

Fault Simulation Study IATAN (UNITS I & II)

SOUTHWEST POWER POOL
ENGINEERING GROUP
Modeling Group

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Table of Contents

- Executive Summary 2**
- Introduction..... 3**
- Study Scope..... 4**
- Model Details 5**
 - Power Flow Model 5
 - Fault Calculations 5
 - Fault Calculations 6
 - PSAS Files 6
 - 345 KV PSAS Files..... 7
 - 161 KV PSAS Files..... 8
- Conclusion 9**
- APPENDIX A – EVENT SPEED AND ANGLE DEVIATION PLOTS..... 10**

Executive Summary

Kansas City Power & Light requested that Southwest Power Pool (SPP) perform a stability study for the IATAN Generation Station. The stability study would simulate the delayed tripping of the 345 kV lines out of IATAN Substation for both three-phase and single-line to ground faults due to the loss of the power line carrier blocking signal during a fault event. Additionally, SPP performed 3-phase and single-line to ground fault simulations on the 161 kV transmission lines out of the IATAN Substation.

SPP performed the stability study running the simulations to outage the 345 KV & 161 kV lines out of the IATAN Substation. The study found no unstable conditions during the four simulations. The speed and angle plots for the worst-case deviations for each simulation are contained in "Appendix A-EVENT SPEED AND ANGLE DEEVIATION PLOTS".

Introduction

IATAN Generation Station is located north of Kansas City on the Kansas-Missouri border in Platte County. The Station is a hub for two Generation Units IATAN #1 (706 MWs) and IATAN #2 (850 MWs). The substation has 345 KV ties to Westar Energy's Stanger Substation and Kansas Greater Missouri Operation St. Joe Substation and 161 KV ties to Greater Missouri Operation's Platte City and Stanger Substations.

This study was performed at the request of Kansas City Power & Light (KCP&L) to simulate the delayed tripping of the 345 kV lines out of IATAN Substation due to the loss of the power line carrier blocking signal during a fault event.

Study Scope

This study was performed to simulate 3-phase and single line to ground, faults on the IATAN to Stranger and IATAN to St. Joe 345 kV Lines with the loss of carrier blocking scheme. These simulations were ran applying a fault near the IATAN substation, then opening the IATAN breaker with a clearing time of 3.6 cycles, and finally opening the remote end after an additional 8 cycles. SPP performed additional 3-phase and single-line to ground fault simulations on the 161 kV transmission lines out of the IATAN Substation. The clearing time for the 161 kV breakers was provided by KCPL and was 7.2 cycles.

- IATAN – STANGER 345 KV 3-phase fault
- IATAN – ST. JOE 345 kV 3-phase fault
- IATAN – STANGER 345 kV single line to ground fault
- IATAN – ST. JOE 345 kV single line to ground fault
- IATAN – STANGER 161 KV 3-phase fault
- IATAN – PLATTE CITY 161 kV 3-phase fault
- IATAN – STANGER 161 kV single line to ground fault
- IATAN – PLATTE CITY 161 kV single line to ground fault

Model Details

Power Flow Model

The SPP 2009 MDWG 2014 Summer Peak Case was used to perform the following simulations using the PSS/E 30.3.3 Dynamic tool.

Fault Calculations

The three-phase and single line to ground fault values used in the simulations are listed below. The three-phase fault value is the generic worst case value used by PSS/E. The single line to ground fault was determined by running a fault current study using PSS/E 30.3.3 Power Flow tool. The output from the fault calculations was copied from the PSS/E report window and has been pasted below for reference.

- 3-Phase fault Magnitude = $-2 e^{-10}$ MVA (PSS/E default value)
- SLG calculated using PSSE 14 Summer Case = $306 - j1707$ MVA

PSS/E SLG Fault Report:

PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS/E WED, JUN 09 2010 9:26
SPP MDWG 2009 Q1 FULL: MDWG09Q1-14S_V30_FINAL (02-27-2009)
2014 SUMMER PEAK: © 2009 SOUTHWEST POWER POOL, INC.; RED DYN

UNBALANCES APPLIED:

LINE TO GROUND FAULT AT BUS 542982 [IATAN 7 345.00] PHASE 1
L-G Z= 0.000 0.000

SEQUENCE THEVENIN IMPEDANCES AT FAULTED BUSES

BUS# X--	NAME	--X BASKV	ZERO	POSITIVE	NEGATIVE
542982	IATAN 7	345.00	0.00946	0.04954	0.00072 0.00721 0.00072 0.00721

LINE TO GROUND FAULT AT BUS 542982 [IATAN 7 345.00]:

SEQUENCE	RE(V0)	IM(V0)	RE(V+)	IM(V+)	RE(V-)	IM(V-)	RE(3V0)	IM(3V0)
----------	--------	--------	--------	--------	--------	--------	---------	---------

PHASE	RE(VA)	IM(VA)	RE(VB)	IM(VB)	RE(VC)	IM(VC)
-------	--------	--------	--------	--------	--------	--------

542982 (P.U.)	-0.7057	0.3461	0.8112	-0.3866	-0.1055	0.0405	-2.1172	1.0382
---------------	---------	--------	--------	---------	---------	--------	---------	--------

IATAN 7 345.00	0.0000	0.0000	-1.4284	-0.2748	-0.6888	1.3129
----------------	--------	--------	---------	---------	---------	--------

SEQUENCE	RE(I0)	IM(I0)	RE(I+)	IM(I+)	RE(I-)	IM(I-)	RE(3I0)	IM(3I0)
----------	--------	--------	--------	--------	--------	--------	---------	---------

PHASE	RE(IA)	IM(IA)	RE(IB)	IM(IB)	RE(IC)	IM(IC)
-------	--------	--------	--------	--------	--------	--------

FROM 532772 CKT 1	-3.7170	-13.0756	-5.8154	-1.5103	-1.0436	-4.8206	-11.1509	-39.2269
-------------------	---------	----------	---------	---------	---------	---------	----------	----------

STRANGR7 345.00	-10.5760	-19.4065	2.5793	-5.7776	-3.1543	-14.0427
-----------------	----------	----------	--------	---------	---------	----------

FROM 541199 CKT 1	-0.3975	-1.9571	-6.8418	-1.4255	-0.8222	-3.6026	-1.1924	-5.8712
-------------------	---------	---------	---------	---------	---------	---------	---------	---------

STJOE 7 345.00	-8.0615	-6.9852	5.3199	5.7701	1.5491	-4.6561
----------------	---------	---------	--------	--------	--------	---------

FROM 542957 CKT 1	0.0000	0.0000	5.2359	-5.7358	-0.9520	-2.4791	0.0000	0.0000
-------------------	--------	--------	--------	---------	---------	---------	--------	--------

IAT G1 1 24.000	4.2839	-8.2150	-4.9623	-1.2513	0.6784	9.4663
-----------------	--------	---------	---------	---------	--------	--------

FROM 542962 CKT 1	0.0000	0.0000	5.9043	-7.7392	-1.0038	-2.7974	0.0000	0.0000
-------------------	--------	--------	--------	---------	---------	---------	--------	--------

IAT G2 1 25.000	4.9005	-10.5366	-6.7299	-0.7143	1.8295	11.2509
-----------------	--------	----------	---------	---------	--------	---------

FROM WINDING 1 CKT	0.0000	0.0000	-2.5974	1.3781	-0.2929	-1.3329	0.0000	0.0000
--------------------	--------	--------	---------	--------	---------	---------	--------	--------

Fault Simulation Study
IATAN (UNITS I & II)

[IATAN 11] 11 -2.8903 0.0452 3.7930 1.9731 -0.9027 -2.0184

SUM OF CONTRIBUTIONS INTO BUS 542982 [IATAN 7 345.00]:

542982 -4.1144 -15.0327 -4.1145 -15.0327 -4.1144 -15.0327 -12.3433 -45.0981
IATAN 7 345.00 -12.3433 -45.0981 0.0000 0.0000 0.0000 0.0000

CONTRIBUTIONS EQUIVALENT POSITIVE SEQUENCE ADMITTANCE 3.0632 -17.0720 PU
306.32 -

1707.20 MVA

FAULT CURRENT AT BUS 542982 [IATAN 7 345.00]:

542982 -4.1144 -15.0327 -4.1144 -15.0327 -4.1144 -15.0327 -12.3433 -45.0981
IATAN 7 345.00 -12.3433 -45.0981 0.0000 0.0000 0.0000 0.0000

POSITIVE SEQUENCE EQUIVALENT FAULT ADMITTANCE 3.0632 -17.0720 PU
306.32 -1707.20 MVA

Fault Calculations

The following set-up automation file was used to simulate transmission breakers on the 345 KV lines and to allow for a fault bus at either end of the transmission lines.

BAT_SPLT,542982,100000,'CB-ITN-STJO', 345.0
BAT_MOVEBRN,541199,542982,'1',100000,'1'
BAT_SPLT,541199,100001,'CB-STJ-ITNT', 345.0
BAT_MOVEBRN,100000,541199,'1',100001,'1'
BAT_SPLT,100000,100002,'ITN-FB1', 345.0
BAT_MOVEBRN,100001,100000,'1',100002,'1'
BAT_SPLT,542982,100003,'CB-ITN-STGR', 345.0
BAT_MOVEBRN,532772,542982,'1',100003,'1'
BAT_SPLT,532772,100004,'CB-STGR-ITN', 230.0
BAT_MOVEBRN,100003,532772,'1',100004,'1'
BAT_SPLT,100003,100005,'ITNFB2', 230.0
BAT_MOVEBRN,100004,100003,'1',100005,'1'

PSAS Files

The following PSAS files were used in the performing the following simulations using the PSS/E 30.3.3 Dynamic tool. The PSA files contains the steps used to run the simulations from applying the fault, clearing the fault, and running the simulation post fault to look for proper system response.

345 KV PSAS Files

3-Phase IATAN to STRANGER 345 kV

```
IATAN_STGR_3PH-zzz_temp.pas  
RUN TO .5 SECOND PRINT 0 PLOT 3 CRTPLT 0  
APPLY FAULT AT ITNFB2 BUS 100005  
RUN FOR 3.6 CYCLES PRINT 0 PLOT 3 CRTPLT 0  
DISCONNECT BUS 100003  
RUN FOR 8 CYCLES PRINT 0 PLOT 3 CRTPLT 0  
DISCONNECT BUS 100004  
Clear Fault  
RUN TO 20 SECOND PRINT 0 PLOT 5 CRTPLT 0  
END
```

3-Phase IATAN to ST. Joe 345 kV

```
IATAN_STJOE_3PH-zzz_temp.pas  
RUN TO .5 SECOND PRINT 0 PLOT 3 CRTPLT 0  
APPLY FAULT AT ITN-FB1 BUS 100002  
RUN FOR 3.6 CYCLES PRINT 0 PLOT 3 CRTPLT 0  
DISCONNECT BUS 100000  
RUN FOR 8 CYCLES PRINT 0 PLOT 3 CRTPLT 0  
DISCONNECT BUS 100001  
Clear Fault  
RUN TO 20 SECOND PRINT 0 PLOT 5 CRTPLT 0  
END
```

SLG IATAN to STRANGER 345 kV

```
IATAN_STGR_1SLG-zzz_temp.pas  
RUN TO .5 SECOND PRINT 0 PLOT 3 CRTPLT 0  
APPLY FAULT AT BUS 100005 with admittance 306 -1707 MVA  
RUN FOR 3.6 CYCLES PRINT 0 PLOT 3 CRTPLT 0  
DISCONNECT BUS 100003  
RUN FOR 8 CYCLES PRINT 0 PLOT 3 CRTPLT 0  
DISCONNECT BUS 100004  
Clear Fault  
RUN TO 20 SECOND PRINT 0 PLOT 5 CRTPLT 0  
END
```

SLG IATAN to ST. Joe 345 kV

```
IATAN_STJOE_1SLG-zzz_temp.pas  
RUN TO .5 SECOND PRINT 0 PLOT 3 CRTPLT 0  
APPLY FAULT AT BUS 100002 with admittance 306 -1707 MVA  
RUN FOR 3.6 CYCLES PRINT 0 PLOT 3 CRTPLT 0  
DISCONNECT BUS 100000  
RUN FOR 8 CYCLES PRINT 0 PLOT 3 CRTPLT 0  
DISCONNECT BUS 100001  
Clear Fault  
RUN TO 20 SECOND PRINT 0 PLOT 5 CRTPLT 0  
END
```


Fault Simulation Study
IATAN (UNITS I & II)

161 KV PSAS Files

3-Phase IATAN to PLATTE CITY 161 kV

IATAN_PLTCTY_161_3PH-zzz_temp.psas
RUN TO .5 SECOND PRINT 0 PLOT 3 CRTPLT 0
APPLY FAULT AT ITN-FB1 BUS 100002
RUN FOR 7.2 CYCLES PRINT 0 PLOT 3 CRTPLT 0
DISCONNECT BUS 100000
DISCONNECT BUS 100001
Clear Fault
RUN TO 20 SECOND PRINT 0 PLOT 5 CRTPLT 0
END

3-Phase IATAN to STRANGER 161 kV

IATAN_STGR_3PH-zzz_temp.psas
RUN TO .5 SECOND PRINT 0 PLOT 3 CRTPLT 0
APPLY FAULT AT ITNFB2 BUS 100005
RUN FOR 7.2 CYCLES PRINT 0 PLOT 3 CRTPLT 0
DISCONNECT BUS 100003
DISCONNECT BUS 100004
Clear Fault
RUN TO 20 SECOND PRINT 0 PLOT 5 CRTPLT 0
END

SLG IATAN to PLATTE CITY 161 kV

IATAN_PLTCTY_161_1SLG-zzz_temp.psas
RUN TO .5 SECOND PRINT 0 PLOT 3 CRTPLT 0
APPLY FAULT AT BUS 100002 with admittance 306 -1707
MVA
RUN FOR 7.2 CYCLES PRINT 0 PLOT 3 CRTPLT 0
DISCONNECT BUS 100000
DISCONNECT BUS 100001
Clear Fault
RUN TO 20 SECOND PRINT 0 PLOT 5 CRTPLT 0
END

SLG IATAN to STRANGER 161 kV

IATAN_STGR5_161_1SLG-zzz_temp.psas
RUN TO .5 SECOND PRINT 0 PLOT 3 CRTPLT 0
APPLY FAULT AT BUS 100005 with admittance 306 -1707
MVA
RUN FOR 7.2 CYCLES PRINT 0 PLOT 3 CRTPLT 0
DISCONNECT BUS 100003
DISCONNECT BUS 100004
Clear Fault
RUN TO 20 SECOND PRINT 0 PLOT 5 CRTPLT 0
END

Conclusion

The study found no unstable conditions during the four simulations. The speed and angle plots for the worst-case deviations for each simulation are contained in "Appendix A- EVENT SPEED AND ANGLE DEVIATION PLOTS".

- IATAN – STANGER 345 KV 3-phase fault
- IATAN – ST. JOE 345 kV 3-phase fault
- IATAN – STANGER 345 kV single line to ground fault
- IATAN – ST. JOE 345 kV single line to ground fault
- IATAN – STANGER 161 KV 3-phase fault
- IATAN – PLATTE CITY 161 kV 3-phase fault
- IATAN – STANGER 161 kV single line to ground fault
- IATAN – PLATTE CITY 161 kV single line to ground fault

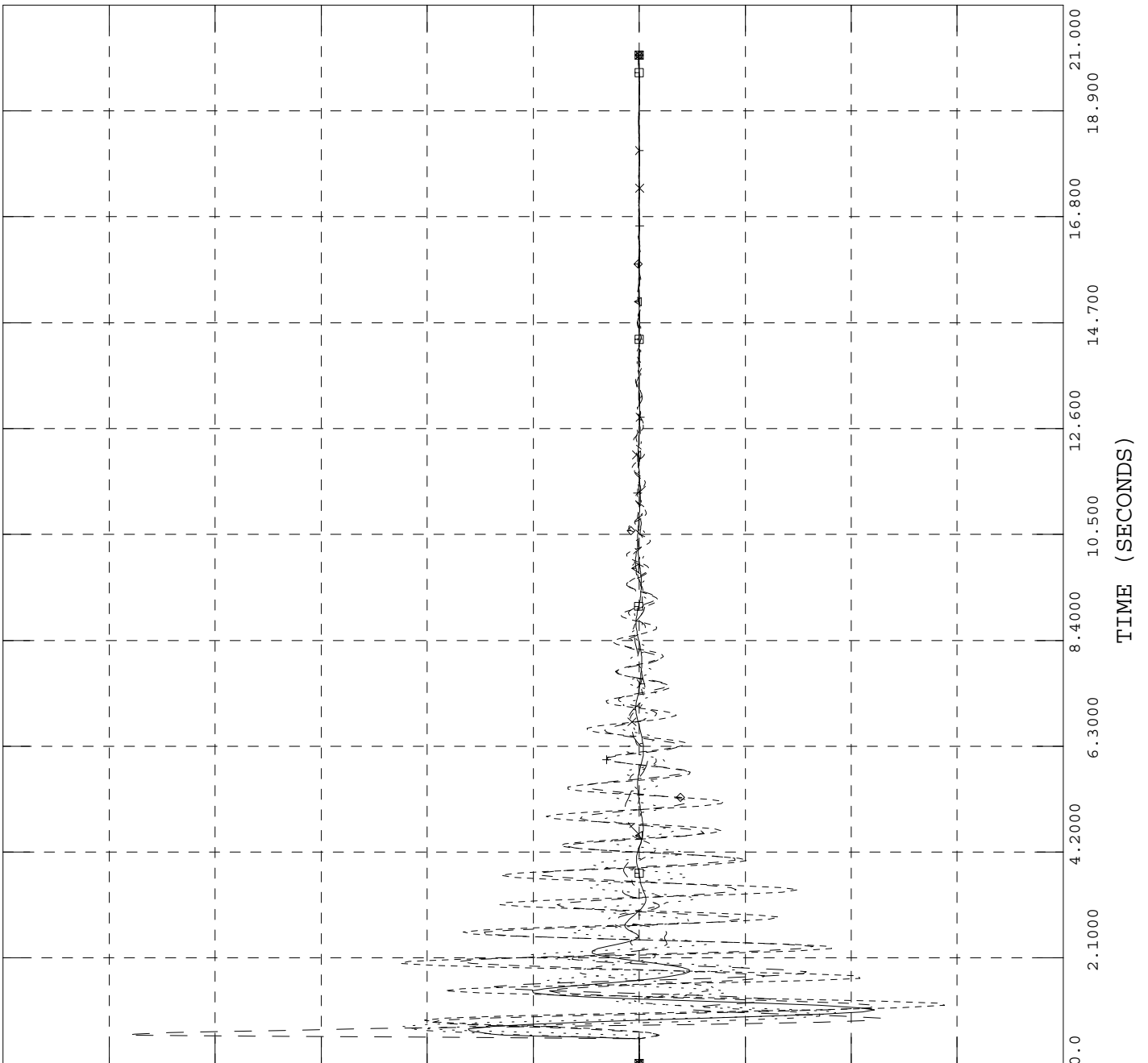
APPENDIX A – EVENT SPEED AND ANGLE DEVIATION PLOTS



SPP MDWG 2009 Q1 FULL: MDWG09Q1-14S_V30_FINAL (02-27-2009)
2014 SUMMER PEAK: ' 2009 SOUTHWEST POWER POOL, INC.; RED DYN

FILE: fault-IATAN STGR 3PH-14S.out

0.01500	CHNL# 488: [SPD BUS 532653 MACH '1 ']	-0.0100
0.01500	CHNL# 579: [SPD BUS 541169 MACH '1 ']	-0.0100
0.01500	CHNL# 603: [SPD BUS 539636 MACH '1 ']	-0.0100
0.01500	CHNL# 557: [SPD BUS 539633 MACH '1 ']	-0.0100
0.01500	CHNL# 588: [SPD BUS 542957 MACH '1 ']	-0.0100
0.03000	CHNL# 590: [SPD BUS 542962 MACH '2 ']	-0.0200



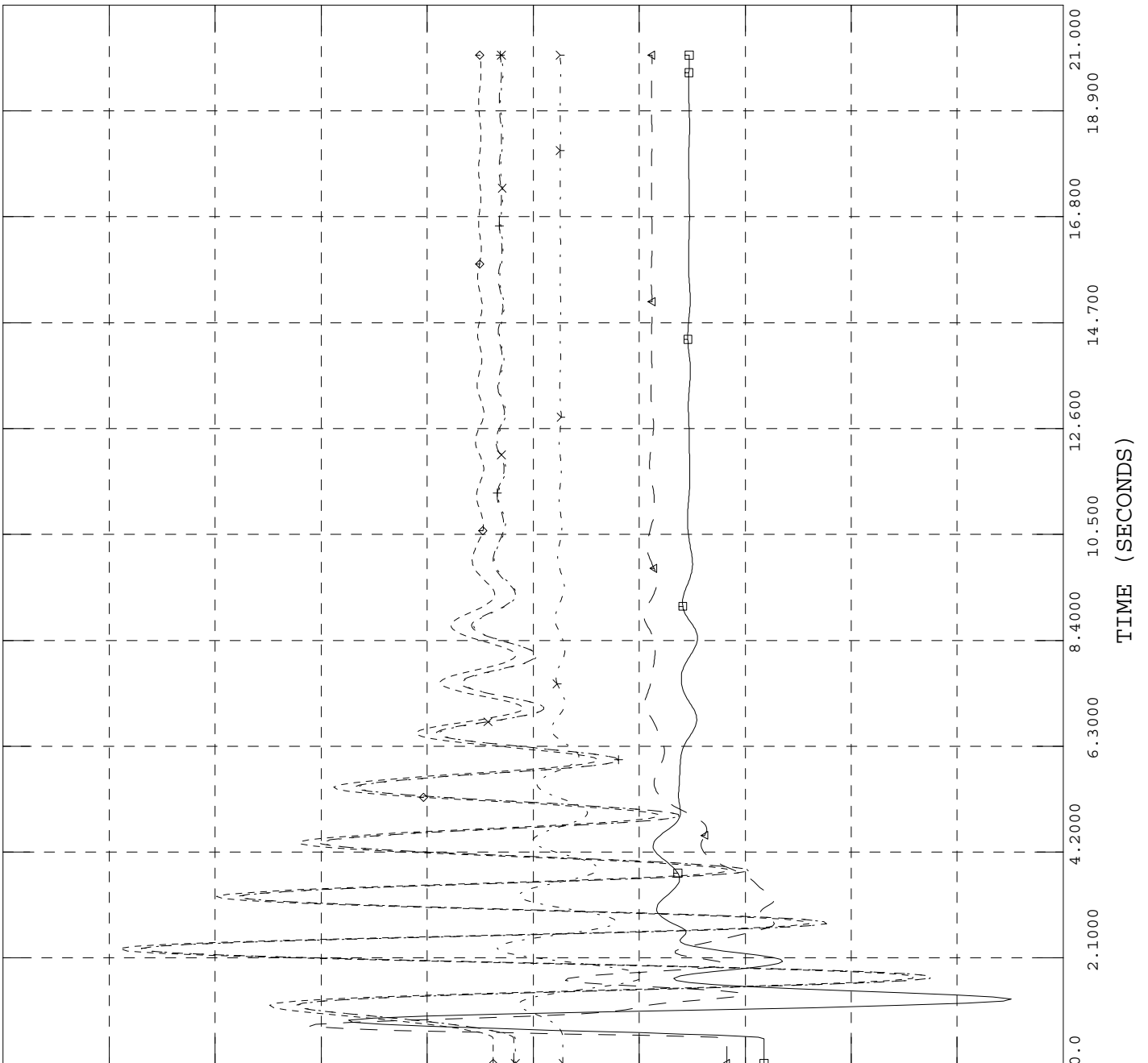
WED, JUN 09 2010 10:34
SPD DEV



SPP MDWG 2009 Q1 FULL: MDWG09Q1-14S_V30_FINAL (02-27-2009)
2014 SUMMER PEAK: ' 2009 SOUTHWEST POWER POOL, INC.; RED DYN

FILE: fault-IATAN STGR 3PH-14S.out

150.00	CHNL# 1235: [ANGL BUS 541158 MACH '4 ']	-100.0
50.000	CHNL# 1232: [ANGL BUS 541155 MACH '1 ']	0.0
50.000	CHNL# 1233: [ANGL BUS 541156 MACH '2 ']	0.0
50.000	CHNL# 1234: [ANGL BUS 541157 MACH '3 ']	0.0
100.00	CHNL# 1251: [ANGL BUS 542957 MACH '1 ']	0.0
100.00	CHNL# 1253: [ANGL BUS 542962 MACH '2 ']	0.0



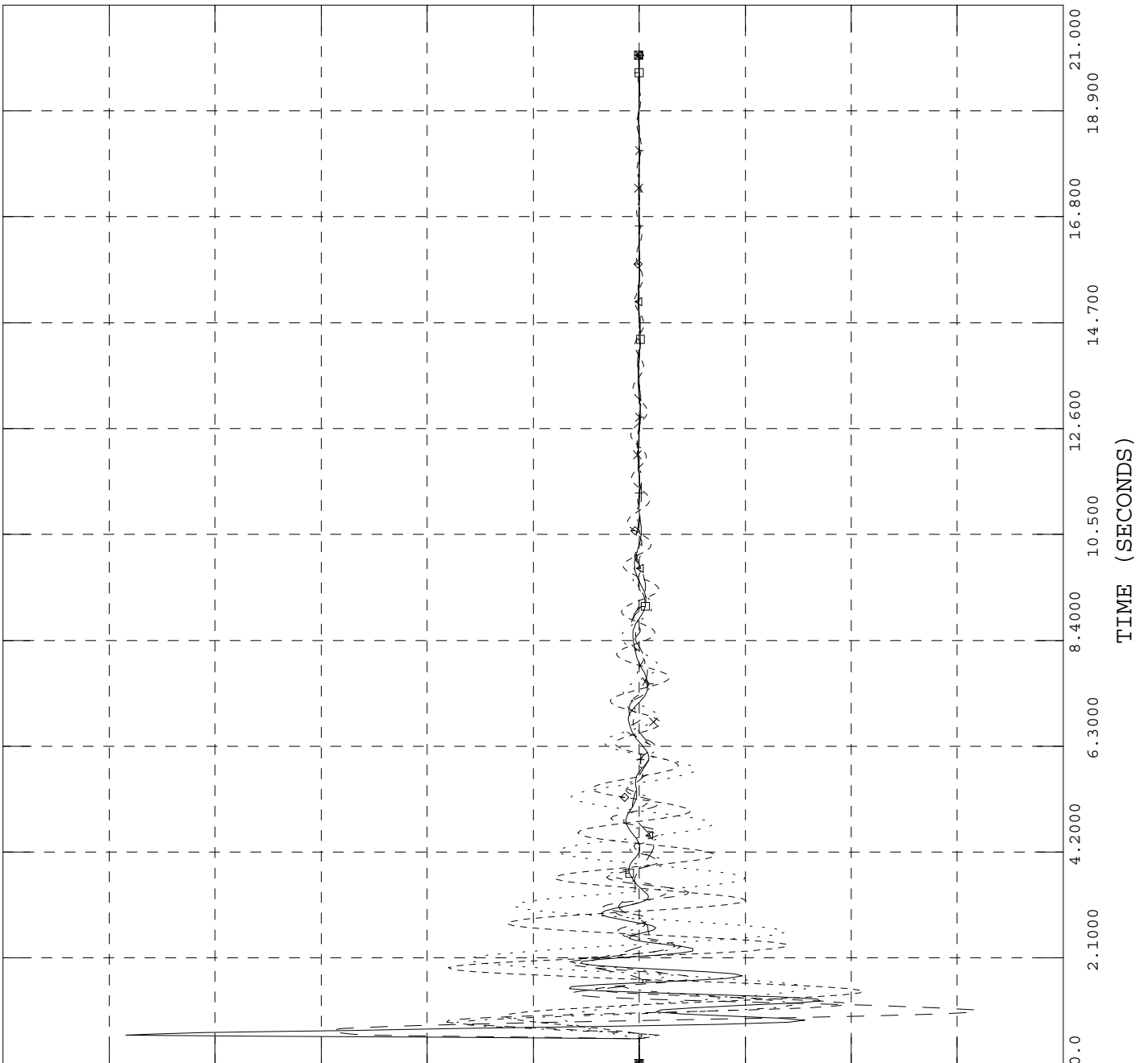
WED, JUN 09 2010 10:34
ANG DEV



SPP MDWG 2009 Q1 FULL: MDWG09Q1-14S_V30_FINAL (02-27-2009)
2014 SUMMER PEAK: ' 2009 SOUTHWEST POWER POOL, INC.; RED DYN

FILE: fault-IATAN_STJOE_3PH-14S.out

0.01500	CHNL# 603: [SPD BUS 539636 MACH '1 ']	-0.0100
0.01500	CHNL# 571: [SPD BUS 541157 MACH '3 ']	-0.0100
0.01500	CHNL# 557: [SPD BUS 539633 MACH '1 ']	-0.0100
0.01500	CHNL# 482: [SPD BUS 530595 MACH '01']	-0.0100
0.01500	CHNL# 590: [SPD BUS 542962 MACH '2 ']	-0.0100
0.01500	CHNL# 588: [SPD BUS 542957 MACH '1 ']	-0.0100



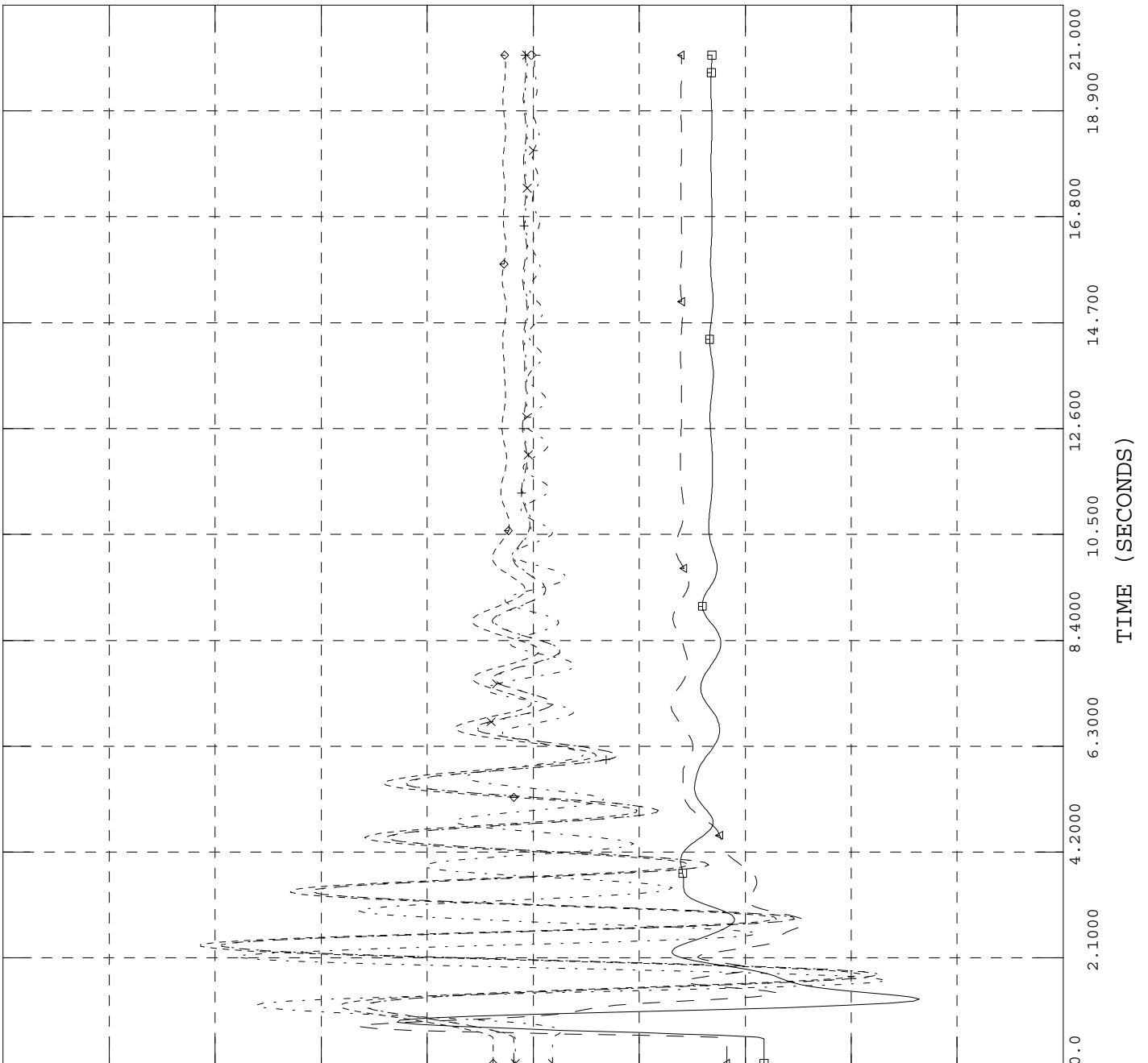
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SPD DEV



SPP MDWG 2009 Q1 FULL: MDWG09Q1-14S_V30_FINAL (02-27-2009)
2014 SUMMER PEAK: ' 2009 SOUTHWEST POWER POOL, INC.; RED DYN

FILE: fault-IATAN_STJOE_3PH-14S.out

0.0	CHNL# 1145: [ANGL BUS 530595 MACH '01']	-50.00
50.000	CHNL# 1232: [ANGL BUS 541155 MACH '1 ']	0.0
50.000	CHNL# 1233: [ANGL BUS 541156 MACH '2 ']	0.0
50.000	CHNL# 1234: [ANGL BUS 541157 MACH '3 ']	0.0
100.00	CHNL# 1251: [ANGL BUS 542957 MACH '1 ']	0.0
100.00	CHNL# 1253: [ANGL BUS 542962 MACH '2 ']	0.0



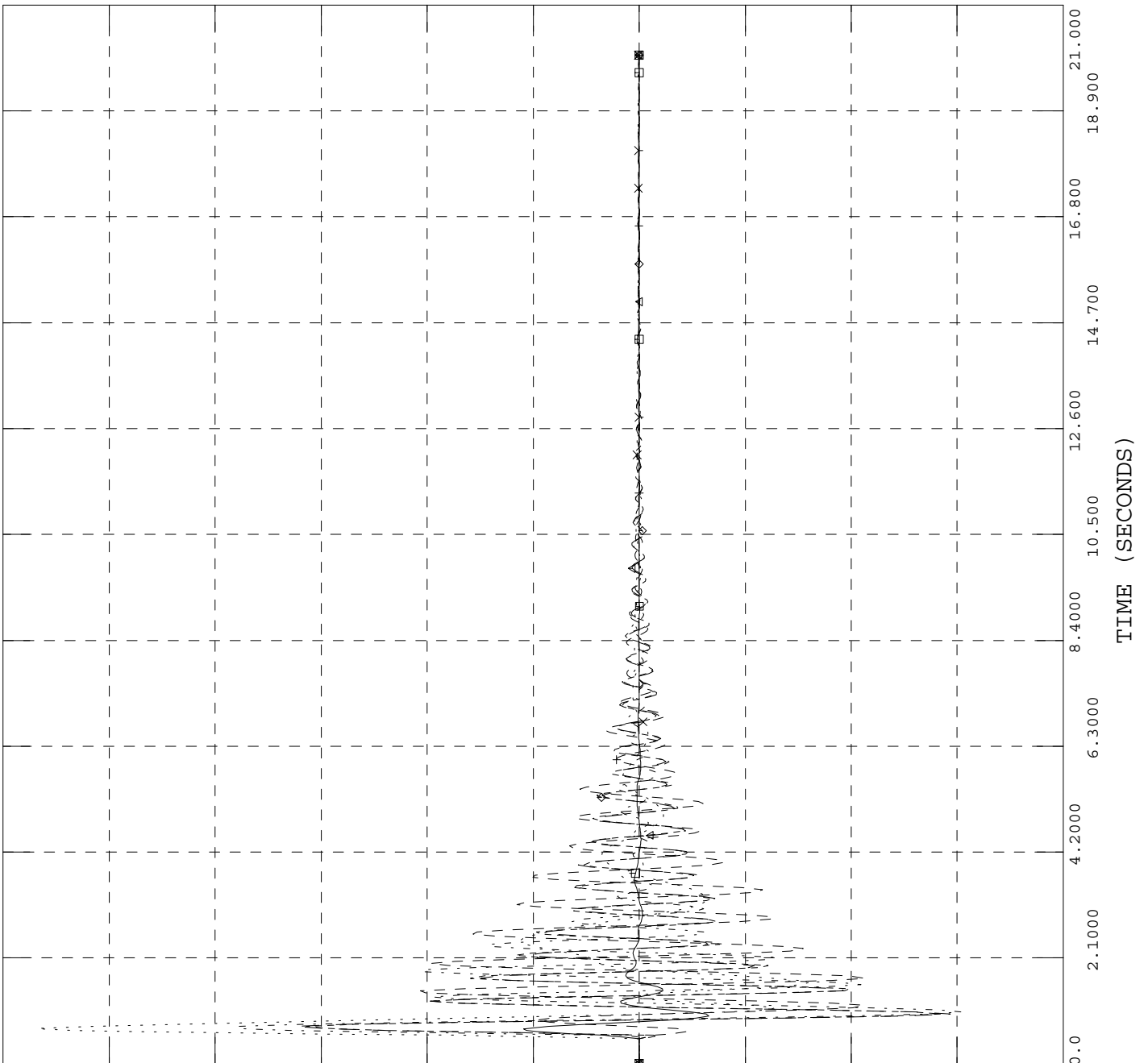
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ANG DEV



SPP MDWG 2009 Q1 FULL: MDWG09Q1-14S_V30_FINAL (02-27-2009)
2014 SUMMER PEAK: ' 2009 SOUTHWEST POWER POOL, INC.; RED DYN

FILE: fault-IATAN_STGR_1SLG-14S.out

0.00150	CHNL# 581: [SPD BUS 541255 MACH '4 ']	-0.0010
0.00150	CHNL# 590: [SPD BUS 542962 MACH '2 ']	-0.0010
0.00300	CHNL# 557: [SPD BUS 539633 MACH '1 ']	-0.0020
0.00300	CHNL# 580: [SPD BUS 541169 MACH '2 ']	-0.0020
0.00300	CHNL# 579: [SPD BUS 541169 MACH '1 ']	-0.0020
0.01500	CHNL# 588: [SPD BUS 542957 MACH '1 ']	-0.0100



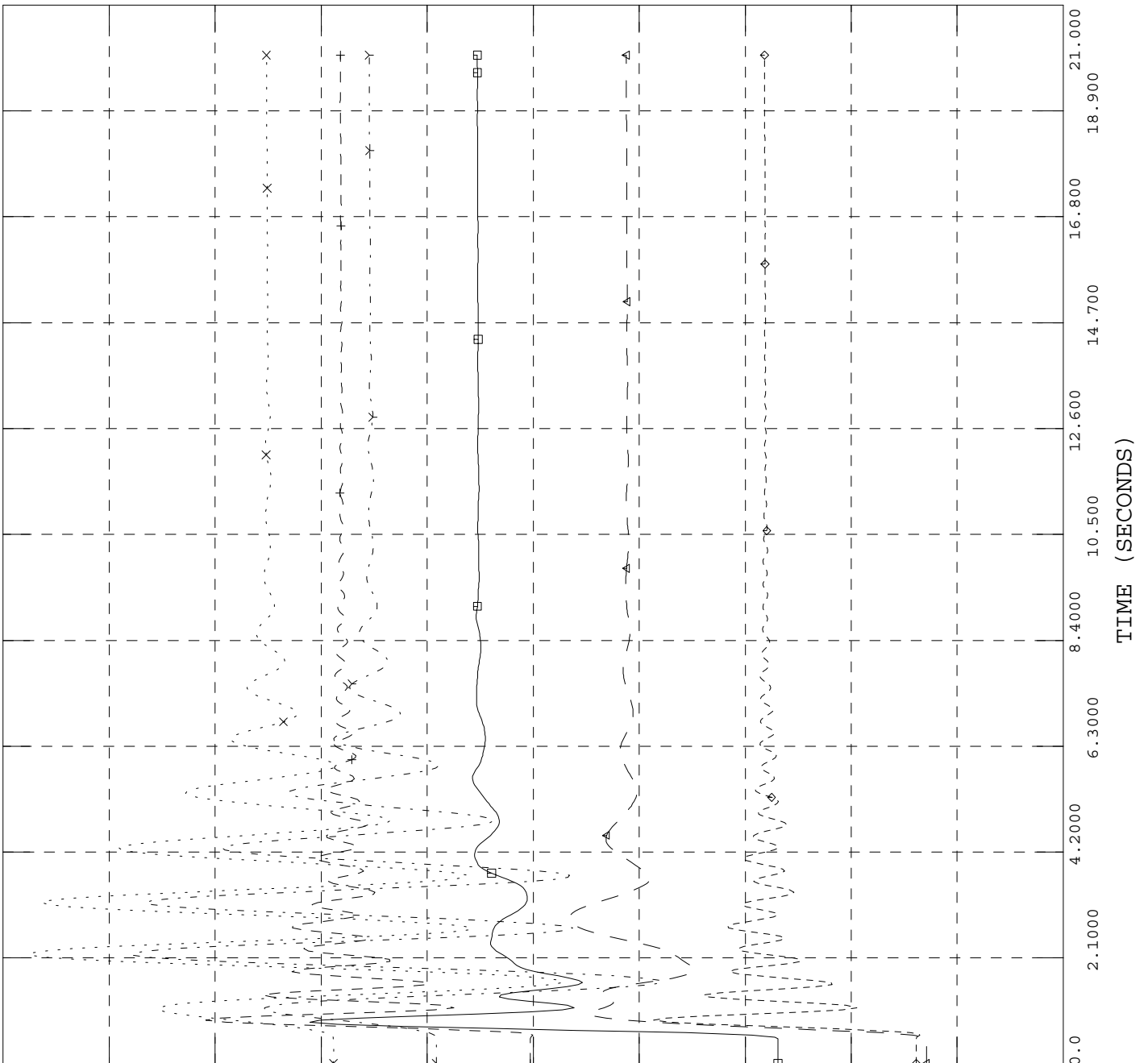
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SPD DEV



SPP MDWG 2009 Q1 FULL: MDWG09Q1-14S_V30_FINAL (02-27-2009)
2014 SUMMER PEAK: ' 2009 SOUTHWEST POWER POOL, INC.; RED DYN

FILE: fault-IATAN_STGR_1SLG-14S.out

30.000	CHNL# 1233: [ANGL BUS 541156 MACH '2 ']	20.000
30.000	CHNL# 1234: [ANGL BUS 541157 MACH '3 ']	20.000
-10.000	CHNL# 1243: [ANGL BUS 541169 MACH '2 ']	-30.000
0.0	CHNL# 1242: [ANGL BUS 541169 MACH '1 ']	-25.000
50.000	CHNL# 1253: [ANGL BUS 542962 MACH '2 ']	25.000
50.000	CHNL# 1251: [ANGL BUS 542957 MACH '1 ']	25.000



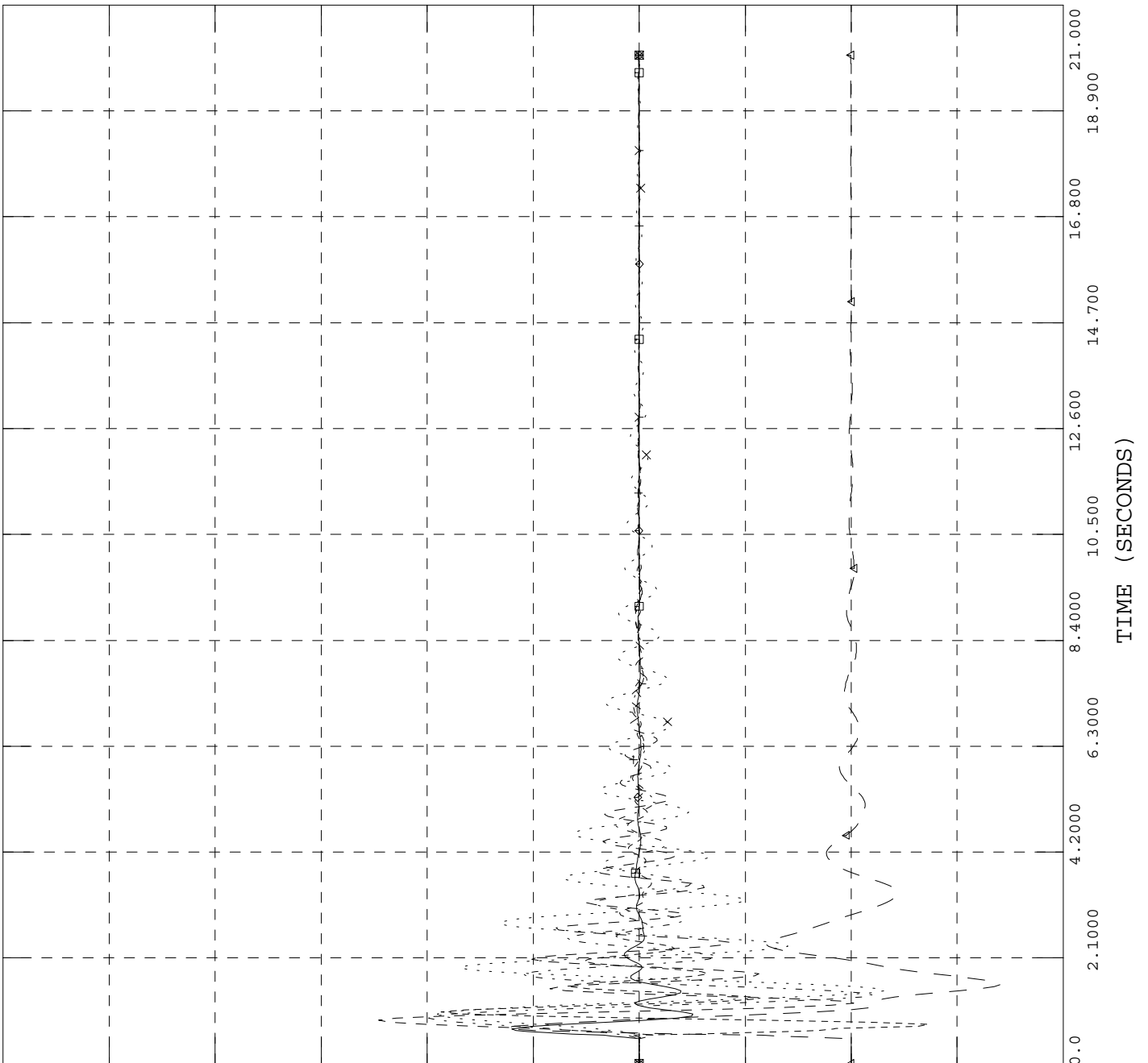
WED, JUN 09 2010 10:34
ANG DEV



SPP MDWG 2009 Q1 FULL: MDWG09Q1-14S_V30_FINAL (02-27-2009)
2014 SUMMER PEAK: ' 2009 SOUTHWEST POWER POOL, INC.; RED DYN

FILE: fault-IATAN_STJOE_1SLG-14S.out

0.00300	CHNL# 506: [SPD BUS 532742 MACH '5 ']	-0.0020
0.00300	CHNL# 482: [SPD BUS 530595 MACH '01 ']	-0.0020
0.00300	CHNL# 557: [SPD BUS 539633 MACH '1 ']	-0.0020
0.00300	CHNL# 581: [SPD BUS 541255 MACH '4 ']	-0.0020
0.00300	CHNL# 590: [SPD BUS 542962 MACH '2 ']	-0.0010
0.01500	CHNL# 588: [SPD BUS 542957 MACH '1 ']	-0.0100



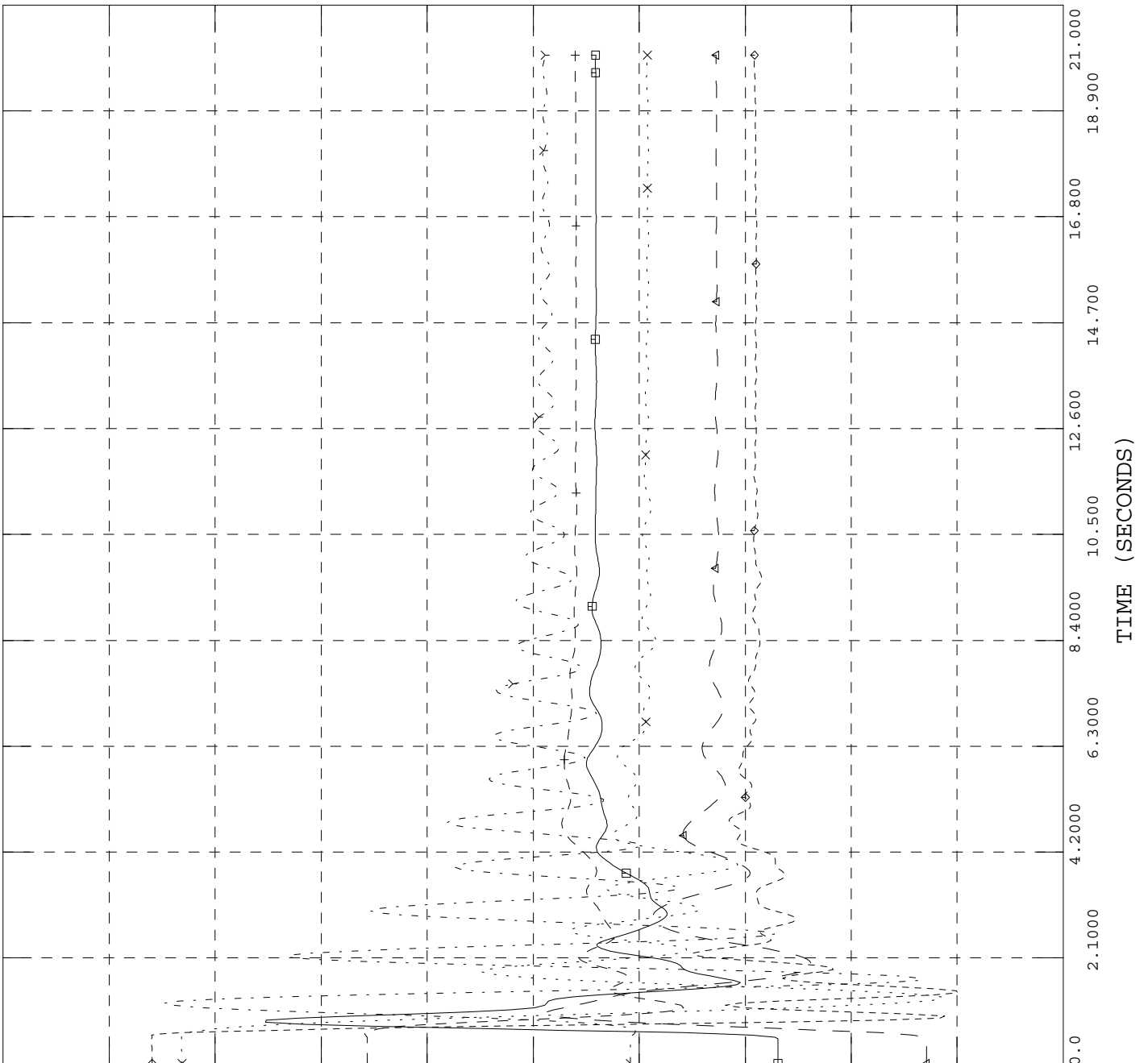
WED, JUN 09 2010 10:47
SPD DEV



SPP MDWG 2009 Q1 FULL: MDWG09Q1-14S_V30_FINAL (02-27-2009)
2014 SUMMER PEAK: ' 2009 SOUTHWEST POWER POOL, INC.; RED DYN

FILE: fault-IATAN_STJOE_1SLG-14S.out

-20.00	CHNL# 1145: [ANGL BUS 530595 MACH '01']	-30.00
20.000	CHNL# 1354: [ANGL BUS 650091 MACH '1 ']	10.000
35.000	CHNL# 1308: [ANGL BUS 640009 MACH '1 ']	10.000
10.000	CHNL# 1244: [ANGL BUS 541255 MACH '4 ']	0.0
50.000	CHNL# 1253: [ANGL BUS 542962 MACH '2 ']	25.000
50.000	CHNL# 1251: [ANGL BUS 542957 MACH '1 ']	25.000



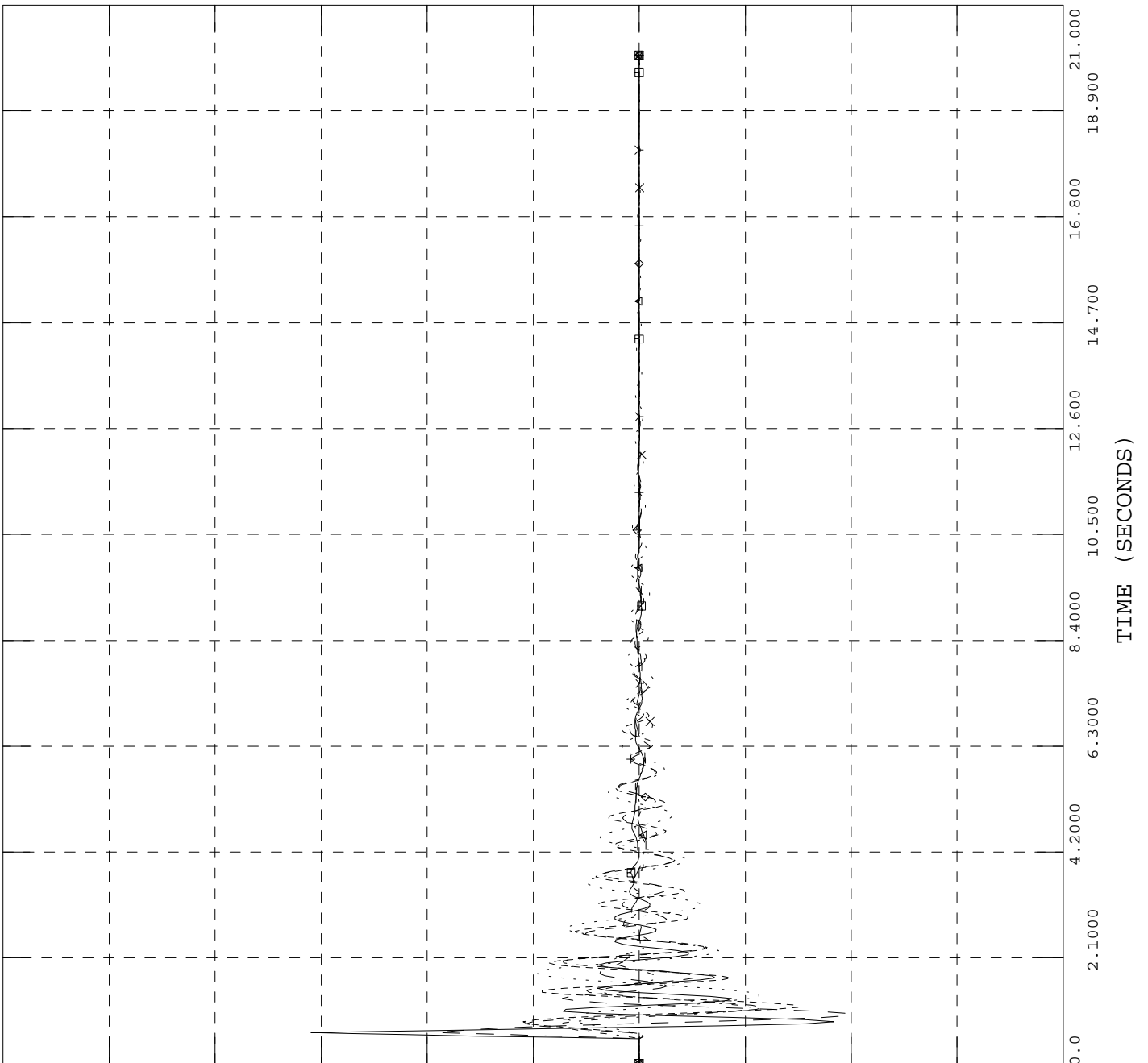
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ANG DEV



SPP MDWG 2009 Q1 FULL: MDWG09Q1-14S_V30_FINAL (02-27-2009)
2014 SUMMER PEAK: ' 2009 SOUTHWEST POWER POOL, INC.; RED DYN

FILE: fault-IATAN_PLTCTY_161_3PH-14S.out

0.01500	CHNL# 493: [SPD BUS 532672 MACH '1 ']	-0.01000
0.01500	CHNL# 482: [SPD BUS 530595 MACH '01 ']	-0.01000
0.01500	CHNL# 603: [SPD BUS 539636 MACH '1 ']	-0.01000
0.01500	CHNL# 557: [SPD BUS 539633 MACH '1 ']	-0.01000
0.01500	CHNL# 590: [SPD BUS 542962 MACH '2 ']	-0.01000
0.01500	CHNL# 588: [SPD BUS 542957 MACH '1 ']	-0.01000



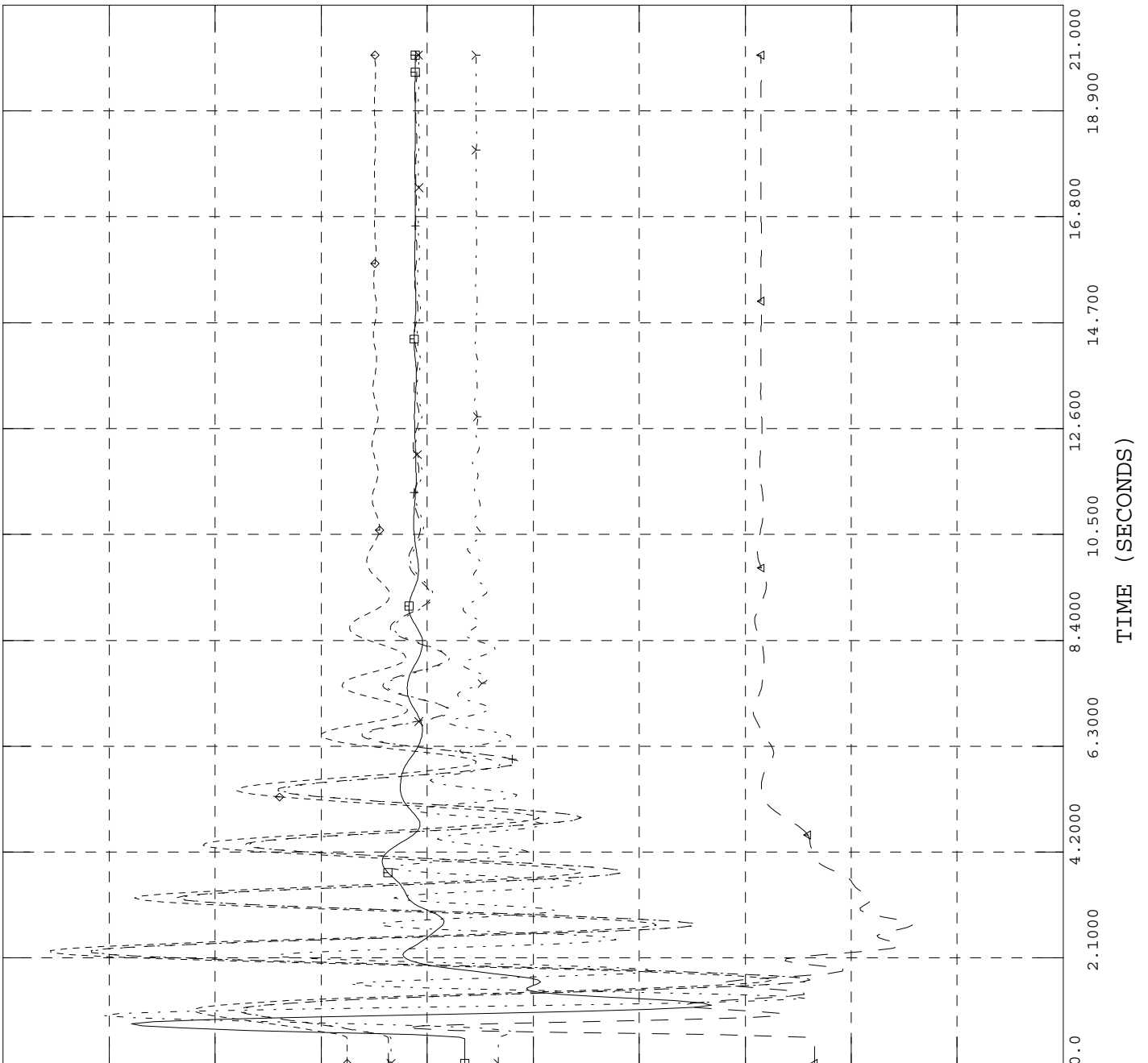
TUE, AUG 10 2010 16:51
SPD DEV



SPP MDWG 2009 Q1 FULL: MDWG09Q1-14S_V30_FINAL (02-27-2009)
2014 SUMMER PEAK: ' 2009 SOUTHWEST POWER POOL, INC.; RED DYN

FILE: fault-IATAN PLTCTY 161 3PH-14S.out

-15.00	CHNL# 1220: [ANGL BUS 539633 MACH '1 ']	-40.00
35.000	CHNL# 1232: [ANGL BUS 541155 MACH '1 ']	10.000
35.000	CHNL# 1233: [ANGL BUS 541156 MACH '2 ']	10.000
35.000	CHNL# 1234: [ANGL BUS 541157 MACH '3 ']	10.000
70.000	CHNL# 1251: [ANGL BUS 542957 MACH '1 ']	20.000
50.000	CHNL# 1253: [ANGL BUS 542962 MACH '2 ']	0.0



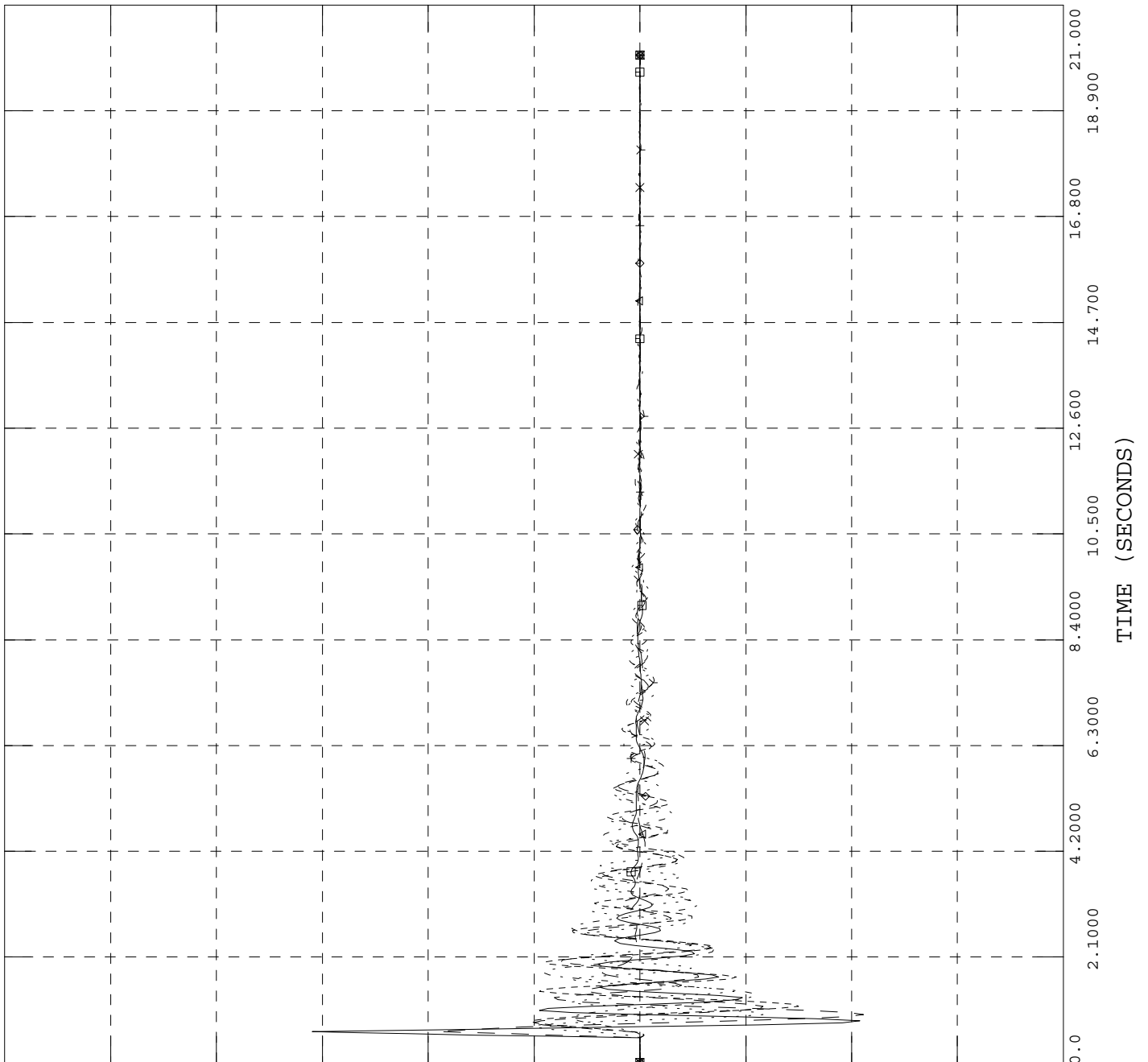
TUE, AUG 10 2010 16:51
ANG DEV



SPP MDWG 2009 Q1 FULL: MDWG09Q1-14S_V30_FINAL (02-27-2009)
2014 SUMMER PEAK: ' 2009 SOUTHWEST POWER POOL, INC.; RED DYN

FILE: fault-IATAN_STGR5_161_3PH-14S.out

0.01500	CHNL# 482: [SPD BUS 530595 MACH '01']	-0.01000
0.01500	CHNL# 579: [SPD BUS 541169 MACH '1 ']	-0.01000
0.01500	CHNL# 603: [SPD BUS 539636 MACH '1 ']	-0.01000
0.01500	CHNL# 557: [SPD BUS 539633 MACH '1 ']	-0.01000
0.01500	CHNL# 590: [SPD BUS 542962 MACH '2 ']	-0.01000
0.01500	CHNL# 588: [SPD BUS 542957 MACH '1 ']	-0.01000



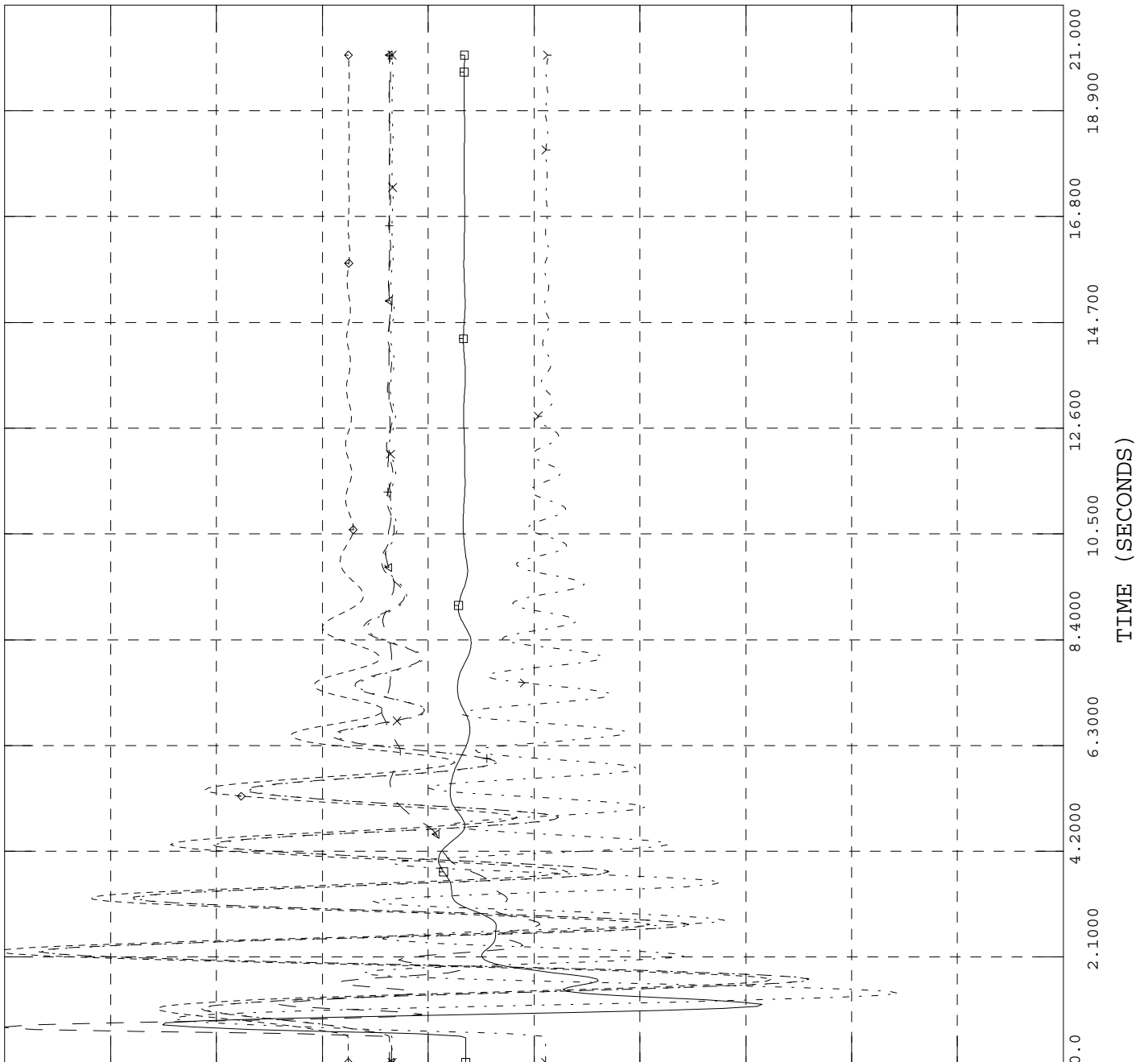
TUE, AUG 10 2010 16:49



SPP MDWG 2009 Q1 FULL: MDWG09Q1-14S_V30_FINAL (02-27-2009)
2014 SUMMER PEAK: ' 2009 SOUTHWEST POWER POOL, INC.; RED DYN

FILE: fault-IATAN_STGR5_161_3PH-14S.out

15.000	CHNL# 1262: [ANGL BUS 546700 MACH '1 ']	-10.00
35.000	CHNL# 1232: [ANGL BUS 541155 MACH '1 ']	10.000
35.000	CHNL# 1233: [ANGL BUS 541156 MACH '2 ']	10.000
35.000	CHNL# 1234: [ANGL BUS 541157 MACH '3 ']	10.000
50.000	CHNL# 1251: [ANGL BUS 542957 MACH '1 ']	0.0
50.000	CHNL# 1253: [ANGL BUS 542962 MACH '2 ']	0.0

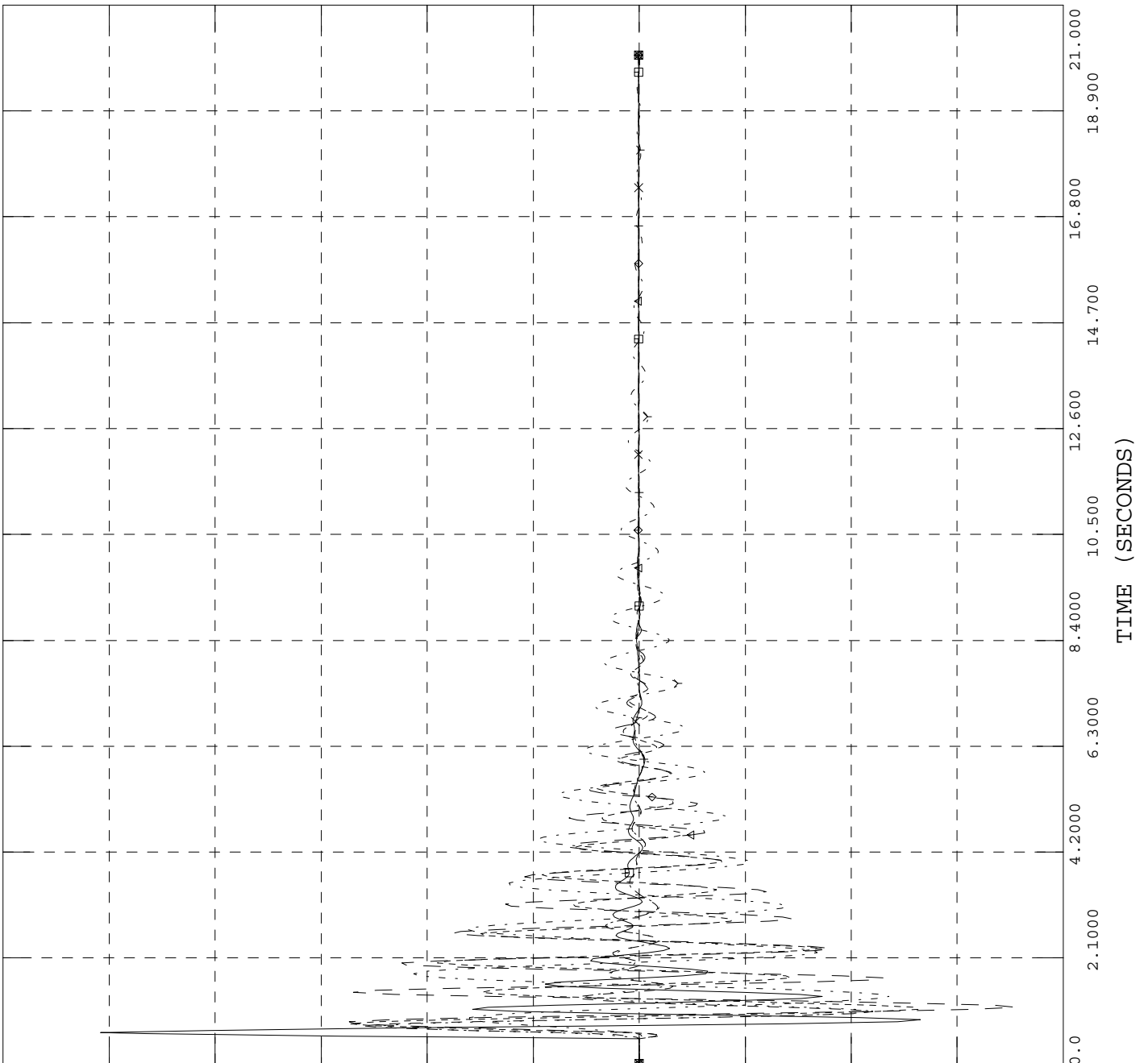




SPP MDWG 2009 Q1 FULL: MDWG09Q1-14S_V30_FINAL (02-27-2009)
2014 SUMMER PEAK: ' 2009 SOUTHWEST POWER POOL, INC.; RED DYN

FILE: fault-IATAN_PLTCTY_161_1SLG-14S.out

0.00150	CHNL# 482: [SPD BUS 530595 MACH '01']	-0.0010
0.00150	CHNL# 489: [SPD BUS 532661 MACH '1 ']	-0.0010
0.00150	CHNL# 490: [SPD BUS 532662 MACH '1 ']	-0.0010
0.00150	CHNL# 603: [SPD BUS 539636 MACH '1 ']	-0.0010
0.00150	CHNL# 557: [SPD BUS 539633 MACH '1 ']	-0.0010
0.00150	CHNL# 588: [SPD BUS 542957 MACH '1 ']	-0.0010



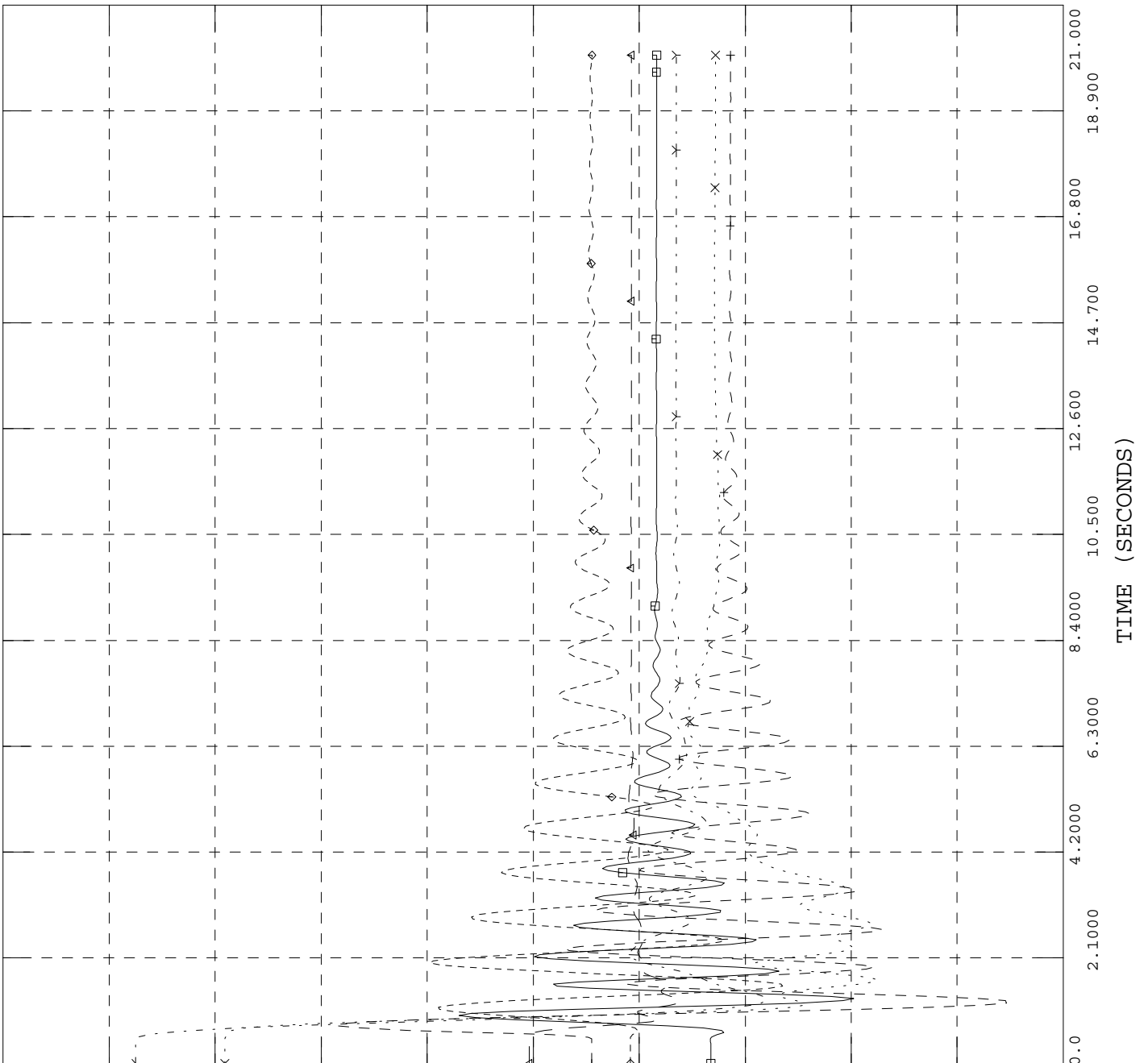
WED, AUG 11 2010 10:37
SPD DEV



SPP MDWG 2009 Q1 FULL: MDWG09Q1-14S_V30_FINAL (02-27-2009)
2014 SUMMER PEAK: ' 2009 SOUTHWEST POWER POOL, INC.; RED DYN

FILE: fault-IATAN_PLTCTY_161_1SLG-14S.out

0.0	CHNL# 1291: [ANGL BUS 548823 MACH '1 ']	-5.000
38.000	CHNL# 1290: [ANGL BUS 548806 MACH '4 ']	33.000
5.0000	CHNL# 1262: [ANGL BUS 546700 MACH '1 ']	0.0
-20.00	CHNL# 1145: [ANGL BUS 530595 MACH '01']	-30.00
25.000	CHNL# 1254: [ANGL BUS 542963 MACH '7 ']	0.0
-20.00	CHNL# 1220: [ANGL BUS 539633 MACH '1 ']	-30.00



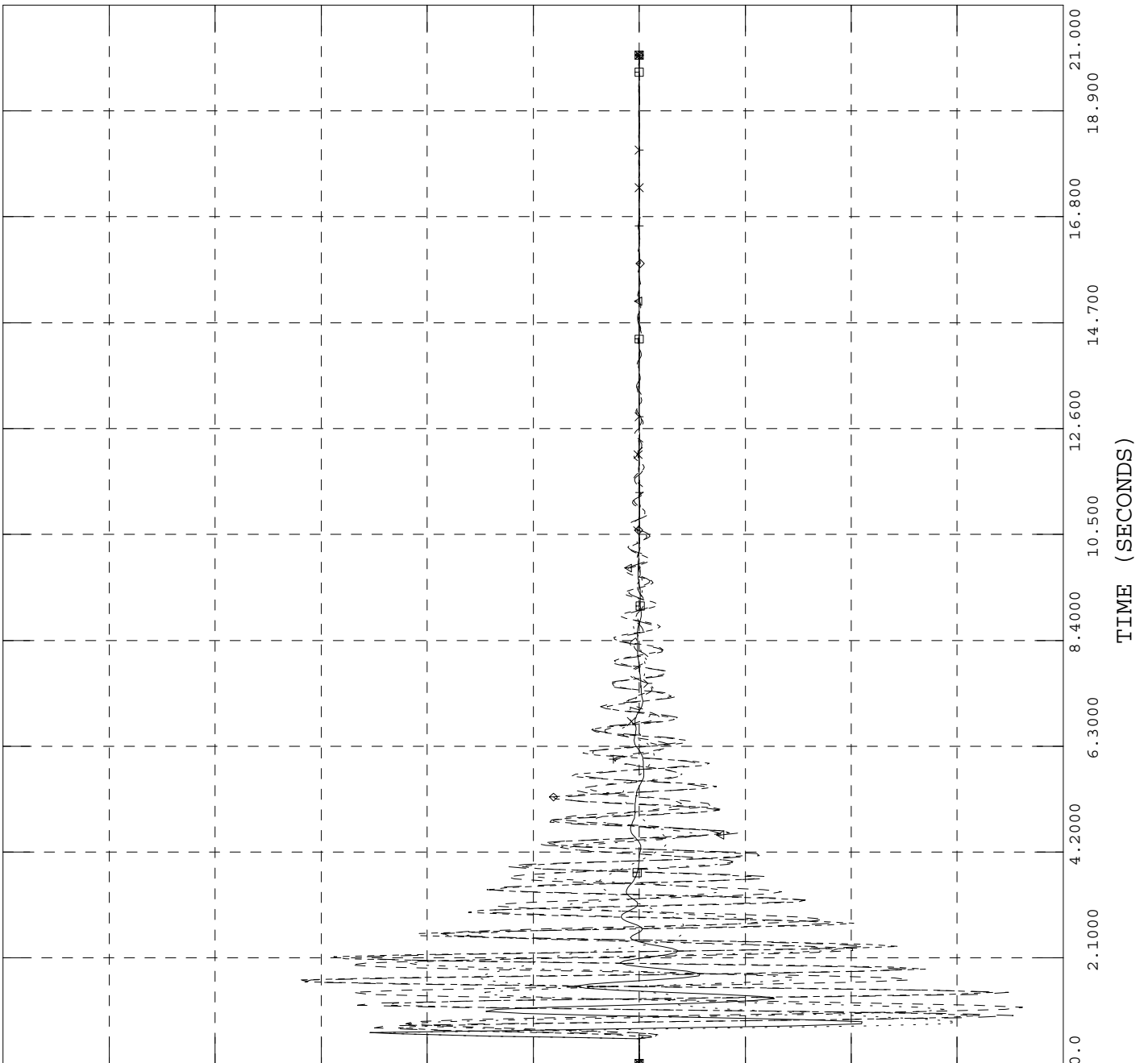
WED, AUG 11 2010 10:37
ANG DEV



SPP MDWG 2009 Q1 FULL: MDWG09Q1-14S_V30_FINAL (02-27-2009)
2014 SUMMER PEAK: ' 2009 SOUTHWEST POWER POOL, INC.; RED DYN

FILE: fault-IATAN_STGR5_161_1SLG-14S.out

0.00150	CHNL# 603: [SPD BUS 539636 MACH '1 ']	-0.0010
0.00150	CHNL# 590: [SPD BUS 542962 MACH '2 ']	-0.0010
0.00150	CHNL# 557: [SPD BUS 539633 MACH '1 ']	-0.0010
0.00150	CHNL# 580: [SPD BUS 541169 MACH '2 ']	-0.0010
0.00150	CHNL# 579: [SPD BUS 541169 MACH '1 ']	-0.0010
0.00300	CHNL# 588: [SPD BUS 542957 MACH '1 ']	-0.0020



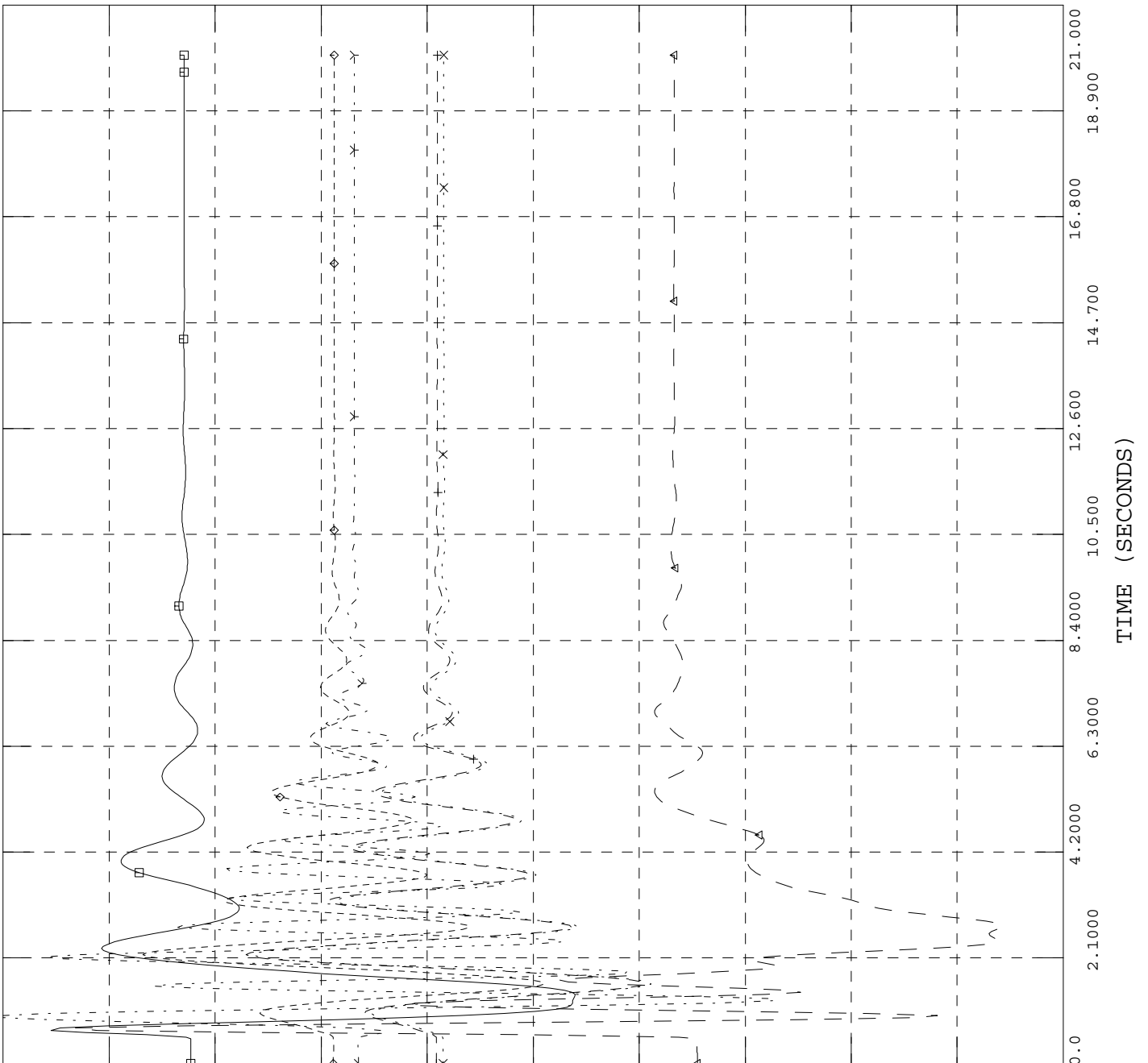
WED, AUG 11 2010 15:26



SPP MDWG 2009 Q1 FULL: MDWG09Q1-14S_V30_FINAL (02-27-2009)
2014 SUMMER PEAK: ' 2009 SOUTHWEST POWER POOL, INC.; RED DYN

FILE: fault-IATAN STGR5_161_1SLG-14S.out

-25.00	CHNL# 1220: [ANGL BUS 539633 MACH '1 ']	-30.00
30.000	CHNL# 1232: [ANGL BUS 541155 MACH '1 ']	20.000
30.000	CHNL# 1233: [ANGL BUS 541156 MACH '2 ']	20.000
30.000	CHNL# 1234: [ANGL BUS 541157 MACH '3 ']	20.000
35.000	CHNL# 1251: [ANGL BUS 542957 MACH '1 ']	30.000
30.000	CHNL# 1253: [ANGL BUS 542962 MACH '2 ']	20.000



WED, AUG 11 2010 15:26
ANG DEV