Southwest Power Pool

Impact Study For Generation Interconnection Request GEN-2006-020S

SPP Tariff Studies

(#GEN-2006-020S)

May 2009

Executive Summary

Pursuant to the tariff Southwest Power Pool (SPP) performed the following Impact Study to satisfy the Impact Study Agreement executed by the requesting customer and SPP for SPP Generation Interconnection request GEN-2006-020S. The request for interconnection was placed with SPP in accordance SPP's Open Access Transmission Tariff which covers new generation interconnections on SPP's transmission system.

This generation interconnection request currently has an executed Interconnection Agreement that was signed assuming the facility would contain Vestes V-80 1.8MV wind turbines. The original study was posted in January 2007. The Customer asked for a restudy assuming the facility will contain Vestes V-80 1.8 MW wind turbines. This study was posted in November 2007. A third study was completed at the request of the customer and is the subject of this report. For this study the customer will be using 13 GE 1.5 MW wind turbines to generate 19.5 MW.

Two seasonal base cases were used in the study to analyze the stability impacts of the proposed generation facility. The cases studied were the 2010 winter peak and 2010 summer peak. Each case was modified to include prior queued projects that are listed in the body of the report. Eighteen contingencies were simulated in each case. The GE 1.5 MW wind turbines were modeled using information provided by the manufacturer.

The stability study results show that with the Customer requested GE wind turbines the transmission system remains stable for all simulated contingencies studied. If the Customer changes the manufacturer or type of wind turbines from the GE 1.5 MW, a new impact study will be required.

Additionally, the stability study results show that in order for the wind farm to meet FERC Order #661A's Low Voltage Ride Through (LVRT) provisions, the Customer shall purchase the GE turbines with the LVRT II low voltage ride through package available from the manufacturer.

The Customer's windfarm is required to maintain +/- 0.95 power factor at the point of interconnection (POI) for any fault condition.

The network upgrade costs and the interconnection facilities costs are found in the Facilities Study for Generation Interconnection Request GEN-2006-020S dated May 2007.

Nothing in this study should be construed as a guarantee of transmission service. If the customer wishes to sell power from the facility, a separate request for transmission service shall be requested on Southwest Power Pool's OASIS by the Customer.

1.0 Introduction

Pursuant to the tariff Southwest Power Pool (SPP) performed the following Impact Study to satisfy the Impact Study Agreement executed by the requesting customer and SPP for SPP Generation Interconnection request GEN-2006-020S. The request for interconnection was placed with SPP in accordance SPP's Open Access Transmission Tariff which covers new generation interconnections on SPP's transmission system.

This generation interconnection request currently has an executed Interconnection Agreement that was signed assuming the facility would contain Vestes V80 1.8 MW wind turbines. The original study was posted in January 2007 studying Suzlon S88 2.1MW turbines. The Customer asked for a restudy assuming the facility will contain Vestes V-80 1.8 MW wind turbines. This study was posted in November 2007. A third study was completed at the request of the customer and is the subject of this report. For this study the customer will be using 13 GE 1.5 MW wind turbines to generate 19.5 MW.

2.0 Purpose

The purpose of the Interconnection System Impact Study is to evaluate the impact of the proposed interconnection on the reliability of the Transmission System. The Impact Study considers the Base Case as well as all Generating Facilities (and with respect to (b) below, any identified Network Upgrades associated with such higher queued interconnection) that, on the date the Interconnection System Impact Study is commenced:

a) are directly interconnected to the Transmission System;
b) are interconnected to Affected Systems and may have an impact on the Interconnection Request;
c) have a pending higher queued Interconnection Request to interconnect to the Transmission System; or
d) have no Queue Position but have executed an LGIA or requested that an unexecuted LGIA be filed with FERC.

Any changes to these assumptions, for example, one or more of the previously queued projects not included in this study signing an interconnection agreement, may require a re-study of this request at the expense of the customer.

Nothing in this System Impact Study constitutes a request for transmission service or confers upon the Interconnection Customer any right to receive transmission service.

3.0 Facilities

3.1 Generating Facility

The generating facility was studied with the assumption that it would be using 13 GE 1.5 MW wind turbines. The nameplate rating of each turbine is 1.5MW (1500kW) with a machine base of 1667 kVA. The turbine output voltage is 575V.

Each wind turbine will feed into a 0.575/34.5 kV GSU rated at 1750 kVA. Impedance for the GSU is 5.75%.

The 13 wind turbines are in series on one collector circuit that feeds into a 34.5/115 kV transformer in the customer's substation. The impedance for the substation transformer is 8% on a 15 MVA OA Base with a top rating of 25 MVA.

Figure 1 shows the one-line modeling of the generation facility.

3.2 Interconnection Facility

The point of interconnection (POI) is to be the SPS transmission system via a new switching station located on the existing Moore County Interchange – Texas County Interchange 115 kV line. See the Facility Study for Generation Interconnection Request GEN-2006-020S dated May 2007 for details.

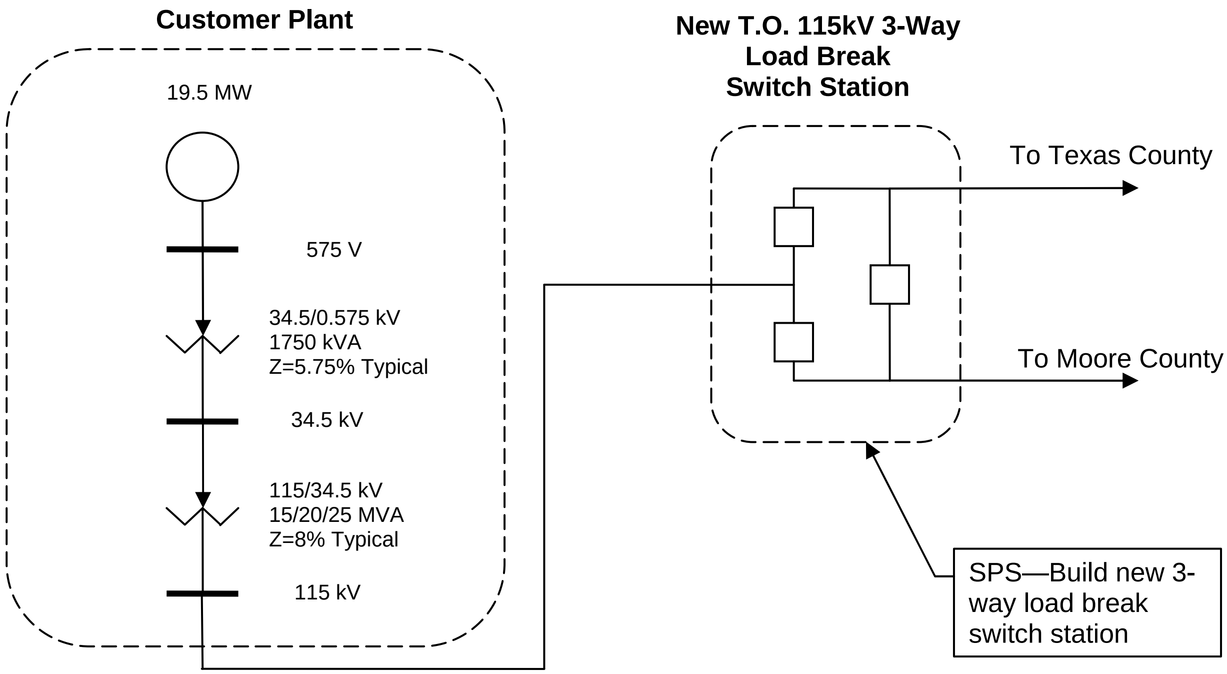


Figure 1: GEN-2006-020S Facility and Proposed Interconnection Configuration

3.3 Power Factor Requirements

The GE turbines have a reactive capability of +/- 0.95 (standard) lead/lag power factor at the generator terminals or +/- 0.90 (optional) lead/lag power factor. With the 'wind var' option the GE turbines can react to system conditions in order to maintain a constant power factor or voltage schedule. An analysis was conducted to determine whether the wind turbines are sufficient to meet the power factor criteria for the wind farm.

The interconnection generators were set to hold a voltage schedule at the POI at the no-fault voltage level. The no-fault voltage for the summer peak is 1.0191 per unit while the winter peak value is 1.0213 per unit. The most stringent contingencies for each season were used to determine the windfarm power factor at the POI. The resulting power factors are shown in Table 1.

The Customer's windfarm is required to maintain +/- 0.95 power factor at the POI for any condition.

SEASON	CONTINGENCY	PF @POI	PF	MW @POI	Mvars @POI
10SP	NONE	0.994	Lead	19.3	-2.1
10SP	Windfarm – Sherman Tap	0.794	Lead	19.3	-12.7
10SP	Spearman – Hansford	0.973	Lag	19.3	4.6
10WP	NONE	0.994	Lead	19.3	-2.1
10WP	Windfarm – Sherman Tap	0.871	Lead	19.3	-10.9
10WP	Windfarm – Hitchland	0.986	Lead	19.3	-3.3

Table 1: Power Factor at the Point of Interconnection

4.0 Stability Analysis

4.1 Modeling of the Wind Turbines in the Power Flow

In order to simplify the model of the wind farm while capturing the effect of the different impedances of cables (due to change of the conductor size and length), the wind turbines and associated impedances on the collector circuit were modeled by an equivalent circuit as shown in Figure 1.

4.2 Modeling of the Wind Turbines in Dynamics

The GE 1.5 wind turbine generators utilize a doubly fed induction-generator with a wound rotor and slip rings. The generator synchronous speed is 1200 rpm, and a variable frequency power converter tied to the generator rotor allows the generator to operate at speeds ranging from 800 rpm to 1600 rpm. Nominal speed at 1.5 MW power output is 1440 rpm and the maximum allowable non-operating rotational speed is 1680 rpm. The power converter allows the generator to produce power at a power factor of 0.95 lagging to 0.95 leading (standard) or 0.90 lagging to 0.90 leading (optional). The power factor is settable at each WTG or by the Plant SCADA system.

Power Technologies Inc. (PTI) has produced a GE 1.5 turbine model package for use on their PSS/E simulation software. This package was obtained from PTI and was used exclusively in modeling this wind farm. The generator data used by the stability model is shown in Table 2.

For the simulations, the wind farm was dispatched directly by the user to the level specified (100% rated power).

Description	Value
Stator resistance, Ra	0.00706 pu
Stator inductance, La	0.1714 pu
Mutual inductance, Lm	2.904 pu
Rotor resistance	0.005 pu
Rotor inductance	0.1563 pu
Drive train inertia	0.64 sec
Shaft damping	0.73 pu
Shaft stiffness	0.6286 pu
Generator rotor inertia	0.57 sec
Number of generator pole pairs	3
Gear box ratio	72.0

Table 2: GE 1.5 Wind Turbine Generator Parameters

4.2.1 Turbine Protection Schemes

The GE turbines utilize an undervoltage/overvoltage protection scheme and an underfrequency/overfrequency protection scheme. The various protection schemes are designed to protect the wind turbines in the case of system disturbances that can cause damage to the mechanical systems or power electronics on board the turbine. Generally, the protection schemes will disconnect the generator from the electric grid if the sampled frequency or voltage is outside of a specified band for a specified amount of time.

FERC Order #661A places specific requirements on wind farms through its Low Voltage Ride Through (LVRT) provisions. For Interconnection Agreements signed after December 31, 2006, wind farms shall stay on line for faults at the POI that draw the voltage down at the POI to 0.0 pu.

In order to meet Order #661A, GE provides three different LVRT packages. The voltage settings for the three packages are shown in Table 3. For this study, the wind turbines were determined to need the LVRT II package.

Voltage	Time Limit
1.3000pu +	1.2 cycles (0.02s)
1.1500pu -- 1.299pu	6 cycles (0.1s)
1.1499pu – 1.1000pu	60 cycles (1.0s)
1.0999pu – 0.8501pu	Continuous Operation
0.8500pu -- 0.7501pu	600 cycles (10.0s)
0.7500pu – 0.7001pu	60 cycles (1.0s)
0.7000pu – 0.3001pu	6 cycles (0.1s)
0.3000pu – 0.0000pu	6 cycles (LVRT I)
0.1500pu – 0.0000pu	37.5 cycles (0.625s) (LVRT II)
0.0000pu	60 cycles (1 s) (LVRT III)

Table 3: GE 1.5 Wind Turbine Generator Voltage Protection

The frequency protection scheme for the GE turbines is shown in Table 4 below:

Frequency	Time Limit
62.5000Hz +	1.2 cycles (0.02s)
62.4999Hz -- 61.500Hz	1800 cycles (30.0s)
61.4999Hz -- 57.5001Hz	Continuous Operation
57.5000Hz – 56.5001Hz	600 cycles (10.0s)
56.5000Hz – 0.0000Hz	1.2 cycles (0.02s)

Table 4: GE 1.5 Wind Turbine Generator Frequency Protection

4.3 Contingencies Simulated

Eighteen (18) contingencies were considered for the transient stability simulations. These contingencies included three phase faults and single phase line faults at locations defined by SPP. Single-phase line faults were simulated by applying a fault impedance to the positive sequence network at the fault location to represent the effect of the negative and zero sequence networks on the positive sequence network. The fault impedance was computed to give a positive sequence voltage at the specified fault location of approximately 60% of pre-fault voltage. This method is in agreement with SPP current practice.

The faults that were defined and simulated are listed in Table 5.

Table 5: Contingencies Evaluated

FAULT	FAULT DESCRIPTION
FLT13PH	3 phase fault on the Wind Farm (560200)-Hitchland (523093) 115kV line 1. Apply fault at Wind Farm 115kV bus (560200). 2. Clear fault after 5 cycles by removing the line from service. 3. Wait 20 cycles, and then re-close the line into the fault. 4. Leave fault on for 5 cycles, then trip and lock out the line.
FLT21PH	Single line to ground fault same as FLT13PH
FLT33PH	3 phase fault on the Wind Farm (560200)-Sherman Tap (523175)115kV line 1. Apply fault at Sherman Tap (523175). 2. Clear fault after 5 cycles by removing the line from service. 3. Wait 20 cycles, and then re-close the line into the fault. 4. Leave fault on for 5 cycles, then trip and lock out the line.
FLT41PH	Single line to ground fault same as FLT33PH
FLT53PH	3 phase fault on the Moore (523309)-Potter (523959) 230kV line 1. Apply fault at Moore (523309). 2. Clear fault after 5 cycles by removing the line from service. 3. Wait 20 cycles, and then re-close the line into the fault. 4. Leave fault on for 5 cycles, then trip and lock out the line.
FLT61PH	Single line to ground fault same as FLT53PH
FLT73PH	3 phase fault on the Texas County (523090) – TCMMRY (523113) 115kV line 1. Apply fault at the TCMMRY 115kV bus. 2. Clear fault after 5 cycles by removing the line from service. 3. Wait 20 cycles, then reclose the line into the fault. 4. Leave fault on for 5 cycles, then trip and lock out the line.
FLT81PH	Single line to ground fault same as FLT73PH

FAULT	FAULT DESCRIPTION
FLT93PH	3 phase fault on the Spearman (523186) – Hansford (523195) 115kV line 1. Apply fault at the Spearman (523186) 115kV bus. 2. Clear fault after 5 cycles by removing the line from service. 3. Wait 20 cycles, and then re-close the line into the fault. 4. Leave fault on for 5 cycles, then trip and lock out the line.
FLT101PH	Single line to ground fault same as FLT93PH
FLT113PH	3 phase fault on the Spearman (523186) – Pringle (523266) 115kV line, CKT 1 1. Apply fault at the Spearman 115kV bus. 2. Clear fault after 5 cycles by removing the line from service. 3. Wait 20 cycles, and then re-close the line into the fault. 4. Leave fault on for 5 cycles, then trip and lock out the line.
FLT121PH	Single line to ground fault same as FLT113PH
FLT133PH	3 phase fault on the Plant X (525481) - Potter (523959) 230kV line 1. Apply fault at the Plant X 230kV bus. 2. Clear fault after 5 cycles by tripping the Plant X - Potter 230kV line 3. Wait 20 cycles, then reclose the line into the fault 4. Leave fault on for 5 cycles, then trip and lock out the line.
FLT141PH	Single line to ground fault same as FLT133PH
FLT153PH	3 phase fault on the Pringle (523266) -Blackhawk (523344)115kV line 1. Apply fault at the Blackhawk 115kV bus. 2. Clear fault after 5 cycles by tripping the Pringle-Blackhawk 115kV line 3. Wait 20 cycles, then reclose the line into the fault 4. Leave fault on for 5 cycles, then trip and lock out the line.
FLT161PH	Single line to ground fault same as FLT153PH
FLT173PH	3 phase fault on the Pringle (523267) -Harrington (523979) 230kV line 1. Apply fault at the Pringle 230kV bus. 2. Clear fault after 5 cycles by tripping the Pringle-Harrington 230kV line 3. Wait 20 cycles, then reclose the line into the fault 4. Leave fault on for 5 cycles, then trip and lock out the line.
FLT181PH	Single line to ground fault same as FLT173PH

Table 5: Contingencies Evaluated (continued)

4.4 Further Model Preparation

The two base cases contain prior queued projects as shown in Table 6.

The wind farm generations from the study customer and previously queued customers were dispatched into the SPP footprint.

Initial simulation were carried out on both base cases and cases with the added generation for a no-disturbance run of 20 seconds to verify the numerical stability of the model. All cases were confirmed to be stable.

Project	MW
GEN-2002-008	240
GEN-2003-013	198
GEN-2005-017	340
GEN-2005-002	80
GEN-2002-009	80
GEN-2002-006	150
GEN-2004-003	240
GEN-2003-020	160

Table 6: Prior Queued Projects

5.0 Results

Results of the stability analysis are summarized in Table 7. The results indicate that for all contingencies studied the transmission system remains stable.

Selected stability plots for the two seasons are in Appendix A and Appendix B. All plots are available on request.

Table 7: Summary of Fault Simulation Results

Cont. No.	Cont. Name	Description	2010 Summer Peak	2010 Winter Peak
1	FLT13PH	3 phase fault on the Wind Farm (560200)-Hitchland (523093) 115kV line 1. Apply fault at Wind Farm 115kV bus (560200). 2. Clear fault after 5 cycles by removing the line from service. 3. Wait 20 cycles, and then re-close the line into the fault. 4. Leave fault on for 5 cycles, then trip and lock out the line.	**STABLE**	**STABLE**
2	FLT21PH	Single phase fault and sequence like Cont. No. 1	**STABLE**	**STABLE**
3	FLT33PH	3 phase fault on the Wind Farm (560200)-Sherman Tap (523175)115kV line 1. Apply fault at Sherman Tap (523175). 2. Clear fault after 5 cycles by removing the line from service. 3. Wait 20 cycles, and then re-close the line into the fault. 4. Leave fault on for 5 cycles, then trip and lock out the line.	**STABLE**	**STABLE**
4	FLT41PH	Single phase fault and sequence like Cont. No. 3	**STABLE**	**STABLE**
5	FLT53PH	3 phase fault on the Moore (523309)-Potter (523959) 230kV line 1. Apply fault at Moore (523309). 2. Clear fault after 5 cycles by removing the line from service. 3. Wait 20 cycles, and then re-close the line into the fault. 4. Leave fault on for 5 cycles, then trip and lock out the line.	**STABLE**	**STABLE**
6	FLT61PH	Single phase fault and sequence like Cont. No. 5	**STABLE**	**STABLE**
7	FLT73PH	3 phase fault on the Texas County (523090) – TCMMRY (523113) 115kV line 1. Apply fault at the TCMMRY 115kV bus. 2. Clear fault after 5 cycles by removing the line from service. 3. Wait 20 cycles, then reclose the line into the fault. 4. Leave fault on for 5 cycles, then trip and lock out the line.	**STABLE**	**STABLE**
8	FLT81PH	Single phase fault and sequence like Cont. No.7	**STABLE**	**STABLE**
9	FLT93PH	3 phase fault on the Spearman (523186) – Hansford (523195) 115kV line 1. Apply fault at the Spearman (523186) 115kV bus. 2. Clear fault after 5 cycles by removing the line from service. 3. Wait 20 cycles, and then re-close the line into the fault. 4. Leave fault on for 5 cycles, then trip and lock out the line.	**STABLE**	**STABLE**
10	FLT101PH	Single phase fault and sequence like Cont. No.9	**STABLE**	**STABLE**

Cont. No.	Cont. Name	Description	2010 Summer Peak	2010 Winter Peak
11	FLT113PH	3 phase fault on the Spearman (523186) – Pringle (523266) 115kV line, CKT 1 1. Apply fault at the Spearman 115kV bus. 2. Clear fault after 5 cycles by removing the line from service. 3. Wait 20 cycles, and then re-close the line into the fault. 4. Leave fault on for 5 cycles, then trip and lock out the line.	**STABLE**	**STABLE**
12	FLT121PH	Single phase fault and sequence like Cont. No.11	**STABLE**	**STABLE**
13	FLT133PH	3 phase fault on the Plant X (525481) - Potter (523959) 230kV line 1. Apply fault at the Plant X 230kV bus. 2. Clear fault after 5 cycles by tripping the Plant X - Potter 230kV line. 3. Wait 20 cycles, then reclose the line into the fault. 4. Leave fault on for 5 cycles, then trip and lock out the line.	**STABLE**	**STABLE**
14	FLT141PH	Single phase fault and sequence like Cont. No.13	**STABLE**	**STABLE**
15	FLT153PH	3 phase fault on the Pringle (523266) -Blackhawk (523344)115kV line 1. Apply fault at the Blackhawk 115kV bus. 2. Clear fault after 5 cycles by tripping the Pringle-Blackhawk 115kV line. 3. Wait 20 cycles, then reclose the line into the fault. 4. Leave fault on for 5 cycles, then trip and lock out the line.	**STABLE**	**STABLE**
16	FLT161PH	Single phase fault and sequence like Cont. No.15	**STABLE**	**STABLE**
17	FLT173PH	3 phase fault on the Pringle (523267) -Harrington (523979) 230kV line 1. Apply fault at the Pringle 230kV bus. 2. Clear fault after 5 cycles by tripping the Pringle-Harrington 230kV line. 3. Wait 20 cycles, then reclose the line into the fault. 4. Leave fault on for 5 cycles, then trip and lock out the line.	**STABLE**	**STABLE**
18	FLT181PH	Single phase fault and sequence like Cont. No.17	**STABLE**	**STABLE**

Table 7: Summary of Fault Simulation Results (continued)

6.0 Conclusion

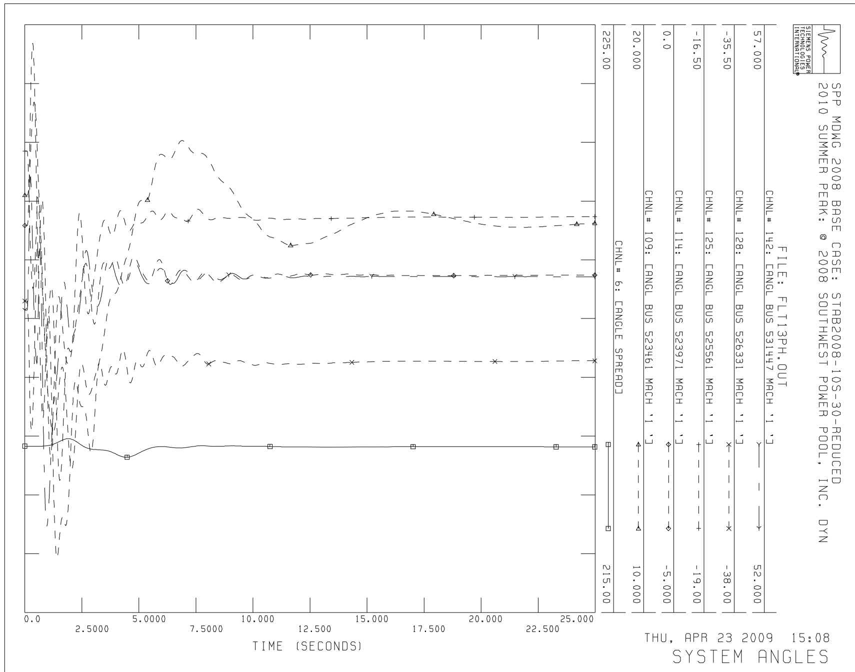
<OMITTED TEXT> (Customer) has requested a restudy of Impact Study for GEN-2006-020S using 13 GE 1.5 MW wind turbine generators in place of the previously studied Vestes V-80 1.8 MW wind turbine generators. The results of this study show that the wind farm and the transmission system remain stable for all contingencies studied. The Customer's windfarm is required to maintain +/- 0.95 power factor at the POI. Additionally, in order for the wind farm to meet the LVRT provisions of FERC Order #661A, the Customer will be required to purchase the GE turbines with the LVRT II low voltage ride through package offered by the manufacturer.

The costs associated with network upgrades and the interconnection facilities are found in the Facilities Study for Generation Interconnection Request GEN-2006-020S dated May 2007, and therefore, have not been included in this study. The costs do not include any costs associated with the deliverability of the energy to final customers. These costs are determined by separate studies if the Customer requests transmission service through Southwest Power Pool's OASIS. It should be noted that the models used for simulation do not contain all SPP transmission service.

APPENDIX A.

SELECTED STABILITY PLOTS -- 2010 SUMMER PEAK

All plots available on request.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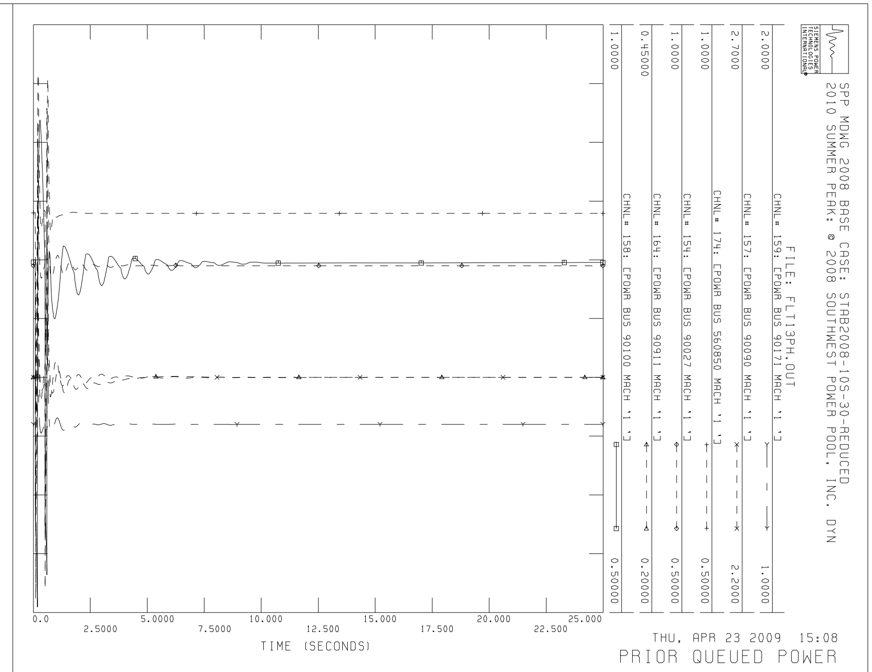
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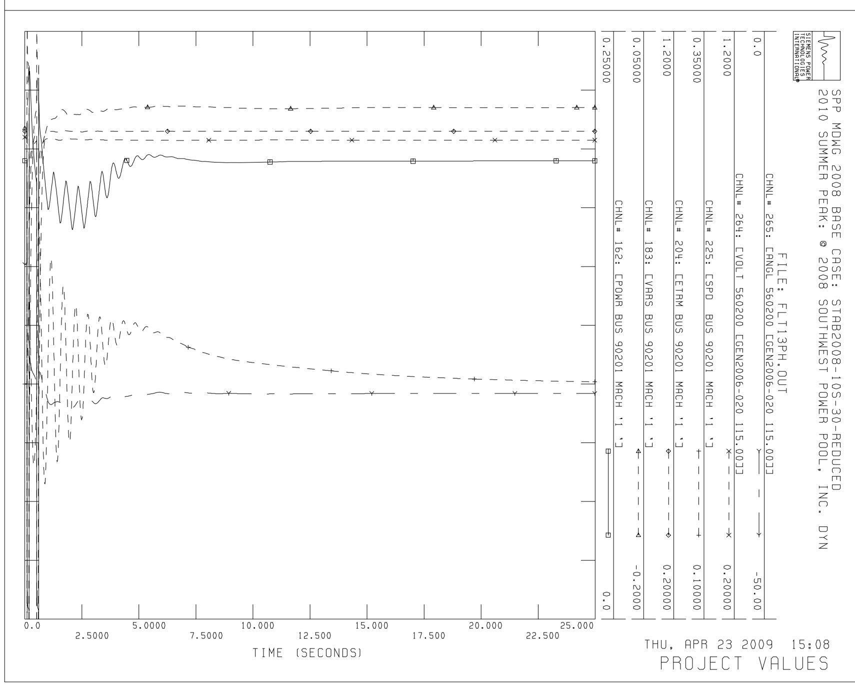
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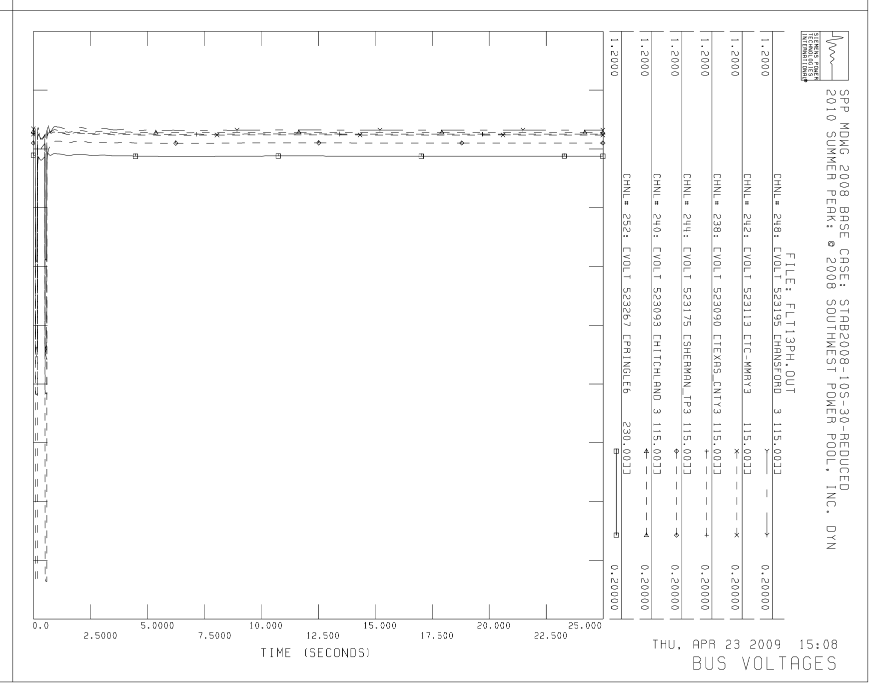
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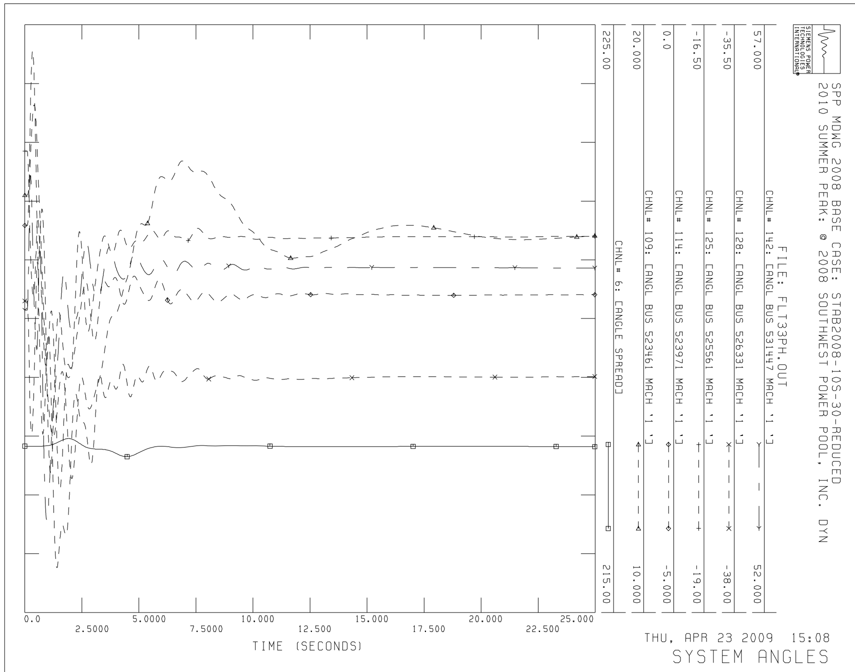
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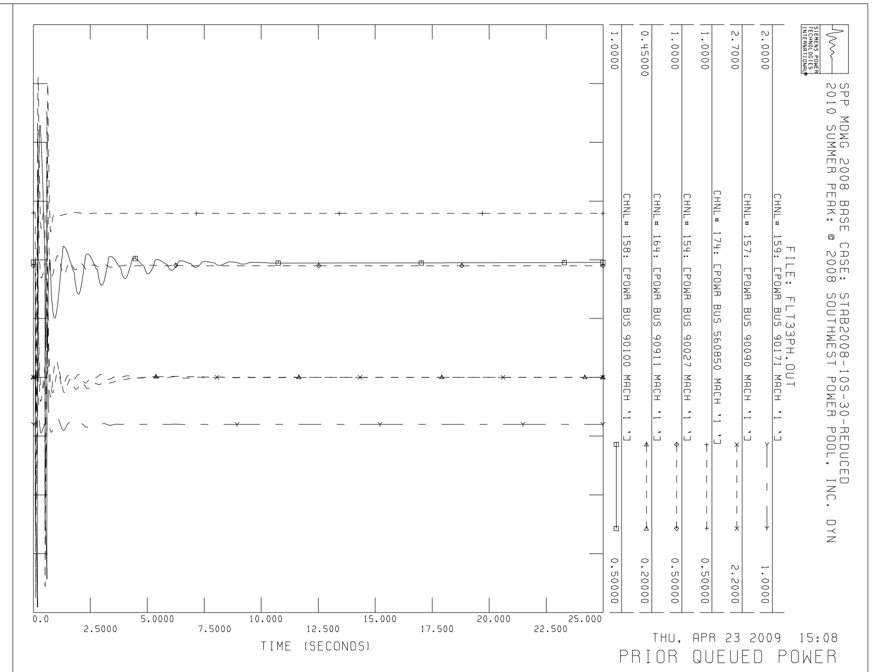
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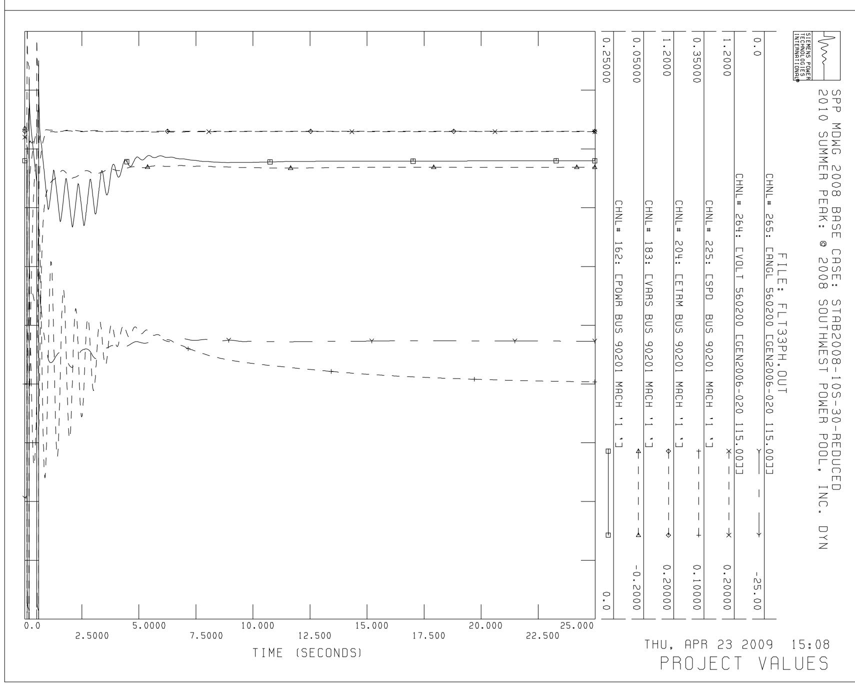
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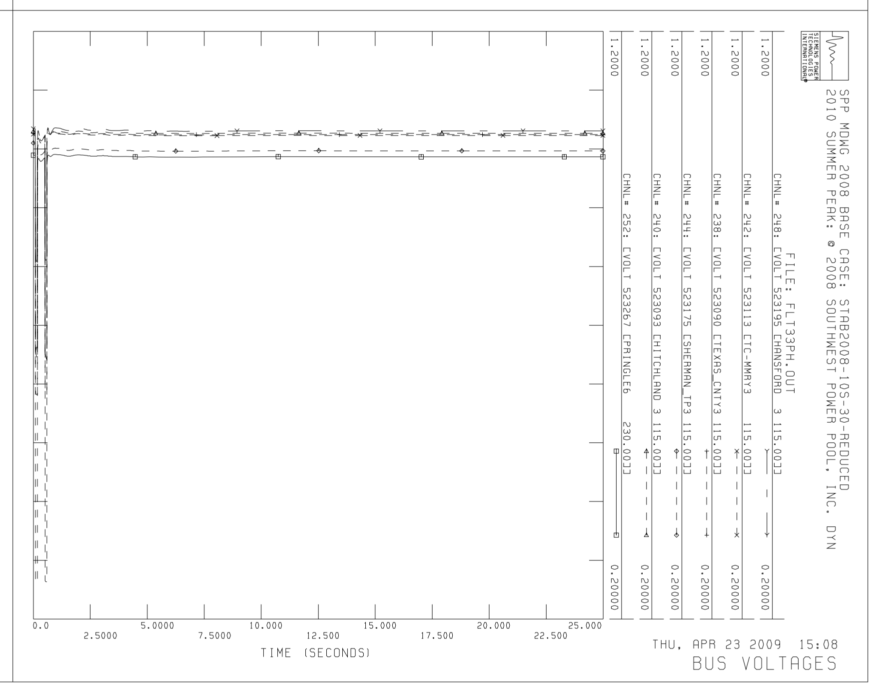
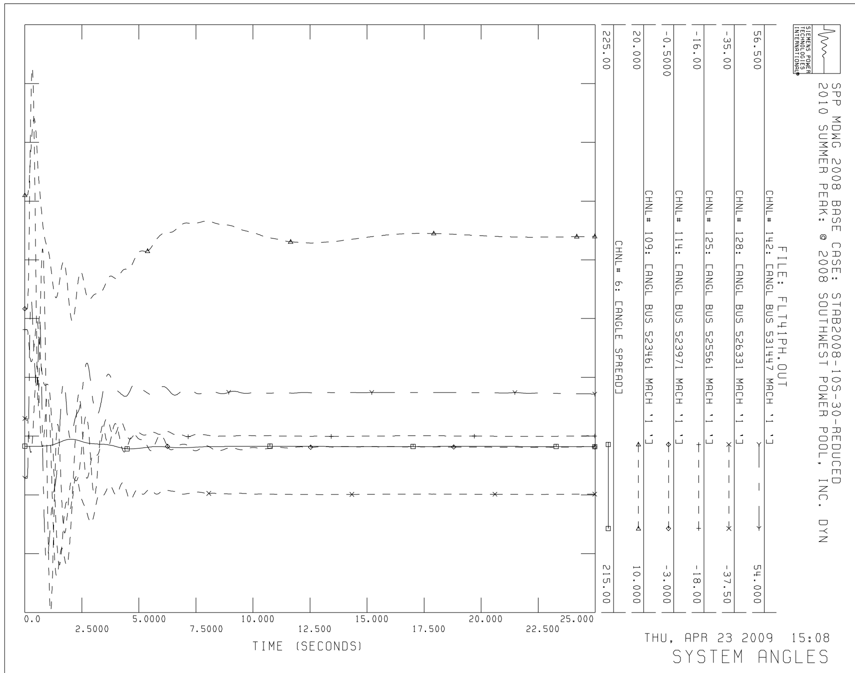
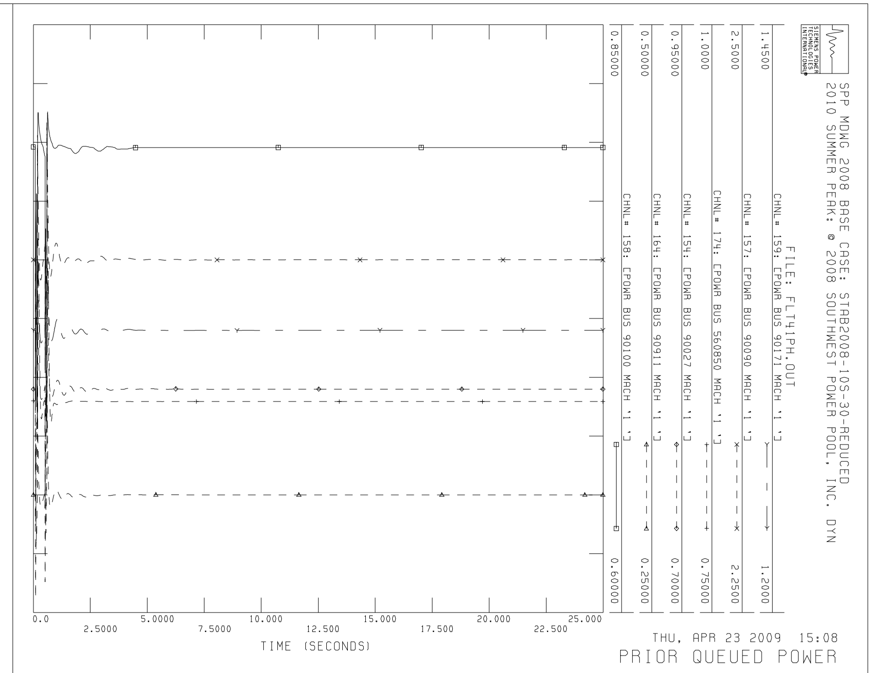
CHNL# 264: [VOLT 560200 [GEN2006-020 115.00]]
CHNL# 225: [SPD BUS 90201 MACH '1 ']
CHNL# 204: [ETRM BUS 90201 MACH '1 ']
CHNL# 183: [VARS BUS 90201 MACH '1 ']
CHNL# 162: [POWR BUS 90201 MACH '1 ']
TIME (SECONDS)
THU, APR 23 2009 15:08
PROJECT VALUES


SPP MDWG 2008 BASE CASE: STAB2008-10S-30-REDUCED
2010 SUMMER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT33PH.OUT
CHNL# 248: [VOLT 523195 [HANSFORD 3 115.00]]
CHNL# 242: [VOLT 523113 [TC-MMRY3 115.00]]
CHNL# 238: [VOLT 523090 [TEXAS_CNTY3 115.00]]
CHNL# 244: [VOLT 523175 [SHERMN_TP3 115.00]]
CHNL# 240: [VOLT 523093 [HITCHLAND 3 115.00]]
CHNL# 252: [VOLT 523267 [PRINGLE6 230.00]]
TIME (SECONDS)
THU, APR 23 2009 15:08
BUS VOLTAGES


SPP MDWG 2008 BASE CASE: STAB2008-10S-30-REDUCED
2010 SUMMER PEAK: @ 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT41PH.OUT
CHNL# 142: [ANGL BUS 531447 MACH '1 '] 56.500 54.000
CHNL# 128: [ANGL BUS 526331 MACH '1 '] -35.00 -37.50
CHNL# 125: [ANGL BUS 525561 MACH '1 '] -16.00 -18.00
CHNL# 114: [ANGL BUS 523971 MACH '1 '] -0.5000 -3.000
CHNL# 109: [ANGL BUS 523461 MACH '1 '] 20.000 10.000
CHNL# 6: [ANGLE SPREAD] 225.00 215.00
TIME (SECONDS)
THU, APR 23 2009 15:08
SYSTEM ANGLES

SPP MDWG 2008 BASE CASE: STAB2008-10S-30-REDUCED
2010 SUMMER PEAK: @ 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT41PH.OUT
CHNL# 159: [POWR BUS 90171 MACH '1 '] 1.4500 1.2000
CHNL# 157: [POWR BUS 90090 MACH '1 '] 2.5000 2.2500
CHNL# 174: [POWR BUS 560850 MACH '1 '] 1.0000 0.75000
CHNL# 154: [POWR BUS 90027 MACH '1 '] 0.95000 0.70000
CHNL# 164: [POWR BUS 90911 MACH '1 '] 0.50000 0.25000
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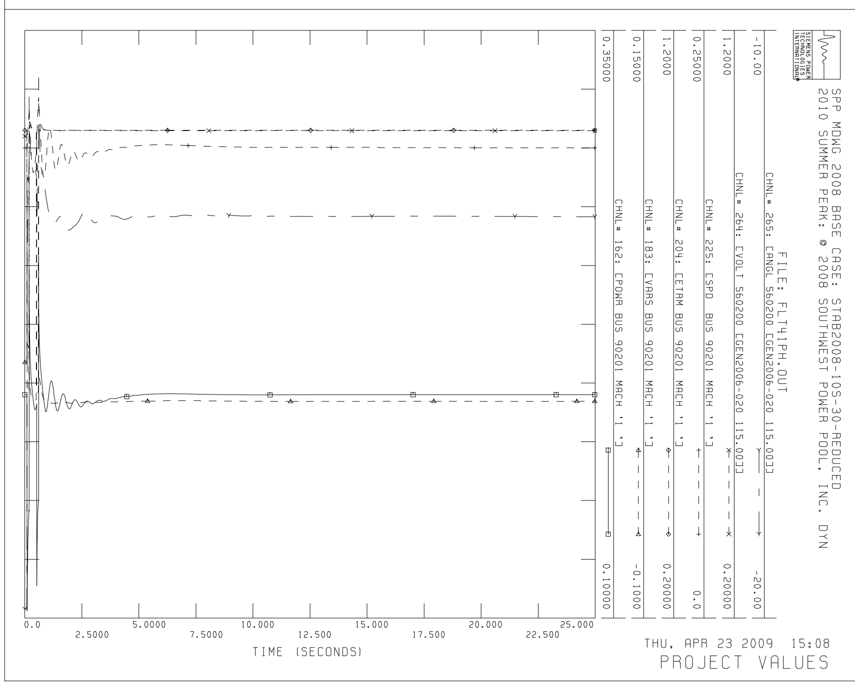
SPP MDWG 2008 BASE CASE: STAB2008-10S-30-REDUCED
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CHNL# 265: [ANGL 560200 [GEN2006-020 115.00]] -10.00 -20.00
CHNL# 264: [VOLT 560200 [GEN2006-020 115.00]] 1.2000 0.20000
CHNL# 225: [SPD BUS 90201 MACH '1 '] 0.25000 0.0
CHNL# 204: [ETRM BUS 90201 MACH '1 '] 1.2000 0.20000
CHNL# 183: [VARS BUS 90201 MACH '1 '] 0.15000 -0.1000
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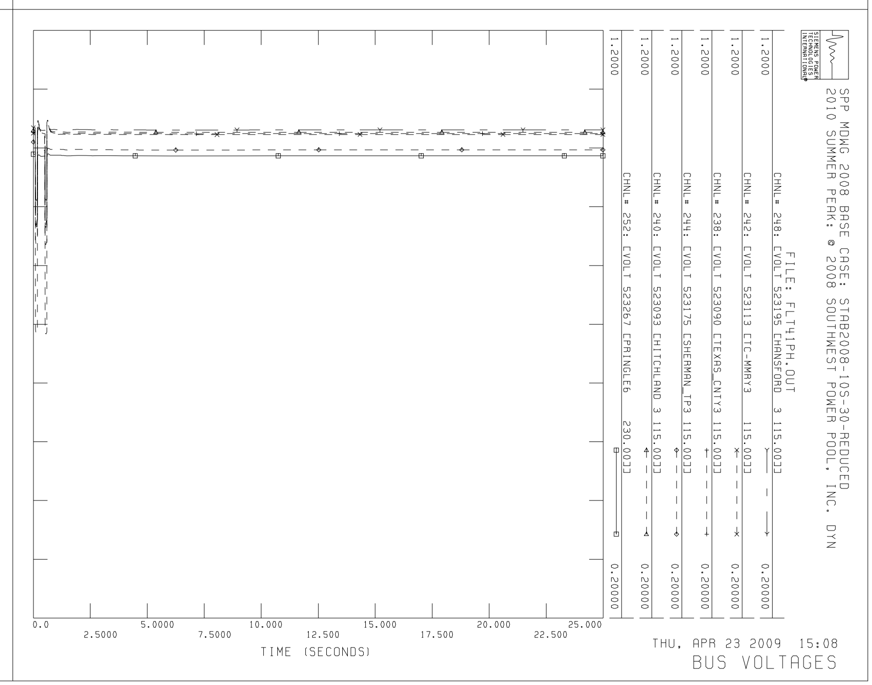
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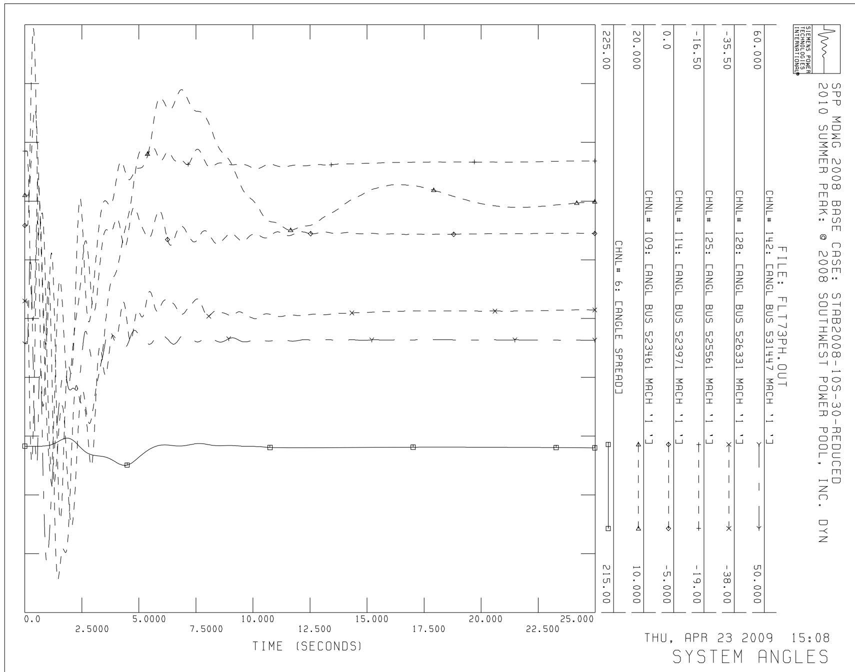
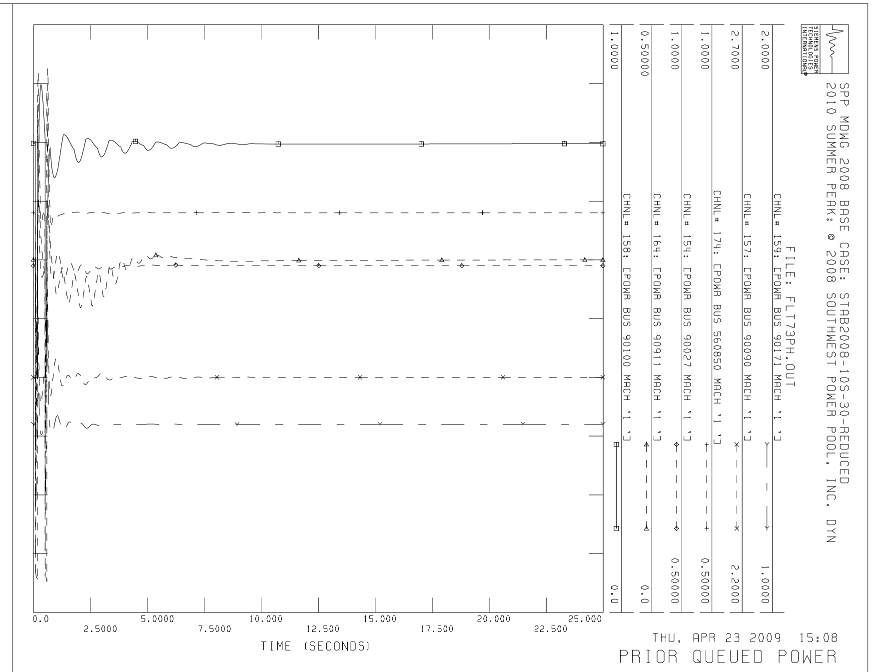
2010 SUMMER PEAK: @ 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT41PH.OUT
CHNL# 248: [VOLT 523195 [HANSFORD 3 115.00]] 1.2000 0.20000
CHNL# 242: [VOLT 523113 [TC-MRY3 115.00]] 1.2000 0.20000
CHNL# 238: [VOLT 523090 [TEXAS_CNTY3 115.00]] 1.2000 0.20000
CHNL# 244: [VOLT 523175 [SHERMAN_TP3 115.00]] 1.2000 0.20000
CHNL# 240: [VOLT 523093 [HITCHLAND 3 115.00]] 1.2000 0.20000
CHNL# 252: [VOLT 523267 [PRINGLE6 230.00]] 1.2000 0.20000
TIME (SECONDS)
THU, APR 23 2009 15:08
BUS VOLTAGES


SPP MDWG 2008 BASE CASE: STAB2008-10S-30-REDUCED
2010 SUMMER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT73PH.OUT
CHNL# 142: [ANGL BUS 531447 MACH '1 '] 60.000 50.000
CHNL# 128: [ANGL BUS 526331 MACH '1 '] -35.50 -38.00
CHNL# 125: [ANGL BUS 525561 MACH '1 '] -16.50 -19.00
CHNL# 114: [ANGL BUS 523971 MACH '1 '] 0.0 -5.000
CHNL# 109: [ANGL BUS 523461 MACH '1 '] 20.000 10.000
CHNL# 6: [ANGLE SPREAD] 225.00 215.00
TIME (SECONDS)
THU, APR 23 2009 15:08
SYSTEM ANGLES

SPP MDWG 2008 BASE CASE: STAB2008-10S-30-REDUCED
2010 SUMMER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT73PH.OUT
CHNL# 159: [POWR BUS 90171 MACH '1 '] 2.0000 1.0000
CHNL# 157: [POWR BUS 90090 MACH '1 '] 2.7000 2.2000
CHNL# 174: [POWR BUS 560850 MACH '1 '] 1.0000 0.50000
CHNL# 154: [POWR BUS 90027 MACH '1 '] 1.0000 0.50000
CHNL# 164: [POWR BUS 90911 MACH '1 '] 0.50000 0.0
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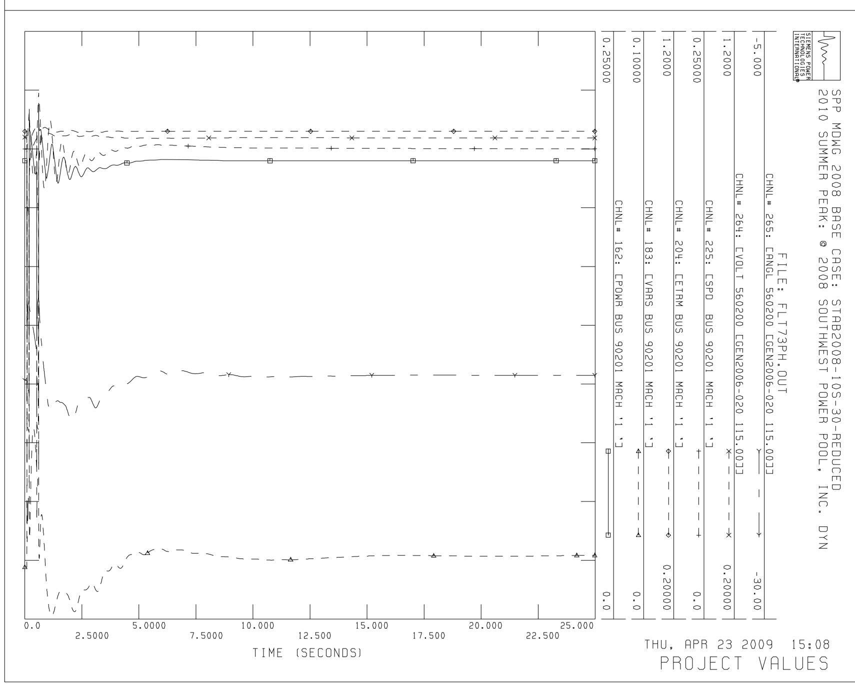
TIME (SECONDS)
THU, APR 23 2009 15:08
PRIOR QUEUED POWER

SPP MDWG 2008 BASE CASE: STAB2008-10S-30-REDUCED
2010 SUMMER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT73PH.OUT
CHNL# 265: [ANGL 560200 [GEN2006-020 115.00]] -5.000 -30.00
CHNL# 264: [VOLT 560200 [GEN2006-020 115.00]] 1.2000 0.20000
CHNL# 225: [SPD BUS 90201 MACH '1 '] 0.25000 0.0
CHNL# 204: [ETRM BUS 90201 MACH '1 '] 1.2000 0.20000
CHNL# 183: [VARS BUS 90201 MACH '1 '] 0.10000 0.0
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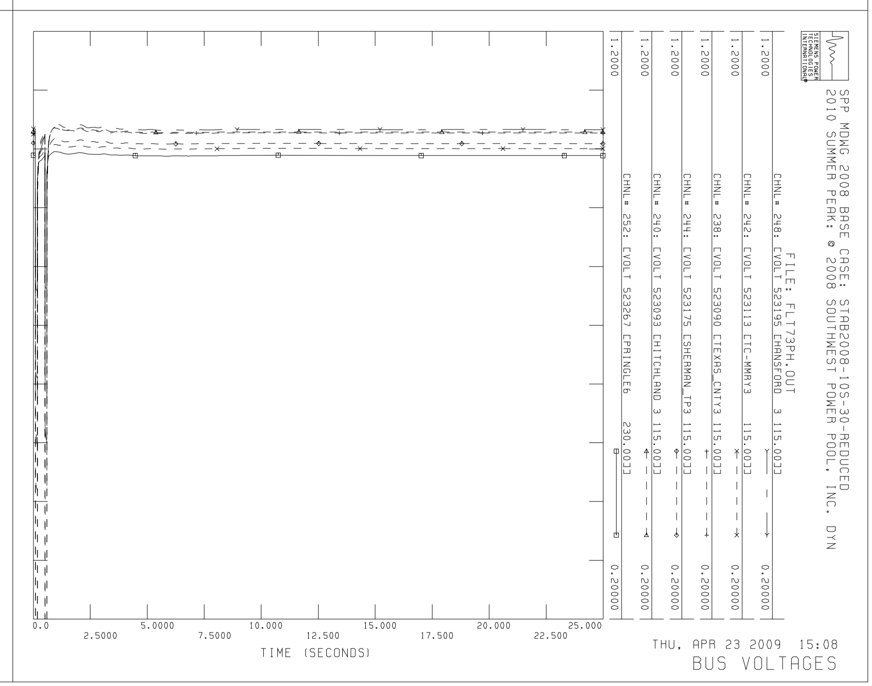
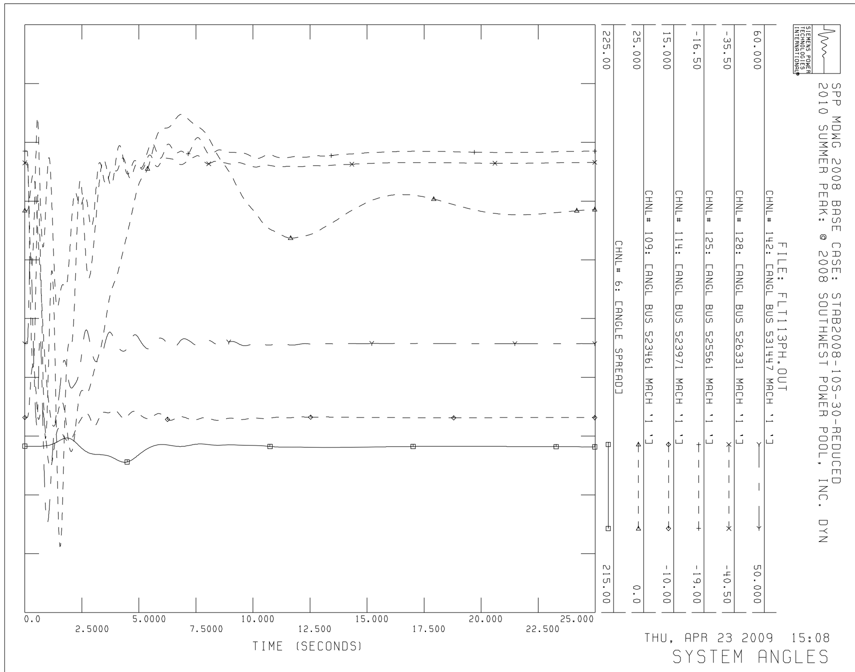
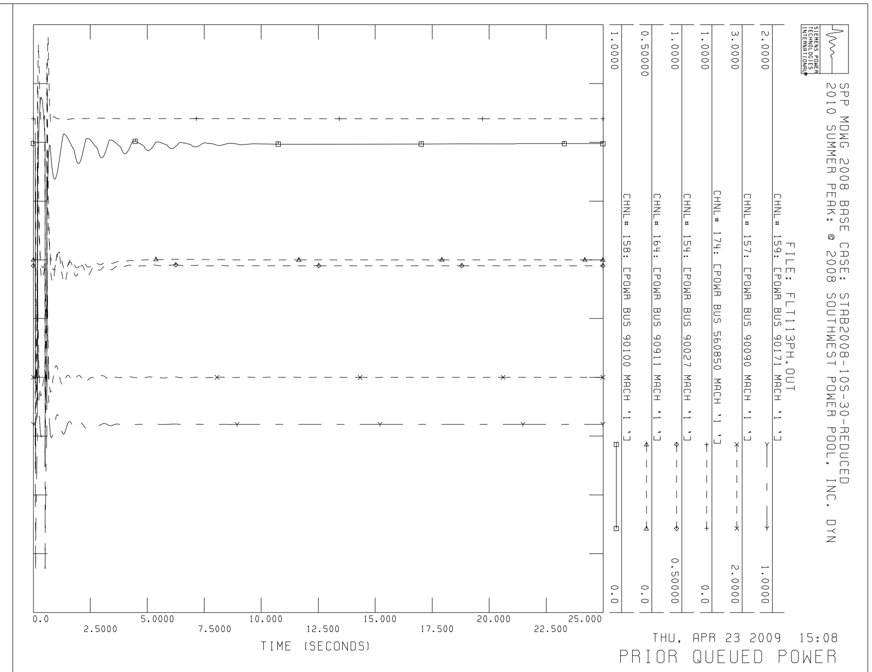
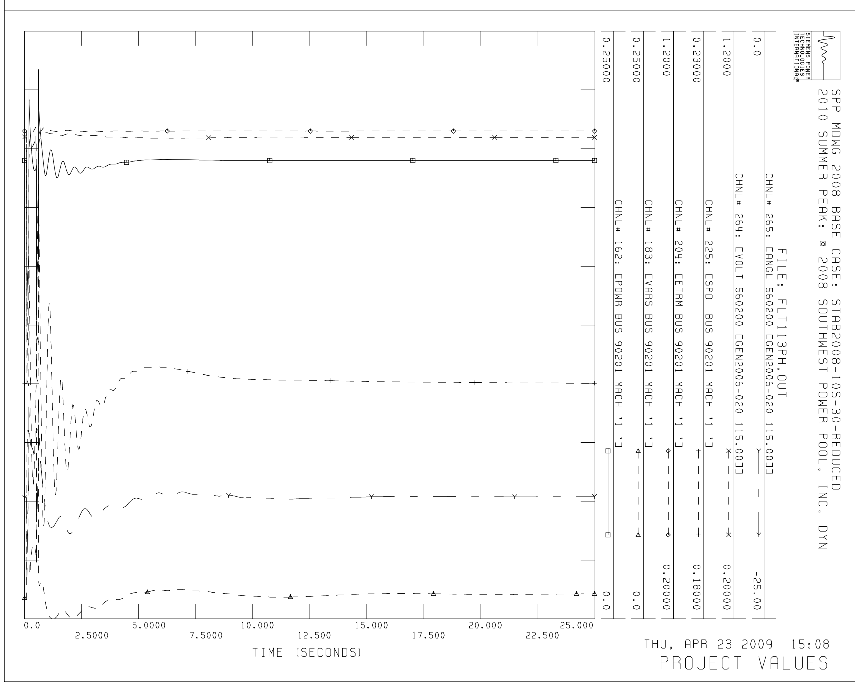
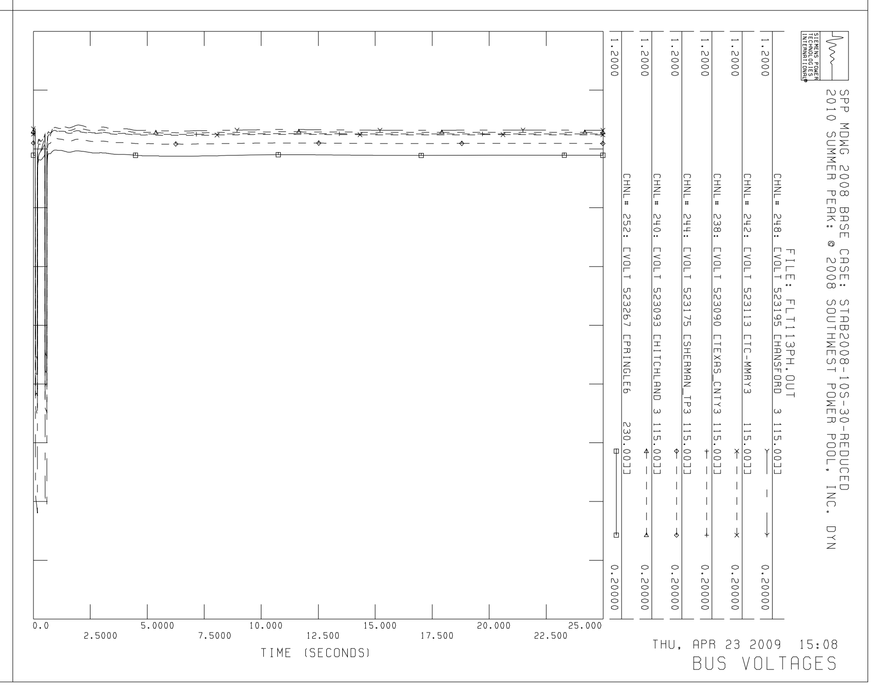
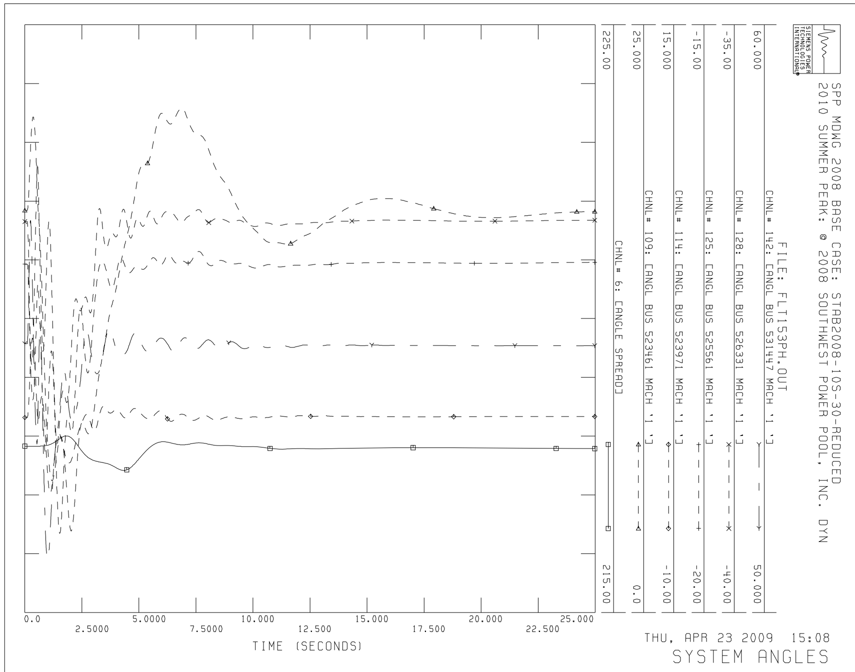
TIME (SECONDS)
THU, APR 23 2009 15:08
PROJECT VALUES

SPP MDWG 2008 BASE CASE: STAB2008-10S-30-REDUCED
2010 SUMMER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT73PH.OUT
CHNL# 248: [VOLT 523195 [HANSFORD 3 115.00]] 1.2000 0.20000
CHNL# 242: [VOLT 523113 [TC-MMRY3 115.00]] 1.2000 0.20000
CHNL# 238: [VOLT 523090 [TEXAS_CNTY3 115.00]] 1.2000 0.20000
CHNL# 244: [VOLT 523175 [SHERMN_TP3 115.00]] 1.2000 0.20000
CHNL# 240: [VOLT 523093 [HITCHLAND 3 115.00]] 1.2000 0.20000
CHNL# 252: [VOLT 523267 [PRINGLE6 230.00]] 1.2000 0.20000
TIME (SECONDS)
THU, APR 23 2009 15:08
BUS VOLTAGES

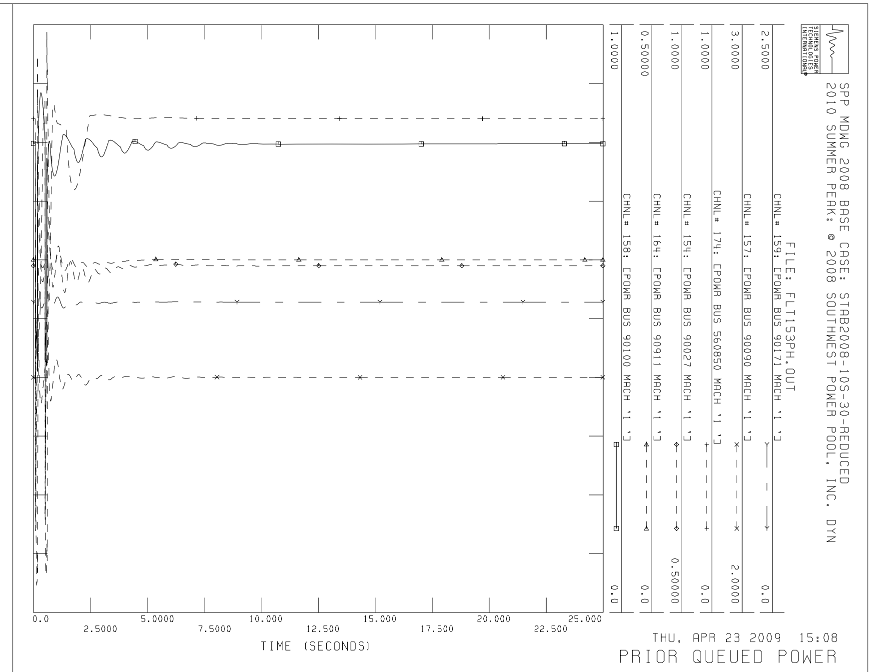

SPP MDWG 2008 BASE CASE: STAB2008-10S-30-REDUCED
2010 SUMMER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT1113PH.OUT
CHNL# 142: [ANGL BUS 531447 MACH '1 '] 60.000 50.000
CHNL# 128: [ANGL BUS 526331 MACH '1 '] -35.50 -40.50
CHNL# 125: [ANGL BUS 525561 MACH '1 '] -16.50 -19.00
CHNL# 114: [ANGL BUS 523971 MACH '1 '] 15.000 -10.00
CHNL# 109: [ANGL BUS 523461 MACH '1 '] 25.000 0.0
CHNL# 6: [ANGLE SPREAD] 225.00 215.00
TIME (SECONDS)
THU, APR 23 2009 15:08
SYSTEM ANGLES

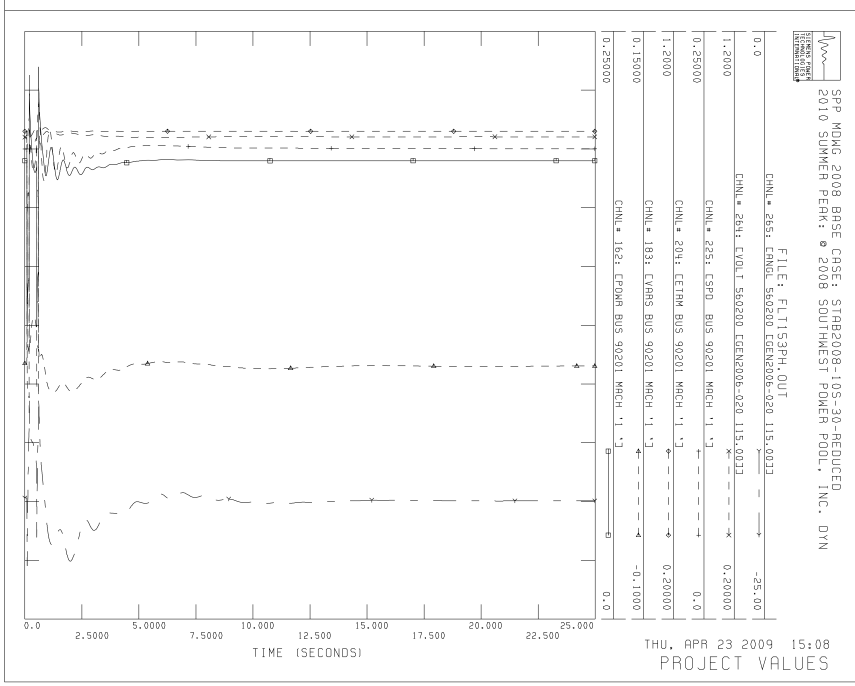

SPP MDWG 2008 BASE CASE: STAB2008-10S-30-REDUCED
2010 SUMMER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT1113PH.OUT
CHNL# 159: [POWR BUS 90171 MACH '1 '] 2.0000 1.0000
CHNL# 157: [POWR BUS 90090 MACH '1 '] 3.0000 2.0000
CHNL# 174: [POWR BUS 560850 MACH '1 '] 1.0000 0.0
CHNL# 154: [POWR BUS 90027 MACH '1 '] 1.0000 0.50000
CHNL# 164: [POWR BUS 90911 MACH '1 '] 0.50000 0.0
CHNL# 158: [POWR BUS 90100 MACH '1 '] 1.0000 0.0
TIME (SECONDS)
THU, APR 23 2009 15:08
PRIOR QUEUED POWER

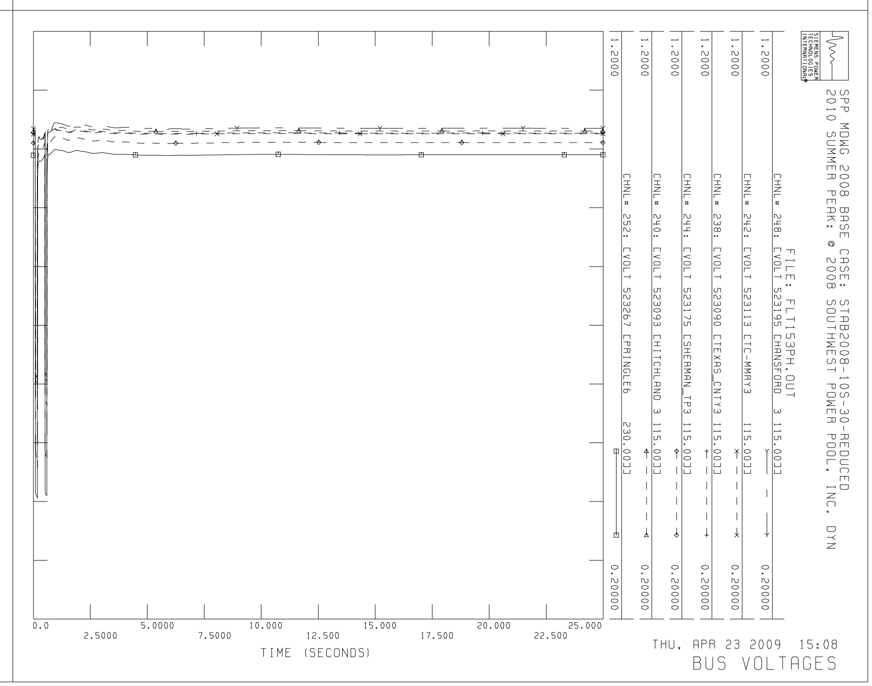

SPP MDWG 2008 BASE CASE: STAB2008-10S-30-REDUCED
2010 SUMMER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT1113PH.OUT
CHNL# 265: [ANGL 560200 [GEN2006-020 115.00]] 0.0 -25.00
CHNL# 264: [VOLT 560200 [GEN2006-020 115.00]] 1.2000 0.20000
CHNL# 225: [SPD BUS 90201 MACH '1 '] 0.23000 0.18000
CHNL# 204: [ETRM BUS 90201 MACH '1 '] 1.2000 0.20000
CHNL# 183: [VARS BUS 90201 MACH '1 '] 0.25000 0.0
CHNL# 162: [POWR BUS 90201 MACH '1 '] 0.25000 0.0
TIME (SECONDS)
THU, APR 23 2009 15:08
PROJECT VALUES


SPP MDWG 2008 BASE CASE: STAB2008-10S-30-REDUCED
2010 SUMMER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT1113PH.OUT
CHNL# 248: [VOLT 523195 [HANSFORD 3 115.00]] 1.2000 0.20000
CHNL# 242: [VOLT 523113 [TC-MMRY3 115.00]] 1.2000 0.20000
CHNL# 238: [VOLT 523090 [TEXAS_CNTY3 115.00]] 1.2000 0.20000
CHNL# 244: [VOLT 523175 [SHERMN_TP3 115.00]] 1.2000 0.20000
CHNL# 240: [VOLT 523093 [HITCHLAND 3 115.00]] 1.2000 0.20000
CHNL# 252: [VOLT 523267 [PRINGLE6 230.00]] 1.2000 0.20000
TIME (SECONDS)
THU, APR 23 2009 15:08
BUS VOLTAGES


SPP MDWG 2008 BASE CASE: STAB2008-10S-30-REDUCED
2010 SUMMER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT153PH.OUT
CHNL# 142: [ANGL BUS 531447 MACH '1 ']
CHNL# 128: [ANGL BUS 526331 MACH '1 ']
CHNL# 125: [ANGL BUS 525561 MACH '1 ']
CHNL# 114: [ANGL BUS 523971 MACH '1 ']
CHNL# 109: [ANGL BUS 523461 MACH '1 ']
CHNL# 6: [ANGLE SPREAD]
TIME (SECONDS)
THU, APR 23 2009 15:08
SYSTEM ANGLES


SPP MDWG 2008 BASE CASE: STAB2008-10S-30-REDUCED
2010 SUMMER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT153PH.OUT
CHNL# 159: [POWR BUS 90171 MACH '1 ']
CHNL# 157: [POWR BUS 90090 MACH '1 ']
CHNL# 174: [POWR BUS 560850 MACH '1 ']
CHNL# 154: [POWR BUS 90027 MACH '1 ']
CHNL# 164: [POWR BUS 90911 MACH '1 ']
CHNL# 158: [POWR BUS 90100 MACH '1 ']
TIME (SECONDS)
THU, APR 23 2009 15:08
PRIOR QUEUED POWER

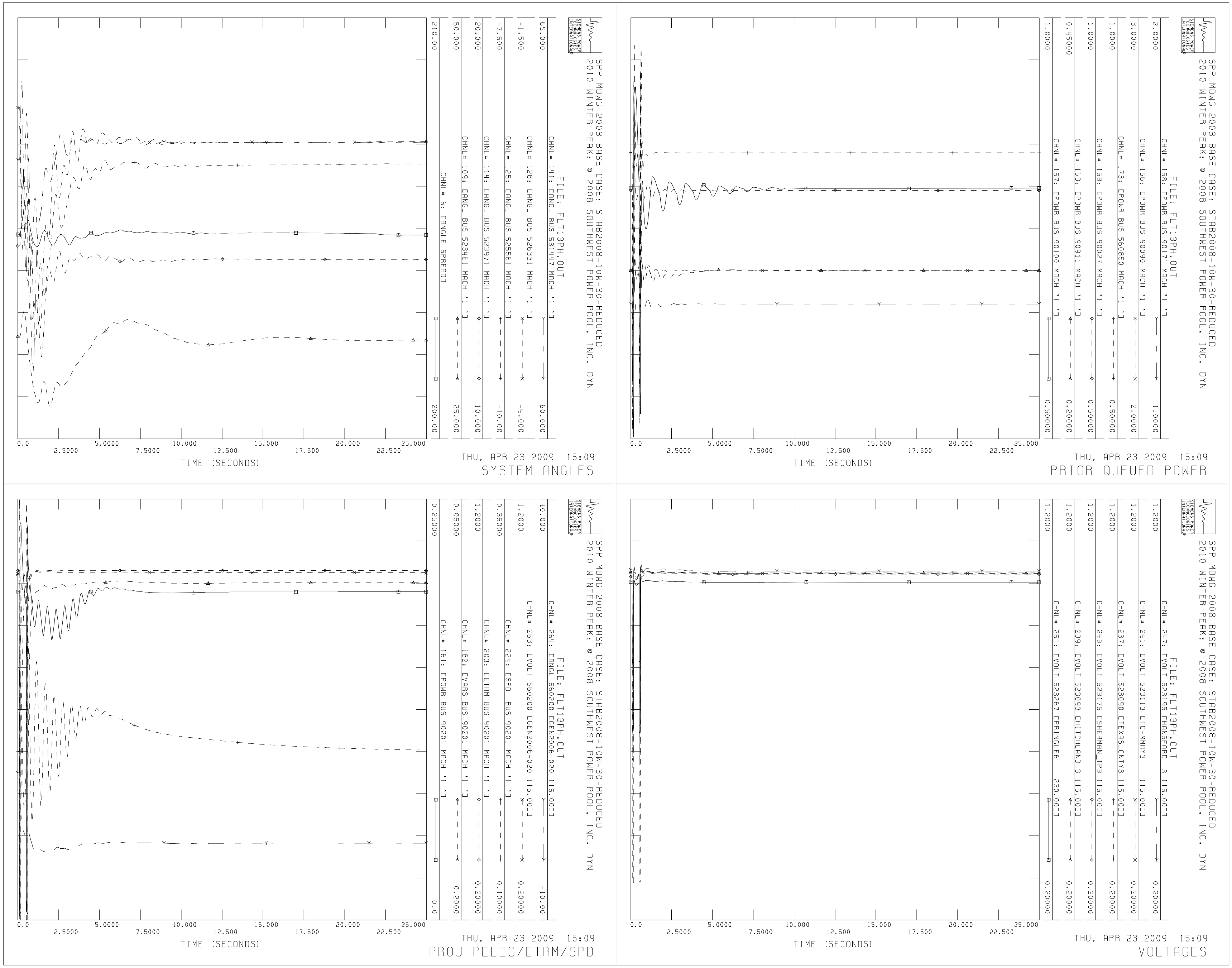

SPP MDWG 2008 BASE CASE: STAB2008-10S-30-REDUCED
2010 SUMMER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT153PH.OUT
CHNL# 265: [ANGL 560200 [GEN2006-020 115.00]]
CHNL# 264: [VOLT 560200 [GEN2006-020 115.00]]
CHNL# 225: [SPD BUS 90201 MACH '1 ']
CHNL# 204: [ETRM BUS 90201 MACH '1 ']
CHNL# 183: [VARS BUS 90201 MACH '1 ']
CHNL# 162: [POWR BUS 90201 MACH '1 ']
TIME (SECONDS)
THU, APR 23 2009 15:08
PROJECT VALUES


SPP MDWG 2008 BASE CASE: STAB2008-10S-30-REDUCED
2010 SUMMER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT153PH.OUT
CHNL# 248: [VOLT 523195 [HANSFORD 3 115.00]]
CHNL# 242: [VOLT 523113 [TC-MMRY3 115.00]]
CHNL# 238: [VOLT 523090 [TEXAS_CNTY3 115.00]]
CHNL# 244: [VOLT 523175 [SHERMN_TP3 115.00]]
CHNL# 240: [VOLT 523093 [HITCHLAND 3 115.00]]
CHNL# 252: [VOLT 523267 [PRINGLE6 230.00]]
TIME (SECONDS)
THU, APR 23 2009 15:08
BUS VOLTAGES

APPENDIX B.

SELECTED STABILITY PLOTS -- 2010 WINTER PEAK

All plots available on request.


SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT13PH.OUT
CHNL# 141: [ANGL BUS 531447 MACH '1 '] 65.000 60.000
CHNL# 128: [ANGL BUS 526331 MACH '1 '] -1.500 -4.000
CHNL# 125: [ANGL BUS 525561 MACH '1 '] -7.500 -10.00
CHNL# 114: [ANGL BUS 523971 MACH '1 '] 20.000 10.000
CHNL# 109: [ANGL BUS 523461 MACH '1 '] 50.000 25.000
CHNL# 6: [ANGLE SPREAD] 210.00 200.00
TIME (SECONDS)
THU, APR 23 2009 15:09
SYSTEM ANGLES
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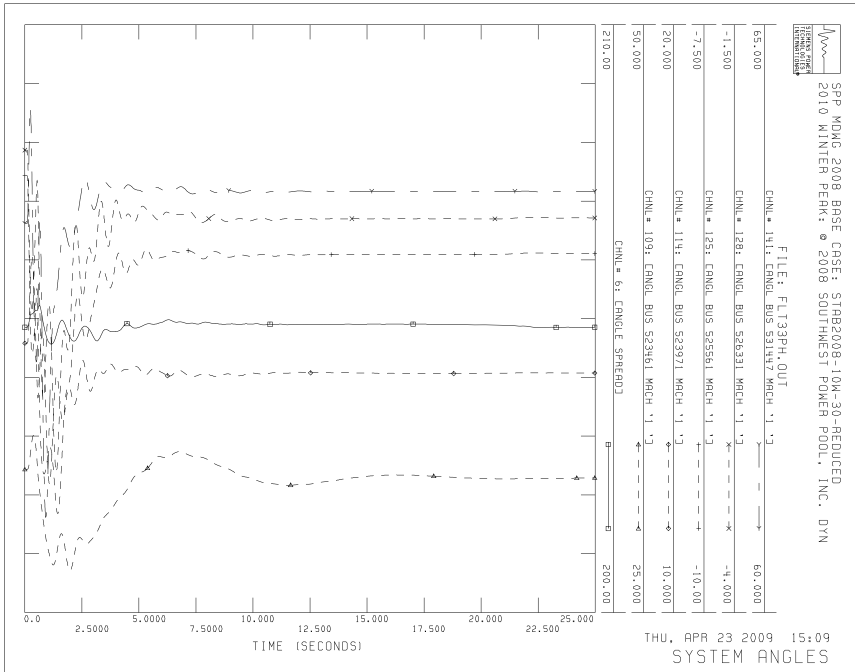
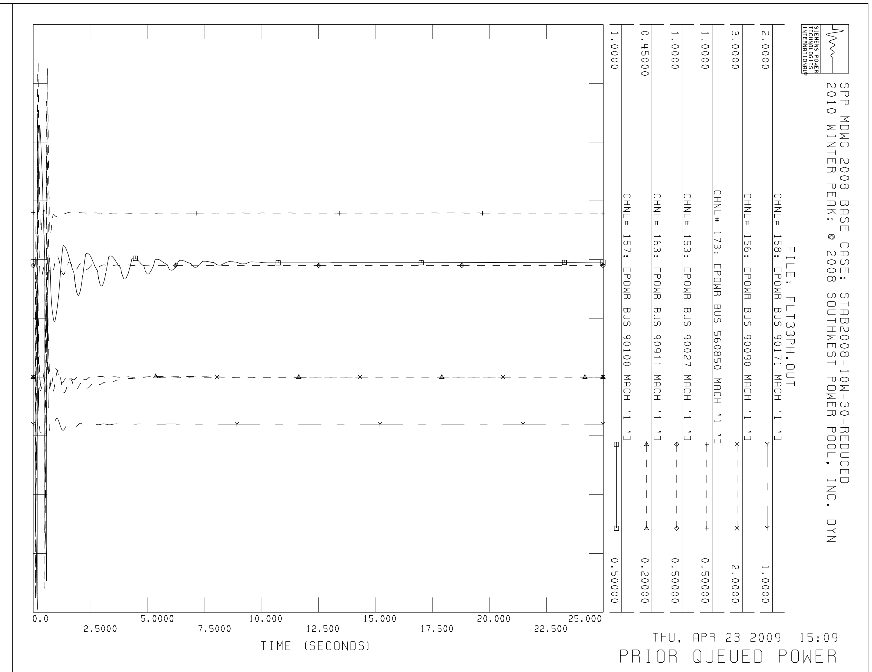
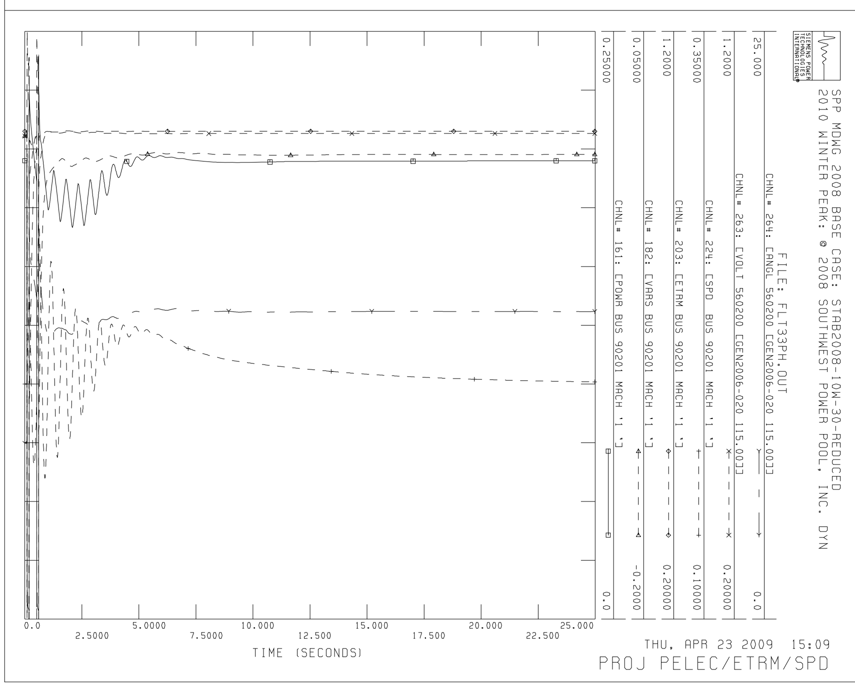
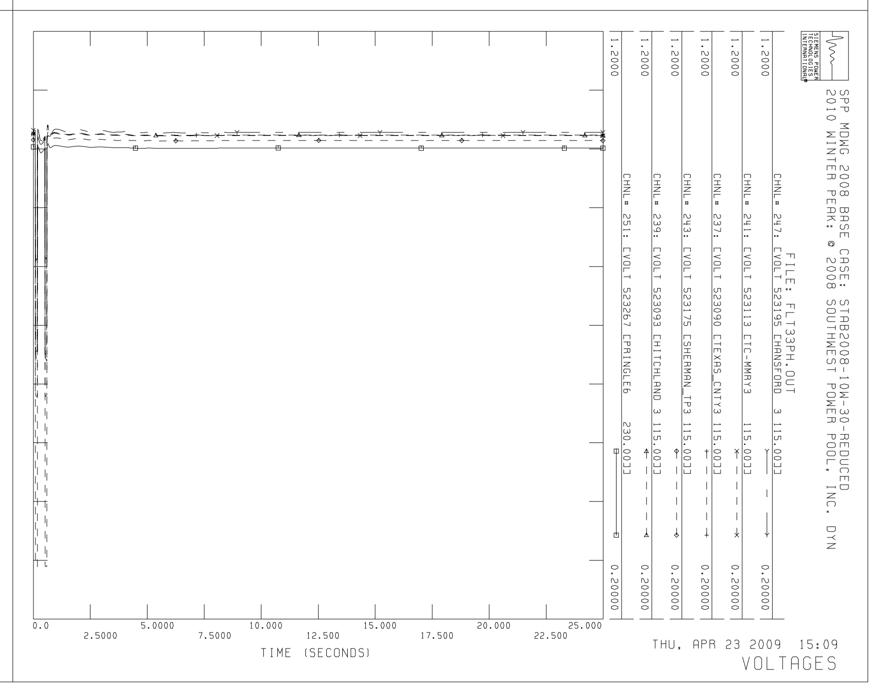
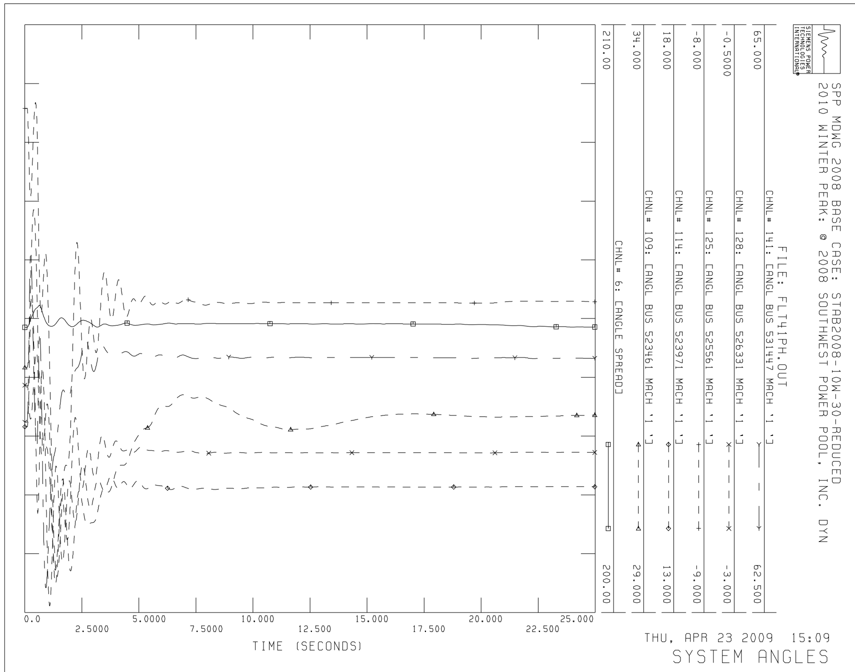
CHNL# 156: [POWR BUS 90090 MACH '1 '] 3.0000 2.0000
CHNL# 173: [POWR BUS 560850 MACH '1 '] 1.0000 0.50000
CHNL# 153: [POWR BUS 90027 MACH '1 '] 1.0000 0.50000
CHNL# 163: [POWR BUS 90911 MACH '1 '] 0.45000 0.20000
CHNL# 157: [POWR BUS 90100 MACH '1 '] 1.0000 0.50000
TIME (SECONDS)
THU, APR 23 2009 15:09
PRIOR QUEUED POWER
CHNL# 264: [ANGL 560200 [GEN2006-020 115.00]] 40.000 -10.00
CHNL# 263: [VOLT 560200 [GEN2006-020 115.00]] 1.2000 0.20000
CHNL# 224: [SPD BUS 90201 MACH '1 '] 0.35000 0.10000
CHNL# 203: [ETRM BUS 90201 MACH '1 '] 1.2000 0.20000
CHNL# 182: [VARS BUS 90201 MACH '1 '] 0.05000 -0.2000
CHNL# 161: [POWR BUS 90201 MACH '1 '] 0.25000 0.0
TIME (SECONDS)
THU, APR 23 2009 15:09
PROJ PELEC/ETRM/SPD
CHNL# 247: [VOLT 523195 [HANSFORD 3 115.00]] 1.2000 0.20000
CHNL# 241: [VOLT 523113 [TC-MMRY3 115.00]] 1.2000 0.20000
CHNL# 237: [VOLT 523090 [TEXAS_CNTY3 115.00]] 1.2000 0.20000
CHNL# 243: [VOLT 523175 [SHERMN_TP3 115.00]] 1.2000 0.20000
CHNL# 239: [VOLT 523093 [HITCHLAND 3 115.00]] 1.2000 0.20000
CHNL# 251: [VOLT 523267 [PRINGLE6 230.00]] 1.2000 0.20000
TIME (SECONDS)
THU, APR 23 2009 15:09
VOLTAGES

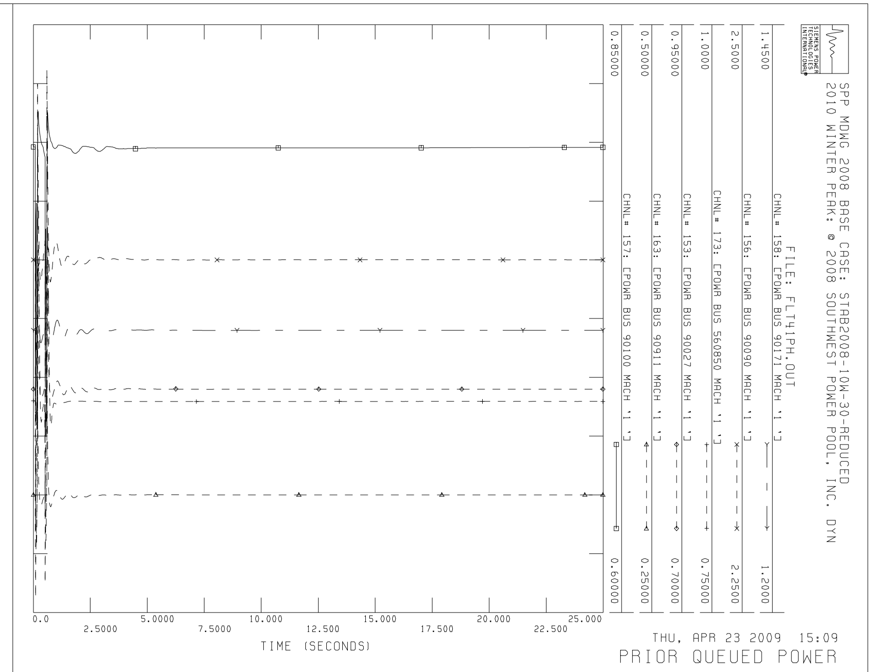

SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT33PH.OUT
CHNL# 141: CANGL BUS 531447 MACH '1 ']
CHNL# 128: CANGL BUS 526331 MACH '1 ']
CHNL# 125: CANGL BUS 525561 MACH '1 ']
CHNL# 114: CANGL BUS 523971 MACH '1 ']
CHNL# 109: CANGL BUS 523461 MACH '1 ']
CHNL# 6: CANGLE SPREAD]
TIME (SECONDS)
THU, APR 23 2009 15:09
SYSTEM ANGLES

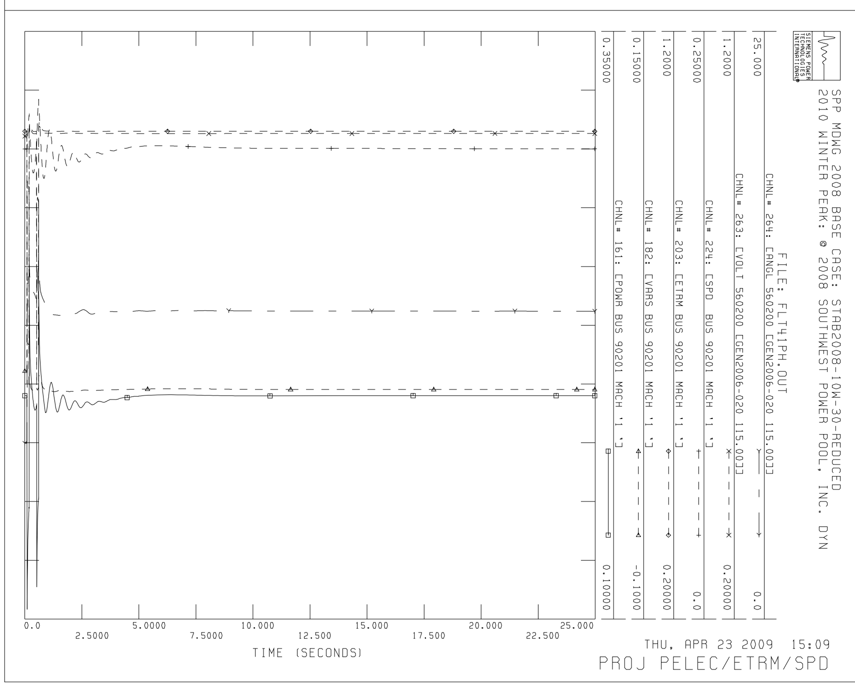

SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT33PH.OUT
CHNL# 158: CPOWR BUS 90171 MACH '1 ']
CHNL# 156: CPOWR BUS 90090 MACH '1 ']
CHNL# 173: CPOWR BUS 560850 MACH '1 ']
CHNL# 153: CPOWR BUS 90027 MACH '1 ']
CHNL# 163: CPOWR BUS 90911 MACH '1 ']
CHNL# 157: CPOWR BUS 90100 MACH '1 ']
TIME (SECONDS)
THU, APR 23 2009 15:09
PRIOR QUEUED POWER

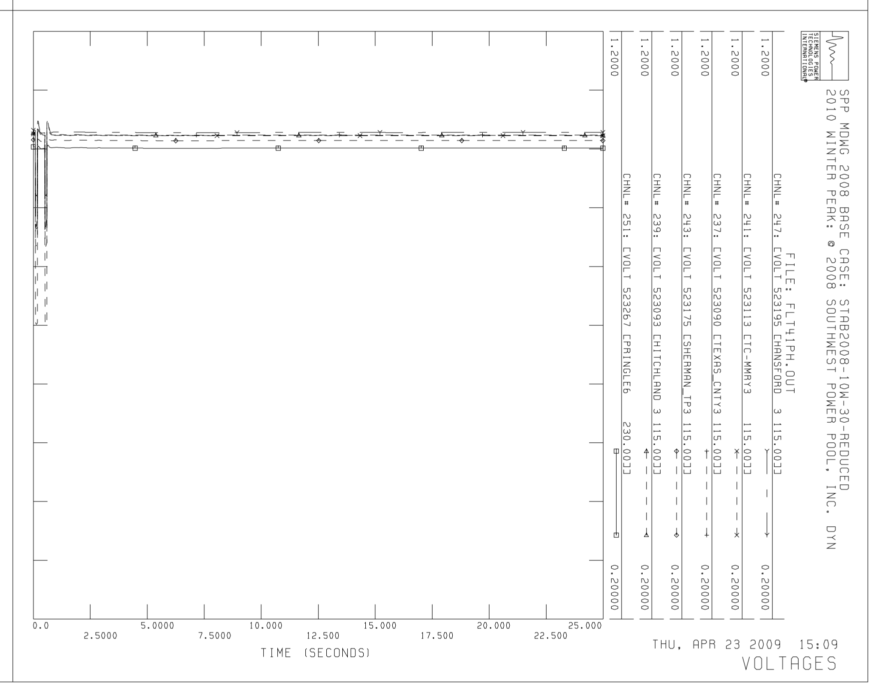

SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT33PH.OUT
CHNL# 264: CANGL 560200 CGEN2006-020 115.00]
CHNL# 263: CVOLT 560200 CGEN2006-020 115.00]
CHNL# 224: CSPD BUS 90201 MACH '1 ']
CHNL# 203: CETRM BUS 90201 MACH '1 ']
CHNL# 182: CVARS BUS 90201 MACH '1 ']
CHNL# 161: CPOWR BUS 90201 MACH '1 ']
TIME (SECONDS)
THU, APR 23 2009 15:09
PROJ PELEC/ETRM/SPD

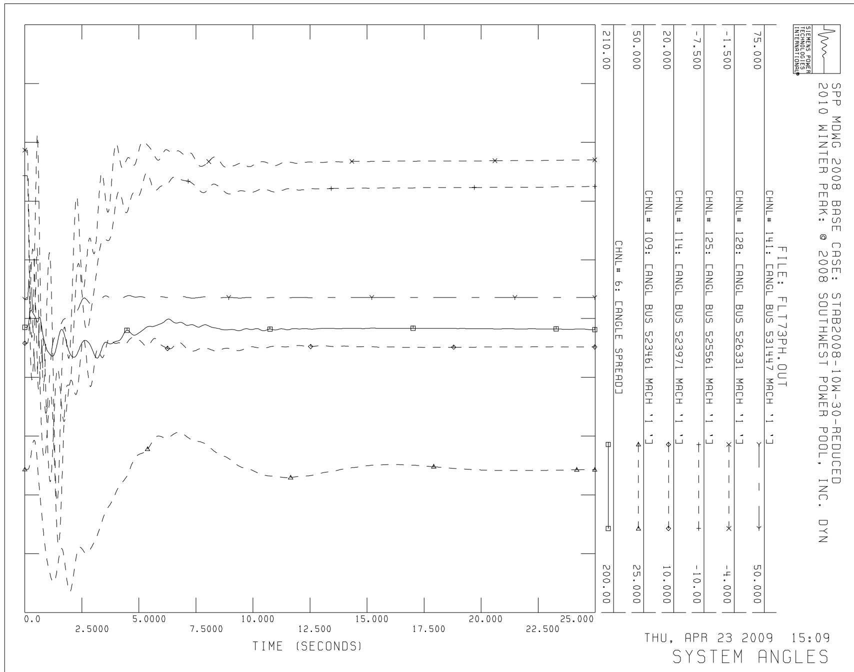

SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT33PH.OUT
CHNL# 247: CVOLT 523195 CHANSFORD 3 115.00]
CHNL# 241: CVOLT 523113 CTC-MMRY3 115.00]
CHNL# 237: CVOLT 523090 CTEXAS_CNTY3 115.00]
CHNL# 243: CVOLT 523175 CSHERMN_TP3 115.00]
CHNL# 239: CVOLT 523093 CHITCHLAND 3 115.00]
CHNL# 251: CVOLT 523267 CPRINGLE6 230.00]
TIME (SECONDS)
THU, APR 23 2009 15:09
VOLTAGES

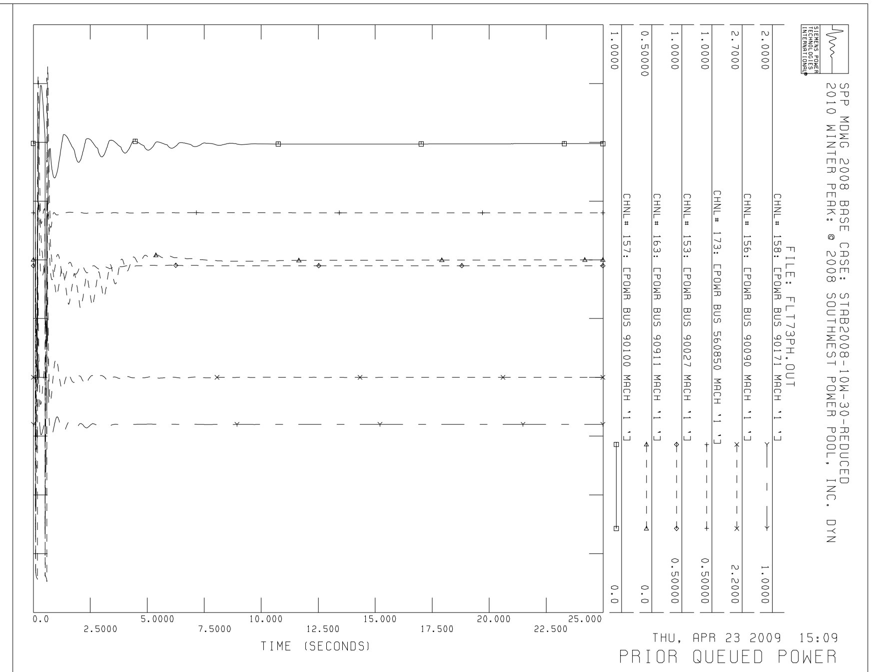

SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT41PH.OUT
CHNL# 141: [ANGL BUS 531447 MACH '1 '] 65.000 62.500
CHNL# 128: [ANGL BUS 526331 MACH '1 '] -0.5000 -3.000
CHNL# 125: [ANGL BUS 525561 MACH '1 '] -8.000 -9.000
CHNL# 114: [ANGL BUS 523971 MACH '1 '] 18.000 13.000
CHNL# 109: [ANGL BUS 523461 MACH '1 '] 34.000 29.000
CHNL# 6: [ANGLE SPREAD] 210.00 200.00
TIME (SECONDS)
THU, APR 23 2009 15:09
SYSTEM ANGLES

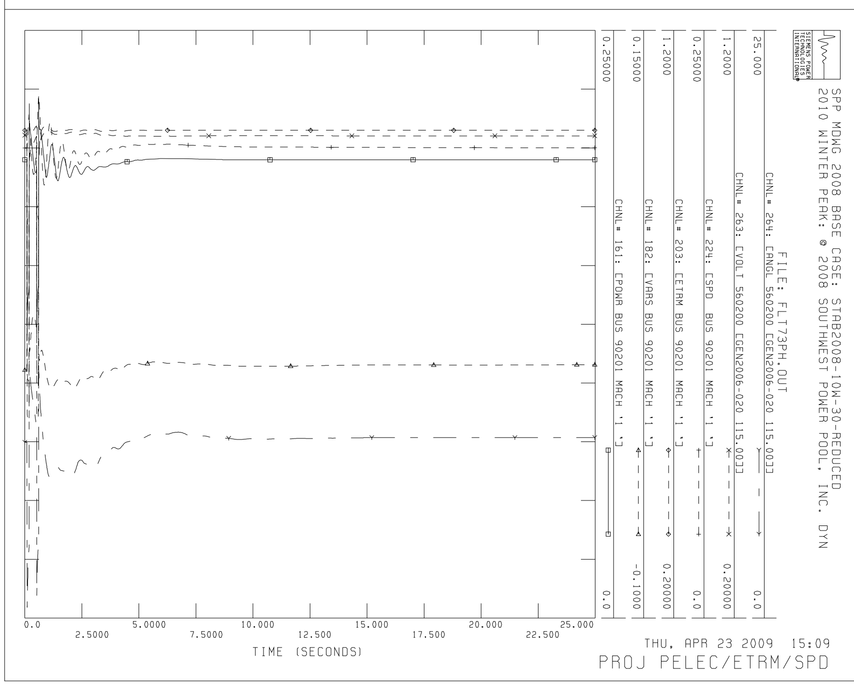

SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT41PH.OUT
CHNL# 158: [POWR BUS 90171 MACH '1 '] 1.4500 1.2000
CHNL# 156: [POWR BUS 90090 MACH '1 '] 2.5000 2.2500
CHNL# 173: [POWR BUS 560850 MACH '1 '] 1.0000 0.75000
CHNL# 153: [POWR BUS 90027 MACH '1 '] 0.95000 0.70000
CHNL# 163: [POWR BUS 90011 MACH '1 '] 0.50000 0.25000
CHNL# 157: [POWR BUS 90100 MACH '1 '] 0.85000 0.60000
TIME (SECONDS)
THU, APR 23 2009 15:09
PRIOR QUEUED POWER

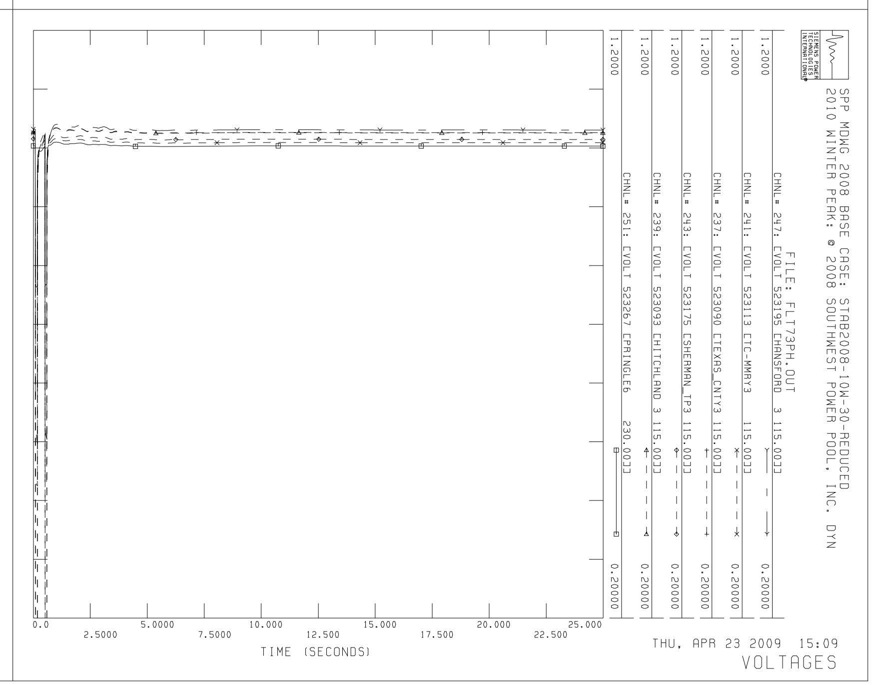

SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT41PH.OUT
CHNL# 264: [ANGL 560200 [GEN2006-020 115.00]] 25.000 0.0
CHNL# 263: [VOLT 560200 [GEN2006-020 115.00]] 1.2000 0.20000
CHNL# 224: [SPD BUS 90201 MACH '1 '] 0.25000 0.0
CHNL# 203: [ETRM BUS 90201 MACH '1 '] 1.2000 0.20000
CHNL# 182: [VARS BUS 90201 MACH '1 '] 0.15000 -0.1000
CHNL# 161: [POWR BUS 90201 MACH '1 '] 0.35000 0.10000
TIME (SECONDS)
THU, APR 23 2009 15:09
PROJ PELEC/ETRM/SPD


SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT41PH.OUT
CHNL# 247: [VOLT 523195 [HANSFORD 3 115.00]] 1.2000 0.20000
CHNL# 241: [VOLT 523113 [TC-MMRY3 115.00]] 1.2000 0.20000
CHNL# 237: [VOLT 523090 [TEXAS_CNTY3 115.00]] 1.2000 0.20000
CHNL# 243: [VOLT 523175 [SHERMN_TP3 115.00]] 1.2000 0.20000
CHNL# 239: [VOLT 523093 [HITCHLAND 3 115.00]] 1.2000 0.20000
CHNL# 251: [VOLT 523267 [PRINGLE6 230.00]] 1.2000 0.20000
TIME (SECONDS)
THU, APR 23 2009 15:09
VOLTAGES


SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT73PH.OUT
CHNL# 141: [ANGL BUS 531447 MACH '1 ']
75.000 50.000
CHNL# 128: [ANGL BUS 526331 MACH '1 ']
-1.500 -4.000
CHNL# 125: [ANGL BUS 525561 MACH '1 ']
-7.500 -10.00
CHNL# 114: [ANGL BUS 523971 MACH '1 ']
20.000 10.000
CHNL# 109: [ANGL BUS 523461 MACH '1 ']
50.000 25.000
CHNL# 6: [ANGLE SPREAD]
210.00 200.00
0.0 2.5000 5.0000 7.5000 10.000 12.500 15.000 17.500 20.000 22.500 25.000
TIME (SECONDS)
THU, APR 23 2009 15:09
SYSTEM ANGLES


SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT73PH.OUT
CHNL# 158: [POWR BUS 90171 MACH '1 ']
2.0000 1.0000
CHNL# 156: [POWR BUS 90090 MACH '1 ']
2.7000 2.2000
CHNL# 173: [POWR BUS 560850 MACH '1 ']
1.0000 0.50000
CHNL# 153: [POWR BUS 90027 MACH '1 ']
1.0000 0.50000
CHNL# 163: [POWR BUS 90911 MACH '1 ']
0.50000 0.0
CHNL# 157: [POWR BUS 90100 MACH '1 ']
1.0000 0.0
0.0 2.5000 5.0000 7.5000 10.000 12.500 15.000 17.500 20.000 22.500 25.000
TIME (SECONDS)
THU, APR 23 2009 15:09
PRIOR QUEUED POWER


SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT73PH.OUT
CHNL# 264: [ANGL 560200 [GEN2006-020 115.0]]
25.000 0.0
CHNL# 263: [VOLT 560200 [GEN2006-020 115.0]]
1.2000 0.20000
CHNL# 224: [SPD BUS 90201 MACH '1 ']
0.25000 0.0
CHNL# 203: [ETRM BUS 90201 MACH '1 ']
1.2000 0.20000
CHNL# 182: [VARS BUS 90201 MACH '1 ']
0.15000 -0.1000
CHNL# 161: [POWR BUS 90201 MACH '1 ']
0.25000 0.0
0.0 2.5000 5.0000 7.5000 10.000 12.500 15.000 17.500 20.000 22.500 25.000
TIME (SECONDS)
THU, APR 23 2009 15:09
PROJ PELEC/ETRM/SPD


SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT73PH.OUT
CHNL# 247: [VOLT 523195 [HANSFORD 3 115.0]]
1.2000 0.20000
CHNL# 241: [VOLT 523113 [TC-MMRY3 115.0]]
1.2000 0.20000
CHNL# 237: [VOLT 523090 [TEXAS_CNTY3 115.0]]
1.2000 0.20000
CHNL# 243: [VOLT 523175 [SHERMN_TP3 115.0]]
1.2000 0.20000
CHNL# 239: [VOLT 523093 [HITCHLAND 3 115.0]]
1.2000 0.20000
CHNL# 251: [VOLT 523267 [PRINGLE6 230.0]]
1.2000 0.20000
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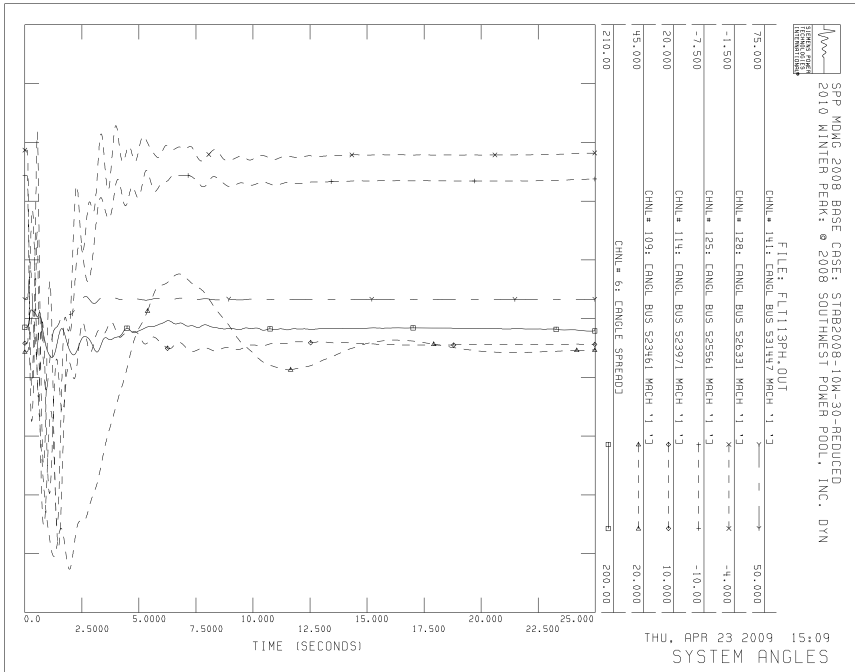
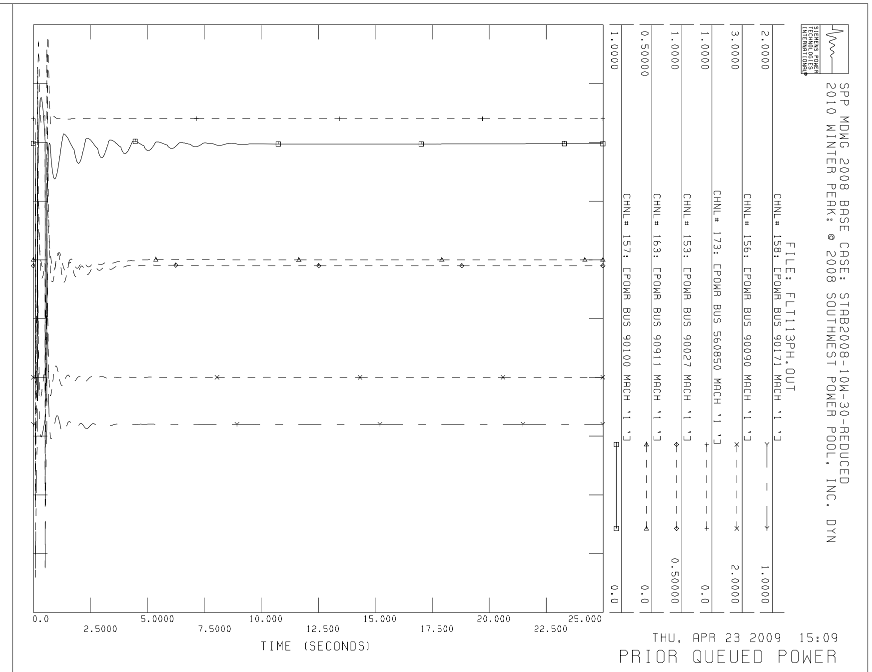
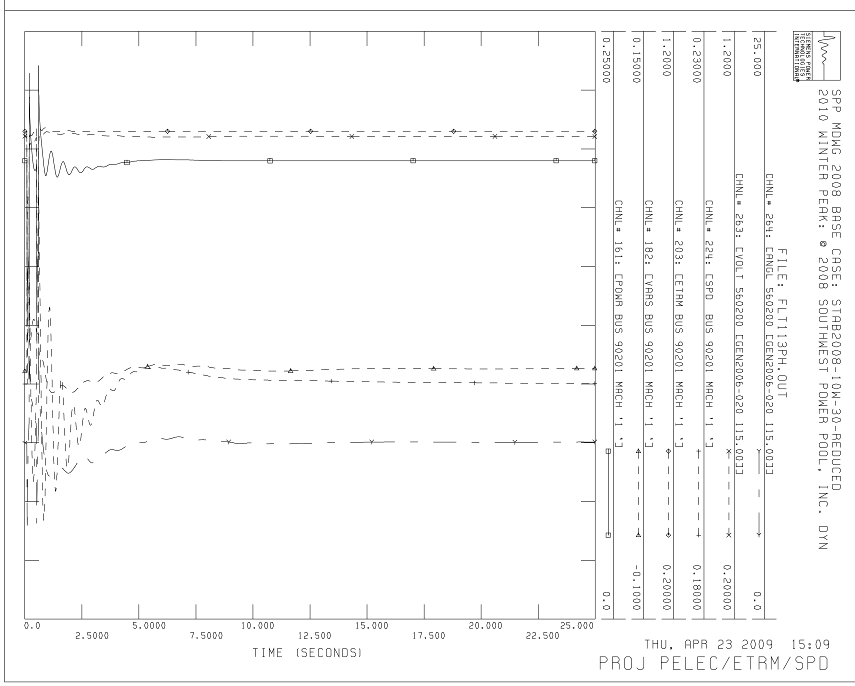
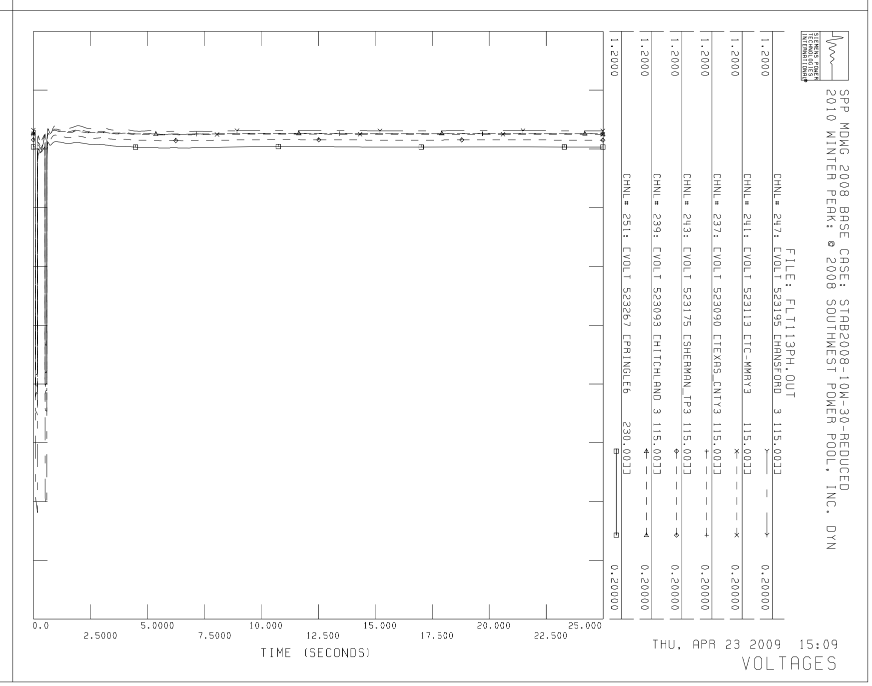
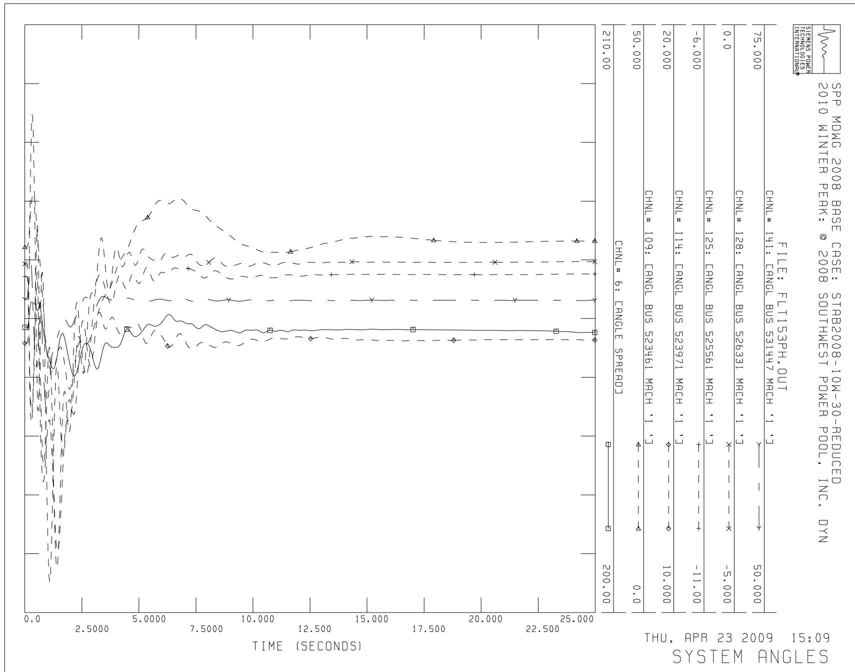
TIME (SECONDS)
THU, APR 23 2009 15:09
VOLTAGES

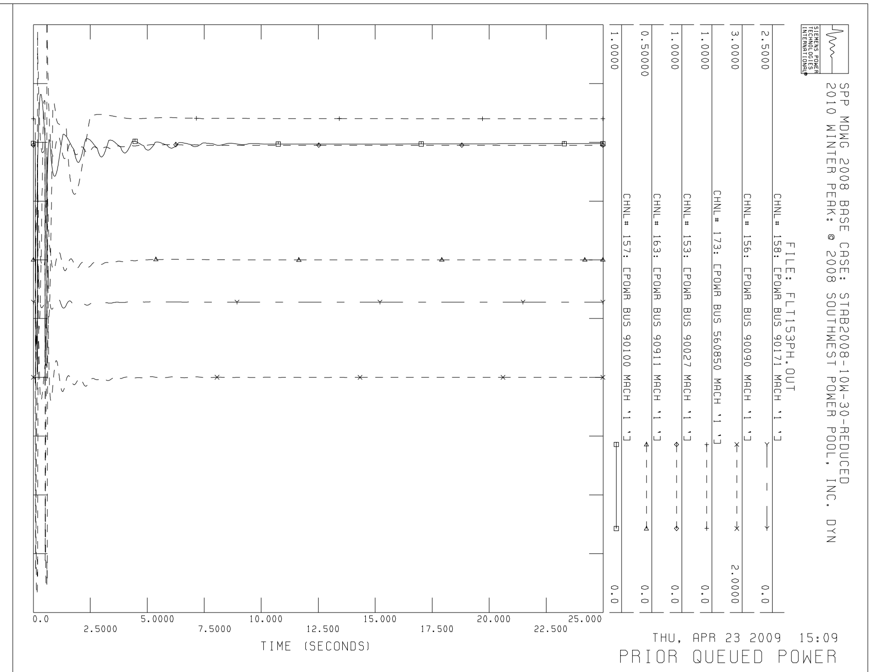

SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT113PH.OUT
CHNL# 141: [ANGL BUS 531447 MACH '1 ']
CHNL# 128: [ANGL BUS 526331 MACH '1 ']
CHNL# 125: [ANGL BUS 525561 MACH '1 ']
CHNL# 114: [ANGL BUS 523971 MACH '1 ']
CHNL# 109: [ANGL BUS 523461 MACH '1 ']
CHNL# 6: [ANGLE SPREAD]
TIME (SECONDS)
THU, APR 23 2009 15:09
SYSTEM ANGLES

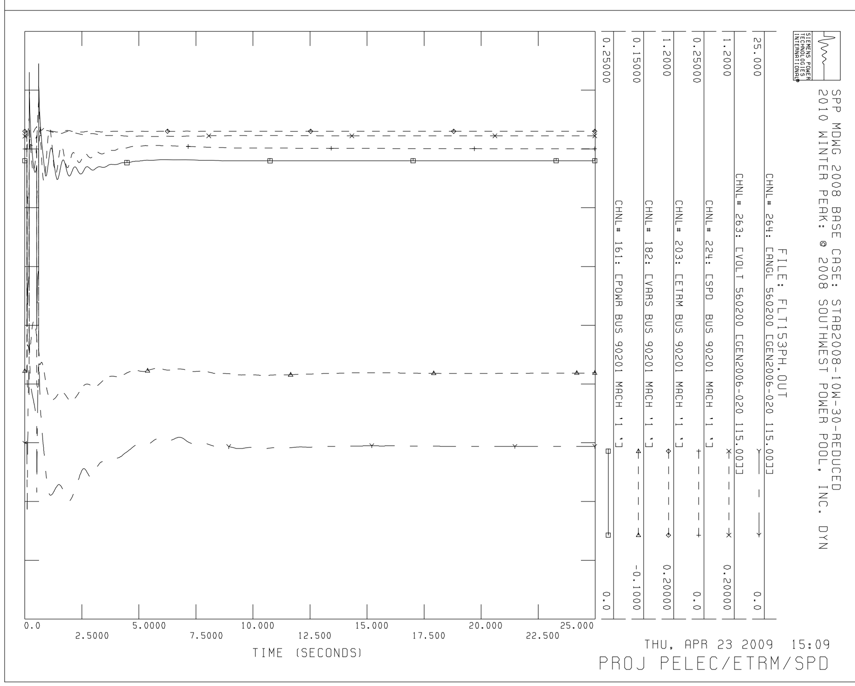

SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT113PH.OUT
CHNL# 158: [POWR BUS 90171 MACH '1 ']
CHNL# 156: [POWR BUS 90090 MACH '1 ']
CHNL# 173: [POWR BUS 560850 MACH '1 ']
CHNL# 153: [POWR BUS 90027 MACH '1 ']
CHNL# 163: [POWR BUS 90911 MACH '1 ']
CHNL# 157: [POWR BUS 90100 MACH '1 ']
TIME (SECONDS)
THU, APR 23 2009 15:09
PRIOR QUEUED POWER

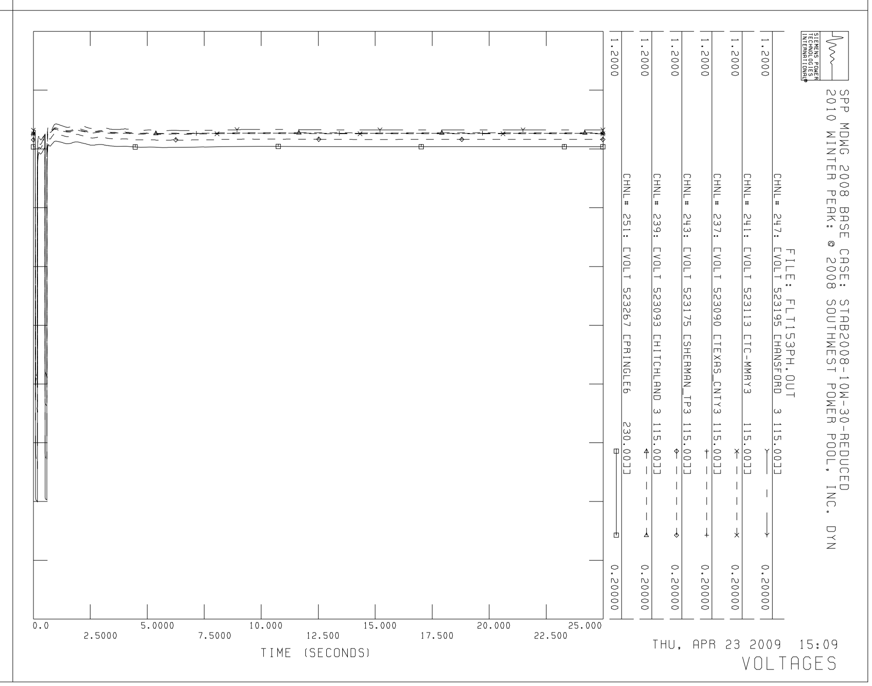

SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT113PH.OUT
CHNL# 264: [ANGL 560200 [GEN2006-020 115.0]]
CHNL# 263: [VOLT 560200 [GEN2006-020 115.0]]
CHNL# 224: [SPD BUS 90201 MACH '1 ']
CHNL# 203: [ETRM BUS 90201 MACH '1 ']
CHNL# 182: [VARS BUS 90201 MACH '1 ']
CHNL# 161: [POWR BUS 90201 MACH '1 ']
TIME (SECONDS)
THU, APR 23 2009 15:09
PROJ PELEC/ETRM/SPD


SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT113PH.OUT
CHNL# 247: [VOLT 523195 [HANSFORD 3 115.0]]
CHNL# 241: [VOLT 523113 [TC-MMRY3 115.0]]
CHNL# 237: [VOLT 523090 [TEXAS_CNTY3 115.0]]
CHNL# 243: [VOLT 523175 [SHERMN_TP3 115.0]]
CHNL# 239: [VOLT 523093 [HITCHLAND 3 115.0]]
CHNL# 251: [VOLT 523267 [PRINGLE6 230.0]]
TIME (SECONDS)
THU, APR 23 2009 15:09
VOLTAGES


SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK: @ 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT153PH.OUT
CHNL# 141: [ANGL BUS 531447 MACH '1 ']
CHNL# 128: [ANGL BUS 526331 MACH '1 ']
CHNL# 125: [ANGL BUS 525561 MACH '1 ']
CHNL# 114: [ANGL BUS 523971 MACH '1 ']
CHNL# 109: [ANGL BUS 523461 MACH '1 ']
CHNL# 6: [ANGLE SPREAD]
TIME (SECONDS)
THU, APR 23 2009 15:09
SYSTEM ANGLES


SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK: @ 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT153PH.OUT
CHNL# 158: [POWR BUS 90171 MACH '1 ']
CHNL# 156: [POWR BUS 90090 MACH '1 ']
CHNL# 173: [POWR BUS 560850 MACH '1 ']
CHNL# 153: [POWR BUS 90027 MACH '1 ']
CHNL# 163: [POWR BUS 90911 MACH '1 ']
CHNL# 157: [POWR BUS 90100 MACH '1 ']
TIME (SECONDS)
THU, APR 23 2009 15:09
PRIOR QUEUED POWER


SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK: @ 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT153PH.OUT
CHNL# 264: [ANGL 560200 [GEN2006-020 115.00]]
CHNL# 263: [VOLT 560200 [GEN2006-020 115.00]]
CHNL# 224: [SPD BUS 90201 MACH '1 ']
CHNL# 203: [ETRM BUS 90201 MACH '1 ']
CHNL# 182: [VARS BUS 90201 MACH '1 ']
CHNL# 161: [POWR BUS 90201 MACH '1 ']
TIME (SECONDS)
THU, APR 23 2009 15:09
PROJ PELEC/ETRM/SPD


SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK: @ 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT153PH.OUT
CHNL# 247: [VOLT 523195 [HANSFORD 3 115.00]]
CHNL# 241: [VOLT 523113 [TC-MMRY3 115.00]]
CHNL# 237: [VOLT 523090 [TEXAS_CNTY3 115.00]]
CHNL# 243: [VOLT 523175 [SHERMN_TP3 115.00]]
CHNL# 239: [VOLT 523093 [HITCHLAND 3 115.00]]
CHNL# 251: [VOLT 523267 [PRINGLE6 230.00]]
TIME (SECONDS)
THU, APR 23 2009 15:09
VOLTAGES