calcasieu - Boudoin 230 kV line	Calcasieu 230 kV	3 Phase Stuck Breaker	6	9	27125 (Calcasieu)	27120 (Calcasieu)	27130 (Calcasieu), 18365 (Pecan Grove)	Calcasieu - Boudoin 230 kV and Calcasieu - Pecan Grove 230 kV
FAULT_31	Nelson 230/20 kV step-up transformer unit # 6	Nelson 230 kV	3 Phase Stuck Breaker	6	9	18160 (Nelson)	18170 (Nelson)	18210, 13035, 18155, 18165, 13140, 18145 (Nelson)	Nelson 230/2 kV transformer (main transformer unit # 6) and Nelson - Cleco Penton Road 230 kV
FAULT_32	Pecan Grove -Vincent 230 kV line	Pecan Grove 230 kV	3 Phase Stuck Breaker	6	9	18370 (Pecan Grove)	PID 256 Breaker	18375 (Pecan Grove)	Pecan Grove -Vincent 230 kV line, Vincent - PID 256 230 kV line and Pecan Grove 230/13.8 kV transformer 1 and 3
FAULT_33	Graywood -Solac 230 kV line	Graywood 230 kV	3 Phase Stuck Breaker	6	9	27270	17425 (Solac), 27275 (Graywood)	27280, 840F (Solac)	Solac - Grywood 230 kV line, Graywood 230/13.8 kV transformer # 2,
FAULT_34	Graywood –PID 256 230 kV line	Graywood 230 kV	3 Phase Stuck Breaker	6	9	27280	27285 (Graywood), PID 256 Breaker	27270, 840F (Graywood)	Grywood – PID 256 230 kV line, Graywood 230/13.8 kV transformer # 2

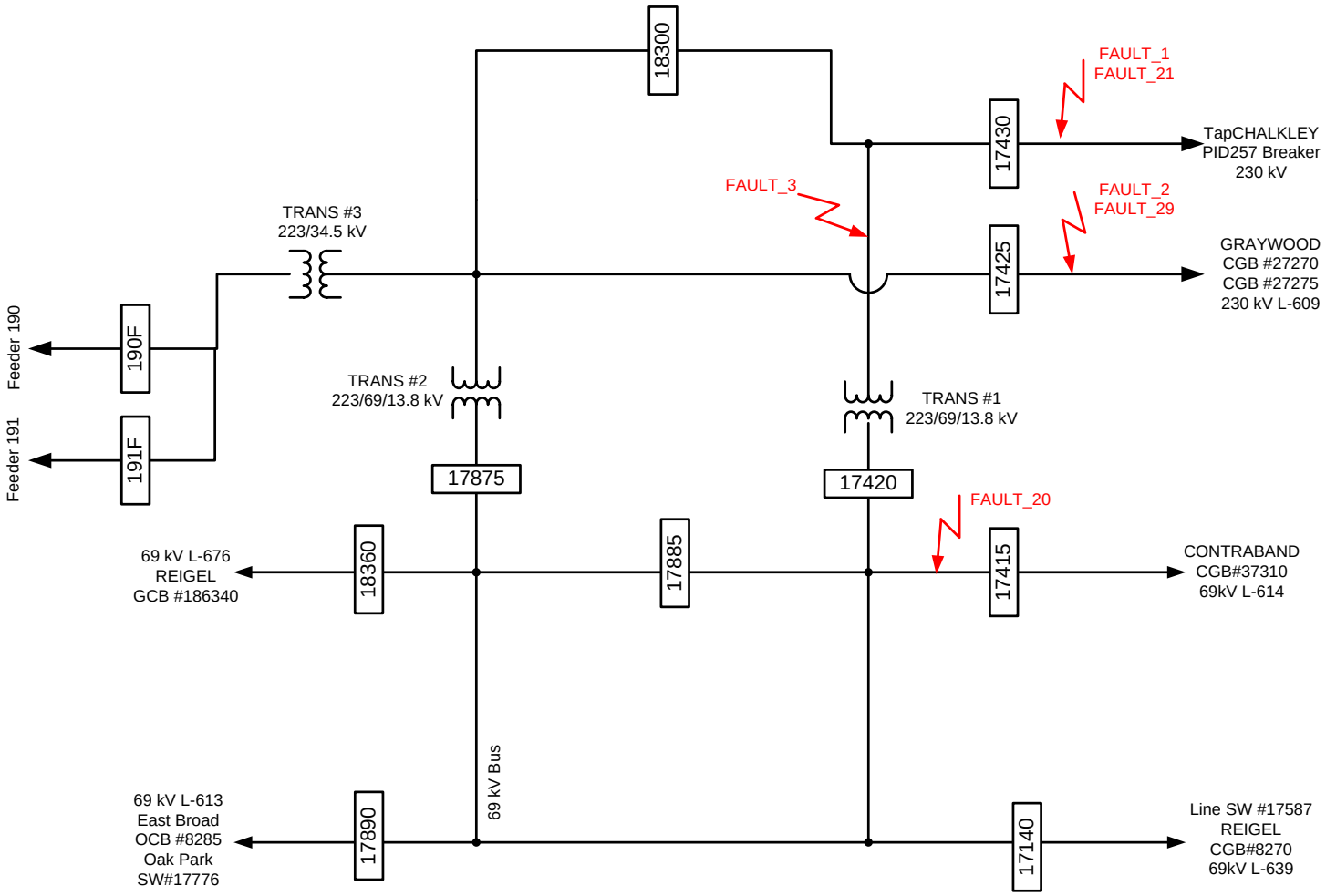


Figure 7-1: Single Line Breaker Diagram of the Solac 230 kV Substation

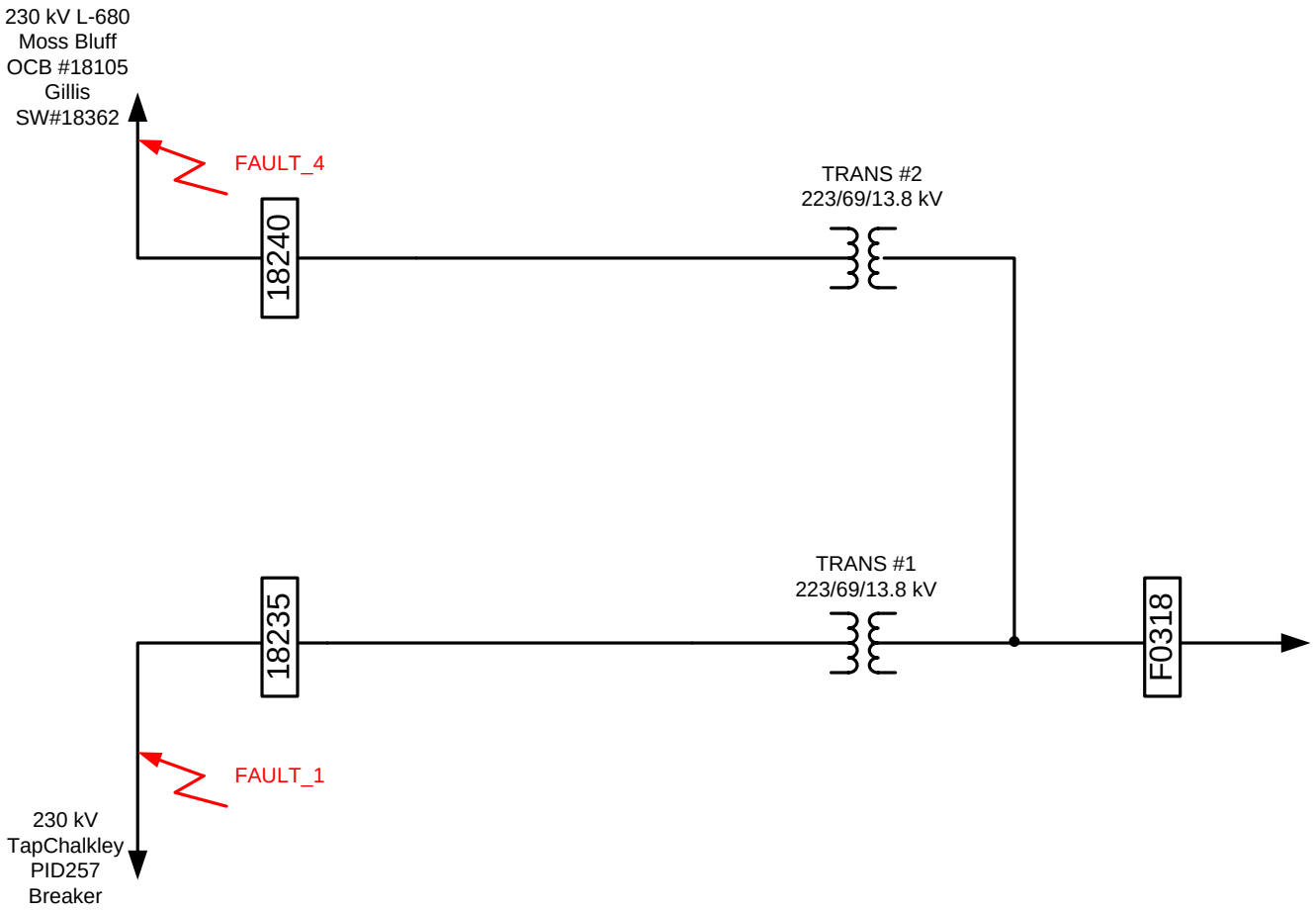


Figure 7-2: Single Line Breaker Diagram of the Chalkley 230 kV Substation

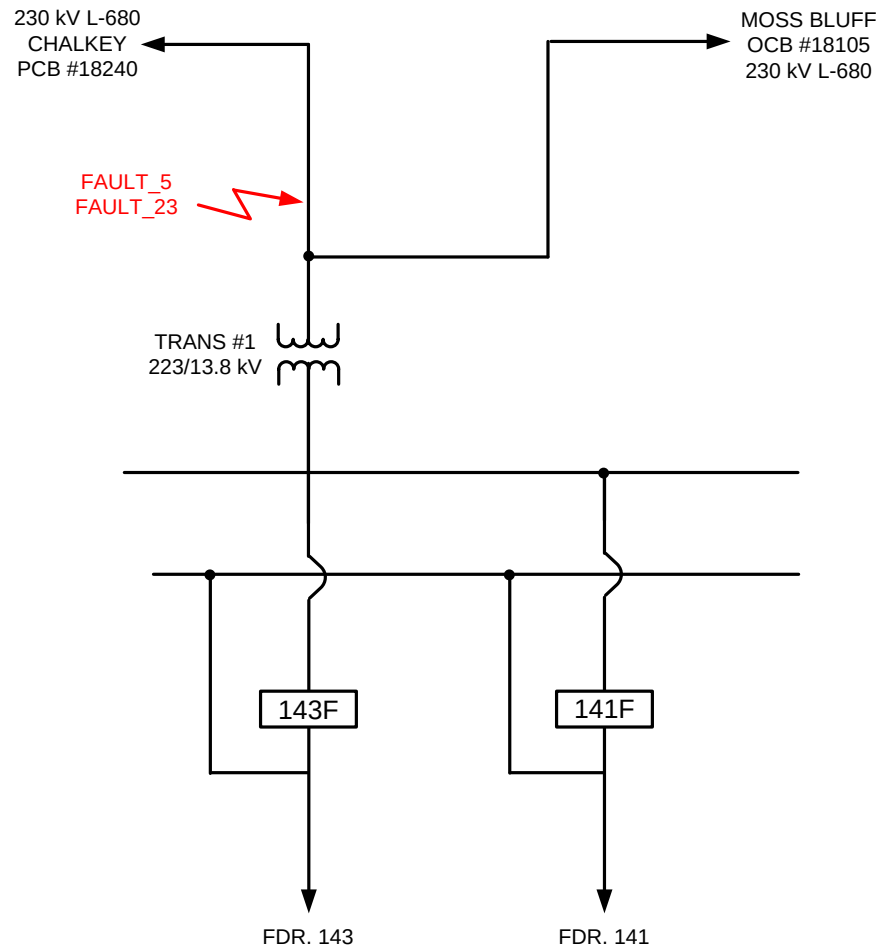


Figure 7-3: Single Line Breaker Diagram of the Gillis 230 kV Substation

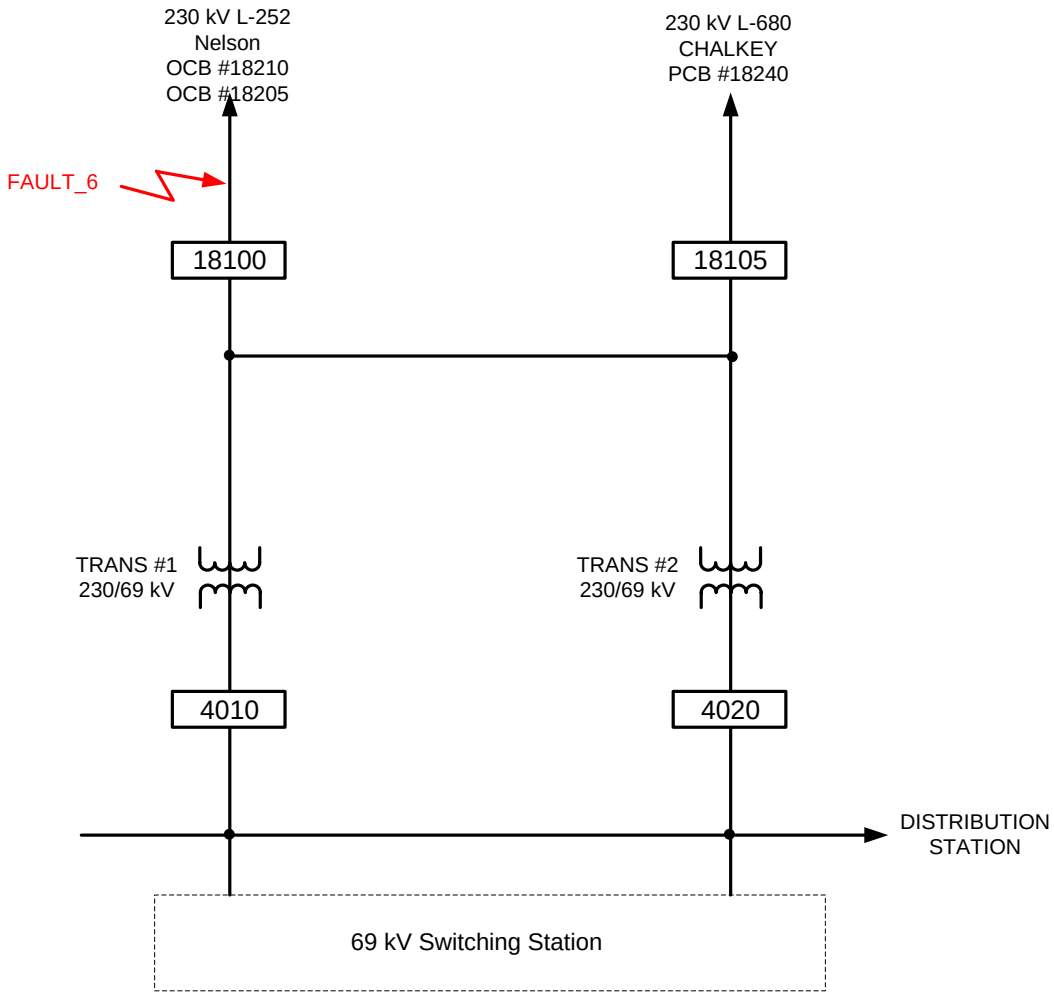


Figure 7-4: Single Line Breaker Diagram of the Moss Bluff 230 kV Substation

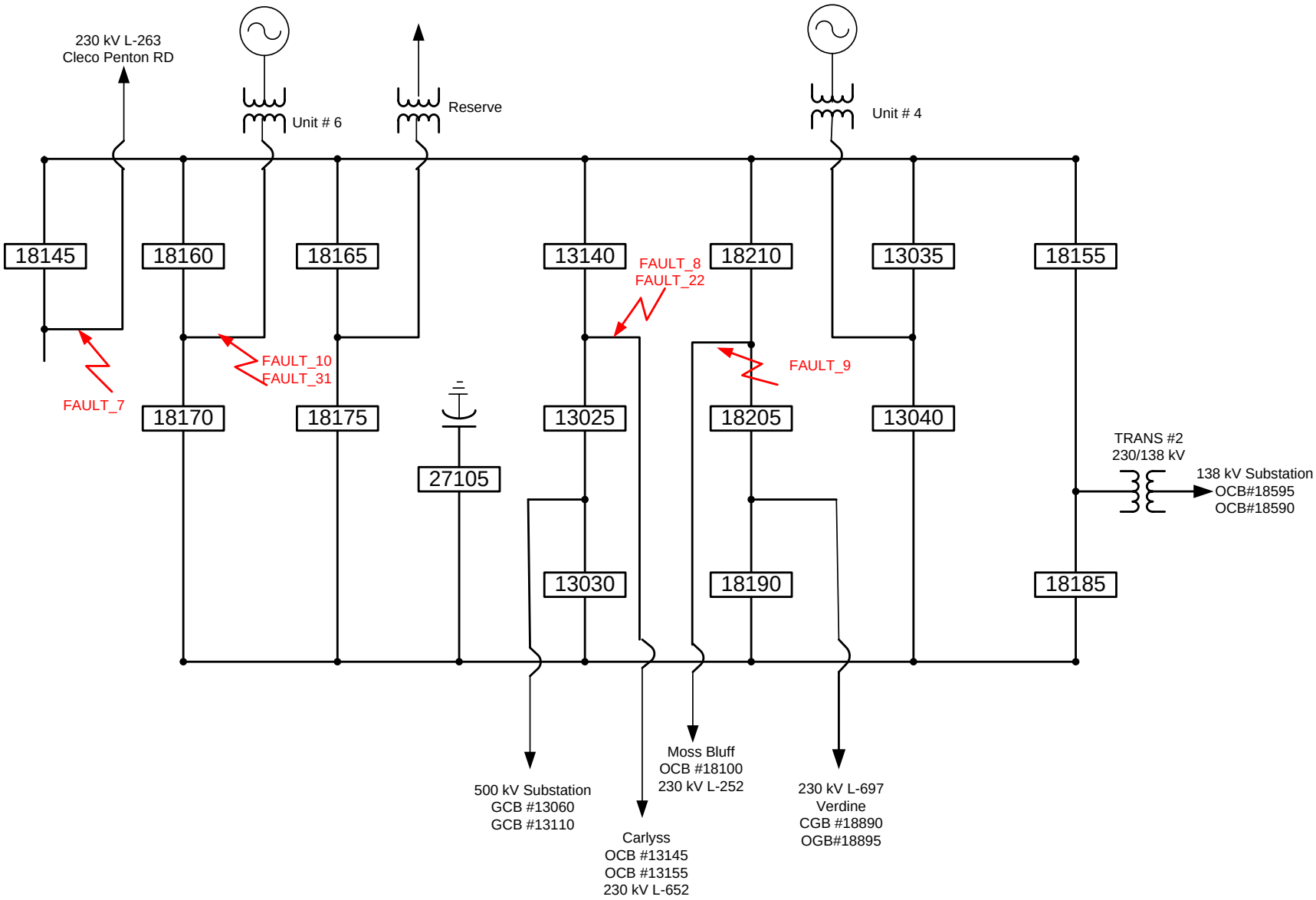


Figure 7-5: Single Line Breaker Diagram of the Nelson 230 kV Substation

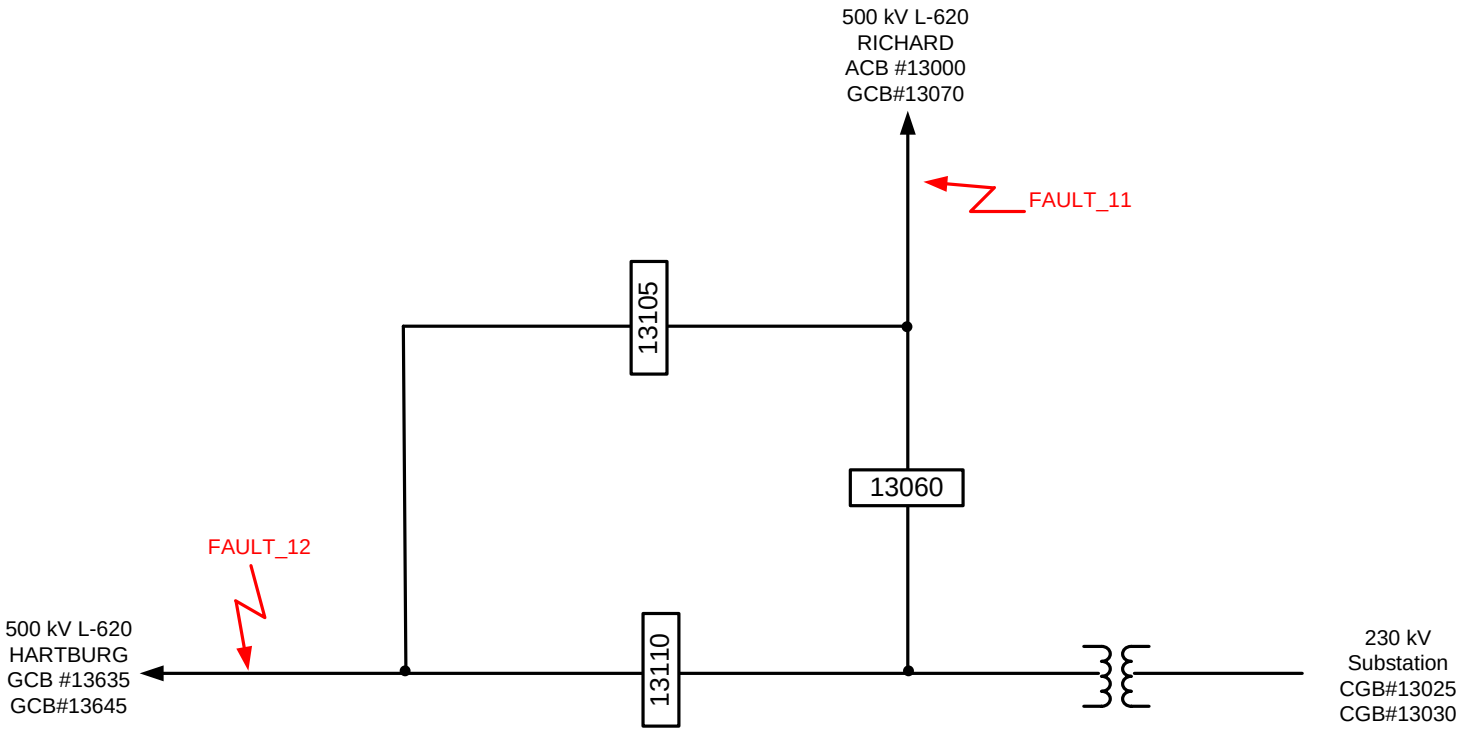


Figure 7-6: Single Line Breaker Diagram of the Nelson 500 kV Substation

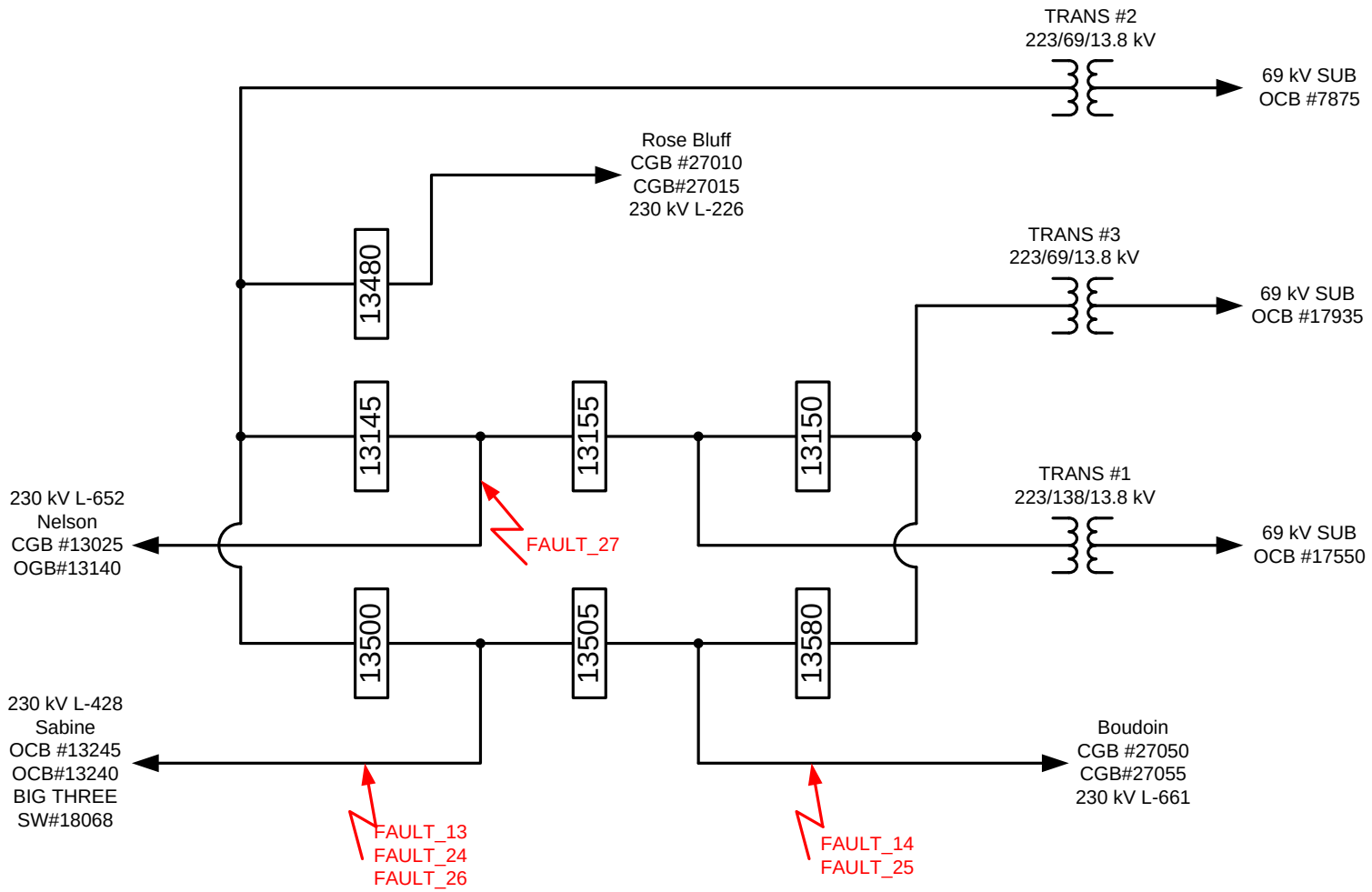


Figure 7-7: Single Line Breaker Diagram of the Carlyss 230 kV Substation

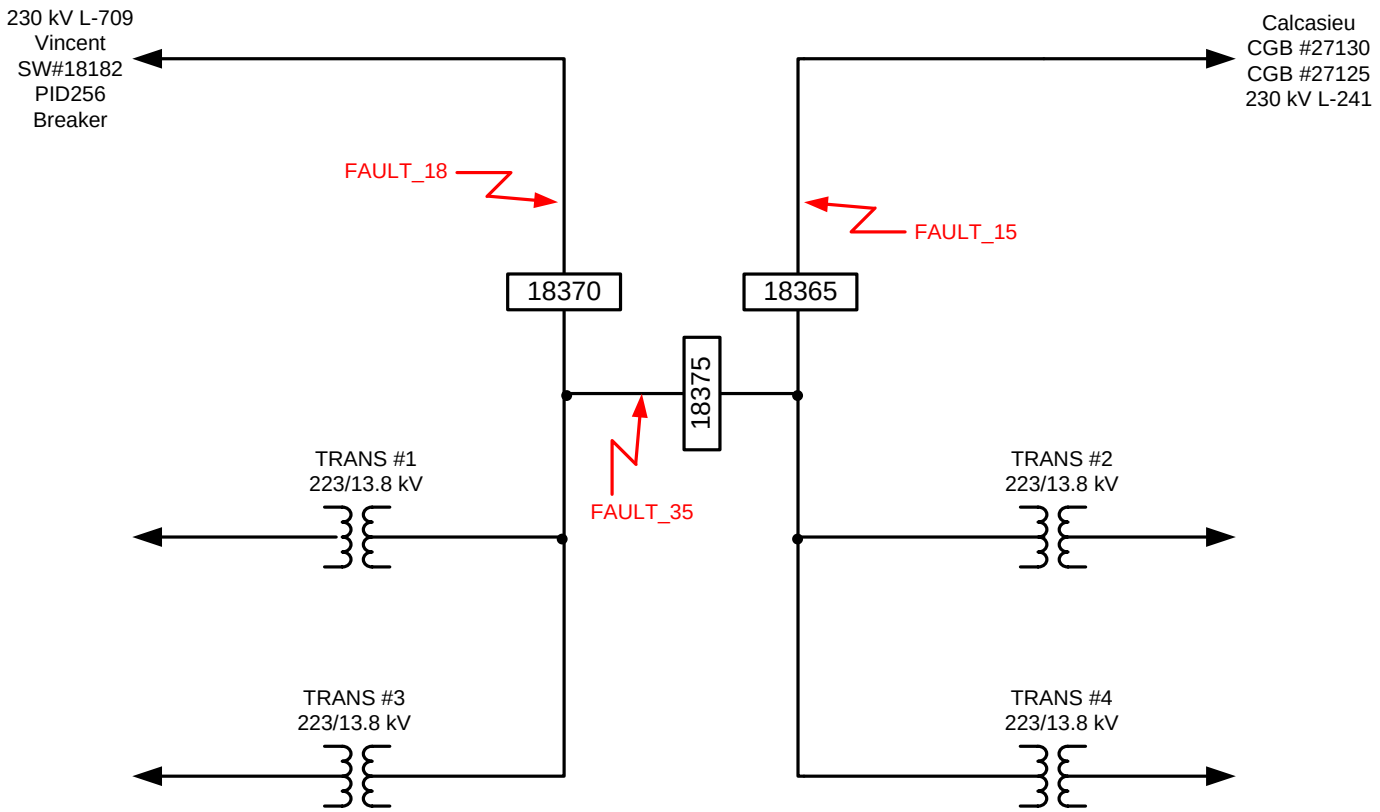


Figure 7-8: Single Line Breaker Diagram of the Pecan Grove 230 kV Substation

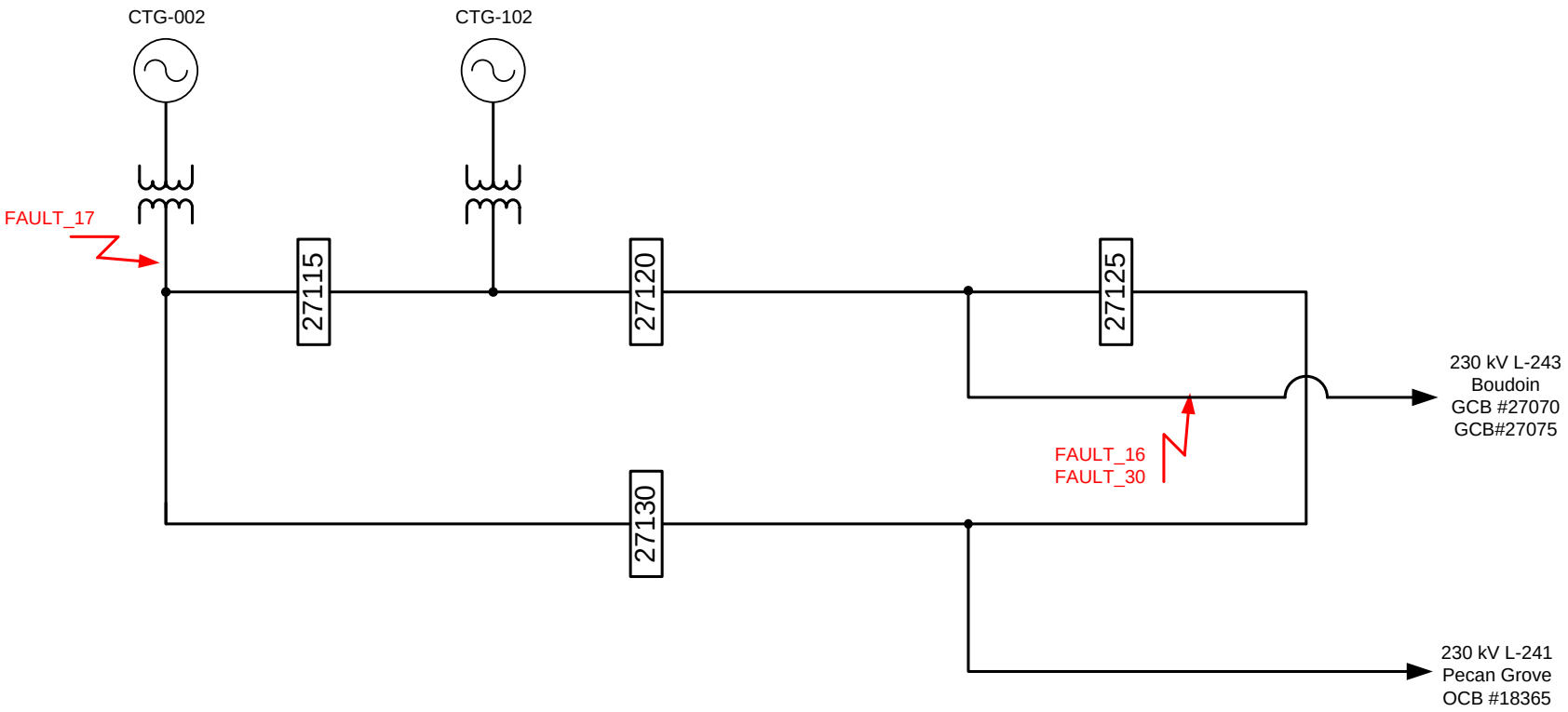


Figure 7-9: Single Line Breaker Diagram of the Calcasieu 230 kV Substation

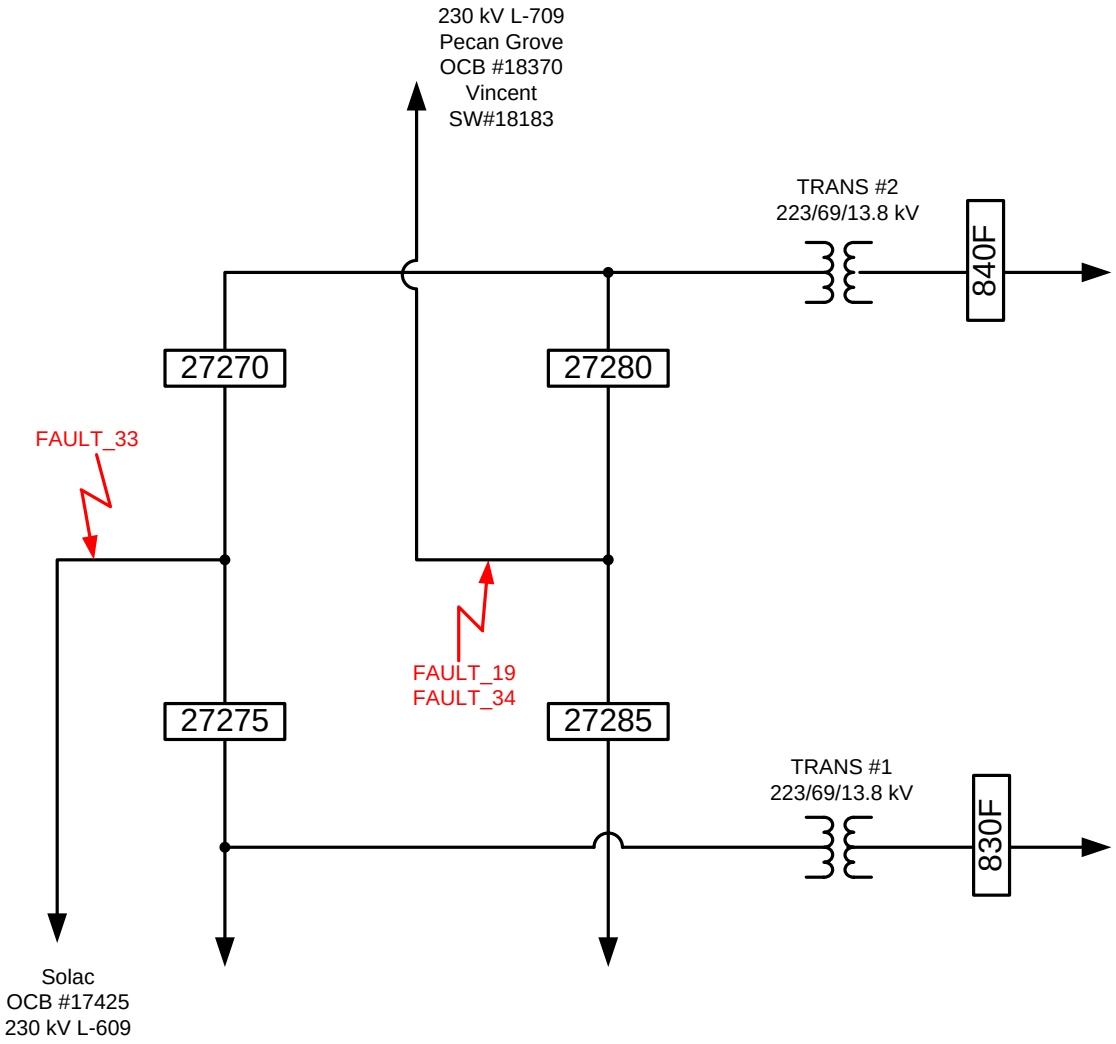


Figure 7-10: Single Line Breaker Diagram of the Graywood 230 kV Substation

7.2 Study Model Development

The study has considered the 2015 Summer Peak load flow model with the PID 257 project modeled. The base case also contains significant previous queued generation projects in the interconnection queue.

7.2.1 Power Flow Case

The PID 257 consists of a wind generation interconnection of 252 MW. Table 7-4 presents the size of the generation project, the type of the wind turbine, the reactive capability of the lumped Wind Turbine Generators (WTG), the project's point of interconnection, as well as the PSS®E bus number in the load flow model.

Request	Size	Manufacturer/ Model	Number of WTGs	Total Reactive Capability of Project		Point of Interconnection	Bus Number
				Max (Mvar)	Min (Mvar)		
PID 257	252MW	Vestas V100 – 1.8 MW	140	78.4	-109.9	Tap in the Chalkley to Solac 230 kV Line	310

Table 7-4: Details of the PID 257 Interconnection Request

The wind farm site is located approximately five (5) miles from the Point of Interconnection (POI), which is a three ring bus substation tapping the Chalkley - Solac 230 kV line. The new plant is connected to the POI through a 69 kV Gen-Tie. Table 7-4 presents the Gen-Tie and collector system parameters modeled in the base case in per unit on 100 MVA base. Table 7-5 shows the transformers data.

Per Unit on 100 MVA Base				
Transmission Line	Line Length (mi)	R+	X+	B+
PID 257 Gen-Tie 69 kV CKT1	5.0	0.01685	.0647	.0018
PID 257 Gen-Tie 69 kV CKT2	5.0	0.01685	.0647	.0018
Equivalent Feeder 34.5 kV – Phase 1	-	0.01006	.03355	0.0
Equivalent Feeder 34.5 kV – Phase 2	-	0.00691	0.0221	0.0

Table 7-4: 230 kV Line Parameters for PID 257 Gen-Tie

Step Up Transformer	HV (kV)	XV (kV)	Rating (ONAN/FA/FA)	Tap Voltages		Impedance (% on ONAN Rating Base)	X/R
				H	X		
Interconnection Transformer 1 and 2	230	69	90/120/150 MVA	None	± 5% in two 2½ % steps	9.0	20
Lake Charles Station Transformers	69	34.5	50/67/88 MVA	None	± 5% in two 2½ % steps	9.0	20

Table7-5: Step-Up Transformer Data

Figure 7-11 presents the surrounding area of the PID 257 point of interconnection. The single line diagram show the line flows and voltage profile for the summer peak scenario, on which the study is based.

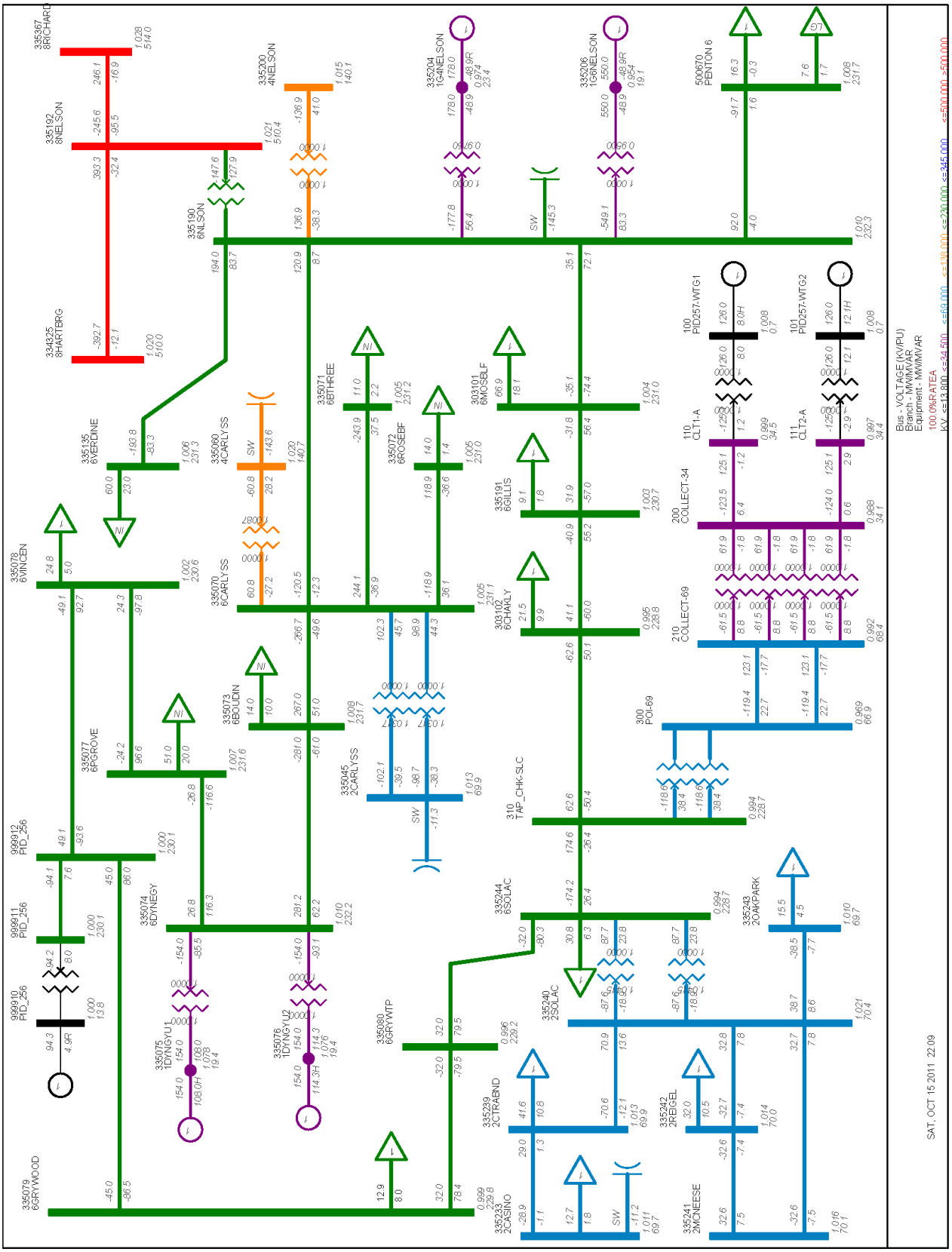


Figure 7-11 – PID 257 Interconnection Surrounding Area

7.2.2 Stability Database

The transient stability analysis was performed using the data provided by SPP. Stability models for the PID 257 interconnection request were added to the dynamic database, based on the technical documentation provided by the developer.

7.3 Transient Stability Analysis

7.3.1 System Faults Followed by Line Outages

Three-phase faults with stuck breaker (Faults 21 to 34 listed on Table 7-3) were simulated. System voltages, as well as rotor angles of nearby synchronous machine were monitored in order to verify if the system maintained synchronism following fault clearing and line outages. Table 7-6 summarizes the results obtained from the stability simulations for the PID 257 impact evaluation.

Contingency	Dynamic System Performance
FAULT_21	*Stable. Acceptable damping and voltage recovery*
FAULT_22	*Stable. Acceptable damping and voltage recovery*
FAULT_23	*Stable. Acceptable damping and voltage recovery*
FAULT_24	*Stable. Acceptable damping and voltage recovery*
FAULT_25	*Stable. Acceptable damping and voltage recovery*
FAULT_26	*Stable. Acceptable damping and voltage recovery*
FAULT_27	*Stable. Acceptable damping and voltage recovery*
FAULT_28	*Stable. Acceptable damping and voltage recovery*
FAULT_29	*Stable. Acceptable damping and voltage recovery*
FAULT_30	*Stable. Acceptable damping and voltage recovery*
FAULT_31	*Stable. Acceptable damping and voltage recovery*
FAULT_32	*Stable. Acceptable damping and voltage recovery*
FAULT_33	*Stable. Acceptable damping and voltage recovery*
FAULT_34	*Stable. Acceptable damping and voltage recovery*

Table 7-6: Results Obtained – PID 257 Stability Analysis

It is important to note that Fault 30 simulates the outage of the two (2) lines that connect the Calcasieu generation units to the grid, that is, the Boudoin - Calcasieu 230 kV line and the Pecan Grove - Calcasieu 230 kV line. Thus, the Calcasieu generation units are disconnected from the network, without further consequences to the system dynamic behavior. Likewise, Fault 31 disconnects the Nelson Generation Unit #6 from the system, without compromising the system dynamic performance.

The Entergy system, including the PID 257 project, presented a well behaved performance under the contingencies tested, that is, all synchronous generators remained in synchronism following the disturbances. Acceptable damping and voltage recovery was observed.

As the system presents a satisfactory dynamic behavior following the tested three-phase faults with stuck breaker conditions, there is no need to perform the simulations FLT1 to FLT20 listed in Table 7-2, as they represent less severe conditions.

The PID 257 project does not cause any detrimental impact on the Entergy system, in terms of dynamic performance, for the conditions and contingencies tested.

7.3.4 Low Voltage Ride Through (LVRT)

LVRT tests were perform to determine the ability of the PID 257 wind project to meet FERC Order 661A (low voltage ride through and wind farm recovery to pre-fault voltage) without additional reactive support.

Faults 1 and 4 listed in Table 7-2 were simulated with fault applied time of 9 cycles. Figure 7-12 shows, for both simulations, the voltage at the POI. Figure 7-13, in turn, shows the electrical power of the two equivalent units that represent PID 257 in this stability analysis. It can be seen that the voltage recovers without triggering the WTG low voltage protection. The electrical power of the WTG units returns to the pre-fault condition after the transient period, which demonstrates that no trips occur for the conditions and contingencies tested.

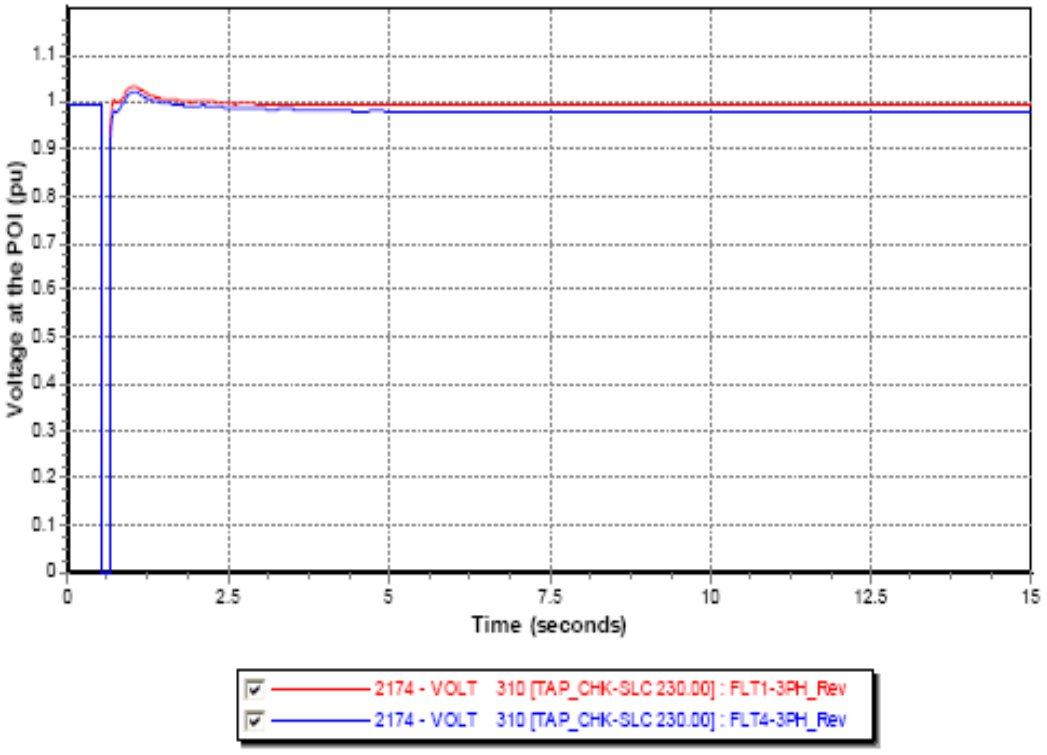


Figure 7-12: Post-Disturbance Voltage at the POI

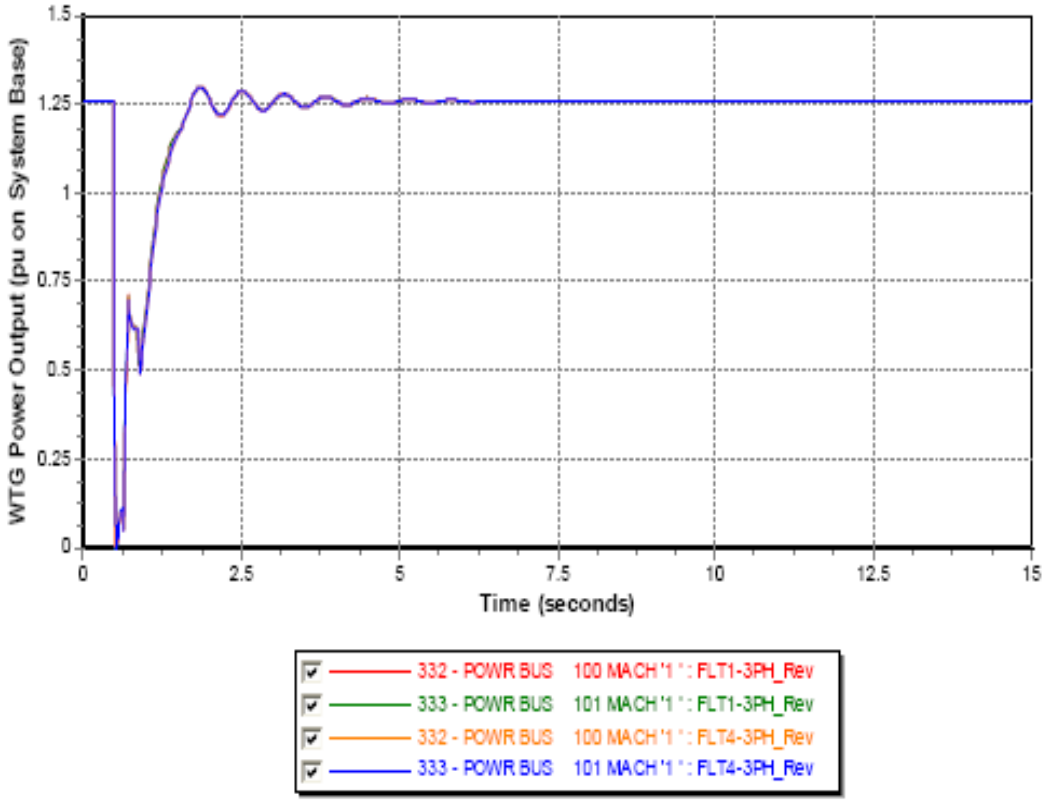


Figure 7-12: PID 257 WTG Power Output

APPENDIX A: Data Provided by the Customer

LARGE GENERATING FACILITY DATA

UNIT RATINGS

kVA 2000 °F 104 Voltage 690V
Power Factor +0.95 capacitive/-0.90 inductive
Speed (RPM) 1344 Connection (e.g. Wye) Delta
Short Circuit Ratio 5.75 Frequency, Hertz 60Hz
Stator Amperes at Rated kVA 1673 A Field Volts N/A
Max Turbine MW 1.800 F 104

COMBINED TURBINE-GENERATOR-EXCITER INERTIA DATA

Inertia Constant, H = ~3.25 seconds sec/kVA
Moment-of-Inertia, WR^2 = ~14250 lb. $ft.^2$

REACTANCE DATA (PER UNIT-RATED KVA)

DIRECT AXIS QUADRATURE AXIS

Synchronous – saturated	X_{dv}	N/A	X_{qv}	N/A
Synchronous – unsaturated	X_{di}	1.7337	X_{qi}	Same as Xd
Transient – saturated	X'_{dv}	N/A	X'_{qv}	N/A
Transient – unsaturated	X'_{di}	0.0966	X'_{qi}	Same as X'd
Subtransient – saturated	X''_{dv}	N/A	X''_{qv}	N/A
Subtransient – unsaturated	X''_{di}	0.0676	X''_{qi}	Same as X"d
Negative Sequence – saturated	$X2_v$	N/A		
Negative Sequence – unsaturated	$X2_i$	0.0966		
Zero Sequence – saturated	$X0_v$	N/A		
Zero Sequence – unsaturated	$X0_i$	0.2095		
Leakage Reactance	Xl_m	0.0401		

GENERATOR STEP-UP TRANSFORMER DATA RATINGS

Capacity Self-cooled / Maximum Nameplate
_____/____1900 AF_____ kVA

Voltage Ratio(Generator Side/System side/Tertiary)
____0.690_____/____34.5____/_____kV

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

Fixed Taps Available ____Yes, +/-5% in 2.5% steps_____

Present Tap Setting _____0.0%_(Center-Tap)_____

IMPEDANCE

Positive Z_1 (on self-cooled kVA rating) ___7.8____ % ____10.4___ X/R

Zero Z_0 (on self-cooled kVA rating) _____7.2____% _____9.9____ X/R

EXCITATION SYSTEM DATA

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

GOVERNOR SYSTEM DATA

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

WIND GENERATORS

Number of generators to be interconnected pursuant to this Interconnection Request: 140

Elevation: _____ _____ Single Phase 3 Three Phase

Inverter manufacturer, model name, number, and version:

N/A

List of adjustable setpoints for the protective equipment or software:
Standard (default) Voltage and Frequency Protection Settings are shown below.
Low Voltage Ride-Through (Advanced Grid Option #2)
voltage settings are included in Vestas Document # 951421 (see attached)

Standard Protection Settings (default unless optional AGO2 is activated)
The generator and the converter will be disconnected if:

The voltage is 15 % below the nominal voltage for 11 s
The voltage is 10 % below the nominal voltage for 60 s.

The voltage is 10 % above the nominal voltage for 60 s.
The voltage is 15 % above the nominal voltage for 2 s.
The voltage is 20 % above the nominal voltage for 0.08 s
The voltage is 25 % above the nominal voltage for 0.005 s

The frequency is above 63.6 Hz for 0.2 s.
The frequency is below 56.4 Hz for 0.2 s.

If a fault on the grid disconnects the voltage supply to the VMP-controller, the emergency stop circuit will be opened immediately, and the generator will be disconnected simultaneously.

Low voltage ride through protection settings are provided by Optional
ADVANCED GRID OPTION #2 (commonly referred to as AGO2)
Refer to Vestas Doc# 951421

See Protection Single Line Diagram 25,27, 27I, 32R, 32F,46, 47, 49, 50/51, 51G, 59I, 60, 81O, 81U

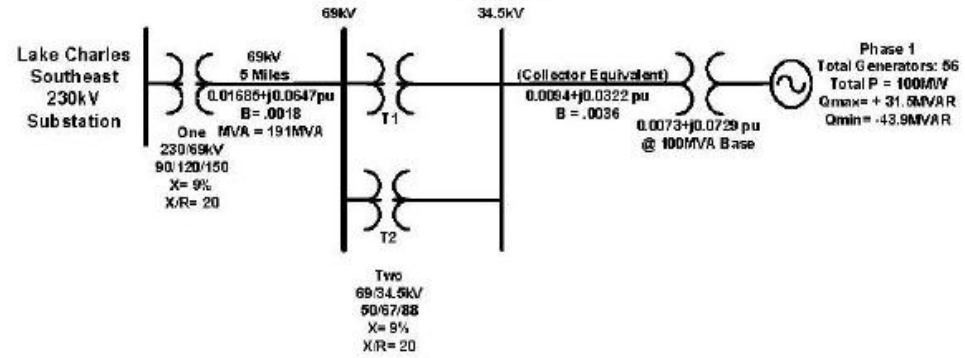
Note: A completed General Electric Company Power Systems Load Flow (PSLF) data sheet or other compatible formats, such as IEEE and PTI power flow models, must be supplied with the Interconnection Request. If other data sheets are more appropriate to the proposed device, then they shall be provided and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

PID 257 Version 2

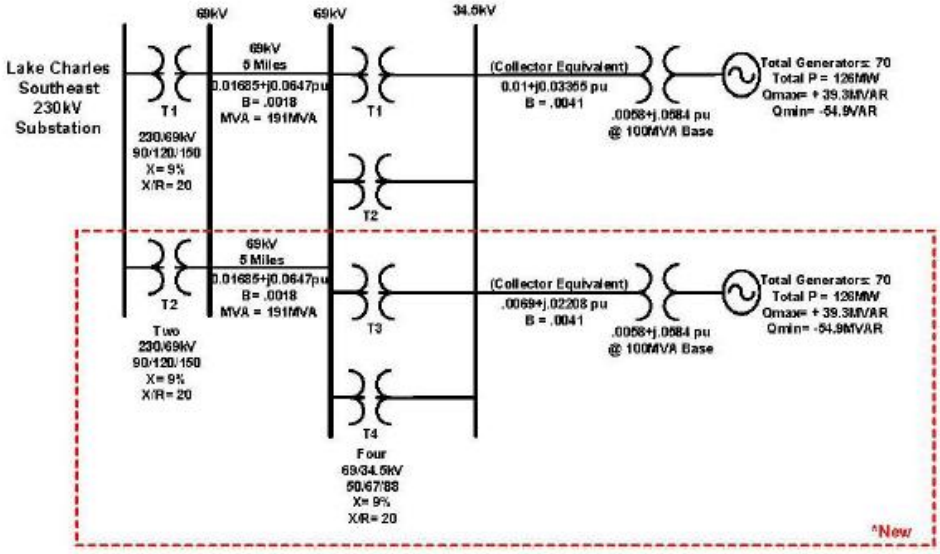
DATA REQUEST FOR WIND POWER PLANTS

1. **One–line Diagram.**

PHASE 1



PHASE 2



2/16/2011

2. **Lake Charles SE Interconnection Transformer 1 and 2**
   - Rating (ONAN/FA/FA): 90/120/150 MVA
   - Nominal Voltage for each winding (Low/High): 69/230 kV
   - Winding Connections: Delta/Wye grounded (Delta, Wye, Wye grounded)
   - Available taps: ± 5%, five fixed taps (indicated fixed or ULTC), operating Tap: neutral
   - Positive sequence Z: 9%, 20/1 X/R on transformer self-cooled (ONAN) MVA
   - Zero sequence Z_o: 9%, 20/1 X/R on transformer self-cooled (ONAN) MVA

3. **Interconnection Transmission Lines 1 and 2.**
   - Line voltage = 69 kV
   - R = 0.01685 pu on 100 MVA and line kV base (positive sequence)
   - X = 0.0647 pu on 100 MVA and line kV base (positive sequence)
   - B = 0.0018 pu on 100 MVA and line kV base

4. **Lake Charles Station Transformers 1, 2, 3 and 4.**
   - Rating (ONAN/FA/FA): 50/67/88 MVA
   - Nominal Voltage for each winding (Low/High): 34.5/69 kV
   - Winding Connections: Wye grounded/Delta (Delta, Wye, Wye grounded)
   - Available taps: ± 5%, five fixed taps (indicated fixed or ULTC), operating Tap: neutral
   - Positive sequence Z: 9%, 20/1 X/R on transformer self-cooled (ONAN) MVA
   - Zero sequence Z_o: 9%, 20/1 X/R on transformer self-cooled (ONAN) MVA

5. **Collector Transmission System Equivalent Models for Phase 1 and Phase 2.**

   Phase 1 first line equivalent
   - Collector system voltage = 34.5 kV
   - R = 0.0094 pu on 100 MVA and line kV base
   - X = 0.0322 pu on 100 MVA and line kV base
   - B = 0.0036 pu on 100 MVA and line kV base

   Phase 2 first line equivalent
   - Collector system voltage = 34.5 kV
   - R = 0.010 pu on 100 MVA and line kV base
   - X = 0.03355 pu on 100 MVA and line kV base
   - B = 0.0041 pu on 100 MVA and line kV base

   Phase 2 second line equivalent
   - Collector system voltage = 34.5 kV
   - R = 0.00691 pu on 100 MVA and line kV base
   - X = 0.0221 pu on 100 MVA and line kV base

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- B = 0.0041 pu on 100 MVA and line kV base
- Attach a one-line diagram of the collector layout.
  See Attached.

6. **Wind-turbine Generator (WTG) Phase 1 Equivalent Transformer.**
   - Rating: 117 MVA
   - Nominal Voltage for each winding (Low/High): 0.69/34.5 kV
   - Winding Connections: Wye/Delta (Delta, Wye, Wye grounded)
   - Available taps: ± 5%, five fixed taps (indicated fixed or ULTC), operating Tap: neutral
   - Positive sequence Z: 7.29%, 10/1 X/R on 100MVA base
   - Zero sequence Z_o: 7.29%, 10/1X/R on 100MVA base

   Wind-turbine Generator (WTG) Phase 2 Equivalent Transformers 1 and 2.
   - Rating: 117 MVA
   - Nominal Voltage for each winding (Low/High): 0.69/34.5 kV
   - Winding Connections: Wye/Delta (Delta, Wye, Wye grounded)
   - Available taps: ± 5%, five fixed taps (indicated fixed or ULTC), operating Tap: neutral
   - Positive sequence Z: 5.84%, 10/1 X/R on 100MVA base
   - Zero sequence Z_o: 5.84%, 10/1X/R on 100MVA base

   WTG Individual Transformer:
   - Rating: 1.9 MVA
   - Nominal Voltage for each winding (Low/High): 0.69/34.5 kV
   - Winding Connections: Wye/Delta (Delta, Wye, Wye grounded)
   - Available taps: ± 5%, five fixed taps (indicated fixed or ULTC), operating Tap: neutral
   - Positive sequence Z: 7.8%, 10.4/1 X/R on transformer rating of 1.9 MVA
   - Zero sequence Z_o: 7.2%, 9.9/1 X/R on transformer rating of 1.9 MVA

7. **WTG Powerflow Data.**
   - Number of WTG's: Phase 1 – 56 units total; Phase 2 – 140 units total(70 in each circuit)
   - Nameplate rating (each WTG): 1.8 MW
   - WTG manufacturer and Model: Vestas V100-1.8
   - WTG Type: Type 3

   For Type 1 or Type 2 WTGs:
   - Uncompensated power factor at full load:_____
   - Power factor correction capacitors at full load:_____Mvar
   - Number of shunt stages and size _____

- Please attach capability curve describing reactive power or power factor range from 0 to full output, including the effect of shunt compensation.

For Type 3 or Type 4 WTGs:

- Maximum under-excited power factor at full load: ___.9
- Maximum over-excited power factor at full load: .95
- Control mode: voltage control (voltage control, fixed power factor) (See Note 7.2)
- Please attach capability curve describing reactive power or power factor range from 0 to full output.

  See attached

Note 7.2: Type 1 and Type 2 WTGs typically operate on **fixed power factor** mode for a wide range of output level, aided by turbine-side power factor correction capacitors (shunt compensation). With a suitable plant-level controller Type 3 and Type 4 WTGs may be capable of dynamically varying power factor to contribute to **voltage control** mode operation, if required by the utility. However, this feature is not available due to commercial and other reasons. The data requested must reflect the WTG capability that can be used in practice. Please consult with the manufacturer when in doubt. The interconnection study will determine the voltage control requirements for the project. Plant –level reactive compensation requirements are engineered to meet specific requirements. WTG reactive capability data described above could significantly impact study results and plant-level reactive compensation requirements.

8. **Wind Farm Reactive Power Compensation.** Provide the following information for wind farm level reactive compensation, if applicable.

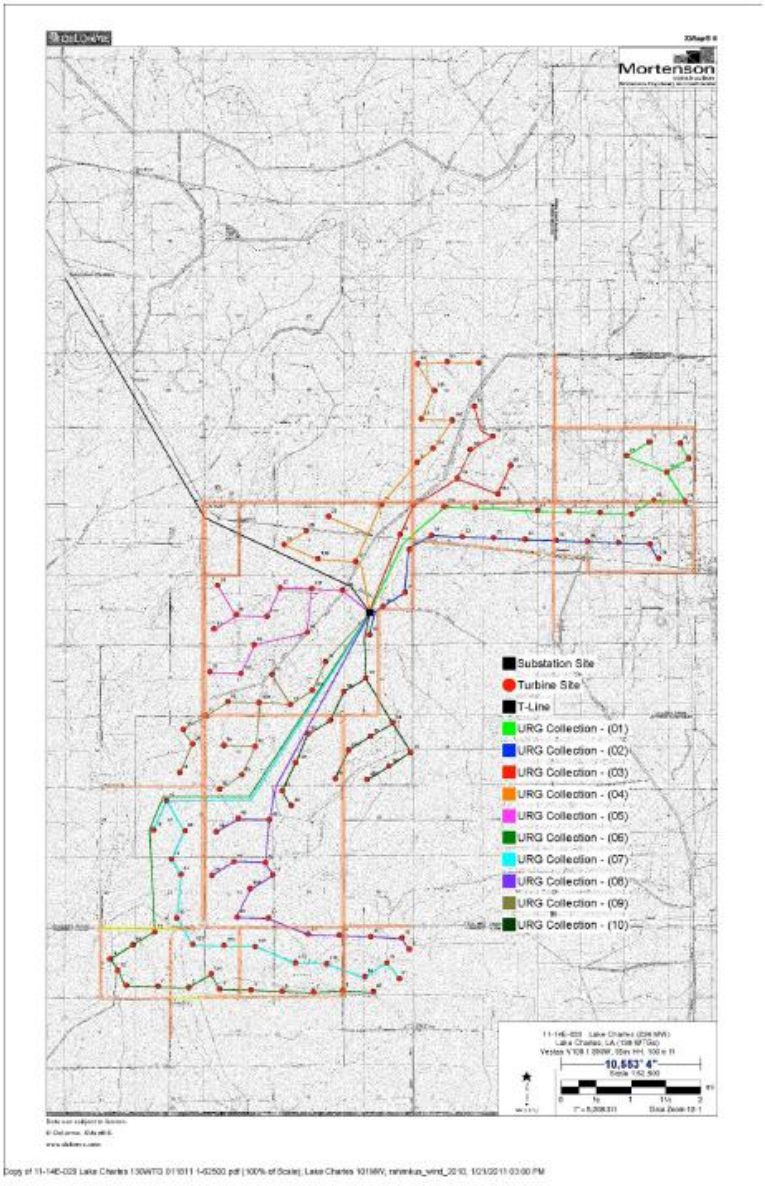
   Not applicable

   - Individual shunt capacitor and size of each: X MVAR
   - Dynamic reactive control device, (SVC, STATCOM):
   - Control range:
   - Control mode (line drop, voltage droop, voltage control):
   - Regulation point:
   - Describe the overall reactive power control strategy:

9. **WTG Dynamic Data.** Model and parameter data required for transient stability analysis is specific to each WTG make and model. The dynamic models must be in an approved WECC format, or in a PSSE or PSLF format that is acceptable to the transmission provider. We strongly suggest that the manufacturers provide this information.

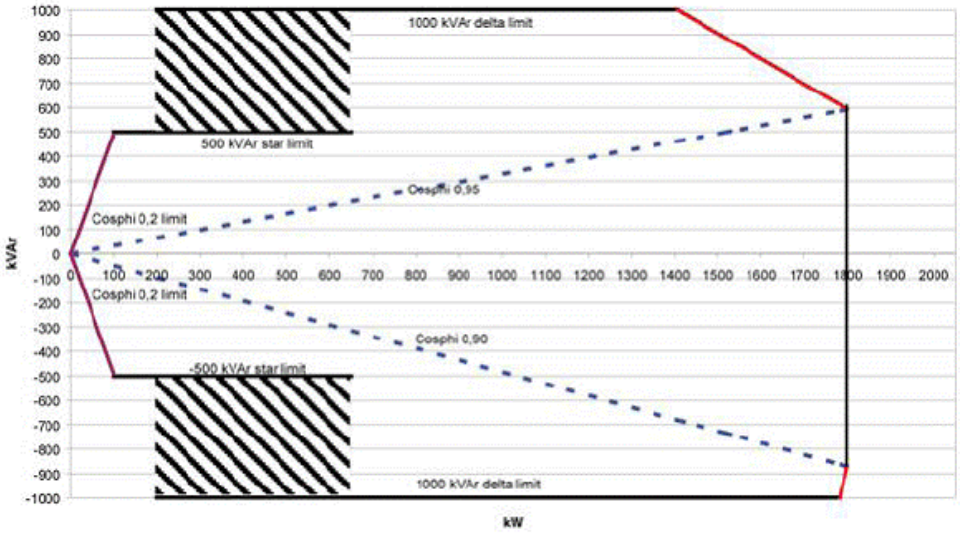
   - Library model name:
   - Model type (standard library or user-written):
   - Model access (proprietary or non-proprietary):
   - Attach full model description and parameter data

One-line Diagram of the Collector Layout



2/16/2011

Vestas V100-1.8 Generator Capability Curve



2/16/2011

APPENDIX B: Power Flow and Stability Data

Model Data

```
1,   100.00          / PSS/E-30.3    THU, SEP 15 2011  17:47
   100,'PID257-WTG1 ',   0.6900,2,     0.000,     0.000, 332, 712,0.99700, -10.2000,   1
   101,'PID257-WTG2 ',   0.6900,2,     0.000,     0.000, 332, 712,0.99700, -10.2000,   1
   110,'CLT1-A      ',  34.5000,1,     0.000,     0.000, 332, 712,0.99700, -10.2000,   1
   111,'CLT2-A      ',  34.5000,1,     0.000,     0.000, 332, 712,0.99700, -10.2000,   1
   200,'COLLECT-34  ',  34.5000,1,     0.000,     0.000, 332, 712,0.99700, -10.2000,   1
   210,'COLLECT-69  ',  69.0000,1,     0.000,     0.000, 332, 712,0.99700, -10.2000,   1
   300,'POI-69      ',  69.0000,1,     0.000,     0.000, 332, 712,0.99700, -10.2000,   1
0 / END OF BUS DATA, BEGIN LOAD DATA
0 / END OF LOAD DATA, BEGIN GENERATOR DATA
   100,'1 ',   126.000,     0.000,    39.340,   -54.920,1.00000,     0,   126.000,   0.00000,
1.00000,   0.00000,   0.00000,1.00000,1,  100.0,   126.000,     0.000,   1,1.0000
   101,'1 ',   126.000,     0.000,    39.340,   -54.920,1.00000,     0,   126.000,   0.00000,
1.00000,   0.00000,   0.00000,1.00000,1,  100.0,   126.000,     0.000,   1,1.0000
0 / END OF GENERATOR DATA, BEGIN BRANCH DATA
   110,   -200,'1 ',   0.01006,   0.03355,   0.00000,  150.00,  150.00,  150.00,  0.00000,
0.00000,  0.00000,  0.00000,1,   0.00,   1,1.0000
   111,   -200,'1 ',   0.00691,   0.02210,   0.00000,  150.00,  150.00,  150.00,  0.00000,
0.00000,  0.00000,  0.00000,1,   0.00,   1,1.0000
   210,   -300,'1 ',   0.01685,   0.06470,   0.00180,  150.00,  150.00,  150.00,  0.00000,
0.00000,  0.00000,  0.00000,1,   0.00,   1,1.0000
   210,   -300,'2 ',   0.01685,   0.06470,   0.00180,  150.00,  150.00,  150.00,  0.00000,
0.00000,  0.00000,  0.00000,1,   0.00,   1,1.0000
0 / END OF BRANCH DATA, BEGIN TRANSFORMER DATA
   110,   100,     0,'1 ',1,2,1,   0.00000,   0.00000,2,'            ',1,   1,1.0000
   0.00747,   0.07764,   133.00
1.00000,   0.000,   0.000,   133.00,   133.00,   133.00, 0,      0, 1.05000, 0.95000, 1.05000,
0.95000,   5, 0, 0.00000, 0.00000
1.00000,   0.000
   111,   101,     0,'1 ',1,2,1,   0.00000,   0.00000,2,'            ',1,   1,1.0000
   0.00747,   0.07764,   133.00
1.00000,   0.000,   0.000,   133.00,   133.00,   133.00, 0,      0, 1.05000, 0.95000, 1.05000,
0.95000,   5, 0, 0.00000, 0.00000
```

```
1.00000,   0.000
   210,   200,     0,'1 ',1,2,1,   0.00000,   0.00000,2,'            ',1,   1,1.0000
   0.00449,   0.08999,    50.00
1.00000,   0.000,   0.000,    88.00,    88.00,    88.00, 0,      0, 1.05000, 0.95000, 1.05000,
0.95000,   5, 0, 0.00000, 0.00000
1.00000,   0.000
   210,   200,     0,'2 ',1,2,1,   0.00000,   0.00000,2,'            ',1,   1,1.0000
   0.00449,   0.08999,    50.00
1.00000,   0.000,   0.000,    88.00,    88.00,    88.00, 0,      0, 1.05000, 0.95000, 1.05000,
0.95000,   5, 0, 0.00000, 0.00000
1.00000,   0.000
   210,   200,     0,'3 ',1,2,1,   0.00000,   0.00000,2,'            ',1,   1,1.0000
   0.00449,   0.08999,    50.00
1.00000,   0.000,   0.000,    88.00,    88.00,    88.00, 0,      0, 1.05000, 0.95000, 1.05000,
0.95000,   5, 0, 0.00000, 0.00000
1.00000,   0.000
   210,   200,     0,'4 ',1,2,1,   0.00000,   0.00000,2,'            ',1,   1,1.0000
   0.00449,   0.08999,    50.00
1.00000,   0.000,   0.000,    88.00,    88.00,    88.00, 0,      0, 1.05000, 0.95000, 1.05000,
0.95000,   5, 0, 0.00000, 0.00000
1.00000,   0.000
   310,   300,     0,'1 ',1,2,1,   0.00000,   0.00000,2,'            ',1,   1,1.0000
   0.00449,   0.08999,    90.00
1.00000,   0.000,   0.000,   150.00,   150.00,   150.00, 0,      0, 1.05000, 0.95000, 1.05000,
0.95000,   5, 0, 0.00000, 0.00000
1.00000,   0.000
   310,   300,     0,'2 ',1,2,1,   0.00000,   0.00000,2,'            ',1,   1,1.0000
   0.00449,   0.08999,    90.00
1.00000,   0.000,   0.000,   150.00,   150.00,   150.00, 0,      0, 1.05000, 0.95000, 1.05000,
0.95000,   5, 0, 0.00000, 0.00000
1.00000,   0.000
0 / END OF TRANSFORMER DATA, BEGIN AREA DATA
 332,303007,   618.000,     5.000,'LAGN        '
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
 712,'GSLLCH-LG   '
0 / END OF ZONE DATA, BEGIN INTER-AREA TRANSFER DATA
0 / END OF INTER-AREA TRANSFER DATA, BEGIN OWNER DATA
   1,'DEFAULT     '
0 / END OF OWNER DATA, BEGIN FACTS DEVICE DATA
0 / END OF FACTS DEVICE DATA
```

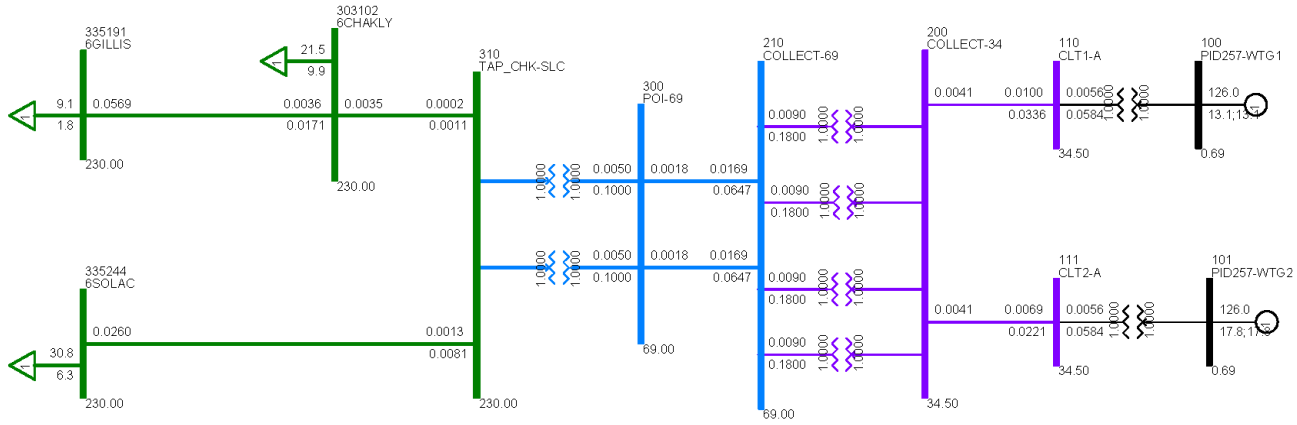


Figure B-1 – PID 257 Modeling Detail

PSS®E Stability Data File for PID 257 (dyr file)

```
/*******   PID 257    **********************************
/ For use with VestasWT_7_2_PSSE30.lib
/              WTG1 - 70 x V100 1.8 MW
100 'USRMDL' '1'  'VWCORE' 1 1 2 27 13 74 1 0
 1800.0000 692.8203 812.7664 700.0000 2.6100 0.6750 0.0160
 1.5013 8.3264 1.5013 8.3264 30.0000 0.2000 1.2000
 0.1000 0.0018 0.6983 0.0385 1.2774 0.0000 422.2301
 162.1532 0.0300 0.0000 0.0300 0.3000 0.0000 /
0 'USRMDL' 0 'VWVARS' 8 0 2 0 0 21 100 '1' /
0 'USRMDL' 0 'VWLVRT' 8 0 3 23 10 15 100 '1' 1
```

```
 0.8500 0.0010 0.2000 12.5000 50.0000 0.0000 0.0000
 0.5000 1.0000 2.6100 0.6750 1.2000 0.5000 692.8203
 812.7664 0.3500 0.0500 0.2500 0.0200 3.0000 4.0000
 60.0000 0.0160 /
0 'USRMDL' 0 'VWPWRC' 8 0 3 21 7 5 100 '1' 0
 1.0000 0.5556 -0.5556 0.7567 0.9372 0.9500 0.9000
 0.2000 0.2000 1.0000 0.0000 0.0000 0.0000 0.1000
 0.1000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 /
0 'USRMDL' 0 'VWMECH' 8 0 2 7 8 0 100 '1'
 1800.0000 422.2301 4263.0788 368.0000 68.5000 5472.3400 28.1000 /
0 'USRMDL' 0 'VWMEAS' 8 0 2 3 8 5 100 '1'
 0.1000 0.1000 0.1000 /
0 'USRMDL' 0 'VWVPRT' 0 2 7 20 0 11 100 '1'  1 1 0 0 0
 0.7500 0.0001 0.8500 0.4000 0.9000 60.0000 1.1000
 60.0000 1.1350 0.2000 1.2000 0.1200 0.0000 0.3000
 0.7000 2.6500 0.8500 11.0000 0.9000 60.0000 /
0 'USRMDL' 0 'VWFPRT' 0 2 3 4 0 1 100 '1'  0
 56.4000 0.2000 63.2000 0.2000 /
/              WTG2 - 70 x V100 1.8 MW
101 'USRMDL' '1'  'VWCORE' 1 1 2 27 13 74 1 0
 1800.0000 692.8203 812.7664 700.0000 2.6100 0.6750 0.0160
 1.5013 8.3264 1.5013 8.3264 30.0000 0.2000 1.2000
 0.1000 0.0018 0.6983 0.0385 1.2774 0.0000 422.2301
 162.1532 0.0300 0.0000 0.0300 0.3000 0.0000 /
0 'USRMDL' 0 'VWVARS' 8 0 2 0 0 21 101 '1' /
0 'USRMDL' 0 'VWLVRT' 8 0 3 23 10 15 101 '1' 1
 0.8500 0.0010 0.2000 12.5000 50.0000 0.0000 0.0000
 0.5000 1.0000 2.6100 0.6750 1.2000 0.5000 692.8203
 812.7664 0.3500 0.0500 0.2500 0.0200 3.0000 4.0000
 60.0000 0.0160 /
0 'USRMDL' 0 'VWPWRC' 8 0 3 21 7 5 101 '1' 0
 1.0000 0.5556 -0.5556 0.7567 0.9372 0.9500 0.9000
```

```
 0.2000 0.2000 1.0000 0.0000 0.0000 0.0000 0.1000
 0.1000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 /
0 'USRMDL' 0 'VWMECH' 8 0 2 7 8 0 101 '1'
 1800.0000 422.2301 4263.0788 368.0000 68.5000 5472.3400 28.1000 /
0 'USRMDL' 0 'VWMEAS' 8 0 2 3 8 5 101 '1'
 0.1000 0.1000 0.1000 /
0 'USRMDL' 0 'VWVPRT' 0 2 7 20 0 11 101 '1'  1 1 0 0 0
 0.7500 0.0001 0.8500 0.4000 0.9000 60.0000 1.1000
60.0000 1.1350 0.2000 1.2000 0.1200 0.0000 0.3000
 0.7000 2.6500 0.8500 11.0000 0.9000 60.0000 /
0 'USRMDL' 0 'VWFPRT' 0 2 3 4 0 1 101 '1'  0
 56.4000 0.2000 63.2000 0.2000 /
```

PSS®E Output List

```
      PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS/E      MON, SEP 19 2011  16:43
 PLANT MODELS
 REPORT FOR ALL MODELS                        BUS 100 [PID257-WTG1 0.6900] MODELS
      ** VWCORE ** at bus 100 machine 1
      Uses CONs 47404-47430   ICON 80-81   STATEs 20989-21001   VARs 152-225
      PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS/E      MON, SEP 19 2011  16:43
 CONEC MODELS
 REPORT FOR ALL MODELS                        BUS 100 [PID257-WTG1 0.6900] MODELS
      ** VWVARS ** at bus 100 machine 1
      Uses ICONs 6777-6778   VARs 14407-14427
      ** VWLVRT ** at bus 100 machine 1
      Uses CONs 154144-154166   ICONs 6779-6781   STATEs 59462-59471   VARs 14428-14442
      ** VWPWRC ** at bus 100 machine 1
      Uses CONs 154167-154187   ICONs 6782-6784   STATEs 59472-59478   VARs 14443-14447

      ** VWMECH ** at bus 100 machine 1
      Uses CONs 154188-154194   ICONs 6785-6786   STATEs 59479-59486
      ** VWMEAS ** at bus 100 machine 1
```

Uses CONs 154195-154197 ICONs 6787-6788 STATEs 59487-59494 VARs 14448-14452

CONET MODELS

REPORT FOR ALL MODELS BUS 100 [PID257-WTG1 0.6900] MODELS

** VWVPRT ** Uses CONs 154434-154453 ICONs 7107-7113 VARs 14564-14574

Vestas voltage relay monitoring bus 100

** VWFPRT ** Uses CONs 154454-154457 ICONs 7114-7116 VAR 14575

Vestas frequency relay monitoring bus 100

PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS/E MON, SEP 19 2011 16:43

PLANT MODELS

REPORT FOR ALL MODELS BUS 101 [PID257-WTG2 0.6900] MODELS

** VWCORE ** at bus 101 machine 1

Uses CONs 47431-47457 ICON 82-83 STATEs 21002-21014 VARs 226-299

CONEC MODELS

REPORT FOR ALL MODELS BUS 101 [PID257-WTG2 0.6900] MODELS

** VWVARS ** at bus 101 machine 1

Uses ICONs 6789-6790 VARs 14453-14473

** VWLVRT ** at bus 101 machine 1

Uses CONs 154198-154220 ICONs 6791-6793 STATEs 59495-59504 VARs 14474-14488

** VWPWRC ** at bus 101 machine 1

Uses CONs 154221-154241 ICONs 6794-6796 STATEs 59505-59511 VARs 14489-14493

** VWMECH ** at bus 101 machine 1

Uses CONs 154242-154248 ICONs 6797-6798 STATEs 59512-59519

** VWMEAS ** at bus 101 machine 1

Uses CONs 154249-154251 ICONs 6799-6800 STATEs 59520-59527 VARs 14494-14498

CONET MODELS

REPORT FOR ALL MODELS BUS 101 [PID257-WTG2 0.6900] MODELS

** VWVPRT ** Uses CONs 154458-154477 ICONs 7117-7123 VARs 14576-14586

Vestas voltage relay monitoring bus 101

** VWFPRT ** Uses CONs 154478-154481 ICONs 7124-7126 VAR 14587

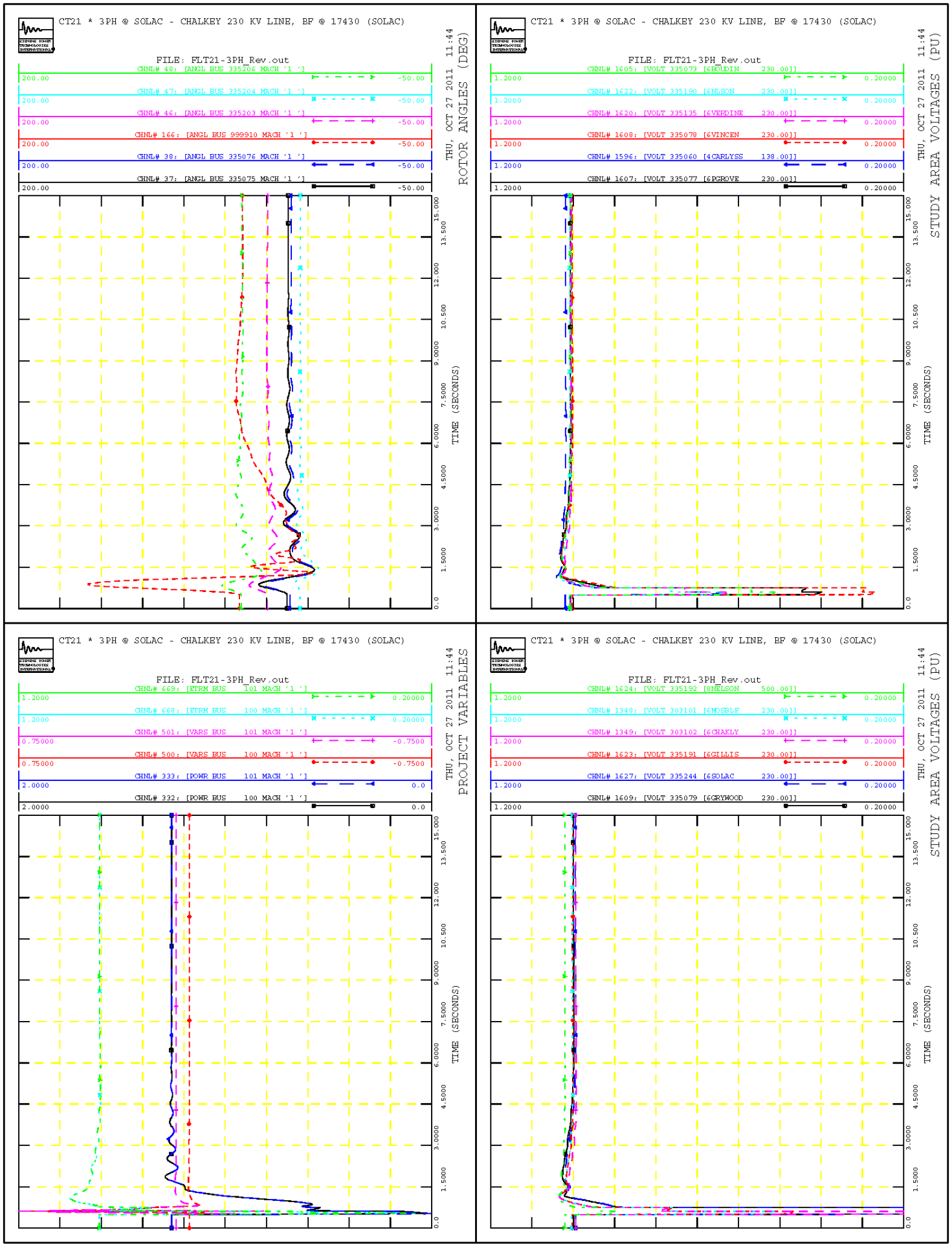
Vestas frequency relay monitoring bus 101

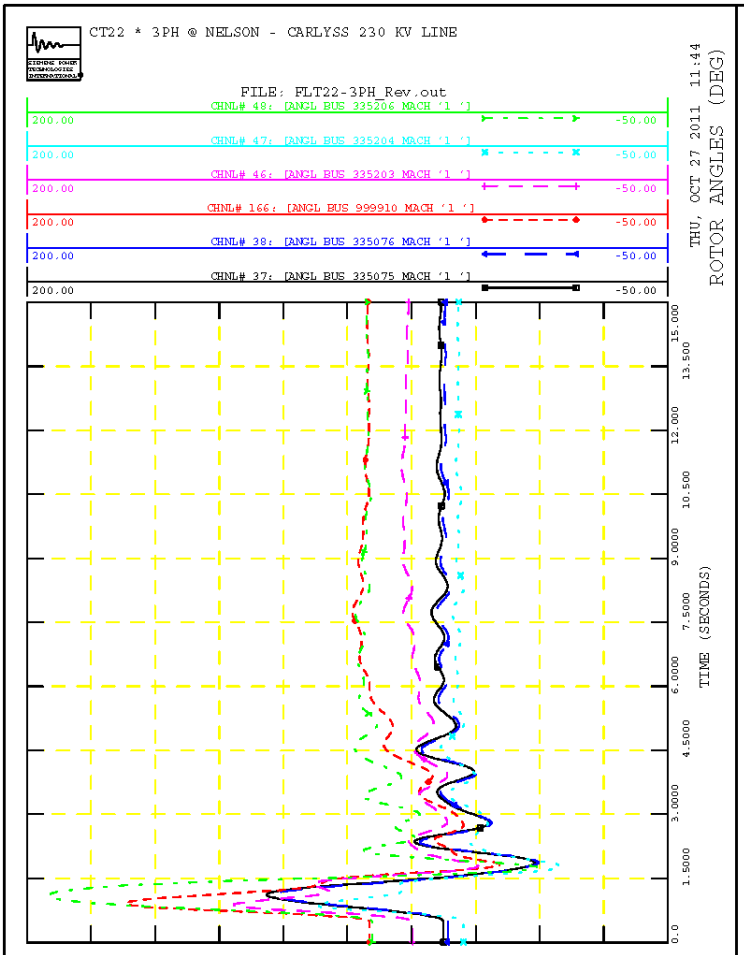
APPENDIX C: Plots for Stability Simulations

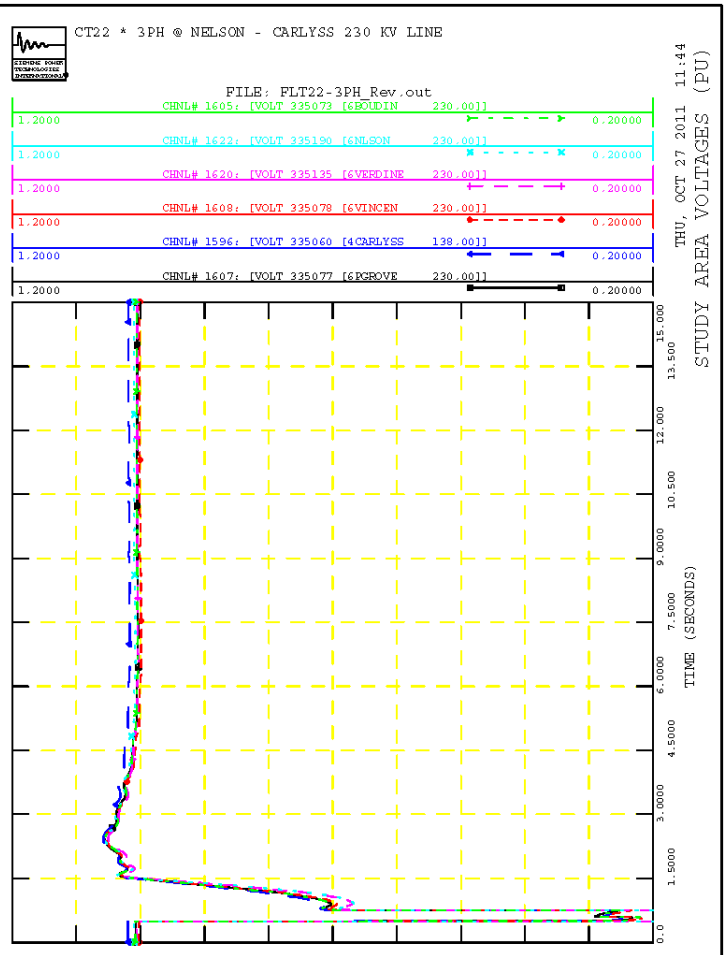
The stability plots for the evaluated contingencies are shown in this appendix. There are 4 plots per page, which include the following channels:

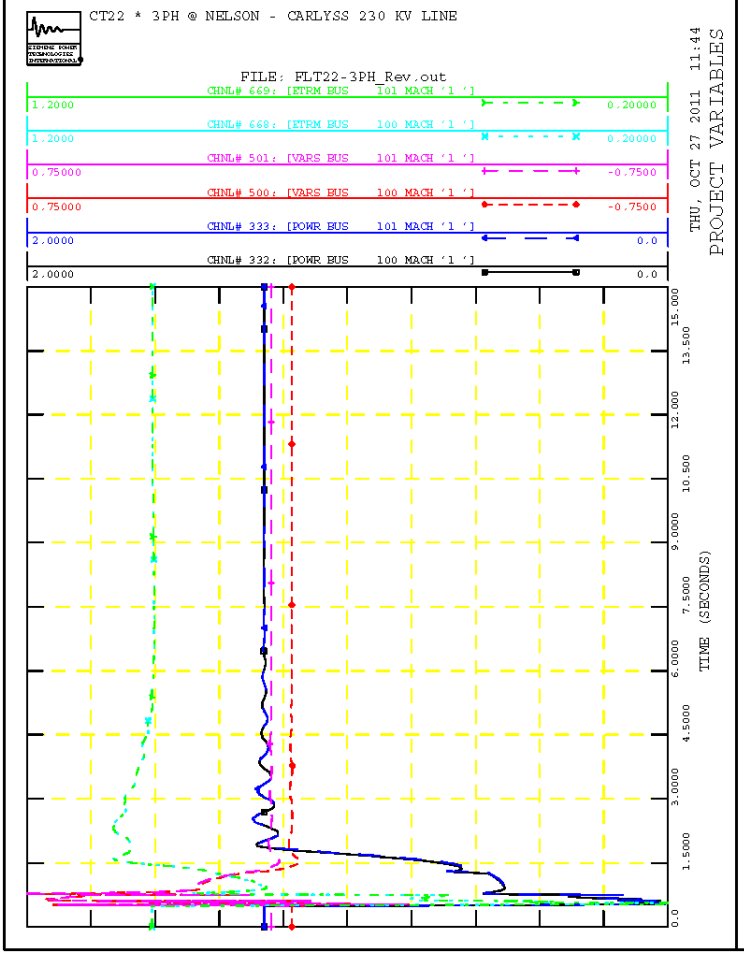
- Bus Voltages.
- PID 257 Project Mechanical Power and Speed Deviation.
- PID 257 P & Q output.
- Rotor Angles for the Synchronous Machines in the Study Area

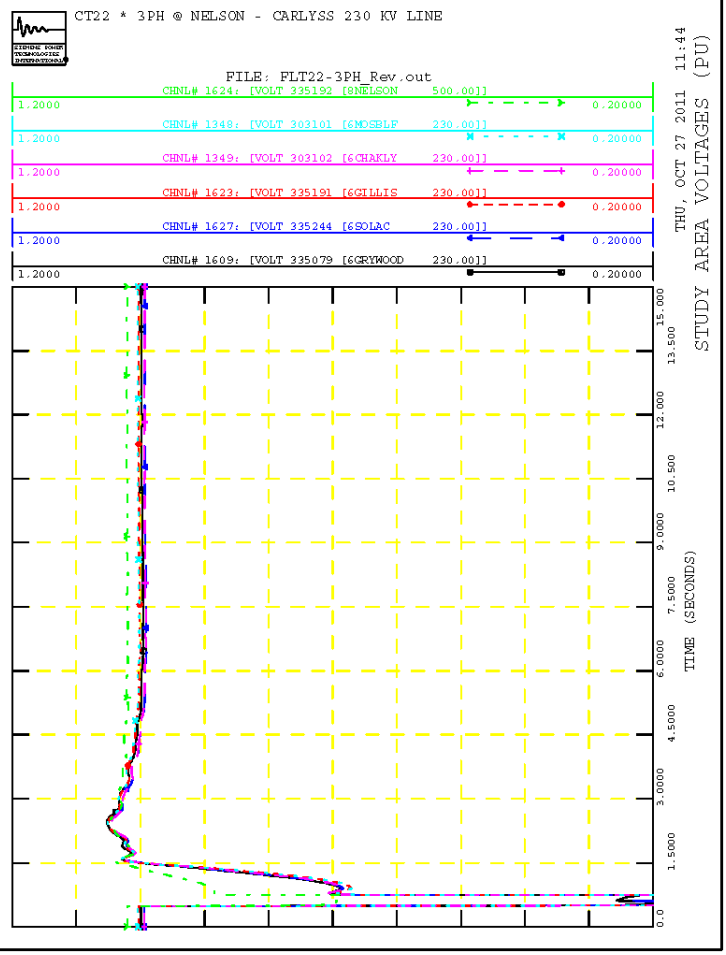
Three Phase Faults with Stuck Breaker

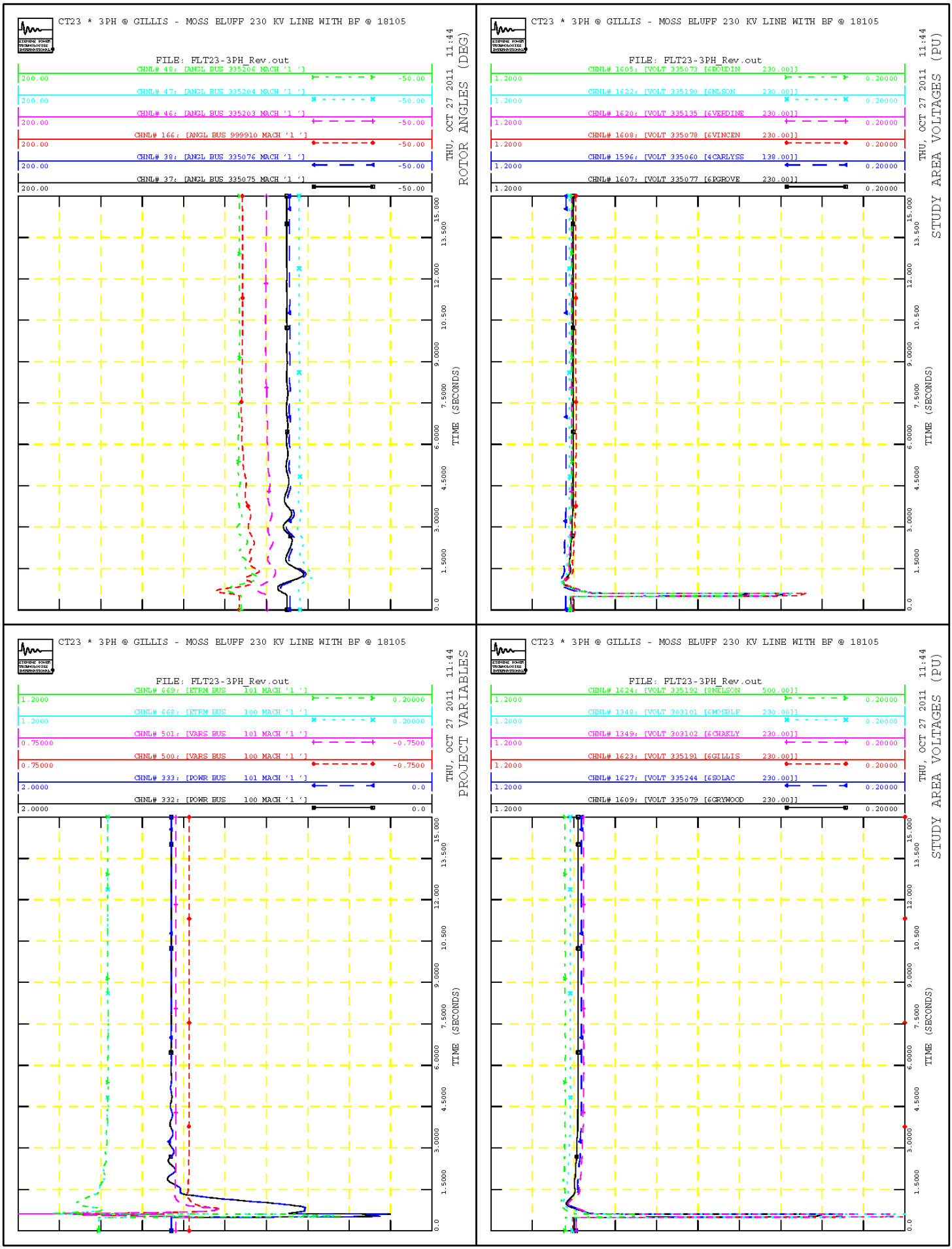

CT21 * 3PH @ SOLAC - CHALKEY 230 KV LINE, BF @ 17430 (SOLAC)
FILE: FLT21-3PH_Rev.out
THU, OCT 27 2011 11:44
ROTOR ANGLES (DEG)
TIME (SECONDS)
CHNL# 48: [ANGL BUS 335206 MACH '1 ']
CHNL# 47: [ANGL BUS 335204 MACH '1 ']
CHNL# 46: [ANGL BUS 335203 MACH '1 ']
CHNL# 166: [ANGL BUS 999910 MACH '1 ']
CHNL# 38: [ANGL BUS 335076 MACH '1 ']
CHNL# 37: [ANGL BUS 335075 MACH '1 ']
CT21 * 3PH @ SOLAC - CHALKEY 230 KV LINE, BF @ 17430 (SOLAC)
FILE: FLT21-3PH_Rev.out
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)
CHNL# 1605: [VOLT 335073 [6BOUDIN 230.00]]
CHNL# 1622: [VOLT 335190 [6NLSON 230.00]]
CHNL# 1620: [VOLT 335135 [6VERDINE 230.00]]
CHNL# 1608: [VOLT 335078 [6VINCEN 230.00]]
CHNL# 1596: [VOLT 335060 [4CARLYSS 138.00]]
CHNL# 1607: [VOLT 335077 [6PGROVE 230.00]]
CT21 * 3PH @ SOLAC - CHALKEY 230 KV LINE, BF @ 17430 (SOLAC)
FILE: FLT21-3PH_Rev.out
THU, OCT 27 2011 11:44
PROJECT VARIABLES
TIME (SECONDS)
CHNL# 669: [ETRM BUS 101 MACH '1 ']
CHNL# 668: [ETRM BUS 100 MACH '1 ']
CHNL# 501: [VARS BUS 101 MACH '1 ']
CHNL# 500: [VARS BUS 100 MACH '1 ']
CHNL# 333: [POWR BUS 101 MACH '1 ']
CHNL# 332: [POWR BUS 100 MACH '1 ']
CT21 * 3PH @ SOLAC - CHALKEY 230 KV LINE, BF @ 17430 (SOLAC)
FILE: FLT21-3PH_Rev.out
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)
CHNL# 1624: [VOLT 335192 [8NELSON 500.00]]
CHNL# 1349: [VOLT 303101 [6MOSSLF 230.00]]
CHNL# 1349: [VOLT 303102 [6CHAKLY 230.00]]
CHNL# 1623: [VOLT 335191 [6GILLIS 230.00]]
CHNL# 1627: [VOLT 335244 [6SOLAC 230.00]]
CHNL# 1609: [VOLT 335079 [6GRYWOOD 230.00]]


CT22 * 3PH @ NELSON - CARLYSS 230 KV LINE
FILE: FLT22-3PH_Rev.out
CHNL# 48: [ANGL BUS 335206 MACH '1 ']
CHNL# 47: [ANGL BUS 335204 MACH '1 ']
CHNL# 46: [ANGL BUS 335203 MACH '1 ']
CHNL# 166: [ANGL BUS 999910 MACH '1 ']
CHNL# 38: [ANGL BUS 335076 MACH '1 ']
CHNL# 37: [ANGL BUS 335075 MACH '1 ']
200.00
-50.00
TIME (SECONDS)
0.0
1.5000
3.0000
4.5000
6.0000
7.5000
9.0000
10.500
12.000
13.500
15.000
THU, OCT 27 2011 11:44
ROTOR ANGLES (DEG)


CT22 * 3PH @ NELSON - CARLYSS 230 KV LINE
FILE: FLT22-3PH_Rev.out
CHNL# 1605: [VOLT 335073 [6BOUDIN 230.00]]
CHNL# 1622: [VOLT 335190 [6NLSON 230.00]]
CHNL# 1620: [VOLT 335135 [6VERDINE 230.00]]
CHNL# 1608: [VOLT 335078 [6VINCEN 230.00]]
CHNL# 1596: [VOLT 335060 [4CARLYSS 138.00]]
CHNL# 1607: [VOLT 335077 [6PGROVE 230.00]]
1.2000
0.20000
TIME (SECONDS)
0.0
1.5000
3.0000
4.5000
6.0000
7.5000
9.0000
10.500
12.000
13.500
15.000
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)


CT22 * 3PH @ NELSON - CARLYSS 230 KV LINE
FILE: FLT22-3PH_Rev.out
CHNL# 669: [ETRM BUS 101 MACH '1 ']
CHNL# 668: [ETRM BUS 100 MACH '1 ']
CHNL# 501: [VARS BUS 101 MACH '1 ']
CHNL# 500: [VARS BUS 100 MACH '1 ']
CHNL# 333: [POWR BUS 101 MACH '1 ']
CHNL# 332: [POWR BUS 100 MACH '1 ']
1.2000
0.20000
0.75000
-0.7500
2.0000
0.0
TIME (SECONDS)
0.0
1.5000
3.0000
4.5000
6.0000
7.5000
9.0000
10.500
12.000
13.500
15.000
THU, OCT 27 2011 11:44
PROJECT VARIABLES


CT22 * 3PH @ NELSON - CARLYSS 230 KV LINE
FILE: FLT22-3PH_Rev.out
CHNL# 1624: [VOLT 335192 [8NELSON 500.00]]
CHNL# 1348: [VOLT 303101 [6MOSBLF 230.00]]
CHNL# 1349: [VOLT 303102 [6CHAKLY 230.00]]
CHNL# 1623: [VOLT 335191 [6GILLIS 230.00]]
CHNL# 1627: [VOLT 335244 [6SOLAC 230.00]]
CHNL# 1609: [VOLT 335079 [6GRYWOOD 230.00]]
1.2000
0.20000
TIME (SECONDS)
0.0
1.5000
3.0000
4.5000
6.0000
7.5000
9.0000
10.500
12.000
13.500
15.000
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)


CT23 * 3PH @ GILLIS - MOSS BLUFF 230 KV LINE WITH BF @ 18105
FILE: FLT23-3PH_Rev.out
THU, OCT 27 2011 11:44
ROTOR ANGLES (DEG)
CHNL# 48: [ANGL BUS 335206 MACH '1 ']
CHNL# 47: [ANGL BUS 335204 MACH '1 ']
CHNL# 46: [ANGL BUS 335203 MACH '1 ']
CHNL# 166: [ANGL BUS 999910 MACH '1 ']
CHNL# 38: [ANGL BUS 335076 MACH '1 ']
CHNL# 37: [ANGL BUS 335075 MACH '1 ']
200.00
-50.00
TIME (SECONDS)
0.0
1.5000
3.0000
4.5000
6.0000
7.5000
9.0000
10.500
12.000
13.500
15.000
CT23 * 3PH @ GILLIS - MOSS BLUFF 230 KV LINE WITH BF @ 18105
FILE: FLT23-3PH_Rev.out
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
CHNL# 1605: [VOLT 335073 [6BOUDIN 230.00]]
CHNL# 1622: [VOLT 335190 [6NLSON 230.00]]
CHNL# 1620: [VOLT 335135 [6VEEDINE 230.00]]
CHNL# 1608: [VOLT 335078 [6VINCEN 230.00]]
CHNL# 1596: [VOLT 335060 [4CARLYSS 138.00]]
CHNL# 1607: [VOLT 335077 [6PGROVE 230.00]]
1.2000
0.20000
TIME (SECONDS)
CT23 * 3PH @ GILLIS - MOSS BLUFF 230 KV LINE WITH BF @ 18105
FILE: FLT23-3PH_Rev.out
THU, OCT 27 2011 11:44
PROJECT VARIABLES
CHNL# 669: [ETRM BUS 101 MACH '1 ']
CHNL# 668: [ETRM BUS 100 MACH '1 ']
CHNL# 501: [VARS BUS 101 MACH '1 ']
CHNL# 500: [VARS BUS 100 MACH '1 ']
CHNL# 333: [POWR BUS 101 MACH '1 ']
CHNL# 332: [POWR BUS 100 MACH '1 ']
2.0000
0.0
0.75000
-0.7500
TIME (SECONDS)
CT23 * 3PH @ GILLIS - MOSS BLUFF 230 KV LINE WITH BF @ 18105
FILE: FLT23-3PH_Rev.out
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
CHNL# 1624: [VOLT 335192 [8NELSON 500.00]]
CHNL# 1348: [VOLT 303101 [6MOSBLF 230.00]]
CHNL# 1349: [VOLT 303102 [6CHAKLY 230.00]]
CHNL# 1623: [VOLT 335191 [6GILLIS 230.00]]
CHNL# 1627: [VOLT 335244 [6SOLAC 230.00]]
CHNL# 1609: [VOLT 335079 [6GRYWOOD 230.00]]
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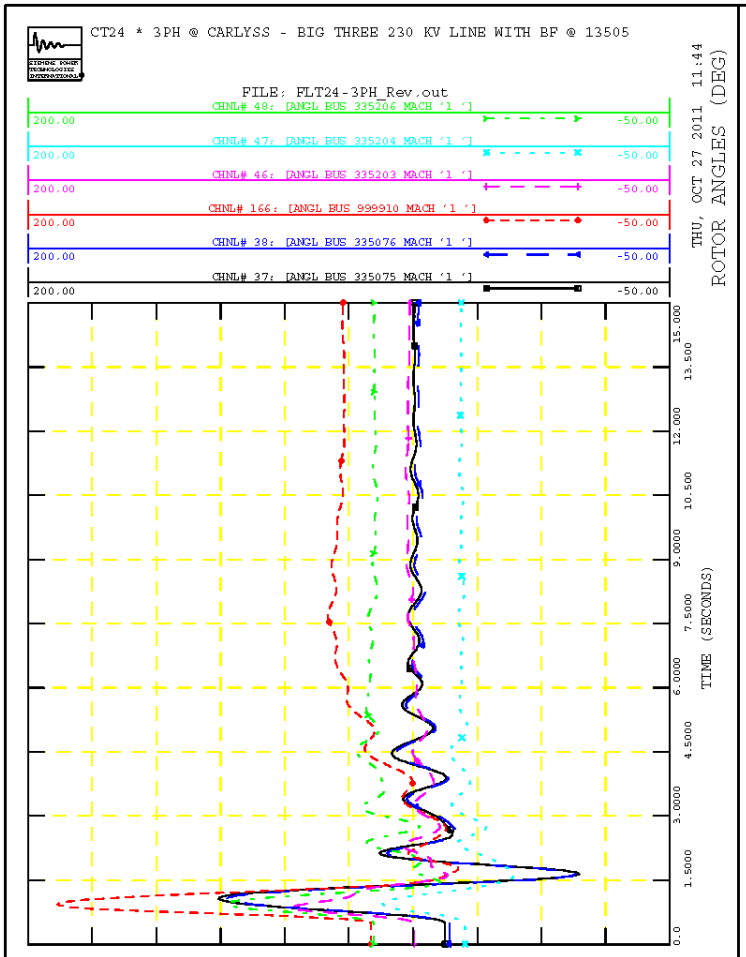
0.20000
TIME (SECONDS)


CT24 * 3PH @ CARLYSS - BIG THREE 230 KV LINE WITH BF @ 13505
FILE: FLT24-3PH_Rev.out
CHNL# 48: [ANGL BUS 335206 MACH '1 ']
CHNL# 47: [ANGL BUS 335204 MACH '1 ']
CHNL# 46: [ANGL BUS 335203 MACH '1 ']
CHNL# 166: [ANGL BUS 999910 MACH '1 ']
CHNL# 38: [ANGL BUS 335076 MACH '1 ']
CHNL# 37: [ANGL BUS 335075 MACH '1 ']
200.00
-50.00
THU, OCT 27 2011 11:44
ROTOR ANGLES (DEG)
TIME (SECONDS)
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1.5000
3.0000
4.5000
6.0000
7.5000
9.0000
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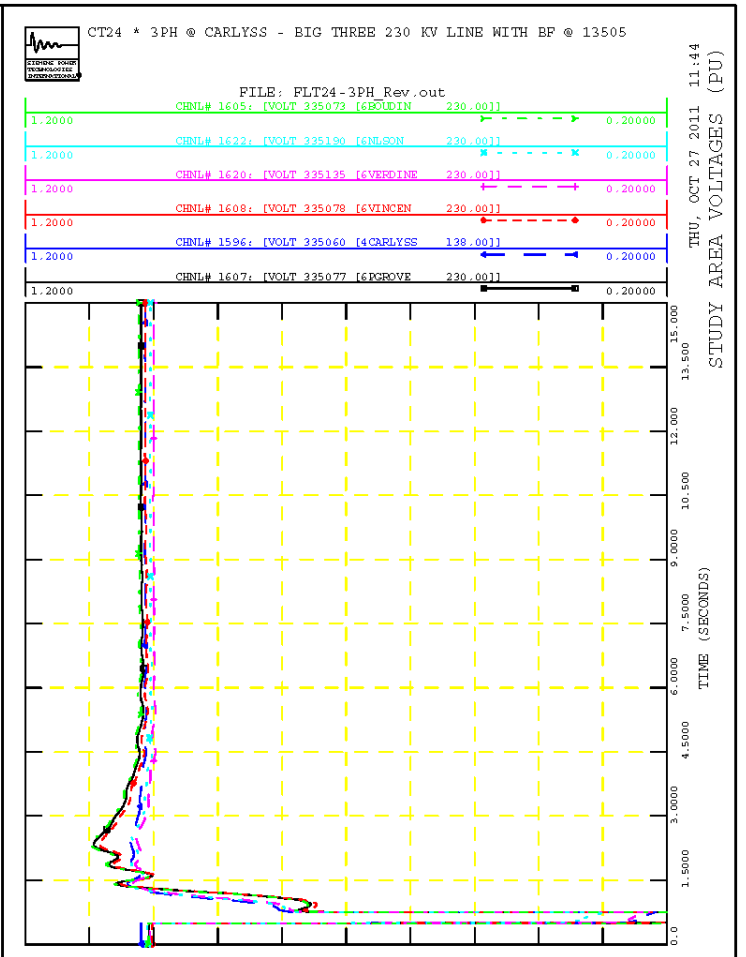
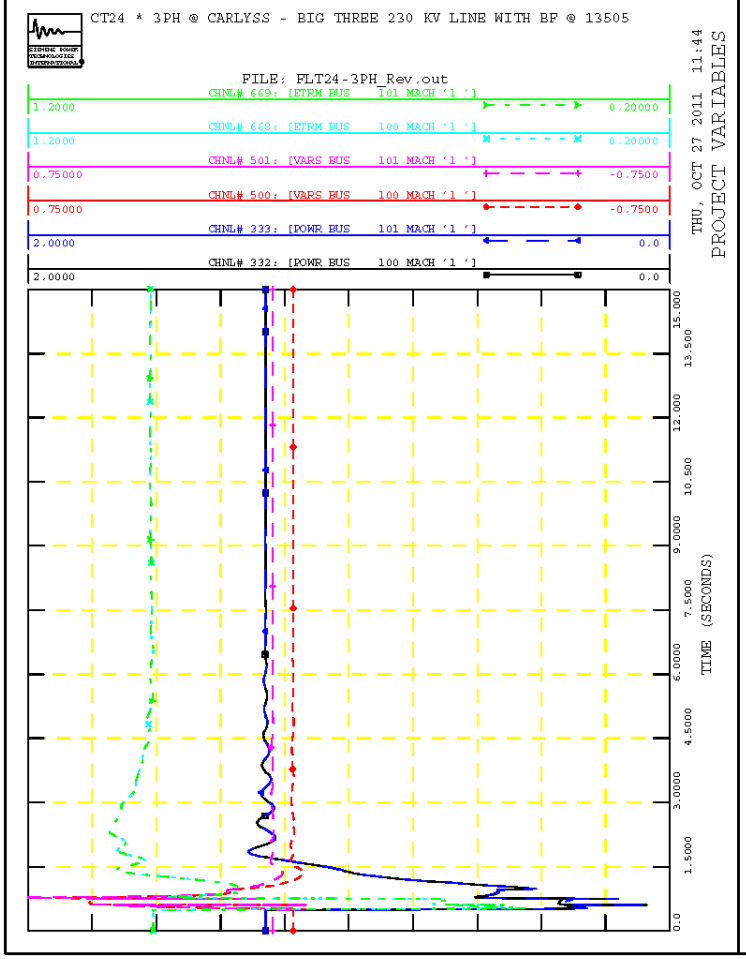
15.000


CT24 * 3PH @ CARLYSS - BIG THREE 230 KV LINE WITH BF @ 13505
FILE: FLT24-3PH_Rev.out
CHNL# 1605: [VOLT 335073 [6BOUDIN 230.00]]
CHNL# 1622: [VOLT 335190 [6NLSON 230.00]]
CHNL# 1620: [VOLT 335135 [6VERDINE 230.00]]
CHNL# 1608: [VOLT 335078 [6VINCEN 230.00]]
CHNL# 1596: [VOLT 335060 [4CARLYSS 138.00]]
CHNL# 1607: [VOLT 335077 [6PGROVE 230.00]]
1.2000
0.20000
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)
0.0
1.5000
3.0000
4.5000
6.0000
7.5000
9.0000
10.500
12.000
13.500
15.000


CT24 * 3PH @ CARLYSS - BIG THREE 230 KV LINE WITH BF @ 13505
FILE: FLT24-3PH_Rev.out
CHNL# 669: [ETRM BUS 101 MACH '1 ']
CHNL# 668: [ETRM BUS 100 MACH '1 ']
CHNL# 501: [VARS BUS 101 MACH '1 ']
CHNL# 500: [VARS BUS 100 MACH '1 ']
CHNL# 333: [POWR BUS 101 MACH '1 ']
CHNL# 332: [POWR BUS 100 MACH '1 ']
1.2000
0.20000
0.75000
-0.7500
2.0000
0.0
THU, OCT 27 2011 11:44
PROJECT VARIABLES
TIME (SECONDS)
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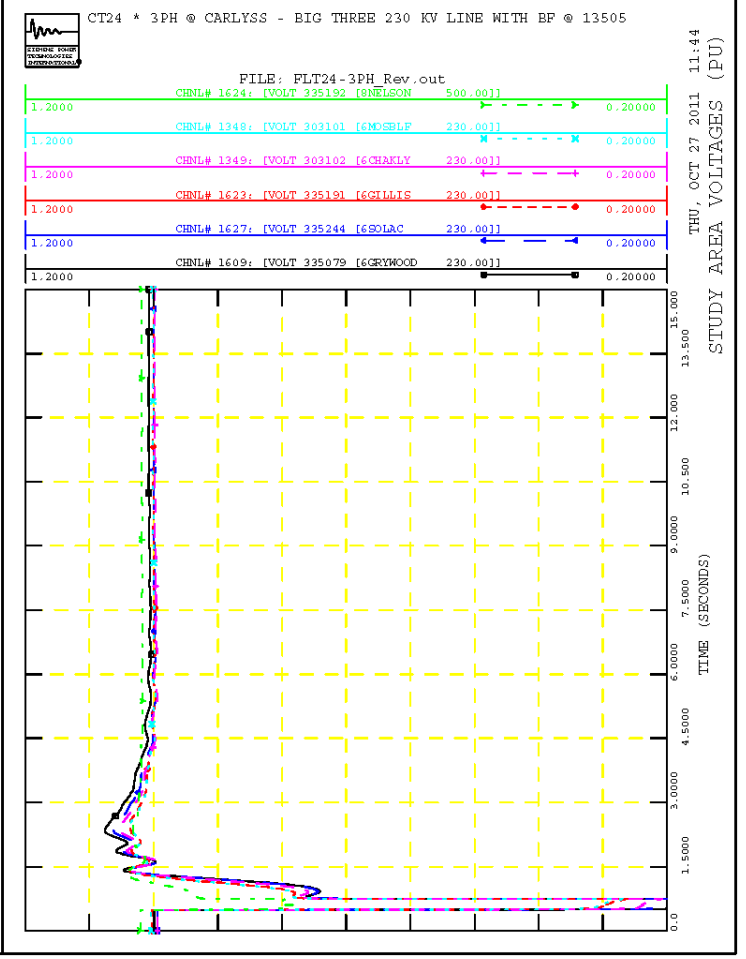
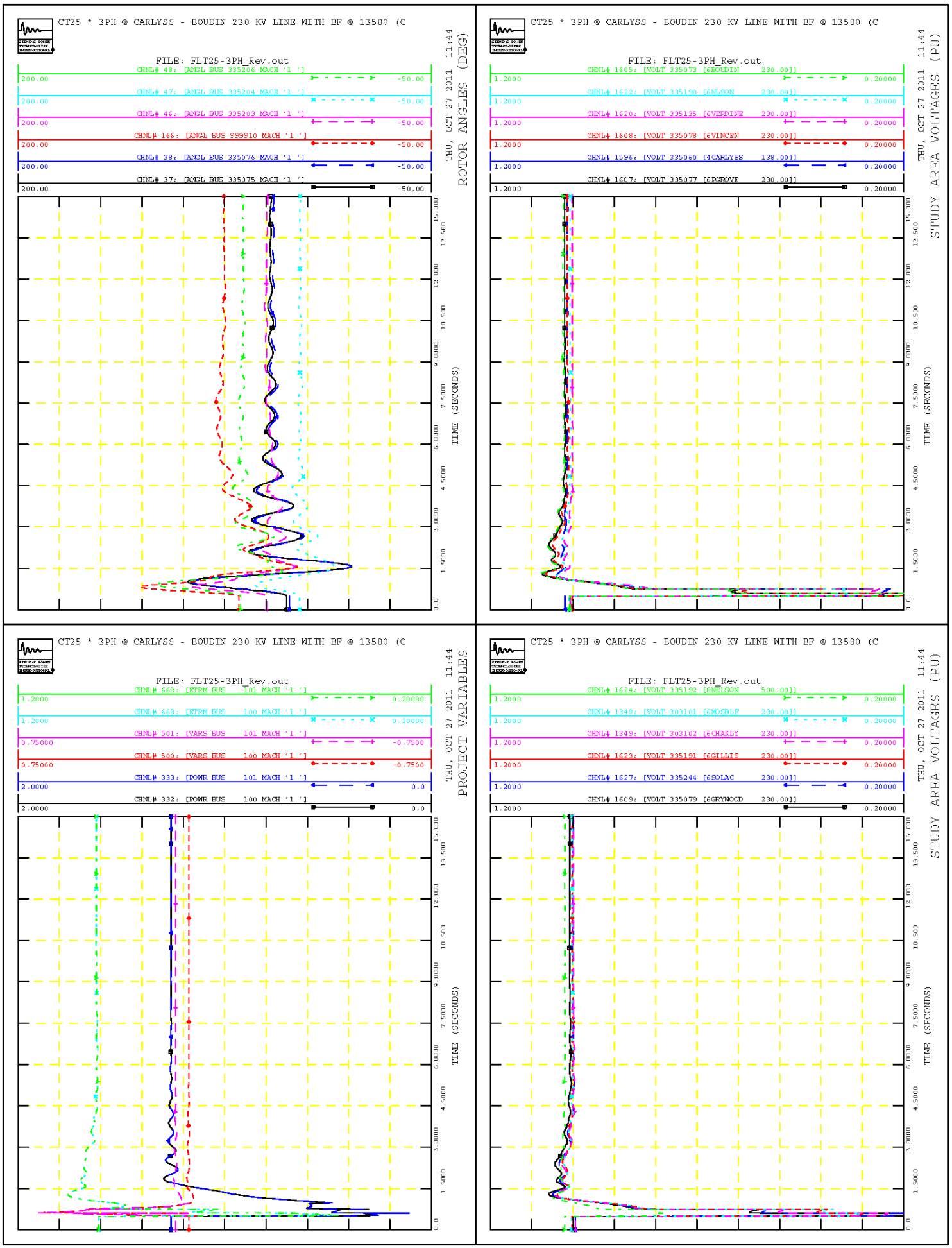
3.0000
4.5000
6.0000
7.5000
9.0000
10.500
12.000
13.500
15.000


CT24 * 3PH @ CARLYSS - BIG THREE 230 KV LINE WITH BF @ 13505
FILE: FLT24-3PH_Rev.out
CHNL# 1624: [VOLT 335192 [8NELSON 500.00]]
CHNL# 1348: [VOLT 303101 [6MOSBLF 230.00]]
CHNL# 1349: [VOLT 303102 [6CHARLY 230.00]]
CHNL# 1623: [VOLT 335191 [6GILLIS 230.00]]
CHNL# 1627: [VOLT 335244 [6SOLAC 230.00]]
CHNL# 1609: [VOLT 335079 [6GRYWOOD 230.00]]
1.2000
0.20000
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)
0.0
1.5000
3.0000
4.5000
6.0000
7.5000
9.0000
10.500
12.000
13.500
15.000


CT25 * 3PH @ CARLYSS - BOUDIN 230 KV LINE WITH BF @ 13580 (C
FILE: FLT25-3PH_Rev.out
CHNL# 48: [ANGL BUS 335206 MACH '1 ']
CHNL# 47: [ANGL BUS 335204 MACH '1 ']
CHNL# 46: [ANGL BUS 335203 MACH '1 ']
CHNL# 166: [ANGL BUS 999910 MACH '1 ']
CHNL# 38: [ANGL BUS 335076 MACH '1 ']
CHNL# 37: [ANGL BUS 335075 MACH '1 ']
200.00
-50.00
THU, OCT 27 2011 11:44
ROTOR ANGLES (DEG)
TIME (SECONDS)
0.0
1.5000
3.0000
4.5000
6.0000
7.5000
9.0000
10.500
12.000
13.500
15.000
CT25 * 3PH @ CARLYSS - BOUDIN 230 KV LINE WITH BF @ 13580 (C
FILE: FLT25-3PH_Rev.out
CHNL# 1605: [VOLT 335073 [6BOUDIN 230.00]]
CHNL# 1622: [VOLT 335190 [6NLSON 230.00]]
CHNL# 1620: [VOLT 335135 [6VERDINE 230.00]]
CHNL# 1608: [VOLT 335078 [6VINCEN 230.00]]
CHNL# 1596: [VOLT 335060 [4CARLYSS 138.00]]
CHNL# 1607: [VOLT 335077 [6PGROVE 230.00]]
1.2000
0.20000
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)
CT25 * 3PH @ CARLYSS - BOUDIN 230 KV LINE WITH BF @ 13580 (C
FILE: FLT25-3PH_Rev.out
CHNL# 669: [ETRM BUS 101 MACH '1 ']
CHNL# 668: [ETRM BUS 100 MACH '1 ']
CHNL# 501: [VARS BUS 101 MACH '1 ']
CHNL# 500: [VARS BUS 100 MACH '1 ']
CHNL# 333: [POWR BUS 101 MACH '1 ']
CHNL# 332: [POWR BUS 100 MACH '1 ']
1.2000
0.20000
0.75000
-0.7500
2.0000
0.0
THU, OCT 27 2011 11:44
PROJECT VARIABLES
TIME (SECONDS)
CT25 * 3PH @ CARLYSS - BOUDIN 230 KV LINE WITH BF @ 13580 (C
FILE: FLT25-3PH_Rev.out
CHNL# 1624: [VOLT 335192 [8NELSON 500.00]]
CHNL# 1348: [VOLT 303101 [6MOSBLF 230.00]]
CHNL# 1349: [VOLT 303102 [6CHAKLY 230.00]]
CHNL# 1623: [VOLT 335191 [6GILLIS 230.00]]
CHNL# 1627: [VOLT 335244 [6SOLAC 230.00]]
CHNL# 1609: [VOLT 335079 [6GRYWOOD 230.00]]
1.2000
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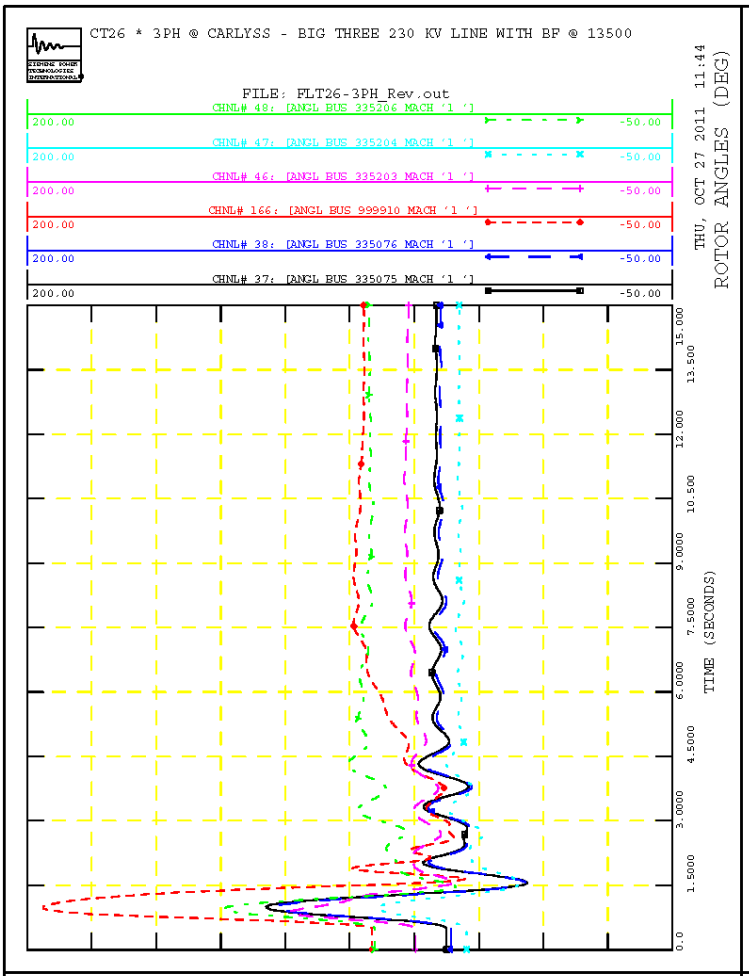
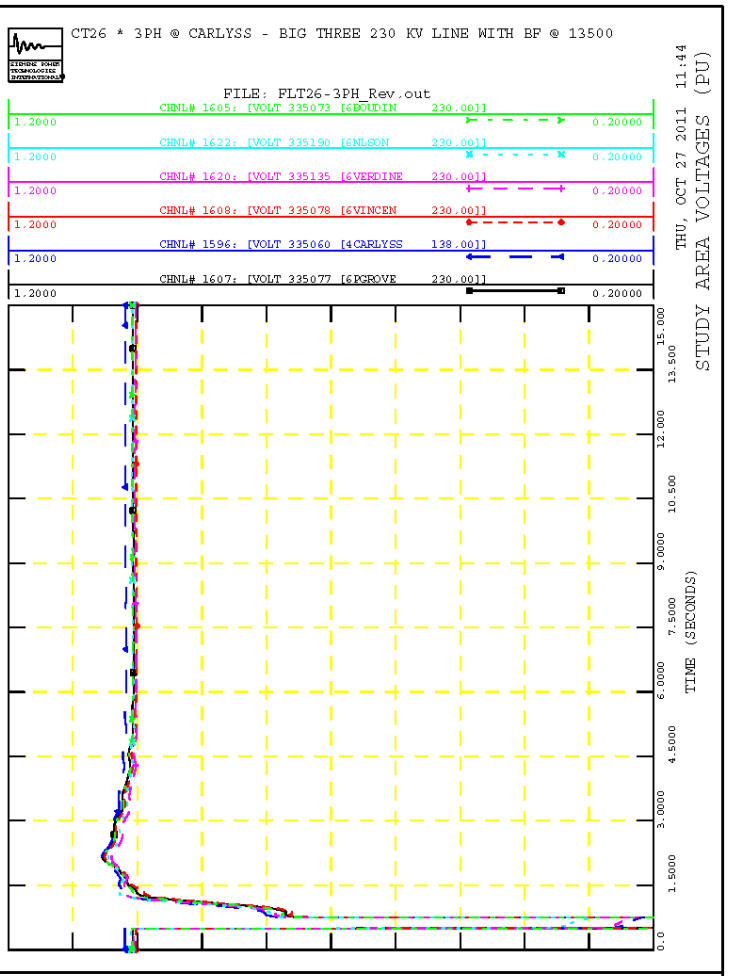
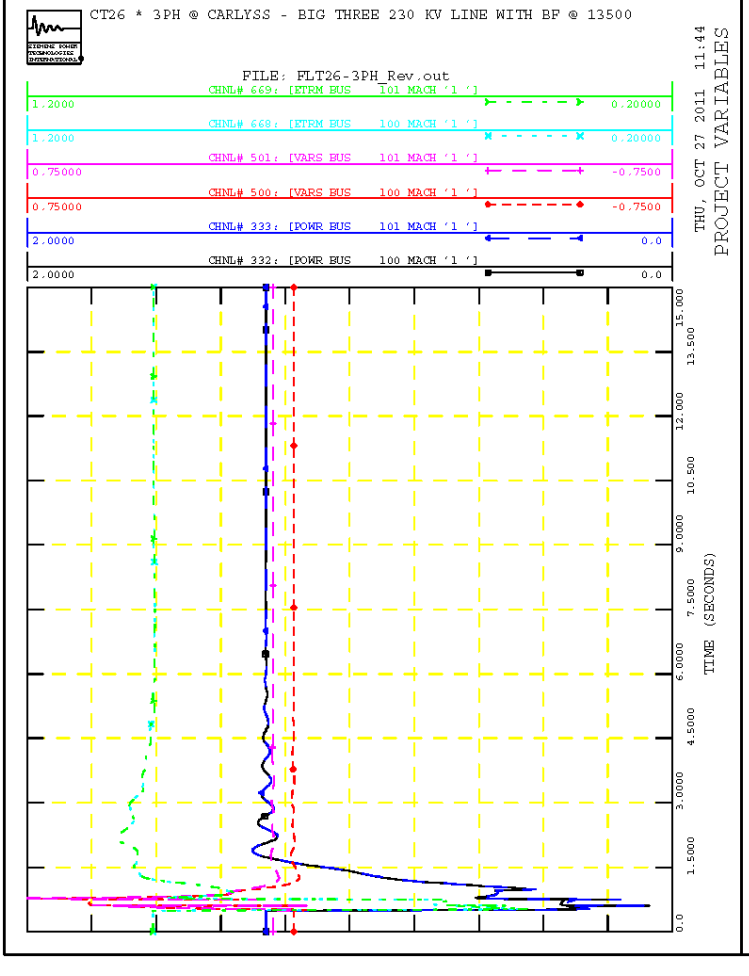
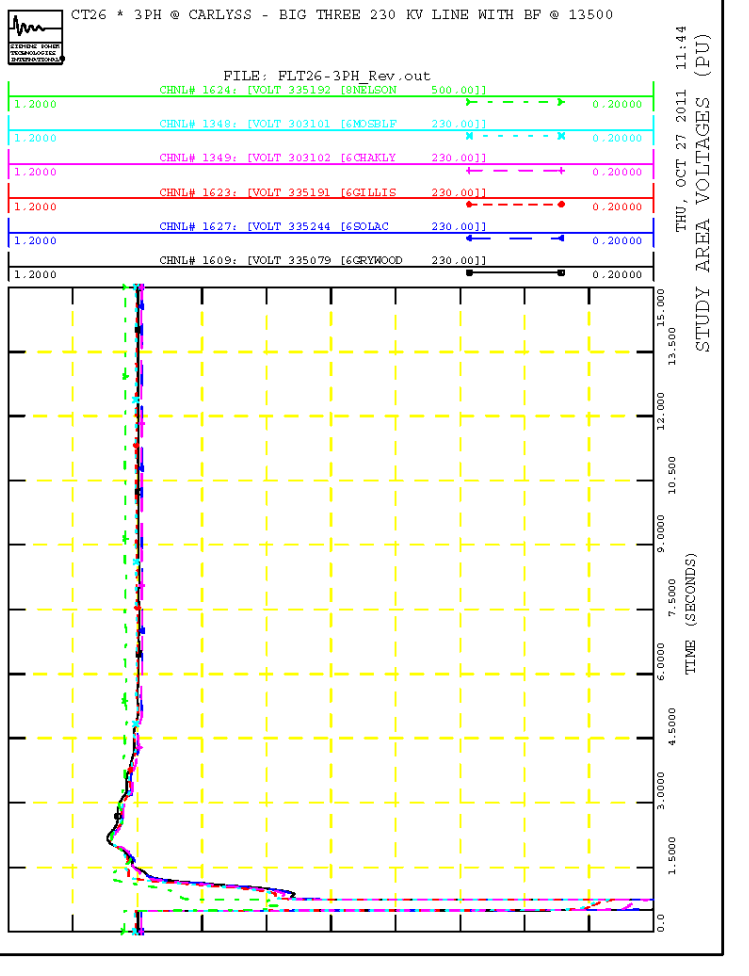
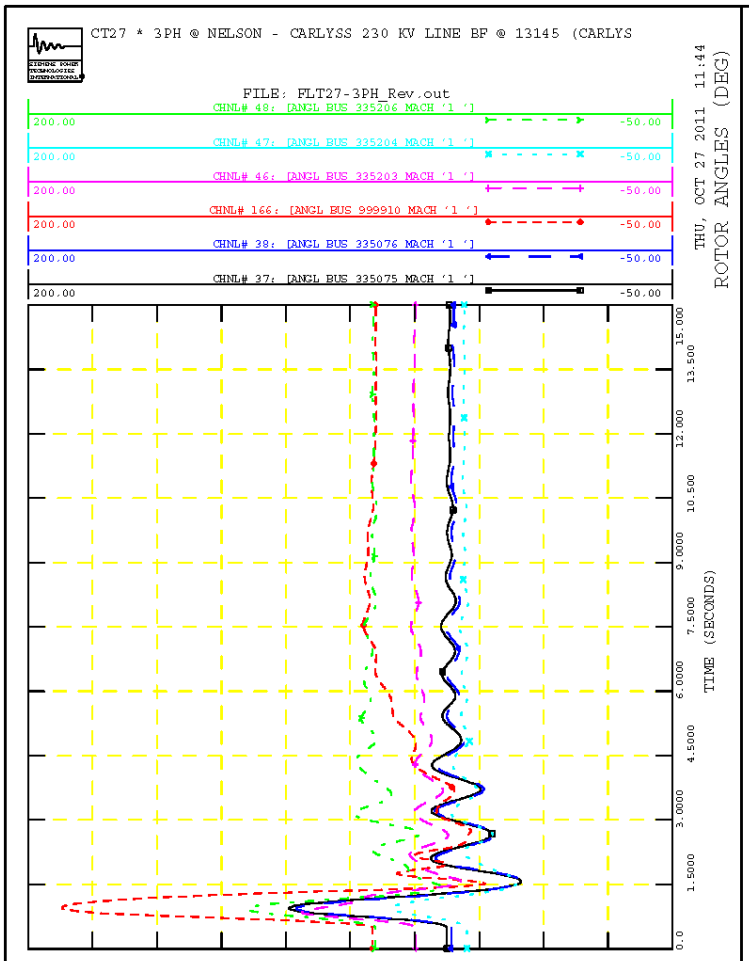
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)

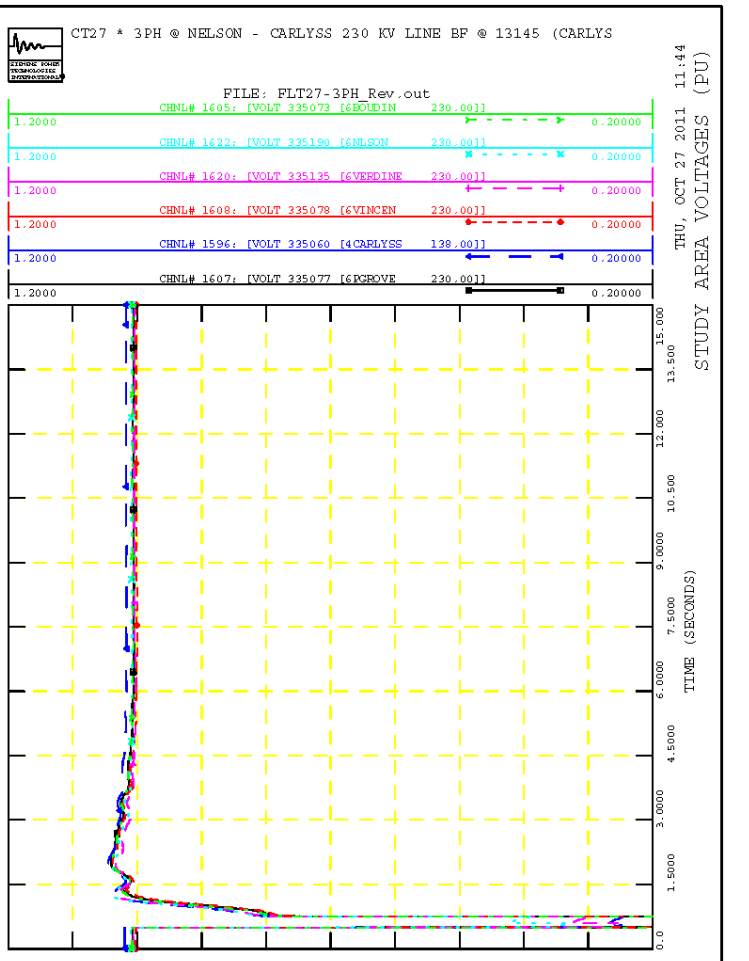

CT26 * 3PH @ CARLYSS - BIG THREE 230 KV LINE WITH BF @ 13500
FILE: FLT26-3PH_Rev.out
CHNL# 48: [ANGL BUS 335206 MACH '1 ']
CHNL# 47: [ANGL BUS 335204 MACH '1 ']
CHNL# 46: [ANGL BUS 335203 MACH '1 ']
CHNL# 166: [ANGL BUS 999910 MACH '1 ']
CHNL# 38: [ANGL BUS 335076 MACH '1 ']
CHNL# 37: [ANGL BUS 335075 MACH '1 ']
THU, OCT 27 2011 11:44
ROTOR ANGLES (DEG)
TIME (SECONDS)

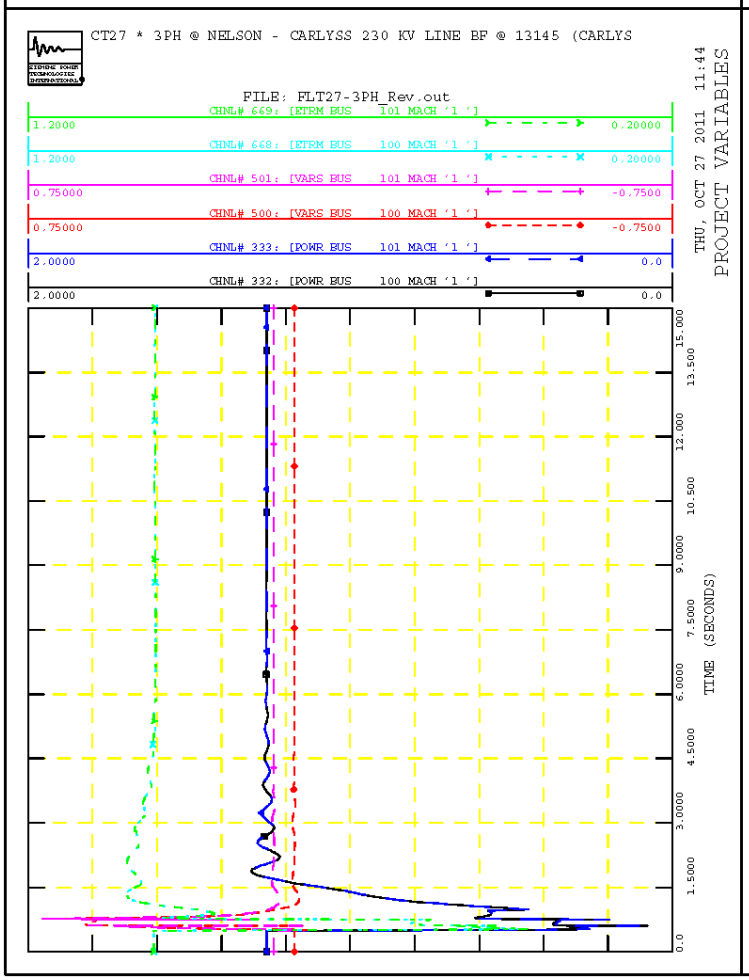

CT26 * 3PH @ CARLYSS - BIG THREE 230 KV LINE WITH BF @ 13500
FILE: FLT26-3PH_Rev.out
CHNL# 1605: [VOLT 335073 [6BOUDIN 230.00]]
CHNL# 1622: [VOLT 335190 [6NLSON 230.00]]
CHNL# 1620: [VOLT 335135 [6VERDINE 230.00]]
CHNL# 1608: [VOLT 335078 [6VINCEN 230.00]]
CHNL# 1596: [VOLT 335060 [4CARLYSS 138.00]]
CHNL# 1607: [VOLT 335077 [6PGROVE 230.00]]
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)

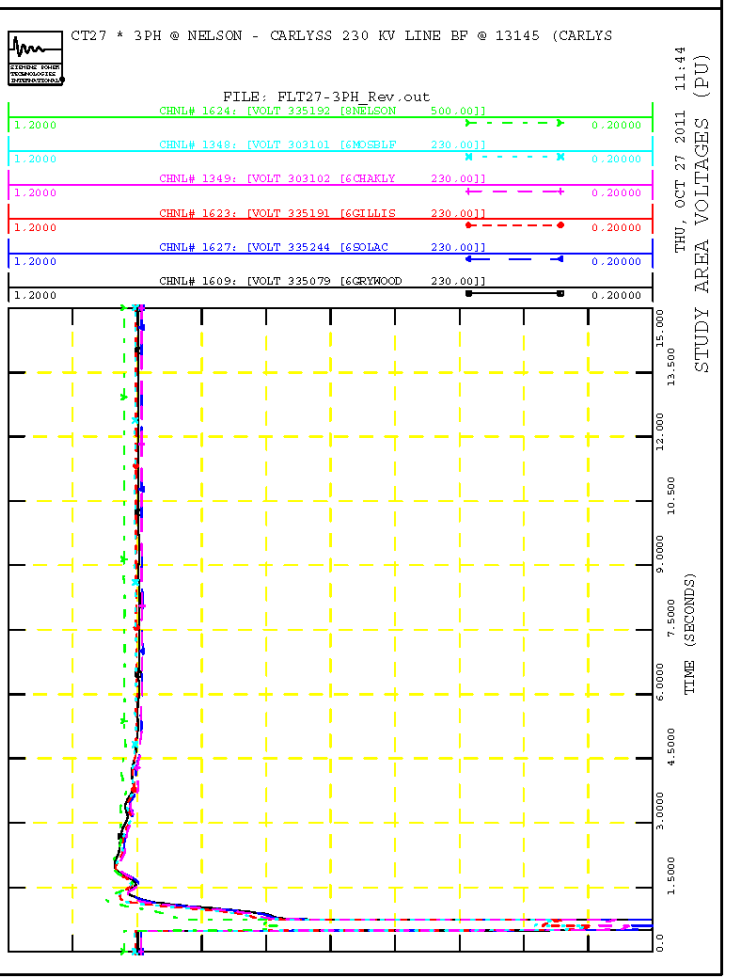

CT26 * 3PH @ CARLYSS - BIG THREE 230 KV LINE WITH BF @ 13500
FILE: FLT26-3PH_Rev.out
CHNL# 669: [ETRM BUS 101 MACH '1 ']
CHNL# 668: [ETRM BUS 100 MACH '1 ']
CHNL# 501: [VARS BUS 101 MACH '1 ']
CHNL# 500: [VARS BUS 100 MACH '1 ']
CHNL# 333: [POWR BUS 101 MACH '1 ']
CHNL# 332: [POWR BUS 100 MACH '1 ']
THU, OCT 27 2011 11:44
PROJECT VARIABLES
TIME (SECONDS)

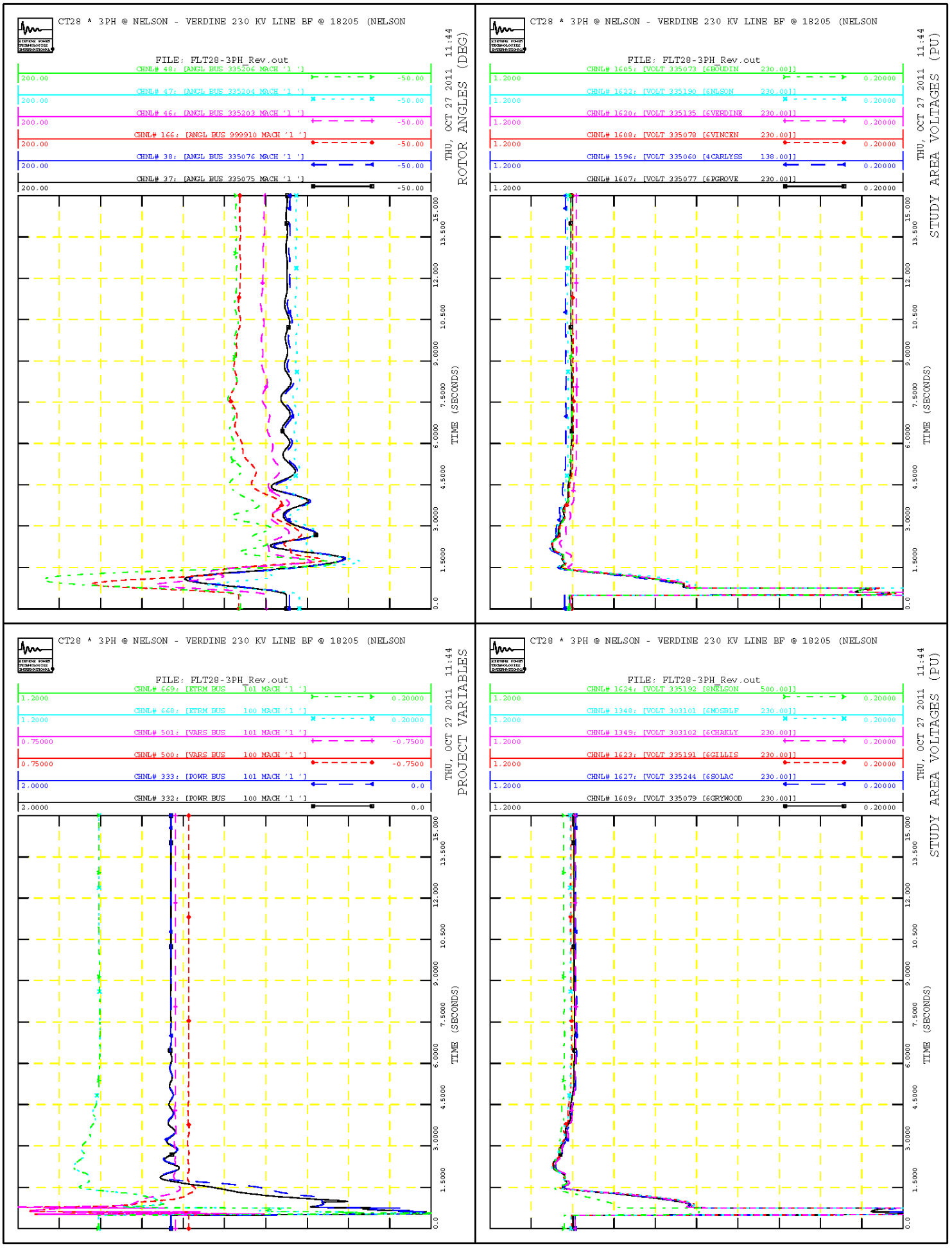

CT26 * 3PH @ CARLYSS - BIG THREE 230 KV LINE WITH BF @ 13500
FILE: FLT26-3PH_Rev.out
CHNL# 1624: [VOLT 335192 [8NELSON 500.00]]
CHNL# 1340: [VOLT 303101 [6MOSELF 230.00]]
CHNL# 1349: [VOLT 303102 [6CHAKLY 230.00]]
CHNL# 1623: [VOLT 335191 [6GILLIS 230.00]]
CHNL# 1627: [VOLT 335244 [6SOLAC 230.00]]
CHNL# 1609: [VOLT 335079 [6GRYWOOD 230.00]]
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)

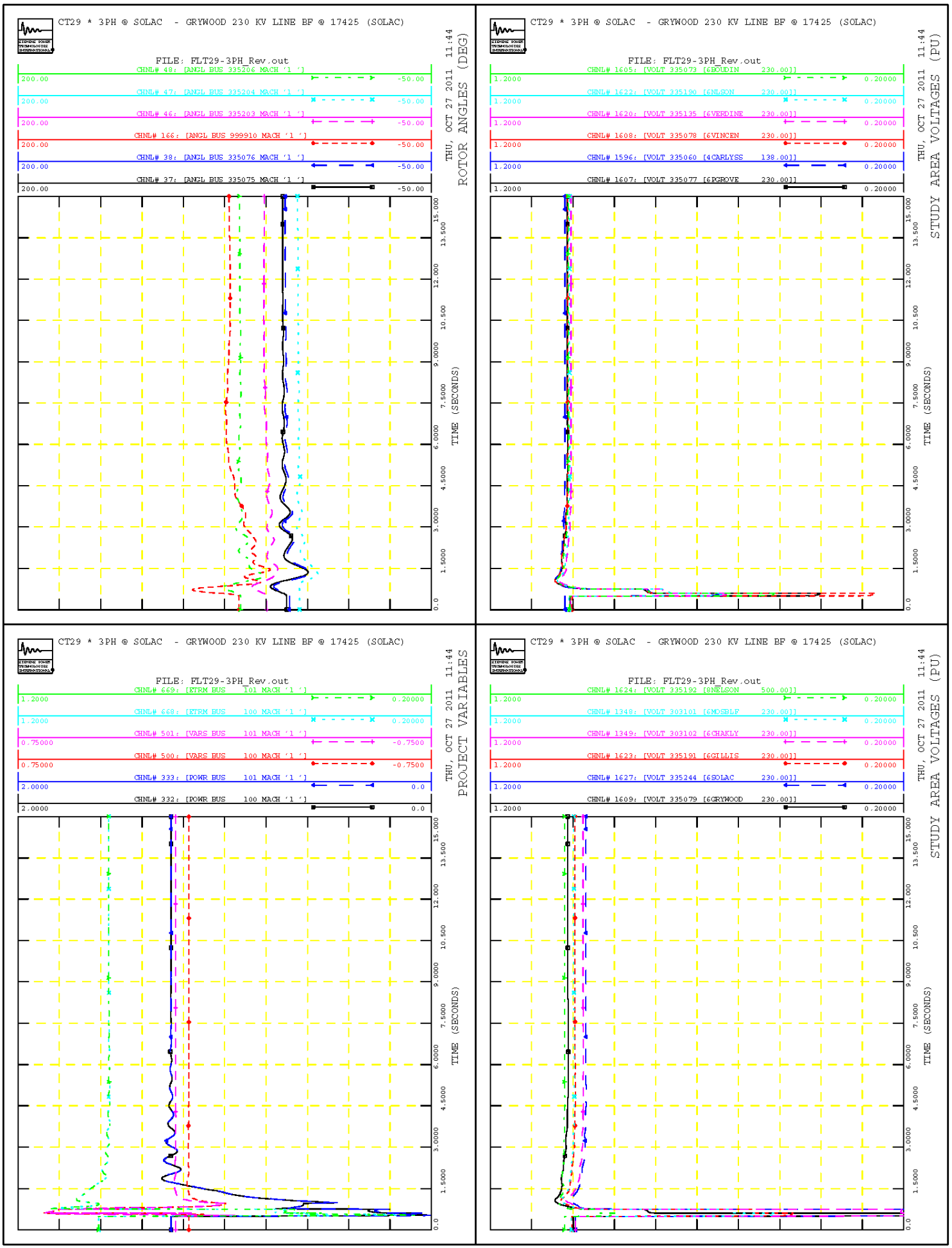

CT27 * 3PH @ NELSON - CARLYSS 230 KV LINE BF @ 13145 (CARLYS
FILE: FLT27-3PH_Rev.out
CHNL# 48: [ANGL BUS 335206 MACH '1 ']
CHNL# 47: [ANGL BUS 335204 MACH '1 ']
CHNL# 46: [ANGL BUS 335203 MACH '1 ']
CHNL# 166: [ANGL BUS 999910 MACH '1 ']
CHNL# 38: [ANGL BUS 335076 MACH '1 ']
CHNL# 37: [ANGL BUS 335075 MACH '1 ']
THU, OCT 27 2011 11:44
ROTOR ANGLES (DEG)
TIME (SECONDS)

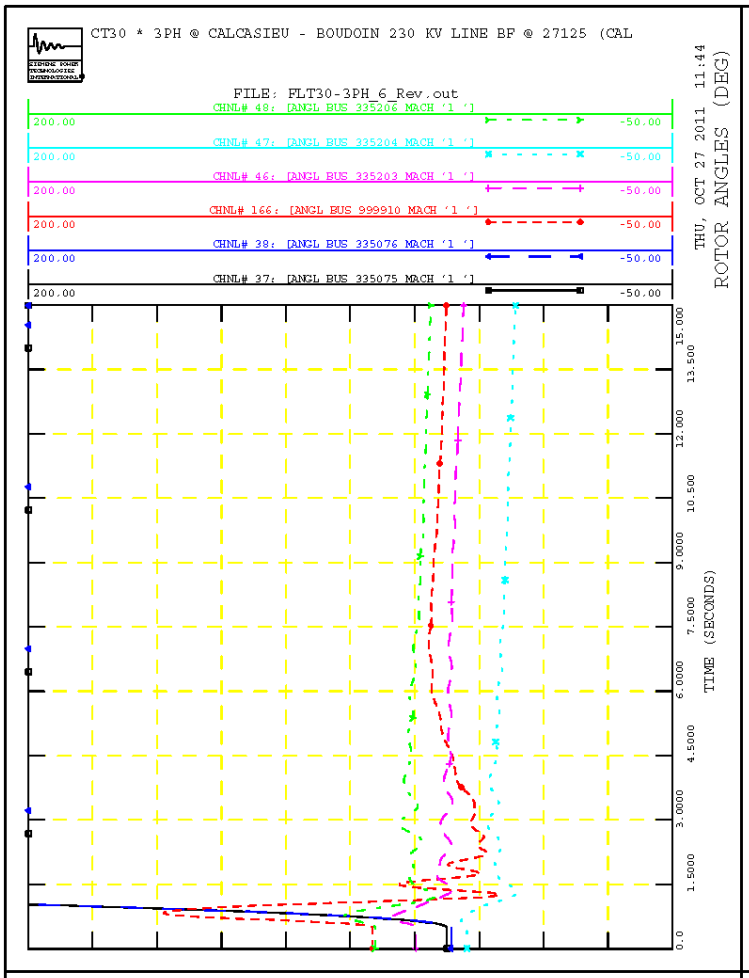

CT27 * 3PH @ NELSON - CARLYSS 230 KV LINE BF @ 13145 (CARLYS
FILE: FLT27-3PH_Rev.out
CHNL# 1605: [VOLT 335073 [6BOUDIN 230.00]]
CHNL# 1622: [VOLT 335190 [6NLSON 230.00]]
CHNL# 1620: [VOLT 335135 [6VERDINE 230.00]]
CHNL# 1608: [VOLT 335078 [6VINCEN 230.00]]
CHNL# 1596: [VOLT 335060 [4CARLYSS 138.00]]
CHNL# 1607: [VOLT 335077 [6PGROVE 230.00]]
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)

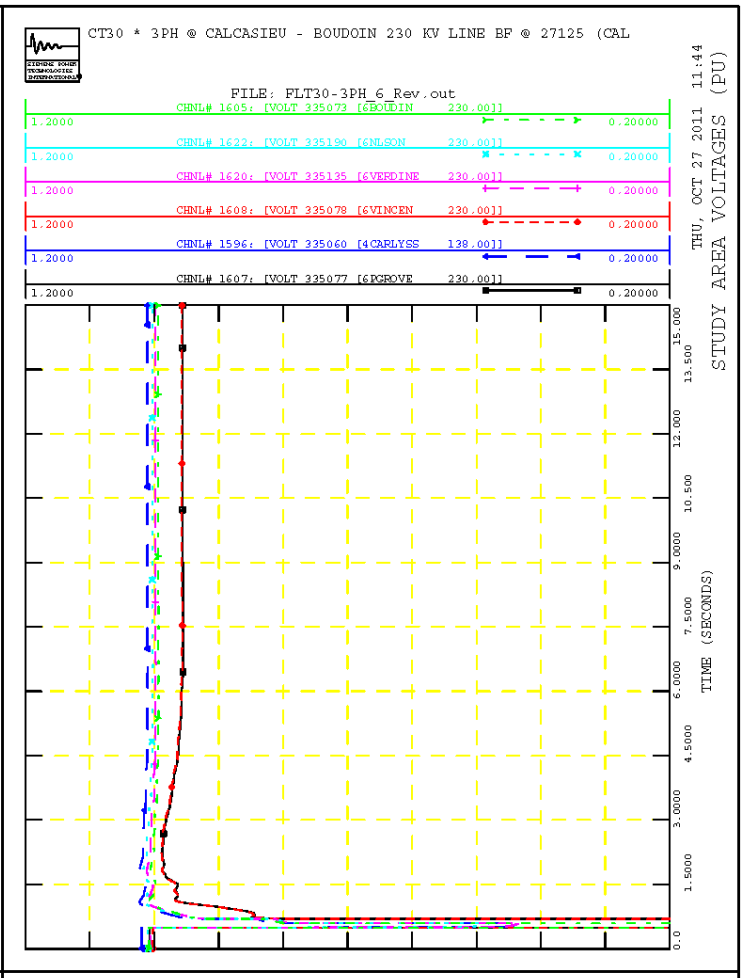

CT27 * 3PH @ NELSON - CARLYSS 230 KV LINE BF @ 13145 (CARLYS
FILE: FLT27-3PH_Rev.out
CHNL# 669: [ETRM BUS 101 MACH '1 ']
CHNL# 668: [ETRM BUS 100 MACH '1 ']
CHNL# 501: [VARS BUS 101 MACH '1 ']
CHNL# 500: [VARS BUS 100 MACH '1 ']
CHNL# 333: [POWR BUS 101 MACH '1 ']
CHNL# 332: [POWR BUS 100 MACH '1 ']
THU, OCT 27 2011 11:44
PROJECT VARIABLES
TIME (SECONDS)

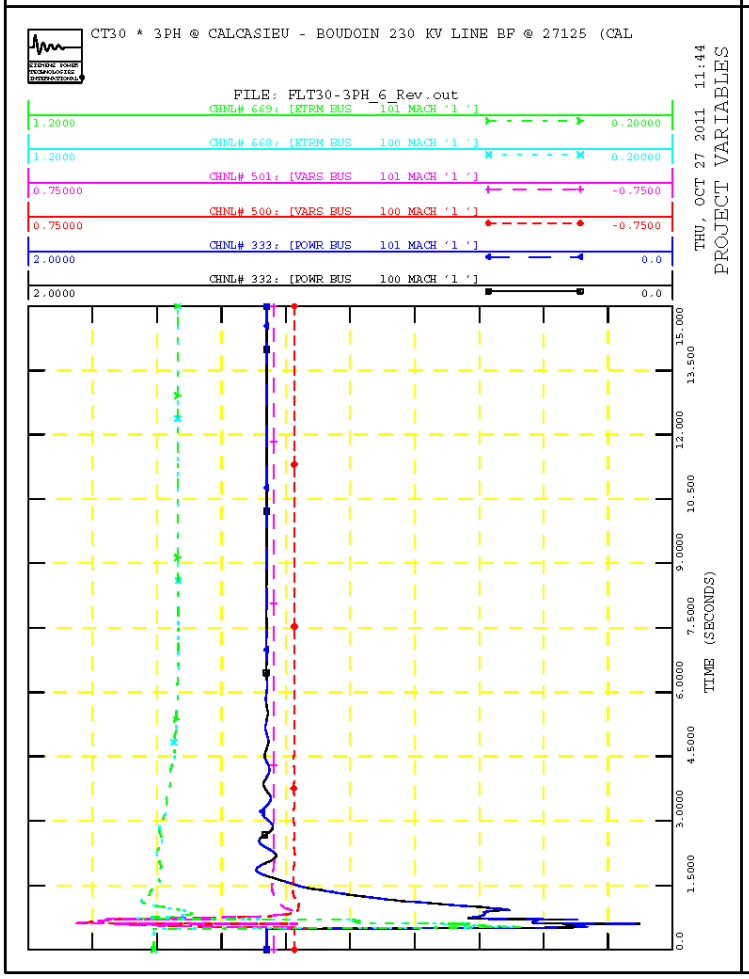

CT27 * 3PH @ NELSON - CARLYSS 230 KV LINE BF @ 13145 (CARLYS
FILE: FLT27-3PH_Rev.out
CHNL# 1624: [VOLT 335192 [8NELSON 500.00]]
CHNL# 1348: [VOLT 303101 [6MOSBLF 230.00]]
CHNL# 1349: [VOLT 303102 [6CHAKLY 230.00]]
CHNL# 1623: [VOLT 335191 [6GILLIS 230.00]]
CHNL# 1627: [VOLT 335244 [6SOLAC 230.00]]
CHNL# 1609: [VOLT 335079 [6GRYWOOD 230.00]]
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)

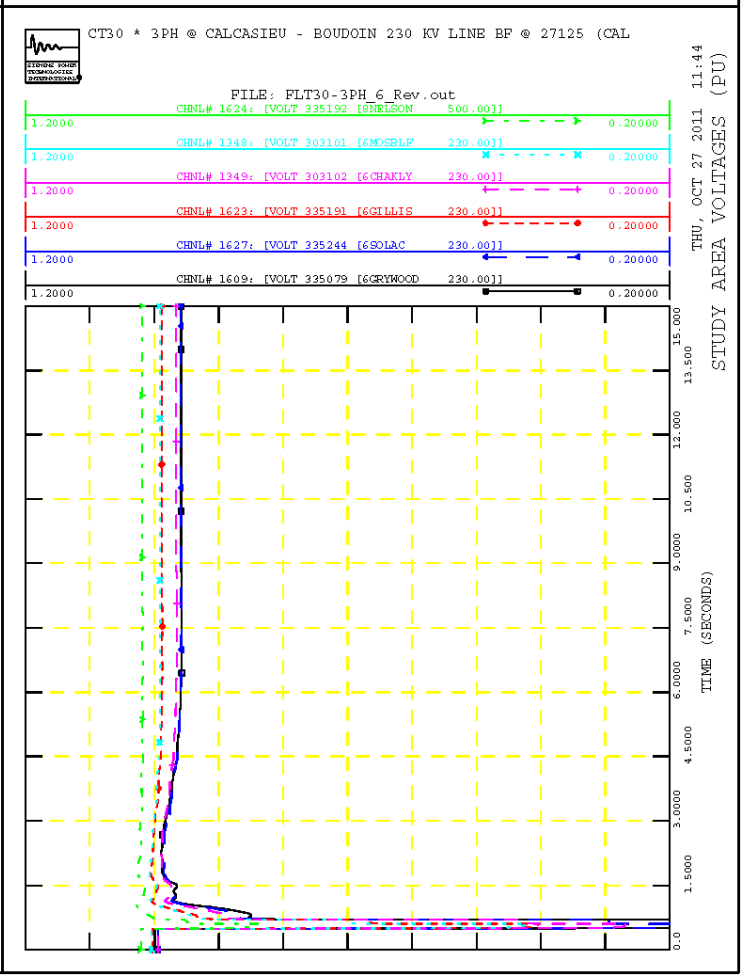

CT28 * 3PH @ NELSON - VERDINE 230 KV LINE BF @ 18205 (NELSON
FILE: FLT28-3PH_Rev.out
THU, OCT 27 2011 11:44
ROTOR ANGLES (DEG)
TIME (SECONDS)
CHNL# 48: [ANGL BUS 335206 MACH '1 ']
CHNL# 47: [ANGL BUS 335204 MACH '1 ']
CHNL# 46: [ANGL BUS 335203 MACH '1 ']
CHNL# 166: [ANGL BUS 999910 MACH '1 ']
CHNL# 38: [ANGL BUS 335076 MACH '1 ']
CHNL# 37: [ANGL BUS 335075 MACH '1 ']
CT28 * 3PH @ NELSON - VERDINE 230 KV LINE BF @ 18205 (NELSON
FILE: FLT28-3PH_Rev.out
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)
CHNL# 1605: [VOLT 335073 [6BOUDIN 230.00]]
CHNL# 1622: [VOLT 335190 [6NLSON 230.00]]
CHNL# 1620: [VOLT 335135 [6VERDINE 230.00]]
CHNL# 1608: [VOLT 335078 [6VINCEN 230.00]]
CHNL# 1596: [VOLT 335060 [4CARLYSS 138.00]]
CHNL# 1607: [VOLT 335077 [6PGROVE 230.00]]
CT28 * 3PH @ NELSON - VERDINE 230 KV LINE BF @ 18205 (NELSON
FILE: FLT28-3PH_Rev.out
THU, OCT 27 2011 11:44
PROJECT VARIABLES
TIME (SECONDS)
CHNL# 669: [ETRM BUS 101 MACH '1 ']
CHNL# 668: [ETRM BUS 100 MACH '1 ']
CHNL# 501: [VARS BUS 101 MACH '1 ']
CHNL# 500: [VARS BUS 100 MACH '1 ']
CHNL# 333: [POWR BUS 101 MACH '1 ']
CHNL# 332: [POWR BUS 100 MACH '1 ']
CT28 * 3PH @ NELSON - VERDINE 230 KV LINE BF @ 18205 (NELSON
FILE: FLT28-3PH_Rev.out
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)
CHNL# 1624: [VOLT 335192 [8NELSON 500.00]]
CHNL# 1348: [VOLT 303101 [6MOSBLF 230.00]]
CHNL# 1349: [VOLT 303102 [6CHARLY 230.00]]
CHNL# 1623: [VOLT 335191 [6GILLIS 230.00]]
CHNL# 1627: [VOLT 335244 [6SOLAC 230.00]]
CHNL# 1609: [VOLT 335079 [6GRYWOOD 230.00]]

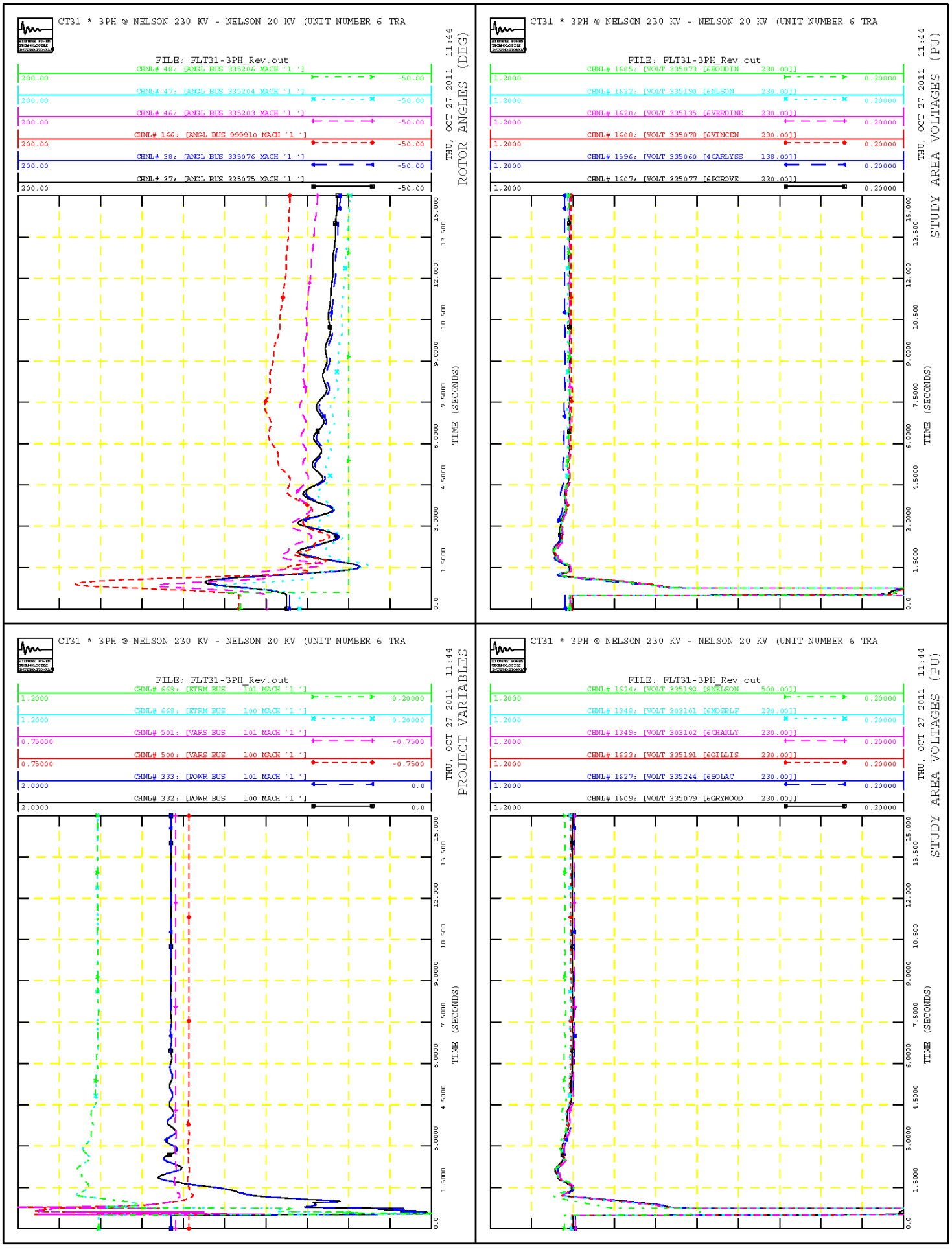

CT29 * 3PH @ SOLAC - GRYWOOD 230 KV LINE BF @ 17425 (SOLAC)
FILE: FLT29-3PH_Rev.out
CHNL# 48: [ANGL BUS 335206 MACH '1 ']
CHNL# 47: [ANGL BUS 335204 MACH '1 ']
CHNL# 46: [ANGL BUS 335203 MACH '1 ']
CHNL# 166: [ANGL BUS 999910 MACH '1 ']
CHNL# 38: [ANGL BUS 335076 MACH '1 ']
CHNL# 37: [ANGL BUS 335075 MACH '1 ']
200.00
-50.00
THU, OCT 27 2011 11:44
ROTOR ANGLES (DEG)
TIME (SECONDS)
CT29 * 3PH @ SOLAC - GRYWOOD 230 KV LINE BF @ 17425 (SOLAC)
FILE: FLT29-3PH_Rev.out
CHNL# 1605: [VOLT 335073 [6BOUDIN 230.00]]
CHNL# 1622: [VOLT 335190 [6NLSON 230.00]]
CHNL# 1620: [VOLT 335135 [6VERDINE 230.00]]
CHNL# 1608: [VOLT 335078 [6VINCEN 230.00]]
CHNL# 1596: [VOLT 335060 [4CARLYSS 138.00]]
CHNL# 1607: [VOLT 335077 [6PGROVE 230.00]]
1.2000
0.20000
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)
CT29 * 3PH @ SOLAC - GRYWOOD 230 KV LINE BF @ 17425 (SOLAC)
FILE: FLT29-3PH_Rev.out
CHNL# 669: [ETRM BUS 101 MACH '1 ']
CHNL# 668: [ETRM BUS 100 MACH '1 ']
CHNL# 501: [VARS BUS 101 MACH '1 ']
CHNL# 500: [VARS BUS 100 MACH '1 ']
CHNL# 333: [POWR BUS 101 MACH '1 ']
CHNL# 332: [POWR BUS 100 MACH '1 ']
0.75000
-0.7500
2.0000
0.0
THU, OCT 27 2011 11:44
PROJECT VARIABLES
TIME (SECONDS)
CT29 * 3PH @ SOLAC - GRYWOOD 230 KV LINE BF @ 17425 (SOLAC)
FILE: FLT29-3PH_Rev.out
CHNL# 1624: [VOLT 335192 [8NELSON 500.00]]
CHNL# 1348: [VOLT 303101 [6MOSBLF 230.00]]
CHNL# 1349: [VOLT 303102 [6CHAKLY 230.00]]
CHNL# 1623: [VOLT 335191 [6GILLIS 230.00]]
CHNL# 1627: [VOLT 335244 [6SOLAC 230.00]]
CHNL# 1609: [VOLT 335079 [6GRYWOOD 230.00]]
1.2000
0.20000
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)

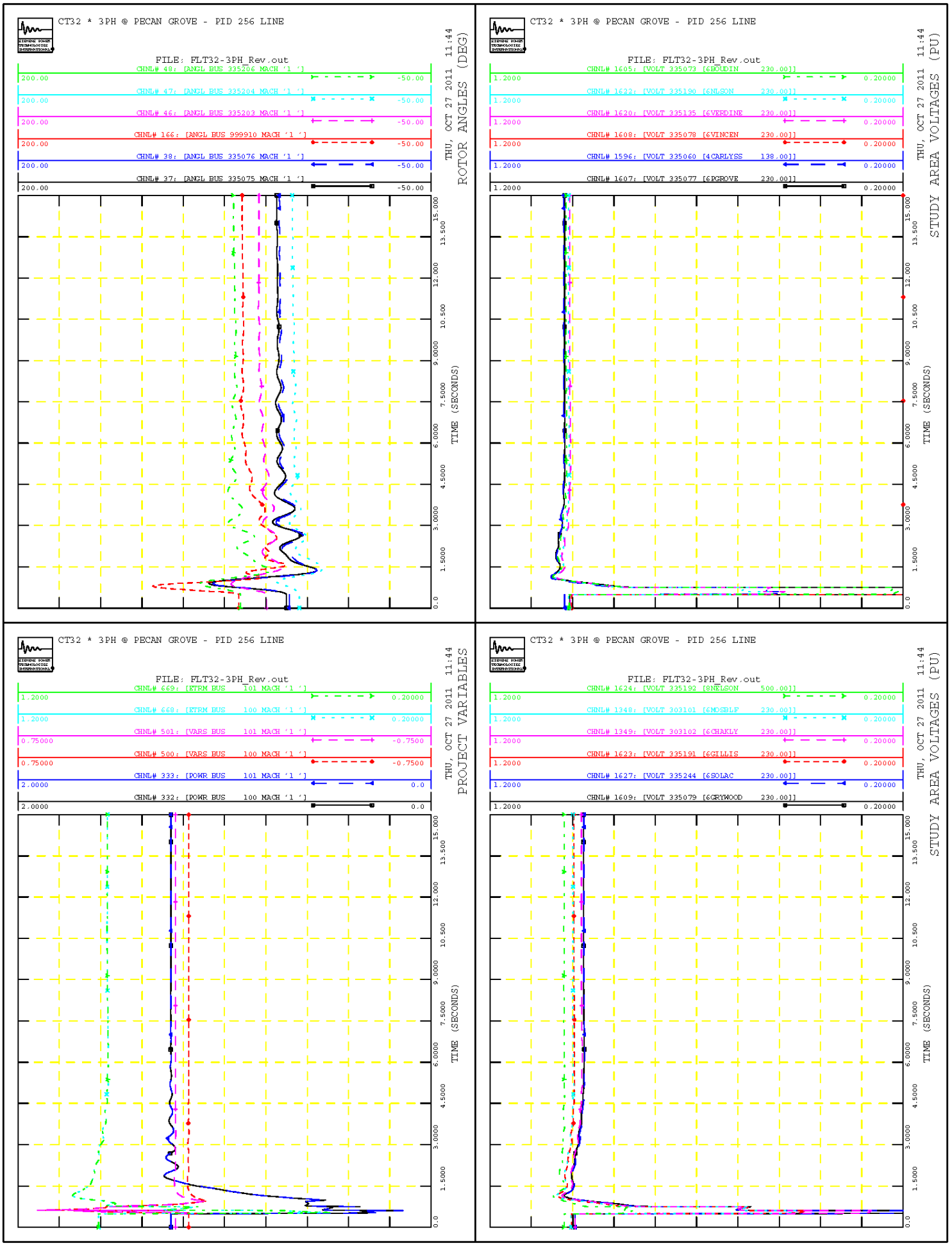

CT30 * 3PH @ CALCASIEU - BOUDOIN 230 KV LINE BF @ 27125 (CAL
FILE: FLT30-3PH_6_Rev.out
CHNL# 48: [ANGL BUS 335206 MACH '1 ']
CHNL# 47: [ANGL BUS 335204 MACH '1 ']
CHNL# 46: [ANGL BUS 335203 MACH '1 ']
CHNL# 166: [ANGL BUS 999910 MACH '1 ']
CHNL# 38: [ANGL BUS 335076 MACH '1 ']
CHNL# 37: [ANGL BUS 335075 MACH '1 ']
200.00
-50.00
ROTOR ANGLES (DEG)
TIME (SECONDS)
THU, OCT 27 2011 11:44

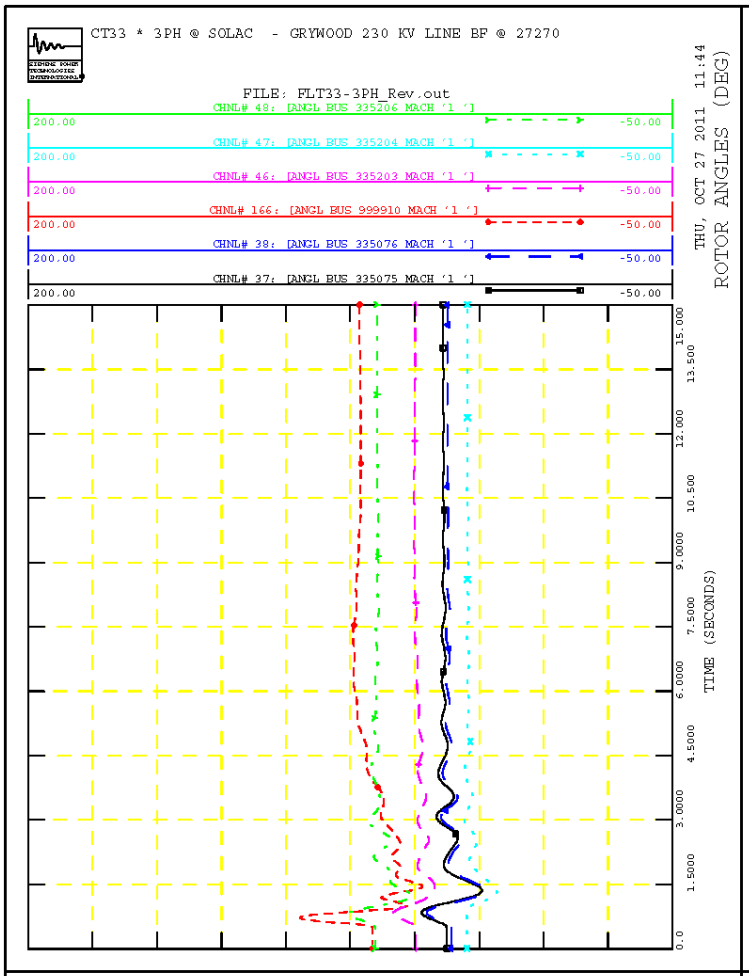

CT30 * 3PH @ CALCASIEU - BOUDOIN 230 KV LINE BF @ 27125 (CAL
FILE: FLT30-3PH_6_Rev.out
CHNL# 1605: [VOLT 335073 [6BOUDIN 230.00]]
CHNL# 1622: [VOLT 335190 [6NLSON 230.00]]
CHNL# 1620: [VOLT 335135 [6VERDINE 230.00]]
CHNL# 1608: [VOLT 335078 [6VINCEN 230.00]]
CHNL# 1596: [VOLT 335060 [4CARLYSS 138.00]]
CHNL# 1607: [VOLT 335077 [6PGROVE 230.00]]
1.2000
0.20000
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)
THU, OCT 27 2011 11:44

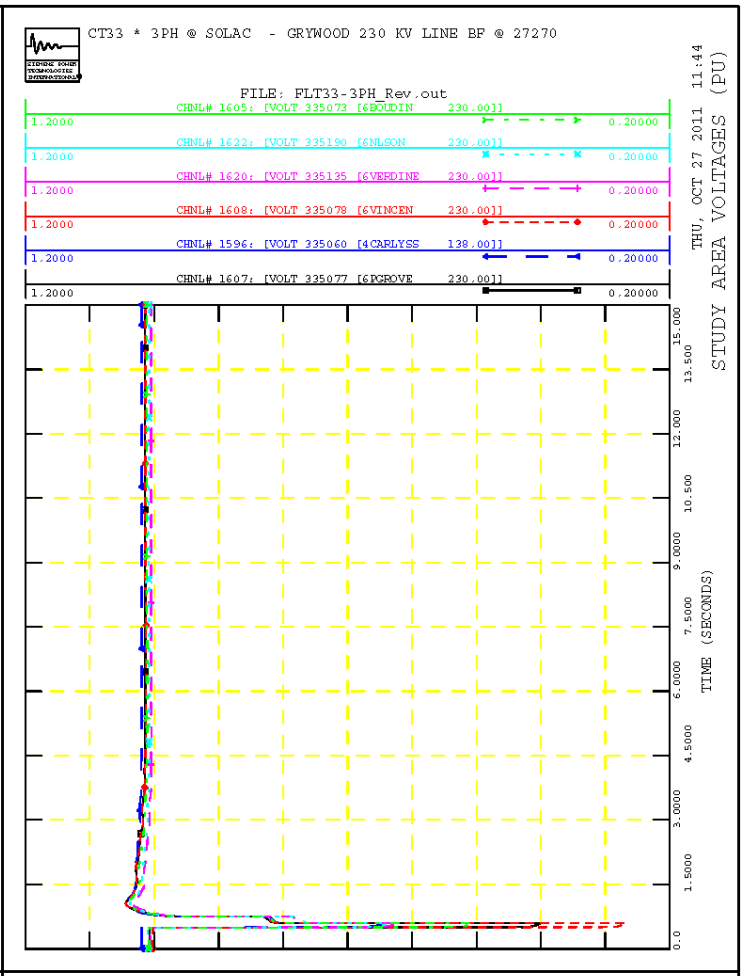

CT30 * 3PH @ CALCASIEU - BOUDOIN 230 KV LINE BF @ 27125 (CAL
FILE: FLT30-3PH_6_Rev.out
CHNL# 669: [ETRM BUS 101 MACH '1 ']
CHNL# 668: [ETRM BUS 100 MACH '1 ']
CHNL# 501: [VARS BUS 101 MACH '1 ']
CHNL# 500: [VARS BUS 100 MACH '1 ']
CHNL# 333: [POWR BUS 101 MACH '1 ']
CHNL# 332: [POWR BUS 100 MACH '1 ']
0.75000
-0.7500
2.0000
0.0
PROJECT VARIABLES
TIME (SECONDS)
THU, OCT 27 2011 11:44

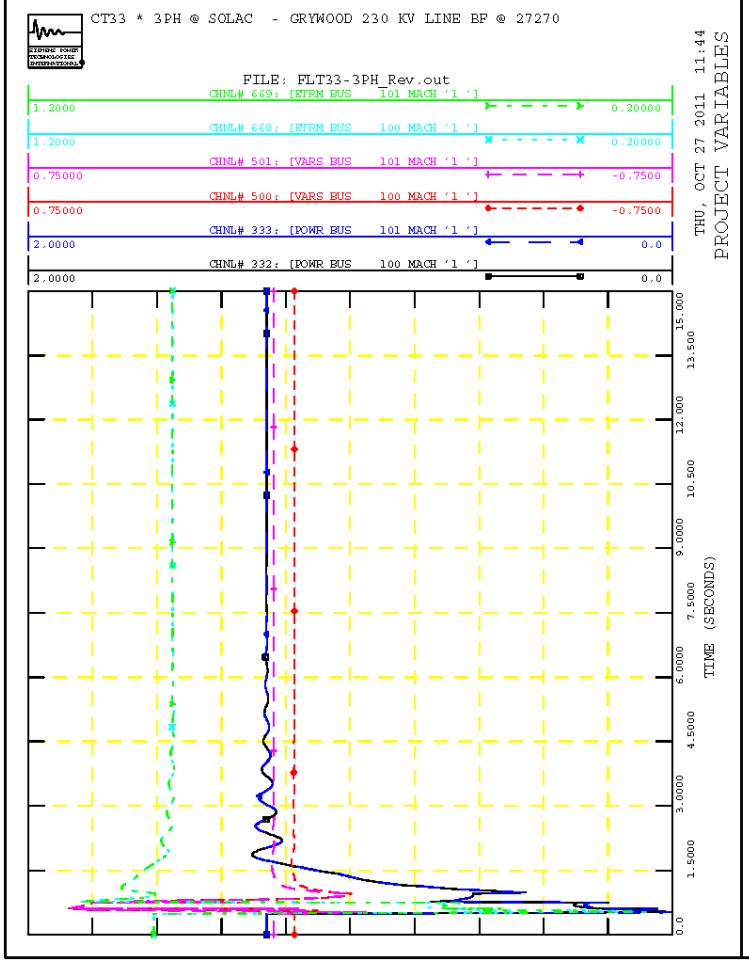

CT30 * 3PH @ CALCASIEU - BOUDOIN 230 KV LINE BF @ 27125 (CAL
FILE: FLT30-3PH_6_Rev.out
CHNL# 1624: [VOLT 335192 [8NELSON 500.00]]
CHNL# 1348: [VOLT 303101 [6MOSBLF 230.00]]
CHNL# 1349: [VOLT 303102 [6CHAKLY 230.00]]
CHNL# 1623: [VOLT 335191 [6GILLIS 230.00]]
CHNL# 1627: [VOLT 335244 [6SOLAC 230.00]]
CHNL# 1609: [VOLT 335079 [6GRYWOOD 230.00]]
1.2000
0.20000
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)
THU, OCT 27 2011 11:44

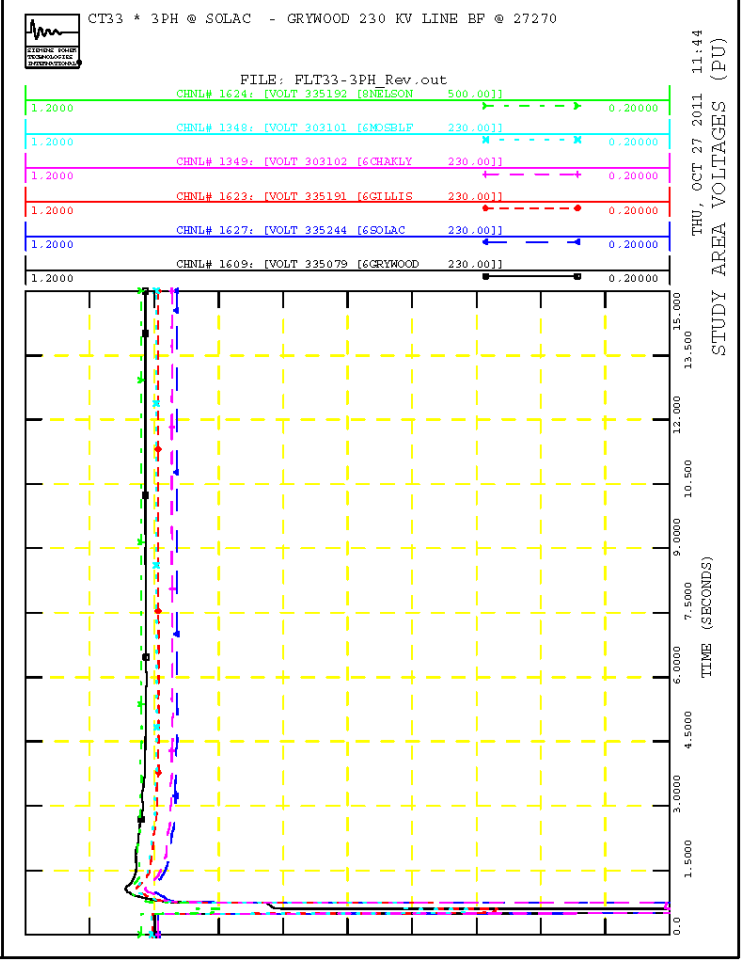

CT31 * 3PH @ NELSON 230 KV - NELSON 20 KV (UNIT NUMBER 6 TRA
FILE: FLT31-3PH_Rev.out
CHNL# 48: [ANGL BUS 335206 MACH '1 ']
CHNL# 47: [ANGL BUS 335204 MACH '1 ']
CHNL# 46: [ANGL BUS 335203 MACH '1 ']
CHNL# 166: [ANGL BUS 999910 MACH '1 ']
CHNL# 38: [ANGL BUS 335076 MACH '1 ']
CHNL# 37: [ANGL BUS 335075 MACH '1 ']
THU, OCT 27 2011 11:44
ROTOR ANGLES (DEG)
TIME (SECONDS)
CHNL# 1605: [VOLT 335073 [6BOUDIN 230.00]]
CHNL# 1622: [VOLT 335190 [6NLSON 230.00]]
CHNL# 1620: [VOLT 335135 [6VERDINE 230.00]]
CHNL# 1608: [VOLT 335078 [6VINCEN 230.00]]
CHNL# 1596: [VOLT 335060 [4CARLYSS 138.00]]
CHNL# 1607: [VOLT 335077 [6PGROVE 230.00]]
STUDY AREA VOLTAGES (PU)
CHNL# 669: [ETRM BUS 101 MACH '1 ']
CHNL# 668: [ETRM BUS 100 MACH '1 ']
CHNL# 501: [VARS BUS 101 MACH '1 ']
CHNL# 500: [VARS BUS 100 MACH '1 ']
CHNL# 333: [POWR BUS 101 MACH '1 ']
CHNL# 332: [POWR BUS 100 MACH '1 ']
PROJECT VARIABLES
CHNL# 1624: [VOLT 335192 [8NELSON 500.00]]
CHNL# 1340: [VOLT 303101 [6MOSBLF 230.00]]
CHNL# 1349: [VOLT 303102 [6CHAKLY 230.00]]
CHNL# 1623: [VOLT 335191 [6GILLIS 230.00]]
CHNL# 1627: [VOLT 335244 [6SOLAC 230.00]]
CHNL# 1609: [VOLT 335079 [6GRYWOOD 230.00]]

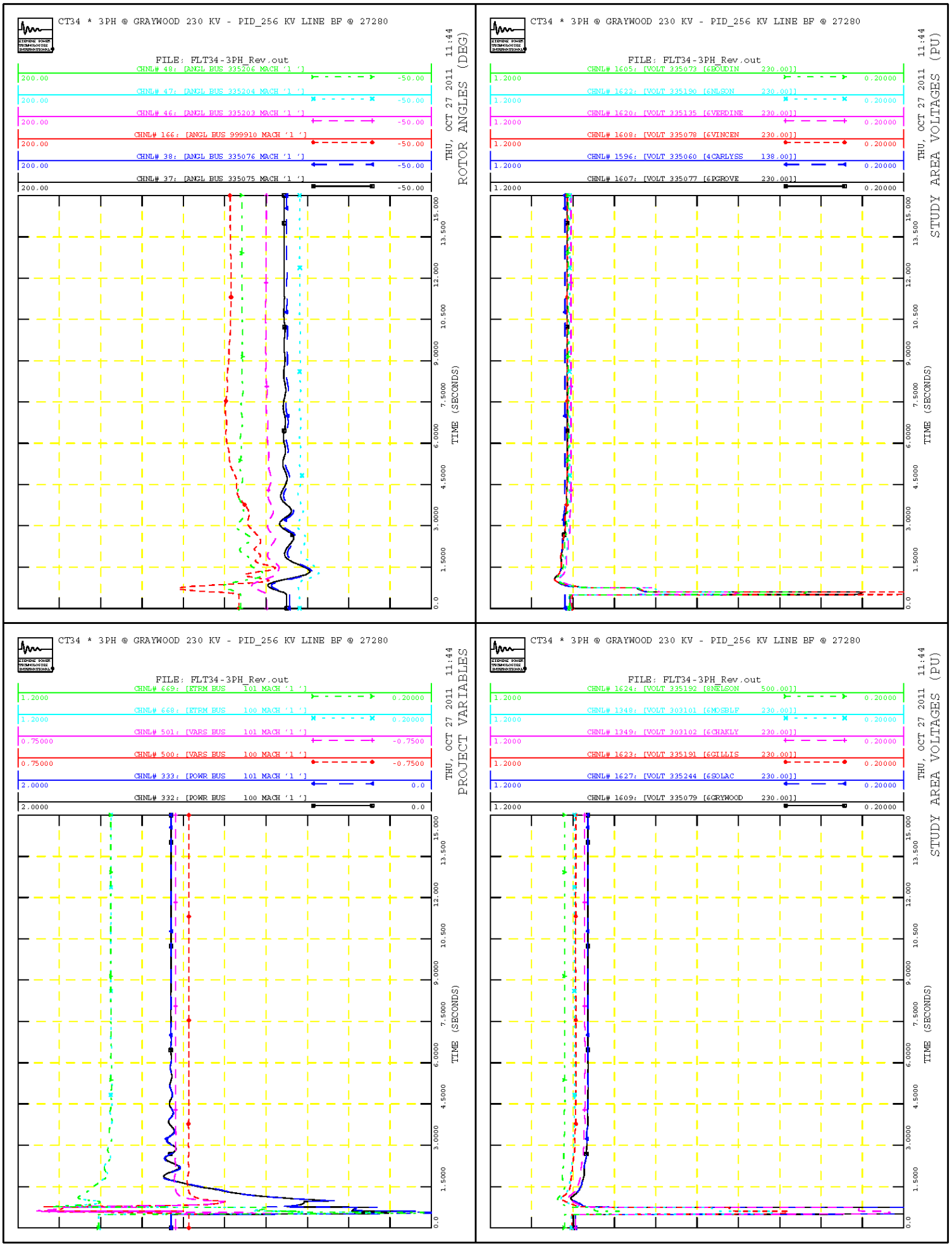

CT32 * 3PH @ PECAN GROVE - PID 256 LINE
FILE: FLT32-3PH_Rev.out
CHNL# 48: [ANGL BUS 335206 MACH '1 ']
CHNL# 47: [ANGL BUS 335204 MACH '1 ']
CHNL# 46: [ANGL BUS 335203 MACH '1 ']
CHNL# 166: [ANGL BUS 999910 MACH '1 ']
CHNL# 38: [ANGL BUS 335076 MACH '1 ']
CHNL# 37: [ANGL BUS 335075 MACH '1 ']
THU, OCT 27 2011 11:44
ROTOR ANGLES (DEG)
TIME (SECONDS)
CT32 * 3PH @ PECAN GROVE - PID 256 LINE
FILE: FLT32-3PH_Rev.out
CHNL# 1605: [VOLT 335073 [6BOUDIN 230.00]]
CHNL# 1622: [VOLT 335190 [6NLSON 230.00]]
CHNL# 1620: [VOLT 335135 [6VERDINE 230.00]]
CHNL# 1608: [VOLT 335078 [6VINCEN 230.00]]
CHNL# 1596: [VOLT 335060 [4CARLYSS 138.00]]
CHNL# 1607: [VOLT 335077 [6PGROVE 230.00]]
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)
CT32 * 3PH @ PECAN GROVE - PID 256 LINE
FILE: FLT32-3PH_Rev.out
CHNL# 669: [ETRM BUS 101 MACH '1 ']
CHNL# 668: [ETRM BUS 100 MACH '1 ']
CHNL# 501: [VARS BUS 101 MACH '1 ']
CHNL# 500: [VARS BUS 100 MACH '1 ']
CHNL# 333: [POWR BUS 101 MACH '1 ']
CHNL# 332: [POWR BUS 100 MACH '1 ']
THU, OCT 27 2011 11:44
PROJECT VARIABLES
TIME (SECONDS)
CT32 * 3PH @ PECAN GROVE - PID 256 LINE
FILE: FLT32-3PH_Rev.out
CHNL# 1624: [VOLT 335192 [8NELSON 500.00]]
CHNL# 1348: [VOLT 303101 [6MOSBLF 230.00]]
CHNL# 1349: [VOLT 303102 [6CHAKLY 230.00]]
CHNL# 1623: [VOLT 335191 [6GILLIS 230.00]]
CHNL# 1627: [VOLT 335244 [6SOLAC 230.00]]
CHNL# 1609: [VOLT 335079 [6GRYWOOD 230.00]]
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)


CT33 * 3PH @ SOLAC - GRYWOOD 230 KV LINE BF @ 27270
FILE: FLT33-3PH_Rev.out
CHNL# 48: [ANGL BUS 335206 MACH '1 ']
CHNL# 47: [ANGL BUS 335204 MACH '1 ']
CHNL# 46: [ANGL BUS 335203 MACH '1 ']
CHNL# 166: [ANGL BUS 999910 MACH '1 ']
CHNL# 38: [ANGL BUS 335076 MACH '1 ']
CHNL# 37: [ANGL BUS 335075 MACH '1 ']
THU, OCT 27 2011 11:44
ROTOR ANGLES (DEG)
TIME (SECONDS)

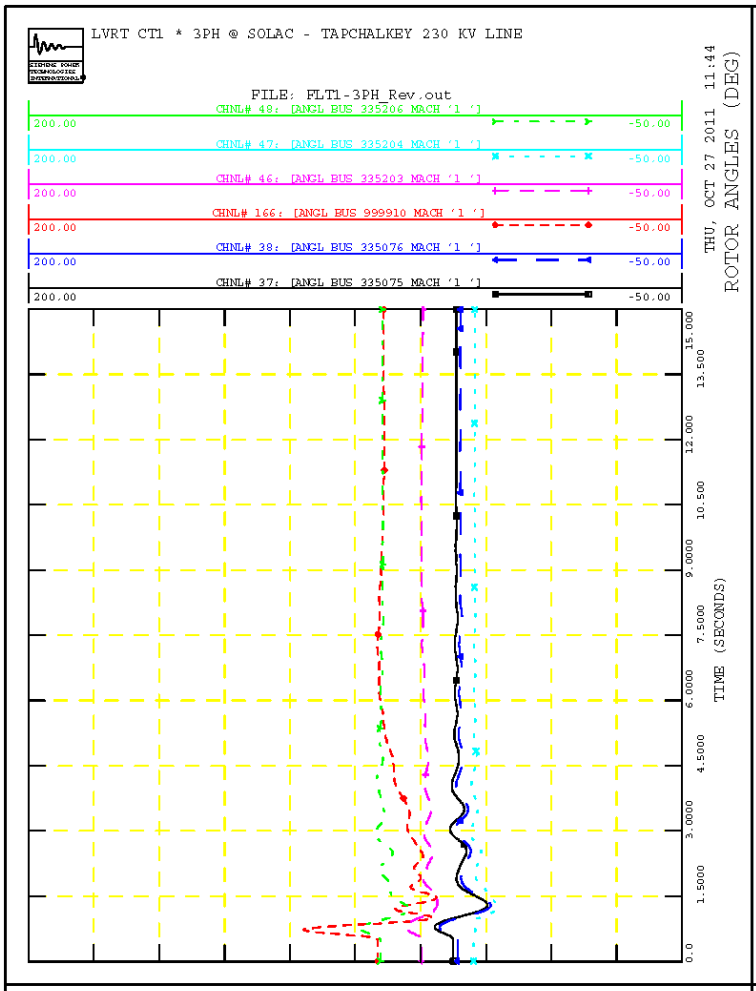

CT33 * 3PH @ SOLAC - GRYWOOD 230 KV LINE BF @ 27270
FILE: FLT33-3PH_Rev.out
CHNL# 1605: [VOLT 335073 [6BOUDIN 230.00]]
CHNL# 1622: [VOLT 335190 [6NLSON 230.00]]
CHNL# 1620: [VOLT 335135 [6VERDINE 230.00]]
CHNL# 1608: [VOLT 335078 [6VINCEN 230.00]]
CHNL# 1596: [VOLT 335060 [4CARLYSS 138.00]]
CHNL# 1607: [VOLT 335077 [6PGROVE 230.00]]
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)

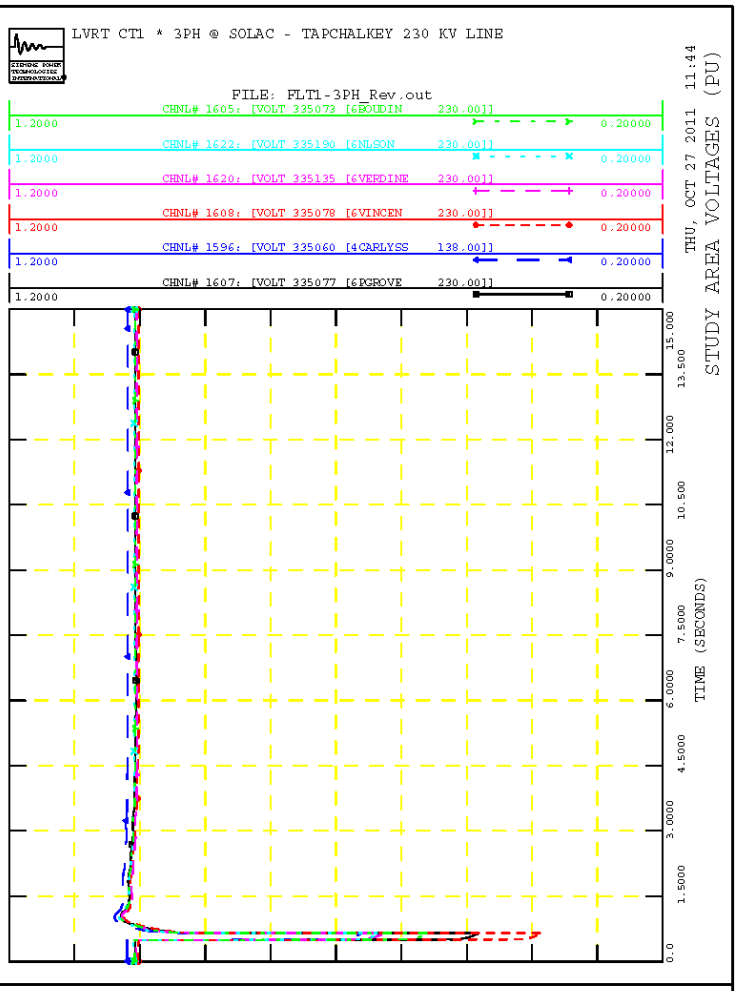

CT33 * 3PH @ SOLAC - GRYWOOD 230 KV LINE BF @ 27270
FILE: FLT33-3PH_Rev.out
CHNL# 669: [ETRM BUS 101 MACH '1 ']
CHNL# 668: [ETRM BUS 100 MACH '1 ']
CHNL# 501: [VARS BUS 101 MACH '1 ']
CHNL# 500: [VARS BUS 100 MACH '1 ']
CHNL# 333: [POWR BUS 101 MACH '1 ']
CHNL# 332: [POWR BUS 100 MACH '1 ']
THU, OCT 27 2011 11:44
PROJECT VARIABLES
TIME (SECONDS)

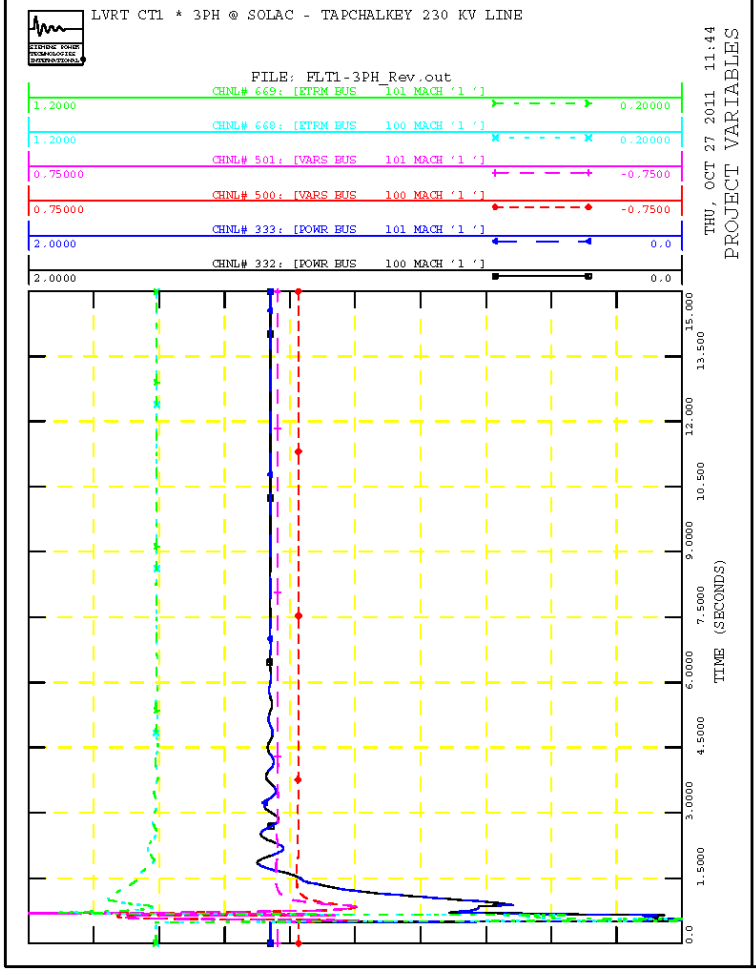

CT33 * 3PH @ SOLAC - GRYWOOD 230 KV LINE BF @ 27270
FILE: FLT33-3PH_Rev.out
CHNL# 1624: [VOLT 335192 [8NELSON 500.00]]
CHNL# 1348: [VOLT 303101 [6MOSBLF 230.00]]
CHNL# 1349: [VOLT 303102 [6CHAKLY 230.00]]
CHNL# 1623: [VOLT 335191 [6GILLIS 230.00]]
CHNL# 1627: [VOLT 335244 [6SOLAC 230.00]]
CHNL# 1609: [VOLT 335079 [6GRYWOOD 230.00]]
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)

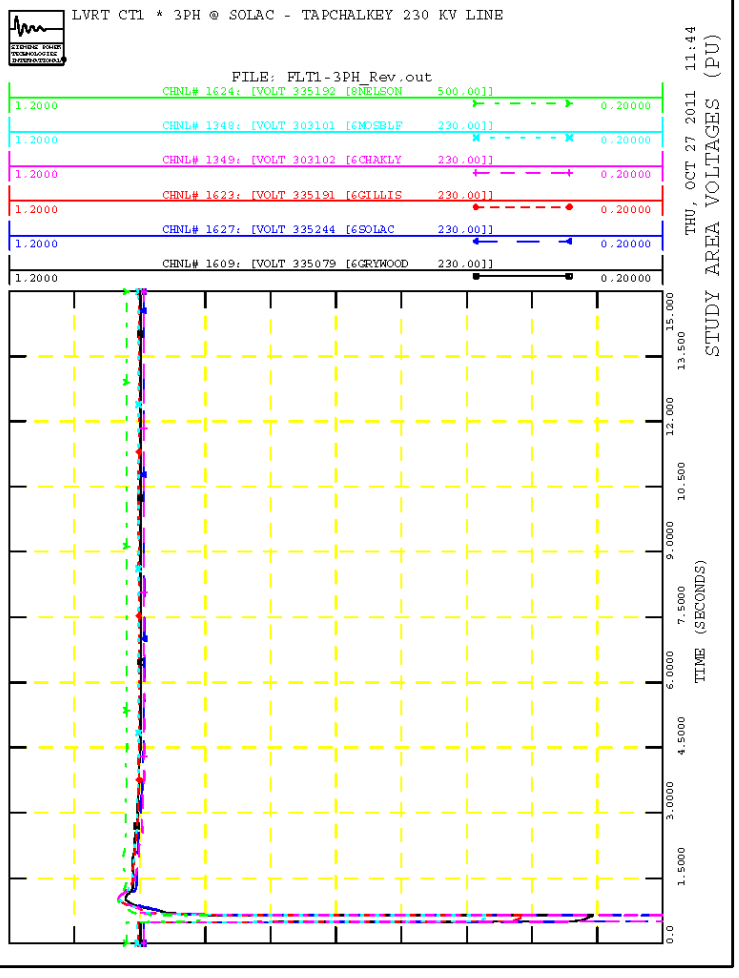

CT34 * 3PH @ GRAYWOOD 230 KV - PID_256 KV LINE BF @ 27280
FILE: FLT34-3PH_Rev.out
CHNL# 48: [ANGL BUS 335206 MACH '1 ']
CHNL# 47: [ANGL BUS 335204 MACH '1 ']
CHNL# 46: [ANGL BUS 335203 MACH '1 ']
CHNL# 166: [ANGL BUS 999910 MACH '1 ']
CHNL# 38: [ANGL BUS 335076 MACH '1 ']
CHNL# 37: [ANGL BUS 335075 MACH '1 ']
THU, OCT 27 2011 11:44
ROTOR ANGLES (DEG)
TIME (SECONDS)
CT34 * 3PH @ GRAYWOOD 230 KV - PID_256 KV LINE BF @ 27280
FILE: FLT34-3PH_Rev.out
CHNL# 1605: [VOLT 335073 [6BOUDIN 230.00]]
CHNL# 1622: [VOLT 335190 [6NELSON 230.00]]
CHNL# 1620: [VOLT 335135 [6VERDINE 230.00]]
CHNL# 1608: [VOLT 335078 [6VINCEN 230.00]]
CHNL# 1596: [VOLT 335060 [4CARLYSS 138.00]]
CHNL# 1607: [VOLT 335077 [6PGROVE 230.00]]
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)
CT34 * 3PH @ GRAYWOOD 230 KV - PID_256 KV LINE BF @ 27280
FILE: FLT34-3PH_Rev.out
CHNL# 669: [ETRM BUS 101 MACH '1 ']
CHNL# 668: [ETRM BUS 100 MACH '1 ']
CHNL# 501: [VARS BUS 101 MACH '1 ']
CHNL# 500: [VARS BUS 100 MACH '1 ']
CHNL# 333: [POWR BUS 101 MACH '1 ']
CHNL# 332: [POWR BUS 100 MACH '1 ']
THU, OCT 27 2011 11:44
PROJECT VARIABLES
TIME (SECONDS)
CT34 * 3PH @ GRAYWOOD 230 KV - PID_256 KV LINE BF @ 27280
FILE: FLT34-3PH_Rev.out
CHNL# 1624: [VOLT 335192 [8NELSON 500.00]]
CHNL# 1348: [VOLT 303101 [6MOSBLF 230.00]]
CHNL# 1349: [VOLT 303102 [6CHAKLY 230.00]]
CHNL# 1623: [VOLT 335191 [6GILLIS 230.00]]
CHNL# 1627: [VOLT 335244 [6SOLAC 230.00]]
CHNL# 1609: [VOLT 335079 [6GRYWOOD 230.00]]
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)

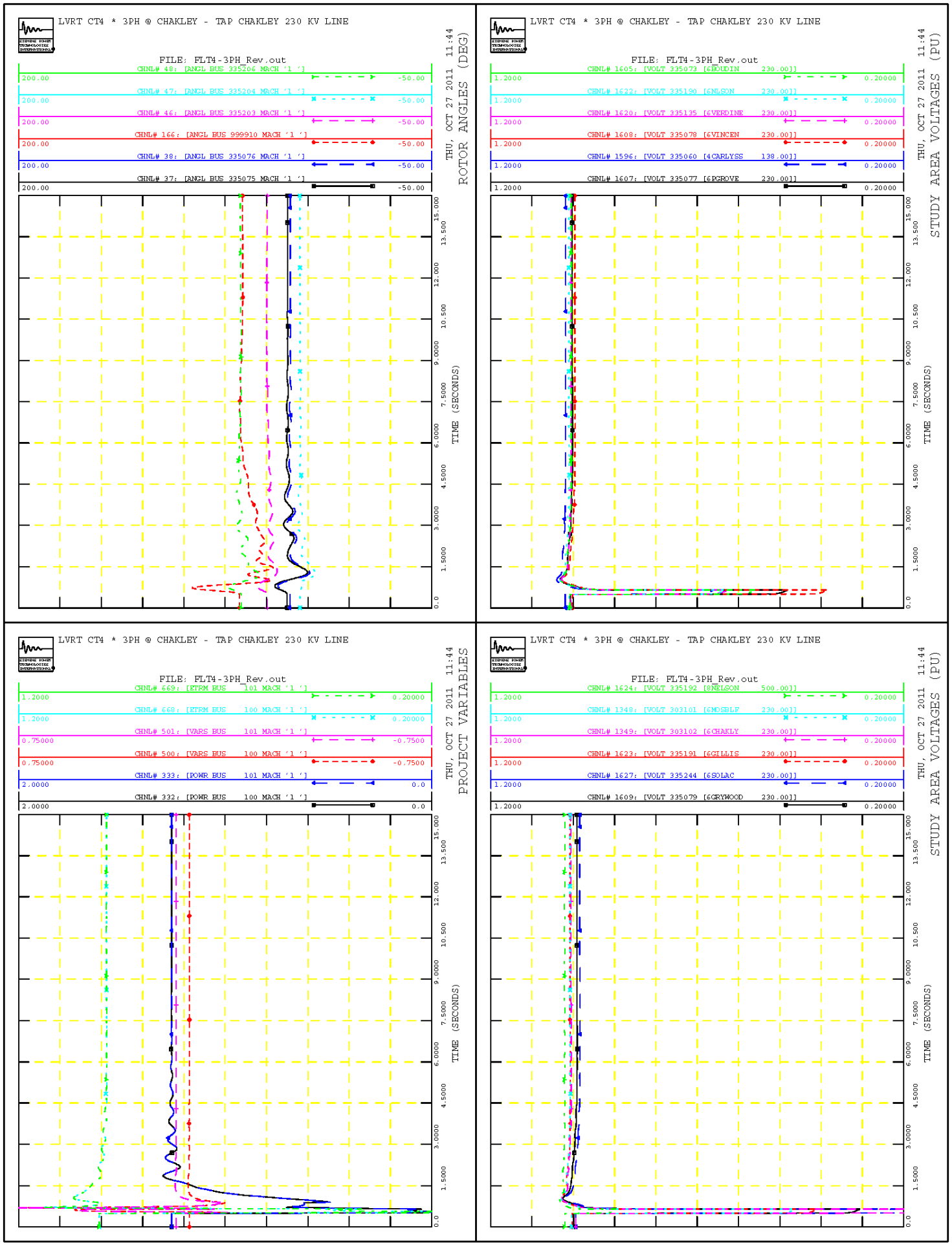
LVRT Tests


LVRT CT1 * 3PH @ SOLAC - TAPCHALKEY 230 KV LINE
FILE: FLT1-3PH_Rev.out
CHNL# 48: [ANGL BUS 335206 MACH '1 ']
CHNL# 47: [ANGL BUS 335204 MACH '1 ']
CHNL# 46: [ANGL BUS 335203 MACH '1 ']
CHNL# 166: [ANGL BUS 999910 MACH '1 ']
CHNL# 38: [ANGL BUS 335076 MACH '1 ']
CHNL# 37: [ANGL BUS 335075 MACH '1 ']
THU, OCT 27 2011 11:44
ROTOR ANGLES (DEG)
TIME (SECONDS)


LVRT CT1 * 3PH @ SOLAC - TAPCHALKEY 230 KV LINE
FILE: FLT1-3PH_Rev.out
CHNL# 1605: [VOLT 335073 [6BOUDIN 230.00]]
CHNL# 1622: [VOLT 335190 [6NLSON 230.00]]
CHNL# 1620: [VOLT 335135 [6VERDINE 230.00]]
CHNL# 1608: [VOLT 335078 [6VINCEN 230.00]]
CHNL# 1596: [VOLT 335060 [4CARLYSS 138.00]]
CHNL# 1607: [VOLT 335077 [6PGROVE 230.00]]
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)


LVRT CT1 * 3PH @ SOLAC - TAPCHALKEY 230 KV LINE
FILE: FLT1-3PH_Rev.out
CHNL# 669: [ETRM BUS 101 MACH '1 ']
CHNL# 668: [ETRM BUS 100 MACH '1 ']
CHNL# 501: [VARS BUS 101 MACH '1 ']
CHNL# 500: [VARS BUS 100 MACH '1 ']
CHNL# 333: [POWR BUS 101 MACH '1 ']
CHNL# 332: [POWR BUS 100 MACH '1 ']
THU, OCT 27 2011 11:44
PROJECT VARIABLES
TIME (SECONDS)


LVRT CT1 * 3PH @ SOLAC - TAPCHALKEY 230 KV LINE
FILE: FLT1-3PH_Rev.out
CHNL# 1624: [VOLT 335192 [8NELSON 500.00]]
CHNL# 1348: [VOLT 303101 [6MOSBLF 230.00]]
CHNL# 1349: [VOLT 303102 [6CHAKLY 230.00]]
CHNL# 1623: [VOLT 335191 [6GILLIS 230.00]]
CHNL# 1627: [VOLT 335244 [6SOLAC 230.00]]
CHNL# 1609: [VOLT 335079 [6GRYWOOD 230.00]]
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)


LVRT CT4 * 3PH @ CHAKLEY - TAP CHAKLEY 230 KV LINE
FILE: FLT4-3PH_Rev.out
CHNL# 48: [ANGL BUS 335206 MACH '1 ']
CHNL# 47: [ANGL BUS 335204 MACH '1 ']
CHNL# 46: [ANGL BUS 335203 MACH '1 ']
CHNL# 166: [ANGL BUS 999910 MACH '1 ']
CHNL# 38: [ANGL BUS 335076 MACH '1 ']
CHNL# 37: [ANGL BUS 335075 MACH '1 ']
THU, OCT 27 2011 11:44
ROTOR ANGLES (DEG)
TIME (SECONDS)
LVRT CT4 * 3PH @ CHAKLEY - TAP CHAKLEY 230 KV LINE
FILE: FLT4-3PH_Rev.out
CHNL# 1605: [VOLT 335073 [6BOUDIN 230.00]]
CHNL# 1622: [VOLT 335190 [6NLSON 230.00]]
CHNL# 1620: [VOLT 335135 [6VERDINE 230.00]]
CHNL# 1608: [VOLT 335078 [6VINCEN 230.00]]
CHNL# 1596: [VOLT 335060 [4CARLYSS 138.00]]
CHNL# 1607: [VOLT 335077 [6PGROVE 230.00]]
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)
LVRT CT4 * 3PH @ CHAKLEY - TAP CHAKLEY 230 KV LINE
FILE: FLT4-3PH_Rev.out
CHNL# 669: [ETRM BUS 101 MACH '1 ']
CHNL# 668: [ETRM BUS 100 MACH '1 ']
CHNL# 501: [VARS BUS 101 MACH '1 ']
CHNL# 500: [VARS BUS 100 MACH '1 ']
CHNL# 333: [POWR BUS 101 MACH '1 ']
CHNL# 332: [POWR BUS 100 MACH '1 ']
THU, OCT 27 2011 11:44
PROJECT VARIABLES
TIME (SECONDS)
LVRT CT4 * 3PH @ CHAKLEY - TAP CHAKLEY 230 KV LINE
FILE: FLT4-3PH_Rev.out
CHNL# 1624: [VOLT 335192 [8NELSON 500.00]]
CHNL# 1348: [VOLT 303101 [6MOSBLF 230.00]]
CHNL# 1349: [VOLT 303102 [6CHAKLY 230.00]]
CHNL# 1623: [VOLT 335191 [6GILLIS 230.00]]
CHNL# 1627: [VOLT 335244 [6SOLRC 230.00]]
CHNL# 1609: [VOLT 335079 [6GRYWOOD 230.00]]
THU, OCT 27 2011 11:44
STUDY AREA VOLTAGES (PU)
TIME (SECONDS)

APPENDIX D: Prior Generation Interconnection and Transsmission Service Requests in Study Models

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

PID	Substation	MW	In Service Date
	NONE		

Prior transmission service requests that were included in this study:

OASIS #	PSE	MW	Begin	End
74597193	NRG Power Marketing	300	1/1/2013	1/1/2018
74597198	NRG Power Marketing	300	1/1/2013	1/1/2018
74799834	Cargill Power Markets	101	7/1/2012	7/1/2017
74799836	Cargill Power Markets	101	7/1/2012	7/1/2017
74799837	Cargill Power Markets	101	7/1/2012	7/1/2017
74799848	Cargill Power Markets	101	7/1/2013	7/1/2018
74799851	Cargill Power Markets	101	7/1/2013	7/1/2018
74799853	Cargill Power Markets	101	7/1/2013	7/1/2018
74846159	AEPM	65	1/1/2015	1/1/2020
74899933	Entergy Services (SPO)	322	2/1/2011	2/1/2041
74899972	Entergy Services (SPO)	1	1/1/2015	1/1/2045
74899974	Entergy Services (SPO)	1	1/1/2015	1/1/2045
74899976	Entergy Services (SPO)	1	1/1/2015	1/1/2045
74899980	Entergy Services (SPO)	584	1/1/2015	1/1/2045
74899996	Entergy Services (SPO)	450	6/1/2012	6/1/2042
74900000	Entergy Services (SPO)	620	6/1/2012	6/1/2042
74900014	Entergy Services (SPO)	35	6/1/2012	6/1/2042
74900016	Entergy Services (SPO)	20	6/1/2012	6/1/2042

APPENDIX E: Details of Scenario 1 – 2014

AECI

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-1117
French Settlement - Sorrento 230kV	Fairview - Gypsy 230kV	-861
French Settlement - Sorrento 230kV	Fairview - Madisonville 230kV	-829
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-641
International Paper - Wallake 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-593
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-565
French Settlement - Sorrento 230kV	Front Street - Michoud 230kV	-401
Toledo - VP Tap 138kV	Colfax - Rodemacher 230kV	-268
French Settlement - Sorrento 230kV	Franklin - Mcknight 500kV	-205
Toledo - VP Tap 138kV	Colfax - Montgomery 230kV	-161
Toledo - Leesville (CLECO) 138kV	Colfax - Rodemacher 230kV	-137
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	-125
French Settlement - Sorrento 230kV	Front Street - Slidell 230kV	-64
Toledo - Leesville (CLECO) 138kV	Colfax - Montgomery 230kV	17
Conroe Bulk2 - Plantation 138kV	Oak Ridge - Porter 138kV	196

AEPW

Limiting Element	Contingency Element	ATC
French Settlement - Sorrento 230kV	Fairview - Gypsy 230kV	-1055
French Settlement - Sorrento 230kV	Fairview - Madisonville 230kV	-1015
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-621
French Settlement - Sorrento 230kV	Front Street - Michoud 230kV	-494
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-442
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-392
International Paper - Wallake 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-330
French Settlement - Sorrento 230kV	Franklin - Mcknight 500kV	-243
Toledo - VP Tap 138kV	Colfax - Rodemacher 230kV	-208
Toledo - VP Tap 138kV	Colfax - Montgomery 230kV	-125
Toledo - Leesville (CLECO) 138kV	Colfax - Rodemacher 230kV	-103
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	-89
French Settlement - Sorrento 230kV	Front Street - Slidell 230kV	-78
Toledo - Leesville (CLECO) 138kV	Colfax - Montgomery 230kV	13
Conroe Bulk2 - Plantation 138kV	Oak Ridge - Porter 138kV	139

AMRN

Limiting Element	Contingency Element	ATC
French Settlement - Sorrento 230kV	Bogalusa - Adams Creek 500/230kV transformer	-2301
French Settlement - Sorrento 230kV	Bogalusa - Franklin 500kV	-2301
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-1185
French Settlement - Sorrento 230kV	Fairview - Gypsy 230kV	-830
French Settlement - Sorrento 230kV	Fairview - Madisonville 230kV	-799
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-672
International Paper - Wallake 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-629
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-585
French Settlement - Sorrento 230kV	Front Street - Michoud 230kV	-385
Toledo - VP Tap 138kV	Colfax - Rodemacher 230kV	-276
French Settlement - Sorrento 230kV	Franklin - Mcknight 500kV	-201
Toledo - VP Tap 138kV	Colfax - Montgomery 230kV	-166
Toledo - Leesville (CLECO) 138kV	Colfax - Rodemacher 230kV	-142
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	-129
French Settlement - Sorrento 230kV	Front Street - Slidell 230kV	-61
Toledo - Leesville (CLECO) 138kV	Colfax - Montgomery 230kV	17
Conroe Bulk2 - Plantation 138kV	Oak Ridge - Porter 138kV	203

CLECO

Limiting Element	Contingency Element	ATC
NONE	NONE	252

EES

Limiting Element	Contingency Element	ATC
Mossville - Roy S. Nelson 138kV	Carlyss - CitCon West 138kV	-762
Mossville - Roy S. Nelson 138kV	CitCon West - Arizona 138kV	-714
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-614
Toledo - VP Tap 138kV	Colfax - Rodemacher 230kV	-450
Toledo - VP Tap 138kV	Colfax - Montgomery 230kV	-270
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	-135
Conroe Bulk2 - Plantation 138kV	Oak Ridge - Porter 138kV	214

EMDE

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-982
French Settlement - Sorrento 230kV	Fairview - Gypsy 230kV	-901
French Settlement - Sorrento 230kV	Fairview - Madisonville 230kV	-867
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-592

Limiting Element	Contingency Element	ATC
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-523
International Paper - Wallake 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-522
French Settlement - Sorrento 230kV	Front Street - Michoud 230kV	-420
Toledo - VP Tap 138kV	Colfax - Rodemacher 230kV	-254
French Settlement - Sorrento 230kV	Franklin - Mcknight 500kV	-213
Toledo - VP Tap 138kV	Colfax - Montgomery 230kV	-152
Toledo - Leesville (CLECO) 138kV	Colfax - Rodemacher 230kV	-129
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	-117
French Settlement - Sorrento 230kV	Front Street - Slidell 230kV	-67
Pleasant Hill 500/161kV transformer	ANO 500/161/22kV 3 Winding Transformer	-49
Toledo - Leesville (CLECO) 138kV	Colfax - Montgomery 230kV	16
Conroe Bulk2 - Plantation 138kV	Oak Ridge - Porter 138kV	183
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-982
French Settlement - Sorrento 230kV	Fairview - Gypsy 230kV	-901

LAFA

Limiting Element	Contingency Element	ATC
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	-289
Semere - Scott2 138kV	Bonin - Cecelia 138kV	-214
Habetz - Richard 138kV	Acadian - Bonin 230kV (LAFA)	-110
Habetz - Richard 138kV	Flander - Acadian 230kV (LAFA)	-5
Semere - Scott2 138kV	Flander - Segura 138kV (CLECO)	31
Semere - Scott2 138kV	Habetz - Richard 138kV	119
Semere - Scott2 138kV	Wells 500/230kV transformer	131
Coughlin - Plaisance 138kV (CLECO)	Cocodrie - Vil Plat 230kV	148
Flander - Acadian 230kV (LAFA)	Habetz - Richard 138kV	187
Champagne - Plaisance (CLECO) 138kV	Cocodrie - Vil Plat 230kV	235
Greenwood - Terrebone 115kV	Webre - Wells 500kV	246
Acadian - Bonin 230kV (LAFA)	Habetz - Richard 138kV	250

LAGN

Limiting Element	Contingency Element	ATC
Toledo - VP Tap 138kV	Colfax - Rodemacher 230kV	-585
Toledo - VP Tap 138kV	Colfax - Montgomery 230kV	-351
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	-306
Toledo - VP Tap 138kV	Colfax - Rodemacher 230kV	-52
Champagne - Plaisance (CLECO) 138kV	Vil Plat - West Fork 230kV	45
Toledo - VP Tap 138kV	Colfax - Montgomery	179

Limiting Element	Contingency Element	ATC
	230kV	
Big Three - Carlyss 230kV	Cypress - Hartburg 500kV	227

LEPA

Limiting Element	Contingency Element	ATC
Bonin - Cecelia 138kV	Colonial Academy - Richard 138kV	-836
Bonin - Cecelia 138kV	Acadia GSU - Colonial Academy 138kV	-710
Bonin - Cecelia 138kV	Acadia GSU - Scanlan 138kV	-626
Toledo - VP Tap 138kV	Colfax - Rodemacher 230kV	-603
Toledo - VP Tap 138kV	Colfax - Montgomery 230kV	-362
Habetz - Richard 138kV	Acadian - Bonin 230kV (LAFA)	-287
Moril - Cecelia 138kV	Flander - Segura 138kV (CLECO)	-256
Bonin - Cecelia 138kV	Scanlan - Scott2 138kV	-218
Meaux - Abbeville 138kV	Flander - Segura 138kV (CLECO)	-215
Bonin - Cecelia 138kV	Semere - Scott2 138kV	-208
Semere - Scott2 138kV	Bonin - Cecelia 138kV	-171
Bonin - Cecelia 138kV	Flander - Segura 138kV (CLECO)	-154
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	-135
Habetz - Richard 138kV	Flander - Acadian 230kV (LAFA)	-12
Flander - Segura 138kV (CLECO)	Meaux - Abbeville 138kV	-9
Judice - Scott1 138kV	Meaux - SELLRD (CLECO) 230kV	5
Judice - Scott1 138kV	Meaux 230/138kV transformer 1	16
Moril - Cecelia 138kV	Meaux - Abbeville 138kV	22
Semere - Scott2 138kV	Flander - Segura 138kV (CLECO)	37
Flander - Segura 138kV (CLECO)	Leblanc - Abbyville 138kV	136
Flander - Segura 138kV (CLECO)	Greenwood - Terrebone 115kV	143
Coughlin - Plaisance 138kV (CLECO)	Cocodrie - Vil Plat 230kV	166
Moril - Cecelia 138kV	Leblanc - Abbyville 138kV	175

OKGE

Limiting Element	Contingency Element	ATC
French Settlement - Sorrento 230kV	Fairview - Gypsy 230kV	-945
French Settlement - Sorrento 230kV	Fairview - Madisonville 230kV	-909
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-863
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-545
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-482
International Paper - Wallake 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-458
French Settlement - Sorrento 230kV	Front Street - Michoud 230kV	-441
Toledo - VP Tap 138kV	Colfax - Rodemacher 230kV	-240
French Settlement - Sorrento 230kV	Franklin - Mcknight 500kV	-221
Toledo - VP Tap 138kV	Colfax - Montgomery 230kV	-144

Limiting Element	Contingency Element	ATC
Toledo - Leesville (CLECO) 138kV	Colfax - Rodemacher 230kV	-121
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	-108
French Settlement - Sorrento 230kV	Front Street - Slidell 230kV	-70
Toledo - Leesville (CLECO) 138kV	Colfax - Montgomery 230kV	15
Conroe Bulk2 - Plantation 138kV	Oak Ridge - Porter 138kV	169

SMEPA

Limiting Element	Contingency Element	ATC
Ray Braswell 500/230kV transformer ckt2 - Supplemental Upgrade	McAdams - Pickens 230kV	*
Ray Braswell 500/230kV transformer ckt2 - Supplemental Upgrade	Canton - Pickens 230kV	*
Ray Braswell 500/230kV transformer ckt2 - Supplemental Upgrade	Canton South - Canton 230kV	*
Ray Braswell 500/230kV transformer ckt2 - Supplemental Upgrade	Rex Brown - Rex Brown C 230/115kV transformer 1	*
Ray Braswell 500/230kV transformer ckt2 - Supplemental Upgrade	Southwest Lonestar (SMEPA) - Prentiss (SMEPA) 161kV	*
Ray Braswell 500/230kV transformer ckt2 - Supplemental Upgrade	Lakeover 500/115kV transformer	*
Ray Braswell 500/230kV transformer ckt2 - Supplemental Upgrade	Colum (SMEPA) - Morow (SMEPA) 161kV	*
Ray Braswell 500/230kV transformer ckt2 - Supplemental Upgrade	McAdams 500/230kV transformer 2	*
Ray Braswell 500/230kV transformer ckt2 - Supplemental Upgrade	Sweatt (SOCO) - Lost Gap (SOCO) 115kV	*
Ray Braswell 500/230kV transformer ckt2 - Supplemental Upgrade	Laurel East (SOCO) - Hatisburg Southwest (SOCO) 230kV	*
Ray Braswell 500/230kV transformer ckt2 - Supplemental Upgrade	Base Case	*
French Settlement - Sorrento 230kV	Bogalusa - Franklin 500kV	-859
French Settlement - Sorrento 230kV	Bogalusa - Adams Creek 500/230kV transformer	-859
French Settlement - Sorrento 230kV	Fairview - Gypsy 230kV	-451
French Settlement - Sorrento 230kV	Fairview - Madisonville 230kV	-433
Toledo - VP Tap 138kV	Colfax - Rodemacher 230kV	-374
Toledo - VP Tap 138kV	Colfax - Montgomery 230kV	-224
Toledo - Leesville (CLECO) 138kV	Colfax - Rodemacher 230kV	-211
French Settlement - Sorrento 230kV	Front Street - Michoud 230kV	-204
French Settlement - Sorrento 230kV	Franklin - Mcknight 500kV	-158
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	-103
French Settlement - Sorrento 230kV	Front Street - Slidell 230kV	-32
Toledo - Leesville (CLECO) 138kV	Colfax - Montgomery 230kV	26
Florence - South Jackson 115kV - Supplemental Upgrade	Bogalusa - Adams Creek 500/230kV transformer	125
Florence - South Jackson 115kV - Supplemental Upgrade	Bogalusa - Franklin 500kV	125
Florence - South Jackson 115kV - Supplemental Upgrade	Choctaw MS (TVA) - Clay (TVA) 500kV	210

Limiting Element	Contingency Element	ATC
French Settlement - Sorrento 230kV	Brookhaven - Mallalieu (MEPA) 115kV	246

SOCO

Limiting Element	Contingency Element	ATC
French Settlement - Sorrento 230kV	Bogalusa - Franklin 500kV	-1736
French Settlement - Sorrento 230kV	Bogalusa - Adams Creek 500/230kV transformer	-1736
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-1561
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-844
International Paper - Wallake 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-829
French Settlement - Sorrento 230kV	Fairview - Gypsy 230kV	-713
French Settlement - Sorrento 230kV	Fairview - Madisonville 230kV	-686
French Settlement - Sorrento 230kV	Front Street - Michoud 230kV	-323
Toledo - VP Tap 138kV	Colfax - Rodemacher 230kV	-318
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	-220
French Settlement - Sorrento 230kV	Franklin - Mcknight 500kV	-198
Toledo - VP Tap 138kV	Colfax - Montgomery 230kV	-191
Toledo - Leesville (CLECO) 138kV	Colfax - Rodemacher 230kV	-170
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	-149
French Settlement - Sorrento 230kV	Front Street - Slidell 230kV	-51
Toledo - Leesville (CLECO) 138kV	Colfax - Montgomery 230kV	21
Conroe Bulk2 - Plantation 138kV	Oak Ridge - Porter 138kV	233

SPA

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-1037
French Settlement - Sorrento 230kV	Fairview - Gypsy 230kV	-899
French Settlement - Sorrento 230kV	Fairview - Madisonville 230kV	-865
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-607
International Paper - Wallake 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-551
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-541
French Settlement - Sorrento 230kV	Front Street - Michoud 230kV	-420
Toledo - VP Tap 138kV	Colfax - Rodemacher 230kV	-259
French Settlement - Sorrento 230kV	Franklin - Mcknight 500kV	-211
Toledo - VP Tap 138kV	Colfax - Montgomery 230kV	-155
Toledo - Leesville (CLECO) 138kV	Colfax - Rodemacher 230kV	-131
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	-120
French Settlement - Sorrento 230kV	Front Street - Slidell 230kV	-66
Pleasant Hill 500/161kV transformer	ANO 500/161/22kV 3 Winding Transformer	-25
Toledo - Leesville (CLECO) 138kV	Colfax - Montgomery 230kV	16

Limiting Element	Contingency Element	ATC
Conroe Bulk2 - Plantation 138kV	Oak Ridge - Porter 138kV	188
Lake Conway - Mayflower 115kV	Pleasant Hill 500/161kV transformer	193

TVA

Limiting Element	Contingency Element	ATC
French Settlement - Sorrento 230kV	Bogalusa - Franklin 500kV	-2087
French Settlement - Sorrento 230kV	Bogalusa - Adams Creek 500/230kV transformer	-2087
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-1404
French Settlement - Sorrento 230kV	Fairview - Gypsy 230kV	-771
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-758
International Paper - Wallake 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-745
French Settlement - Sorrento 230kV	Fairview - Madisonville 230kV	-741
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-642
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	-453
French Settlement - Sorrento 230kV	Front Street - Michoud 230kV	-357
Toledo - VP Tap 138kV	Colfax - Rodemacher 230kV	-298
French Settlement - Sorrento 230kV	Franklin - Mcknight 500kV	-190
Toledo - VP Tap 138kV	Colfax - Montgomery 230kV	-178
Toledo - Leesville (CLECO) 138kV	Colfax - Rodemacher 230kV	-156
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	-141
French Settlement - Sorrento 230kV	Front Street - Slidell 230kV	-56
Toledo - Leesville (CLECO) 138kV	Colfax - Montgomery 230kV	19
Conroe Bulk2 - Plantation 138kV	Oak Ridge - Porter 138kV	221
French Settlement - Sorrento 230kV	Bogalusa - Franklin 500kV	-2087

APPENDIX F: Details of Scenario 2 – 2014

AECI

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-252
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-47
Toledo - VP Tap 138kV	Colfax - Rodemacher 230kV	-9
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	39
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	93
Toledo - VP Tap 138kV	Colfax - Montgomery 230kV	104
French Settlement - Sorrento 230kV	Fairview - Gypsy 230kV	239

AEPW

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-140
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-33
Toledo - VP Tap 138kV	Colfax - Rodemacher 230kV	-7
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	27
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	66
Toledo - VP Tap 138kV	Colfax - Montgomery 230kV	81
International Paper - Wallake 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	151
Toledo - Leesville (CLECO) 138kV	Colfax - Rodemacher 230kV	227
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-140

AMRN

Limiting Element	Contingency Element	ATC
French Settlement - Sorrento 230kV	Bogalusa - Adams Creek 500/230kV transformer	-2146
French Settlement - Sorrento 230kV	Bogalusa - Franklin 500kV	-2146
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-267
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-49
Toledo - VP Tap 138kV	Colfax - Rodemacher 230kV	-9
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	41
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	96
Toledo - VP Tap 138kV	Colfax - Montgomery 230kV	108
French Settlement - Sorrento 230kV	Fairview - Gypsy 230kV	230

CLECO

Limiting Element	Contingency Element	ATC
NONE	NONE	252

EES

Limiting Element	Contingency Element	ATC
Mossville - Roy S. Nelson 138kV	Carlyss - CitCon West 138kV	-1301
Mossville - Roy S. Nelson 138kV	CitCon West - Arizona 138kV	-1254
Carlyss - CitCon West 138kV	Mossville - Roy S. Nelson 138kV	-155
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-51
Toledo - VP Tap 138kV	Colfax - Rodemacher 230kV	-15
Coly - Vignes 230kV - Supplemental Upgrade	A.A.C. - Polsky Carville 230kV	83
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	100
Coly - Vignes 230kV - Supplemental Upgrade	A.A.C. - Licar 230kV	122
Toledo - VP Tap 138kV	Colfax - Montgomery 230kV	175

EMDE

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-222
Pleasant Hill 500/161kV transformer	ANO 500/161/22kV 3 Winding Transformer	-107
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-44
Toledo - VP Tap 138kV	Colfax - Rodemacher 230kV	-8
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	36
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	87
Toledo - VP Tap 138kV	Colfax - Montgomery 230kV	99
International Paper - Wallake 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	239
French Settlement - Sorrento 230kV	Fairview - Gypsy 230kV	250

LAFA

Limiting Element	Contingency Element	ATC
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	-2143
Coughlin - Plaisance 138kV (CLECO)	Cocodrie - Vil Plat 230kV	-443
Semere - Scott2 138kV	Bonin - Cecelia 138kV	-434
Champagne - Plaisance (CLECO) 138kV	Cocodrie - Vil Plat 230kV	-356
Coughlin - Plaisance 138kV (CLECO)	Vil Plat - West Fork 230kV	-302
Champagne - Plaisance (CLECO) 138kV	Vil Plat - West Fork 230kV	-215
Habetz - Richard 138kV	Acadian - Bonin 230kV (LAFA)	-178
Semere - Scott2 138kV	Flander - Segura 138kV (CLECO)	-127
Coughlin - Plaisance 138kV (CLECO)	Wells (CLECO) - West Fork (CLECO) 230kV	-81
Habetz - Richard 138kV	Flander - Acadian 230kV (LAFA)	-74
Rapidies (CLECO) - Rodemacher (CLECO) 230kV	Rodemacher (CLECO) - Sherwood (CLECO) 230kV	-69
Semere - Scott2 138kV	Habetz - Richard 138kV	1
Champagne - Plaisance (CLECO) 138kV	Wells (CLECO) - West Fork (CLECO) 230kV	7

Limiting Element	Contingency Element	ATC
Semere - Scott2 138kV	Richard - Scott1 138kV	56
Semere - Scott2 138kV	RORK (CLECO) - Sellers Road (CLECO) 230kV	69
Flander - Acadian 230kV (LAFA)	Habetz - Richard 138kV	146
North Crowley - Scott1 138kV	Richard - Scott1 138kV	207
Acadian - Bonin 230kV (LAFA)	Habetz - Richard 138kV	209

LAGN

Limiting Element	Contingency Element	ATC
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	-2268
Coughlin - Plaisance 138kV (CLECO)	Cocodrie - Vil Plat 230kV	-966
Champagne - Plaisance (CLECO) 138kV	Cocodrie - Vil Plat 230kV	-775
Coughlin - Plaisance 138kV (CLECO)	Vil Plat - West Fork 230kV	-659
Champagne - Plaisance (CLECO) 138kV	Vil Plat - West Fork 230kV	-468
Coughlin - Plaisance 138kV (CLECO)	Wells (CLECO) - West Fork (CLECO) 230kV	-176
Toledo - VP Tap 138kV	Colfax - Rodemacher 230kV	-19
Champagne - Plaisance (CLECO) 138kV	Wells (CLECO) - West Fork (CLECO) 230kV	15
Toledo - VP Tap 138kV	Colfax - Montgomery 230kV	228

LEPA

Limiting Element	Contingency Element	ATC
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	-1003
Bonin - Cecelia 138kV	Colonial Academy - Richard 138kV	-973
Bonin - Cecelia 138kV	Acadia GSU - Colonial Academy 138kV	-846
Bonin - Cecelia 138kV	Acadia GSU - Scanlan 138kV	-762
Coughlin - Plaisance 138kV (CLECO)	Cocodrie - Vil Plat 230kV	-497
Habetz - Richard 138kV	Acadian - Bonin 230kV (LAFA)	-467
Moril - Cecelia 138kV	Flander - Segura 138kV (CLECO)	-405
Champagne - Plaisance (CLECO) 138kV	Cocodrie - Vil Plat 230kV	-399
Meaux - Abbeville 138kV	Flander - Segura 138kV (CLECO)	-361
Bonin - Cecelia 138kV	Scanlan - Scott2 138kV	-354
Semere - Scott2 138kV	Bonin - Cecelia 138kV	-345
Bonin - Cecelia 138kV	Semere - Scott2 138kV	-344
Coughlin - Plaisance 138kV (CLECO)	Vil Plat - West Fork 230kV	-339
Bonin - Cecelia 138kV	Flander - Segura 138kV (CLECO)	-278
Champagne - Plaisance (CLECO) 138kV	Vil Plat - West Fork 230kV	-241
Habetz - Richard 138kV	Flander - Acadian 230kV (LAFA)	-192
Flander - Segura 138kV (CLECO)	Meaux - Abbeville 138kV	-156
Semere - Scott2 138kV	Flander - Segura 138kV (CLECO)	-149
Judice - Scott1 138kV	Meaux - SELLRD (CLECO) 230kV	-129
Moril - Cecelia 138kV	Meaux - Abbeville 138kV	-127
Judice - Scott1 138kV	Meaux 230/138kV transformer 1	-117

Limiting Element	Contingency Element	ATC
Rapidies (CLECO) - Rodemacher (CLECO) 230kV	Rodemacher (CLECO) - Sherwood (CLECO) 230kV	-116
Coughlin - Plaisance 138kV (CLECO)	Wells (CLECO) - West Fork (CLECO) 230kV	-91
Willow Glen - PTPLEA 230kV	Willow Glen - Evergreen 230kV ckt 1	-69
Toledo - VP Tap 138kV	Colfax - Rodemacher 230kV	-20
Flander - Segura 138kV (CLECO)	Leblanc - Abbyville 138kV	-11
Semere - Scott2 138kV	Habetz - Richard 138kV	1
Champagne - Plaisance (CLECO) 138kV	Wells (CLECO) - West Fork (CLECO) 230kV	8
Moril - Cecelia 138kV	Leblanc - Abbyville 138kV	26
Coly - Vignes 230kV - Supplemental Upgrade	A.A.C. - Polsky Carville 230kV	44
Flander - Segura 138kV (CLECO)	Meaux - SELLRD (CLECO) 230kV	53
Flander - Segura 138kV (CLECO)	Meaux 230/138kV transformer 1	56
Coly - Vignes 230kV - Supplemental Upgrade	A.A.C. - Licar 230kV	64
Evergreen - PTPLEA 230kV	Willow Glen - Evergreen 230kV ckt 1	73
Semere - Scott2 138kV	Richard - Scott1 138kV	95
Coly - Vignes 230kV - Supplemental Upgrade	Belle Helene - Licar 230kV	132
Flander - Segura 138kV (CLECO)	Moril - Cecelia 138kV	135
Bonin - Cecelia 138kV	Meaux - Abbeville 138kV	137
Flander - Segura 138kV (CLECO)	Greenwood - Terrebone 115kV	140
Meaux - Abbeville 138kV	Acadian - Bonin 230kV (LAFA)	160

OKGE

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-195
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-40
Toledo - VP Tap 138kV	Colfax - Rodemacher 230kV	-8
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	33
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	80
Toledo - VP Tap 138kV	Colfax - Montgomery 230kV	93
International Paper - Wallake 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	210

SMEPA

Limiting Element	Contingency Element	ATC
French Settlement - Sorrento 230kV	Bogalusa - Adams Creek 500/230kV transformer	-801
French Settlement - Sorrento 230kV	Bogalusa - Franklin 500kV	-801
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	-761
Jackson Miami - Rex Brown 115kV	South Jackson 230/115kV transformer 1	-205
Florence - South Jackson 115kV - Supplemental Upgrade	Bogalusa - Adams Creek 500/230kV transformer	-186
Florence - South Jackson 115kV - Supplemental Upgrade	Bogalusa - Franklin 500kV	-186

Limiting Element	Contingency Element	ATC
Florence - South Jackson 115kV - Supplemental Upgrade	Choctaw MS (TVA) - Clay (TVA) 500kV	-82
Toledo - VP Tap 138kV	Colfax - Rodemacher 230kV	-12
Florence - South Jackson 115kV - Supplemental Upgrade	South Jackson - Pop Spring 115kV	0
Florence - South Jackson 115kV - Supplemental Upgrade	Kemper (SOCO) - Kemper1 (SOCO) 230kV	8
Florence - South Jackson 115kV - Supplemental Upgrade	Georgetown - Pop Spring 115kV	21
Florence - South Jackson 115kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	22
Florence - South Jackson 115kV - Supplemental Upgrade	Georgetown - Silver Creek 115kV	27
Florence - South Jackson 115kV - Supplemental Upgrade	Ellicott (SOCO) - BarryCC2 (SOCO) 230kV	61
Florence - South Jackson 115kV - Supplemental Upgrade	Ellicott (SOCO) - BarryCC1 (SOCO) 230kV	62
Coly - Vignes 230kV - Supplemental Upgrade	A.A.C. - Polsky Carville 230kV	76
Jackson Miami - Jackson Monument Street 115kV	South Jackson 230/115kV transformer 1	100
Coly - Vignes 230kV - Supplemental Upgrade	A.A.C. - Licar 230kV	112
French Settlement - Sorrento 230kV	Fairview - Gypsy 230kV	125
French Settlement - Sorrento 230kV	Fairview - Madisonville 230kV	142
Toledo - VP Tap 138kV	Colfax - Montgomery 230kV	146
Semere - Scott2 138kV	Richard - Wells 500kV	186
Florence - South Jackson 115kV - Supplemental Upgrade	Base Case	186
Coly - Vignes 230kV - Supplemental Upgrade	Belle Helene - Licar 230kV	232

SOCO

Limiting Element	Contingency Element	ATC
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	-1635
French Settlement - Sorrento 230kV	Bogalusa - Adams Creek 500/230kV transformer	-1619
French Settlement - Sorrento 230kV	Bogalusa - Franklin 500kV	-1619
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-352
Toledo - VP Tap 138kV	Colfax - Rodemacher 230kV	-10
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	51
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	111
Toledo - VP Tap 138kV	Colfax - Montgomery 230kV	124
French Settlement - Sorrento 230kV	Fairview - Gypsy 230kV	198
French Settlement - Sorrento 230kV	Fairview - Madisonville 230kV	225

SPA

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV	Dolet Hills - S.W. Shreevport 345kV	-234

Limiting Element	Contingency Element	ATC
(CLECO)	(CLECO)	
Pleasant Hill 500/161kV transformer	ANO 500/161/22kV 3 Winding Transformer	-55
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-45
Toledo - VP Tap 138kV	Colfax - Rodemacher 230kV	-8
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	37
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	89
Toledo - VP Tap 138kV	Colfax - Montgomery 230kV	101
Lake Conway - Mayflower 115kV	Pleasant Hill 500/161kV transformer	203
French Settlement - Sorrento 230kV	Fairview - Gypsy 230kV	249

TVA

Limiting Element	Contingency Element	ATC
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	-3360
French Settlement - Sorrento 230kV	Bogalusa - Adams Creek 500/230kV transformer	-1946
French Settlement - Sorrento 230kV	Bogalusa - Franklin 500kV	-1946
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-317
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-53
Toledo - VP Tap 138kV	Colfax - Rodemacher 230kV	-10
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	46
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	105
Toledo - VP Tap 138kV	Colfax - Montgomery 230kV	116
French Settlement - Sorrento 230kV	Fairview - Gypsy 230kV	214
French Settlement - Sorrento 230kV	Fairview - Madisonville 230kV	243

APPENDIX G: Details of Scenario 3 – 2014

AECI

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-1102
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-572
International Paper - Wallake 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-566
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-544
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	-103
Conroe Bulk2 - Plantation 138kV	Oak Ridge - Porter 138kV	217

AEPW

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-631
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-388
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-381
International Paper - Wallake 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-324
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	-74
Conroe Bulk2 - Plantation 138kV	Oak Ridge - Porter 138kV	155

AMRN

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-1167
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-601
International Paper - Wallake 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-600
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-563
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	-107
Conroe Bulk2 - Plantation 138kV	Oak Ridge - Porter 138kV	224

CLECO

Limiting Element	Contingency Element	ATC
NONE	NONE	252

EES

Limiting Element	Contingency Element	ATC
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-591
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	-111
Conroe Bulk2 - Plantation 138kV	Oak Ridge - Porter 138kV	236

EMDE

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-977
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-526
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-505
International Paper - Wallake 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-502
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	-96
Conroe Bulk2 - Plantation 138kV	Oak Ridge - Porter 138kV	202

LAFA

Limiting Element	Contingency Element	ATC
Coughlin - Plaisance 138kV (CLECO)	Cocodrie - Vil Plat 230kV	231
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	249

LAGN

Limiting Element	Contingency Element	ATC
NONE	NONE	252

LEPA

Limiting Element	Contingency Element	ATC
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	124
Greenwood - Terrebone 115kV	Bayou Sales - Teche 138kV (CLECO)	244
Coughlin - Plaisance 138kV (CLECO)	Cocodrie - Vil Plat 230kV	245
Greenwood - Terrebone 115kV	Bayou Sales - WaxLake 138kV (CLECO)	246

OKGE

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-864
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-482
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-466
International Paper - Wallake 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-444
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	-89
Conroe Bulk2 - Plantation 138kV	Oak Ridge - Porter 138kV	188

SMEPA

Limiting Element	Contingency Element	ATC
Ray Braswell 500/230kV transformer ckt2 - Supplemental Upgrade	McAdams - Pickens 230kV	-10775
Ray Braswell 500/230kV transformer ckt2 - Supplemental Upgrade	Canton - Pickens 230kV	-10286
Ray Braswell 500/230kV transformer ckt2 - Supplemental Upgrade	Canton South - Canton 230kV	*
Ray Braswell 500/230kV transformer ckt2 - Supplemental Upgrade	Rex Brown - Rex Brown C 230/115kV transformer 1	*
Ray Braswell 500/230kV transformer ckt2 - Supplemental Upgrade	Colum (SMEPA) - Morow (SMEPA) 161kV	*
Ray Braswell 500/230kV transformer ckt2 - Supplemental Upgrade	Lakeover 500/115kV transformer	*
Ray Braswell 500/230kV transformer ckt2 - Supplemental Upgrade	McAdams 500/230kV transformer 2	*
Ray Braswell 500/230kV transformer ckt2 - Supplemental Upgrade	Sweatt (SOCO) - Lost Gap (SOCO) 115kV	*
Ray Braswell 500/230kV transformer ckt2 - Supplemental Upgrade	Lost Gap (SOCO) - Hickory MS (SOCO) 115kV	*
Ray Braswell 500/230kV transformer ckt2 - Supplemental Upgrade	Newton (SOCO) - Hickory MS (SOCO) 115kV	*
Ray Braswell 500/230kV transformer ckt2 - Supplemental Upgrade	Base Case	*
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	*
Florence - South Jackson 115kV - Supplemental Upgrade	Bogalusa - Adams Creek 500/230kV transformer	*
Florence - South Jackson 115kV - Supplemental Upgrade	Bogalusa - Franklin 500kV	94
Florence - South Jackson 115kV - Supplemental Upgrade	Choctaw MS (TVA) - Clay (TVA) 500kV	164

SOCO

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-1524
International Paper - Wallake 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-784
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-759
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	-123
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	203

SPA

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-1027
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV	-541

Limiting Element	Contingency Element	ATC
	(CLECO)	
International Paper - Wallake 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-528
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-522
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	-99
Conroe Bulk2 - Plantation 138kV	Oak Ridge - Porter 138kV	208

TVA

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-1370
International Paper - Wallake 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-704
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-680
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-616
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	-116
Conroe Bulk2 - Plantation 138kV	Oak Ridge - Porter 138kV	244

APPENDIX H: Details of Scenario 4 – 2014

AECI

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-259
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-39
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	109
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	125

AEPW

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-148
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-27
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	78
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	85
International Paper - Wallake 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	158
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-148

AMRN

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-274
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-40
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	113
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	131

CLECO

Limiting Element	Contingency Element	ATC
NONE	NONE	252

EES

Limiting Element	Contingency Element	ATC
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-42
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	117

EMDE

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-230
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-36
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	102
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	115
International Paper - Wallake 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	245

LAFA

Limiting Element	Contingency Element	ATC
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	-1410
Coughlin - Plaisance 138kV (CLECO)	Cocodrie - Vil Plat 230kV	-419
Champagne - Plaisance (CLECO) 138kV	Cocodrie - Vil Plat 230kV	-321
Coughlin - Plaisance 138kV (CLECO)	Vil Plat - West Fork 230kV	-266
Champagne - Plaisance (CLECO) 138kV	Vil Plat - West Fork 230kV	-169
Rapidies (CLECO) - Rodemacher (CLECO) 230kV	Rodemacher (CLECO) - Sherwood (CLECO) 230kV	-45
Coughlin - Plaisance 138kV (CLECO)	Wells (CLECO) - West Fork (CLECO) 230kV	-26
Champagne - Plaisance (CLECO) 138kV	Wells (CLECO) - West Fork (CLECO) 230kV	71

LAGN

Limiting Element	Contingency Element	ATC
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	-1594
Coughlin - Plaisance 138kV (CLECO)	Cocodrie - Vil Plat 230kV	-844
Champagne - Plaisance (CLECO) 138kV	Cocodrie - Vil Plat 230kV	-648
Coughlin - Plaisance 138kV (CLECO)	Vil Plat - West Fork 230kV	-536
Champagne - Plaisance (CLECO) 138kV	Vil Plat - West Fork 230kV	-340
Coughlin - Plaisance 138kV (CLECO)	Wells (CLECO) - West Fork (CLECO) 230kV	-53
Champagne - Plaisance (CLECO) 138kV	Wells (CLECO) - West Fork (CLECO) 230kV	143

LEPA

Limiting Element	Contingency Element	ATC
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	-700
Coughlin - Plaisance 138kV (CLECO)	Cocodrie - Vil Plat 230kV	-444
Champagne - Plaisance (CLECO) 138kV	Cocodrie - Vil Plat 230kV	-341
Coughlin - Plaisance 138kV (CLECO)	Vil Plat - West Fork 230kV	-282
Champagne - Plaisance (CLECO) 138kV	Vil Plat - West Fork 230kV	-179
Rapidies (CLECO) - Rodemacher (CLECO)	Rodemacher (CLECO) - Sherwood	-70

Limiting Element	Contingency Element	ATC
230kV	(CLECO) 230kV	
Coughlin - Plaisance 138kV (CLECO)	Wells (CLECO) - West Fork (CLECO) 230kV	-28
Champagne - Plaisance (CLECO) 138kV	Wells (CLECO) - West Fork (CLECO) 230kV	75

OKGE

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-203
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-33
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	94
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	105
International Paper - Wallake 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	217

SMEPA

Limiting Element	Contingency Element	ATC
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	-533
Florence - South Jackson 115kV - Supplemental Upgrade	Bogalusa - Adams Creek 500/230kV transformer	-142
Florence - South Jackson 115kV - Supplemental Upgrade	Bogalusa - Franklin 500kV	-142
Florence - South Jackson 115kV - Supplemental Upgrade	Choctaw MS (TVA) - Clay (TVA) 500kV	-82
Florence - South Jackson 115kV - Supplemental Upgrade	South Jackson - Pop Spring 115kV	7
Florence - South Jackson 115kV - Supplemental Upgrade	Kemper (SOCO) - Kemper1 (SOCO) 230kV	12
Florence - South Jackson 115kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	26
Florence - South Jackson 115kV - Supplemental Upgrade	Georgetown - Pop Spring 115kV	28
Florence - South Jackson 115kV - Supplemental Upgrade	Georgetown - Silver Creek 115kV	34
Jackson Miami - Rex Brown 115kV	South Jackson 230/115kV transformer 1	47
Florence - South Jackson 115kV - Supplemental Upgrade	Ellicott (SOCO) - BarryCC2 (SOCO) 230kV	65
Florence - South Jackson 115kV - Supplemental Upgrade	Ellicott (SOCO) - BarryCC1 (SOCO) 230kV	66
Florence - South Jackson 115kV - Supplemental Upgrade	Base Case	190

SOCO

Limiting Element	Contingency Element	ATC
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	-1148

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-358
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	129
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	165

SPA

Limiting Element	Contingency Element	ATC
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-241
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-37
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	105
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	118

TVA

Limiting Element	Contingency Element	ATC
Ray Braswell - Baxter Wilson 500kV - Supplemental Upgrade	Franklin - Grand Gulf 500kV	-2387
International Paper - Mansfield 138kV (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	-322
Conroe 1 - Conroe 2 138kV	Oak Ridge - Porter 138kV	-44
Plantation - Cedar Hill 138kV	Oak Ridge - Porter 138kV	123
Carroll 230/138kV transformer (CLECO)	Dolet Hills - S.W. Shreevport 345kV (CLECO)	148