Southwest Power Pool

Interim Operational Impact Study For Generation Interconnection Request GEN-2007-052

SPP Tariff Studies

(#GEN-2007-052)

June 2009

Executive Summary

<OMITTED TEXT> (Customer) has requested an Impact Study under the Southwest Power Pool Open Access Transmission Tariff (OATT) for interconnection of 150 MW of gas fired generation within the balancing authority of Western Farmers Electric Cooperative (WFEC) in Caddo County, Oklahoma. SPP expects to complete the Impact Study as part of the cluster study ICS-2008-001. SPP will not be able to complete all interconnection studies required under the OATT in time for the Customer's requested in-service date of July 1, 2009. Therefore, Customer has requested this Interim Operation Impact Study (IOIS) to determine the impacts of interconnecting its generating facility to the transmission system before all required studies can be completed and all required Network Upgrades identified in the Feasibility Cluster Study (FCS-2008-001) posted on December 18, 2008 can be placed into service. SPP announced it would conduct interim operation impact studies for interested interconnection customers in an OASIS posting on March 6, 2009.

This study is intended only as an Interim Operation Study that will be used in order to tender an Interim Interconnection Agreement to the Customer for Interim Interconnection Service. If an Interim Interconnection Agreement is not executed with the Customer, this study will be inapplicable. If an Interim Interconnection Agreement is executed with the Customer, this study will be considered inapplicable upon termination of such Interim Interconnection Agreement.

This study assumed that only the higher queued projects identified in Table 2 of this study might go into service before the completion of all Network Upgrades identified in FCS-2008-001. If any additional generation projects not identified in Table 2 but with queue priority over GEN-2007-052 request to go into commercial operation before all Network Upgrades identified through the Cluster Interconnection Study process as required, then this study must be conducted again to determine whether sufficient interim interconnection capacity exists to interconnect the GEN-2007-052 interconnection request in addition to all higher priority requests in operation or pending operation.

The gas fired generation facility was studied with three (3) General Electric LM6000 combustion turbine generators. The requested in-service date for the 150 MW facility is July 1, 2009. This Impact study addresses the dynamic stability effects of interconnecting the plant to the rest of the WFEC transmission system for the system condition as it will be on July 1, 2009.

Two seasonal base cases were used in the study to analyze the stability impacts of the proposed generation facility. The cases studied were a modified 2010 summer peak and 2010 winter peak that were adjusted to meet the system conditions stated above. Each case was modified to include prior queued projects that are listed in the body of the report. Thirty (30) contingencies were identified for use in this study. The GE LM6000 gas fired turbines were modeled using information provided by the Customer.

The stability study results show that with the Customer facility the transmission system remains stable for all simulated contingencies and conditions studied. If the Customer does not use the LM 6000, this IOIS will be considered inapplicable and the Customer will not be allowed to interconnect on an interim basis.

The estimates of costs for network upgrades and the interconnection facilities for interim operation will be estimated by the Transmission Owner on an expedited basis to meet the Customer's in service date. The Customer will also be required to provide security in the amount of $809,000 per the Feasibility Cluster Study (FCS-2008-001). This amount of security will be adjusted as the GEN-2007-052 interconnection request advances through the Cluster interconnection process as stated in SPP's OASIS posting.

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

<OMITTED TEXT> (Customer) has requested an Impact Study under the Southwest Power Pool Open Access Transmission Tariff (OATT) for interconnection of 150 MW of gas fired generation within the balancing authority of Western Farmers Electric Cooperative (WFEC) in Caddo County, Oklahoma. SPP expects to complete the Impact Study as part of the cluster study ICS-2008-001. SPP will not be able to complete all interconnection studies required under the OATT in time for the Customer's requested in-service date of July 1, 2009. Therefore, Customer has requested this Interim Operation Impact Study (IOIS) to determine the impacts of interconnecting its generating facility to the transmission system before all required studies can be completed and all required Network Upgrades identified in the Feasibility Cluster Study (FCS-2008-001) posted on December 18, 2008 can be placed into service. SPP announced it would conduct interim operation impact studies for interested interconnection customers in an OASIS posting on March 6, 2009.

The gas fired generation facility was studied with three (3) General Electric LM 6000 combustion turbine generators. The requested in-service date for the 150 MW facility is July 1, 2009. This Impact study addresses the dynamic stability effects of interconnecting the plant to the rest of the WFEC transmission system.

Two seasonal base cases were used in the study to analyze the stability impacts of the proposed generation facility. The cases studied were modified versions of the 2010 summer peak and 2010 winter peak to reflect the system conditions stated above. Each case was modified to include prior queued projects that are listed in the body of the report. Thirty (30) contingencies were identified for this study.

2.0 Purpose

The purpose of this Interim Operational Impact Study (IOIS) is to evaluate the impact of the proposed interconnection on the reliability of the Transmission System. The IOIS 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 IOIS 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 listed in Table 2; 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 three (3) General Electric LM6000 combustion turbines.

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

3.2 Interconnection Facility

The point of interconnection (POI) will be at the WFEC Anadarko 138kV switching station located at the WFEC Anadarko Power Station. Figure 1 shows the proposed POI. WFEC is expanding the Anadarko 138kV substation as part of its construction plans.

Cost to interconnect on an Interim basis is estimated at **$750,000**.

Customer's latest estimate for cost responsibility for Interconnection Service is given in the Feasibility Cluster Study (FCS-2008-001) at **$809,000**. The Customer will be required to provide security in this amount to move forward into an Interim Interconnection Agreement.

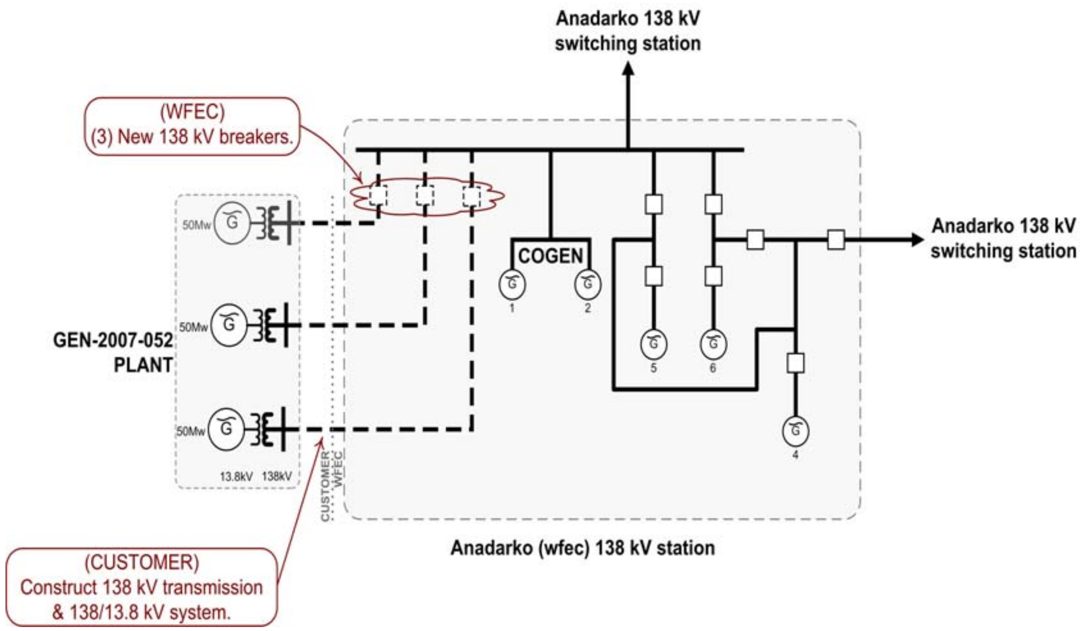

Figure 1: GEN-2007-052 Facility and Proposed Interconnection Configuration

4.0 Stability Analysis

4.1 Modeling of the Generators for the Stability Simulation

The GEN-2007-052 project is comprised of three GE LM 6000 combustion turbines nominally rated 40MW (summer)/50MW (winter). The three turbines are each connected to a 138/13.8kV GSU transformer rated 45/70MVA with 8% impedance on the 45MVA base.

From the information provided by the Customer, the following PTI data sets were compiled and loaded into the SPP stability database for a modified winter case (2010wp) and summer case (2010sp). Minor modifications were made to the data sets provided by the Customer in order to make the dynamic model initialize.

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REPORT FOR PLANT MODELS                    BUS 521206 [2007-52     13.800] MODELS
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** GENROU **  BUS X-- NAME --X BASEKV MC    C O N S     S T A T E S
           521206 2007-52      13.800 1   33901-33914   15167-15172

            MBASE     Z S O R C E         X T R A N       GENTAP
             71.2  0.00000+J 0.18100  0.00000+J 0.00000  1.00000

 T'D0 T''D0  T'Q0 T''Q0     H   DAMP   XD     XQ     X'D    X'Q   X''D    XL
 9.67 0.050  2.95 0.040   1.19 16.00 2.3500 1.6800 0.2450 0.3500 0.1810 0.1300

                              S(1.0)  S(1.2)
                              0.1370  0.4780


** PSS2A **   BUS X-- NAME --X BASEKV MC    C O N S     S T A T E S     V A R S      I C O N S
           521206 2007-52      13.800 1   41356-41372   21247-21262    2570-2573     2567-2572

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

      TW1      TW2      T6       TW3      TW4      T7       KS2      KS3
     2.000    2.000    0.000    2.000    0.000    2.000    0.337    1.000

      T8       T9      KS1       T1       T2       T3       T4      VSTMAX   VSTMIN
     0.500    0.100   10.000    0.150    0.030    0.150    0.030    0.100   -0.100


** IEEET2 **  BUS X-- NAME --X BASEKV MC    C O N S     S T A T E S     VAR
           521206 2007-52      13.800 1   74501-74514   30376-30380    4102

    TR      KA      TA   VRMAX   VRMIN     KE     TE     KF     TF1    TF2
  0.022 2894.00  0.100 47.000   0.000   1.000  1.200  0.017  0.600  1.200

                  E1     S(E1)    E2     S(E2)        KE VAR
                5.6600  2.4400  7.5700  5.2400        0.0000
```

```
**  GGOV1 ** BUS X-- NAME --X BASEKV MC    C O N S     S T A T E S     V A R S        ICONS
       521206 2007-52      13.800 1   97194-97226   38788-38797    7765-7784     3222-3223

   R    TPELEC   MAXERR  MINERR  KPGOV    KIGOV    KDGOV    TDGOV    VMAX    VMIN
 0.040   1.000   0.050  -0.050  10.000   2.000    0.000    1.000    1.000   0.100

  TACT   KTURB    WFNL     TB       TC     TENG    TFLOAD  KPLOAD   KILOAD  LDREF
 0.500   1.500   0.150   0.500   0.000   0.000    3.000    1.000    0.200   1.000

   DM    ROPEN  RCLOSE    KIMW    ASET      KA       TA     TRATE     DB
 0.000   0.100  -0.100   0.000   0.010  10.000    0.100   50.000   0.000

  TSA     TSB     RUP    RDOWN
 4.000   5.000  99.000 -99.000

            ICON(M)= 1 (Feedback signal for governor droop)
            ICON(M+1)= 0 (Switch for fuel source characteristic)
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4.2 Contingencies Simulated

Thirty (30) 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 1.

Table 5: Contingencies Evaluated

Cont. No.	Cont. Name	Description
1	FLT_1_3PH	3 phase fault on the Anadarko (520814) to Gen-2003-005 (99992) 138kV line, near Anadarko. a. Apply fault at the Anadarko 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.
2	FLT_2_1PH	*Single phase fault and sequence like previous*
3	FLT_3_3PH	3 phase fault on the Anadarko (520814) to SWS (511477) 138kV line, near Anadarko. a. Apply fault at the Anadarko 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.
4	FLT_4_1PH	*Single phase fault and sequence like previous*
5	FLT_5_3PH	3 phase fault on the Anadarko (520814) to Cornville Tap (520867) 138kV line, near Anadarko. a. Apply fault at the Anadarko 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.
6	FLT_6_1PH	*Single phase fault and sequence like previous*
7	FLT_7_3PH	3 phase fault on the Anadarko (520814) to Georgia (52093) 138kV line, near Anadarko. a. Apply fault at the Anadarko 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.
8	FLT_8_1PH	*Single phase fault and sequence like previous*
9	FLT_9_3PH	3 phase fault on the Anadarko (520814) to Pocasset (521031) 138kV line, near Anadarko. a. Apply fault at the Anadarko 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.
10	FLT_10_1PH	*Single phase fault and sequence like previous*
11	FLT_11_3PH	3 phase fault on the Anadarko (520814) to Washita (521089) 138kV line, near Anadarko. a. Apply fault at the Anadarko 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.
12	FLT_12_1PH	*Single phase fault and sequence like previous*
13	FLT_13_3PH	3 phase fault on the SWS (511477) to Verden (511421) 138kV line, near SWS. a. Apply fault at the SWS 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.
14	FLT_14_1PH	*Single phase fault and sequence like previous*
15	FLT_15_3PH	3 phase fault on the SWS (511477) to Fletcher (511423) 138kV line, near SWS. a. Apply fault at the SWS 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.
16	FLT_16_1PH	*Single phase fault and sequence like previous*

Table 5: Contingencies Evaluated

Cont. No.	Cont. Name	Description
17	FLT_17_3PH	3 phase fault on the SWS (511477) to Fort Cobb (511454) 138kV line, near SWS. a. Apply fault at the SWS 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.
18	FLT_18_1PH	*Single phase fault and sequence like previous*
19	FLT_19_3PH	3 phase fault on the SWS (511477) to Norge Road (511483) 138kV line, near SWS. a. Apply fault at the SWS 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.
20	FLT_20_1PH	*Single phase fault and sequence like previous*
21	FLT_21_3PH	3 phase fault on the SWS (511477) to Elgin Junction (511486) 138kV line, near SWS. a. Apply fault at the SWS 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.
22	FLT_22_1PH	*Single phase fault and sequence like previous*
23	FLT_23_3PH	3 phase fault on the SWS (511477) to Washita (521089) 138kV line, near SWS. a. Apply fault at the SWS 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.
24	FLT_24_1PH	*Single phase fault and sequence like previous*
25	FLT_25_3PH	3 phase fault on the Sickles (521050) to Bingerj (520827) 138kV line, near Sickles. a. Apply fault at the Sickles 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.
26	FLT_26_1PH	*Single phase fault and sequence like previous*
27	FLT_27_3PH	3 phase fault on the Fletcher (511423) to LES (511467) 138kV line, near Fletcher. a. Apply fault at the Fletcher 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.
28	FLT_28_1PH	*Single phase fault and sequence like previous*
29	FLT_29_3PH	3 phase fault on the Cornville Tap (520867) to Paoli (521023) 138kV line, near Cornville Tap. a. Apply fault at the Corn Tap 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.
30	FLT_30_1PH	*Single phase fault and sequence like previous*

4.3 Further Model Preparation

The base cases contain prior queued projects as shown in Table 2.

The gas fired generation 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
Blue Canyon I	74
Blue Canyon II	151
Blue Canyon V	100
Weatherford Wind	147
Red Hills	120
GEN-2006-002	150
GEN-2006-035	224
GEN-2006-043	99
GEN-2007-032	150
GEN-2007-043	300
GEN-2007-049	60

Table 2: Prior Queued Projects

5.0 Results

Results of the stability analysis are summarized in Table 3. The results indicate that for all contingencies studied the transmission system remains stable.

Selected stability plots for the simulations are in Appendices A and B. All plots are available on request.

Table 3: Results of Simulated Contingencies

Cont. No.	Cont. Name	Description	2010 Summer Peak	2010 Winter Peak
1	FLT_1_3PH	3 phase fault on the Anadarko (520814) to Gen-2003-005 (99992) 138kV line, near Anadarko. a. Apply fault at the Anadarko 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.	Stable	Stable
2	FLT_2_1PH	*Single phase fault and sequence like previous*	Stable	Stable
3	FLT_3_3PH	3 phase fault on the Anadarko (520814) to SWS (511477) 138kV line, near Anadarko. a. Apply fault at the Anadarko 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.	Stable	Stable
4	FLT_4_1PH	*Single phase fault and sequence like previous*	Stable	Stable
5	FLT_5_3PH	3 phase fault on the Anadarko (520814) to Cornville Tap (520867) 138kV line, near Anadarko. a. Apply fault at the Anadarko 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.	Stable	Stable
6	FLT_6_1PH	*Single phase fault and sequence like previous*	Stable	Stable
7	FLT_7_3PH	3 phase fault on the Anadarko (520814) to Georgia (52093) 138kV line, near Anadarko. a. Apply fault at the Anadarko 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.	Stable	Stable
8	FLT_8_1PH	*Single phase fault and sequence like previous*	Stable	Stable
9	FLT_9_3PH	3 phase fault on the Anadarko (520814) to Pocasset (521031) 138kV line, near Anadarko. a. Apply fault at the Anadarko 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.	Stable	Stable
10	FLT_10_1PH	*Single phase fault and sequence like previous*	Stable	Stable

Table 3: Results of Simulated Contingencies

Cont. No.	Cont. Name	Description	2010 Summer Peak	2010 Winter Peak
11	FLT_11_3PH	3 phase fault on the Anadarko (520814) to Washita (521089) 138kV line, near Anadarko. a. Apply fault at the Anadarko 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.	Stable	Stable
12	FLT_12_1PH	*Single phase fault and sequence like previous*	Stable	Stable
13	FLT_13_3PH	3 phase fault on the SWS (511477) to Verden (511421) 138kV line, near SWS. a. Apply fault at the SWS 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.	Stable	Stable
14	FLT_14_1PH	*Single phase fault and sequence like previous*	Stable	Stable
15	FLT_15_3PH	3 phase fault on the SWS (511477) to Fletcher (511423) 138kV line, near SWS. a. Apply fault at the SWS 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.	Stable	Stable
16	FLT_16_1PH	*Single phase fault and sequence like previous*	Stable	Stable
17	FLT_17_3PH	3 phase fault on the SWS (511477) to Fort Cobb (511454) 138kV line, near SWS. a. Apply fault at the SWS 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.	Stable	Stable
18	FLT_18_1PH	*Single phase fault and sequence like previous*	Stable	Stable
19	FLT_19_3PH	3 phase fault on the SWS (511477) to Norge Road (511483) 138kV line, near SWS. a. Apply fault at the SWS 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.	Stable	Stable
20	FLT_20_1PH	*Single phase fault and sequence like previous*	Stable	Stable

Table 3: Results of Simulated Contingencies

Cont. No.	Cont. Name	Description	2010 Summer Peak	2010 Winter Peak
21	FLT_21_3PH	3 phase fault on the SWS (511477) to Elgin Junction (511486) 138kV line, near SWS. a. Apply fault at the SWS 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.	Stable	Stable
22	FLT_22_1PH	*Single phase fault and sequence like previous*	Stable	Stable
23	FLT_23_3PH	3 phase fault on the SWS (511477) to Washita (521089) 138kV line, near SWS. a. Apply fault at the SWS 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.	Stable	Stable
24	FLT_24_1PH	*Single phase fault and sequence like previous*	Stable	Stable
25	FLT_25_3PH	3 phase fault on the Sickles (521050) to Bingerj (520827) 138kV line, near Sickles. a. Apply fault at the Sickles 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.	Stable	Stable
26	FLT_26_1PH	*Single phase fault and sequence like previous*	Stable	Stable
27	FLT_27_3PH	3 phase fault on the Fletcher (511423) to LES (511467) 138kV line, near Fletcher. a. Apply fault at the Fletcher 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.	Stable	Stable
28	FLT_28_1PH	*Single phase fault and sequence like previous*	Stable	Stable
29	FLT_29_3PH	3 phase fault on the Cornville Tap (520867) to Paoli (521023) 138kV line, near Cornville Tap. a. Apply fault at the Corn Tap 138kV bus. b. Clear fault after 5 cycles by tripping the faulted line. c. Wait 20 cycles, and then re-close the line in (b) back into the fault. d. Leave fault on for 5 cycles, then trip the line in (b) and remove fault.	Stable	Stable
30	FLT_30_1PH	*Single phase fault and sequence like previous*	Stable	Stable

6.0 Conclusion

<OMITTED TEXT> (Customer) has requested an Interim Operation Impact Study for interim interconnection service of 150 MW of gas fired generation within the balancing authority of Western Farmers Electric Cooperative (WFEC), in Caddo County, Oklahoma, in accordance with the OASIS posting made by SPP on March 6, 2009. The gas fired generation facility was studied with three (3) GE LM6000 combustion turbine generators

The results of this study show that the gas fired generation and the transmission system remain stable for all contingencies studied.

The estimates of costs for network upgrades and the interconnection facilities are found in the Feasibility Cluster Study, FCS-2008-001, posted December 19, 2008. The Customer is required to provide security in the amount of $809,000 to move forward into an Interim Interconnection Agreement. Failure by the Customer to provide the security in this amount in accordance with the Interim Interconnection will cause this Interim Operation Impact Study and the Interim Interconnection Agreement to become invalid

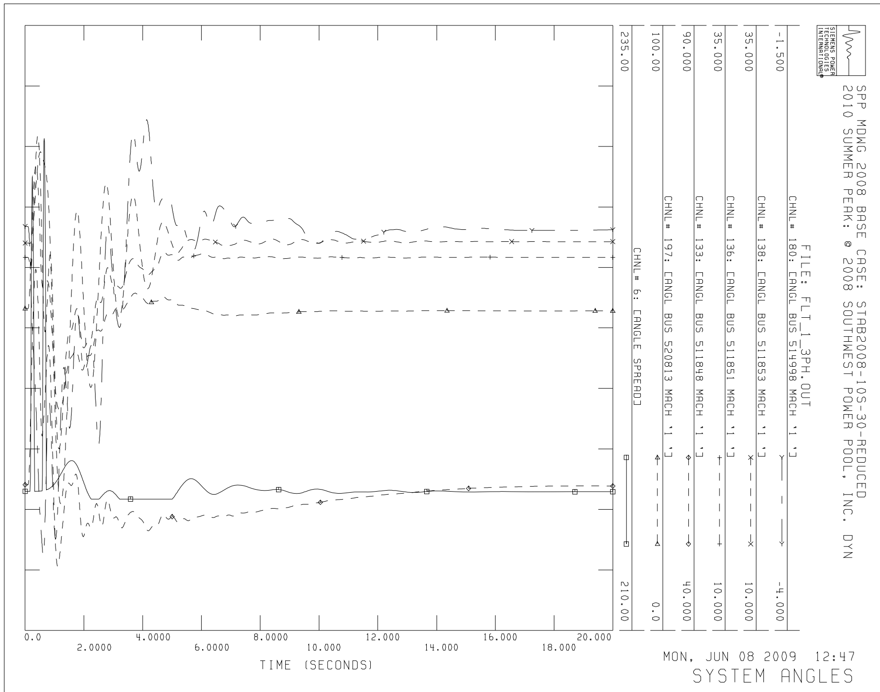
The estimates do not include any costs associated with the deliverability of the energy to final customers. These costs are determined by separate studies if the Customer requests transmission service through Southwest Power Pool’s OASIS. It should be noted that the models used for simulation do not contain all SPP transmission service.

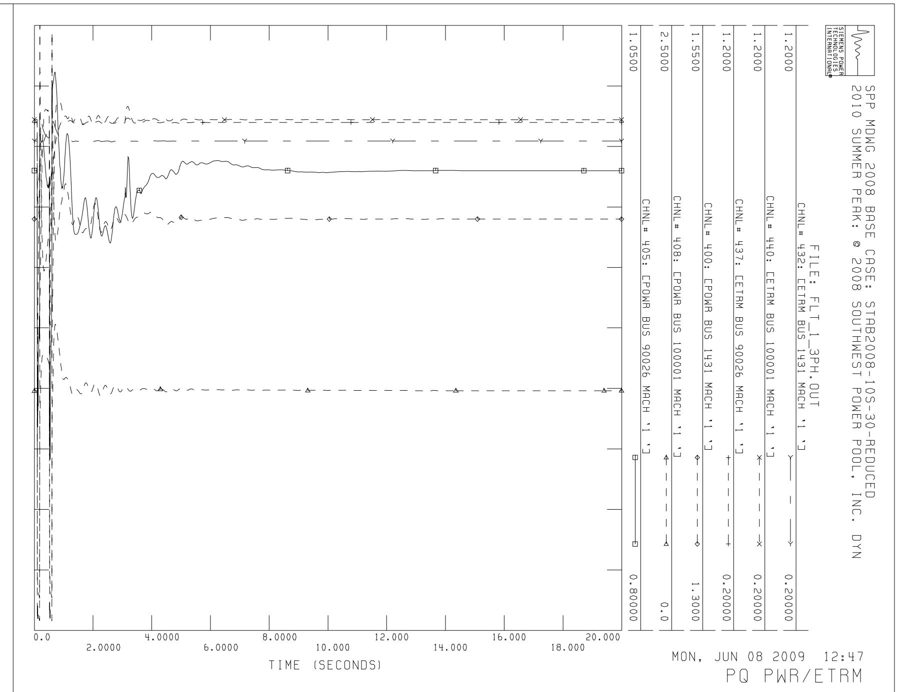
APPENDIX A.

SELECTED STABILITY PLOTS

2010 SUMMER PEAK

All plots available on request.


SPP MDWG 2008 BASE CASE: STAB2008-10S-30-REDUCED
2010 SUMMER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT_1_3PH.OUT
CHNL# 180: [ANGL BUS 514998 MACH '1 ']
CHNL# 138: [ANGL BUS 511853 MACH '1 ']
CHNL# 136: [ANGL BUS 511851 MACH '1 ']
CHNL# 133: [ANGL BUS 511848 MACH '1 ']
CHNL# 197: [ANGL BUS 520813 MACH '1 ']
CHNL# 6: [ANGLE SPREAD]
TIME (SECONDS)
MON, JUN 08 2009 12:47
SYSTEM ANGLES


SPP MDWG 2008 BASE CASE: STAB2008-10S-30-REDUCED
2010 SUMMER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT_1_3PH.OUT
CHNL# 432: [ETRM BUS 1431 MACH '1 ']
CHNL# 440: [ETRM BUS 10001 MACH '1 ']
CHNL# 437: [ETRM BUS 90026 MACH '1 ']
CHNL# 400: [POWR BUS 1431 MACH '1 ']
CHNL# 408: [POWR BUS 10001 MACH '1 ']
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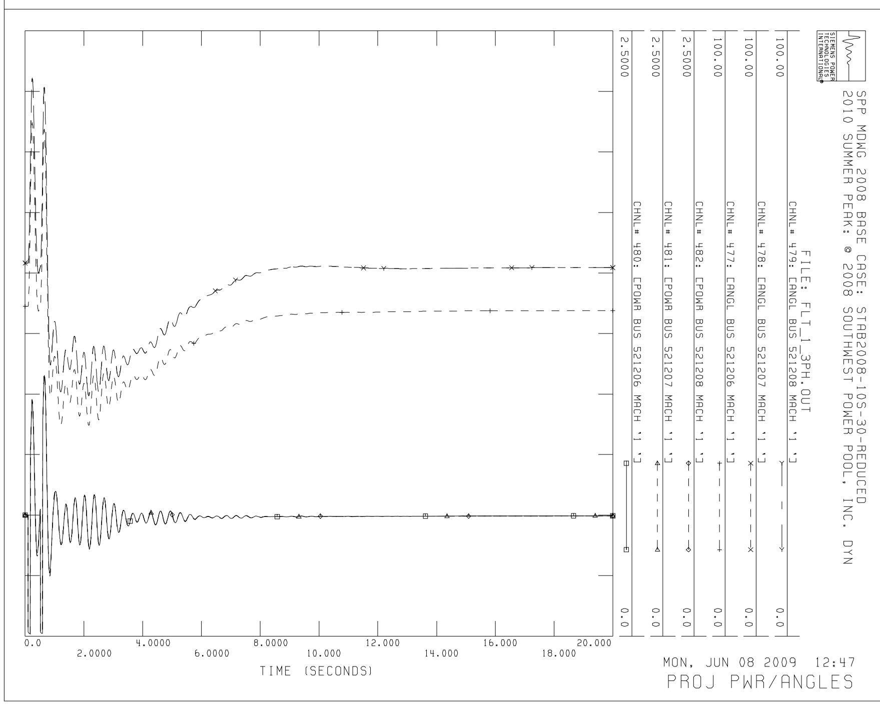
TIME (SECONDS)
MON, JUN 08 2009 12:47
PQ PWR/ETRM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2010 SUMMER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
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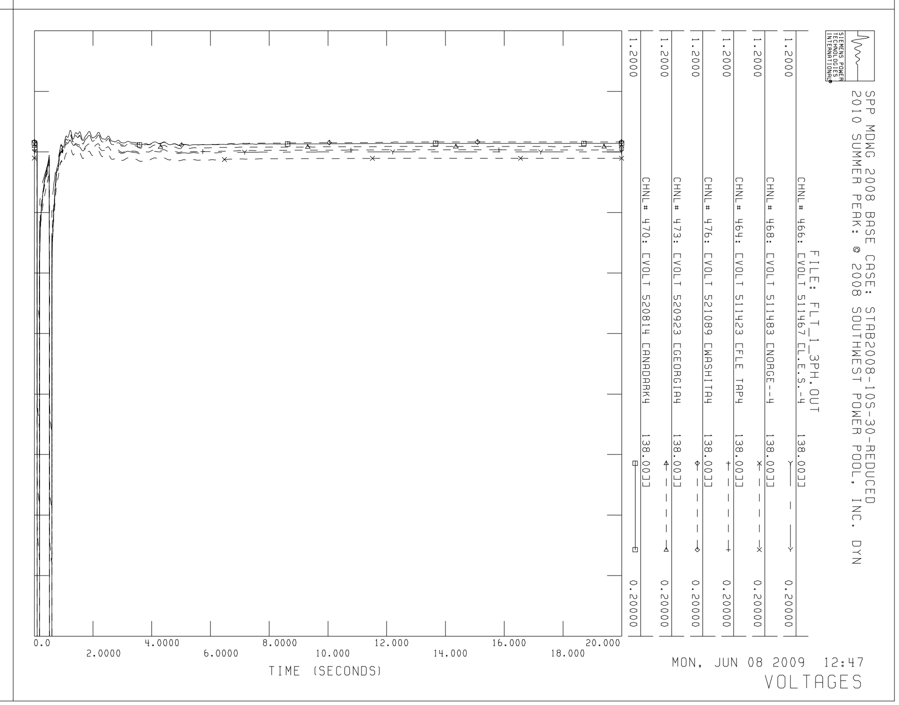
CHNL# 479: [ANGL BUS 521208 MACH '1 ']
CHNL# 478: [ANGL BUS 521207 MACH '1 ']
CHNL# 477: [ANGL BUS 521206 MACH '1 ']
CHNL# 482: [POWR BUS 521208 MACH '1 ']
CHNL# 481: [POWR BUS 521207 MACH '1 ']
CHNL# 480: [POWR BUS 521206 MACH '1 ']
TIME (SECONDS)
MON, JUN 08 2009 12:47
PROJ PWR/ANGLES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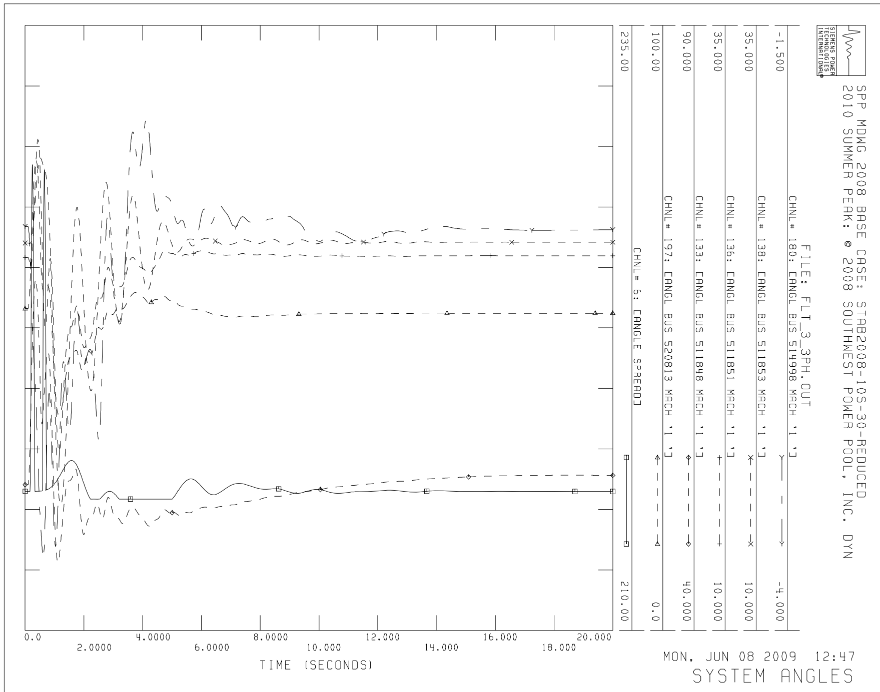
2010 SUMMER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT_1_3PH.OUT
CHNL# 466: [VOLT 511467 CL.E.S.-4 138.00]
CHNL# 468: [VOLT 511483 CNORGE--4 138.00]
CHNL# 464: [VOLT 511423 CFLE TAP4 138.00]
CHNL# 476: [VOLT 521089 CWASHITA4 138.00]
CHNL# 473: [VOLT 520923 CGEORGIA4 138.00]
CHNL# 470: [VOLT 520814 CANADARK4 138.00]
TIME (SECONDS)
MON, JUN 08 2009 12:47
VOLTAGES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FILE: FLT_3_3PH.OUT
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CHNL# 138: [ANGL BUS 511853 MACH '1 ']
CHNL# 136: [ANGL BUS 511851 MACH '1 ']
CHNL# 133: [ANGL BUS 511848 MACH '1 ']
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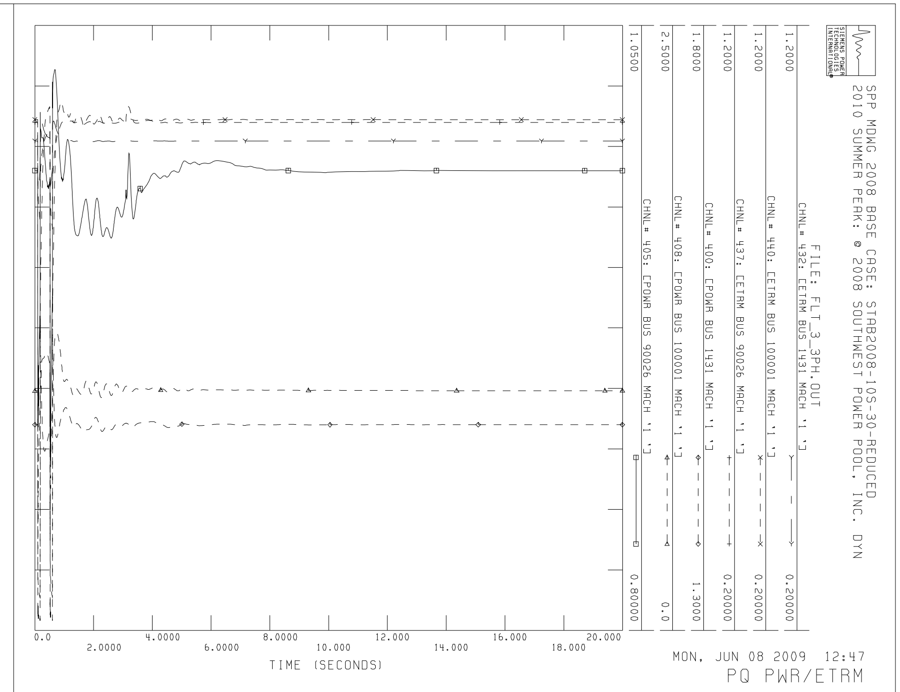
CHNL# 6: [ANGLE SPREAD]
TIME (SECONDS)
MON, JUN 08 2009 12:47
SYSTEM ANGLES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FILE: FLT_3_3PH.OUT
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CHNL# 440: [ETRM BUS 10001 MACH '1 ']
CHNL# 437: [ETRM BUS 90026 MACH '1 ']
CHNL# 400: [POWR BUS 1431 MACH '1 ']
CHNL# 408: [POWR BUS 10001 MACH '1 ']
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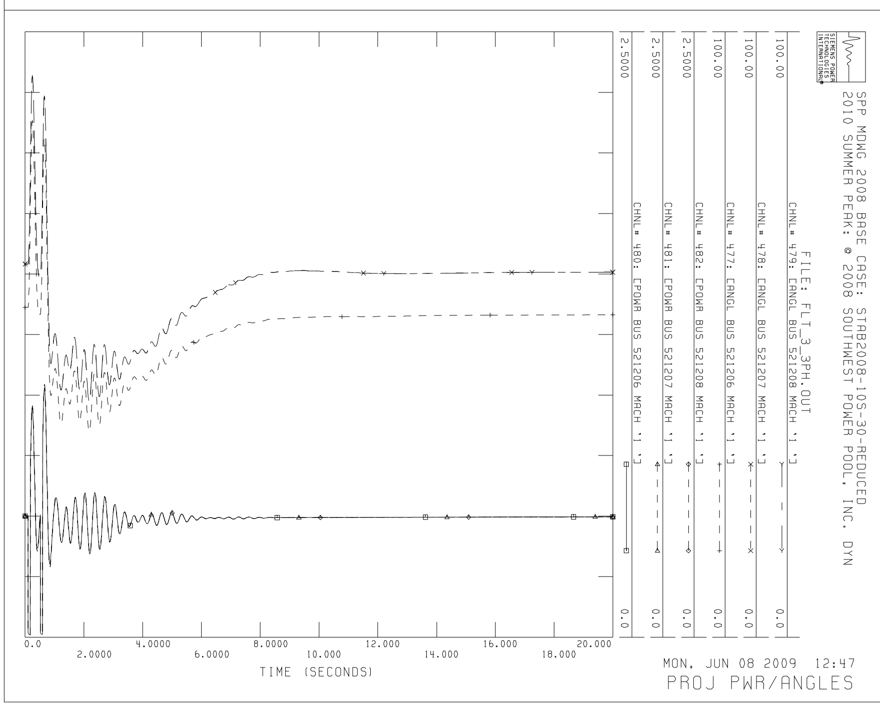
TIME (SECONDS)
MON, JUN 08 2009 12:47
PQ PWR/ETRM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CHNL# 478: [ANGL BUS 521207 MACH '1 ']
CHNL# 477: [ANGL BUS 521206 MACH '1 ']
CHNL# 482: [POWR BUS 521208 MACH '1 ']
CHNL# 481: [POWR BUS 521207 MACH '1 ']
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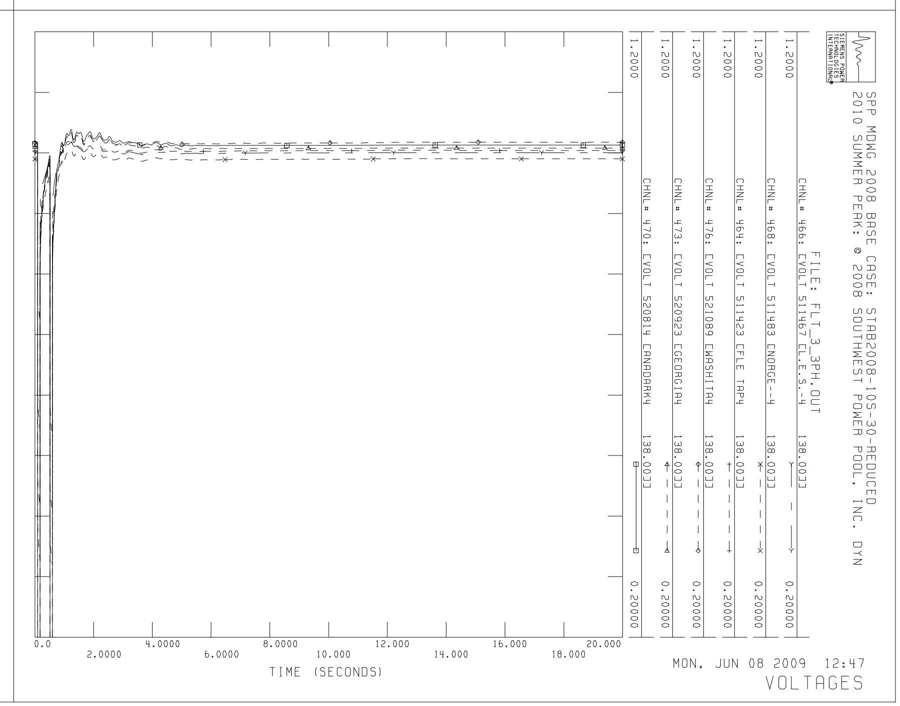
TIME (SECONDS)
MON, JUN 08 2009 12:47
PROJ PWR/ANGLES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2010 SUMMER PEAK: @ 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT_3_3PH.OUT
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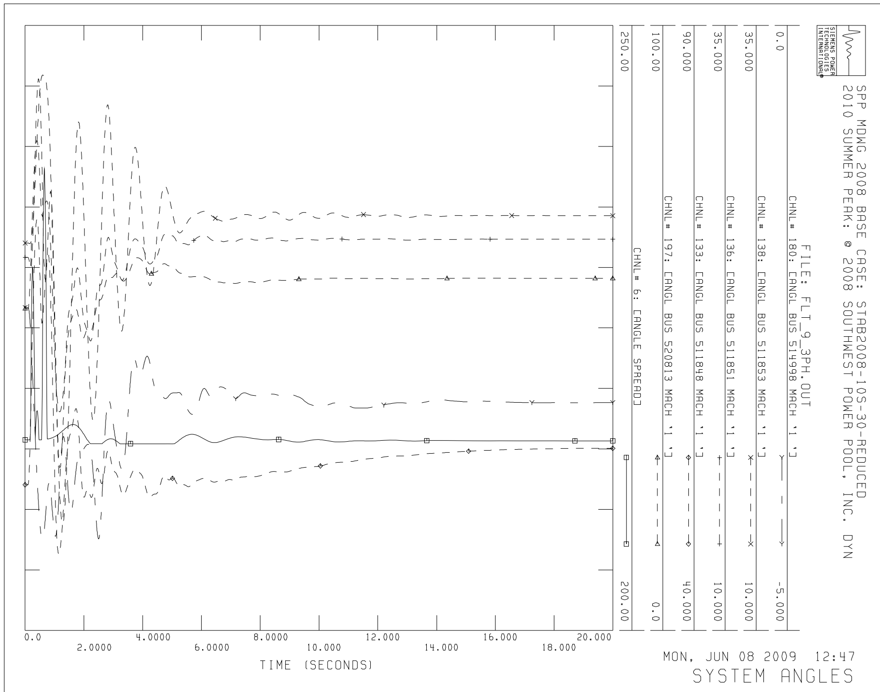
CHNL# 468: [VOLT 511483 [NORGE--4 138.00]]
CHNL# 464: [VOLT 511423 [FLE TAP4 138.00]]
CHNL# 476: [VOLT 521089 [WASHITA4 138.00]]
CHNL# 473: [VOLT 520923 [GEORGIA4 138.00]]
CHNL# 470: [VOLT 520814 [ANADARK4 138.00]]
TIME (SECONDS)
MON, JUN 08 2009 12:47
VOLTAGES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CHNL# 138: CANGL BUS 511853 MACH '1 '
CHNL# 136: CANGL BUS 511851 MACH '1 '
CHNL# 133: CANGL BUS 511848 MACH '1 '
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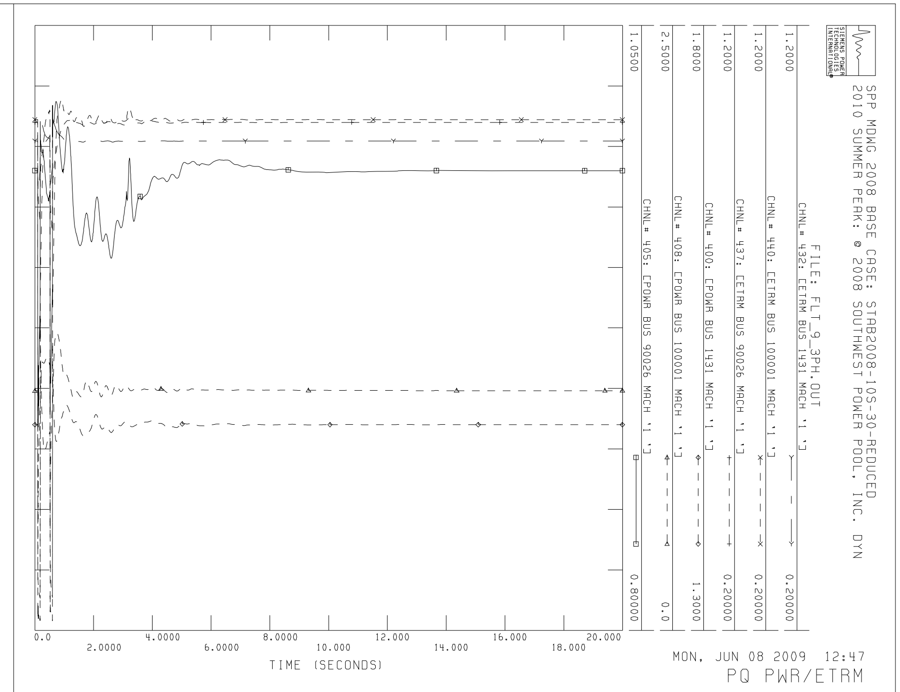
TIME (SECONDS)
MON, JUN 08 2009 12:47
SYSTEM ANGLES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2010 SUMMER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT_9_3PH.OUT
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CHNL# 440: CETRM BUS 10001 MACH '1 '
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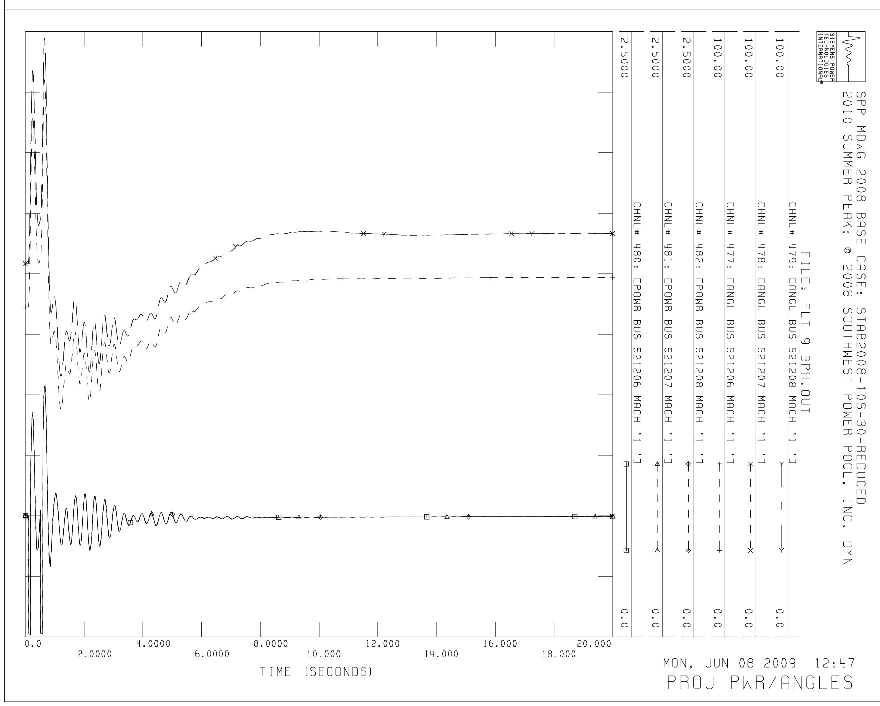
MON, JUN 08 2009 12:47
PQ PWR/ETRM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2010 SUMMER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT_9_3PH.OUT
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CHNL# 478: CANGL BUS 521207 MACH '1 '
CHNL# 477: CANGL BUS 521206 MACH '1 '
CHNL# 482: CPOWR BUS 521208 MACH '1 '
CHNL# 481: CPOWR BUS 521207 MACH '1 '
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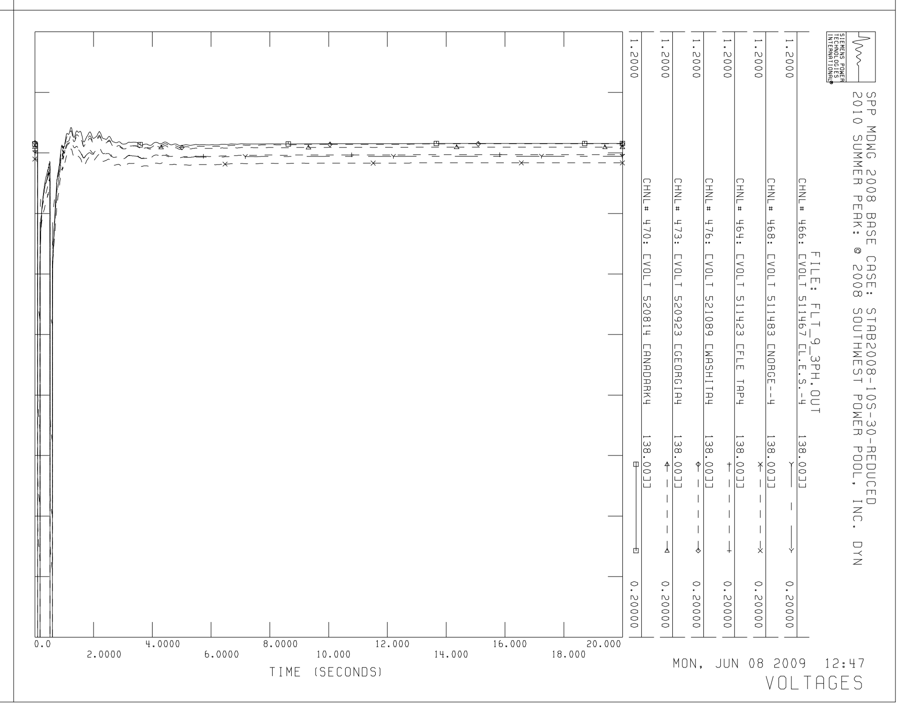
TIME (SECONDS)
MON, JUN 08 2009 12:47
PROJ PWR/ANGLES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2010 SUMMER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
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CHNL# 466: CVOLT 511467 CL.E.S.-4 138.00
CHNL# 468: CVOLT 511483 CNORGE--4 138.00
CHNL# 464: CVOLT 511423 CFLE TAP4 138.00
CHNL# 476: CVOLT 521089 CWASHITA4 138.00
CHNL# 473: CVOLT 520923 CGEORGIA4 138.00
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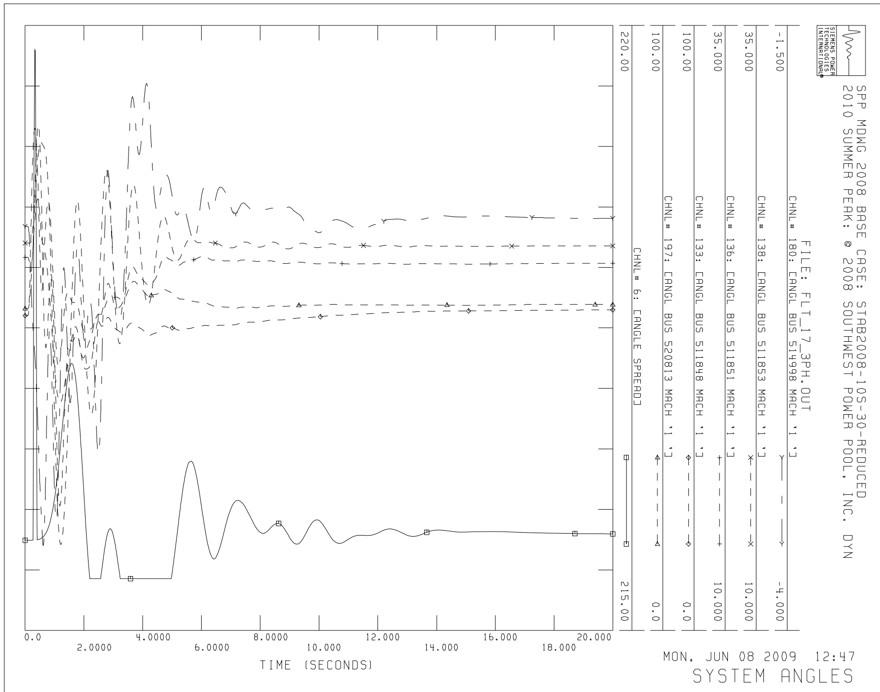
TIME (SECONDS)
MON, JUN 08 2009 12:47
VOLTAGES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CHNL# 180: CANGL BUS 514998 MACH '1 '] -1.500 -4.000
CHNL# 138: CANGL BUS 511853 MACH '1 '] 35.000 10.000
CHNL# 136: CANGL BUS 511851 MACH '1 '] 35.000 10.000
CHNL# 133: CANGL BUS 511848 MACH '1 '] 100.00 0.0
CHNL# 197: CANGL BUS 520813 MACH '1 '] 100.00 0.0
CHNL# 6: CANGLE SPREAD] 220.00 215.00
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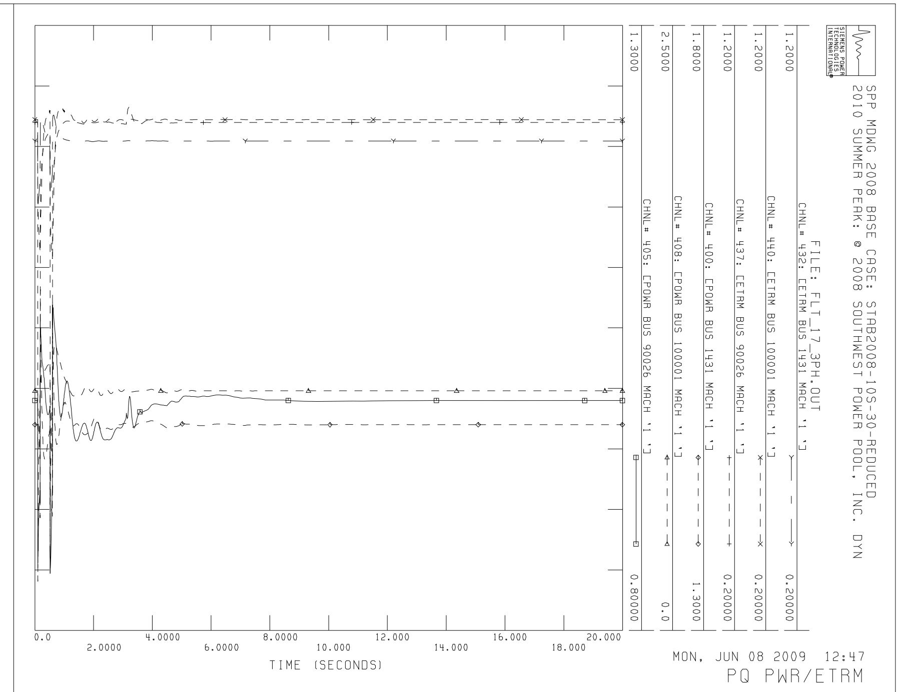
TIME (SECONDS)
MON, JUN 08 2009 12:47
SYSTEM ANGLES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2010 SUMMER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
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CHNL# 432: CETRM BUS 1431 MACH '1 '] 1.2000 0.20000
CHNL# 440: CETRM BUS 10001 MACH '1 '] 1.2000 0.20000
CHNL# 437: CETRM BUS 90026 MACH '1 '] 1.2000 0.20000
CHNL# 400: CPOWR BUS 1431 MACH '1 '] 1.8000 1.3000
CHNL# 408: CPOWR BUS 10001 MACH '1 '] 2.5000 0.0
CHNL# 405: CPOWR BUS 90026 MACH '1 '] 1.3000 0.80000
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TIME (SECONDS)
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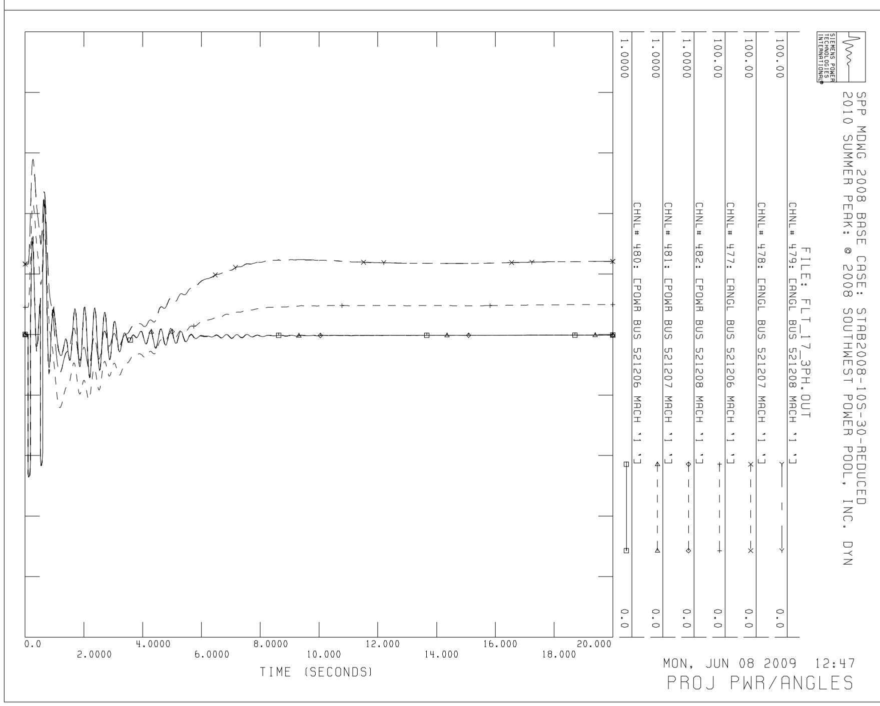
PQ PWR/ETRM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2010 SUMMER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
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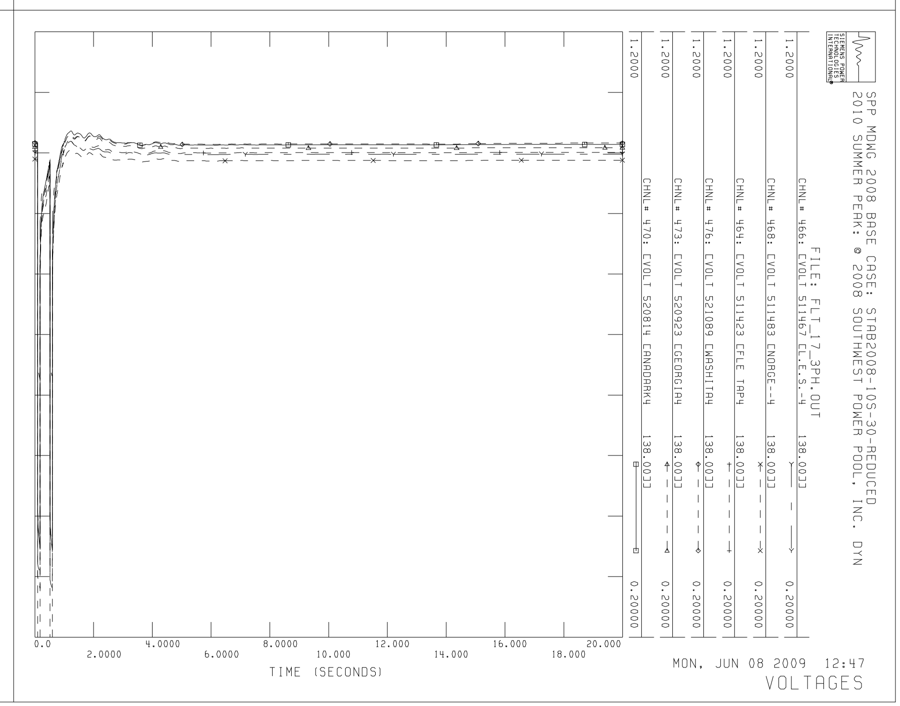
CHNL# 479: CANGL BUS 521208 MACH '1 '] 100.00 0.0
CHNL# 478: CANGL BUS 521207 MACH '1 '] 100.00 0.0
CHNL# 477: CANGL BUS 521206 MACH '1 '] 100.00 0.0
CHNL# 482: CPOWR BUS 521208 MACH '1 '] 1.0000 0.0
CHNL# 481: CPOWR BUS 521207 MACH '1 '] 1.0000 0.0
CHNL# 480: CPOWR BUS 521206 MACH '1 '] 1.0000 0.0
0.0 2.0000 4.0000 6.0000 8.0000 10.000 12.000 14.000 16.000 18.000 20.000
TIME (SECONDS)
MON, JUN 08 2009 12:47
PROJ PWR/ANGLES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2010 SUMMER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
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CHNL# 468: CVOLT 511483 CNORGE--4 138.00] 1.2000 0.20000
CHNL# 464: CVOLT 511423 CFLE TAP4 138.00] 1.2000 0.20000
CHNL# 476: CVOLT 521089 CWASHITA4 138.00] 1.2000 0.20000
CHNL# 473: CVOLT 520923 CGEORGIA4 138.00] 1.2000 0.20000
CHNL# 470: CVOLT 520814 CANADRK4 138.00] 1.2000 0.20000
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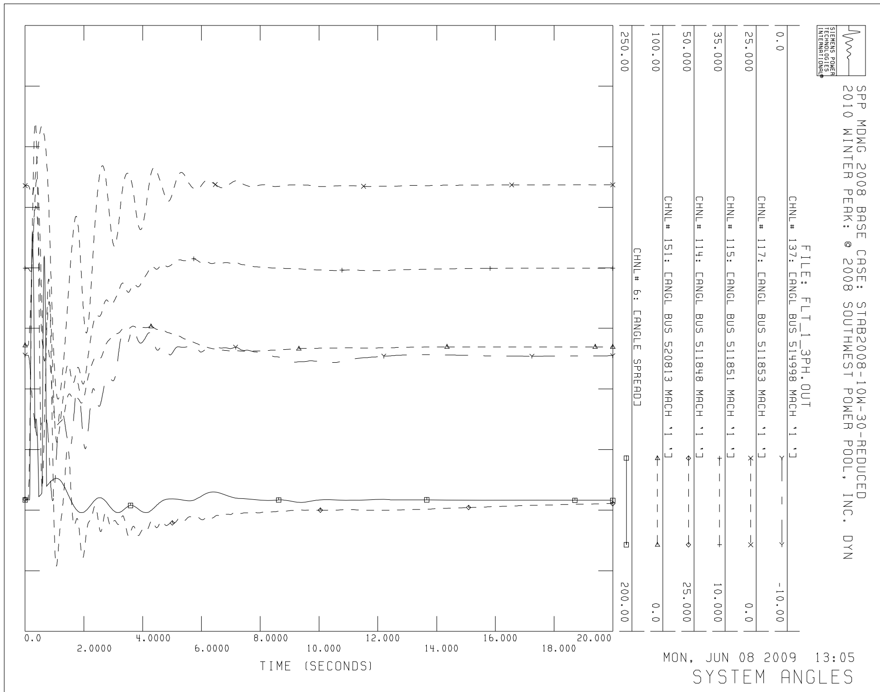
MON, JUN 08 2009 12:47
VOLTAGES

APPENDIX B.

SELECTED STABILITY PLOTS

2010 SUMMER PEAK

All plots available on request.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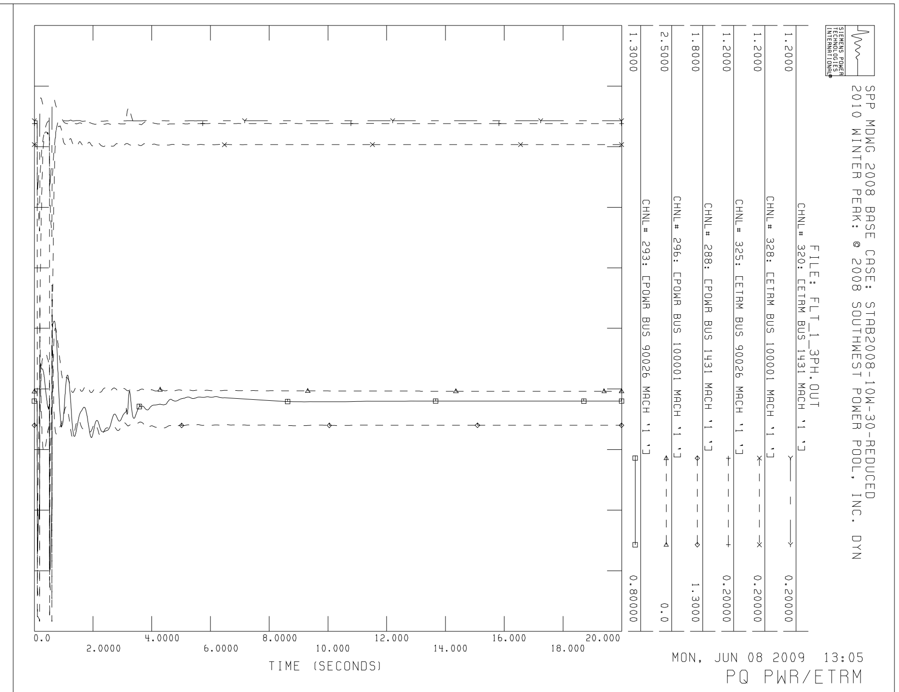
2010 WINTER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT_1_3PH.OUT
CHNL# 137: [ANGL BUS 514998 MACH '1 ']
CHNL# 117: [ANGL BUS 511853 MACH '1 ']
CHNL# 115: [ANGL BUS 511851 MACH '1 ']
CHNL# 114: [ANGL BUS 511848 MACH '1 ']
CHNL# 151: [ANGL BUS 520813 MACH '1 ']
CHNL# 6: [ANGLE SPREAD]
TIME (SECONDS)
MON, JUN 08 2009 13:05
SYSTEM ANGLES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2010 WINTER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT_1_3PH.OUT
CHNL# 320: [ETRM BUS 1431 MACH '1 ']
CHNL# 328: [ETRM BUS 10001 MACH '1 ']
CHNL# 325: [ETRM BUS 90026 MACH '1 ']
CHNL# 288: [POWR BUS 1431 MACH '1 ']
CHNL# 296: [POWR BUS 10001 MACH '1 ']
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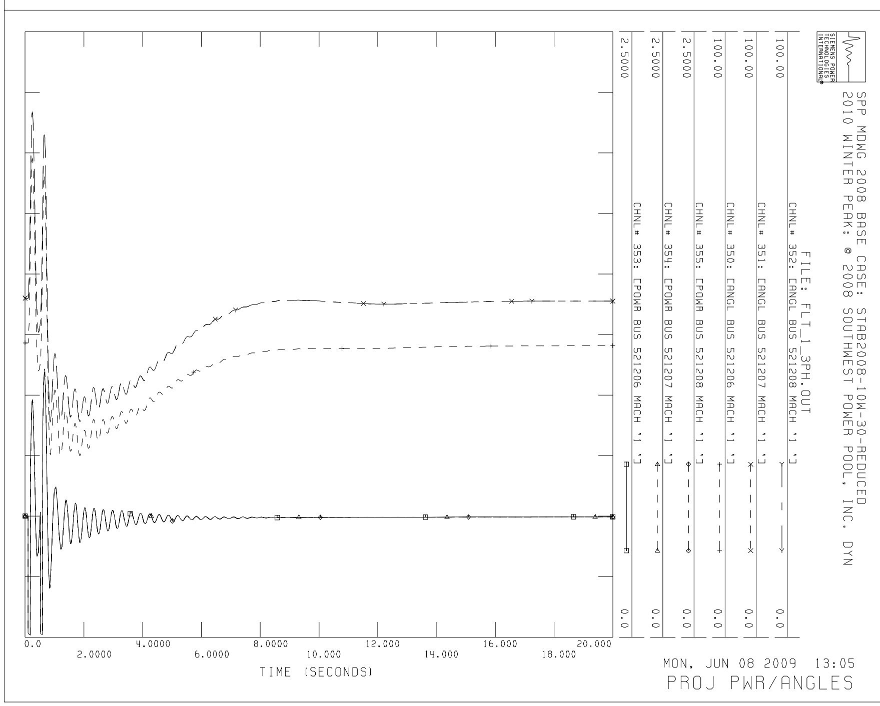
TIME (SECONDS)
MON, JUN 08 2009 13:05
PQ PWR/ETRM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2010 WINTER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT_1_3PH.OUT
CHNL# 352: [ANGL BUS 521208 MACH '1 ']
CHNL# 351: [ANGL BUS 521207 MACH '1 ']
CHNL# 350: [ANGL BUS 521206 MACH '1 ']
CHNL# 355: [POWR BUS 521208 MACH '1 ']
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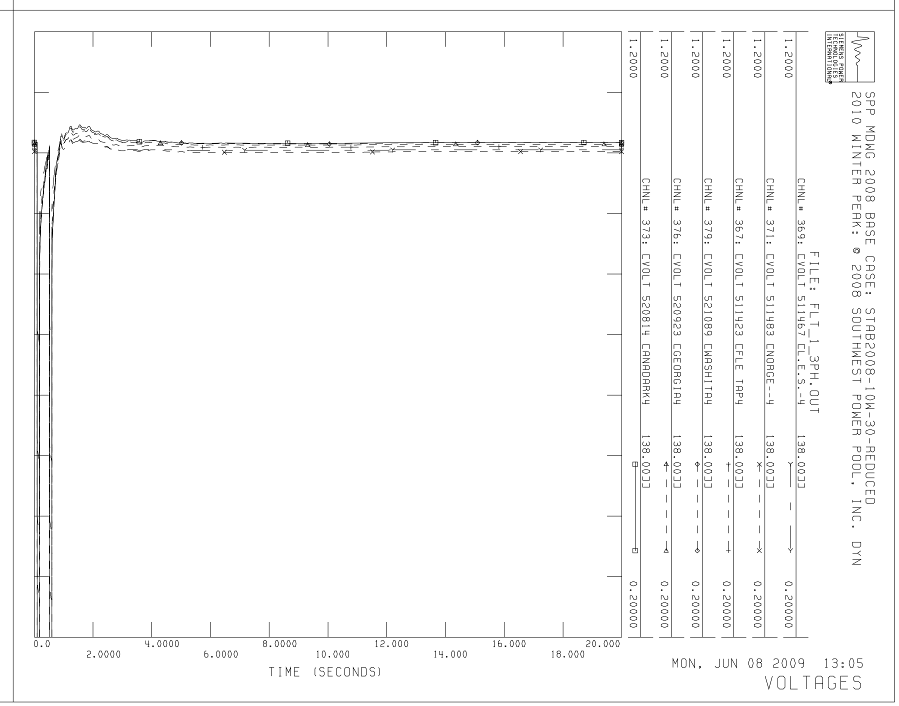
MON, JUN 08 2009 13:05
PROJ PWR/ANGLES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2010 WINTER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT_1_3PH.OUT
CHNL# 369: [VOLT 511467 CL.E.S.-4 138.00]
CHNL# 371: [VOLT 511483 CNORGE--4 138.00]
CHNL# 367: [VOLT 511423 CFLE TAP4 138.00]
CHNL# 379: [VOLT 521089 CWASHITA4 138.00]
CHNL# 376: [VOLT 520923 CGEORGIA4 138.00]
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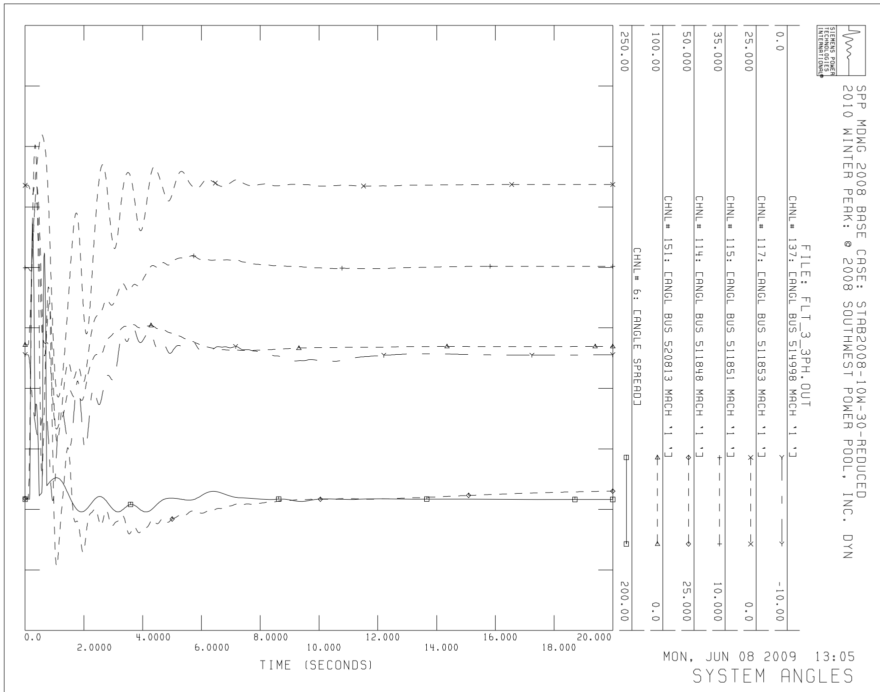
TIME (SECONDS)
MON, JUN 08 2009 13:05
VOLTAGES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2010 WINTER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT_3_3PH.OUT
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CHNL# 117: [ANGL BUS 511853 MACH '1 '] 25.000 0.0
CHNL# 115: [ANGL BUS 511851 MACH '1 '] 35.000 10.000
CHNL# 114: [ANGL BUS 511848 MACH '1 '] 50.000 25.000
CHNL# 151: [ANGL BUS 520813 MACH '1 '] 100.00 0.0
CHNL# 6: [ANGLE SPREAD] 250.00 200.00
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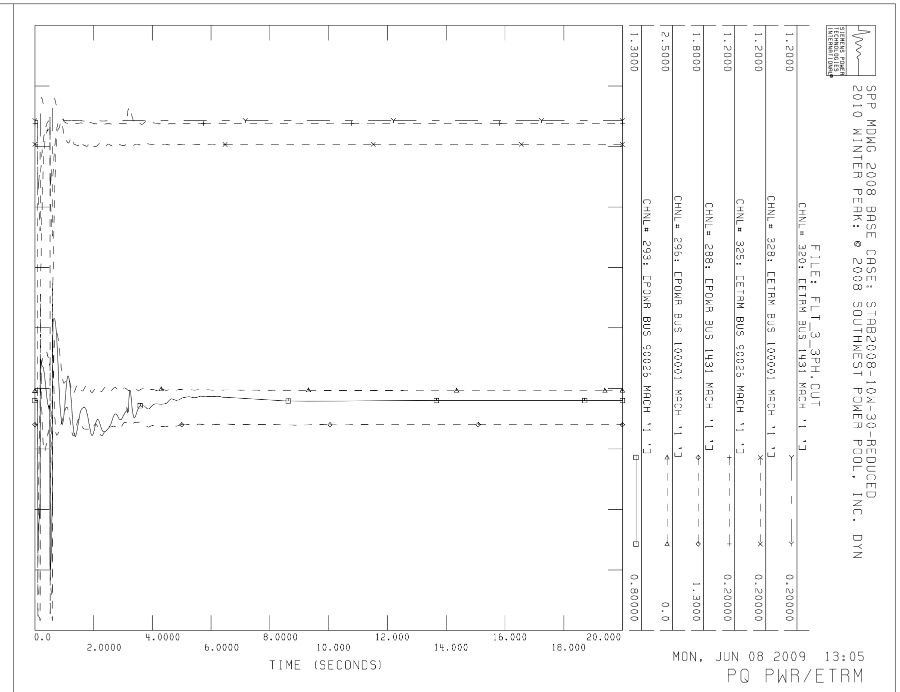
TIME (SECONDS)
MON, JUN 08 2009 13:05
SYSTEM ANGLES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2010 WINTER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT_3_3PH.OUT
CHNL# 320: [ETRM BUS 1431 MACH '1 '] 1.2000 0.20000
CHNL# 328: [ETRM BUS 10001 MACH '1 '] 1.2000 0.20000
CHNL# 325: [ETRM BUS 90026 MACH '1 '] 1.2000 0.20000
CHNL# 288: [POWR BUS 1431 MACH '1 '] 1.8000 1.3000
CHNL# 296: [POWR BUS 10001 MACH '1 '] 2.5000 0.0
CHNL# 293: [POWR BUS 90026 MACH '1 '] 1.3000 0.80000
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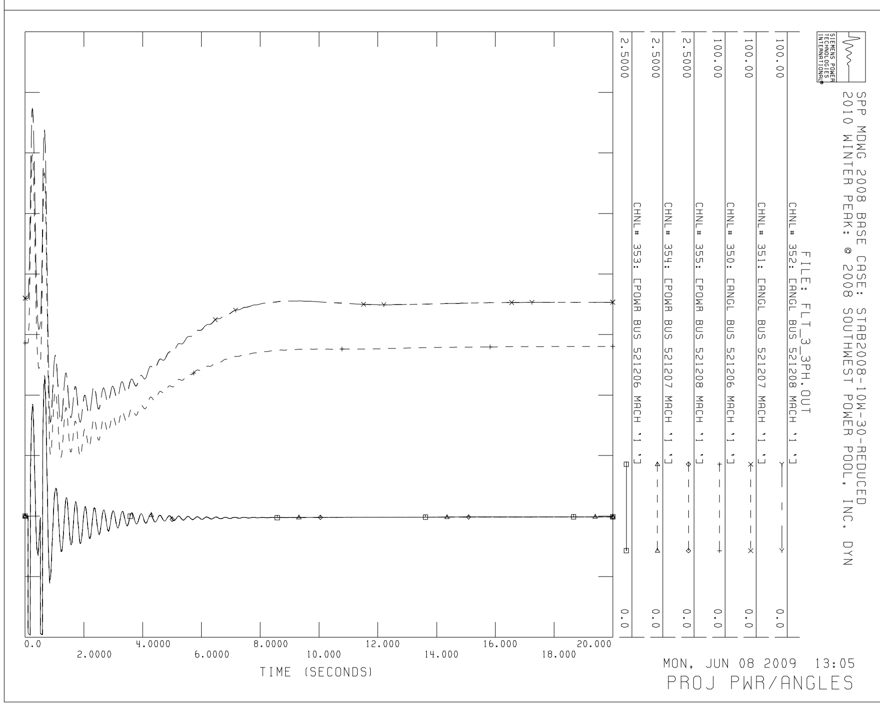
PQ PWR/ETRM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2010 WINTER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
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CHNL# 351: [ANGL BUS 521207 MACH '1 '] 100.00 0.0
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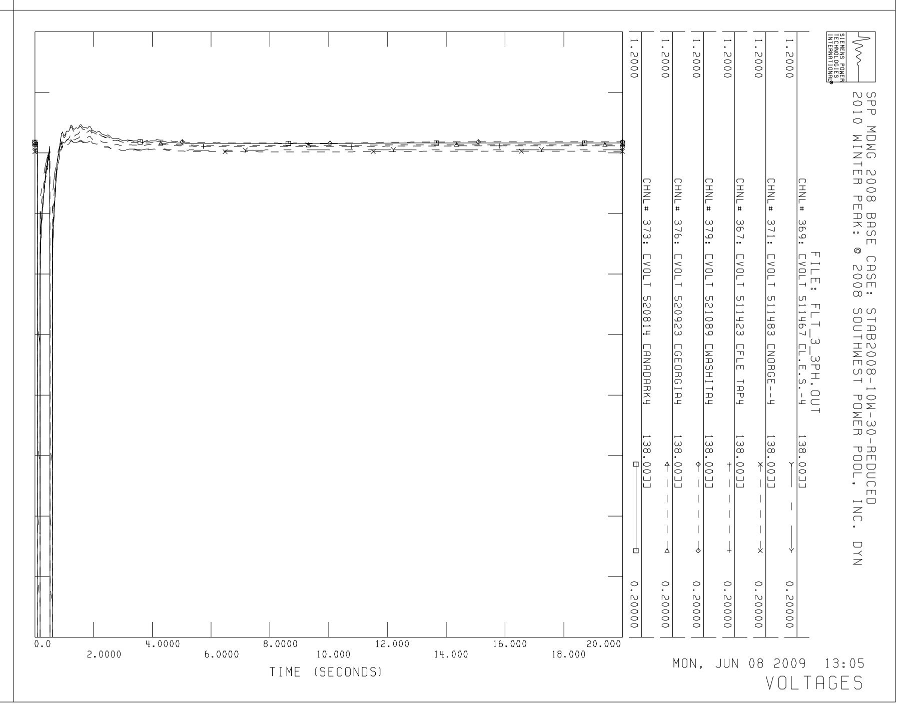
TIME (SECONDS)
MON, JUN 08 2009 13:05
PROJ PWR/ANGLES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2010 WINTER PEAK: © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT_3_3PH.OUT
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CHNL# 371: [VOLT 511483 CNORGE--4 138.00] 1.2000 0.20000
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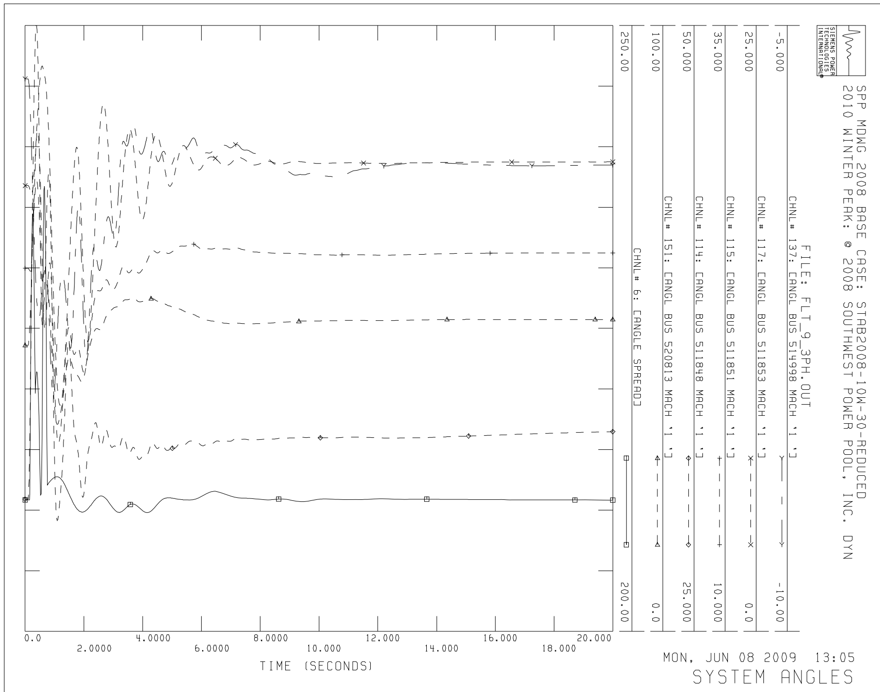
VOLTAGES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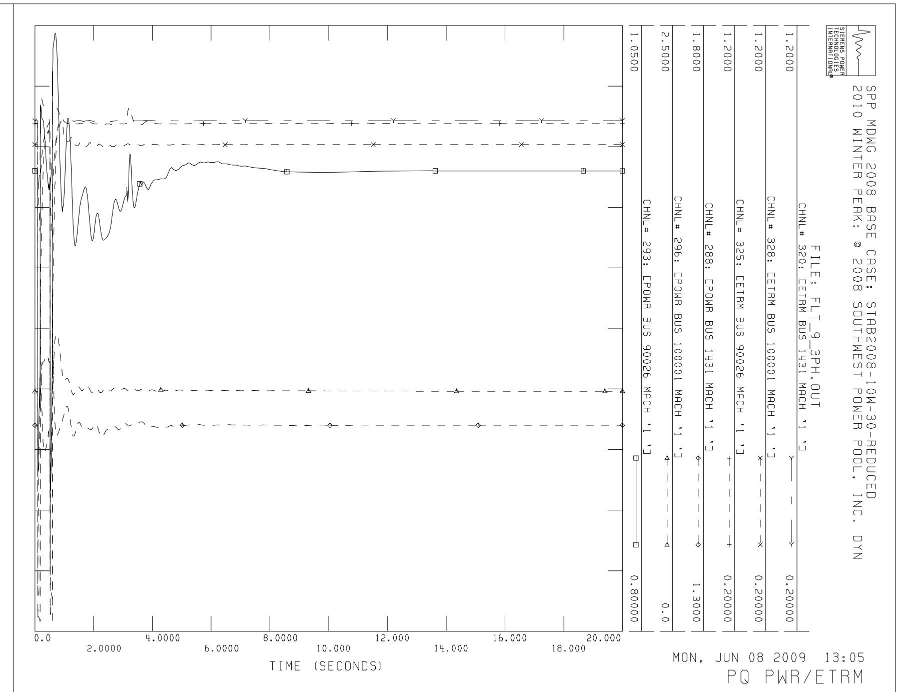
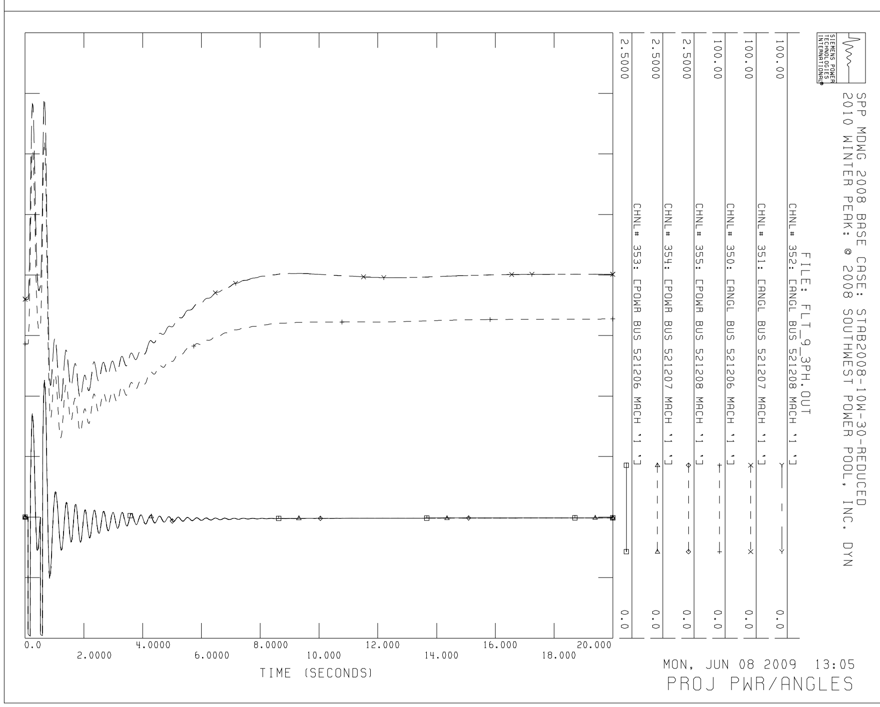
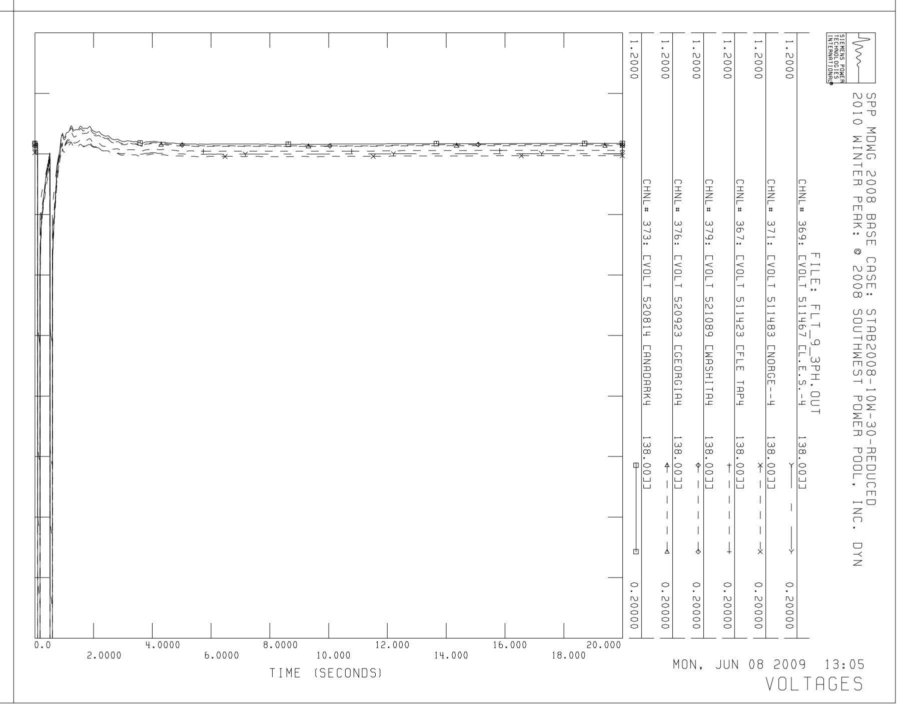
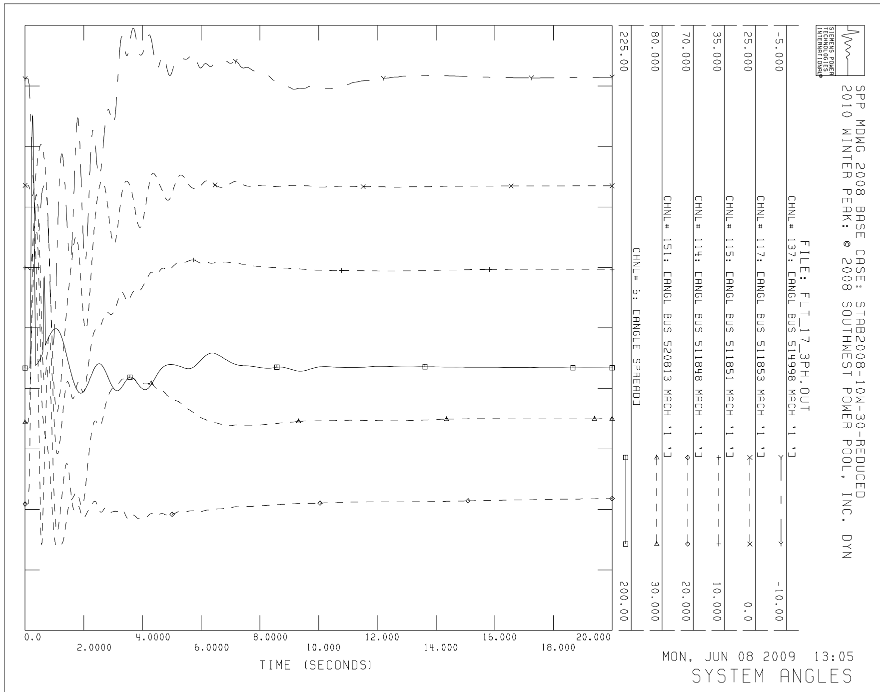
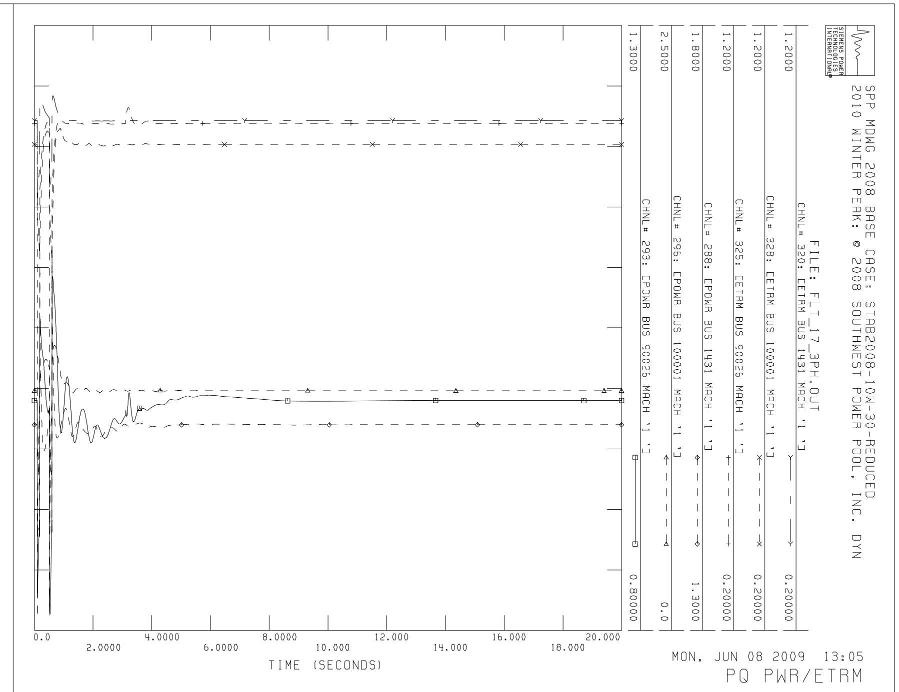
2010 WINTER PEAK; © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT_9_3PH.OUT
CHNL# 137: [ANGL BUS 514998 MACH '1 ']
CHNL# 117: [ANGL BUS 511853 MACH '1 ']
CHNL# 115: [ANGL BUS 511851 MACH '1 ']
CHNL# 114: [ANGL BUS 511848 MACH '1 ']
CHNL# 151: [ANGL BUS 520813 MACH '1 ']
CHNL# 6: [ANGLE SPREAD]
TIME (SECONDS)
MON, JUN 08 2009 13:05
SYSTEM ANGLES

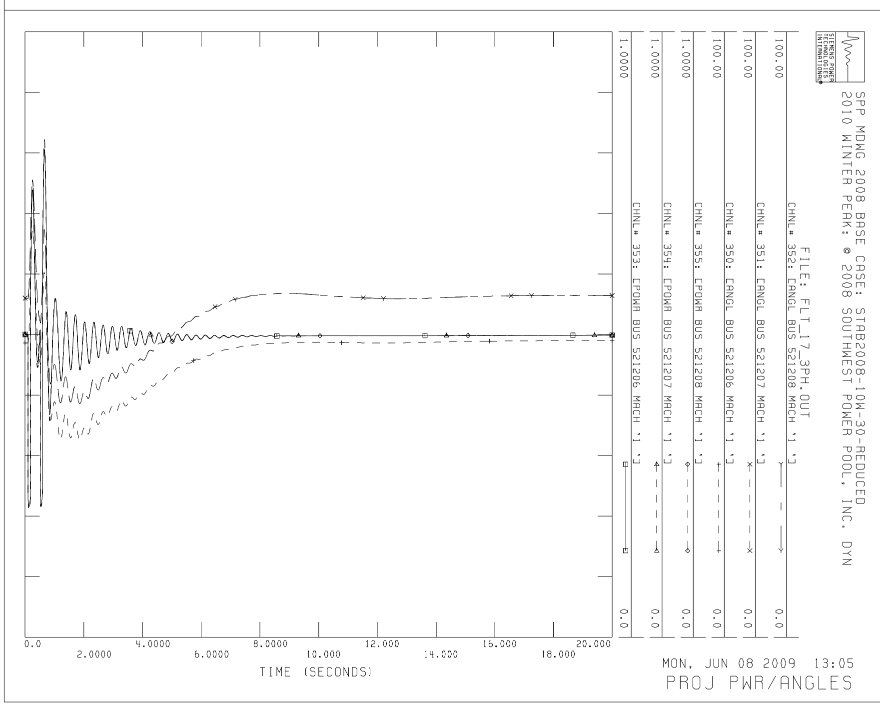

SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK; © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT_9_3PH.OUT
CHNL# 320: [ETRM BUS 1431 MACH '1 ']
CHNL# 328: [ETRM BUS 10001 MACH '1 ']
CHNL# 325: [ETRM BUS 90026 MACH '1 ']
CHNL# 288: [POWR BUS 1431 MACH '1 ']
CHNL# 296: [POWR BUS 10001 MACH '1 ']
CHNL# 293: [POWR BUS 90026 MACH '1 ']
TIME (SECONDS)
MON, JUN 08 2009 13:05
PQ PWR/ETRM


SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK; © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT_9_3PH.OUT
CHNL# 352: [ANGL BUS 521208 MACH '1 ']
CHNL# 351: [ANGL BUS 521207 MACH '1 ']
CHNL# 350: [ANGL BUS 521206 MACH '1 ']
CHNL# 355: [POWR BUS 521208 MACH '1 ']
CHNL# 354: [POWR BUS 521207 MACH '1 ']
CHNL# 353: [POWR BUS 521206 MACH '1 ']
TIME (SECONDS)
MON, JUN 08 2009 13:05
PROJ PWR/ANGLES


SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK; © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT_9_3PH.OUT
CHNL# 369: [VOLT 511467 CL.E.S.-4 138.00]
CHNL# 371: [VOLT 511483 CNORGE--4 138.00]
CHNL# 367: [VOLT 511423 CFLE TAP4 138.00]
CHNL# 379: [VOLT 521089 CWASHITA4 138.00]
CHNL# 376: [VOLT 520923 CGEORGIA4 138.00]
CHNL# 373: [VOLT 520814 CANADARK4 138.00]
TIME (SECONDS)
MON, JUN 08 2009 13:05
VOLTAGES


SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK; © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT_17_3PH.OUT
CHNL# 137: [ANGL BUS 514998 MACH '1 ']
CHNL# 117: [ANGL BUS 511853 MACH '1 ']
CHNL# 115: [ANGL BUS 511851 MACH '1 ']
CHNL# 114: [ANGL BUS 511848 MACH '1 ']
CHNL# 151: [ANGL BUS 520813 MACH '1 ']
CHNL# 6: [ANGLE SPREAD]
TIME (SECONDS)
MON, JUN 08 2009 13:05
SYSTEM ANGLES


SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK; © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT_17_3PH.OUT
CHNL# 320: [ETRM BUS 1431 MACH '1 ']
CHNL# 328: [ETRM BUS 100001 MACH '1 ']
CHNL# 325: [ETRM BUS 90026 MACH '1 ']
CHNL# 288: [POWR BUS 1431 MACH '1 ']
CHNL# 296: [POWR BUS 100001 MACH '1 ']
CHNL# 293: [POWR BUS 90026 MACH '1 ']
TIME (SECONDS)
MON, JUN 08 2009 13:05
PQ PWR/ETRM


SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK; © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT_17_3PH.OUT
CHNL# 352: [ANGL BUS 521208 MACH '1 ']
CHNL# 351: [ANGL BUS 521207 MACH '1 ']
CHNL# 350: [ANGL BUS 521206 MACH '1 ']
CHNL# 355: [POWR BUS 521208 MACH '1 ']
CHNL# 354: [POWR BUS 521207 MACH '1 ']
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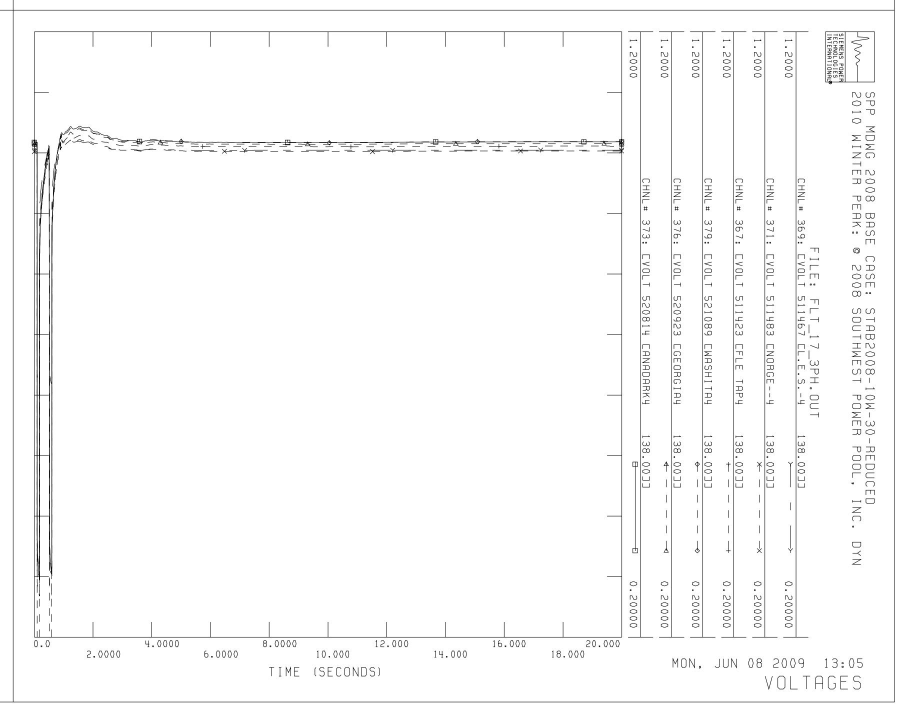
TIME (SECONDS)
MON, JUN 08 2009 13:05
PROJ PWR/ANGLES


SPP MDWG 2008 BASE CASE: STAB2008-10W-30-REDUCED
2010 WINTER PEAK; © 2008 SOUTHWEST POWER POOL, INC. DYN
FILE: FLT_17_3PH.OUT
CHNL# 369: [VOLT 511467 CL.E.S.-4 138.00]
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CHNL# 379: [VOLT 521089 CWASHITA4 138.00]
CHNL# 376: [VOLT 520923 CGEORGIA4 138.00]
CHNL# 373: [VOLT 520814 CANADRK4 138.00]
TIME (SECONDS)
MON, JUN 08 2009 13:05
VOLTAGES