



***Expedited System Impact Study for
Generation Interconnection Request***

GEN-2004-012

SPP Tariff Studies

(#GEN-2004-012)

September 2004

Executive Summary

<OMITTED TEXT>Customer has requested an Expedited System Impact Study to evaluate a proposal to add up to 900MW of generation in northern Platte County, MO. The requested in-service date is June 1, 2009.

The Customer has proposed the addition of 900MW of coal-fired generation at the site. The unit will be interconnected to the existing Kansas City Power and Light (KCPL) Iatan 345kV substation.

The network upgrade requirements include expansion of the Iatan 345kV bus and installation of six (6) new 345kV circuit breakers. This expansion would provide terminals for the unit and start/standby transformers and a line terminal position for a new Iatan-Nashua 345kV circuit necessary for the generation interconnection. The ratings of the new Iatan-Nashua 345kV circuit will be at least 1099MVA normal and 1251MVA emergency.

The network upgrades outside of the Iatan 345kV substation are required to alleviate the contingency overloading on the 345kV and 161kV transmission system that results from the additional generation. A new Iatan-Nashua 345kV circuit eliminates the contingency overloading of the Iatan-St. Joe 345kV circuit and Iatan-Stranger Creek 345kV circuit along with several surrounding 161kV overloads due to contingency events.

The total estimated cost of the required network upgrades for interconnection are \$25,318,000 including work at both Iatan and Nashua substations and the Iatan to Nashua 345kV line.

Short circuit analysis will be performed as part of the Facility Study performed by the Transmission Owner if the customer wishes to proceed.

Transient stability analysis indicates that for more probable disturbances with normal fault clearing times, system stability is maintained. With the occurrence of a less probable, extreme fault condition at the Iatan bus, in which fault clearing is delayed due to stuck breaker conditions, the Iatan and Customer units are unstable if the proposed Iatan-Nashua 345kV line is not built. If the Iatan-Nashua 345kV line is in service, the units remain stable for a stuck breaker condition at Iatan. Equipment at the Iatan substation is equipped with independent pole tripping to reduce the likelihood of delayed clearing of the three-phase fault condition. New equipment for the interconnection facilities should include similar operational capability, and out-of-step relaying is recommended for equipment protection.

Transmission Service is not analyzed during the interconnection impact study.

1. Introduction

1.1 Project Description

<OMITTED TEXT>Customer has requested a System Impact Study to evaluate a proposal to add up to 900MW of generation in northern Platte County, MO. The requested generation addition is for a 900MW coal-fired unit at the customer's site adjacent to the existing KCPL 345kV substation. The requested in-service date is June 1, 2009.

1.2 Study Methodology

The Interconnection System Impact Study investigates the effect of new generation on system performance during normal and contingency conditions. Deliverability of power to final customers is not analyzed. Those facilities that are affected only by the interconnection of the generation are analyzed in the Interconnection System Impact Study. Separate studies evaluate the impact of deliverability of the plants output.

Comparison of the base case, which excludes the proposed facilities, to the study case, which includes the proposed Customer unit, reveals any system constraints that result from the proposed generation addition. The analysis cases are based on the 2005 April Minimum, 2007 summer peak, 2007 winter peak, 2010 summer peak and 2010 winter peak to address the different seasonal loading conditions of the system. The proposed plant is modeled at maximum output of 900MW for all study cases.

The proposed plant is to be located in the Kansas City Power & Light (KCPL) control area. In order to determine the impact on facilities based only on the interconnection of the facility, a single sink for the plants output is not studied. The plants output is allocated to KCPL and the rest of the SPP area footprint on a pro rata basis.

Full AC contingency analysis (ACCC) is used to investigate the limiting constraints of the transmission system during contingency events. The analysis is performed using Shaw PTI's PSS/E v. 29.5. Comparisons are made between the cases with and without the Customer generation in service in order to identify the severity and cause of the overloading conditions. All branches in the KCPL and surrounding control areas above 69kV and all ties with KCPL are monitored for overloads exceeding 100% of emergency rating (Rate B). A TDF of 3% is required before a facility is flagged as impacted. Buses are monitored for voltage deviations exceeding +/- 5% of nominal.

2. Powerflow Analysis

2.1 2005 April Minimum

The 2005 April Minimum study case is used to evaluate light loading conditions and the effect of the added generation. It is likely that load levels and facilities will be different from the 2005 season when the generating unit enters service. However, the 2005 April Minimum case will provide insight into what will occur during light load conditions.

Added generation at the Customer facility results in no base case overloads on the transmission system. Prior to the addition of the proposed network upgrades, several transmission facilities were overloaded due to contingencies. After addition of the proposed network upgrades, no overloading occurs as a result of outages of transmission facilities in the 2005 April Minimum case.

2.2 2007 Summer Peak

The 2007 Summer Peak study case is used to evaluate summer peak loading conditions and the effect of the added generation. It is likely that load levels and facilities will be different from the 2007 season when the generating unit enters service. However, the 2007 Summer Peak case will provide insight into what will occur during summer peak loading conditions and the reasons for overloads in later seasons.

Added generation at the Customer facility results in no base case overloads on the transmission system. Prior to the addition of the proposed network upgrades, several transmission facilities were overloaded due to contingencies. After addition of the proposed network upgrades, no overloading occurs as a result of outages of transmission facilities in the 2007 Summer Peak case.

2.3 2007 Winter Peak

Added generation at the Customer facility results in no base case overloads on the transmission system. Prior to the addition of the proposed network upgrades, several transmission facilities were overloaded due to contingencies. After addition of the proposed network upgrades, no overloading occurs as a result of outages of transmission facilities in the 2007 Winter Peak case.

2.4 2010 Summer Peak

Added generation at the Customer facility results in no base case overloads on the transmission system. Prior to the addition of the proposed network upgrades, several transmission facilities were overloaded due to contingencies. After addition of the proposed network upgrades, some overloading still occurs as a result of outages of transmission facilities in the 2010 Summer Peak case. The table below documents the KCPL facilities impacted by the addition of the generation after the proposed network upgrades are added.

Facility Name	SIS Rate B	Base Case Loading	Transfer Case Loading	%TDF	Outage Contingency	Solution	Cost
BLUE VALLEY -- WINCHESTER JCT SOUTH 161 KV	224	90.2	104.7	3.6	STRANGER CREEK -- CRAIG 345kV	Replace Wavetrap at Blue Valley	\$6,000
SOUTHTOWN -- WINCHESTER JCT SOUTH 161 KV	224	90.8	104.8	3.5	STRANGER CREEK -- CRAIG 345kV	Replace Wavetrap at Southtown	\$6,000
Total Estimated Cost							\$12,000

2.5 2010 Winter Peak

Added generation at the Customer facility results in no base case overloads on the transmission system. Prior to the addition of the proposed network upgrades, several transmission facilities were overloaded due to contingencies. After addition of the proposed network upgrades, some overloading still occurs as a result of outages of transmission facilities in the 2010 Winter Peak case. The table below documents the KCPL facilities impacted by the addition of the generation after the proposed network upgrades are added.

Facility Name	SIS Rate B	Base Case Loading	Transfer Case Loading	%TDF	Outage Contingency	Solution	Cost
BUCYRUS - STILWELL 161KV	245	91.8	103.7	3.2	WEST GARDNER – S. RICHLAND 161KV	Wavetrap at Stilwell for Bucyrus line terminal must be replaced.	\$6,000
Total Estimated Cost							\$6,000

3. Interconnection Network Upgrades

3.1 Interconnection Substation

The Customer plant will be interconnected with the 345kV transmission system at the Iatan substation in northern Platte County, MO. The existing 345kV bus will be expanded to accommodate the new generating unit and two (2) unit auxiliary transformers. Six (6) 345kV circuit breakers will be added to accommodate the new unit and additional 345kV line terminal for the proposed Iatan-Nashua line. The new Iatan-Nashua line is necessary to relieve the contingency overloads on the existing circuits at the point of the interconnection due to the increased generation. The estimated cost of the interconnection substation work is \$5,300,000.

3.2 Iatan-Nashua 345kV line

The combined output of 1570MW from the Customer and the Iatan #1 plants will be injected into the grid at the Iatan substation. Presently, the Iatan-St. Joe 345kV line and the Iatan-Stranger Creek 345kV line exit the Iatan substation. The Iatan-St. Joe circuit is rated at 956MVA and the Iatan-Stranger Creek 345kV line is rated at 1099MVA. Loss of either line results in overloading of the remaining circuit. The Iatan-St. Joe line is particularly susceptible to overloading by a number of contingencies because of the limited capability. A third 345kV circuit exiting the Iatan substation is required to inject the proposed plant's output into the grid and will be included as part of the direct-assignment interconnection facilities. The new circuit would carry a significant portion of the combined plant output under normal conditions and would alleviate the overloading of the Iatan-St. Joe line and the Iatan-Stranger Creek line during contingency events. The estimated cost of the Iatan-Nashua 345kV circuit is \$15,000,000.

3.3 Nashua 345kV Substation

Analysis indicates that the third circuit from Iatan should be tied into the Hawthorn-St. Joe 345kV line at Nashua. This substation construction will be included as part of the network upgrades. The estimated cost of the Nashua substation is estimated at \$5,000,000.

3.4 161kV Upgrades

After the installation of the proposed Network Upgrades mentioned above, three 161kV facilities still show overloading due to contingency analysis. The 161kV line from Blue Valley to Winchester Junction South and the line from Winchester Junction South to Southtown both show an overload after outage of the Stranger Creek to Craig 345kV line in the 2010 Summer Peak model. Upgrade of these facilities will include replacement of wave traps at both Blue Valley and Southtown. This will increase the emergency summer rating from 224MVA to 335MVA. The estimated cost of these upgrades is \$12,000. Also, the Bucyrus to Stillwell 161kV

circuit shows overloading due to outage of the West Gardner to South Richland 161kV line. Mitigation of this overload involves rebuilding the Bucyrus line terminal at Stillwell to remove a wavetrapped limitation on the rating of the circuit. This upgrade will result in an increase in the emergency rating of this facility from 245MVA to 335MVA. The estimated cost of this upgrade is \$6,000. The total estimated 161kV costs are \$18,000.

The preliminary cost estimates for the network upgrade facilities are listed in Table 1 below. An estimated project schedule will be included in the Facility Study.

Table 1 – Summary of Network Upgrade Costs for Interconnection	
Stand Alone Network Upgrades	
Description	Cost
Iatan 345kV substation facilities and equipment to facilitate interconnection	\$5,300,000
Total Stand Alone Network Upgrades	\$5,300,000

Other Required Network Upgrades	
Description	Cost
New Iatan-Nashua line (27.5 mi.)	\$15,000,000
Nashua substation construction	\$5,000,000
Southtown -- Winchester Junction South 161kV	\$6,000
Blue Valley -- Winchester Junction South 161kV	\$6,000
Bucyrus – Stillwell 161kV	\$6,000
Total Other Required Network Upgrades	\$20,018,000
Total Required Network Upgrades	\$25,318,000

Other facilities may be required depending on the results of the Transmission Service study performed separately and attached to this study. The facilities mentioned above are required only for interconnection of the generation facility.

4. Short Circuit Analysis

A short circuit study will be conducted by KCPL as part of the Facility Study to determine if fault current levels exceed equipment ratings at KCPL facilities.

5. Transient Stability Analysis

Transient Stability analysis was performed to verify dynamic system response to disturbances on the system using the 2010 summer peak model. The customer provided the machine data for the proposed Customer plant. Typical values were provided for a 1000MVA generator with an ESST4B exciter. This data was used to create a PTI dynamics model for the Customer plant.

The machine data for the remaining system was obtained from the current SPP dynamics data files modified to include all previously queued plants proposed for the study period. Selected fault scenarios were applied with clearing times specified in accordance with KCPL Planning Criteria. Single phase and three phase fault conditions were tested at the interconnection point and machines in the KCPL, WERE, MIPU, NPPD, OPPD, and KACY control areas were monitored for stability. Analysis of stuck breaker events was included to examine the effects of extreme disturbances. A list of the faults applied is in Table 4 below.

Table 4 Selected Faults

Fault #	Fault Description
FLT_1_1PH	Single Phase fault at Stranger Creek on the Stranger Creek -- Iatan 345kV line
FLT_1_3PH	Three Phase fault at Stranger Creek on the Stranger Creek -- Iatan 345kV line
FLT_2_1PH	Single Phase fault at St. Joe on the St. Joe -- Iatan 345kV line
FLT_2_3PH	Three Phase fault at St. Joe on the St. Joe -- Iatan 345kV line
FLT_3_1PH	Single Phase fault at Stranger Creek on the Stranger Creek -- Craig 345kV line
FLT_3_3PH	Three Phase fault at Stranger Creek on the Stranger Creek -- Craig 345kV line
FLT_4_1PH	Single Phase fault at Stranger Creek on the Stranger Creek -- Hoyt 345kV line
FLT_4_3PH	Three Phase fault at Stranger Creek on the Stranger Creek -- Hoyt 345kV line
FLT_5_1PH	Single Phase fault at St. Joe on the St. Joe -- Cooper 345kV line
FLT_5_3PH	Three Phase fault at St. Joe on the St. Joe -- Cooper 345kV line
FLT_6_1PH	Single Phase fault at St. Joe on the St. Joe -- Fairport 345kV line
FLT_6_3PH	Three Phase fault at St. Joe on the St. Joe -- Fairport 345kV line
FLT_7_1PH	Single Phase fault at the Midpoint on the Cooper -- Fairport 345kV line
FLT_7_3PH	Three Phase fault at the Midpoint on the Cooper -- Fairport 345kV line
FLT_8_1PH	Single Phase fault at St. Joe on the St. Joe -- Hawthorn 345kV line
FLT_8_3PH	Three Phase fault at St. Joe on the St. Joe -- Hawthorn 345kV line
FLT_9	Trip Iatan Unit #1 (670MW)
FLT_10	Trip Customer Unit at Iatan (900MW)
FLT_11	Trip Jeffrey Energy Center Unit #2 (681MW)
FLT_12_1PH	Single Phase fault at Iatan on the St. Joe -- Iatan 345kV line
FLT_12_3PH	Three Phase fault at Iatan on the St. Joe -- Iatan 345kV line
FLT_12_1PH_stuck	Stuck breaker/delayed clearing -- Single Phase fault at Iatan on the St. Joe -- Iatan 345kV line
FLT_12_3PH_stuck	Stuck breaker/delayed clearing -- Three Phase fault at Iatan on the St. Joe -- Iatan 345kV line

The faults above were applied in three scenarios: A basecase without the Customer plant or the Iatan-Nashua 345kV line in service, a case with the Customer plant online at 900MW and no Iatan-Nashua line, and a case with the Customer plant online at 900MW with the Iatan-Nashua line in service.

In the case without the Iatan-Nashua 345kV line, the study indicates that normally cleared single-phase and three-phase fault events do not cause system instability. However, a less probable, extreme disturbance involving a stuck breaker with delayed clearing of a three-phase fault, causes the Iatan and Customer units to become unstable. The terminal voltage of the plants begins to oscillate wildly. Out-of-synchronism relaying would trip the Iatan and Customer units offline and the remainder of the system should remain stable. Oscillations are generally damped following all fault clearing. The use of Independent pole tripping at the Iatan substation reduces the likelihood of the three-phase delayed clearing condition and is recommended, in addition to out-of-step relaying for generator protection during the extreme disturbance events.

In the case with the new Iatan-Nashua 345kV line, the stuck breaker at Iatan does not cause instability.

Plots of machine angles and selected 345kV system voltages for all scenarios analyzed are attached in the Appendices to this report.

6. Conclusion

This System Impact Study was requested by Customer to assess the interconnection requirements for the addition of 900MW of new generation in northern Platte County, MO. The analysis evaluates the impact of introducing the new generation on the power system during normal operation and contingency conditions.

The addition of 900MW generating capacity at the proposed site results in the overloading of transmission facilities during outages on the 345kV and 161kV system. The existing circuits from the Iatan substation are inadequate for the additional capacity of the plant, and a new Iatan-Nashua 345kV line rated at 1099MVA is required for the plant interconnection to allow the transfer of power from the Iatan site under contingency conditions.

Network upgrades are required at the Iatan substation to accommodate the proposed plant. Expansion of the 345kV ring bus and installation of six (6) 345kV circuit breakers is necessary for the new unit terminal and proposed Iatan-Nashua 345kV circuit. Land acquisition and environmental impact issues are not included in the cost of constructing interconnection facilities. The total estimated cost for the network upgrades is \$25,318,000. An estimated project schedule will be determined during the Facility 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 when the Customer requests transmission service through Southwest Power Pool's OASIS.

Appendix A-1

Plots of Fault Simulations

Plots of selected machine angle response during faults

Scenario:

2010 Summer Peak

Basecase

[No Customer Plant – No Network Upgrades]

3000
 1000
 500
 250
 100
 50
 25
 10
 5
 2.5
 1
 0.5
 0.25
 0.125
 0.0625
 0.03125
 0.015625
 0.0078125
 0.00390625
 0.001953125
 0.0009765625
 0.00048828125
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SPP MDWG 04 STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BASEDRSE INCLUDING PRIOR SCHEDULE

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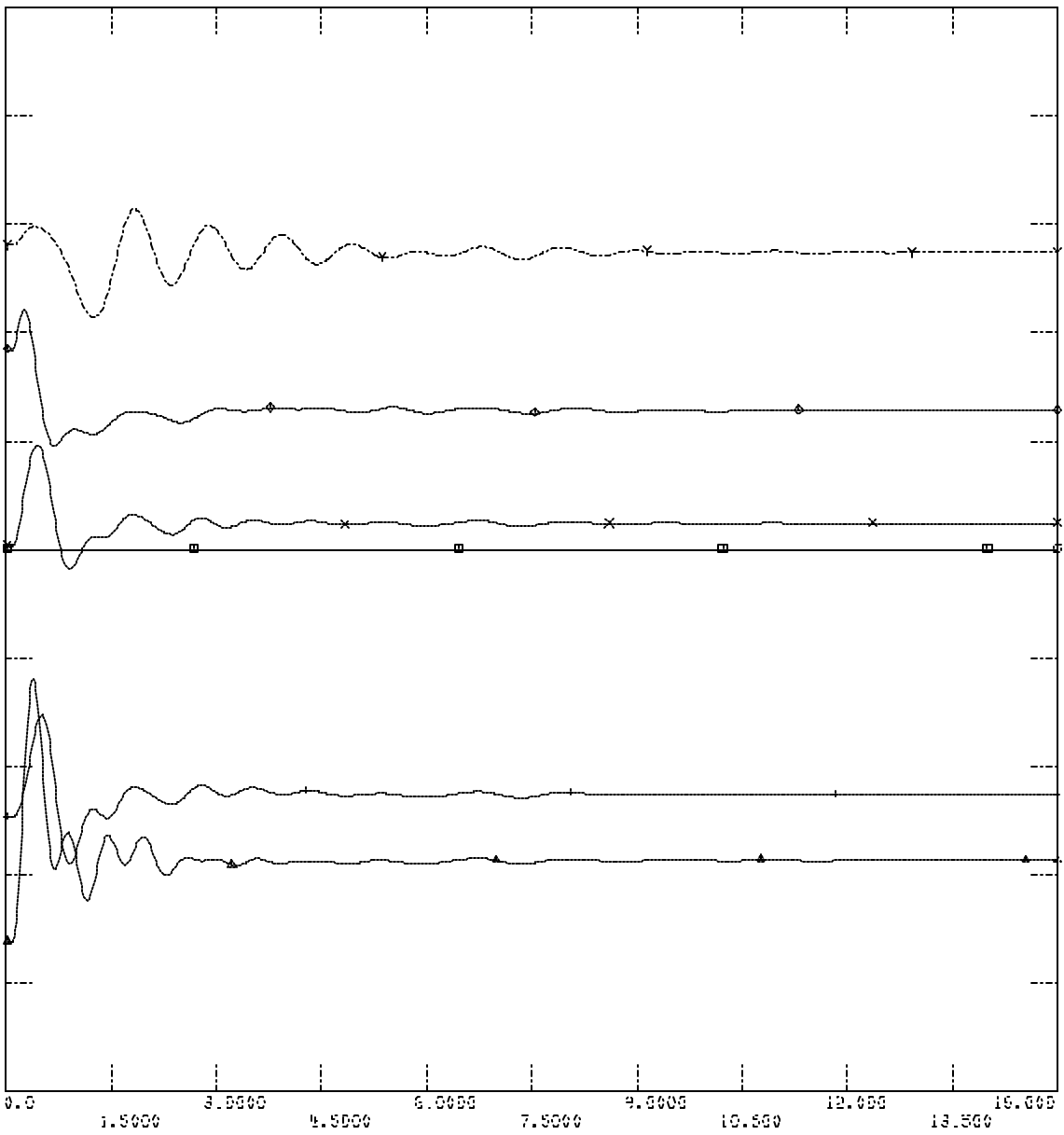
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25.000 0.0
 CHNL # 16: ERNG. TECUMSEH EN CNTR MEREJ

25.000 0.0
 CHNL # 66: ERNG. COOPER NPP03

35.000 10.000
 CHNL # 3: ERNG. JATRN G1 KPPLJ

10.000 -10.000
 CHNL # 2: ERNG. JATRN G2 KPPLJ



TUE, SEP 07 2004 16:00

FLT_2_1PH_MACHINE ANGLES

3000
 2000
 1000
 0
 -1000
 -2000

SPP MDMG ON STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BASEDRSE INCLUDING PRIOR SUPPDED

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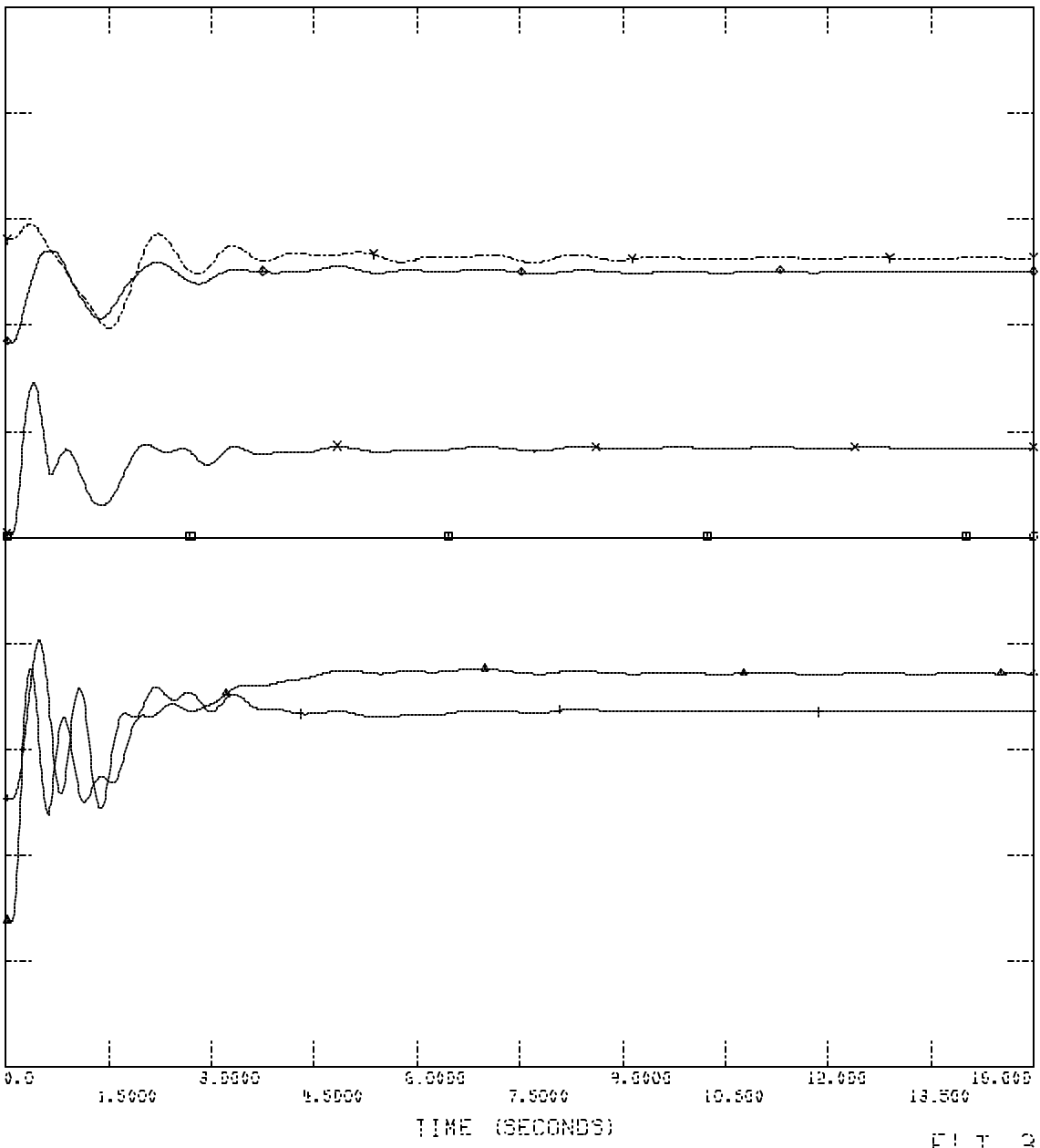
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 CHNL # 66: ERNG COOPER NPP0J

35.000 10.000
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10.000 -10.000
 CHNL # 2: ERNG JATRN GJ KPPLJ



TUE, SEP 07 2004 16:00

FLT_3_1PH_MACHINE ANGLES

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SPP MDWG 04 STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BASEDRSE INCLUDING PRIOR SCHEDULE

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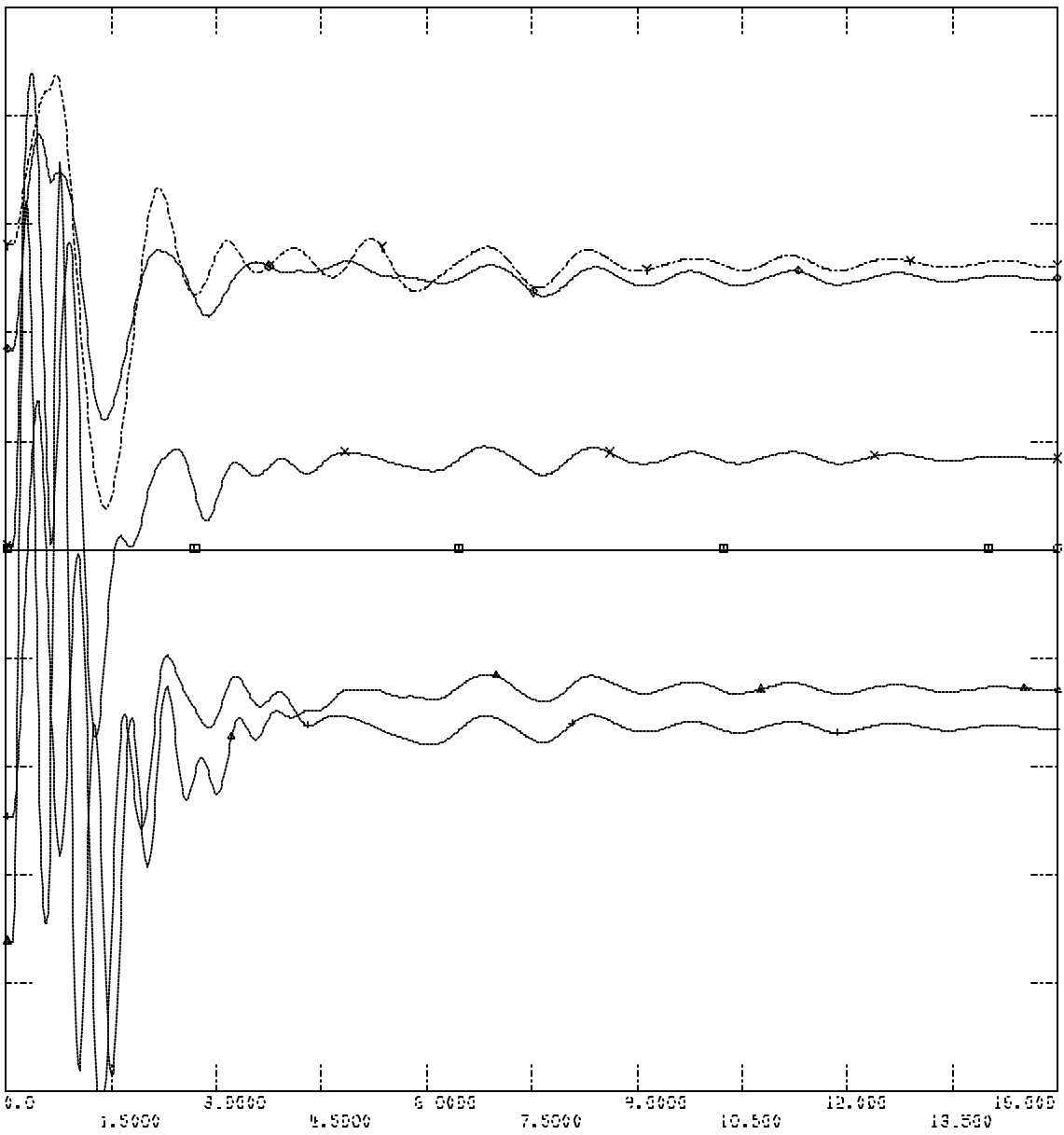
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 X X
 10.000

25.000
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 + +
 0.0

25.000
 CHNL # 66: ERNG COOPER NPFDJ
 ◆ ◆
 0.0

35.000
 CHNL # 3: ERNG JATRN GJ KPFLJ
 ◆ ◆
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10.000
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TUE, SEP 07 2004 16:01

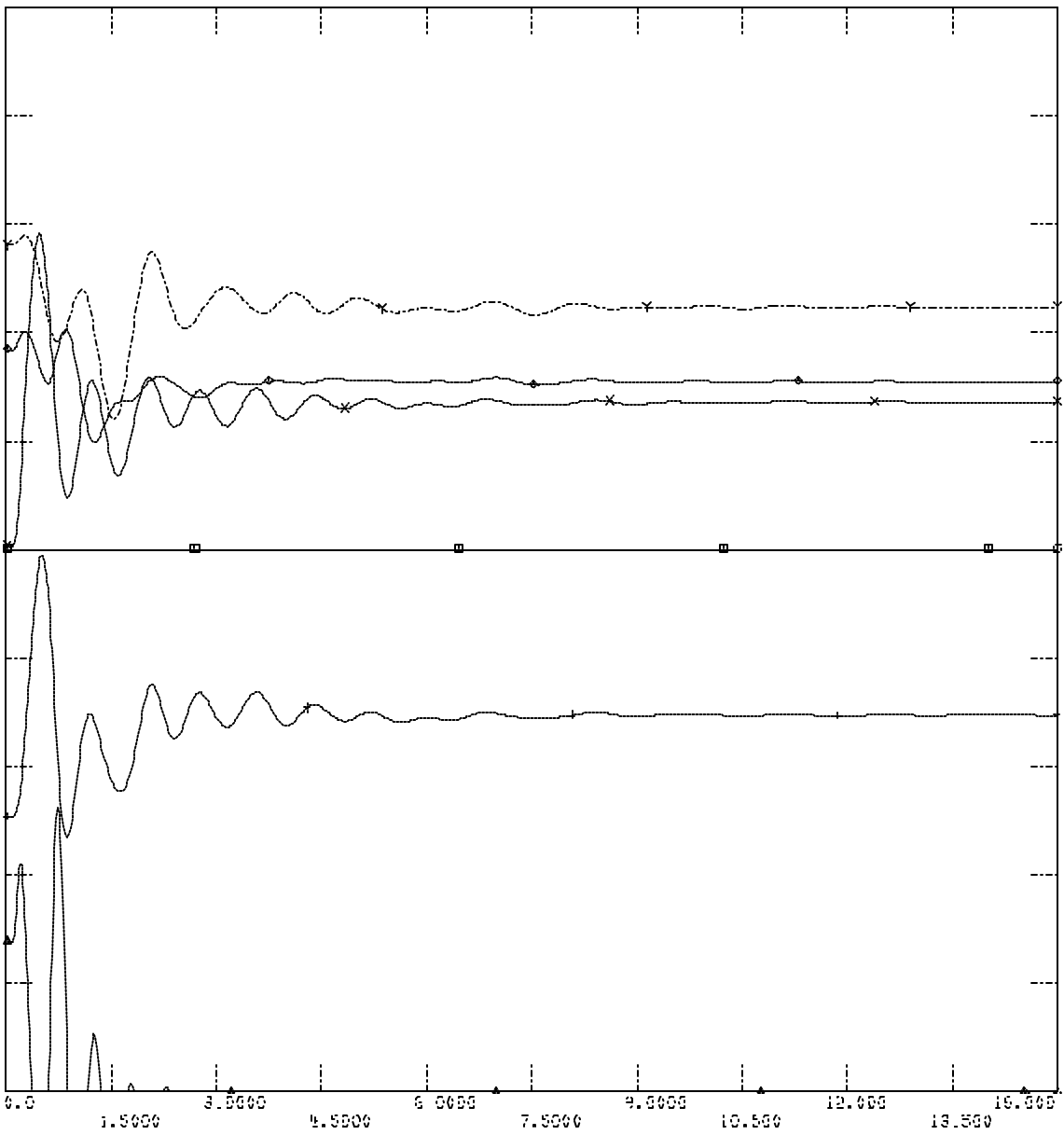
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 GEN-2004-012 BASED/SE INCL UDINO PRIOR SUPPDED

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 CHNL # 10: ERNG MCFITZ KOPFL

CHNL # 14: ERNG JEFFREY EN CNTR WEREJ
 CHNL # 16: ERNG TECUMSEH EN CNTR WEREJ
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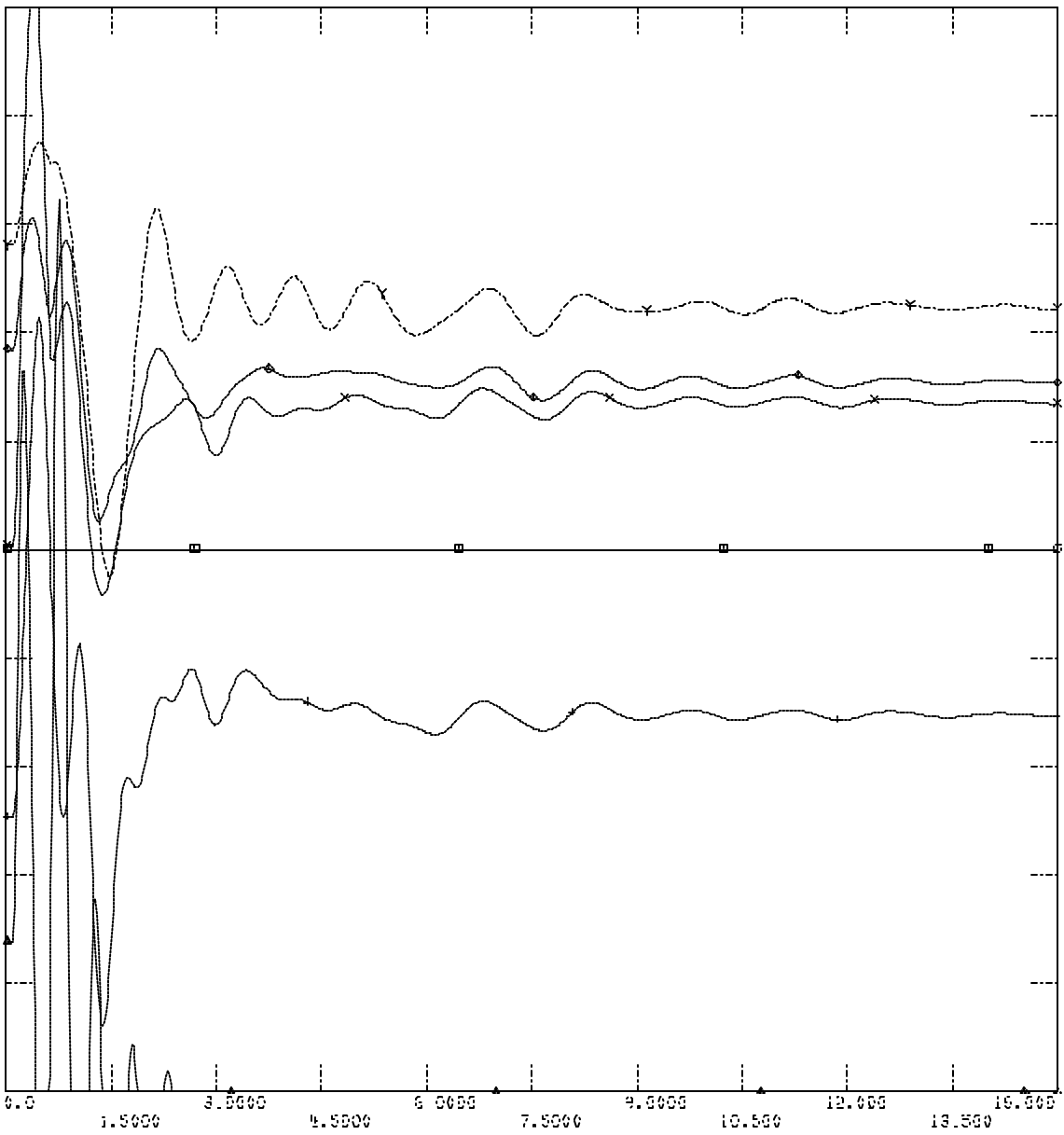
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SPP MDWG 04 STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BASED/HSE INCLUDING PRIOR SCHEDULE

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 CHNL # 10: LANG. MEC. C13. KOPPL

CHNL # 14: LANG. JEFFREY EN CNTR MEREJ
 CHNL # 16: LANG. TECUMSEH EN CNTR MEREJ
 CHNL # 66: LANG. COOPER NPFDJ
 CHNL # 3: LANG. JATRN G1 KOPPL
 CHNL # 2: LANG. JATRN G2 KOPPL



TUE, SEP 07 2004 16:01

PLT_4_3PH_MACHINE ANGLES

25.000
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 35.000
 10.000

SPP MDWG 04 STABILITY; 2010 SUM PEAK; MODIFIED
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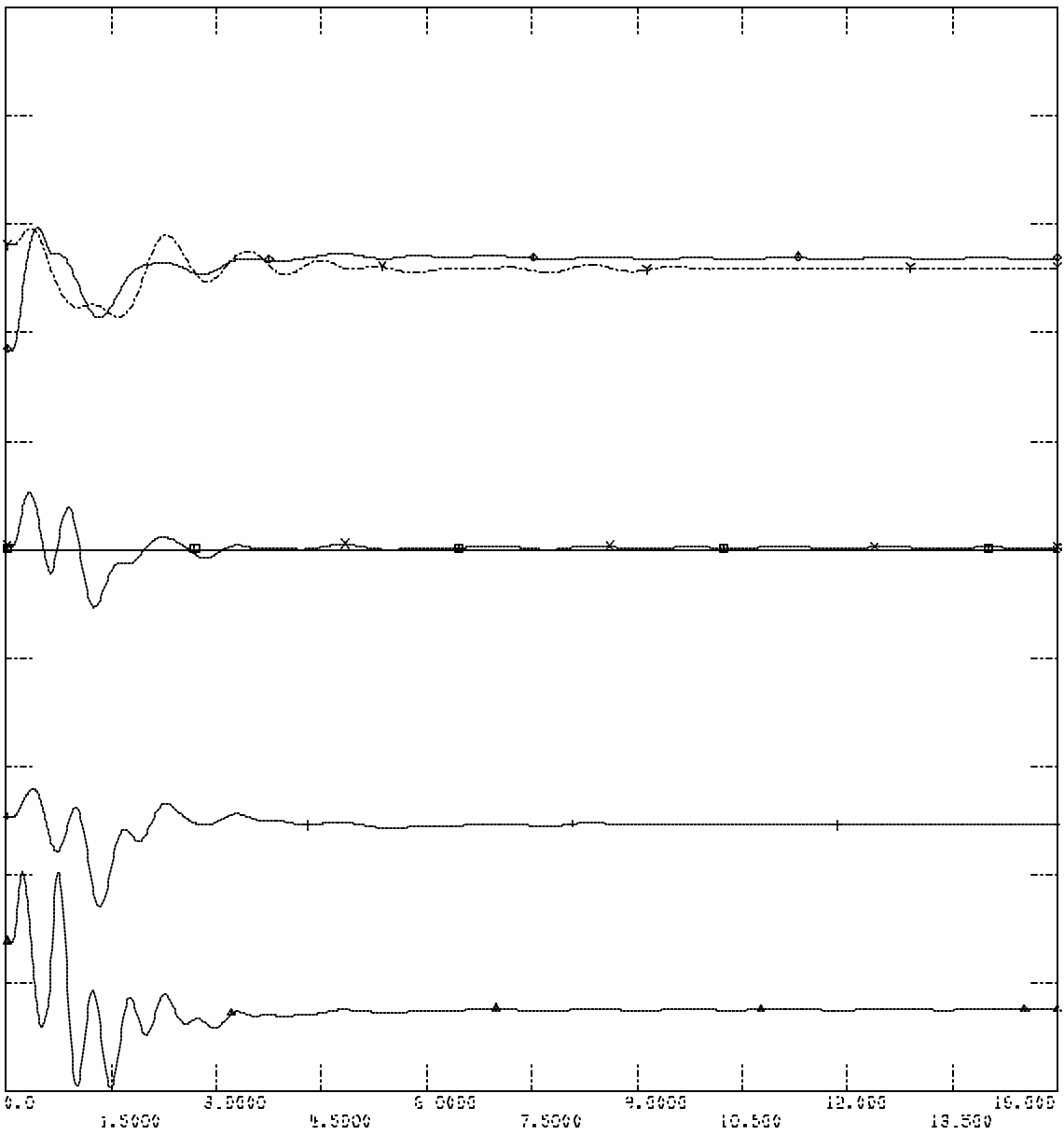
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CHNL # 16: LANG. TECUMSEH EN CNTR MEREJ
 10.000

CHNL # 66: LANG. COOPER NPPOJ
 0.0

CHNL # 3: LANG. JATRN GJ KOPLA
 10.000

CHNL # 2: LANG. JATRN G2 KOPLA
 -10.000



TUE, SEP 07 2004 16:01

FLT_5_1PH_MACHINE ANGLES

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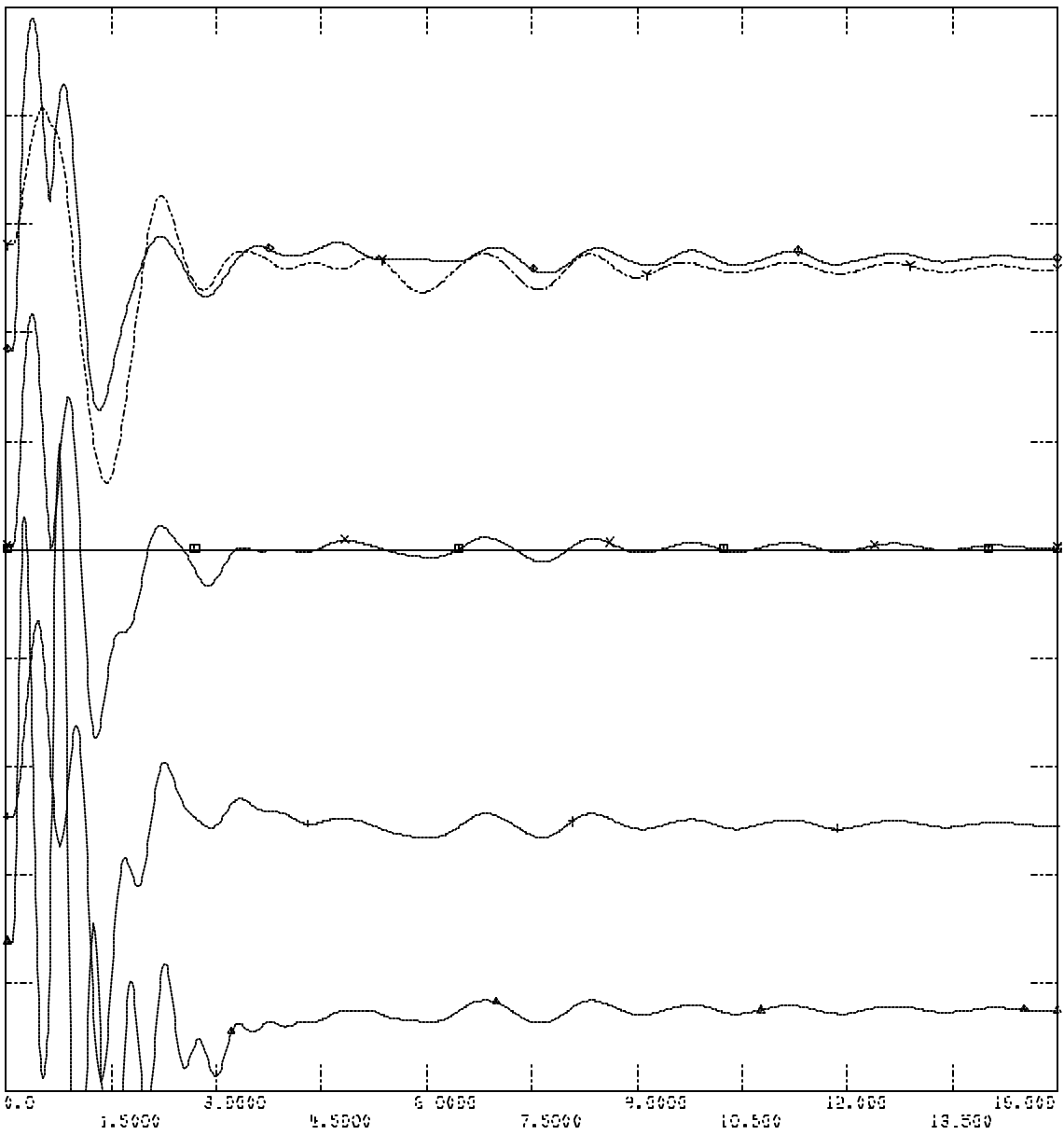
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 GEN-2004-012 BASEDRSE INCLUDING PRIOR SCHEDULE

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 CHNL # 10: ERNG MEX-LI3.KOPL3

25.000
 35.000
 25.000
 25.000
 35.000
 10.000

CHNL # 14: ERNG JEFFREY EN CNTR MEREJ
 CHNL # 10: ERNG TECUMSEH EN CNTR MEREJ
 CHNL # 66: ERNG COOPER NPP03
 CHNL # 3: ERNG JATRN G1 KOPL3
 CHNL # 2: ERNG JATRN G2 KOPL3

0.0
 0.0
 0.0
 10.000
 -10.000



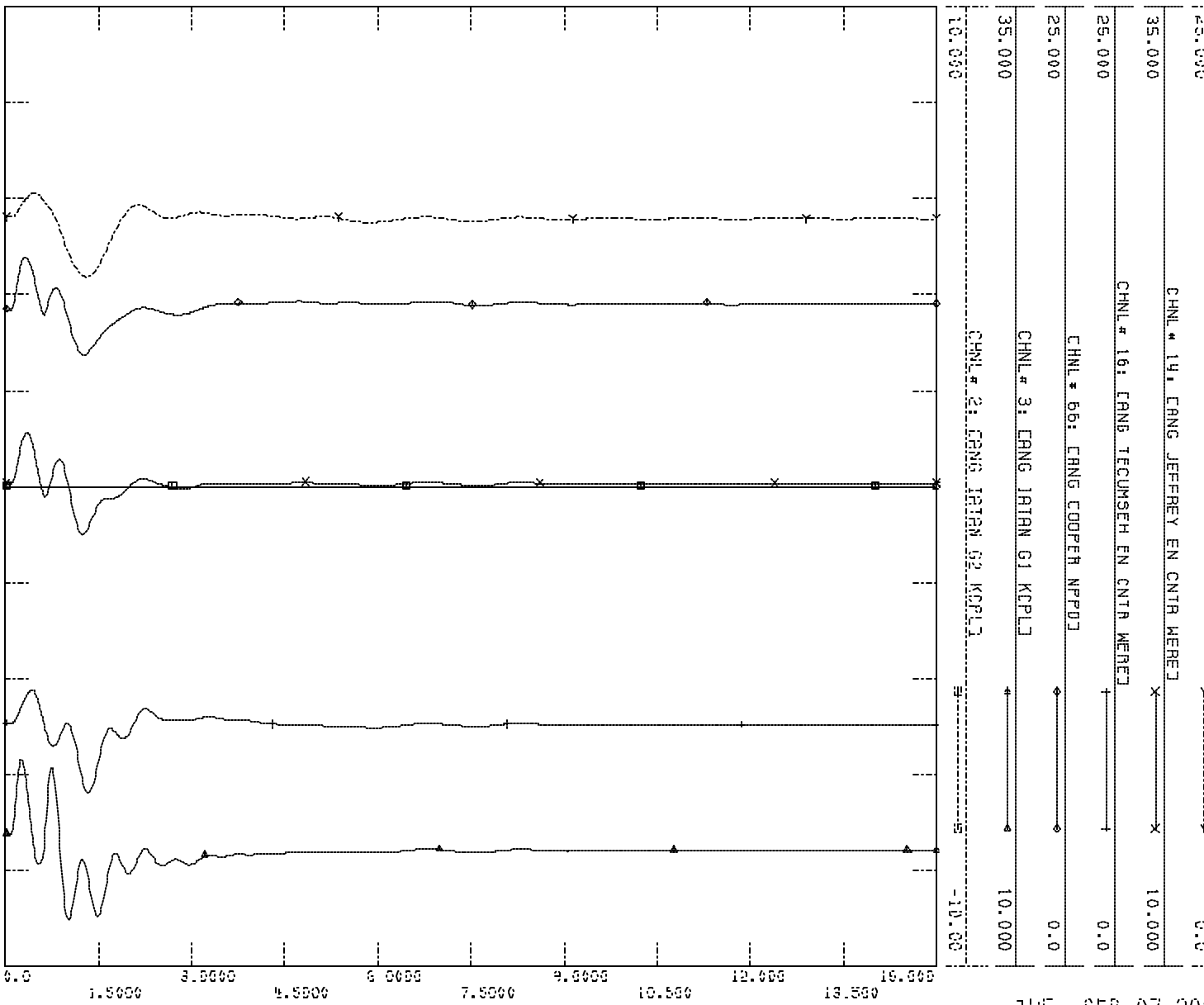
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 25.000
 25.000
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 10.000
 -10.000

SPP MDWG 04 STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BASED ON INCL UDINO PRIOR SCHEDULE

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 CHANNEL # 10: ERNG MEGEN
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 CHANNEL # 2: ERNG JATRN G2 KPPLJ



TUE, SEP 07 2004 16:01

FLT_6_1PH_MACHINE ANGLES

3000
 2000
 1000
 0
 -1000
 -2000
 -3000

SPP MDWG 04 STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BASED ON SE INCLUDING PRIOR SCHEDULE

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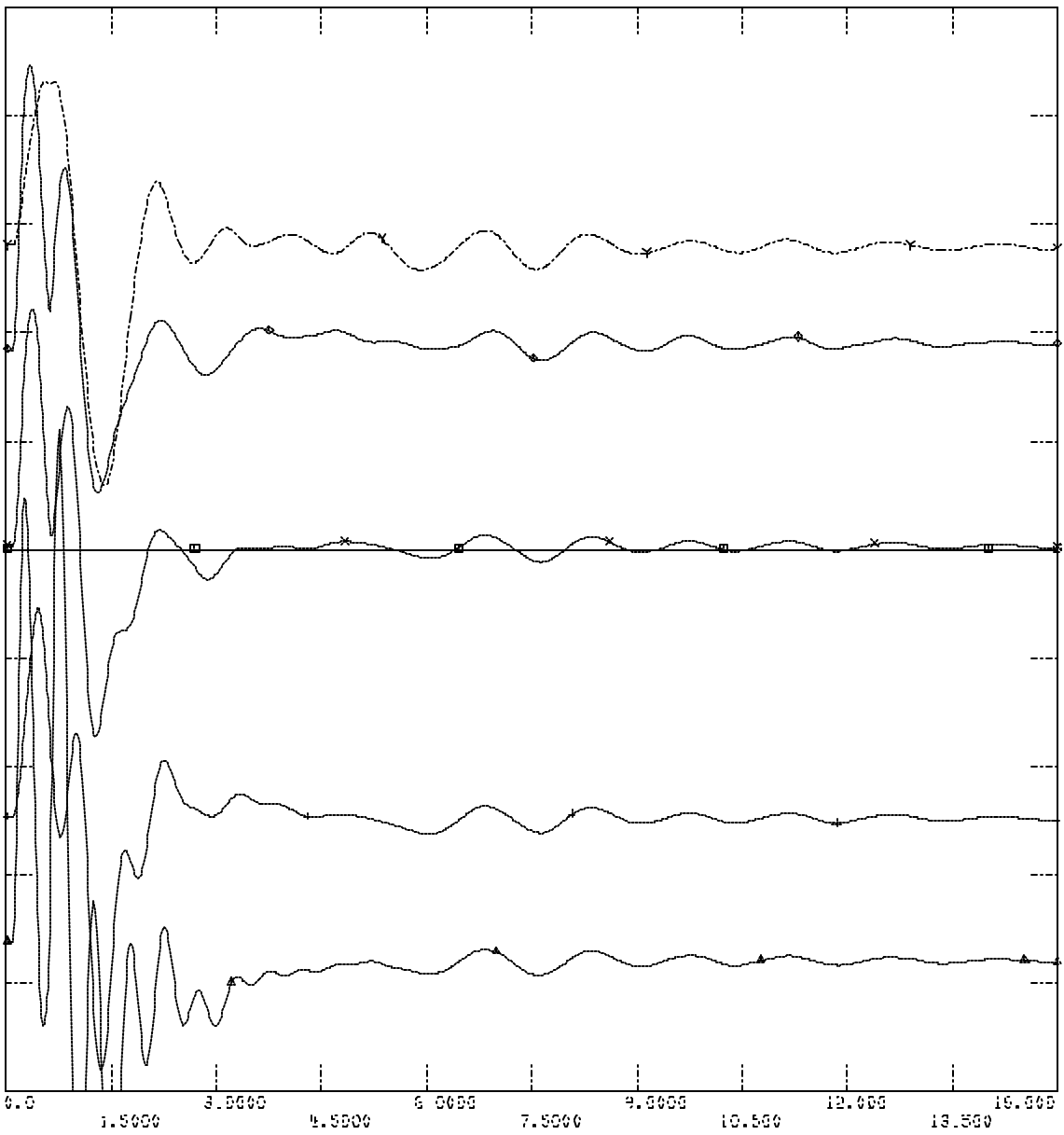
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25.000 CHNL # 66: LANG. COOPER NPPOJ
 | | 0.0

35.000 CHNL # 3: LANG. JATRN GJ KOPLA
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10.000 CHNL # 2: LANG. JATRN G2 KOPLA
 | | -10.000



TIME (SECONDS)

TUE, SEP 07 2004 16:01

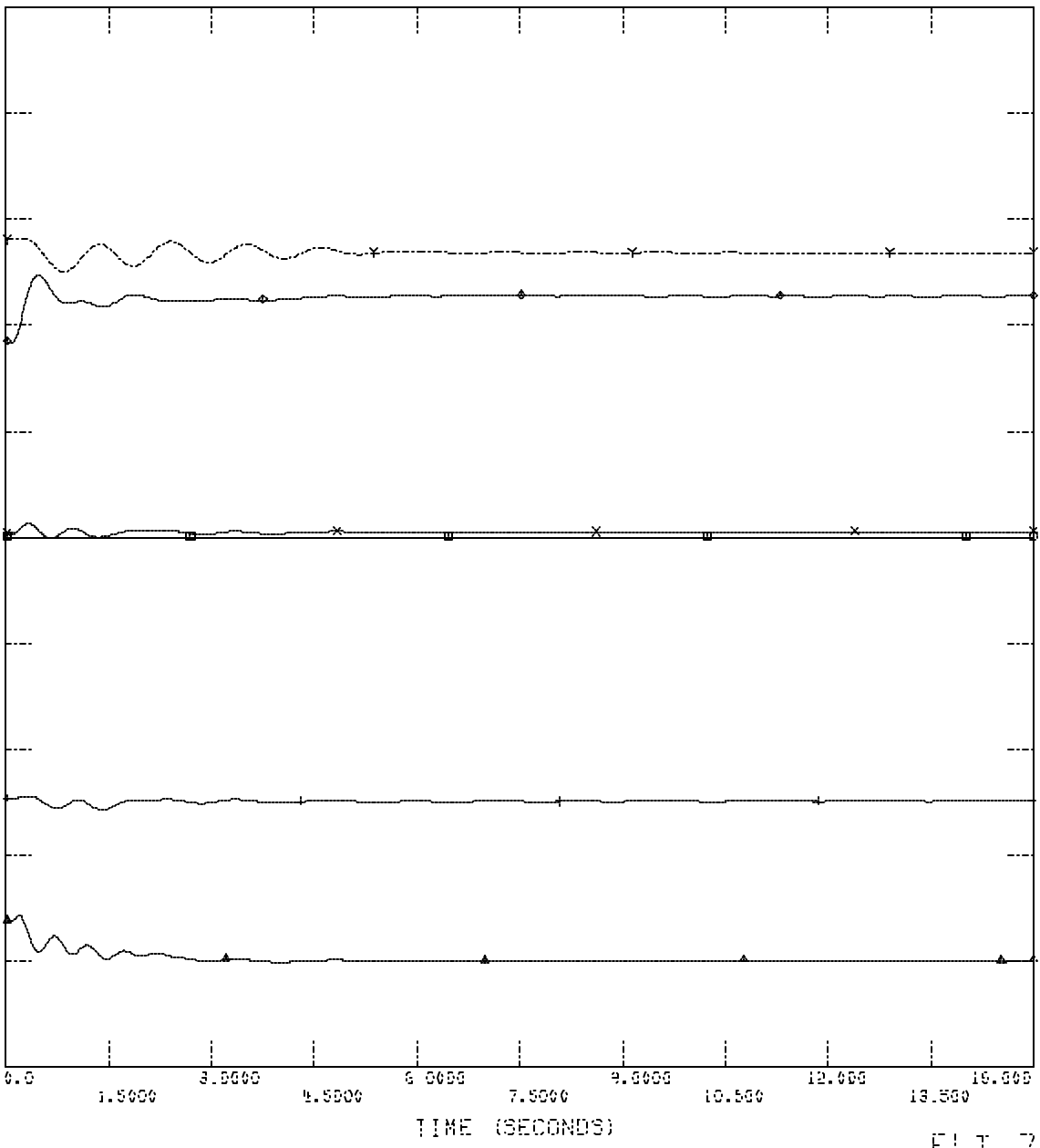
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SPP MDWG 04 STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BASEDRSE INCL UDINO PRIOR SCHEDULE

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 CHNL # 16: ERNG TECUMSEH EN CNTR MEREJ
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 CHNL # 3: ERNG JATRN GJ KOPLJ
 CHNL # 2: ERNG JATRN G2 KOPLJ
 -10.000



TUE, SEP 07 2004 16:01

FLT_7_1PH_MACHINE ANGLES

3000
 2000
 1000
 0
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 -2000
 -3000

SPP MDWG 04 STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BASEDRSE INCL UDINO PRIOR SCHEDULE

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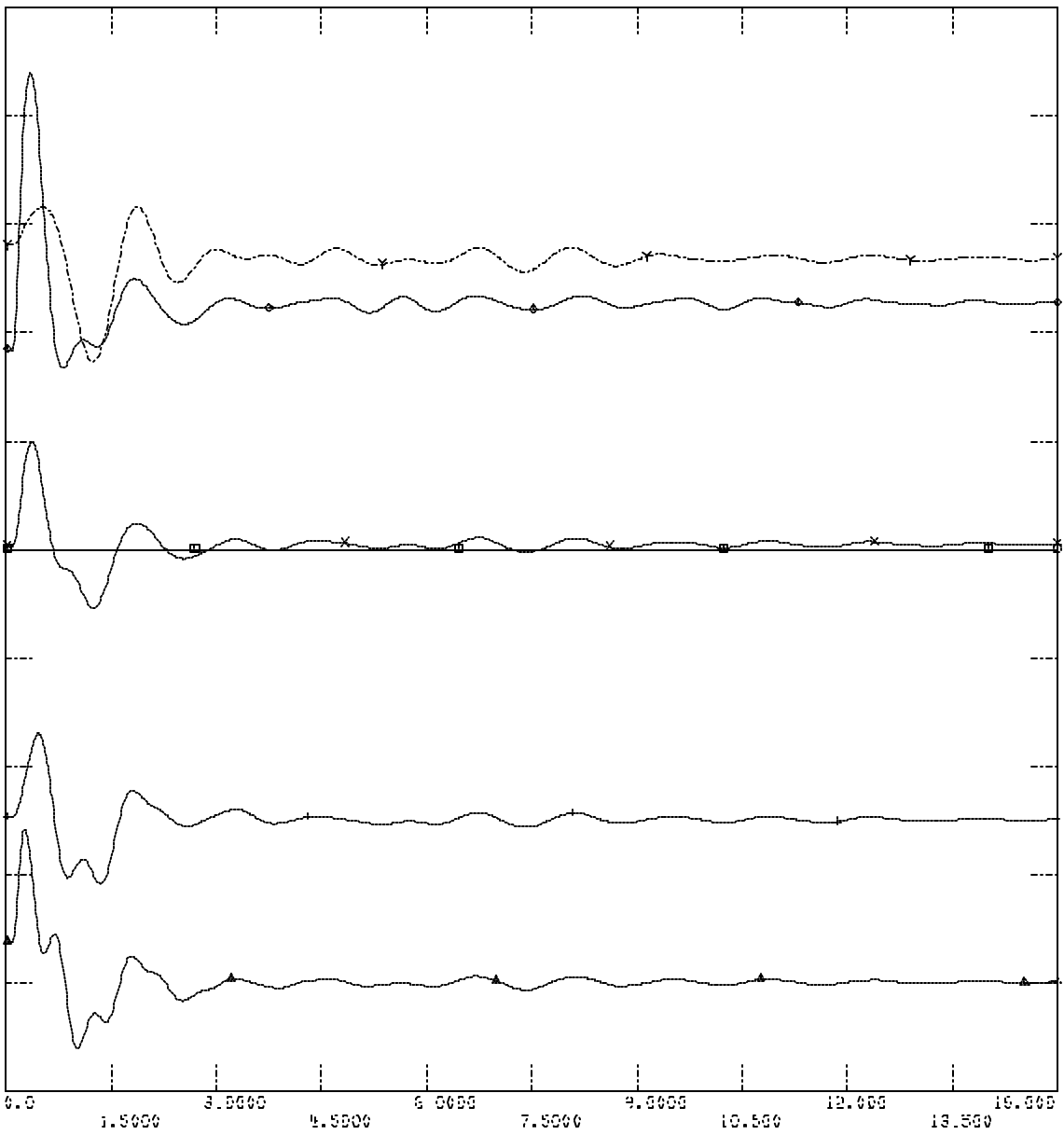
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25.000 0.0
 CHNL # 66: ERNG. COOPER NPP03

35.000 10.000
 CHNL # 3: ERNG. JATRN G1 KPPLJ

10.000 -10.000
 CHNL # 2: ERNG. JATRN G2 KPPLJ



TUE, SEP 07 2004 16:01

FLT_7_3PH_MACHINE ANGLES

25.000
 35.000
 25.000
 25.000
 35.000
 10.000
 -10.000

SPP MDWG 04 STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BASEDRSE INCL UDINO PRIOR SUPPDED

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 CHNL # 19: ERNG MEREJ

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 25.000
 35.000
 10.000
 -10.000

CHNL # 19: ERNG JEFFREY EN CNTR MEREJ
 CHNL # 19: ERNG MEREJ

25.000
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 25.000
 35.000
 10.000
 -10.000

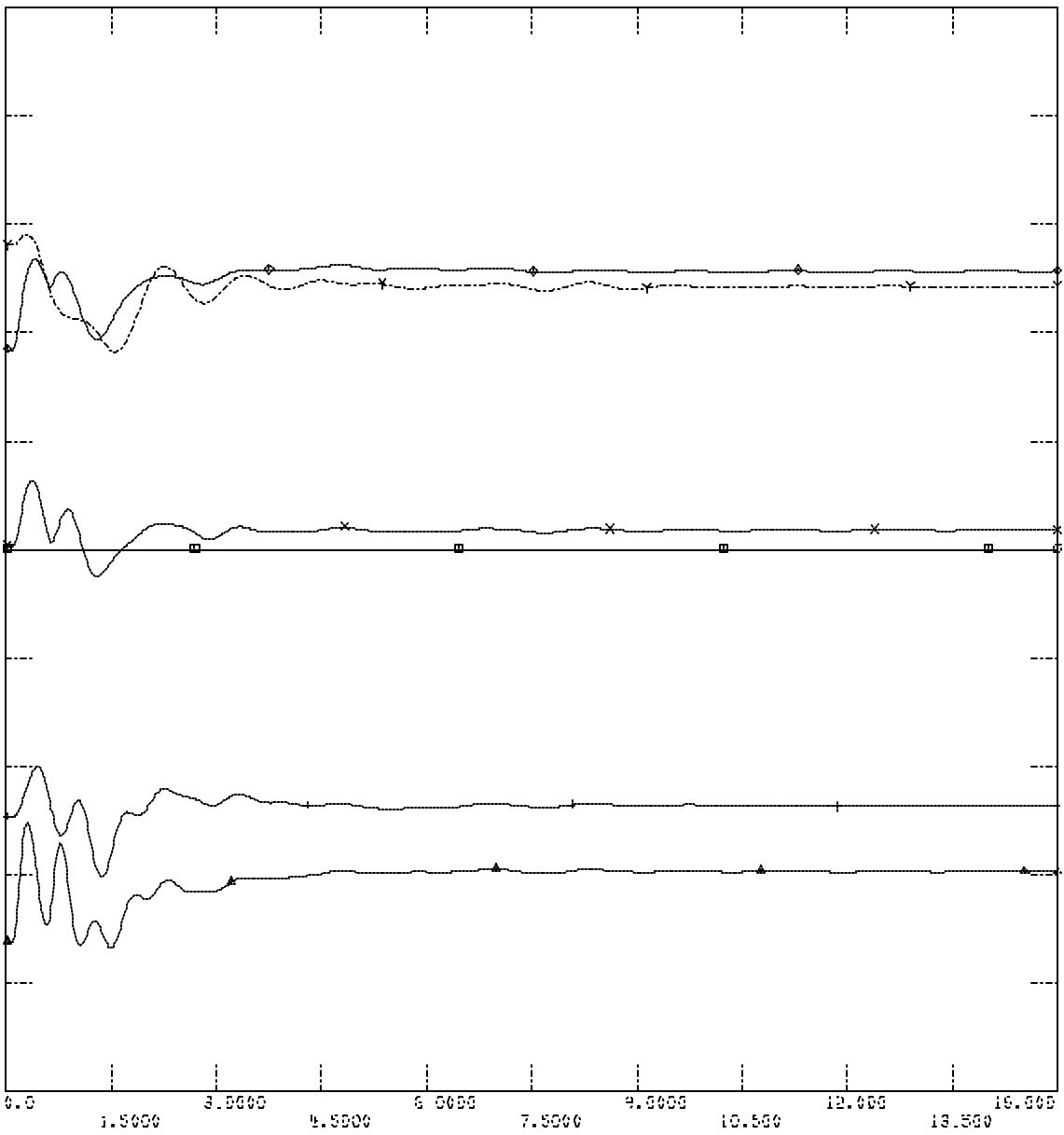
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 CHNL # 19: ERNG MEREJ

25.000
 35.000
 25.000
 35.000
 10.000
 -10.000

CHNL # 19: ERNG JEFFREY EN CNTR MEREJ
 CHNL # 19: ERNG MEREJ
 CHNL # 19: ERNG JEFFREY EN CNTR MEREJ
 CHNL # 19: ERNG MEREJ

25.000
 35.000
 25.000
 35.000
 10.000
 -10.000

CHNL # 19: ERNG JEFFREY EN CNTR MEREJ
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TIME (SECONDS)

TUE, SEP 07 2004 16:01

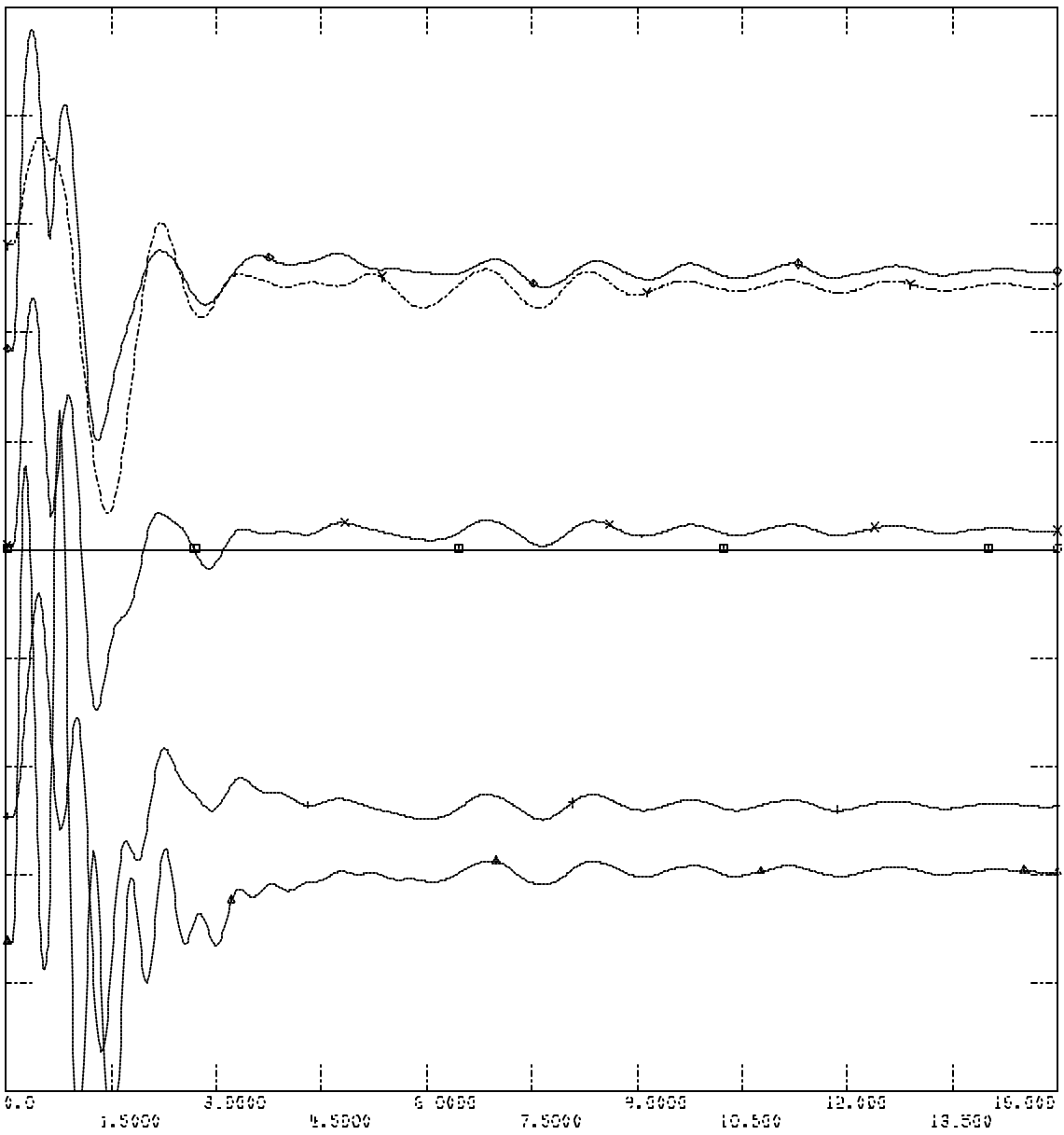
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SPP MDWG 04 STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BASED ON SE INCLUDING PRIOR SCHEDULE

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CHNL # 14: ERNG JEFFREY EN CNTR MEREJ
 CHNL # 16: ERNG TECUMSEH EN CNTR MEREJ
 CHNL # 66: ERNG COOPER NPP03
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TIME (SECONDS)

TUE, SEP 07 2004 16:01

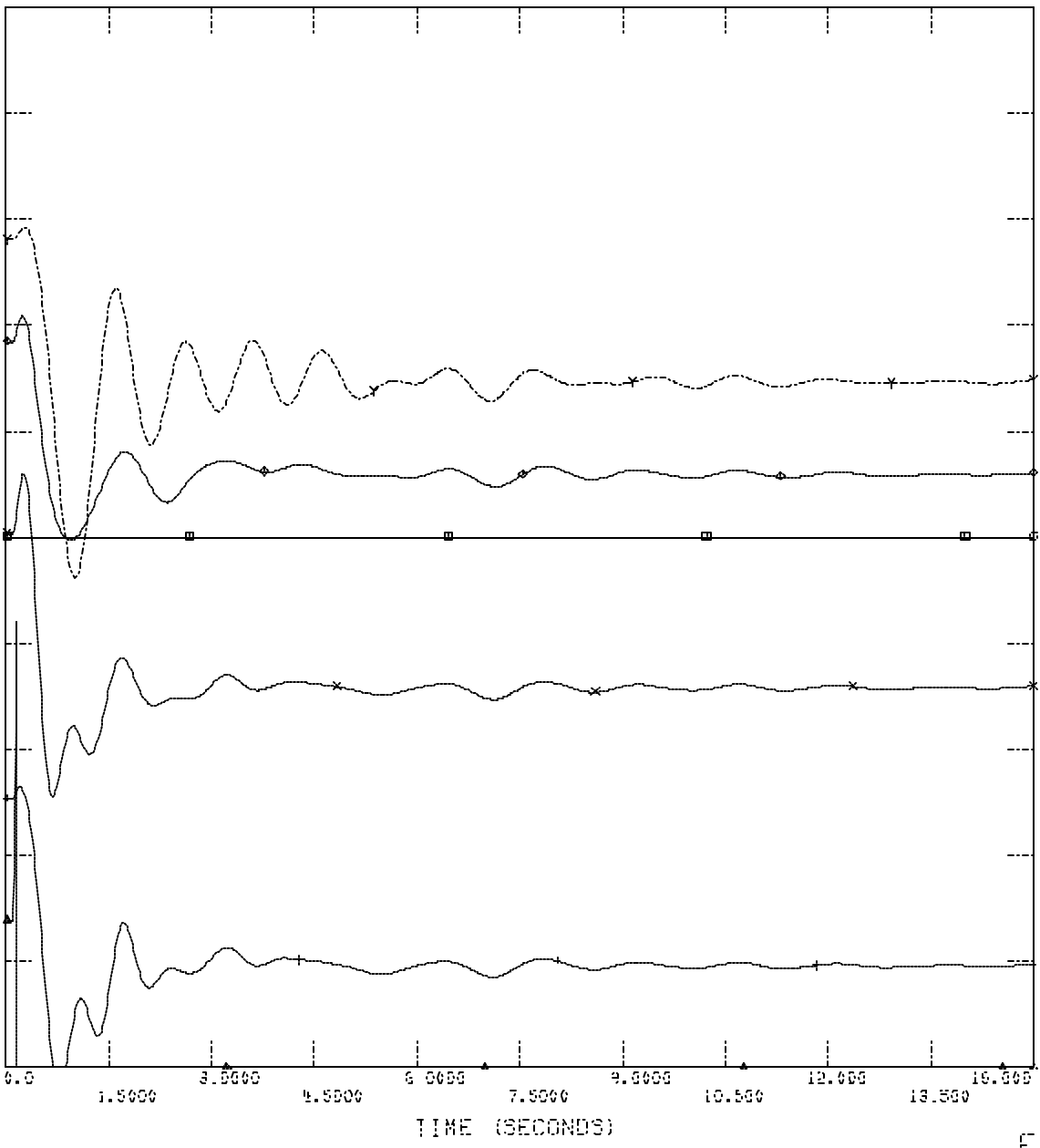
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 1000
 0
 -1000
 -2000
 -3000

SPP MDWG 04 STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BASEDRSE INCLUDING PRIOR SUPPDED

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35.000	CHNL # 16: ERNG TECUMSEH EN CNTR WEREJ	10.000
25.000	CHNL # 66: ERNG COOPER NPFDJ	0.0
25.000	CHNL # 3: ERNG JATRN GJ KPPLJ	10.000
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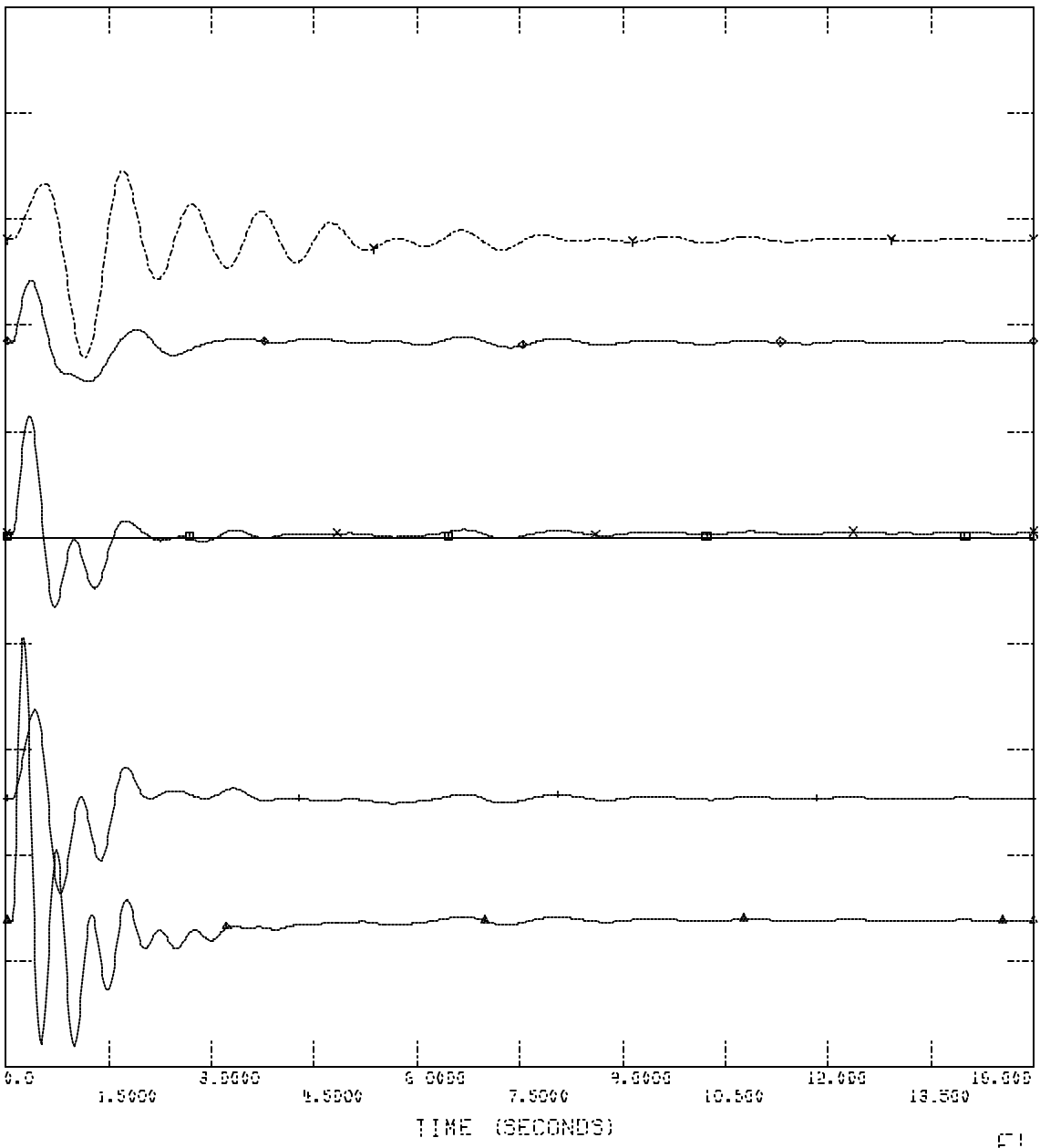
TUE, SEP 07 2004 16:01
 FLT_9_MACHINE ANGLES

2004-09-07
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SPP MDWG 04 STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BRSEDRSE INCL UD INO PRIOR SUPPDR

FILE: C:\Interconnection Studies\WORK\Inq\basexase\RESULT\SVFLT_10.0UT

CHNL # 14: CRNG JEFFREY EN CNTR MEREJ
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 CHNL # 19: CRNG TECUMSEH EN CNTR MEREJ
 CHNL # 66: CRNG COOPER NPP0J
 CHNL # 3: CRNG JATRN GJ KPPLJ
 CHNL # 2: CRNG JATRN G2 KPPLJ

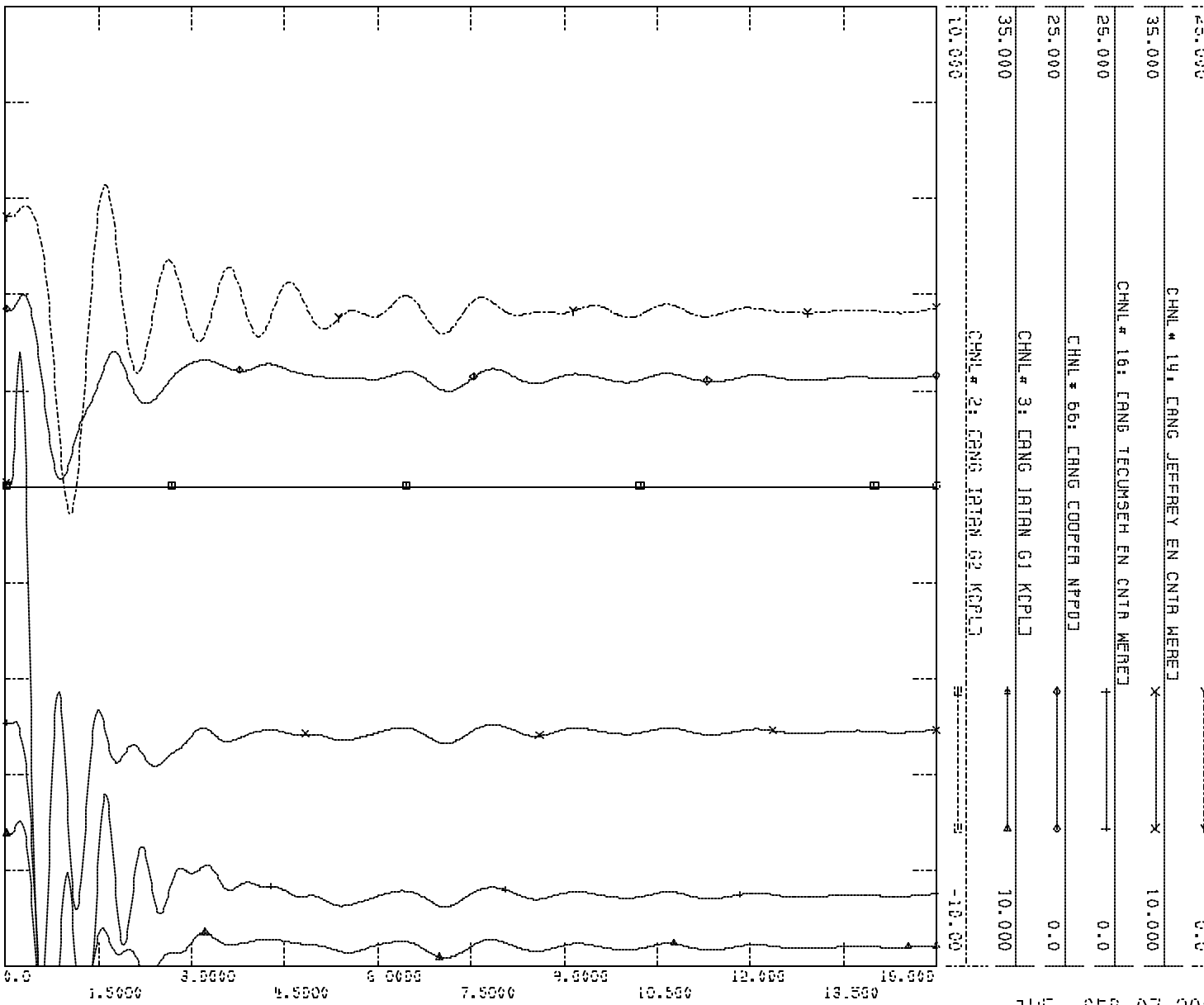


TUE, SEP 07 2004 16:01
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 35.000
 25.000
 25.000
 35.000
 10.000

SPP MDWG 04 STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BASED ON INCL UDING PRIOR SCHEDULE

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 CHNL # 13: ERNG. MEG. C13. KPPLJ
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 CHNL # 11: ERNG. JEFFREY EN CNTR MEREJ
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 CHNL # 9: ERNG. JEFFREY EN CNTR MEREJ
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 CHNL # 7: ERNG. JEFFREY EN CNTR MEREJ
 CHNL # 6: ERNG. COOPER NPPOJ
 CHNL # 5: ERNG. JATRN GJ KPPLJ
 CHNL # 4: ERNG. JATRN GJ KPPLJ
 CHNL # 3: ERNG. JATRN GJ KPPLJ
 CHNL # 2: ERNG. JATRN GJ KPPLJ
 CHNL # 1: ERNG. JATRN GJ KPPLJ



TUE, SEP 07 2004 16:01
 FLT_11_MACHINE ANGLES

Appendix A-2

Plots of Fault Simulations

Plots of selected bus voltage response during faults

Scenario:

2010 Summer Peak

Basecase

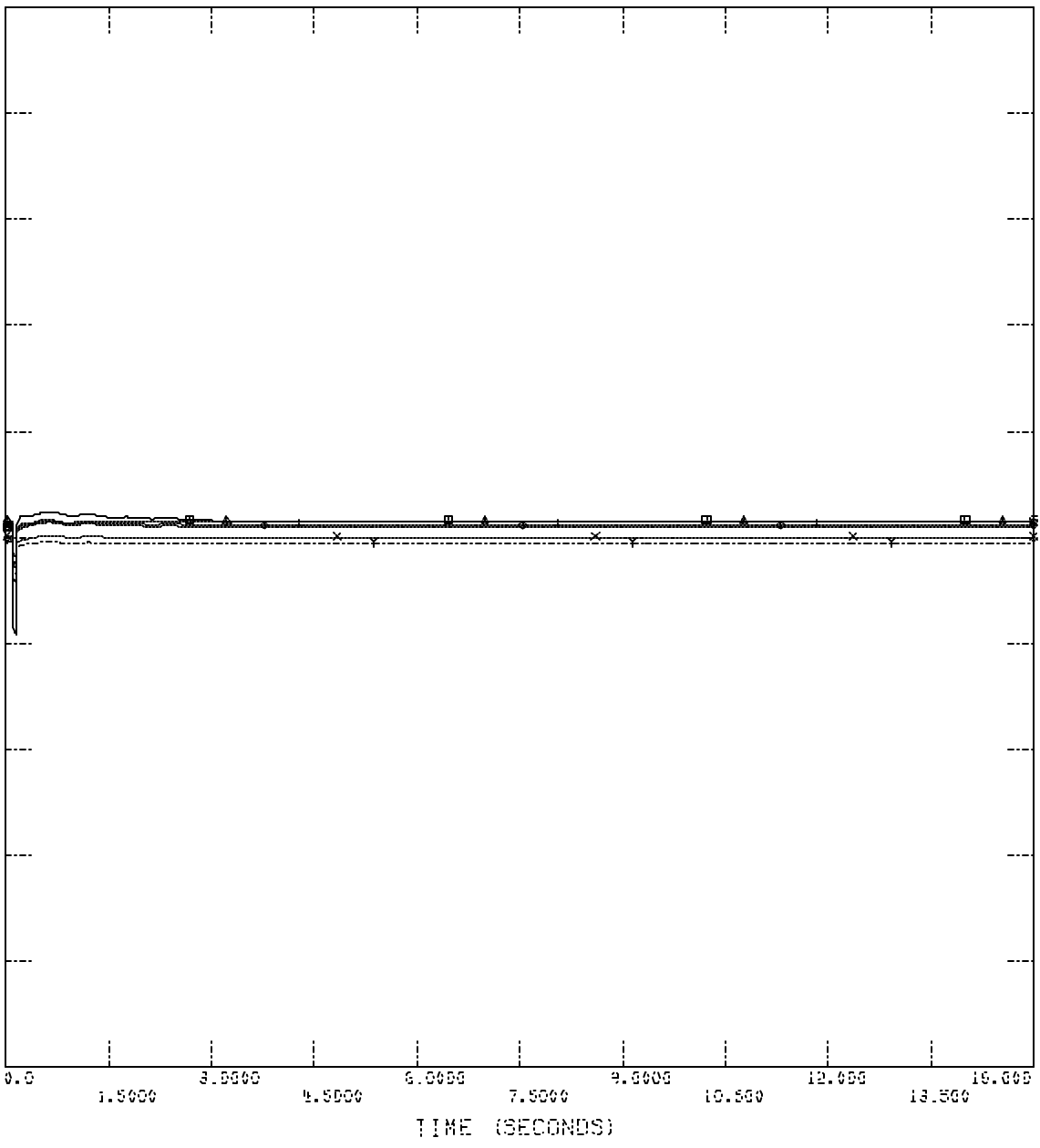
[No Customer Plant – No Network Upgrades]

395KVA
 2724
 2724

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BRSECHSE INCLUDING PRIOR QUEUED

FILE: C:\Interconnection Studies\Working\bassecase\RESULT1\FLT_1_1PH.DAT

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2.0000	CHNL # 293: EVOLTAGE PLEASNT HIL 395KVJ	0.0
2.0000	CHNL # 296: EVOLTAGE FAIRPT 395KVJ	0.0
2.0000	CHNL # 292: EVOLTAGE ST JOE 395KVJ	0.0
2.0000	CHNL # 281: EVOLTAGE JEC N 395KVJ	0.0
2.0000	CHNL # 279: EVOLTAGE IRAN 395KVJ	0.0



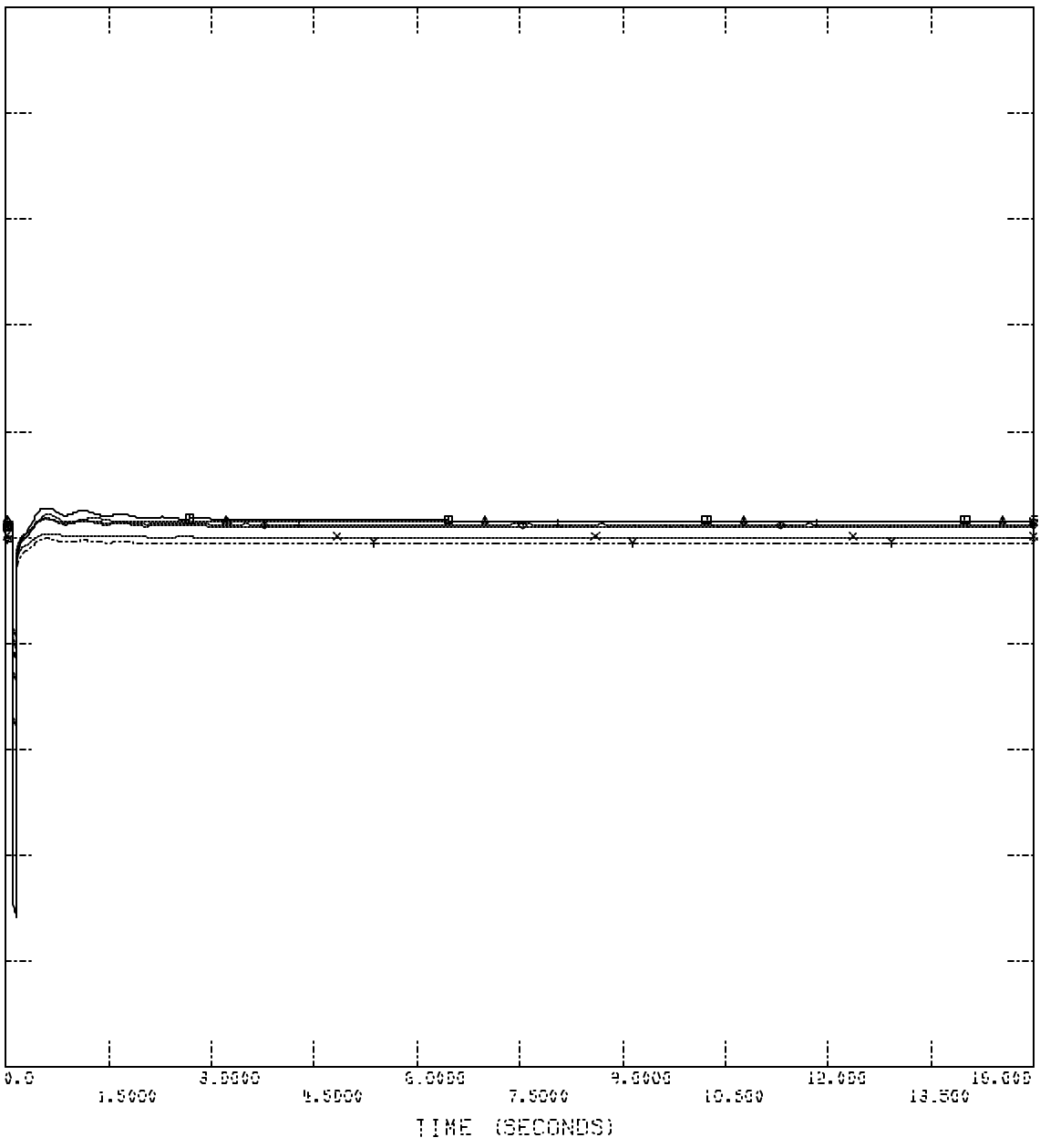
TUE, SEP 07 2004 16:04
 FLT_1_1PH_VOLTAGES

395KVA
 2724
 2724

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BRSECHSE INCLUDING PRIOR QUEUED

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2.0000	CHNL # 293: EVOLTAGE PLEASNT HIL 395KVJ	0.0
2.0000	CHNL # 296: EVOLTAGE FAIRPT 395KVJ	0.0
2.0000	CHNL # 292: EVOLTAGE ST JOE 395KVJ	0.0
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2.0000	CHNL # 279: EVOLTAGE IRTPN 395KVJ	0.0



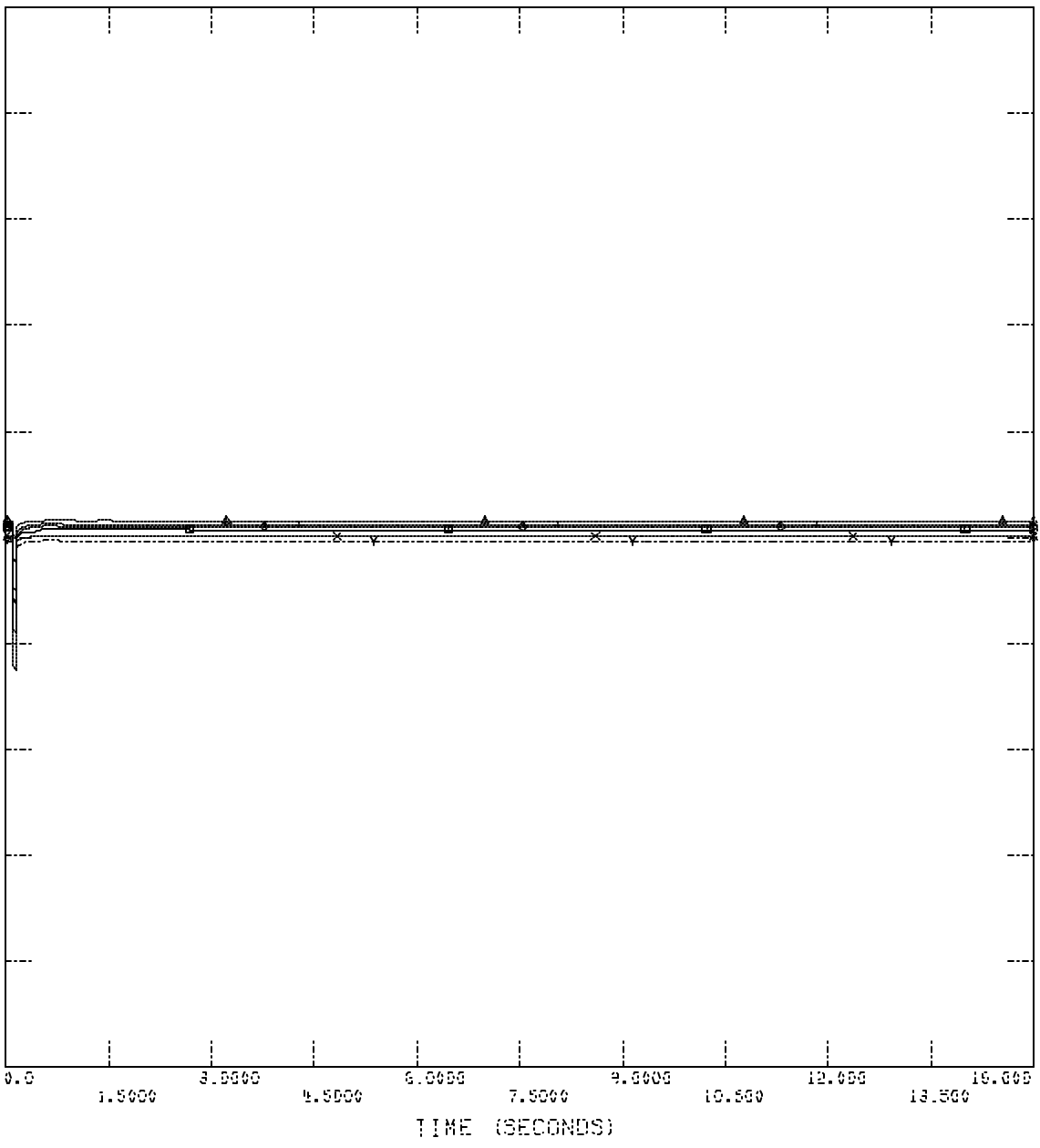
TUE, SEP 07 2004 16:04
 FLT_1_3PH_VOLTAGES

395KVA
 2724
 2724

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BRSECHSE INCLUDING PRIOR QUEUED

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2.0000	CHNL # 292: EVOLTAGE ST JOE 395KVJ	0.0
2.0000	CHNL # 281: EVOLTAGE JEC N 395KVJ	0.0
2.0000	CHNL # 279: EVOLTAGE IRAN 395KVJ	0.0

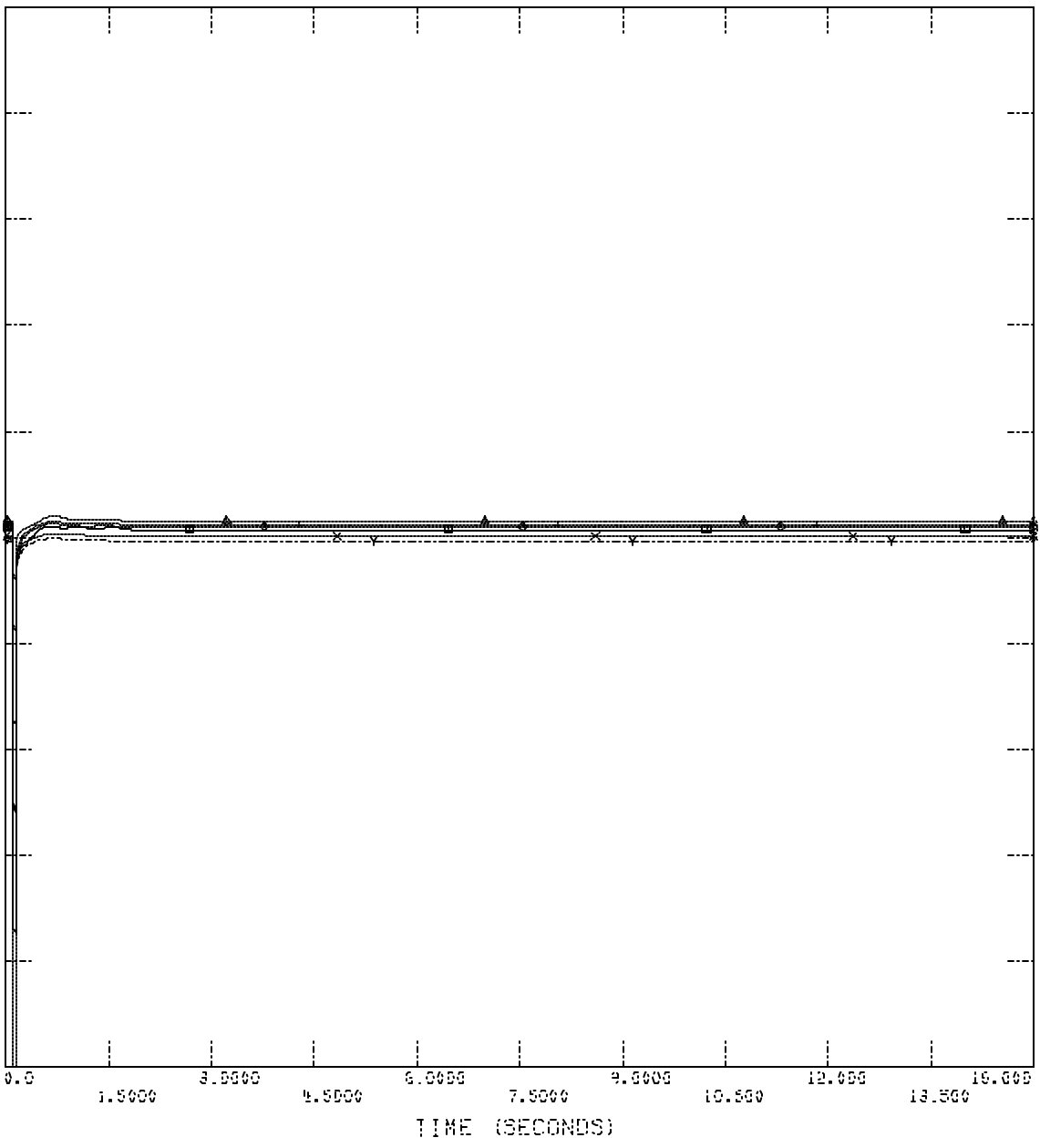


TUE, SEP 07 2004 16:04
 FLT_2_1PH_VOLTAGES

395KVA
 115KV
 1000000VA

SPP MDWG 04 STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BRSECHSE INCLUDING PRIOR QUEUED

FILE: C:\Interconnection Studies\Working\basew\resou\RESUL1SVPL1_2_3PH.DAT
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 CHNL # 296: EVOLTAGE FAIRPT 395KVJ 0.0
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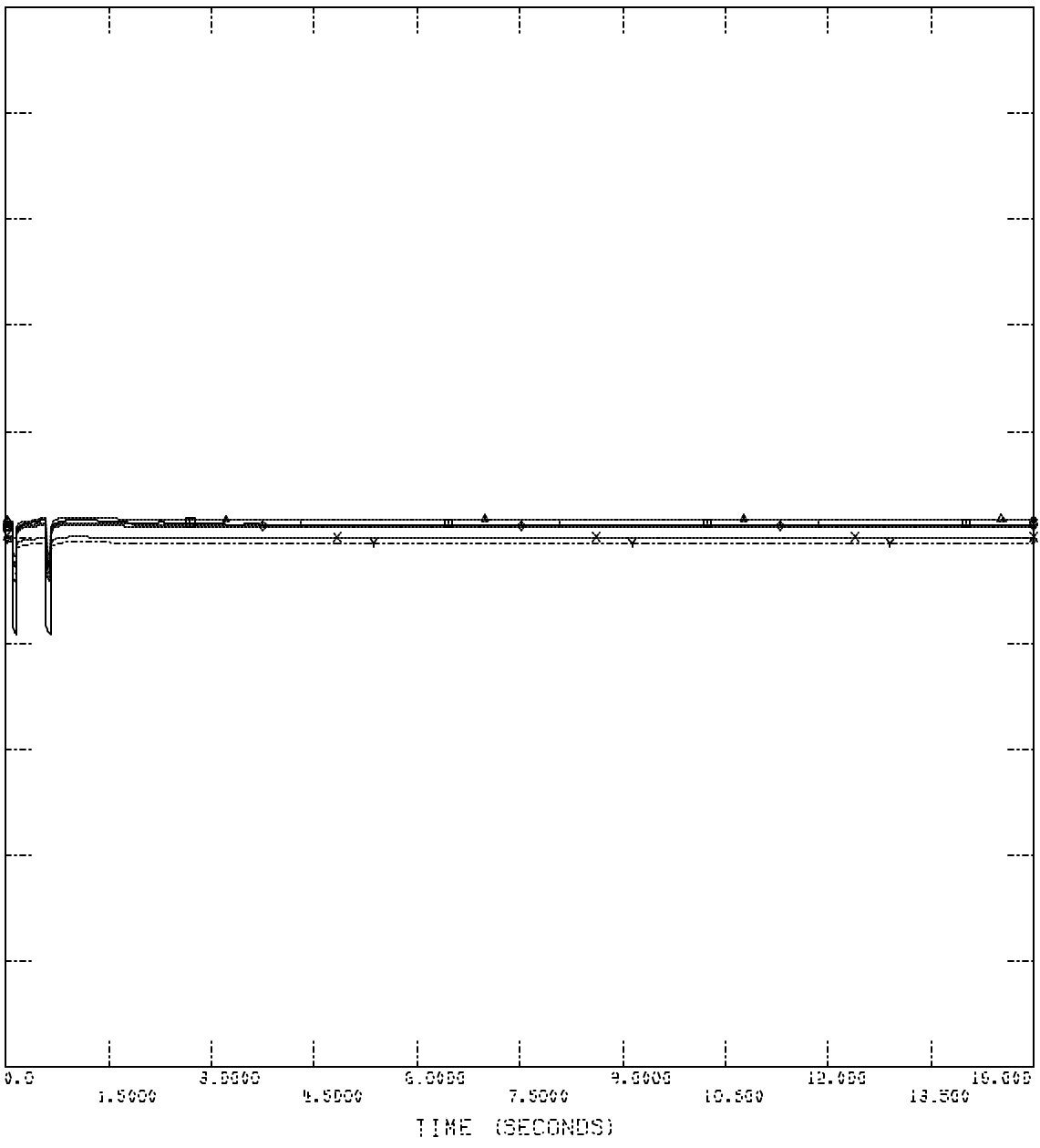
TUE, SEP 07 2004 16:04
 FLT_2_3PH_VOLTAGES

395KVA
 13.8KV
 100%

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BRSECHSE INCLUDING PRIOR QUEUED

FILE: C:\Interconnection Studies\Working\bassecase\RESULT SV\PLT_3_1PH.DAT

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2.0000	CHNL # 293: EVOLTAGE PLEASNT HIL 395KV]	0.0
2.0000	CHNL # 296: EVOLTAGE FAIRPT 395KV]	0.0
2.0000	CHNL # 292: EVOLTAGE ST JOE 395KV]	0.0
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2.0000	CHNL # 279: EVOLTAGE IR1RN 395KV]	0.0

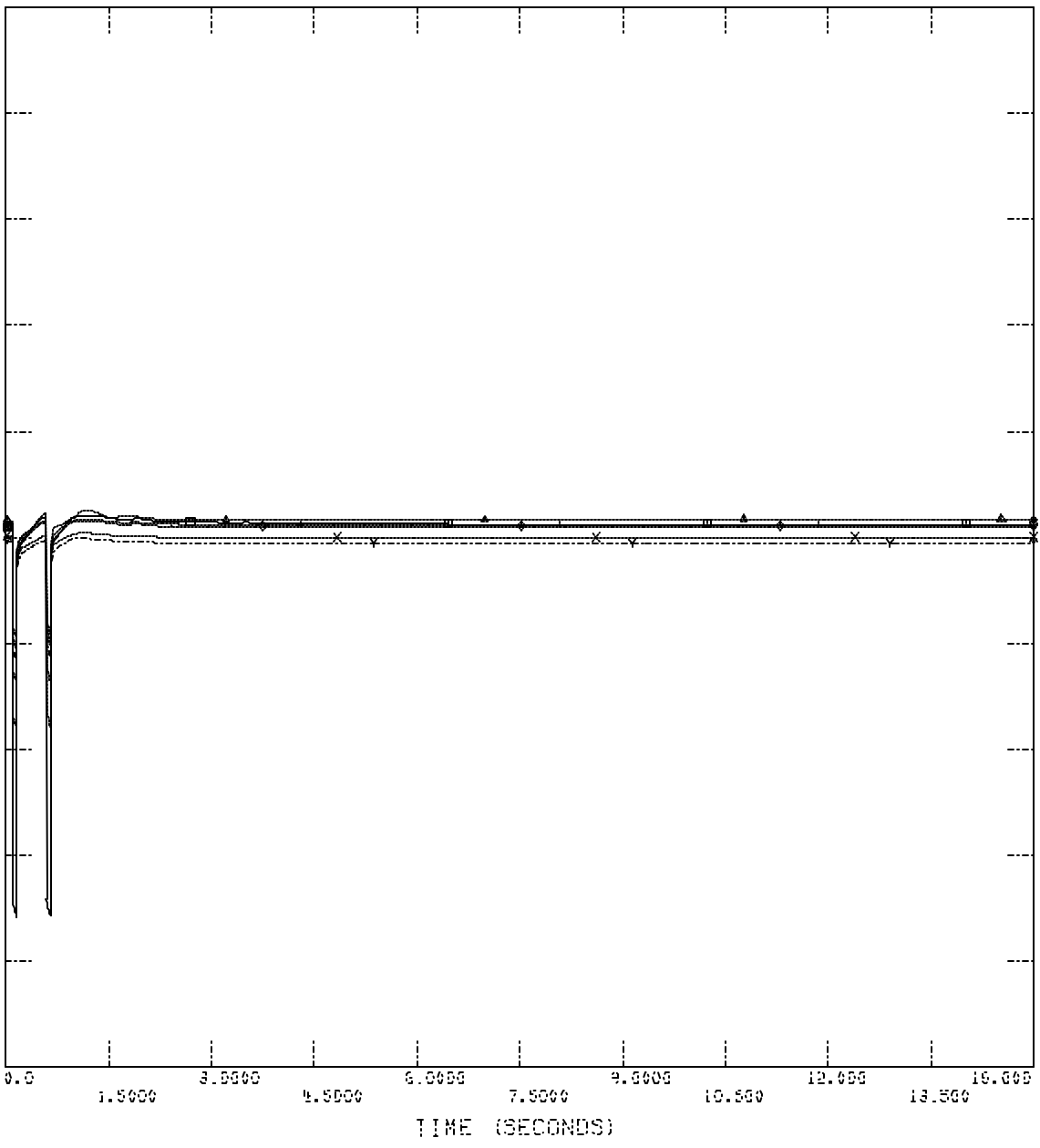


TUE, SEP 07 2004 16:04
 FLT_3_1PH_VOLTAGES

395KVA
 172.5
 172.5

SPP MDMS 04 STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BRSECHSE INCLUDING PRIOR QUEUED

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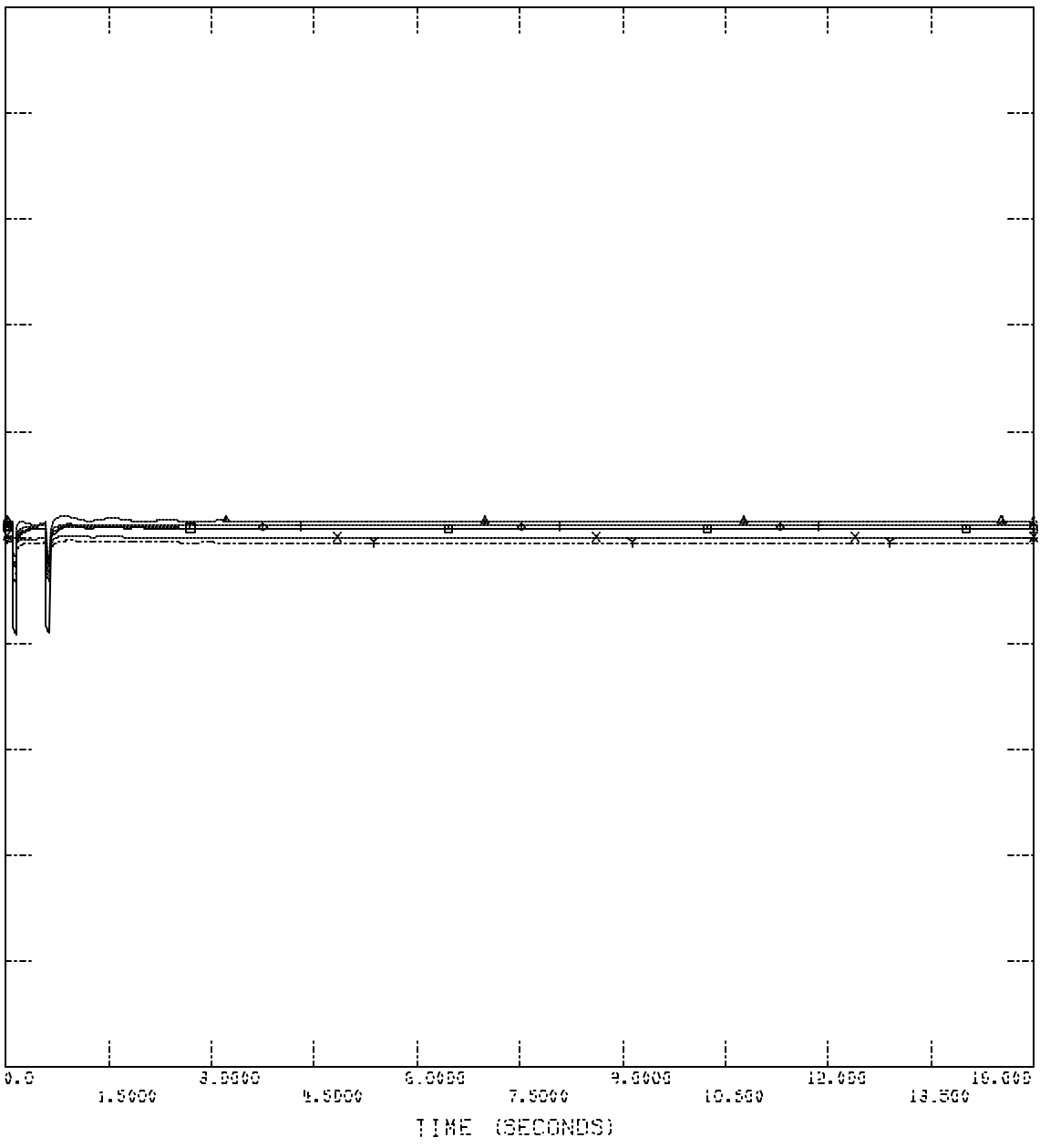


TUE, SEP 07 2004 16:04
 FLT_3_SPH_VOLTAGES

395KVA
 12.47KV
 100%

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BRSECHSE INCLUDING PRIOR QUEUED

FILE: C:\Interconnection Studies\Working\bassecase\RESULT_TSVPL_4_1PH.DAT
 CHNL # 278: EVOLTAGE BRM1 395KVJ 0.0
 CHNL # 293: EVOLTAGE PLEASNT HIL 395KVJ 0.0
 CHNL # 296: EVOLTAGE FAIRPT 395KVJ 0.0
 CHNL # 292: EVOLTAGE ST JOE 395KVJ 0.0
 CHNL # 281: EVOLTAGE JEC N 395KVJ 0.0
 CHNL # 279: EVOLTAGE IATRN 395KVJ 0.0

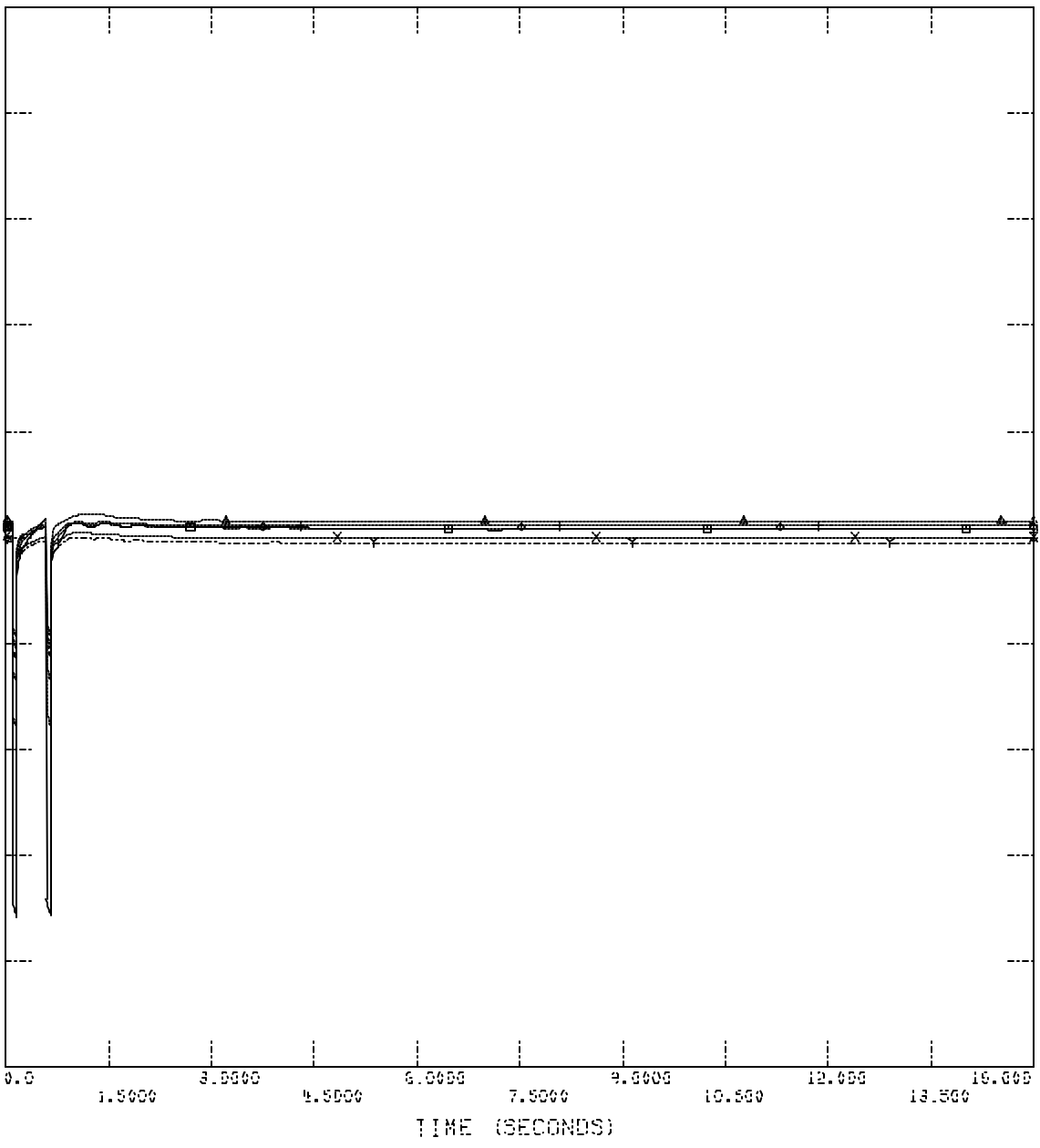


TUE, SEP 07 2004 16:04
 FLT_4_1PH_VOLTAGES

395KVA
 2724
 2724

SPP MDMS 04 STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BRSECHSE INCLUDING PRIOR QUEUED

FILE: C:\Interconnection Studies\Working\bassecase\RESUL TS\PL 1_4_3PH.DAT
 CHNL # 2724: EVOLTAGE BRMTH 395KVJ 0.0
 CHNL # 293: EVOLTAGE PLEASNT HIL 395KVJ 0.0
 CHNL # 296: EVOLTAGE FAIRPT 395KVJ 0.0
 CHNL # 292: EVOLTAGE ST JOE 395KVJ 0.0
 CHNL # 281: EVOLTAGE JEC N 395KVJ 0.0
 CHNL # 279: EVOLTAGE IRAN 395KVJ 0.0

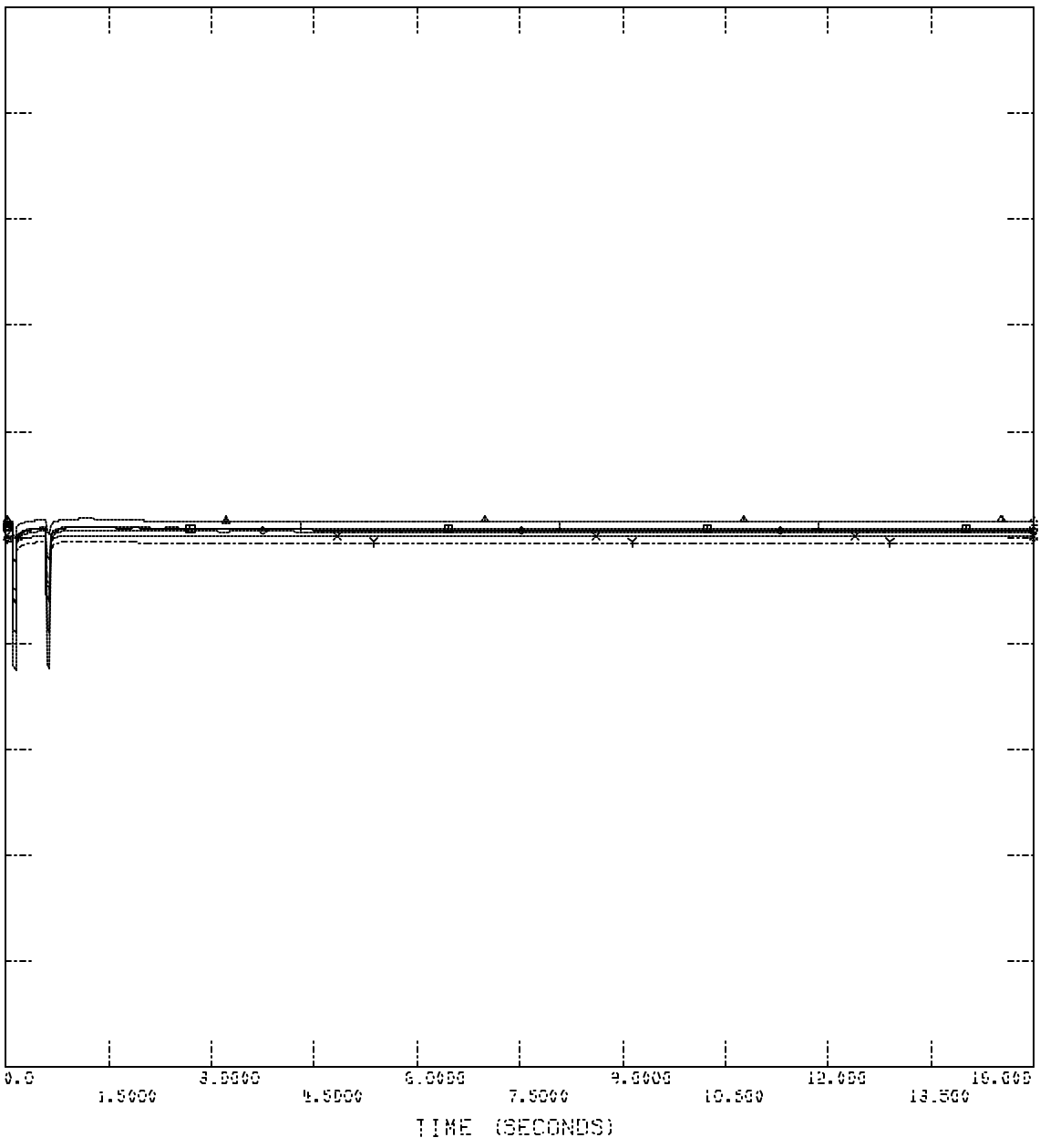


TUE, SEP 07 2004 16:04
 FLT_4_3PH_VOLTAGES

395KVA
 13.8KV
 100%

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BRSECHSE INCLUDING PRIOR QUEUED

FILE: C:\Interconnection Studies\Working\bassecase\RESULT5_VFL1_5_1PH.DAT
 CHNL # 278: EVOLTAGE BRN 395KVJ
 CHNL # 293: EVOLTAGE PLEASNT HIL 395KVJ
 CHNL # 296: EVOLTAGE FAIRPT 395KVJ
 CHNL # 292: EVOLTAGE ST JOE 395KVJ
 CHNL # 281: EVOLTAGE JEC N 395KVJ
 CHNL # 279: EVOLTAGE IATRN 395KVJ

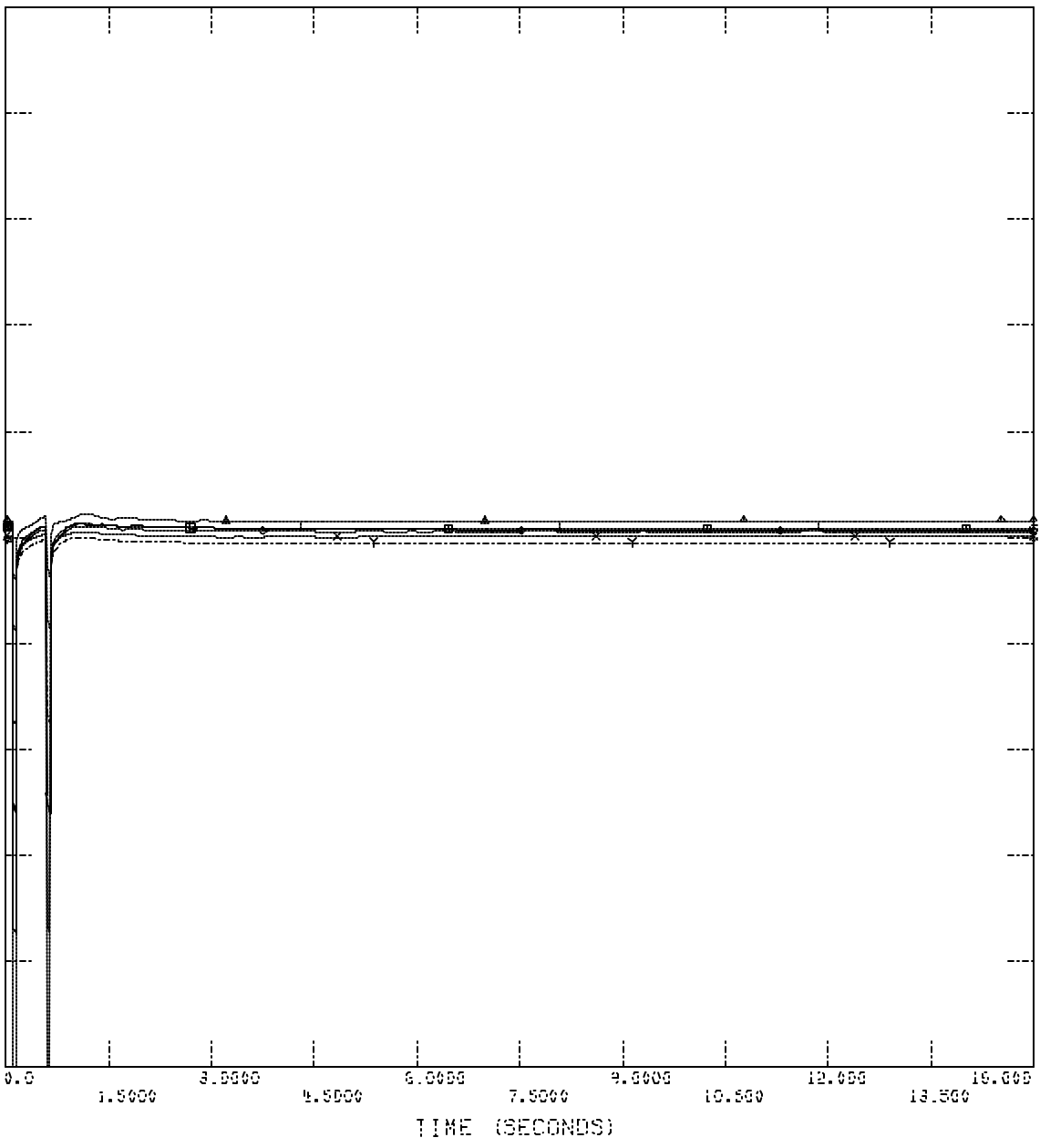


TUE, SEP 07 2004 16:04
 FLT_5_1PH_VOLTAGES

395KVA
 172.5
 172.5

SPP MDMS 04 STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BRSECHSE INCLUDING PRIOR QUEUED

FILE: C:\Interconnection Studies\Working\bassecase\RESUL TS\FLT_5_3PH.DAT
 CHNL # 278: EVOLTAGE BRN 395KVJ
 CHNL # 293: EVOLTAGE PLEASNT HIL 395KVJ
 CHNL # 296: EVOLTAGE FAIRPT 395KVJ
 CHNL # 292: EVOLTAGE ST JOE 395KVJ
 CHNL # 281: EVOLTAGE JEC N 395KVJ
 CHNL # 279: EVOLTAGE IATRN 395KVJ



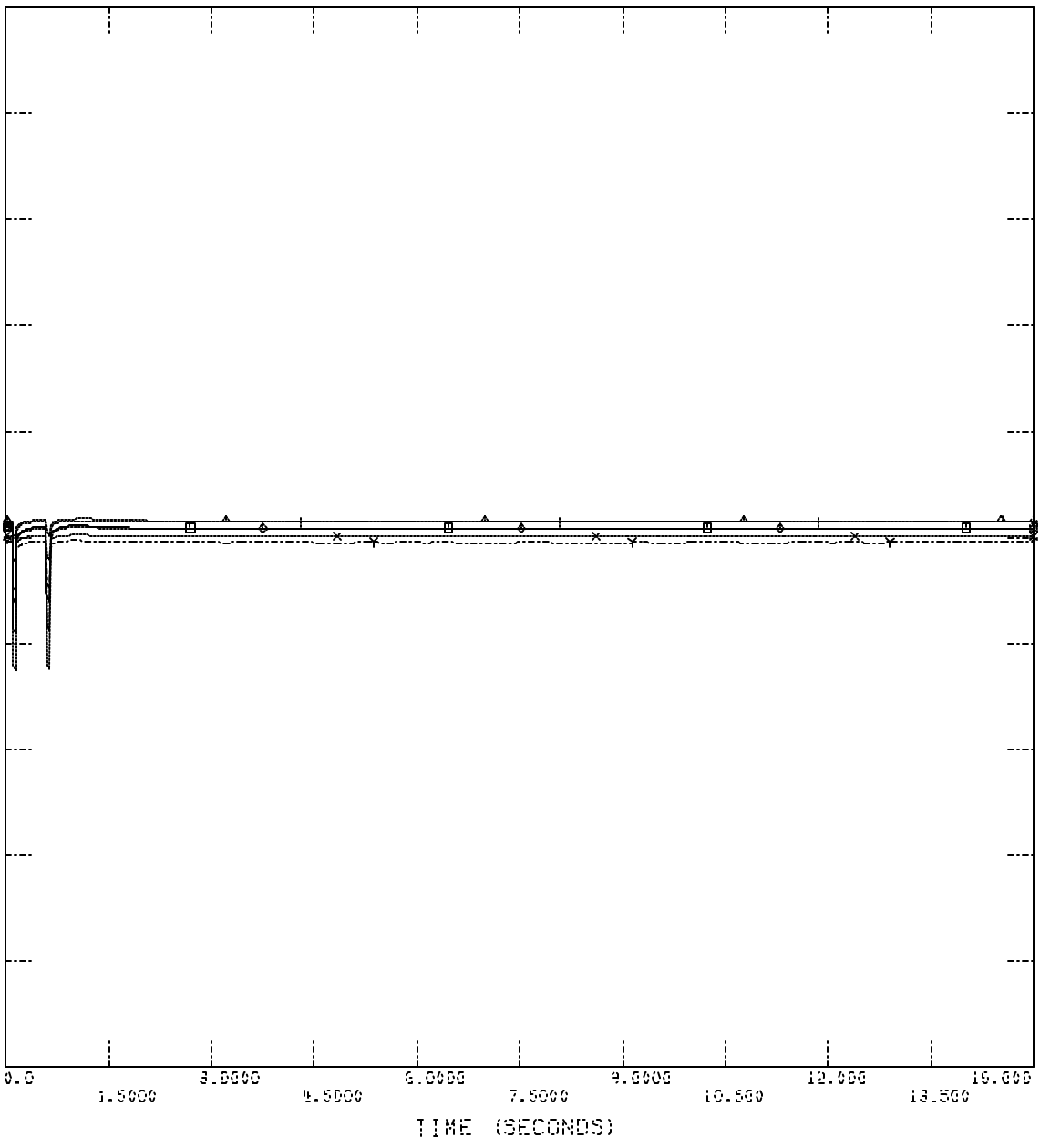
TUE, SEP 07 2004 16:04
 FLT_5_3PH_VOLTAGES

395KVA
 2724
 2724

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BRSECHSE INCLUDING PRIOR QUEUED

FILE: C:\Interconnection Studies\working\basexase\RESUL TS\PLT_6_1PH.DAT

2.0000	CHNL # 2724: EVOLTAGE BRMTH 395KVJ	0.0
2.0000	CHNL # 293: EVOLTAGE PLEASNT HIL 395KVJ	0.0
2.0000	CHNL # 296: EVOLTAGE FAIRPT 395KVJ	0.0
2.0000	CHNL # 292: EVOLTAGE ST JOE 395KVJ	0.0
2.0000	CHNL # 281: EVOLTAGE JEC N 395KVJ	0.0
2.0000	CHNL # 279: EVOLTAGE IATRN 395KVJ	0.0



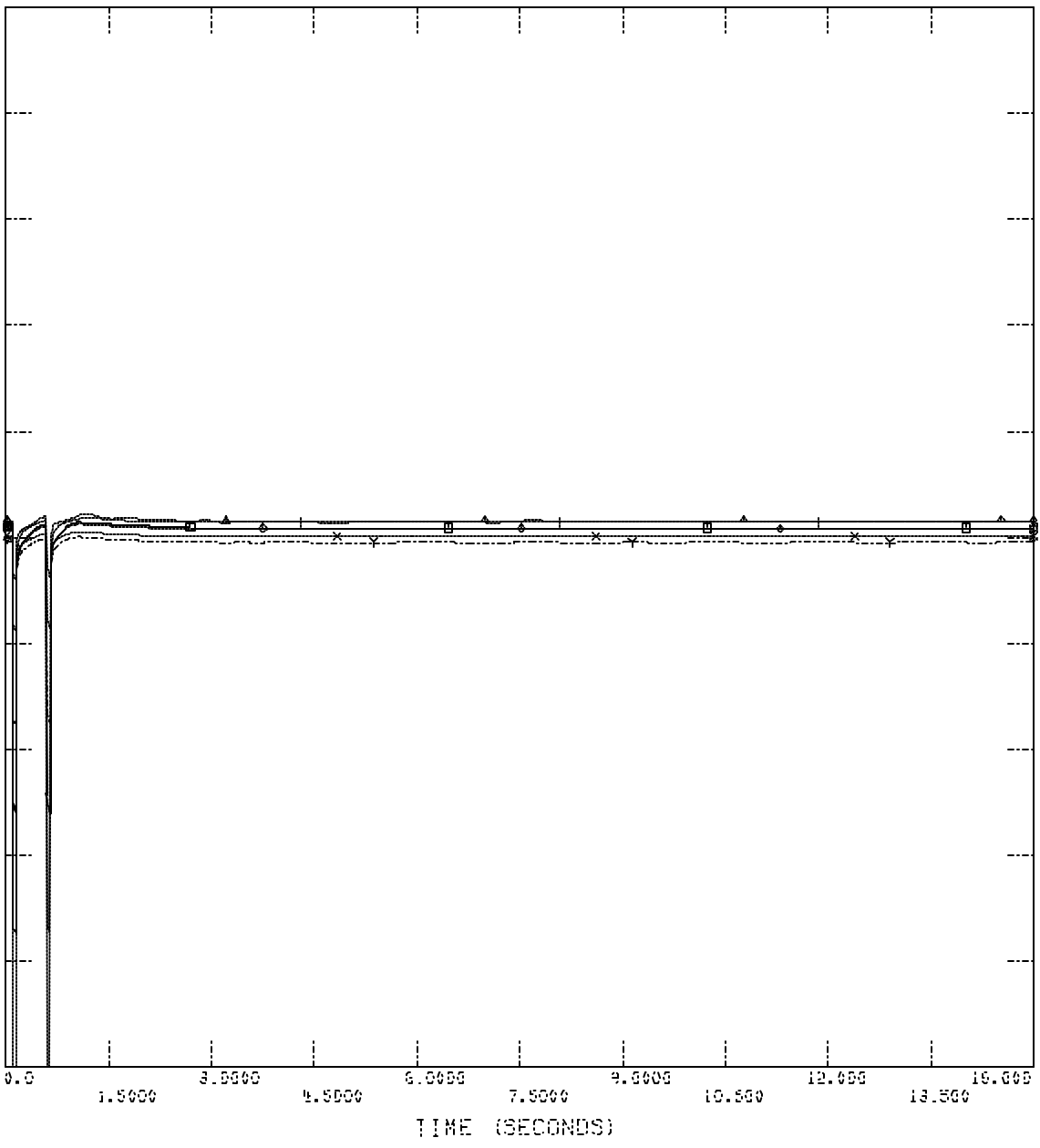
TUE, SEP 07 2004 16:04
 FLT_6_1PH_VOLTAGES

395KVA
 13.8KV
 100%

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BRSECHSE INCLUDING PRIOR QUEUED

FILE: C:\Interconnection Studies\Working\bassecase\RESUL1SV\F1_6_3PH.DAT

2.0000	CHNL # 278: EVOLTAGE BRM1 395KV	0.0
2.0000	CHNL # 293: EVOLTAGE PLEASNT HIL 395KV	0.0
2.0000	CHNL # 296: EVOLTAGE FAIRPT 395KV	0.0
2.0000	CHNL # 292: EVOLTAGE ST JOE 395KV	0.0
2.0000	CHNL # 281: EVOLTAGE JEC N 395KV	0.0
2.0000	CHNL # 279: EVOLTAGE IATRN 395KV	0.0



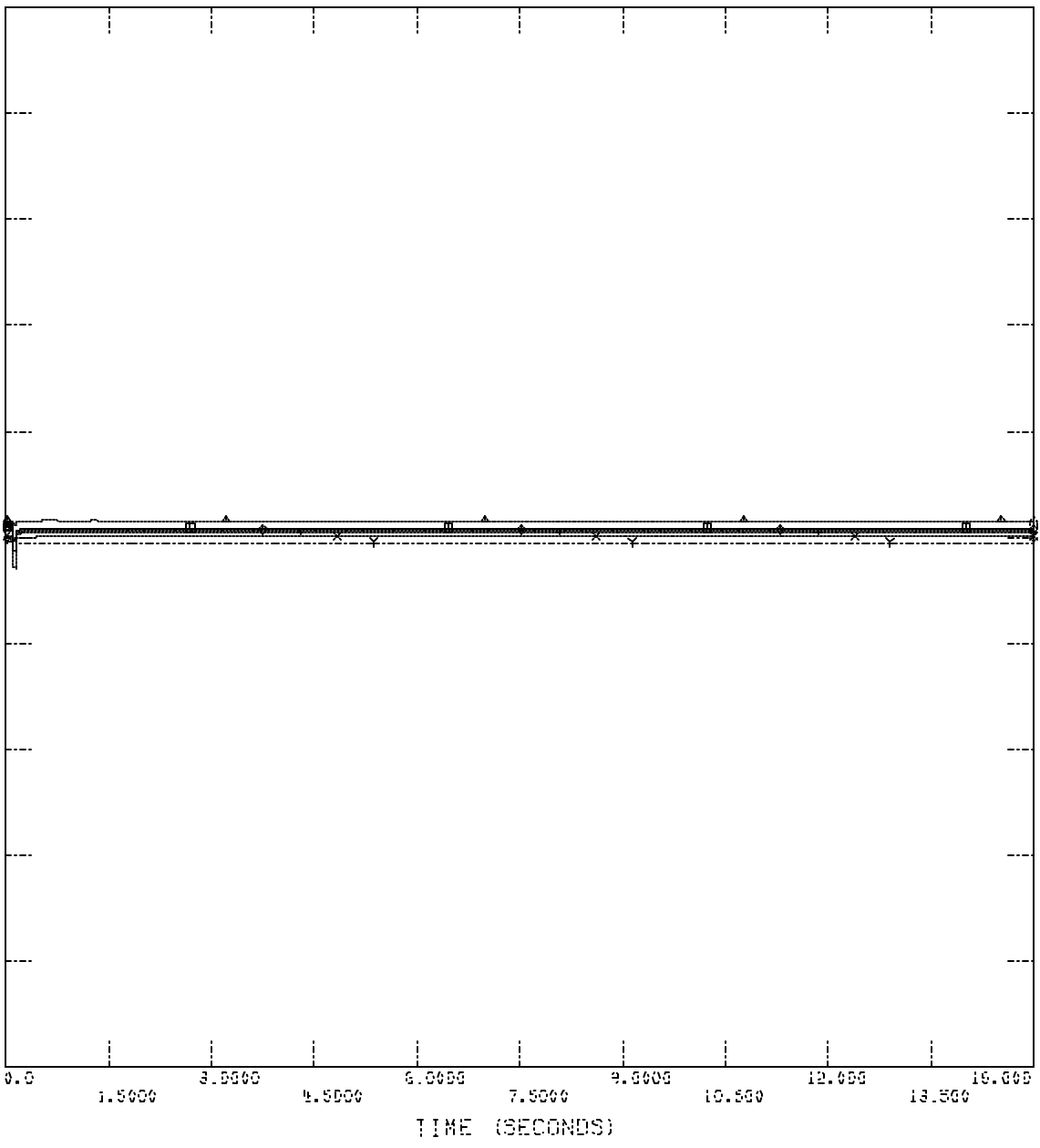
TUE, SEP 07 2004 16:04
 FLT_6_3PH_VOLTAGES

395KVA
 12.47KV
 100%

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BRSECHSE INCLUDING PRIOR QUEUED

FILE: C:\Interconnection Studies\Working\bassecas9\RESUL TS\FLT_7_1PH.DAT

2.0000	CHNL # 278: EVOLTAGE BRM1 395KV]	0.0
2.0000	CHNL # 293: EVOLTAGE PLEASNT HIL 395KV]	0.0
2.0000	CHNL # 296: EVOLTAGE FAIRPT 395KV]	0.0
2.0000	CHNL # 292: EVOLTAGE ST JOE 395KV]	0.0
2.0000	CHNL # 281: EVOLTAGE JEC N 395KV]	0.0
2.0000	CHNL # 279: EVOLTAGE IR1RN 395KV]	0.0

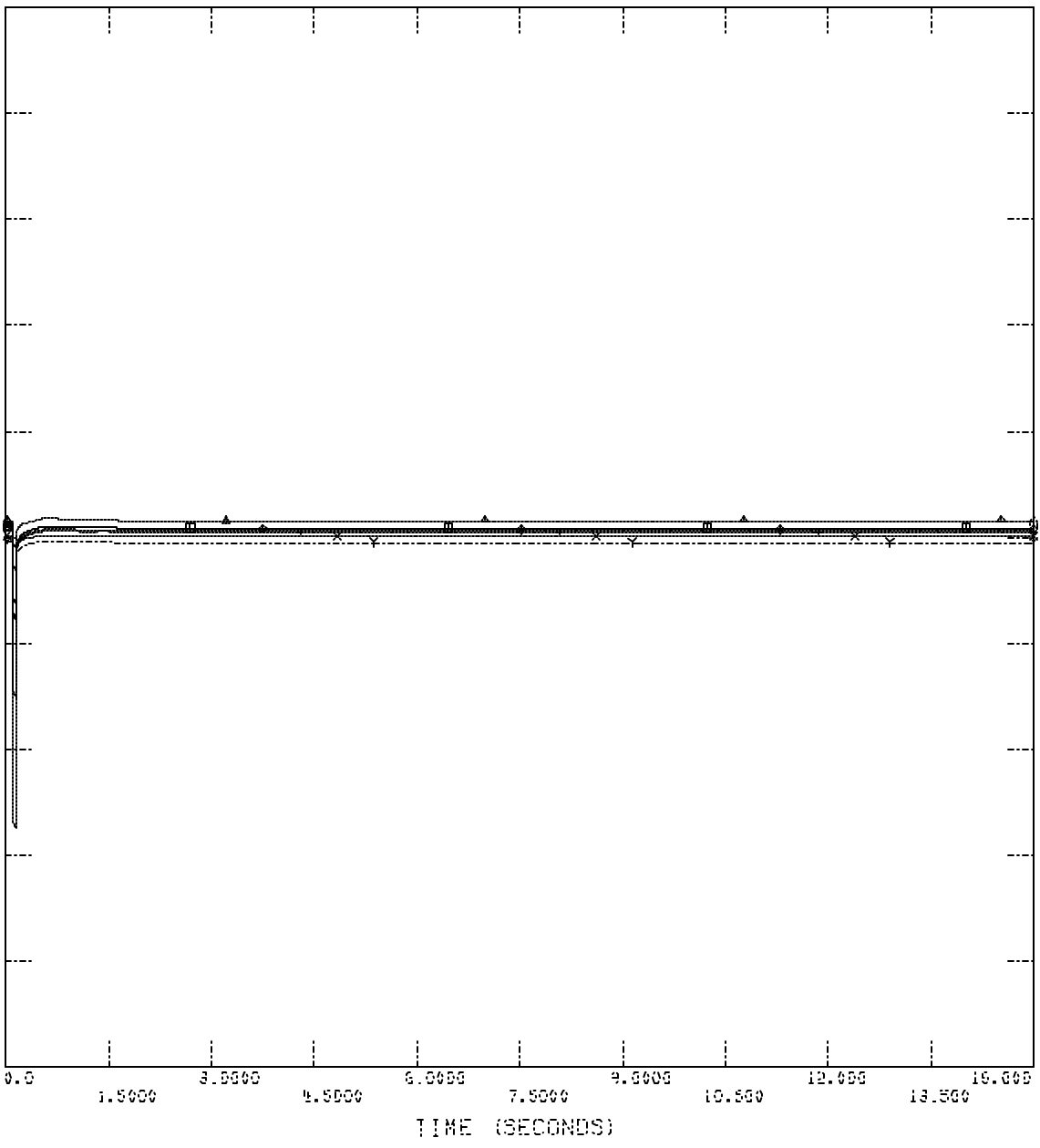


TUE, SEP 07 2004 16:04
 FLT_7_1PH_VOLTAGES

395KVA
 17.5MVA
 17.5MVA

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BRSECHSE INCLUDING PRIOR QUEUED

FILE: C:\Interconnection Studies\Working\bassecase\RESULT1\7_3PH.DAT
 CHNL # 278: EVOLTAGE BRN 395KVJ 0.0
 CHNL # 293: EVOLTAGE PLEASNT HIL 395KVJ 0.0
 CHNL # 296: EVOLTAGE FAIRPT 395KVJ 0.0
 CHNL # 292: EVOLTAGE ST JOE 395KVJ 0.0
 CHNL # 281: EVOLTAGE JEC N 395KVJ 0.0
 CHNL # 279: EVOLTAGE IRPN 395KVJ 0.0

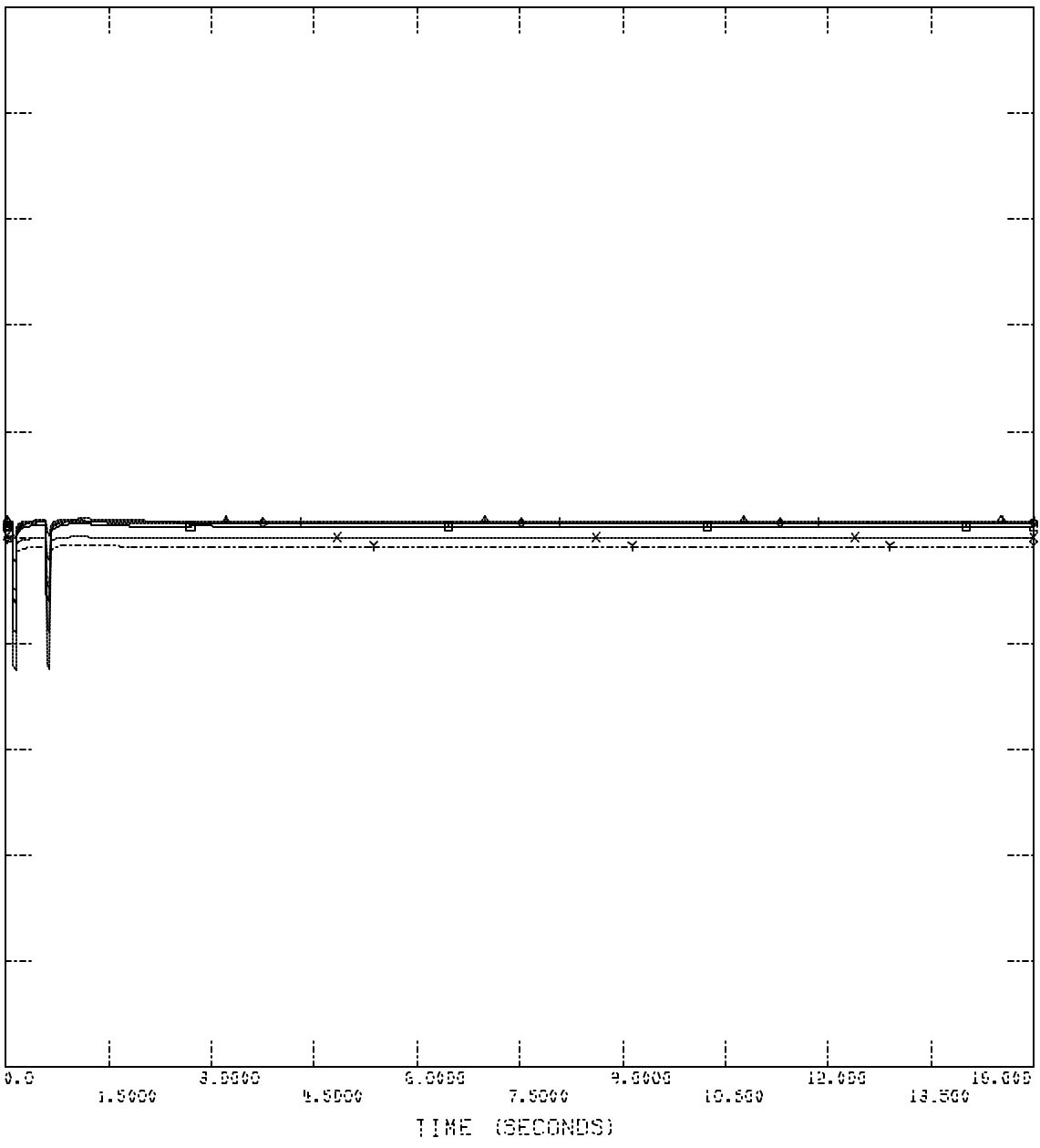


TUE, SEP 07 2004 16:04
 FLT_7_3PH_VOLTAGES

395KVA
 2724
 2724

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BRSECHSE INCLUDING PRIOR QUEUED

FILE: C:\Interconnection Studies\Working\bassecase\RESUL1SVPL1_B_1PH.DAT
 CHNL # 2724: EVOLTAGE BRSECH 395KVJ 0.0
 CHNL # 293: EVOLTAGE PLEASNT HIL 395KVJ 0.0
 CHNL # 296: EVOLTAGE FAIRPT 395KVJ 0.0
 CHNL # 292: EVOLTAGE ST JOE 395KVJ 0.0
 CHNL # 281: EVOLTAGE JEC N 395KVJ 0.0
 CHNL # 279: EVOLTAGE IATRN 395KVJ 0.0

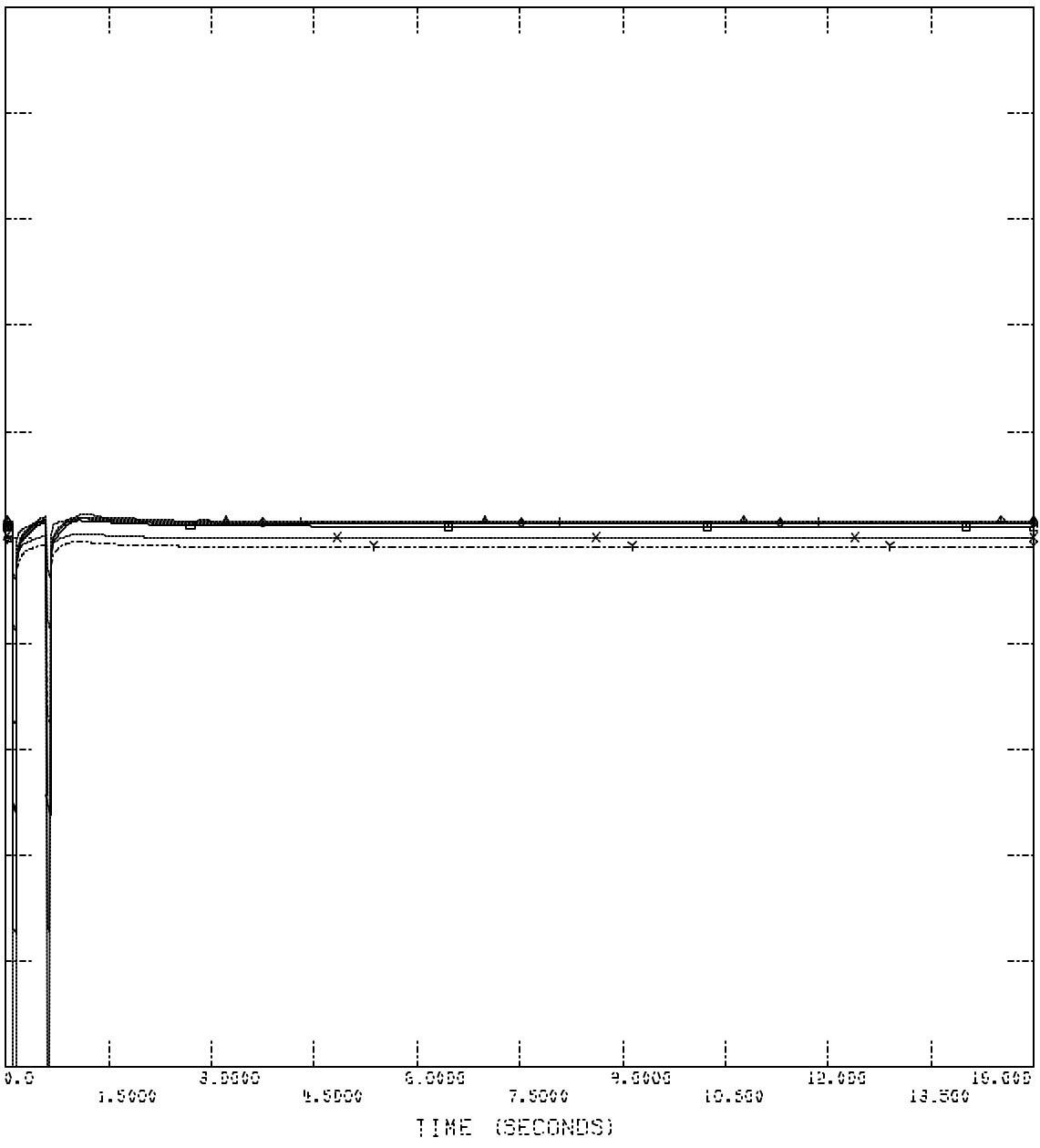


TUE, SEP 07 2004 16:04
 FLT_0_1PH_VOLTAGES

395KVA
 15.000
 10.000
 5.000
 0.000

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BRSECHSE INCLUDING PRIOR QUEUED

FILE: C:\Interconnection Studies\Working\bassecase\RESULT1\B_3PH.DAT
 CHNL # 278: EVOLTAGE_BSMH_395KV] 0.0
 CHNL # 293: EVOLTAGE_PLEASNT_HIL_395KV] 0.0
 CHNL # 296: EVOLTAGE_FAIRPT_395KV] 0.0
 CHNL # 292: EVOLTAGE_ST_JOE_395KV] 0.0
 CHNL # 281: EVOLTAGE_JEC_N_395KV] 0.0
 CHNL # 279: EVOLTAGE_IATRN_395KV] 0.0



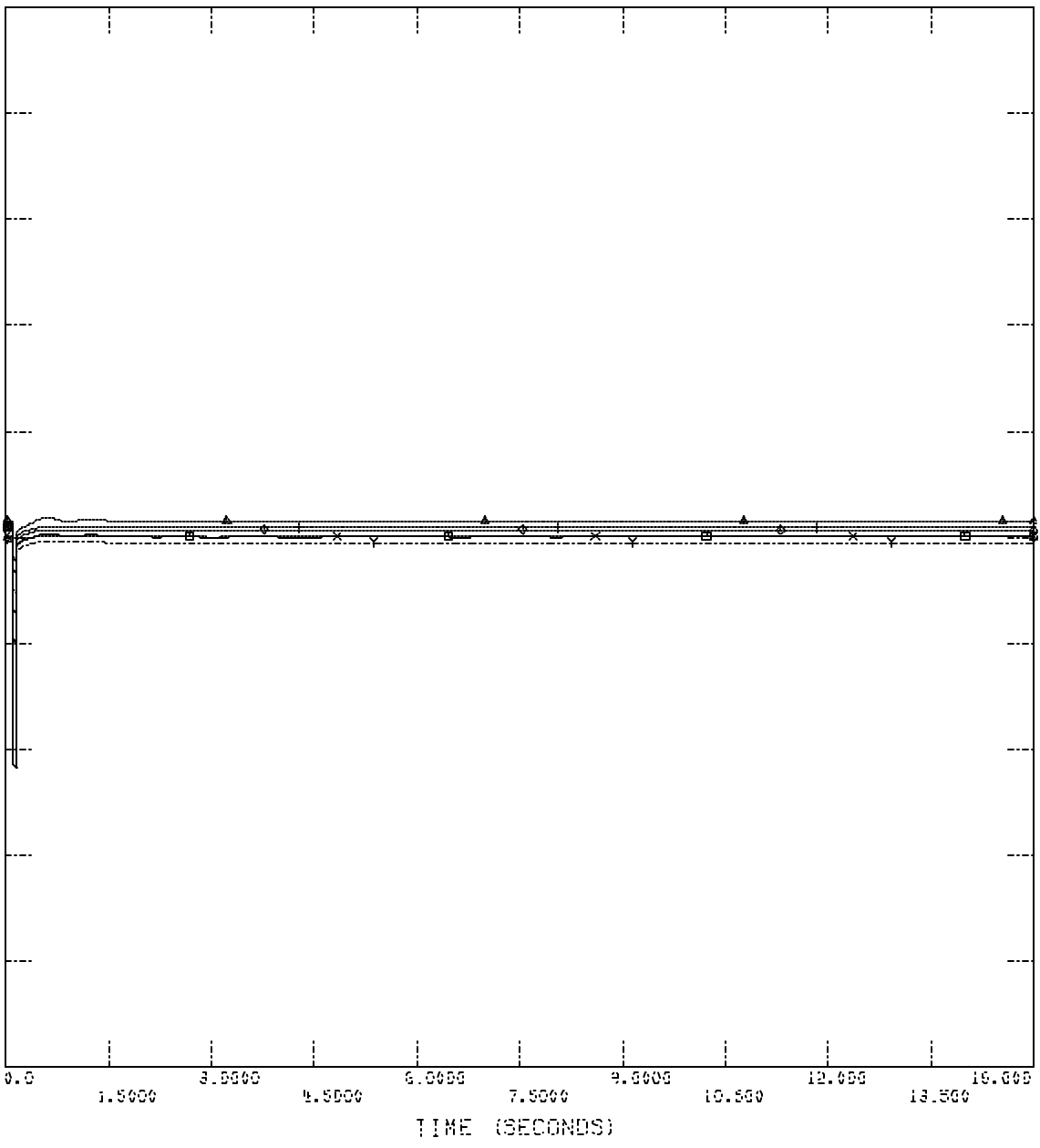
TUE, SEP 07 2004 16:04
 FLT_0_3PH_VOLTAGES

395KVA
 138KV
 12724

SPP MDMS 04 STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BRSECHSE INCLUDING PRIOR QUEUED

FILE: C:\Interconnection Studies\work\ing\basexcas9\RESULT_1SVFLT_9.001

2.0000	CHNL # 2781: EVOLTAGE BRN1R 395KVJ	0.0
2.0000	CHNL # 2931: EVOLTAGE PLEASNT HIL 395KVJ	0.0
2.0000	CHNL # 2961: EVOLTAGE FAIRPT 395KVJ	0.0
2.0000	CHNL # 2921: EVOLTAGE ST JOE 395KVJ	0.0
2.0000	CHNL # 2811: EVOLTAGE JEC N 395KVJ	0.0
2.0000	CHNL # 2791: EVOLTAGE IATRN 395KVJ	0.0



TUE, SEP 07 2004 16:04
 FLT_9_VOLTAGES

395KVA
 112.5%
 100%

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BRSECHSE INCLUDING PRIOR QUEUED

FILE: C:\Interconnection Studies\Work In Progress\Case\RESUL13\FLT_10.0UT

2.0000 CHNL # 278: EVOLTAGE BRN1 395KVJ

2.0000 CHNL * 293: EVOLTAGE PLEASNT HIL 395KVJ

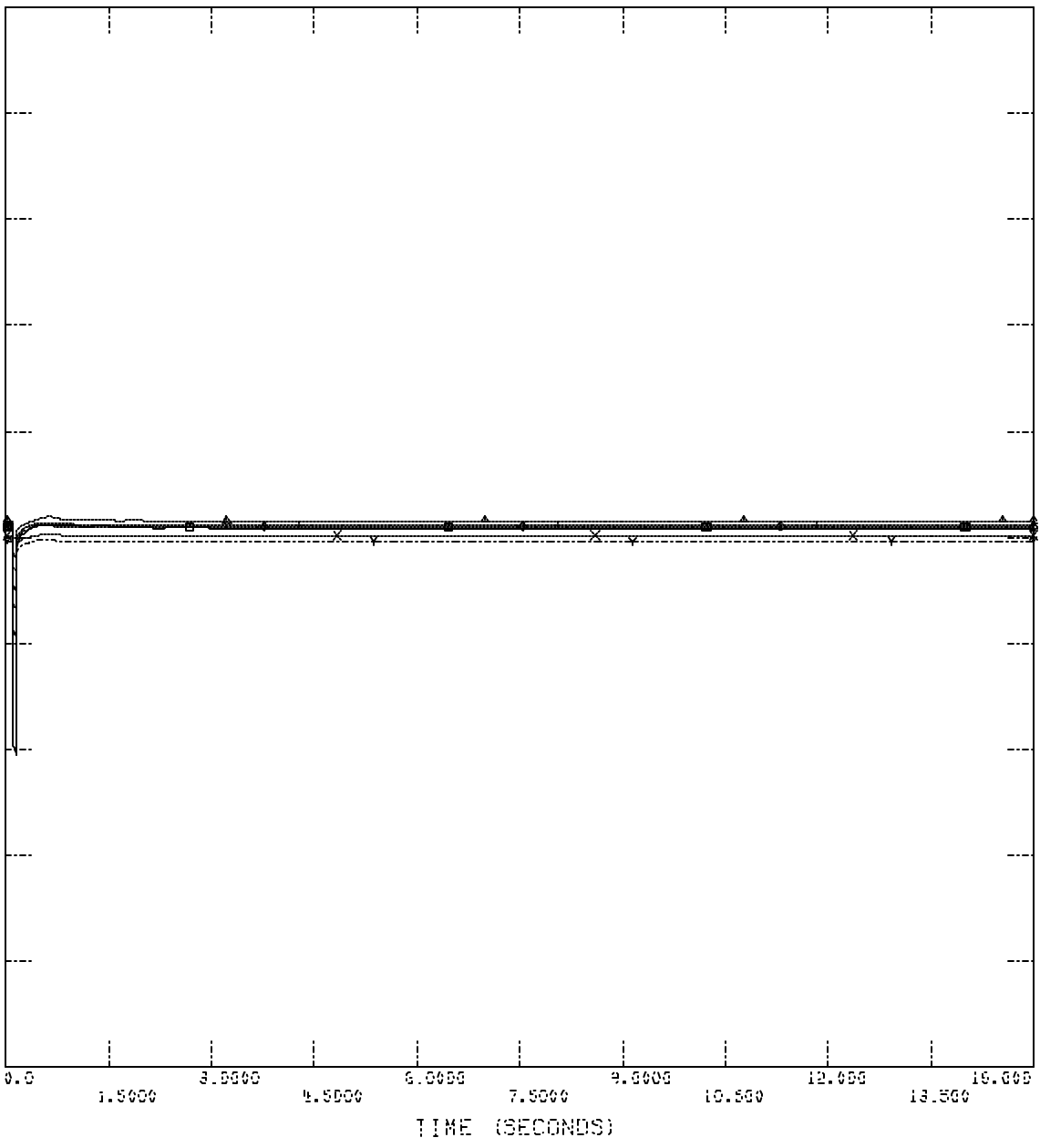
2.0000 CHNL * 296: EVOLTAGE FAIRPT 395KVJ

2.0000 CHNL * 292: EVOLTAGE ST JOE 395KVJ

2.0000 CHNL # 281: EVOLTAGE JEC N 395KVJ

2.0000 CHNL # 279: EVOLTAGE IATRN 395KVJ

0.0



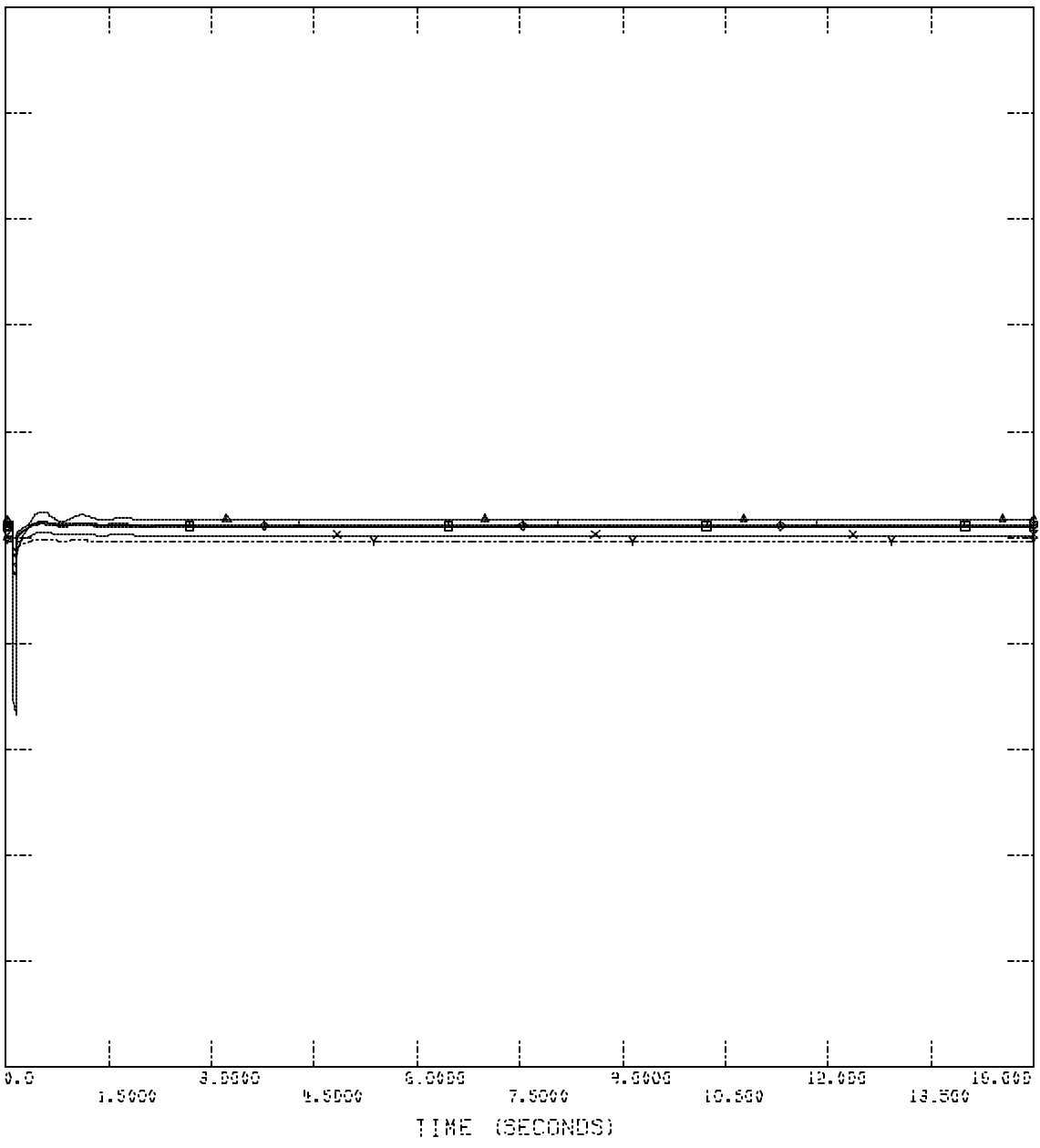
TUE, SEP 07 2004 16:04
 FLT_10_VOLTAGES

395KVA
 2724
 2724

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED
 GEN-2004-012 BRSECHSE INCLUDING PRIOR QUEUED

FILE: C:\Interconnection Studies\Work In Progress\Case\RESULT\FLT_11.0UT

2.0000	CHNL # 2724: EVOLTAGE BRPH 395KVJ	0.0
2.0000	CHNL # 293: EVOLTAGE PLEASNT HIL 395KVJ	0.0
2.0000	CHNL # 296: EVOLTAGE FAIRPT 395KVJ	0.0
2.0000	CHNL # 292: EVOLTAGE ST JOE 395KVJ	0.0
2.0000	CHNL # 281: EVOLTAGE JEC N 395KVJ	0.0
2.0000	CHNL # 279: EVOLTAGE IATRN 395KVJ	0.0



TUE, SEP 07 2004 16:04
 FLT_11_VOLTAGES

Appendix B-1

Plots of Fault Simulations

Plots of selected machine angle response during faults

Scenario:

2010 Summer Peak

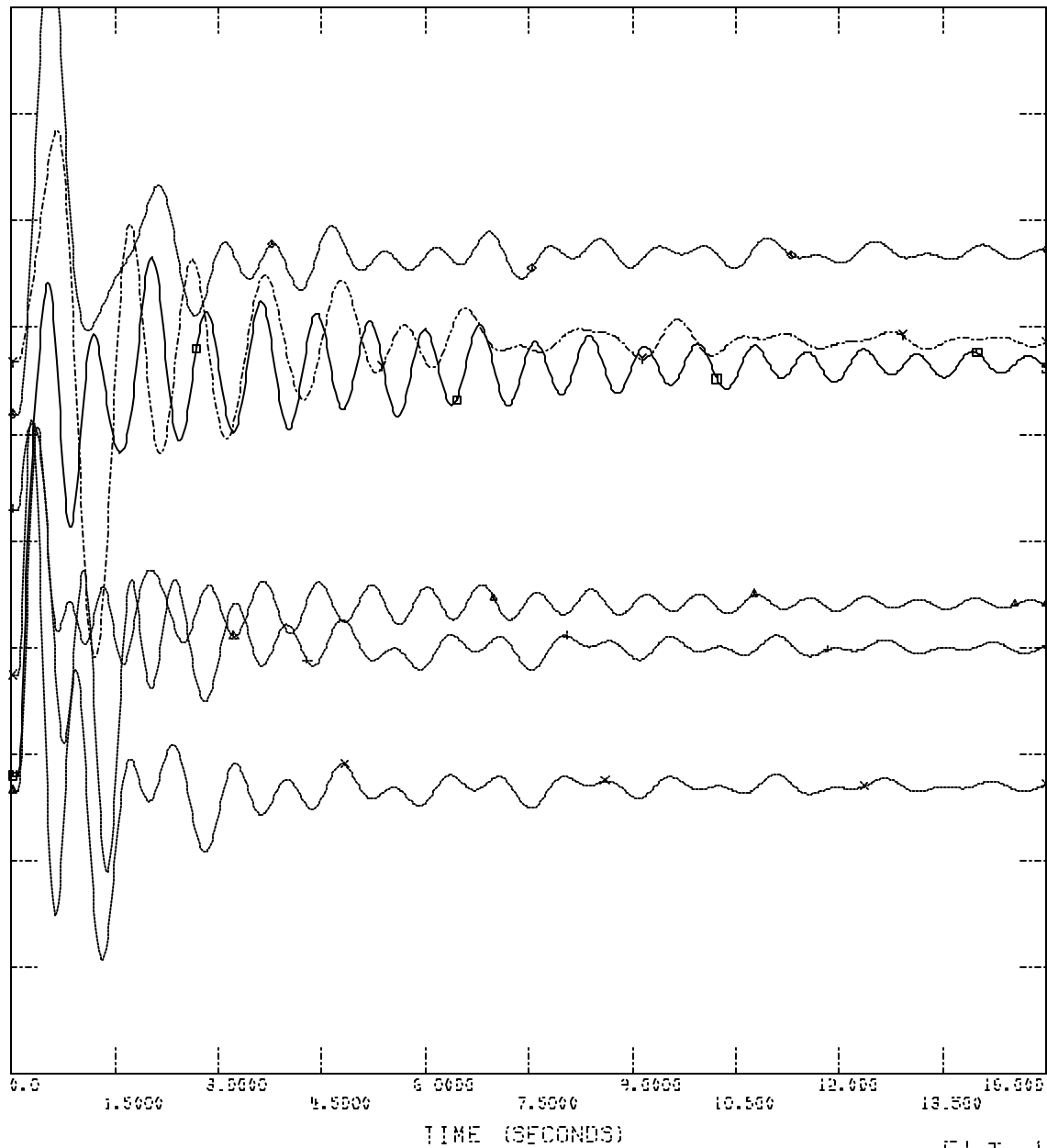
900MW

[Customer Plant at 900MW – No Network upgrades]

FILE: C:\INTERCONNECTION STUDIES\WORK\ING\900MW\MESUL75\FLT1.L3PH.001

SPP MWMS 04 STABILITY:2010 SUN PEAK MODIFIED
GEN-2004-012 900MW IRTAN 2 ADDITION NO UPGRADES

45.000	CHNL # 14: ERNG JEFFREY EN CNTR MEREJ	X	X	20.000
25.000	CHNL # 16: ERNG TECUMSEH EN CNTR MEREJ	+	+	0.0
35.000	CHNL # 66: ERNG COOPER NPPD3	◇	◇	10.000
100.00	CHNL # 3: ERNG IRTAN G1 KEPLA	↑	↓	0.0
70.000	CHNL # 2: ERNG IRTAN G2 KEPLA	+	+	25.000



TUE, SEP 07 2004 16:23
FLT1.L3PH_MACHINE ANGLES

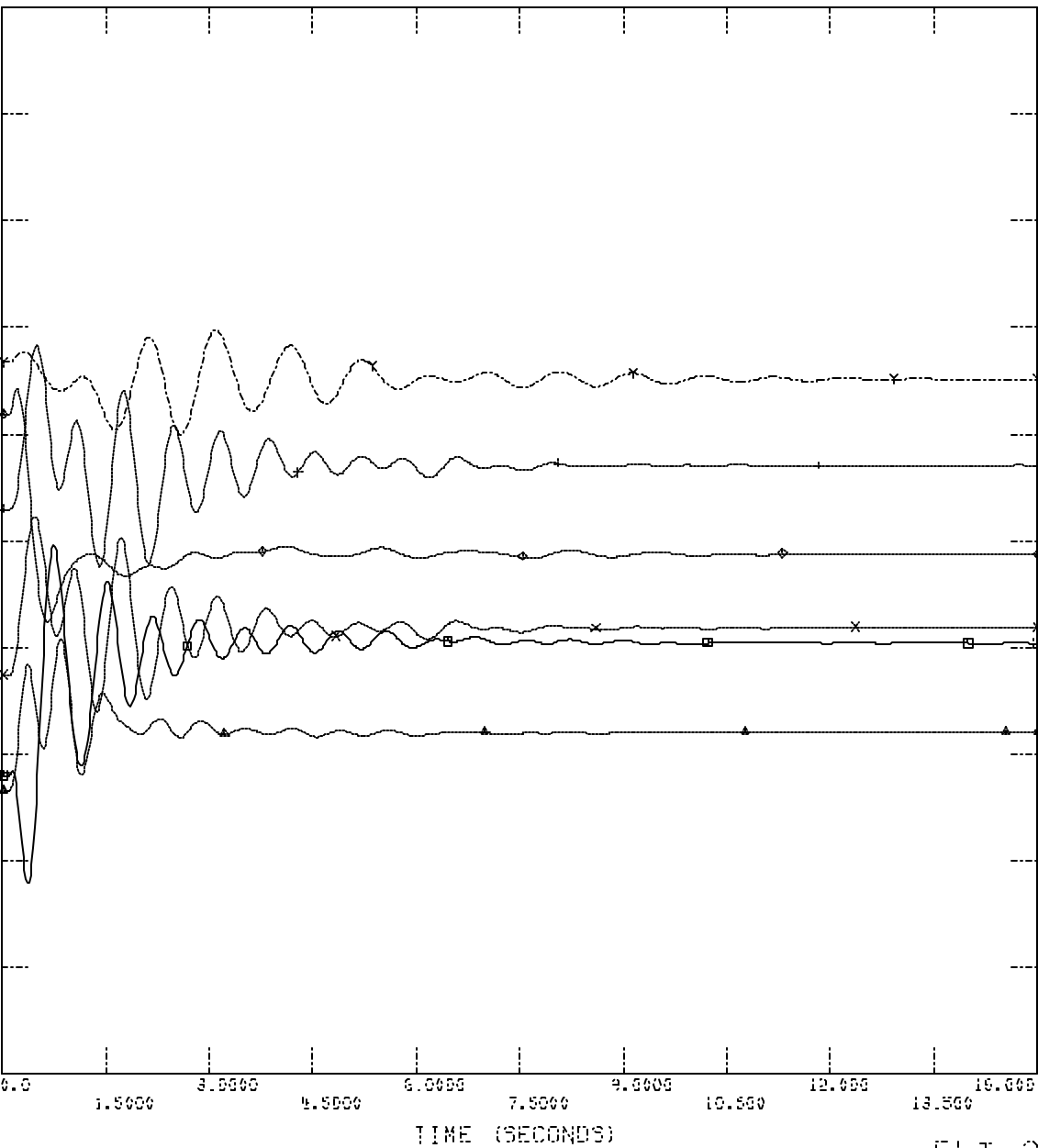
A

 CHANNELS
 TIME
 FILE

SPP MON6 04 STABILITY:2010 SUN PERK: MODIFIED
 GEN-2004-012 900MW IRTAN 2 ADDITION NO UPGRADES

FILE: C:\Vinterconnection Studies\WOL\ING\900MW\RESUL 75\FLT_2_1PH.OUT

35.000	CHNL # 14: ERNG JEFFREY EN CNTR WEREJ	10.000
45.000	CHNL # 19: ERNG TECUMSEH EN CNTR WEREJ	20.000
25.000	CHNL # 66: ERNG COOPER NPPD3	0.0
35.000	CHNL # 3: ERNG IRTAN G1 KEPLA	10.000
100.00	CHNL # 2: ERNG IRTAN G2 KEPLA	0.0
70.000		25.000



TUE, SEP 07 2004 16:20

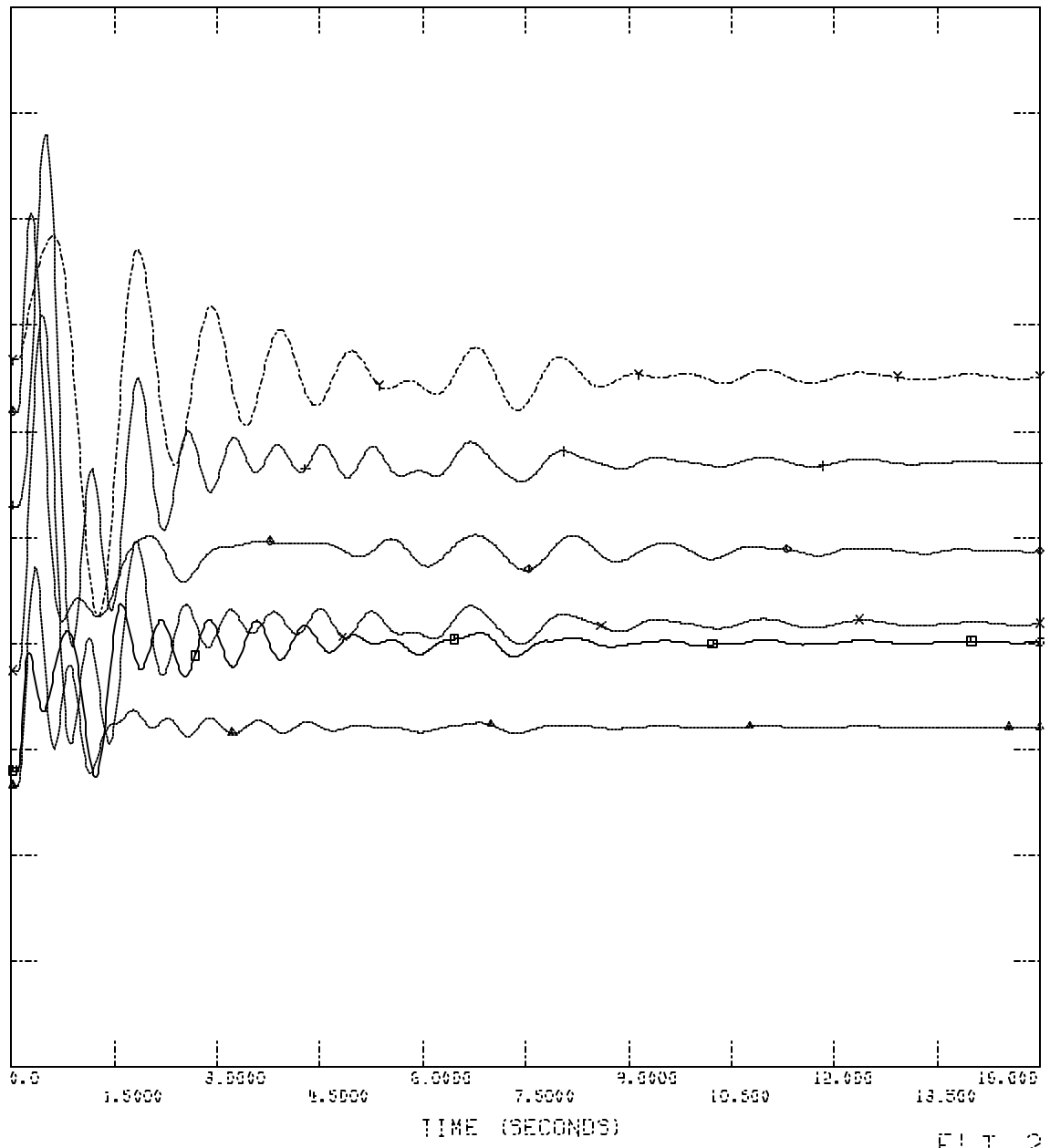
FLT_2_1PH_MACHINE ANGLES

A
 VVVV
 CHANNELS
 TIME (SECS)
 DIFF

SPP M0M6 04 STABILITY:2010 SUN PERK: MODIFIED
 GEN-2004-012 900MM IRTAN 2 ADDITION NO UPGRADES

FILE: C:\interconnection Studies\M06\110\900MM\MRESUL\TSVFLT_2_3PH.001
 CHNL # 10: CRNG NE_A13_KPPLJ

35.000	CHNL # 14: CRNG JEFFREY EN CNTR MEREJ	X	X	20.000
45.000	CHNL # 16: CRNG TECUMSEH EN CNTR MEREJ	+	+	0.0
25.000	CHNL # 66: CRNG COOPER NPPD3	◇	◇	10.000
35.000	CHNL # 3: CRNG IRTAN G1 KPPLJ	↑	↑	0.0
100.00	CHNL # 2: CRNG IRTAN G2 KPPLJ	↓	↓	0.0
70.000				25.000



TUE, SEP 07 2004 16:20

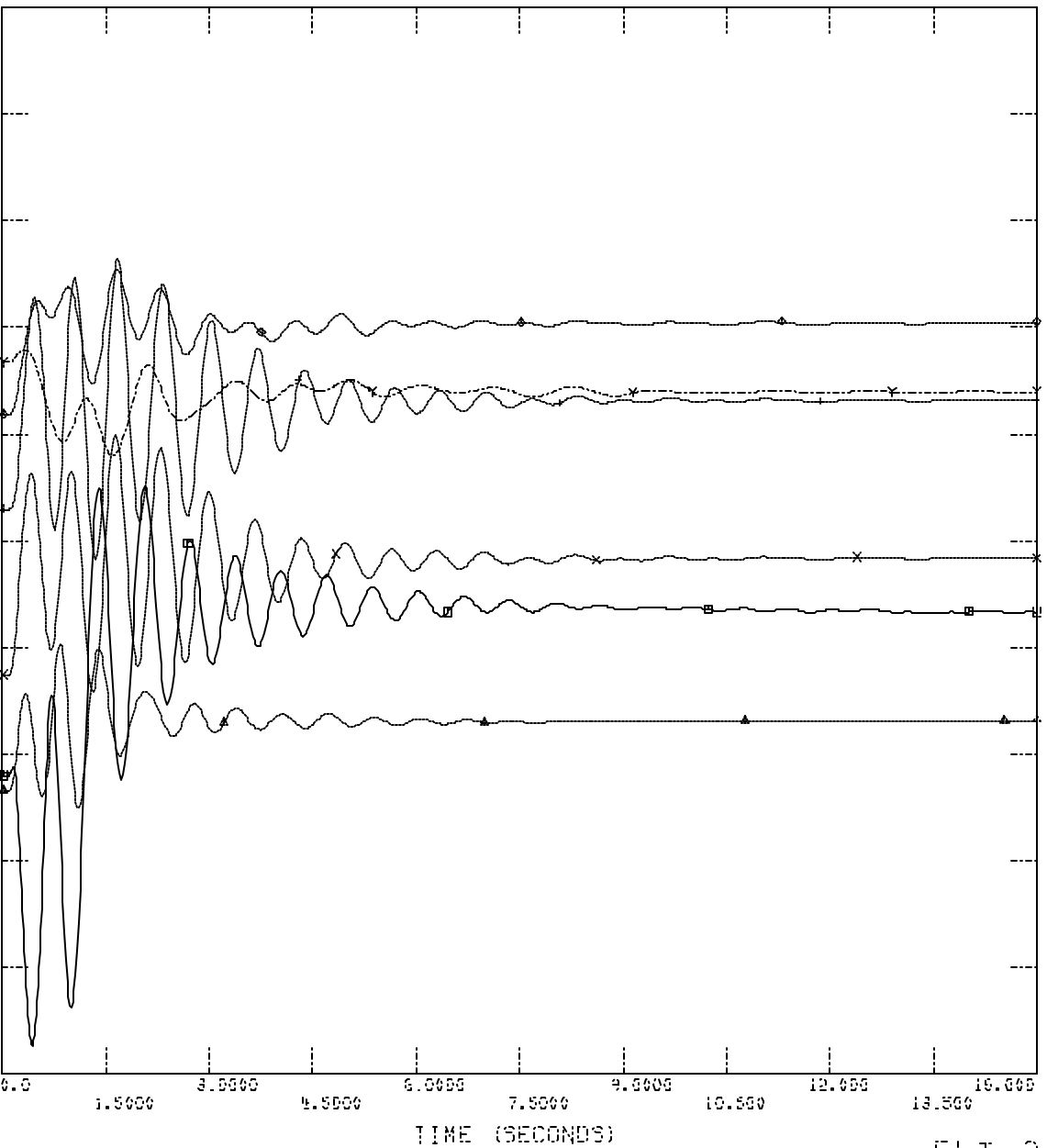
FLT_2_3PH_MACHINE ANGLES

A V V V
 CHANNELS
 TIME (SECS)
 DATE

SPP MON6 04 STABILITY; 2010 SUN PERK; MODIFIED
 GEN-2004-012 900MW IRTAN 2 ADDITION NO UPGRADES

FILE: C:\Vinterconnection Studies\WOL\ING\900MW\RESUL\TSVFLT_3_1PH.DAT

35.000	CHNL # 10: ERNG. NE. G13. KPPLJ	10.000
45.000	CHNL # 14: ERNG. JEFFREY EN CNTR. WEREJ	20.000
25.000	CHNL # 16: ERNG. TECUMSEH EN CNTR. WEREJ	0.0
35.000	CHNL # 66: ERNG. COOPER. NPPD3	10.000
100.00	CHNL # 3: ERNG. IRTAN G1. KPPLJ	0.0
70.000	CHNL # 2: ERNG. IRTAN G2. KPPLJ	9.000



TUE, SEP 07 2004 16:20

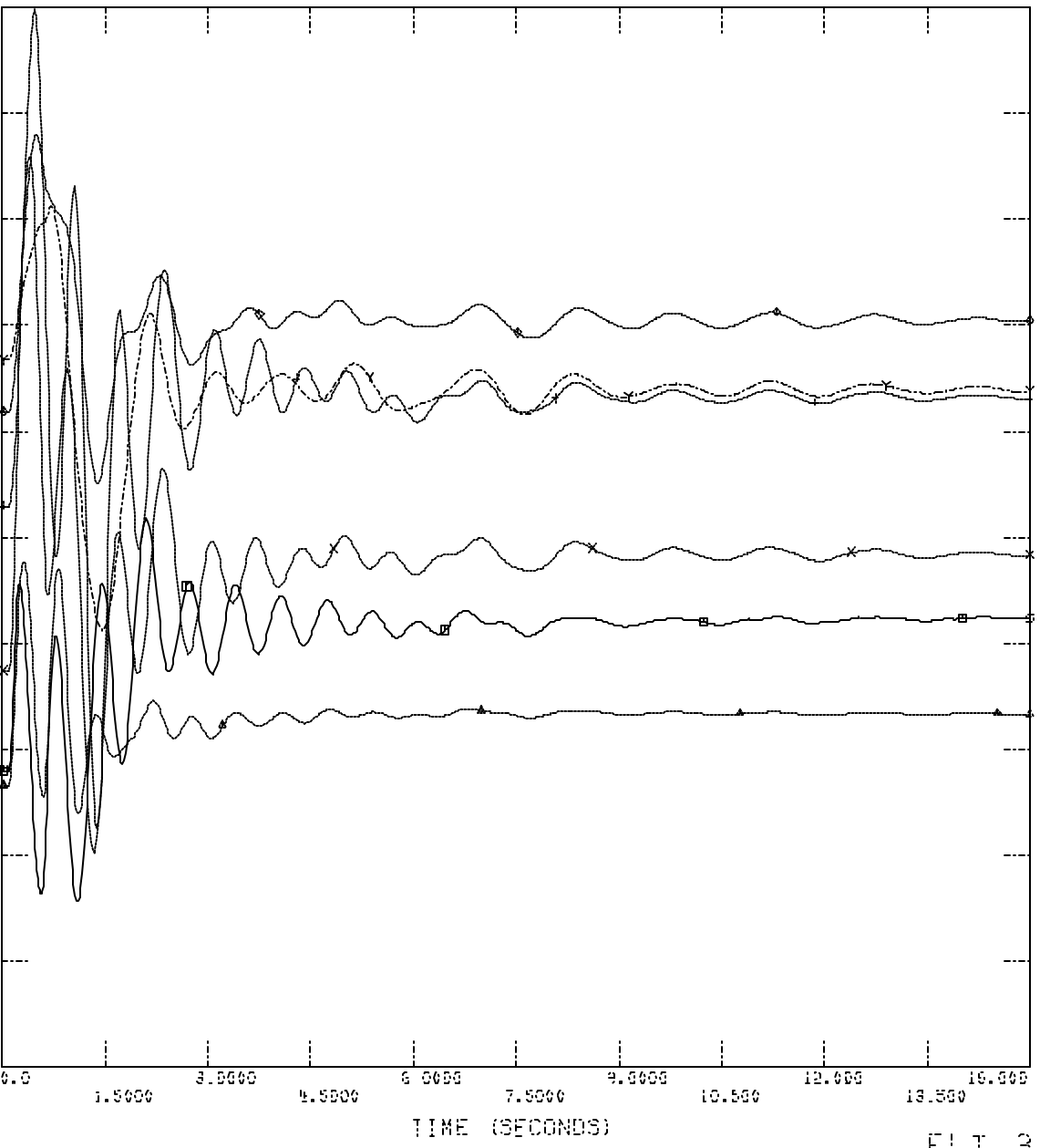
FLT_3_1PH_MACHINE ANGLES

CHANNELS
 CHANNELS
 CHANNELS
 CHANNELS

SPP MONG 04 STABILITY:2010 SUN PEAK MODIFIED
 GEN-2004-012 900MW IRTAN 2 ADDITION NO UPGRADES

FILE: C:\interconnection_studies\work\ing\900MW\RESUL_TSV\FLT_3_SPH_OUT

35.000	CHNL # 14: ERNG JEFFREY EN CNTR MEREJ	10.000
45.000	CHNL # 19: ERNG TECUMSEH EN CNTR MEREJ	20.000
25.000	CHNL # 66: ERNG COOPER NTPD3	0.0
35.000	CHNL # 3: ERNG IRTAN G1 KEPLA	10.000
100.00	CHNL # 2: ERNG IRTAN G2 KEPLA	0.0
70.000		25.000



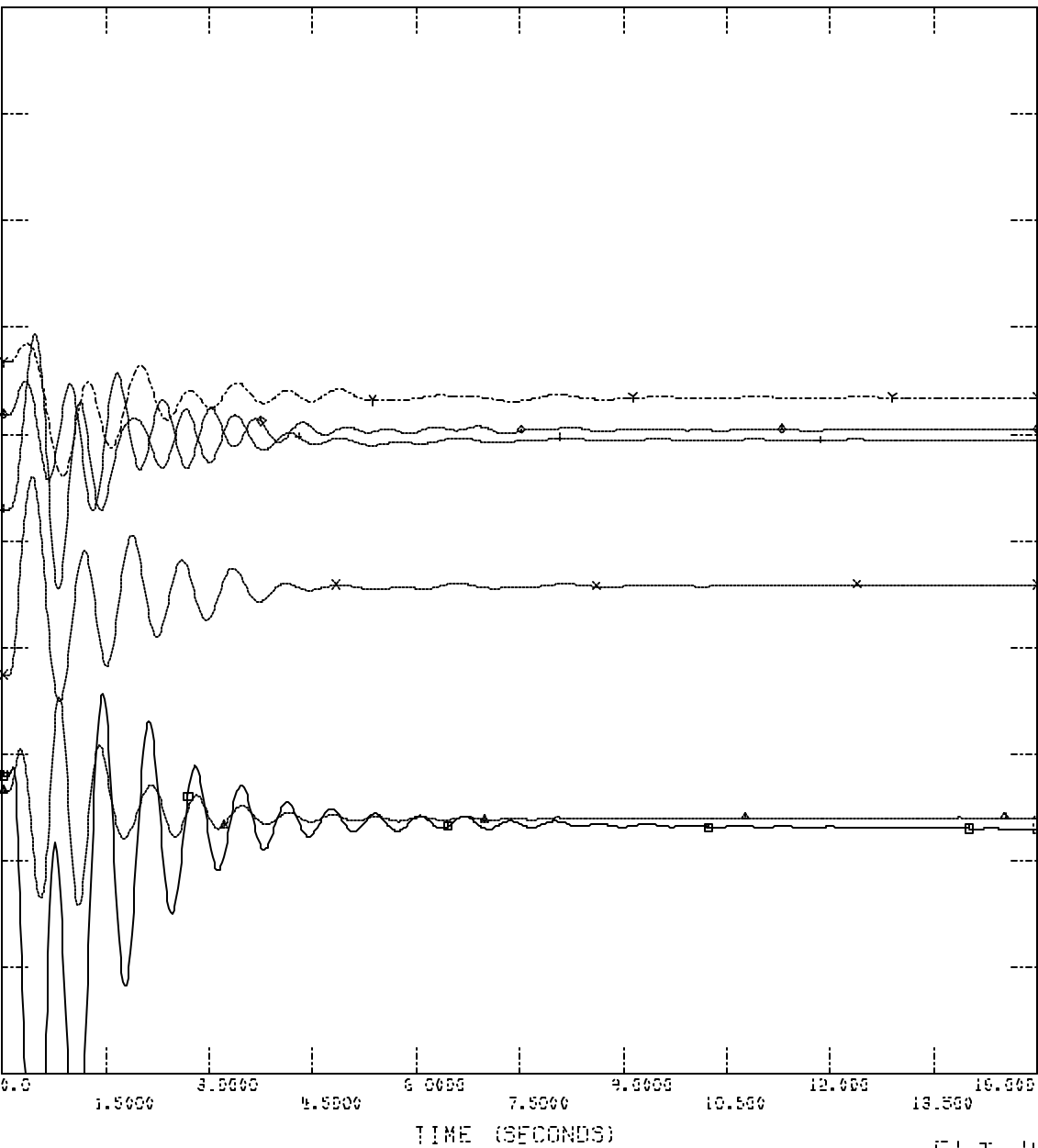
TUE, SEP 07 2004 16:23

FLT_3_SPH_MACHINE ANGLES

FILE: C:\WinterConnection Studies\WOL\ING\900MW\MESU1\TSVFLT_4_1PH.001
 GEN-2004-012 900MW IRTAN 2 ADDITION NO UPGRADES

SPP MODEL Q4 STABILITY: 2010 SUN PEAK MODIFIED
 GEN-2004-012 900MW IRTAN 2 ADDITION NO UPGRADES

CHNL #	NAME	ANGLE (DEG)
14	CRNG JEFFREY EN CNTR MEREJ	20.000
16	CRNG TECUMSEH EN CNTR MEREJ	0.0
66	CRNG COOPER NPPD3	10.000
3	CRNG IRTAN G1 KPPL3	0.0
2	CRNG IRTAN G2 KPPL3	0.0



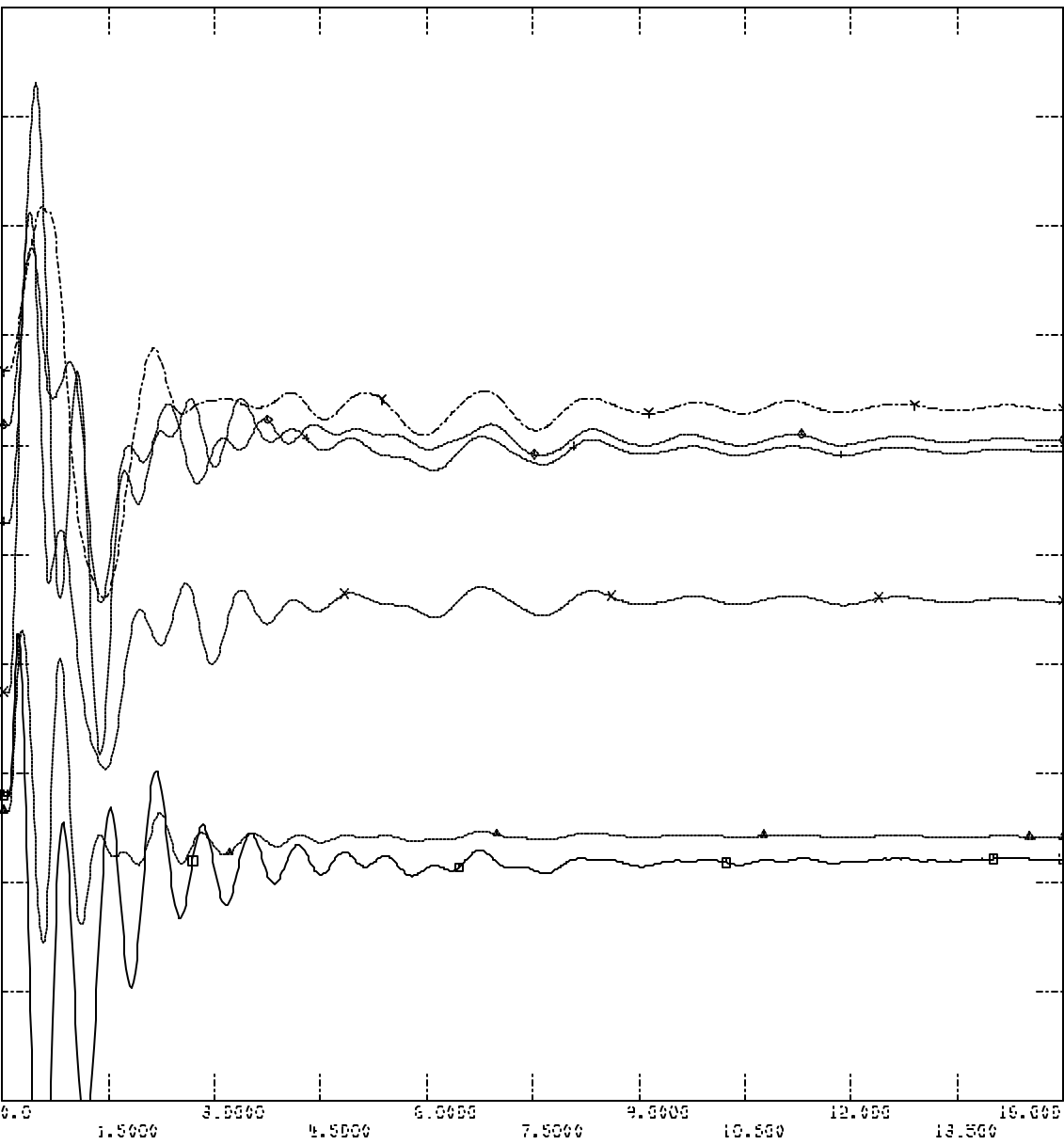
TUE, SEP 07 2004 16:23

FLT_4_1PH_MACHINE ANGLES

FILE: C:\Vinterconnection Studies\WGL\ING\900MW\RESUL\TS\FLT_4_3PH.OUT

SPP MON6 04 STABILITY:2010 SUN PERK: MODIFIED
GEN-2004-012 900MW IRTAN 2 ADDITION NO UPGRADES

45.000	CHNL # 14: ERNG JEFFREY EN CNTR WEREJ	X	X	20.000
25.000	CHNL # 16: ERNG TECUMSEH EN CNTR WEREJ	+	+	0.0
35.000	CHNL # 66: ERNG COOPER NPPD3	◇	◇	10.000
100.00	CHNL # 3: ERNG IRTAN G1 KPPLJ	↑	↓	0.0
70.000	CHNL # 2: ERNG IRTAN G2 KPPLJ	→	←	25.000



TIME (SECONDS)

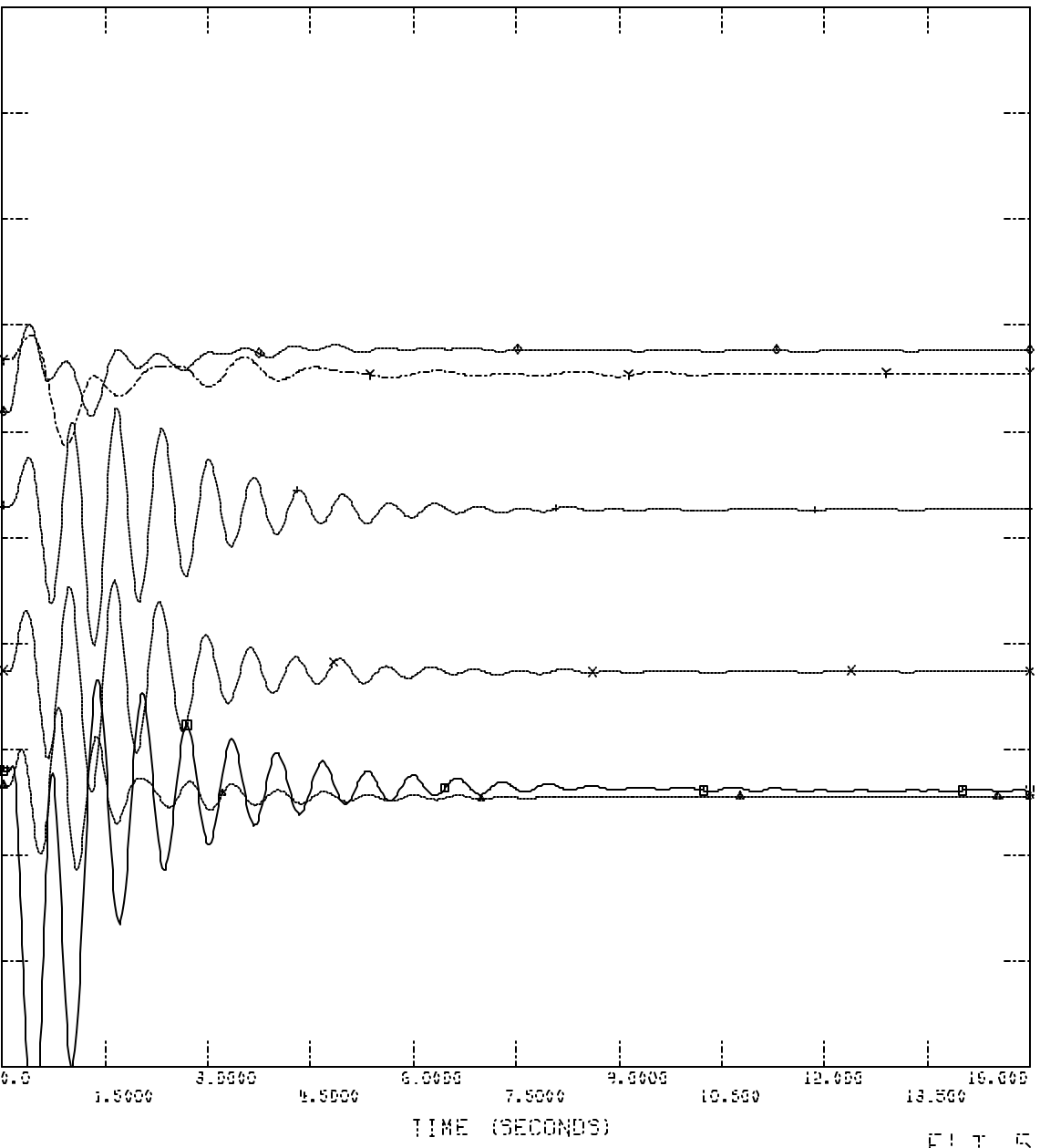
TUE, SEP 07 2004 16:20
FLT_4_3PH_MACHINE ANGLES

A
 ~~~~~  
 CHNL 1066  
 TESTED 0.00  
 DIFF

SPP MON6 04 STABILITY:2010 SUN PERK# MODIFIED  
 GEN-2004-012 900MW IRTAN 2 ADDITION NO UPGRADES

FILE: C:\Interconnection Studies\WOL\ING\900MW\RESUL TS\FLT\_5\_1PH.001

|        |                                        |        |
|--------|----------------------------------------|--------|
| 35.000 | CHNL # 10: ERNG NE. G13 KPPLJ          | 10.000 |
| 45.000 | CHNL # 14: ERNG JEFFREY EN CNTR WEREJ  | 20.000 |
| 25.000 | CHNL # 16: ERNG TECUMSEH EN CNTR WEREJ | 0.0    |
| 35.000 | CHNL # 66: ERNG COOPER NPPD3           | 10.000 |
| 100.00 | CHNL # 3: ERNG IRTAN G1 KPPLJ          | 0.0    |
| 70.000 | CHNL # 2: ERNG IRTAN G2 KPPLJ          | 5.0    |



TUE, SEP 07 2004 16:20

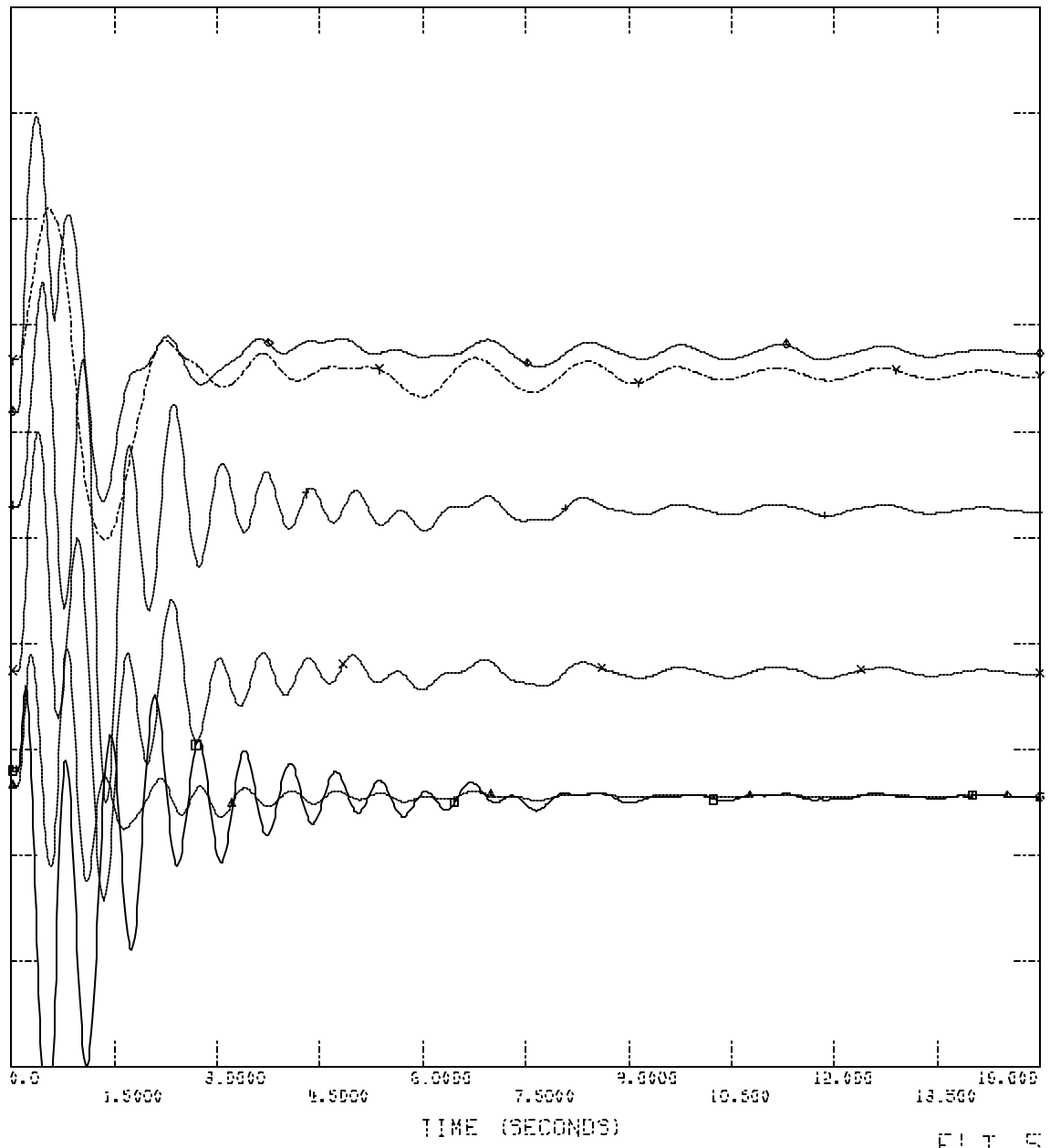
FLT\_5\_1PH\_MACHINE ANGLES

AVV  
CHNL 1066  
TESTED  
DATE

SPP MDMG 04 STABILITY:2010 SUN PERK# MODIFIED  
GEN-2004-012 900MW IRTAN 2 ADDITION NO UPGRADES

FILE: C:\interconnection\_studies\work\ing\900MW\RESUL TS\FLT\_5\_SPH\_001

|        |                                        |   |   |        |
|--------|----------------------------------------|---|---|--------|
| 35.000 | CHNL # 14: ERNG JEFFREY EN CNTR WEREJ  | X | X | 20.000 |
| 45.000 | CHNL # 10: ERNG NE. G13 KPLD           |   |   | 10.000 |
| 25.000 | CHNL # 16: ERNG TECUMSEH EN CNTR WEREJ | + | + | 0.0    |
| 35.000 | CHNL # 66: ERNG COOPER NPPD3           | ◇ | ◇ | 10.000 |
| 100.00 | CHNL # 3: ERNG IRTAN G1 KPLD           | ↑ | ↓ | 0.0    |
| 70.000 | CHNL # 2: ERNG IRTAN G2 KPLD           | ↑ | ↓ | 0.0    |



TUE, SEP 07 2004 16:20

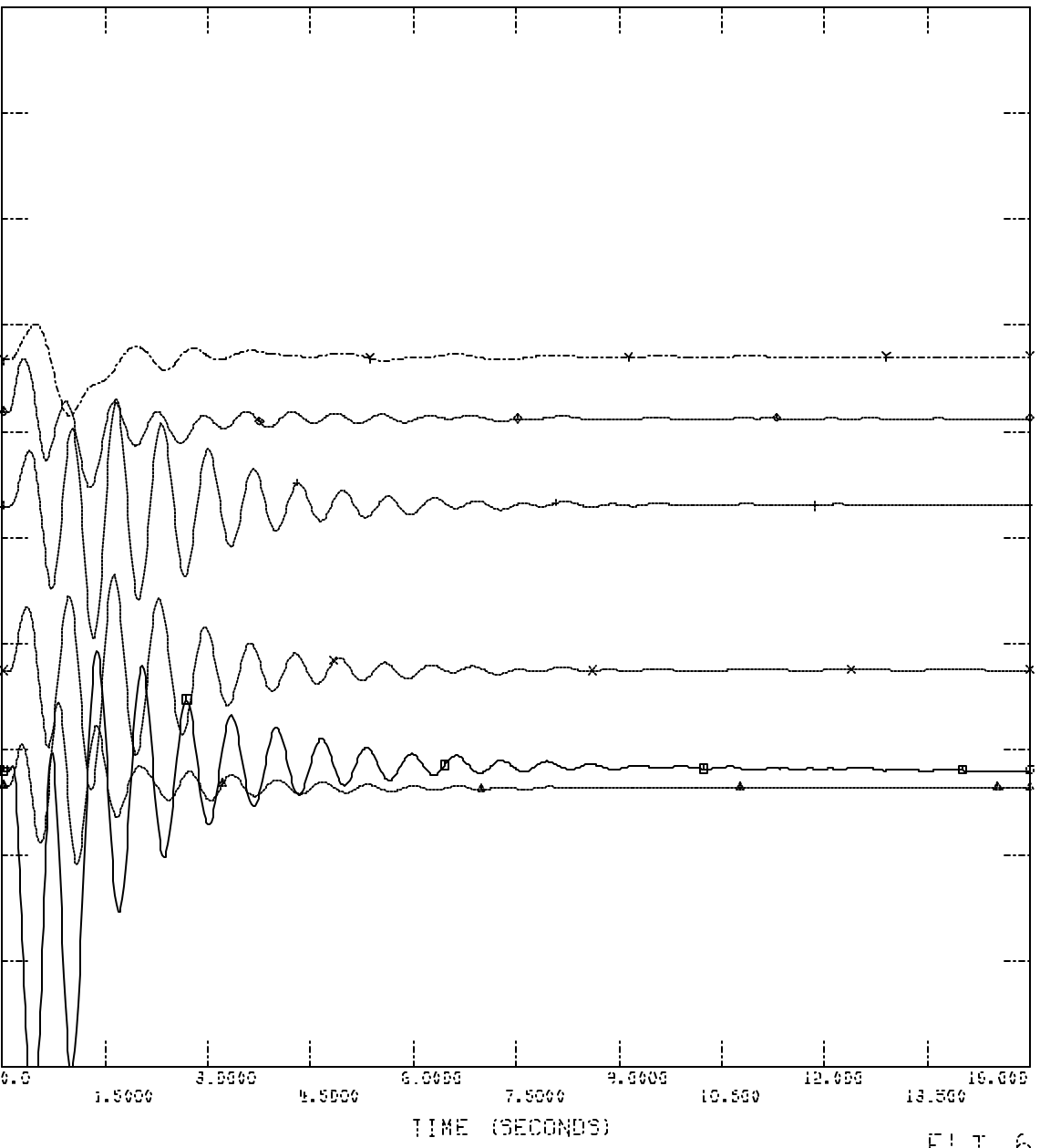
FLT\_5\_SPH\_MACHINE ANGLES

APPENDIX  
APPENDIX  
APPENDIX

SPP M0M6 04 STABILITY:2010 SUN PERK# MODIFIED  
GEN-2004-012 900MM IRTAN 2 ADDITION NO UPGRADES

FILE: C:\Interconnection Studies\W04\ING\900MM\RESUL TS\FLT\_6\_1PH.001

|        |                                        |   |   |        |
|--------|----------------------------------------|---|---|--------|
| 45.000 | CHNL # 14: ERNG JEFFREY EN CNTR MEREJ  | X | X | 20.000 |
| 25.000 | CHNL # 16: ERNG TECUMSEH EN CNTR MEREJ | + | + | 0.0    |
| 35.000 | CHNL # 66: ERNG COOPER NPPD3           | ◇ | ◇ | 10.000 |
| 100.00 | CHNL # 3: ERNG IRTAN G1 KEPLA          | ↑ | ↓ | 0.0    |
| 70.000 | CHNL # 2: ERNG IRTAN G2 KEPLA          | □ | △ | 5.0    |



TUE, SEP 07 2004 16:20

FLT\_6\_1PH\_MACHINE ANGLES

A V V V  
 \*\*\*\*\*  
 CHANNELS  
 CHANNELS  
 CHANNELS  
 CHANNELS

SPP M0M6 04 STABILITY:2010 SUN PERK# MODIFIED  
 GEN-2004-012 900MW IRTAN 2 ADDITION NO UPGRADES

FILE: C:\Interconnection Studies\WOL\ING\900MW\RESUL75\FLT\_6\_3PH.001  
 CHNL # 14: ERNG JEFFREY EN CNTR WEREJ  
 CHNL # 13: ERNG NE.013.KPPLJ  
 CHNL # 12: ERNG NE.012.KPPLJ

35.000

45.000

25.000

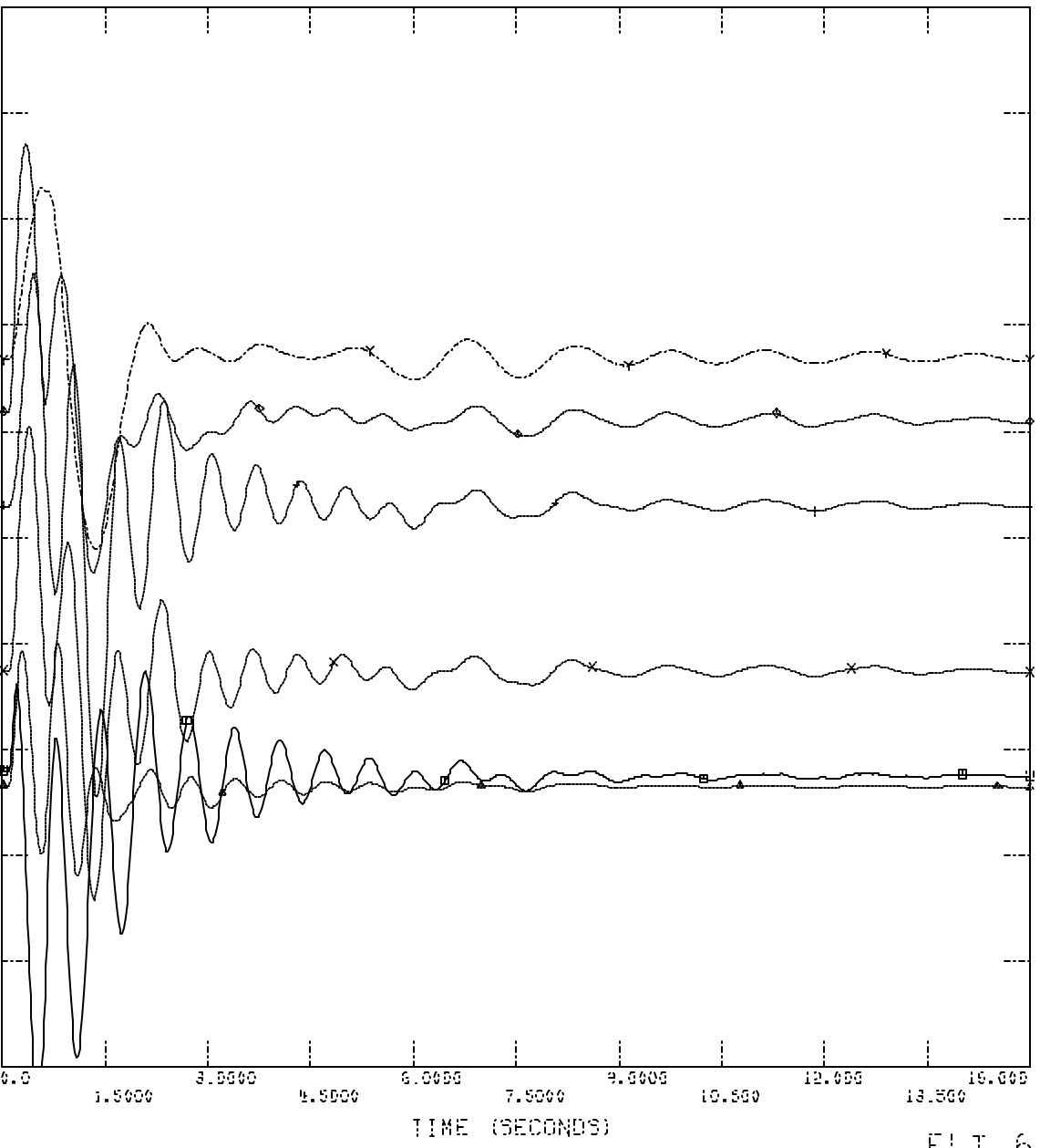
35.000

100.00

70.000

CHNL # 14: ERNG JEFFREY EN CNTR WEREJ  
 CHNL # 13: ERNG NE.013.KPPLJ  
 CHNL # 12: ERNG NE.012.KPPLJ  
 CHNL # 3: ERNG IRTAN 01 KPPLJ  
 CHNL # 2: ERNG IRTAN 02 KPPLJ

TUE, SEP 07 2004 16:20  
 FLT\_6\_3PH\_MACHINE ANGLES

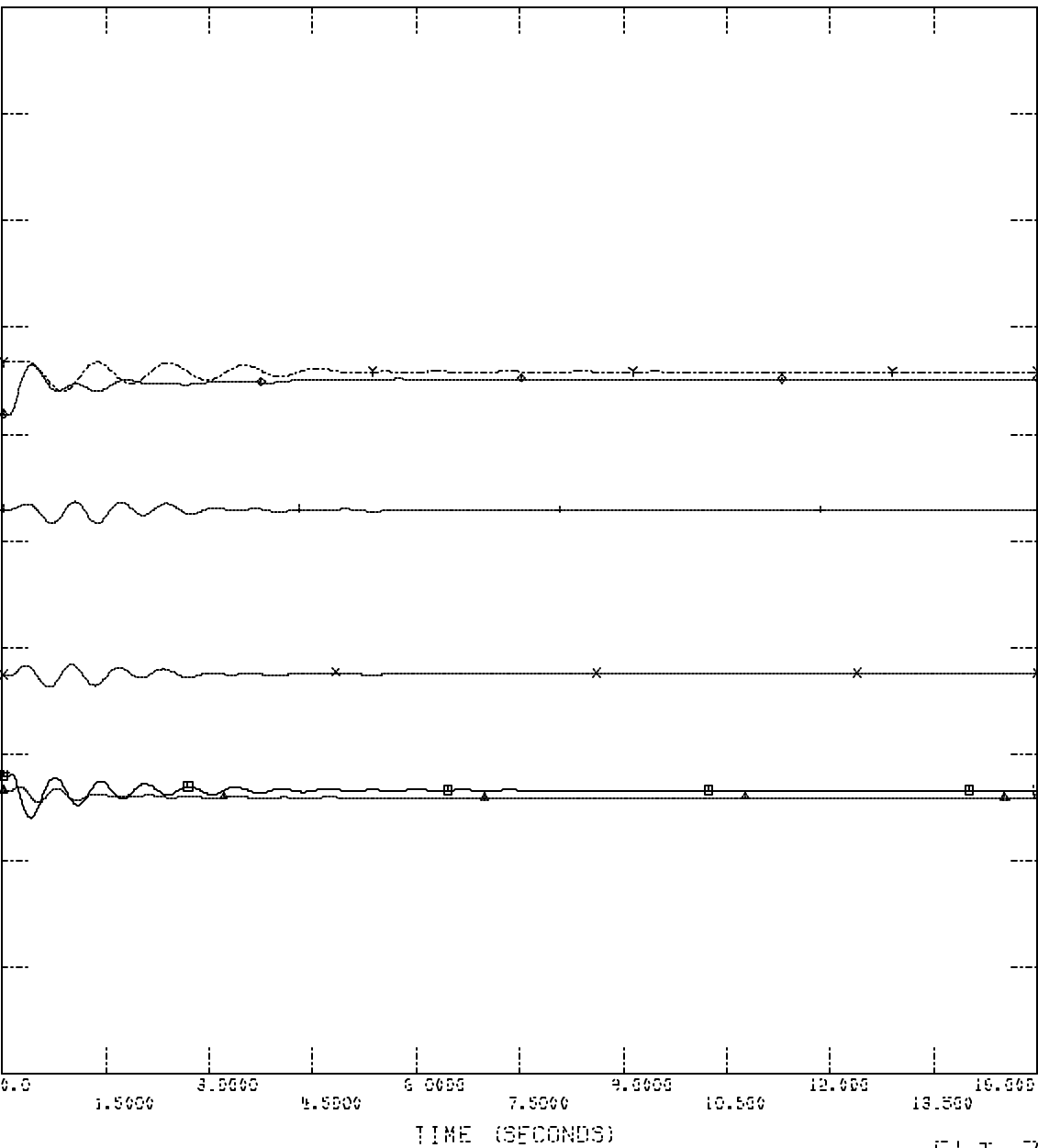


CHANNELS  
 CHANNELS  
 CHANNELS  
 CHANNELS

SPP MON6 04 STABILITY:2010 SUN PEAK MODIFIED  
 GEN-2004-012 900MW IRTAN 2 ADDITION NO UPGRADES

FILE: C:\Interconnection Studies\WOL\ING\900MW\RESUL TS\FLT\_7\_1PH.001

|        |                                        |        |
|--------|----------------------------------------|--------|
| 35.000 | CHNL # 14: ERNG JEFFREY EN CNTR MEREJ  | 10.000 |
| 45.000 | CHNL # 19: ERNG TECUMSEH EN CNTR MEREJ | 20.000 |
| 25.000 | CHNL # 66: ERNG COOPER NPPD3           | 0.0    |
| 35.000 | CHNL # 3: ERNG IRTAN G1 KPPLJ          | 10.000 |
| 100.00 | CHNL # 2: ERNG IRTAN G2 KPPLJ          | 0.0    |
| 70.000 |                                        | 25.000 |



TUE, SEP 07 2004 16:23

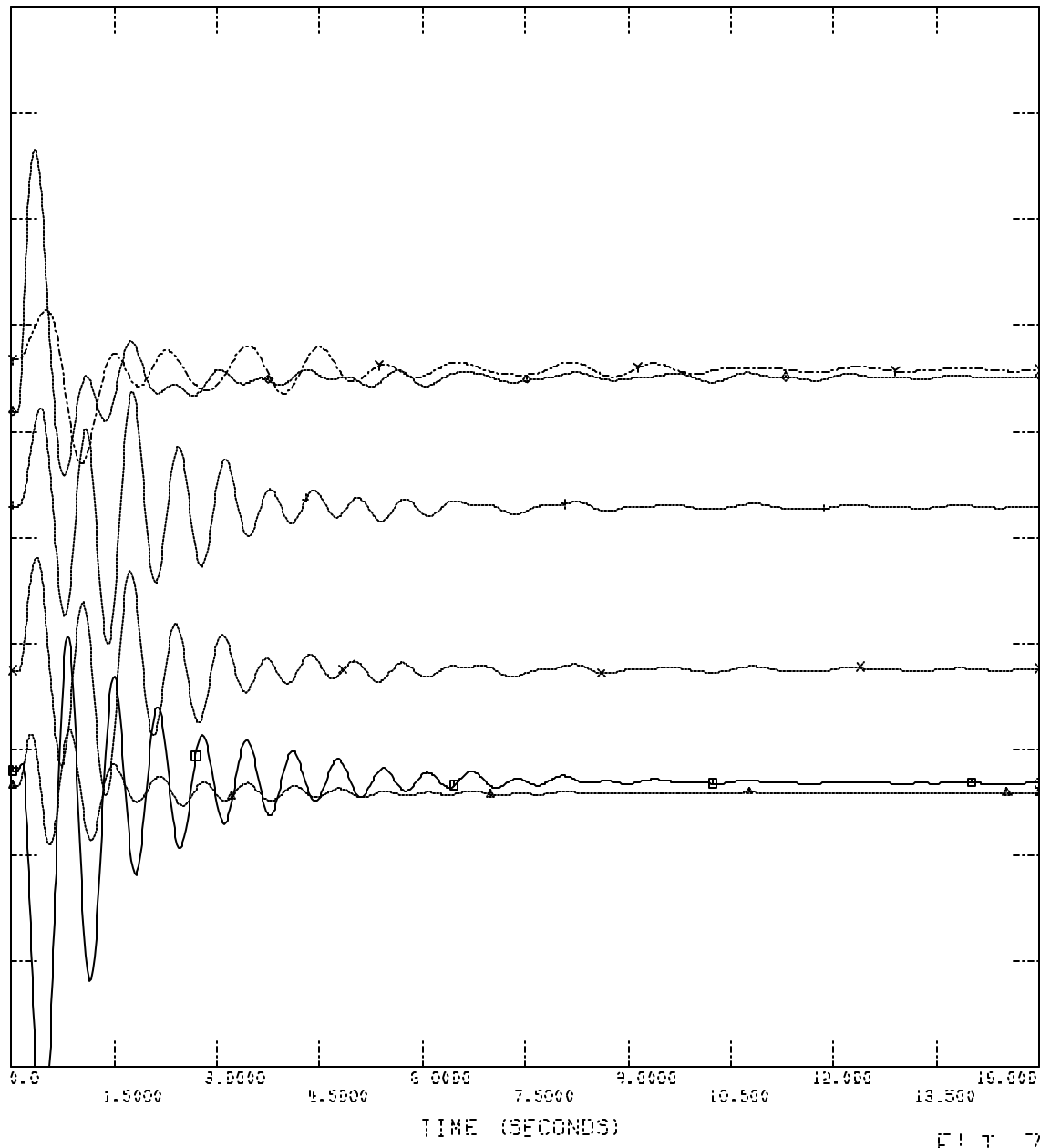
FLT\_7\_1PH\_MACHINE ANGLES

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SPP MDMG 04 STABILITY:2010 SUN PEAK MODIFIED  
 GEN-2004-012 900MW IRTAN 2 ADDITION NO UPGRADES

FILE: C:\interconnection\studies\mold\ing\900mw\resul\7s\FLT\_7\_3PH\_001

|        |                                        |        |
|--------|----------------------------------------|--------|
| 35.000 | CHNL # 10: ERNG_NEL_C13_KPPLJ          | 10.000 |
| 45.000 | CHNL # 14: ERNG_JEFFREY_EN_CNTR_MERED  | 20.000 |
| 25.000 | CHNL # 16: ERNG_TECUMSEH_EN_CNTR_MERED | 0.0    |
| 35.000 | CHNL # 66: ERNG_COOPER_NFPD3           | 10.000 |
| 100.00 | CHNL # 3: ERNG_IATAN_G1_KPPLJ          | 0.0    |
| 70.000 | CHNL # 2: ERNG_IRTAN_G2_KPPLJ          | 25.000 |



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FLT\_7\_3PH\_MACHINE ANGLES

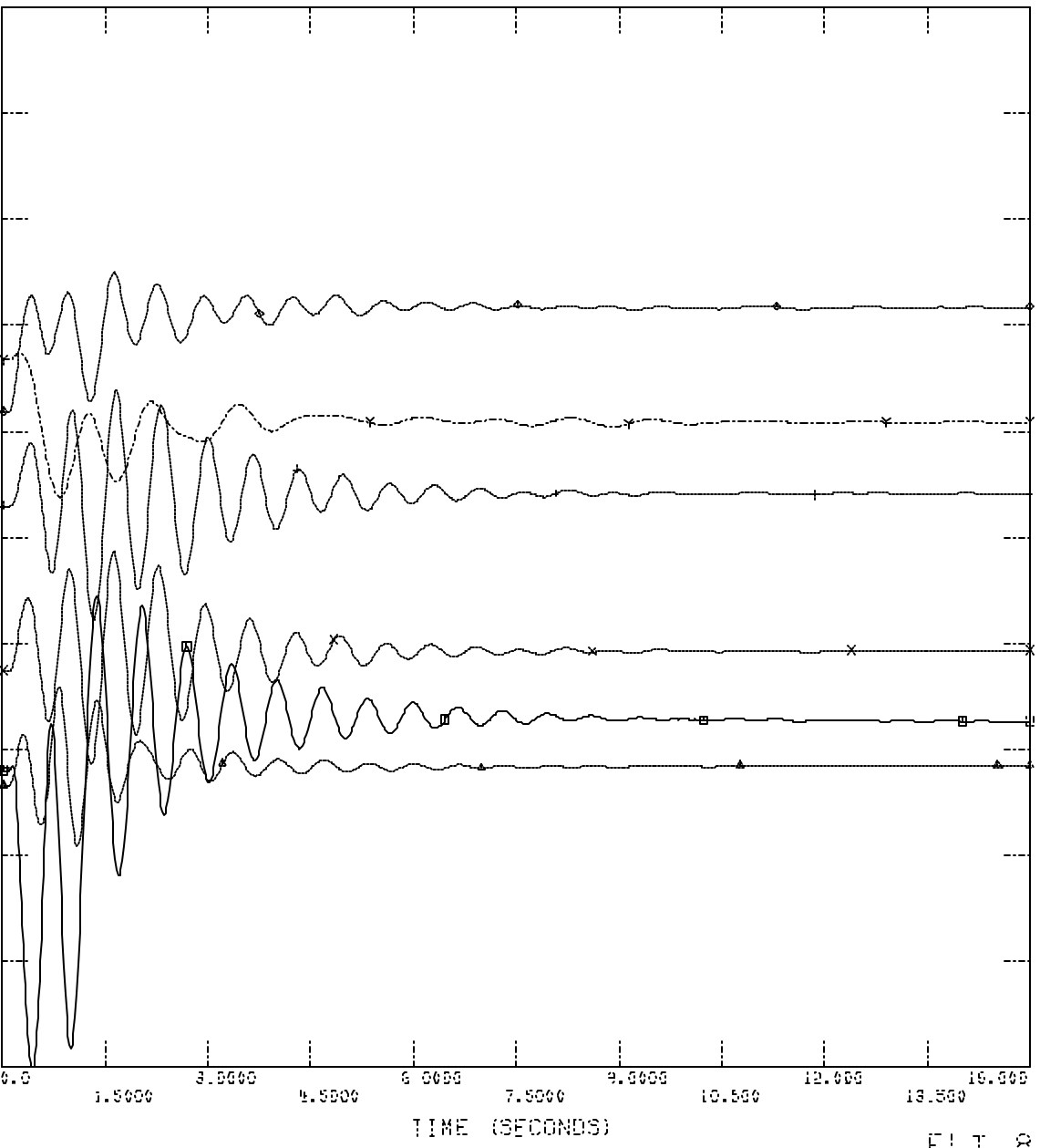


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SPP MON6 04 STABILITY:2010 SUN PEAK MODIFIED  
 GEN-2004-012 900MW IRTAN 2 ADDITION NO UPGRADES

FILE: C:\winterconnection\studies\mcc\1ng\900mw\resul\75\FLT\_8\_1PH\_001

|        |                                        |        |
|--------|----------------------------------------|--------|
| 35.000 | CHNL # 14: ERNG JEFFREY EN CNTR MEREJ  | 10.000 |
| 45.000 | CHNL # 10: ERNG NE_C13_KEPLA           | 20.000 |
| 25.000 | CHNL # 16: ERNG TECUMSEH EN CNTR MEREJ | 0.0    |
| 35.000 | CHNL # 66: ERNG COOPER NPPD3           | 10.000 |
| 100.00 | CHNL # 3: ERNG IRTAN G1 KEPLA          | 0.0    |
| 75.000 | CHNL # 2: ERNG IRTAN G2 KEPLA          | 25.000 |



TUE, SEP 07 2004 16:23

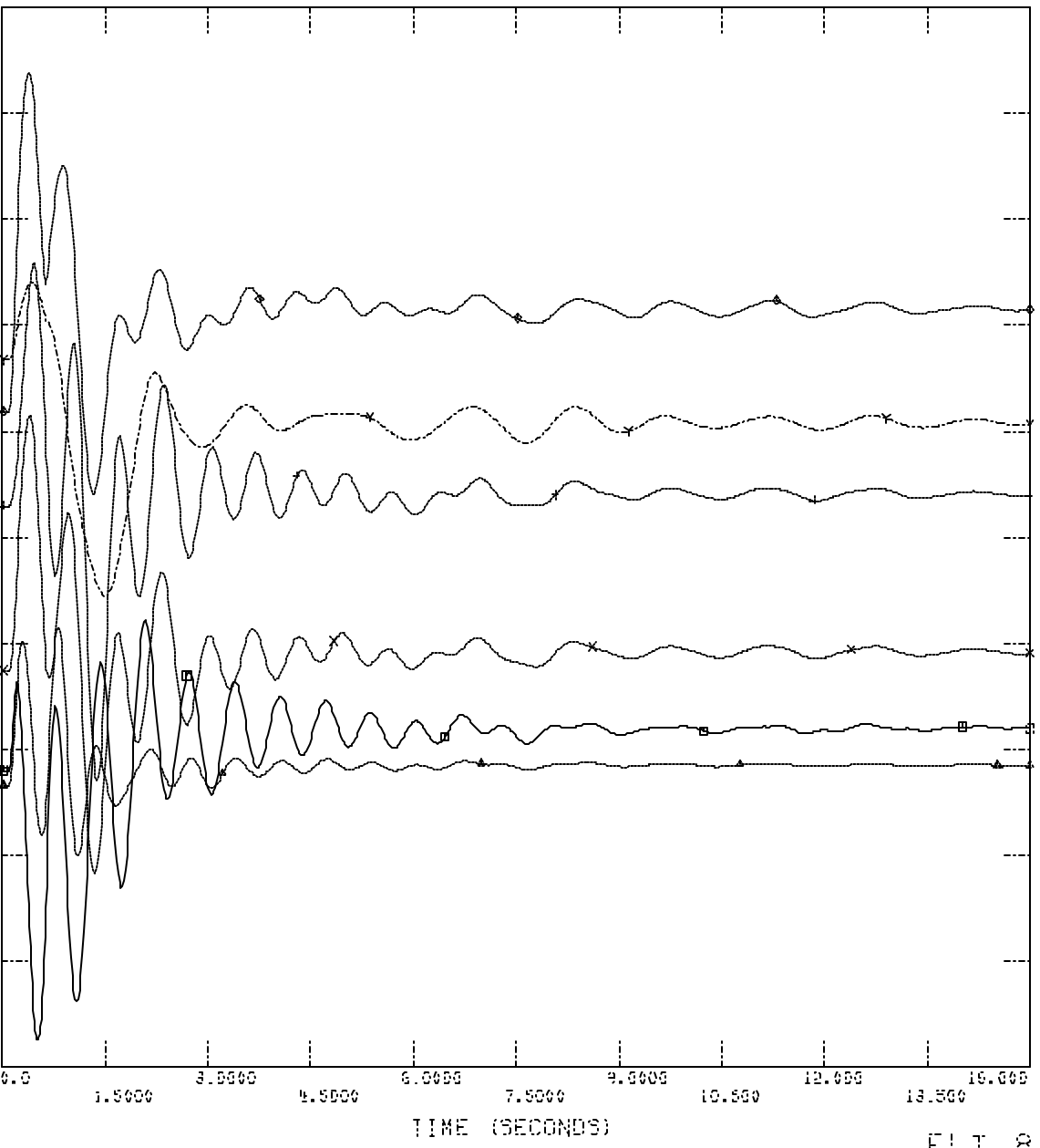
FLT\_8\_1PH\_MACHINE ANGLES

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 A  
 C  
 E

SPP MODEL 04 STABILITY: 2010 SUN PERK: MODIFIED  
 GEN-2004-012 900MM IRTAN 2 ADDITION NO UPGRADES

FILE: C:\Vinterconnection Studies\WOL\ING\900MM\MESUL 75\FLT\_8\_SPH.OUT  
 CHNL # 10: CRNG NE. G13, KPPLJ

|        |                                        |   |   |        |
|--------|----------------------------------------|---|---|--------|
| 35.000 | CHNL # 14: CRNG JEFFREY EN CNTR MEREJ  | X | X | 20.000 |
| 45.000 | CHNL # 16: CRNG TECUMSEH EN CNTR MEREJ | + | + | 0.0    |
| 25.000 | CHNL # 66: CRNG COOPER NPPD3           | ◇ | ◇ | 10.000 |
| 35.000 | CHNL # 3: CRNG JATAN G1 KPPLJ          | ↑ | ↓ | 0.0    |
| 100.00 | CHNL # 2: CRNG IRTAN G2 KPPLJ          | 9 | 9 | 25.000 |
| 70.000 |                                        |   |   |        |



TUE, SEP 07 2004 16:20

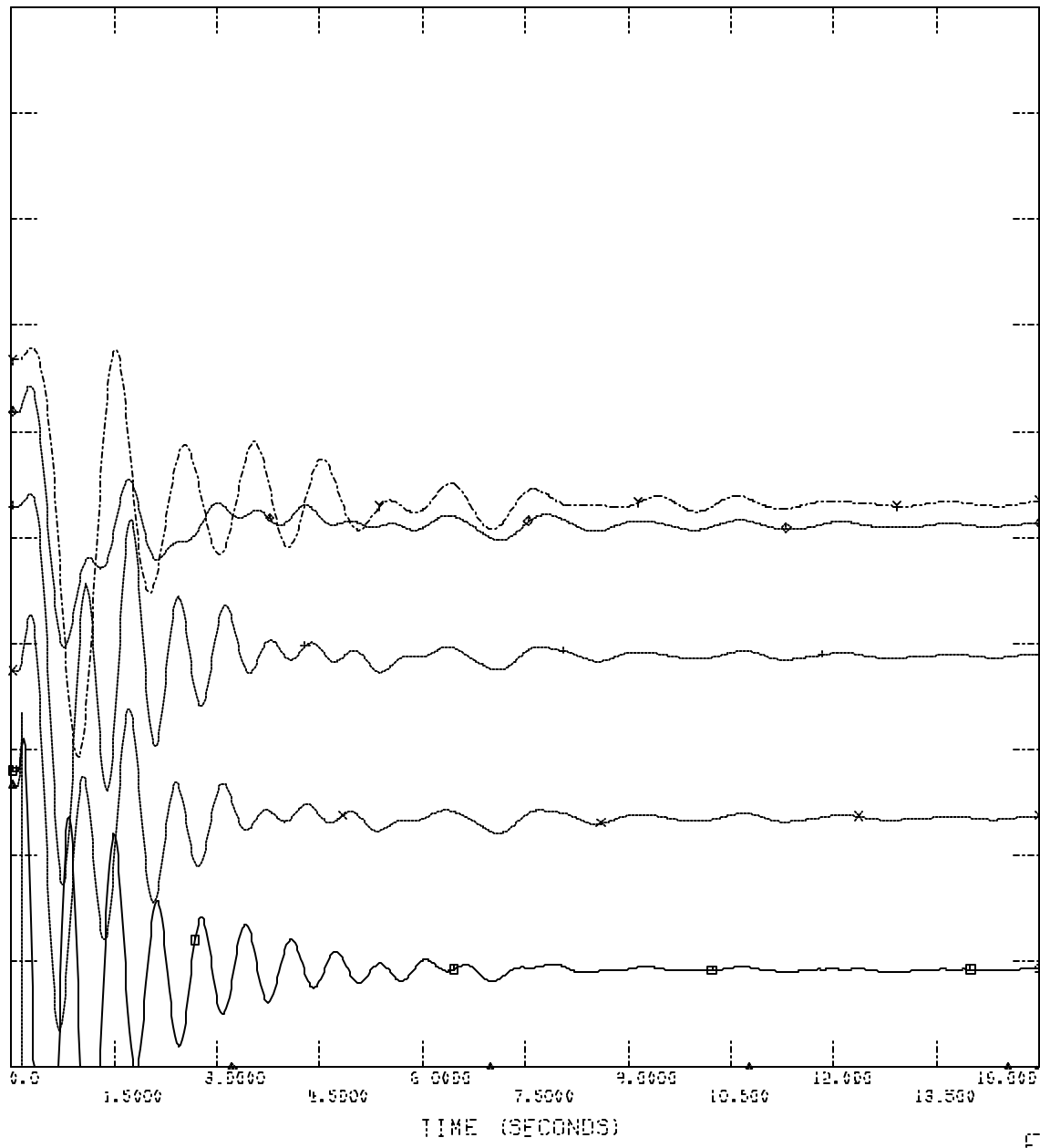
FLT\_8\_SPH\_MACHINE ANGLES

SPP  
 GEN-2004-012  
 900KW  
 IRTN 2  
 ADDITION NO UPGRADES

SPP M0M6 04 STABILITY:2010 SUN PEAK MODIFIED  
 GEN-2004-012 900KW IRTN 2 ADDITION NO UPGRADES

FILE: C:\Interconnection Studies\Working\900KW\RESUL TS\FLT 1.9.001

|        |                                        |        |
|--------|----------------------------------------|--------|
| 35.000 | CHNL # 14: ERNG JEFFREY EN CNTR MEREJ  | 10.000 |
| 45.000 | CHNL # 10: ERNG NE CL19 KPLLA          | 20.000 |
| 25.000 | CHNL # 16: ERNG TECUMSEH EN CNTR MEREJ | 0.0    |
| 35.000 | CHNL # 66: ERNG COOPER NPPD3           | 10.000 |
| 100.00 | CHNL # 3: ERNG IRTN G1 KPLLA           | 0.0    |
| 70.000 | CHNL # 2: ERNG IRTN G2 KPLLA           | 25.000 |



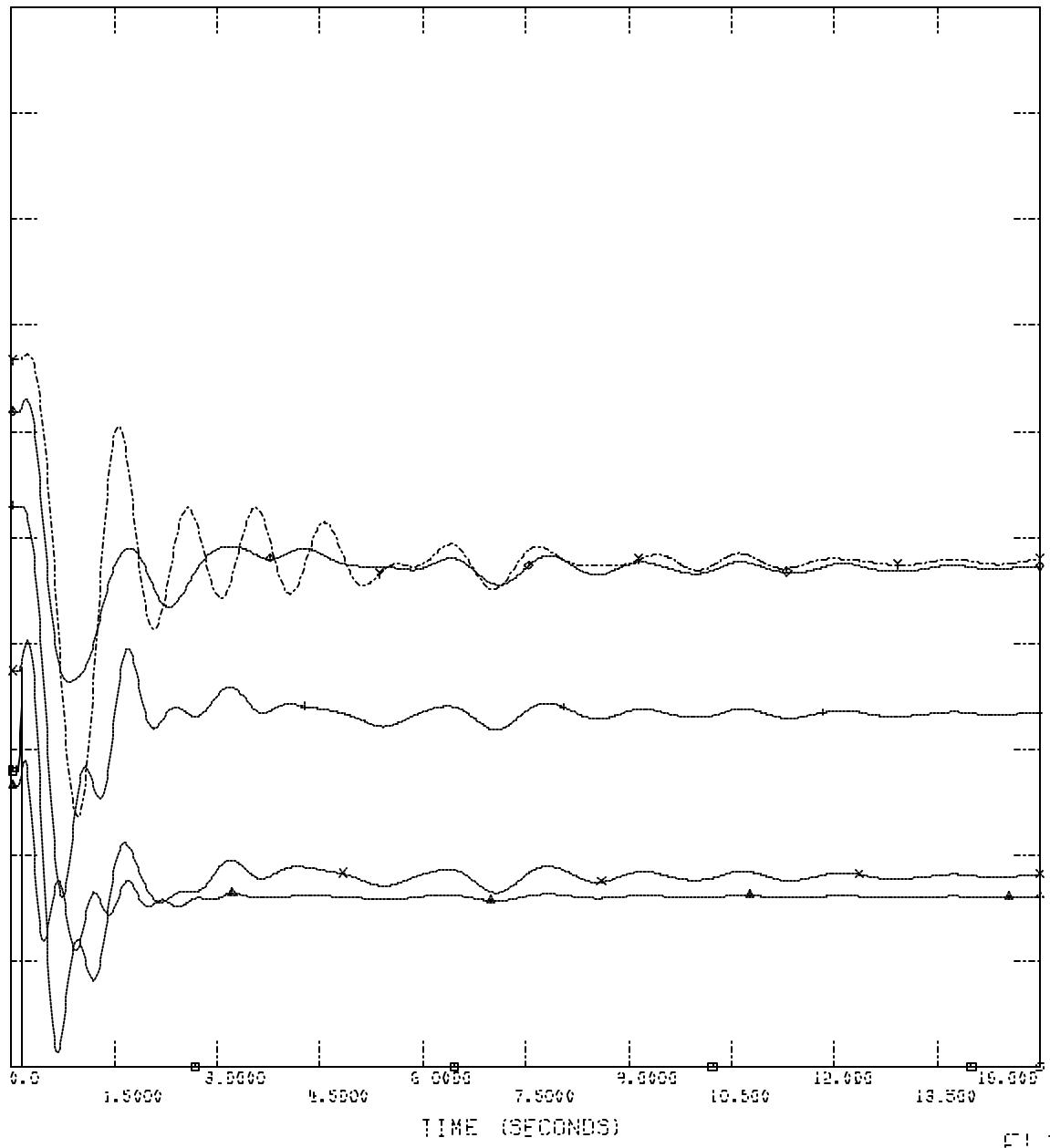
TUE, SEP 07 2004 16:23  
 FLT\_9\_MACHINE ANGLES

SPP ENGINE  
 CONTROL LOG  
 FILE:

SPP MODEL 04 STABILITY: 2010 SUN PEAK MODIFIED  
 GEN-2004-012 900MW IRTAN 2 ADDITION NO UPGRADES

FILE: C:\Interconnection Studies\working\900MW\RESUL13\F17\_130.001

|        |                                        |        |
|--------|----------------------------------------|--------|
| 35.000 | CHNL # 10: ERNG NE C13 KPPLJ           | 10.000 |
| 45.000 | CHNL # 14: ERNG JEFFREY EN CNTR WEREJ  | 20.000 |
| 25.000 | CHNL # 16: ERNG TECUMSEH EN CNTR WEREJ | 0.0    |
| 35.000 | CHNL # 66: ERNG COOPER NFPD3           | 10.000 |
| 100.00 | CHNL # 3: ERNG JATAN G1 KPPLJ          | 0.0    |
| 70.000 | CHNL # 2: ERNG IRTAN G2 KPPLJ          | 25.000 |



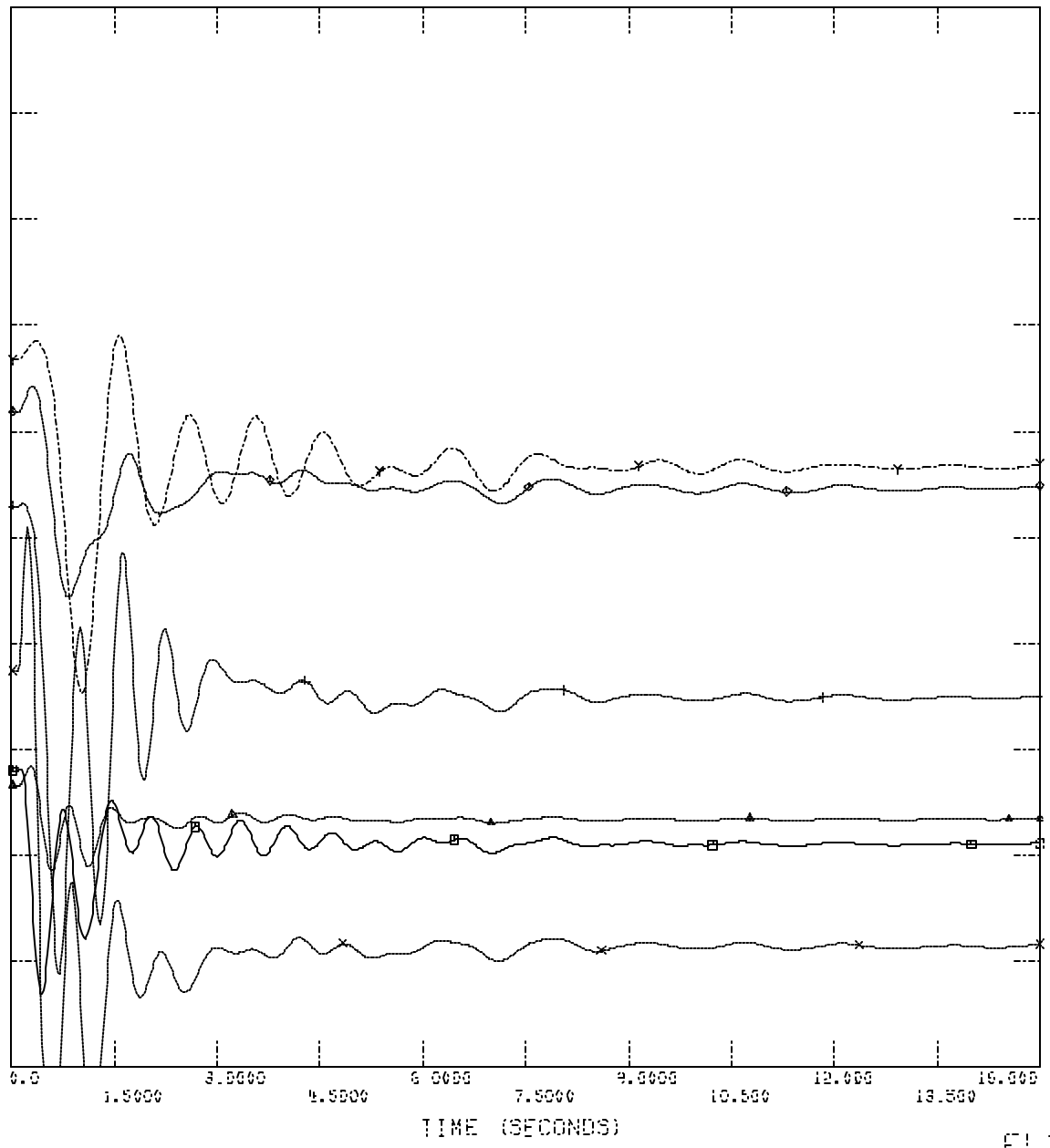
TUE, SEP 07 2004 16:23  
 FLT\_10\_MACHINE ANGLES

CHANNEL # 14  
 CHANNEL # 16  
 CHANNEL # 3  
 CHANNEL # 66  
 CHANNEL # 10  
 CHANNEL # 21

SPP MON6 04 STABILITY: 2010 SUN PEAK MODIFIED  
 GEN-2004-012 900MW IRTAN 2 ADDITION NO UPGRADES

FILE: C:\Interconnection Studies\working\900MW\RESUL19\F17...11.001

|        |                                        |        |
|--------|----------------------------------------|--------|
| 35.000 | CHNL # 14: CRNG JEFFREY EN CNTR WEREJ  | 10.000 |
| 45.000 | CHNL # 16: CRNG TECUMSEH EN CNTR WEREJ | 20.000 |
| 25.000 | CHNL # 3: CRNG JATIAN G1 KEPLA         | 0.0    |
| 35.000 | CHNL # 66: CRNG COOPER NPPD3           | 10.000 |
| 100.00 | CHNL # 10: CRNG IRTAN G2 KEPLA         | 0.0    |
| 70.000 | CHNL # 21: CRNG IRTAN G2 KEPLA         | 25.000 |



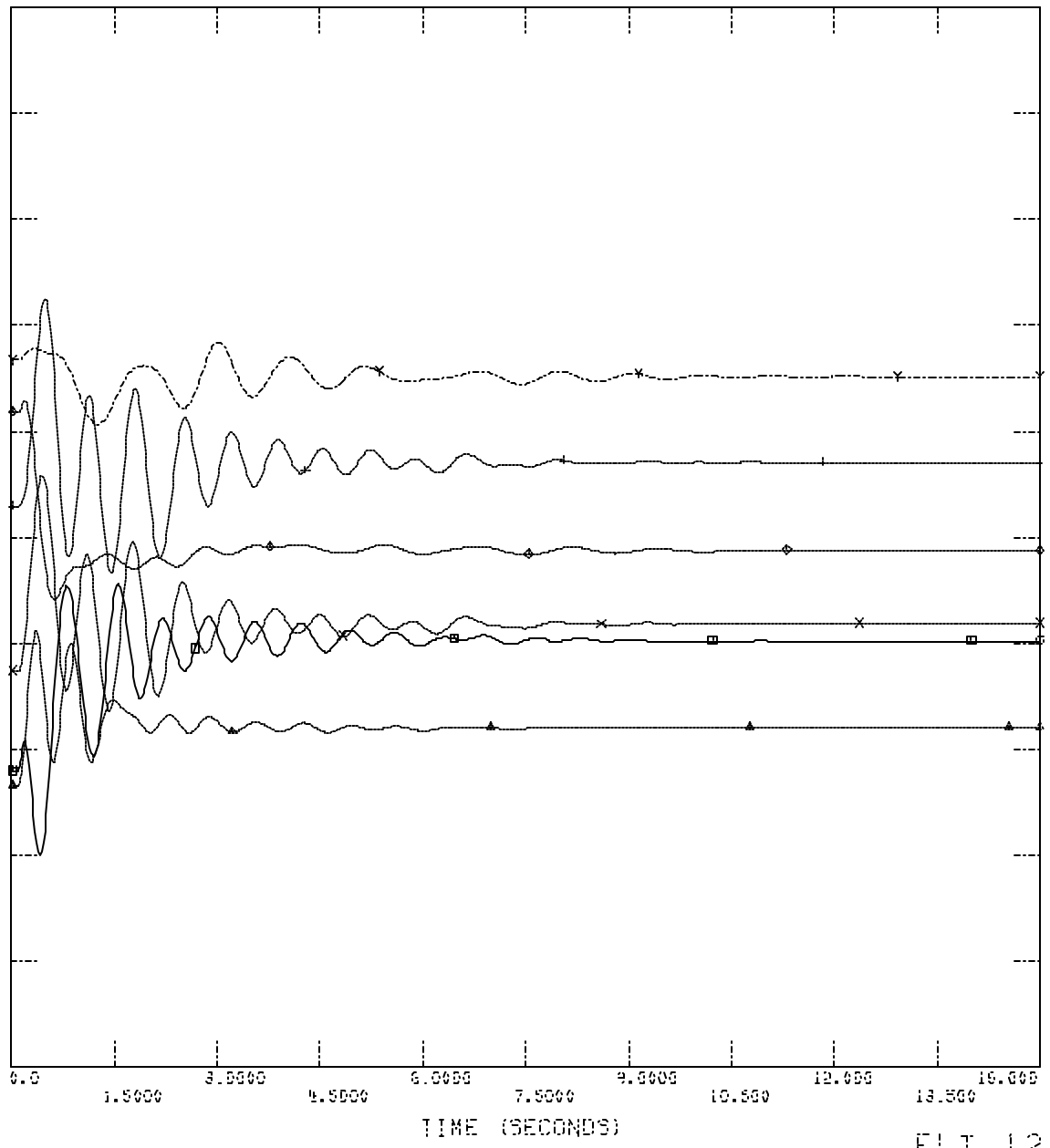
TUE, SEP 07 2004 16:23  
 FLT\_11\_MACHINE ANGLES

A  
 VVVV  
 CHANNELS  
 TIME  
 FILE

SPP MON6 04 STABILITY:2010 SUN PERK: MODIFIED  
 GEN-2004-012 900MM IRTAN 2 ADDITION NO UPGRADES

FILE: C:\Interconnection Studies\Work\Inq\900MM\RESUL TS\FLT\_12\_1PH.OUT

|        |                                        |        |
|--------|----------------------------------------|--------|
| 35.000 | CHNL # 14: ERNG JEFFREY EN CNTR MEREJ  | 10.000 |
| 45.000 | CHNL # 19: ERNG TECUNSEH EN CNTR MEREJ | 20.000 |
| 25.000 | CHNL # 66: ERNG COOPER NPPD3           | 0.0    |
| 35.000 | CHNL # 3: ERNG JATAN G1 KPPLJ          | 10.000 |
| 100.00 | CHNL # 2: ERNG IRTAN G2 KPPLJ          | 0.0    |
| 70.000 |                                        | 25.000 |



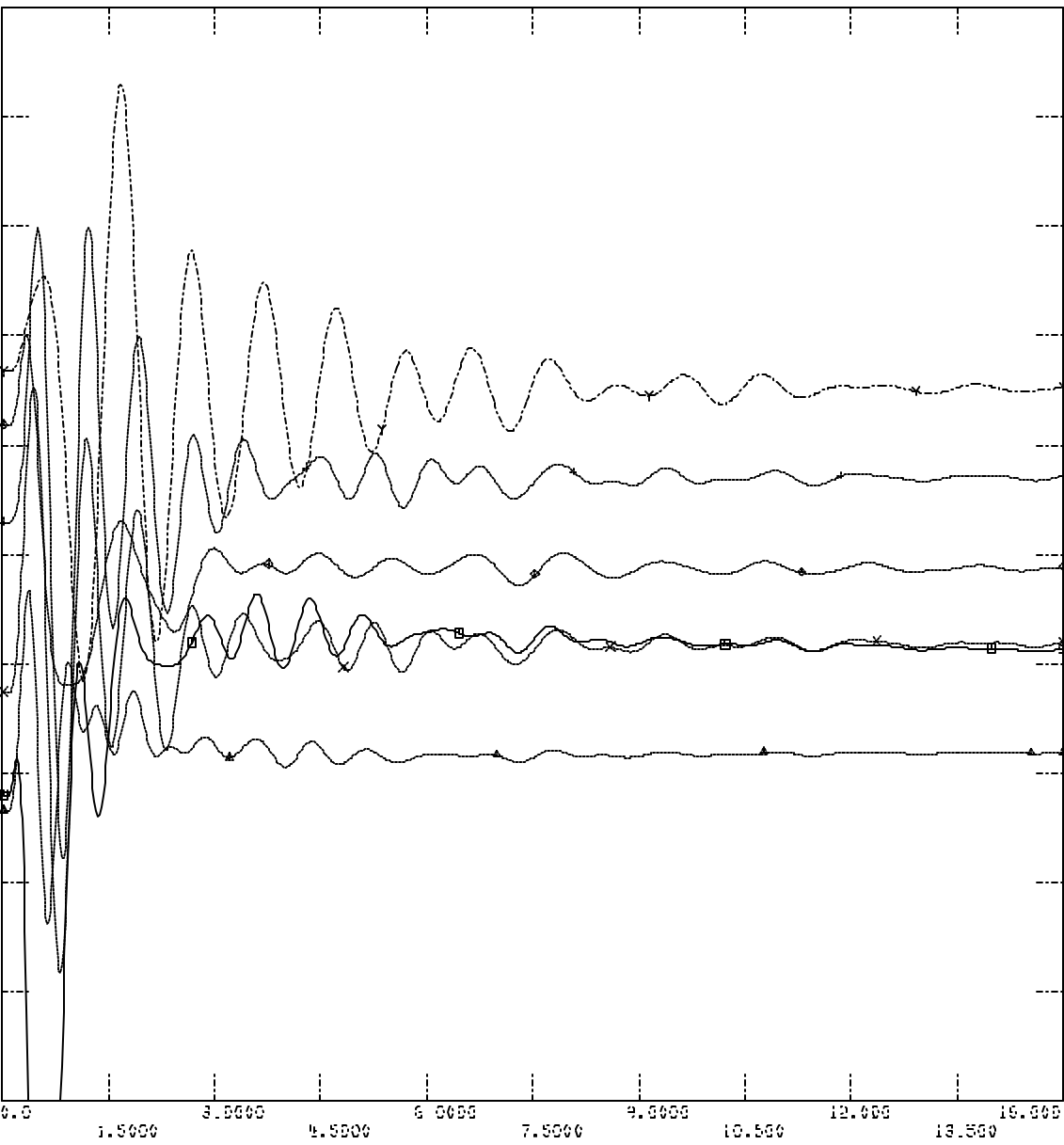
TUE, SEP 07 2004 16:20  
 FLT\_12\_1PH\_MACHINE ANGLES

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 SPP  
 2004-012

SPP MON6 04 STABILITY:2010 SUN PEAK MODIFIED  
 GEN-2004-012 900MW IRTAN 2 ADDITION NO UPGRADES

FILE: C:\Interconnection Studies\...\900MW\RESULTS\FLT\_12\_IPH\_Stuck.DAT

|        |                                        |   |   |        |
|--------|----------------------------------------|---|---|--------|
| 35.000 | CHNL # 14: CRNG JEFFREY EN CNTR MEREJ  | X | X | 20.000 |
| 45.000 | CHNL # 10: CRNG NE. C13, KPPLJ         |   |   | 10.000 |
| 25.000 | CHNL # 16: CRNG TECUMSEH EN CNTR MEREJ |   |   | 0.0    |
| 35.000 | CHNL # 66: CRNG COOPER NPPD3           |   |   | 10.000 |
| 100.00 | CHNL # 3: CRNG IRTAN G1 KPPLJ          |   |   | 0.0    |
| 70.000 | CHNL # 2: CRNG IRTAN G2 KPPLJ          |   |   | 25.000 |



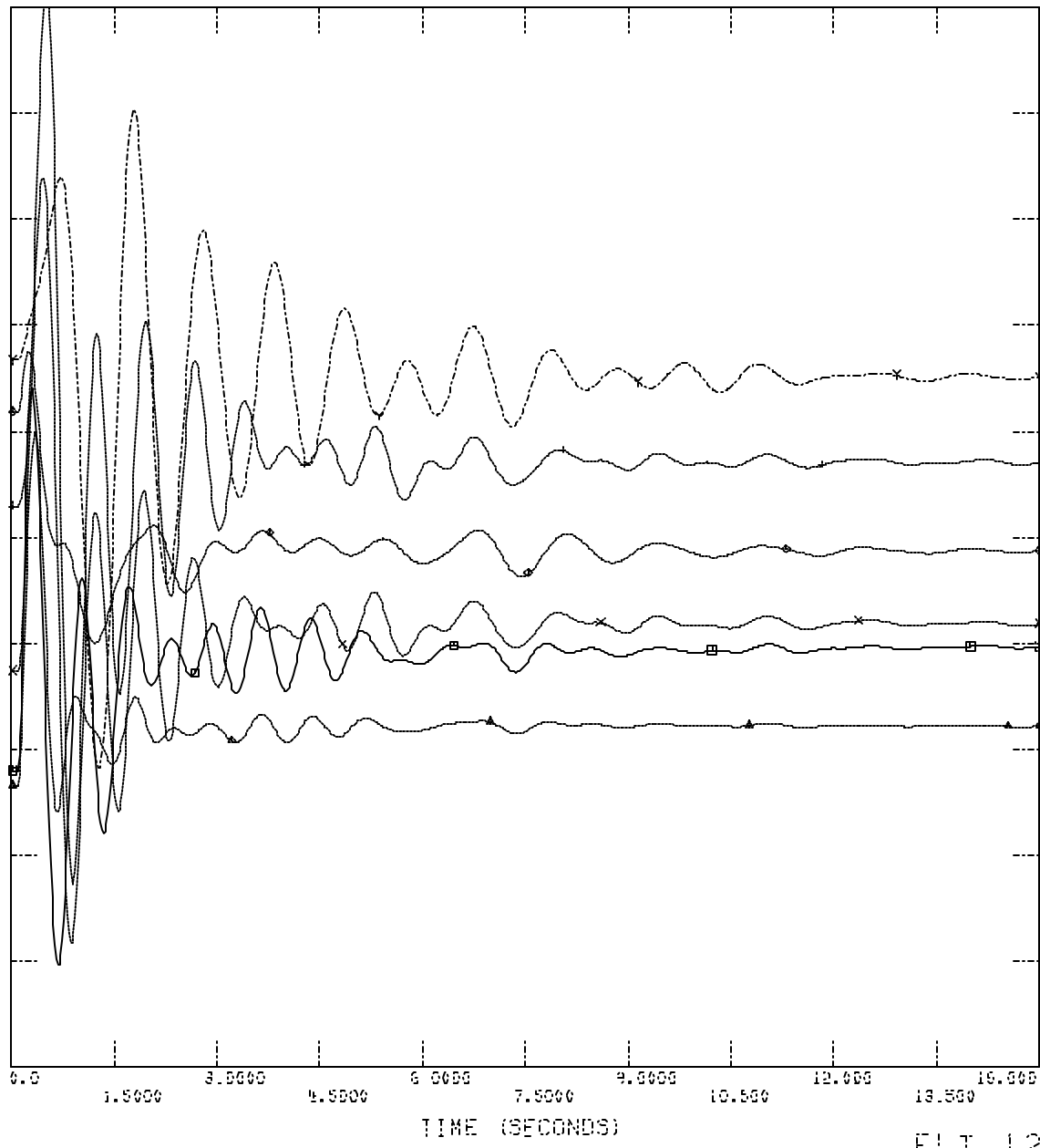
TUE, SEP 07 2004 16:23  
 FLT\_12\_IPH\_STUCK\_MACHINE

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 PROJECTS  
 2004

SPP M006 04 STABILITY; 2010 SUN PEAK; MODIFIED  
 GEN-2004-012 900MW IRTAN 2 ADDITION NO UPGRADES

FILE: C:\interconnection Studies\work\ing\900MW\RESUL TS\FLT\_12\_SPH\_OUT

|        |                                        |   |   |        |
|--------|----------------------------------------|---|---|--------|
| 35.000 | CHNL # 14: ERNG JEFFREY EN CNTR MEREJ  | X | X | 20.000 |
| 45.000 | CHNL # 19: ERNG TECUMSEH EN CNTR MEREJ | + | + | 0.0    |
| 25.000 | CHNL # 66: ERNG COOPER NFPD3           | o | o | 10.000 |
| 35.000 | CHNL # 3: ERNG IATAN G1 KEPLA          | + | + | 0.0    |
| 100.00 | CHNL # 2: ERNG IRTAN G2 KEPLA          | + | + | 0.0    |
| 70.000 |                                        |   |   | 25.000 |



TUE, SEP 07 2004 16:23

FLT\_12\_SPH\_MACHINE ANGLES

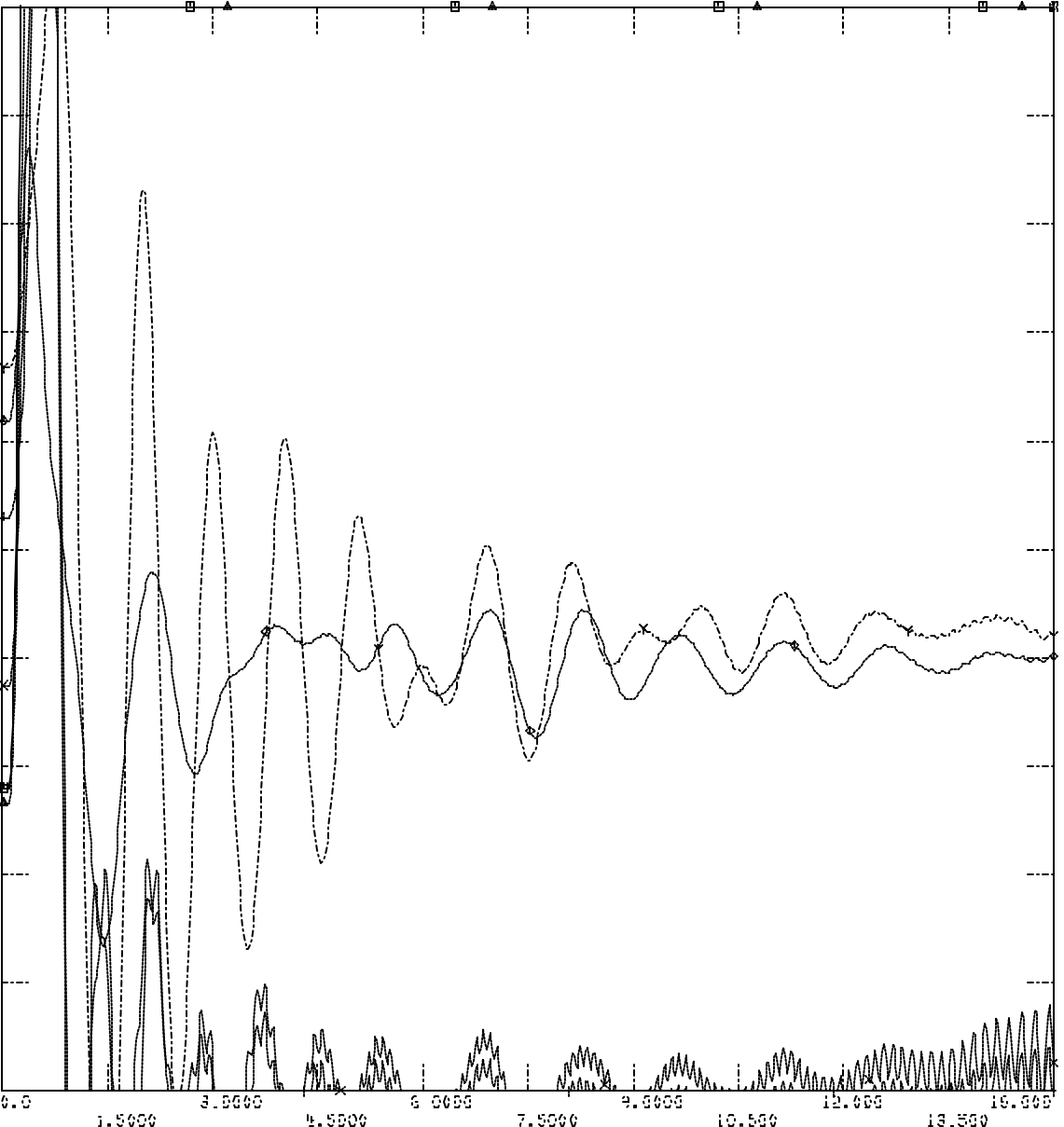


SPP  
 GEN-2004-012  
 900MW  
 IRTN 2  
 ADDITION  
 NO UPGRADES

SPP M0M6 04 STABILITY; 2010 SUN PERK; MODIFIED  
 GEN-2004-012 900MW IRTN 2 ADDITION NO UPGRADES

FILE: C:\Interconnection Studies\...\900MW\RESUL15\FLT\_12\_3PH\_STUCK.DAT  
 CHNL # 10: CRNG NE G13 KPLA

|        |                                        |   |   |        |
|--------|----------------------------------------|---|---|--------|
| 45.000 | CHNL # 14: CRNG JEFFREY EN CNTR MEREJ  | X | X | 20.000 |
| 25.000 | CHNL # 16: CRNG TECUMSEH EN CNTR MEREJ | + | + | 0.0    |
| 35.000 | CHNL # 66: CRNG COOPER NPPD3           | ◇ | ◇ | 10.000 |
| 100.00 | CHNL # 3: CRNG IRTN G1 KPLA            | ↑ | ↓ | 0.0    |
| 75.000 | CHNL # 2: CRNG IRTN G2 KPLA            | ↑ | ↓ | 25.000 |



TUE, SEP 07 2004 16:23

FLT\_12\_3PH\_STUCK\_MACHINE

## **Appendix B-2**

### **Plots of Fault Simulations**

Plots of selected bus voltage response during faults

Scenario:

2010 Summer Peak

900MW

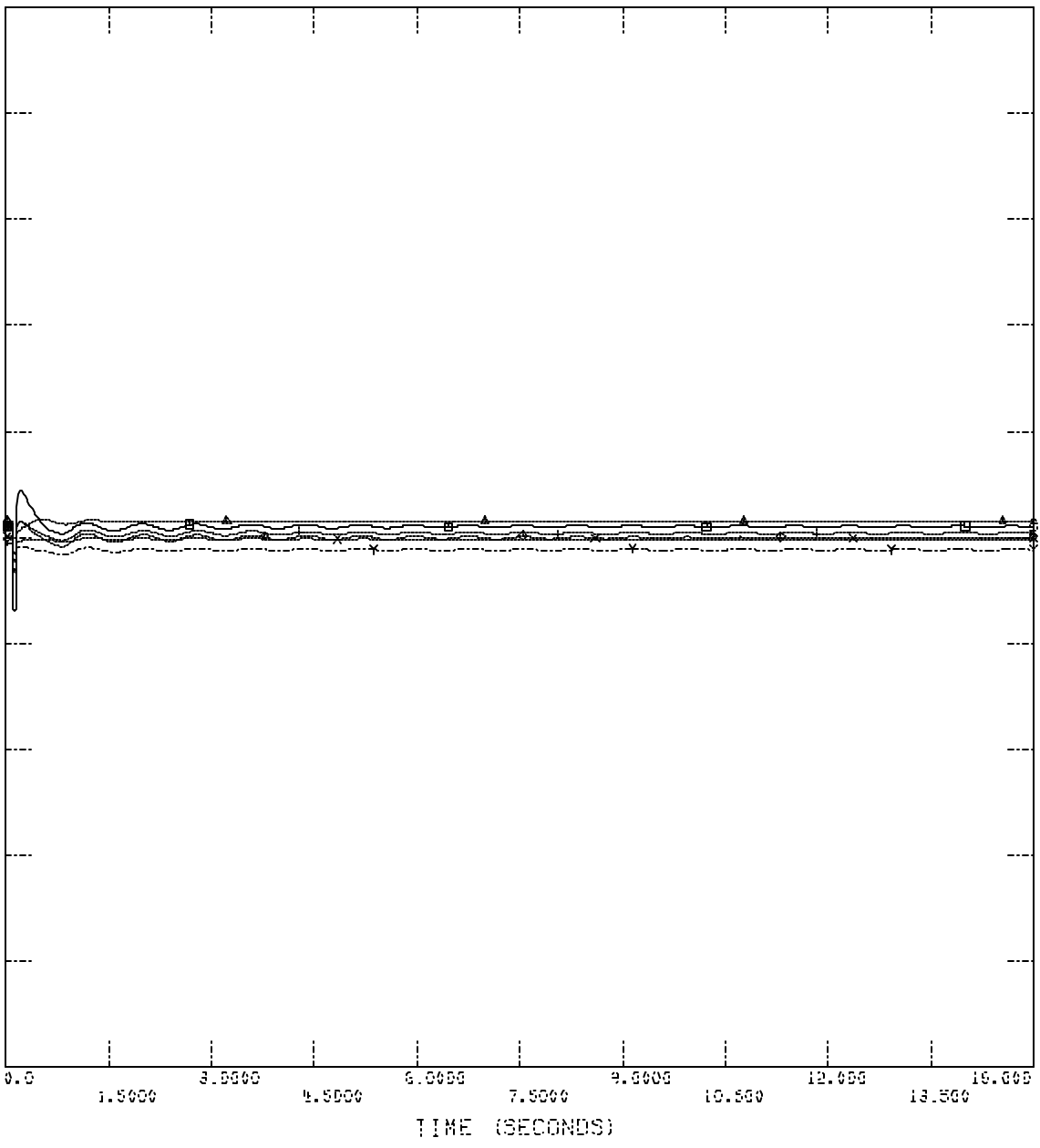
[Customer Plant at 900MW – No Network Upgrades]

395KVA  
 172.8  
 172.8

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW IRTPM 2 ADDITION NO UPGRIDES

FILE: C:\Interconnection Studies\Work\Inq\900MW\FESUL 19\FLT\_1\_1PH.GUT

|        |                                         |     |
|--------|-----------------------------------------|-----|
| 2.0000 | CHNL # 278: EVOLTAGE BRN 395KV]         | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLESNNT HIL 395KV] | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV]      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV]      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV]       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRTAN 395KV]       | 0.0 |



TUE, SEP 07 2004 16:27  
 FLT\_1\_1PH\_VOLTAGES

395KVA  
172.4  
172.4

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED  
GEN-2004-012 900MW IRTPN 2 ADDITION NO UPGRIDES

FILE: C:\Interconnection Studies\Work\Inq\900MW\FESUL 19\FLT\_1\_3PH\_OUT

2.0000 CHNL # 278: EVOLTAGE\_HPRM 395KV

2.0000 CHNL \* 293: EVOLTAGE\_PLEASNT\_HIL 395KV

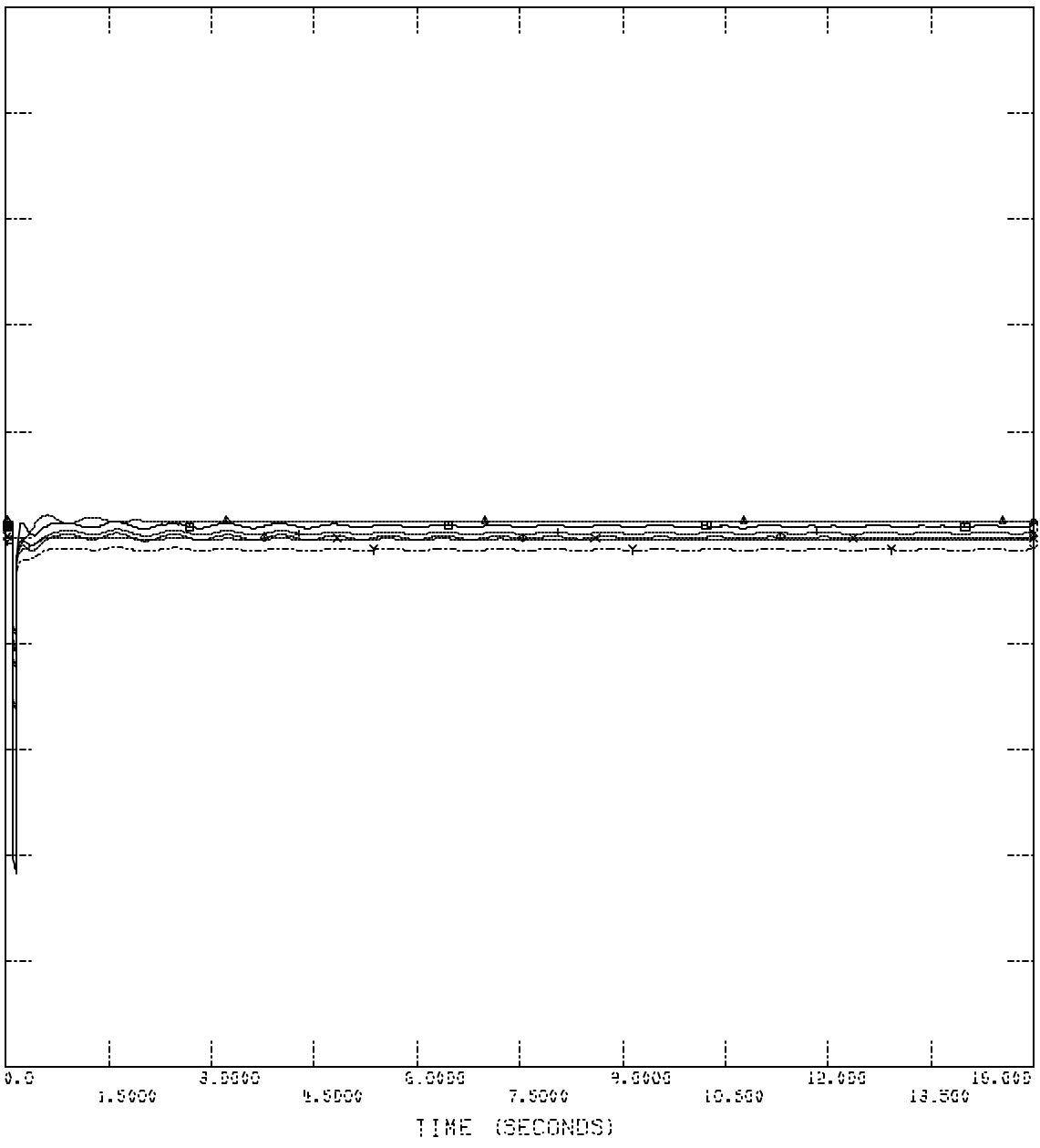
2.0000 CHNL \* 296: EVOLTAGE\_FAIPT 395KV

2.0000 CHNL \* 292: EVOLTAGE\_ST\_JOE 395KV

2.0000 CHNL # 281: EVOLTAGE\_JEC\_N 395KV

2.0000 CHNL # 279: EVOLTAGE\_IRTPN 395KV

2.0000



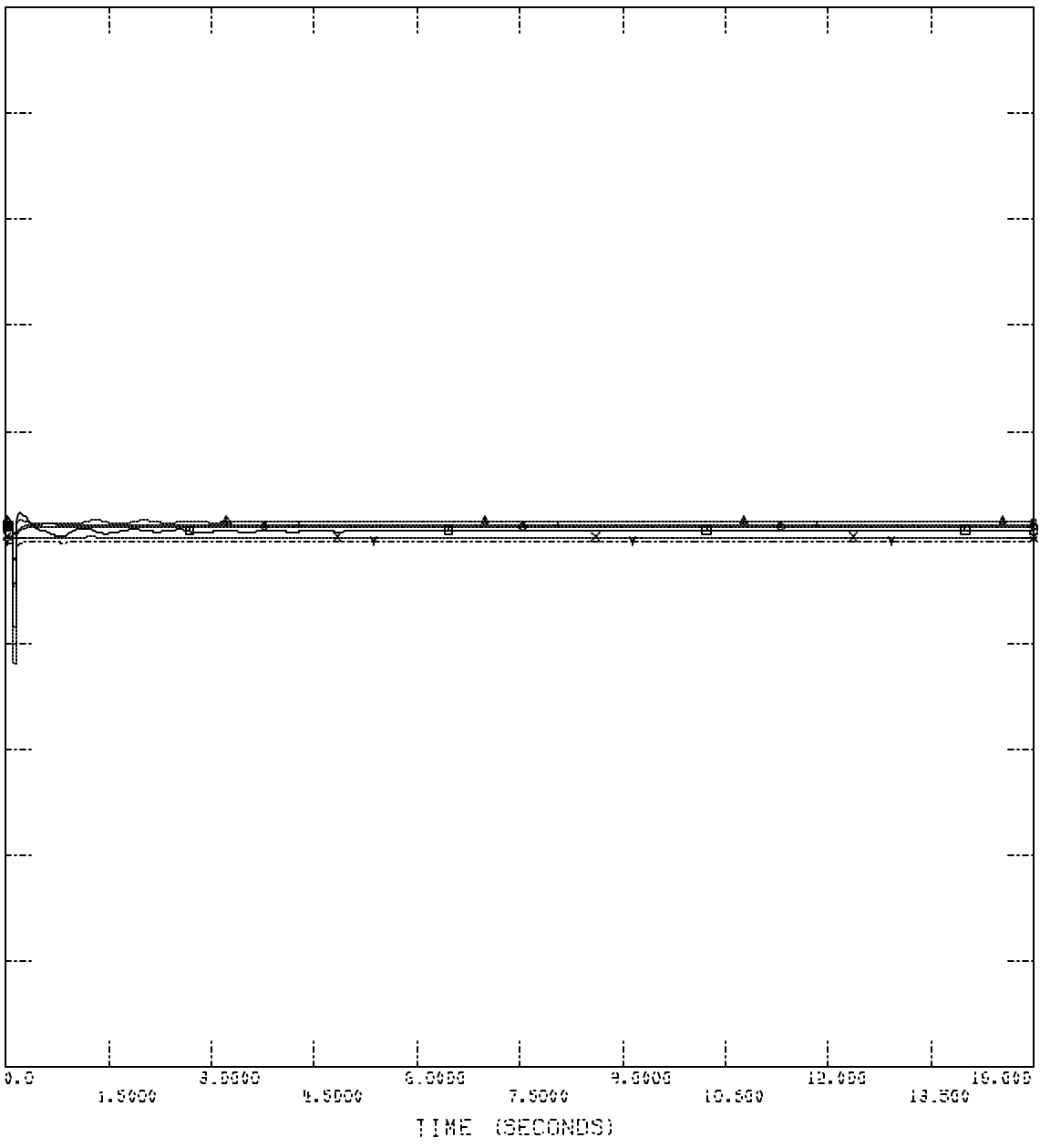
TUE, SEP 07 2004 16:27  
FLT\_1\_3PH\_VOLTAGES

395KVA  
 172.4  
 172.4

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW IRTPM 2 ADDITION NO UPDATES

FILE: C:\Interconnection Studies\WORLD\NO\900MW\FESUL 19\FLT\_2\_1PH.GUT

|        |                                         |     |
|--------|-----------------------------------------|-----|
| 2.0000 | CHNL # 278: EVOLTAGE BRN1 395KV]        | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV] | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV]      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV]      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV]       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRTAN 395KV]       | 0.0 |



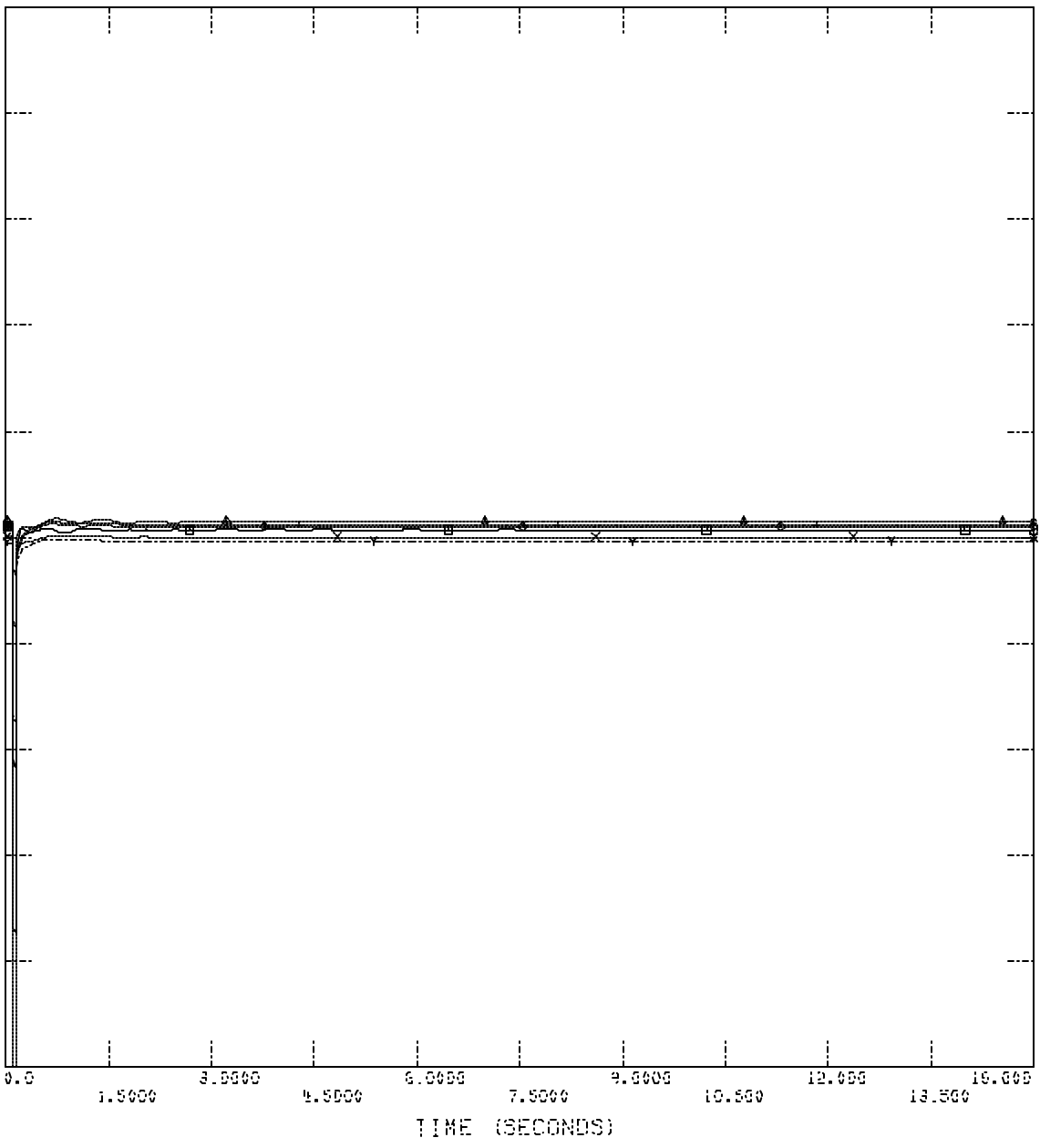
TUE, SEP 07 2004 16:27  
 FLT\_2\_1PH\_VOLTAGES

395KVA  
 112.5000  
 112.5000

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW IRTPN 2 ADDITION NO UPGRIDES

FILE: C:\Interconnection Studies\WORLD\900MW\FRESOL19\FLT\_2\_3PH\_OUT

|        |                                         |     |
|--------|-----------------------------------------|-----|
| 2.0000 | CHNL # 278: EVOLTAGE BRN1 395KV]        | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV] | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV]      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV]      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV]       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRTPN 395KV]       | 0.0 |



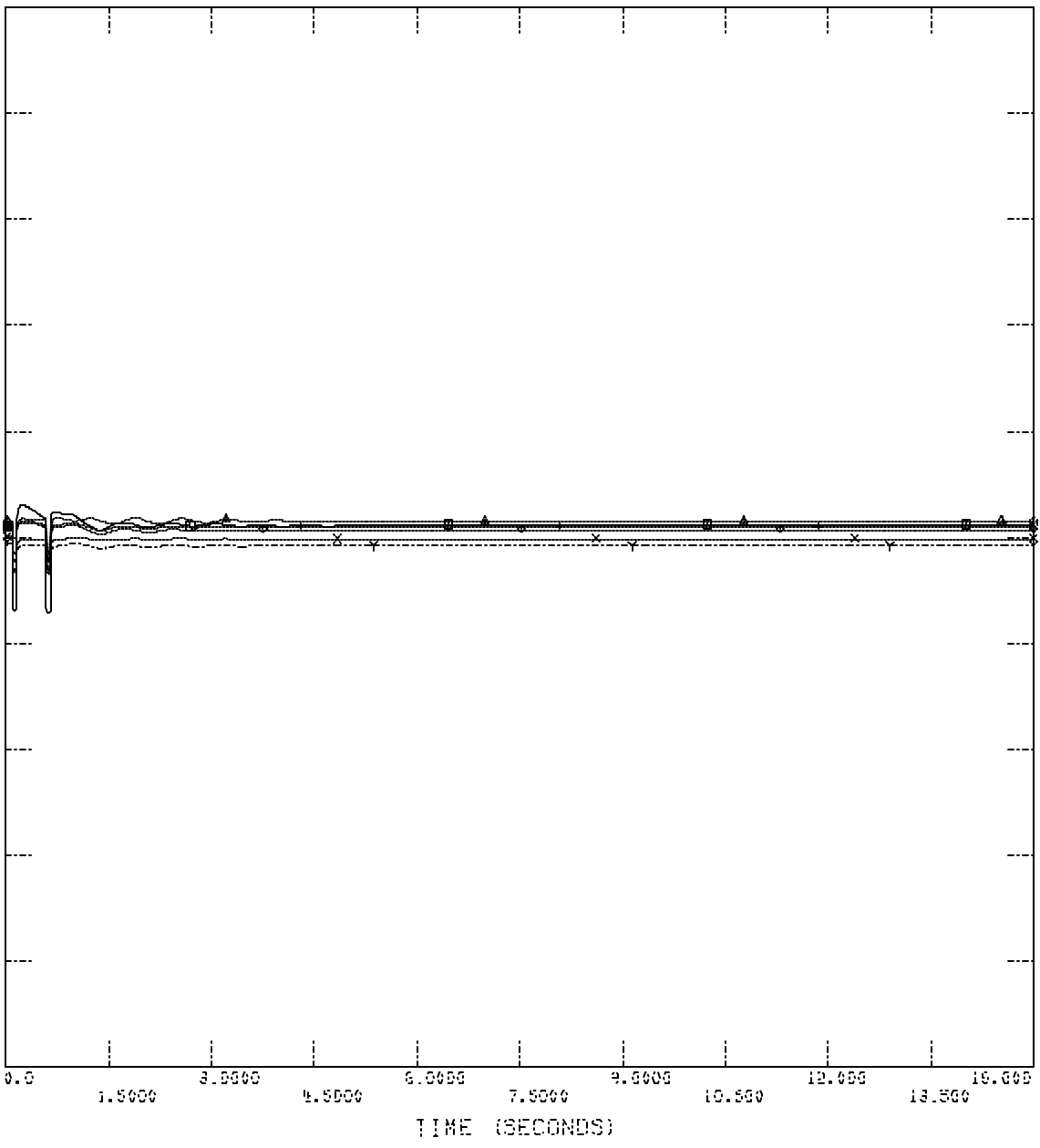
TUE, SEP 07 2004 16:27  
 FLT\_2\_3PH\_VOLTAGES

395KVA  
172.4  
172.4

SPP MDMS 04 STABILITY; 2010 SUM PEAK; MODIFIED  
GEN-2004-012 900MW IRTPN 2 ADDITION NO UPGRADES

FILE: C:\Interconnection Studies\WOL\Inq\900MW\FESUL 19\FLT\_3\_1PH.GUT

|        |                                         |     |
|--------|-----------------------------------------|-----|
| 2.0000 | CHNL # 278: EVOLTAGE BRNTH 395KV]       | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV] | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV]      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV]      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV]       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRTPN 395KV]       | 0.0 |



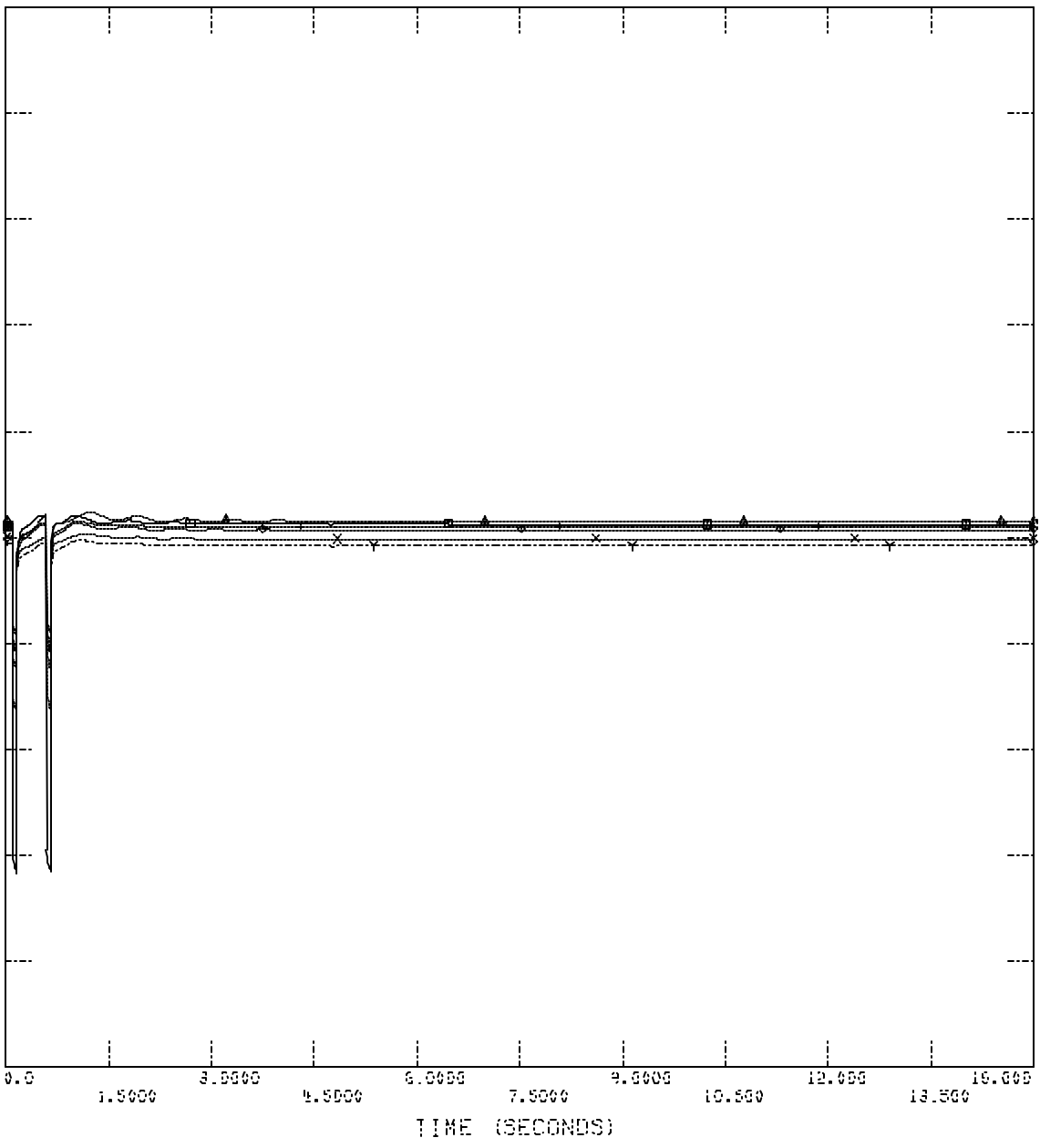
TUE, SEP 07 2004 16:27  
FLT\_3\_1PH\_VOLTAGES

395KVA  
 172.4  
 172.4

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW IRTPM 2 ADDITION NO UPGRADES

FILE: C:\Interconnection Studies\Work\Inq\900MW\FESUL 19\FLT\_3\_SPH\_OUT

|        |                                         |     |
|--------|-----------------------------------------|-----|
| 2.0000 | CHNL # 278: EVOLTAGE BRN1 395KV]        | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV] | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV]      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV]      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV]       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRTPM 395KV]       | 0.0 |



TUE, SEP 07 2004 16:27  
 FLT\_3\_SPH\_VOLTAGES

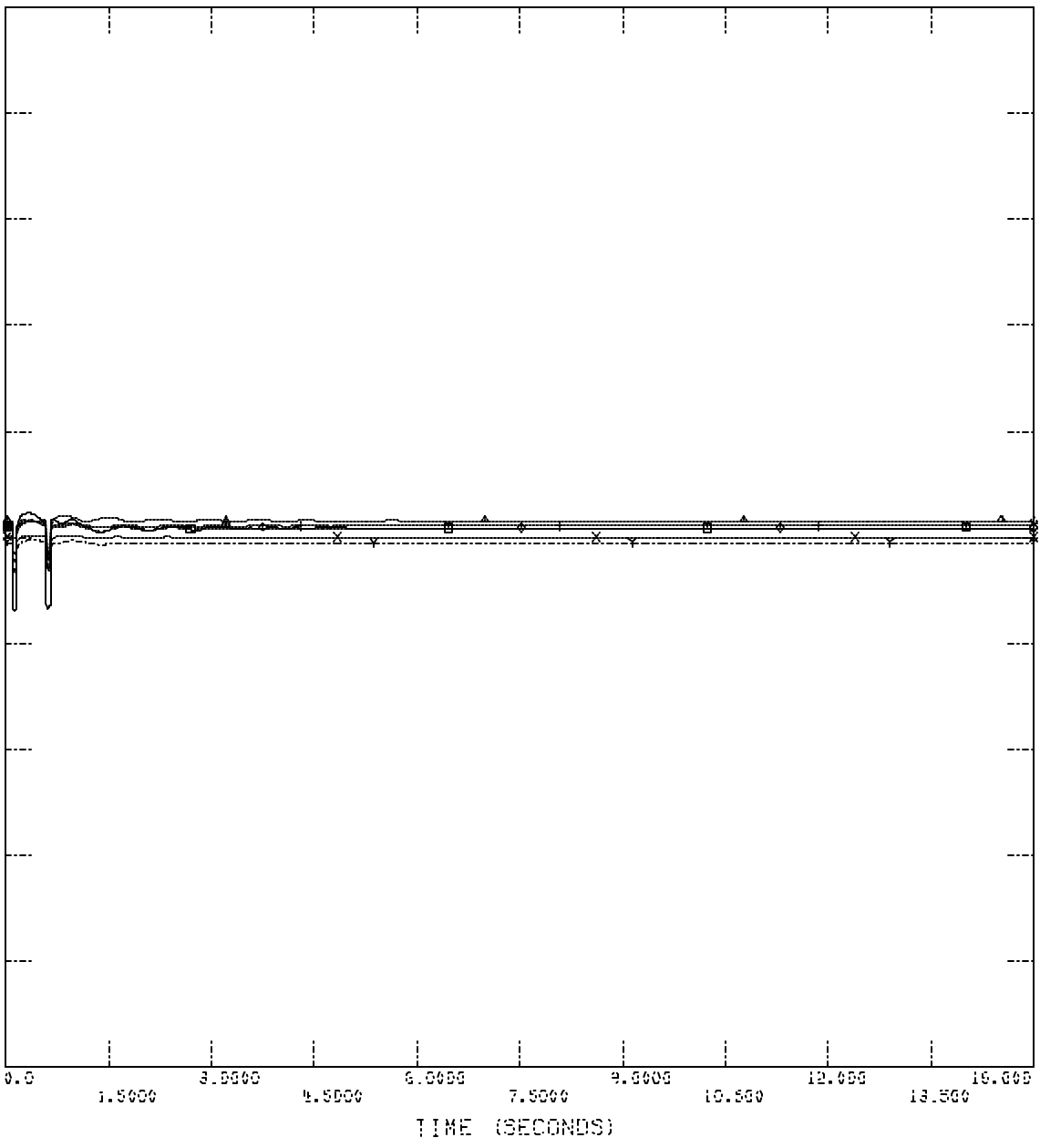


395KVA  
 172.4  
 172.4

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW IRTPN 2 ADDITION NO UPGRADES

FILE: C:\Interconnection Studies\Work\Inq\900MW\FESUL 19\FLT\_4\_1PH.GUT

|        |                                         |     |
|--------|-----------------------------------------|-----|
| 2.0000 | CHNL # 278: EVOLTAGE BRNTH 395KV]       | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV] | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV]      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV]      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV]       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRTPN 395KV]       | 0.0 |



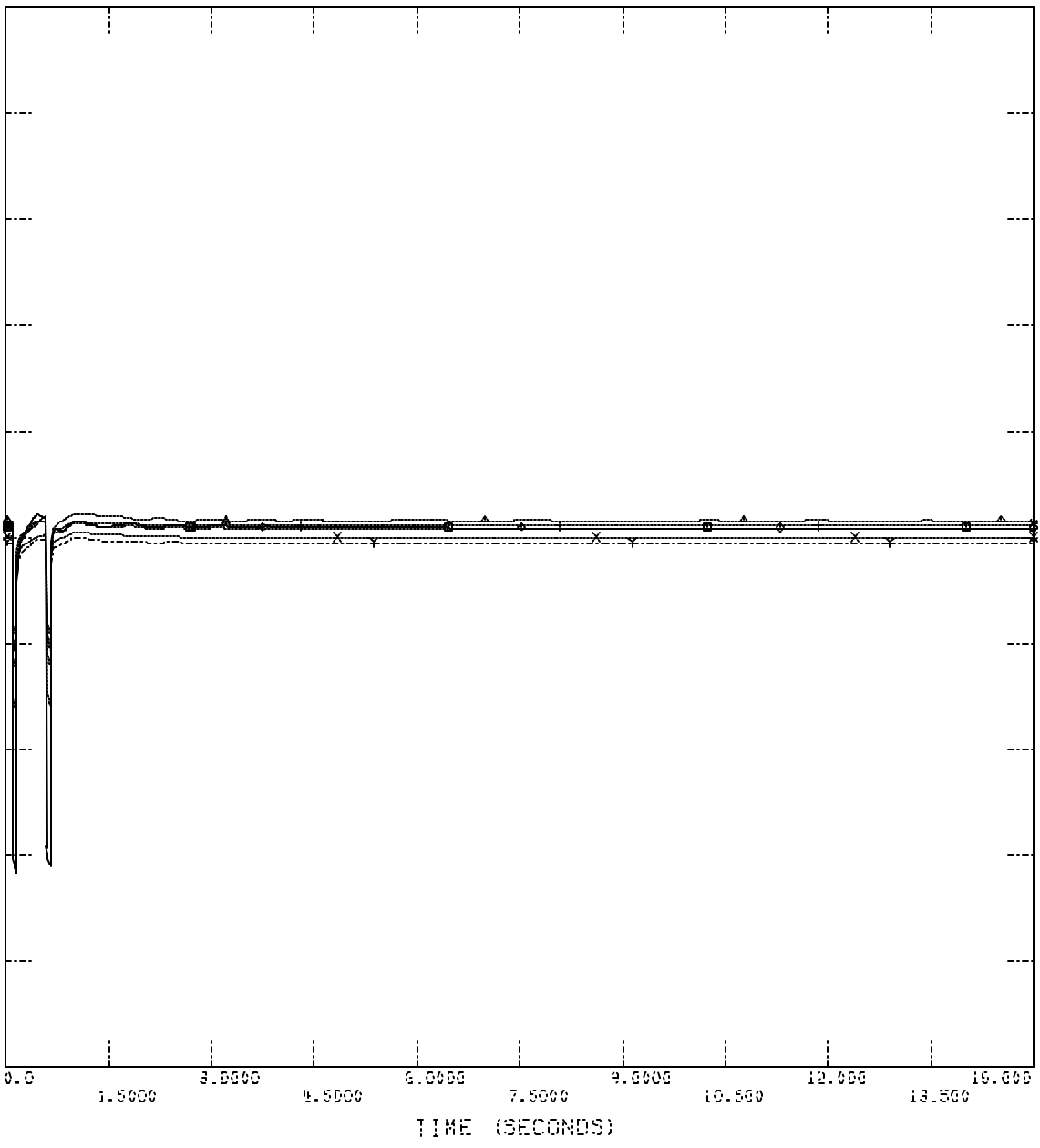
TUE, SEP 07 2004 16:27  
 FLT\_4\_1PH\_VOLTAGES

395KVA  
 172.4  
 279.1

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW IRTPM 2 ADDITION NO UPGRIDES

FILE: C:\Interconnection Studies\Work\Inq\900MW\FESUL 19\FLT\_4\_3PH\_OUT

|        |                                         |     |
|--------|-----------------------------------------|-----|
| 2.0000 | CHNL # 278: EVOLTAGE BRN1 395KV]        | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV] | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV]      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV]      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV]       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRTPM 395KV]       | 0.0 |



TUE, SEP 07 2004 16:27  
 FLT\_4\_3PH\_VOLTAGES

395KVA  
1000V  
1000V

SPP MDMS 04 STABILITY:2010 SUM PEAK: MODIFIED  
GEN-2004-012 900MW IRTPN 2 ADDITION NO UPGRADES

FILE: C:\Interconnection Studies\Work\Inq\900MW\FESUL 19\FLT\_5\_1PH.GUT

CHNL # 278: EVOLTAGE\_HPRM 395KVJ

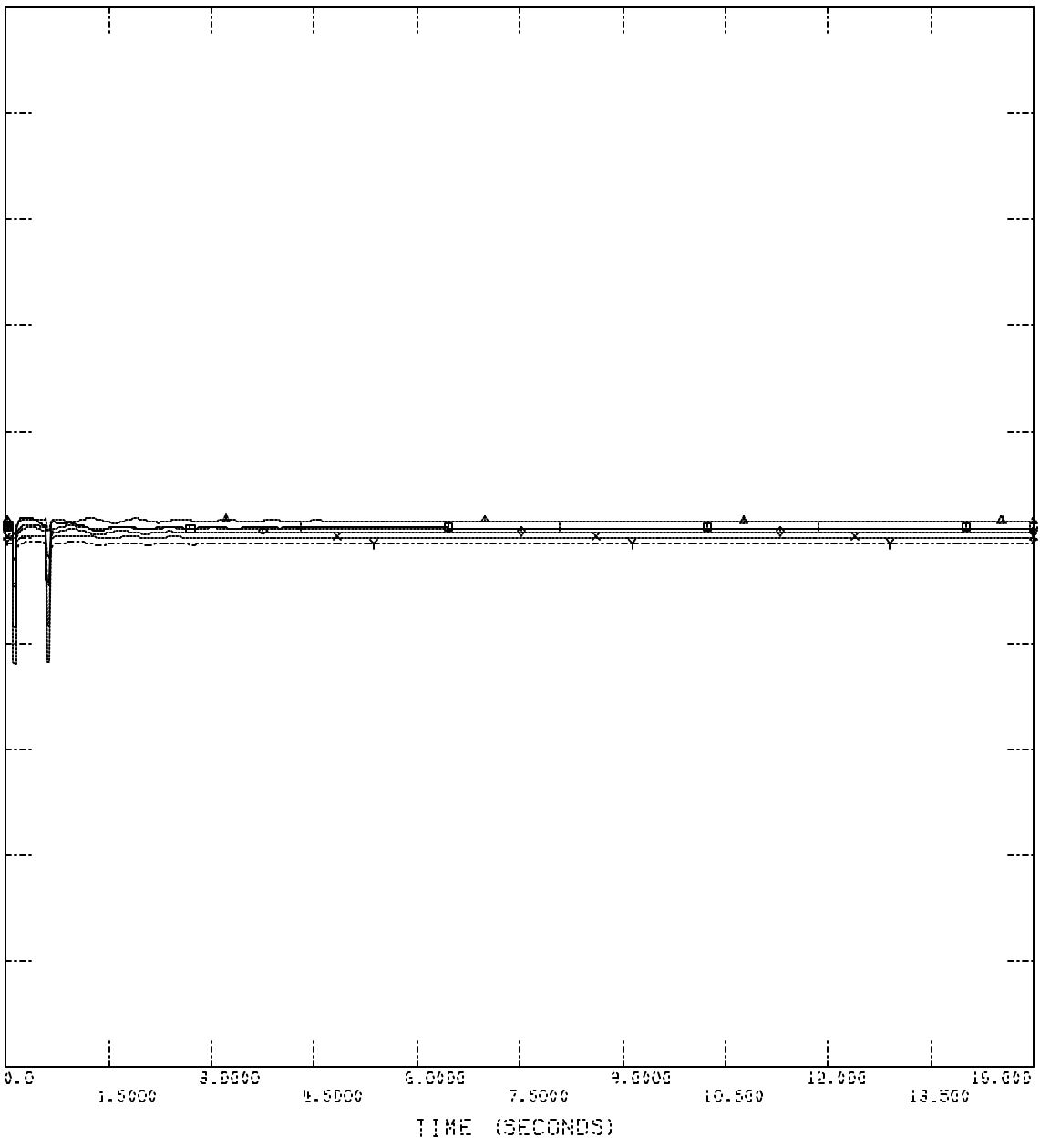
CHNL # 293: EVOLTAGE\_PLEASNT\_HIL 395KVJ

CHNL # 296: EVOLTAGE\_FAI1P1 395KVJ

CHNL # 292: EVOLTAGE\_ST\_JOE 395KVJ

CHNL # 281: EVOLTAGE\_JEC\_N 395KVJ

CHNL # 279: EVOLTAGE\_IRTPN 395KVJ



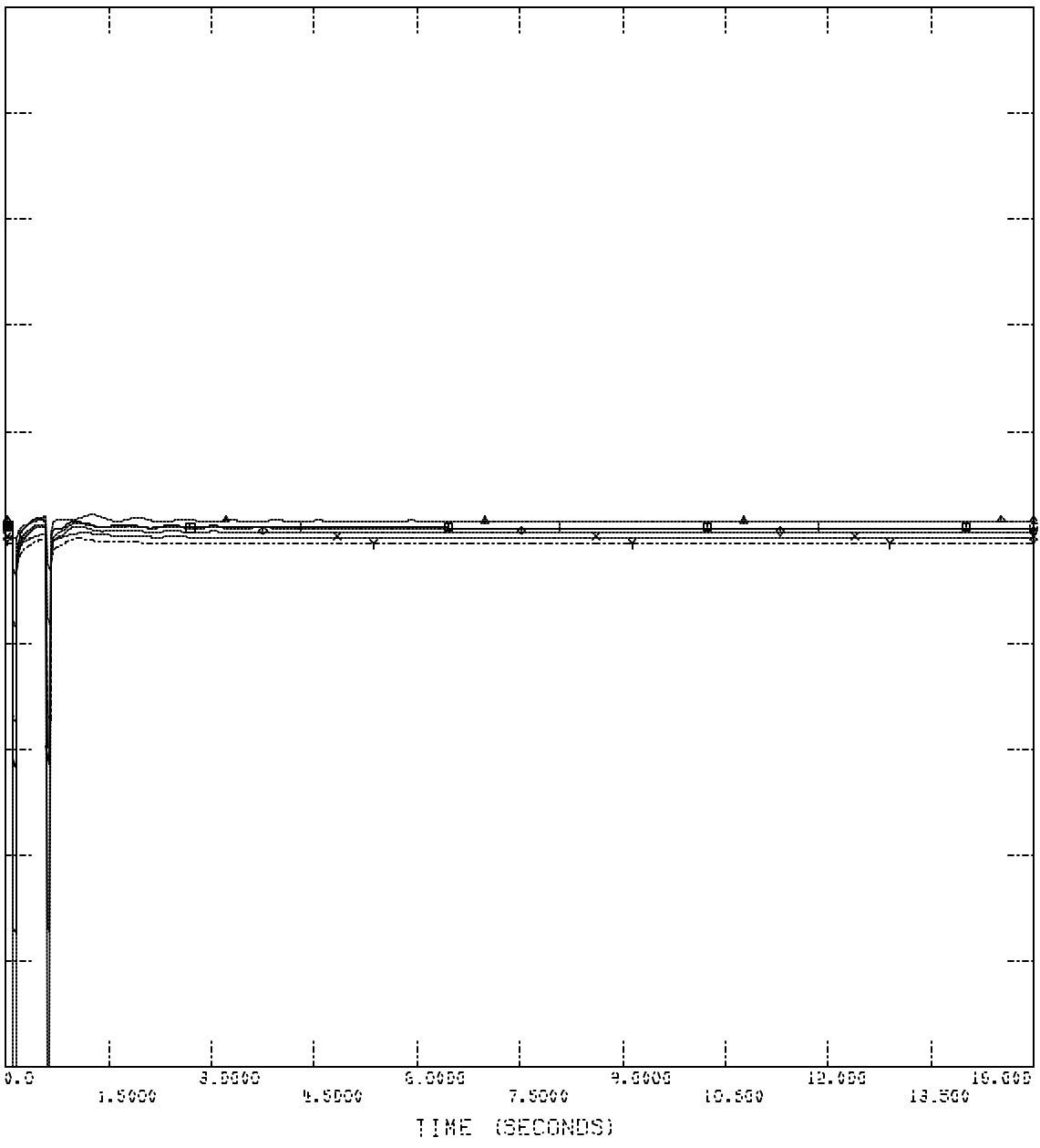
TUE, SEP 07 2004 16:27  
FLT\_5\_1PH\_VOLTAGES

395KVA  
1000V  
1000V

SPP MDMS ON STABILITY; 2010 SUN PEAK; MODIFIED  
GEN-2004-012 900MW ITRPN 2 ADDITION NO UPGRADES

FILE: C:\Interconnection Studies\Work\Inq\900MW\FESUL 19\FLT\_5\_SPH\_OUT

|        |                                         |     |
|--------|-----------------------------------------|-----|
| 2.0000 | CHNL # 278: EVOLTAGE BRPH 395KV]        | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV] | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV]      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV]      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV]       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE ITRPN 395KV]       | 0.0 |



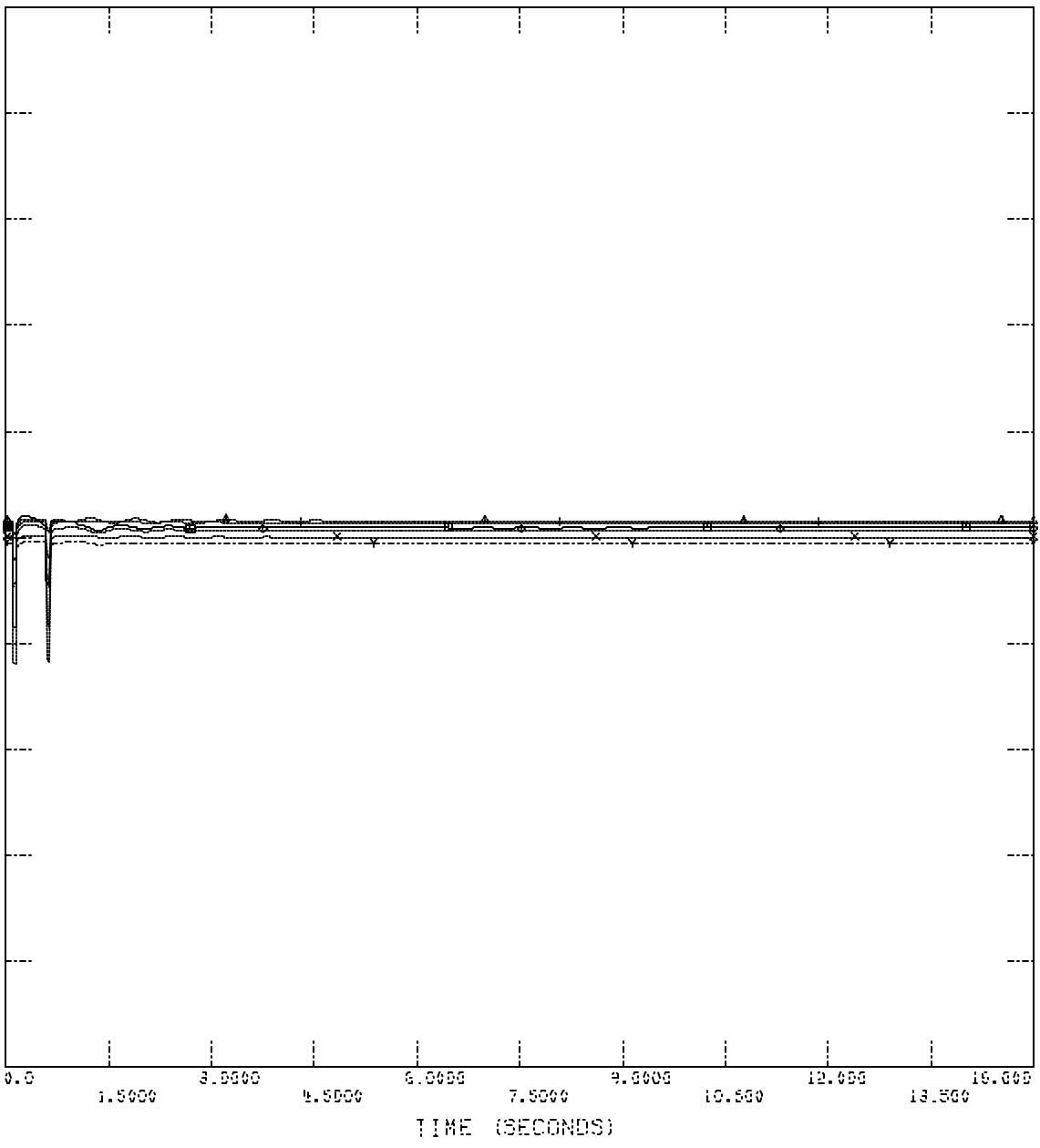
TUE, SEP 07 2004 16:27  
FLT\_5\_SPH\_VOLTAGES

395KVA  
 172.4  
 172.4

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW IRTPN 2 ADDITION NO UPDATES

FILE: C:\Interconnection Studies\WORLD\900MW\FESUL19\FLT\_6\_1PH.GUT

|        |                                         |     |
|--------|-----------------------------------------|-----|
| 2.0000 | CHNL # 278: EVOLTAGE BRN1 395KV]        | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV] | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV]      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV]      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV]       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRTPN 395KV]       | 0.0 |



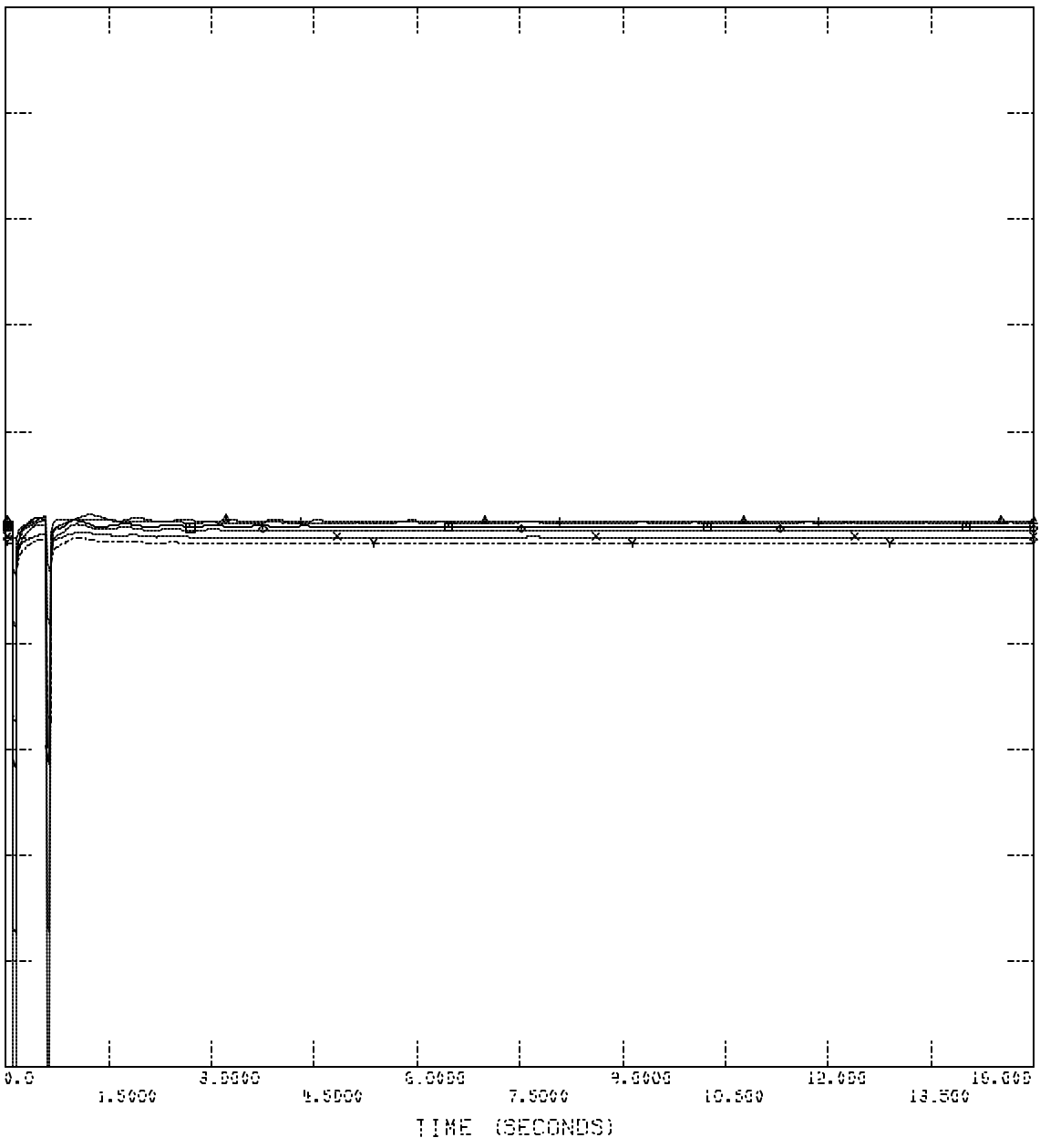
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 FLT\_6\_1PH\_VOLTAGES

395KVA  
 172.4  
 172.4

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW ITRPN 2 ADDITION NO UPGRIDES

FILE: C:\Interconnection Studies\Work\Inq\900MW\FESUL 19\FLT\_6\_SPH\_OUT

|        |                                         |     |
|--------|-----------------------------------------|-----|
| 2.0000 | CHNL # 278: EVOLTAGE BRNTH 395KV]       | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV] | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV]      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV]      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV]       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE ITRPN 395KV]       | 0.0 |



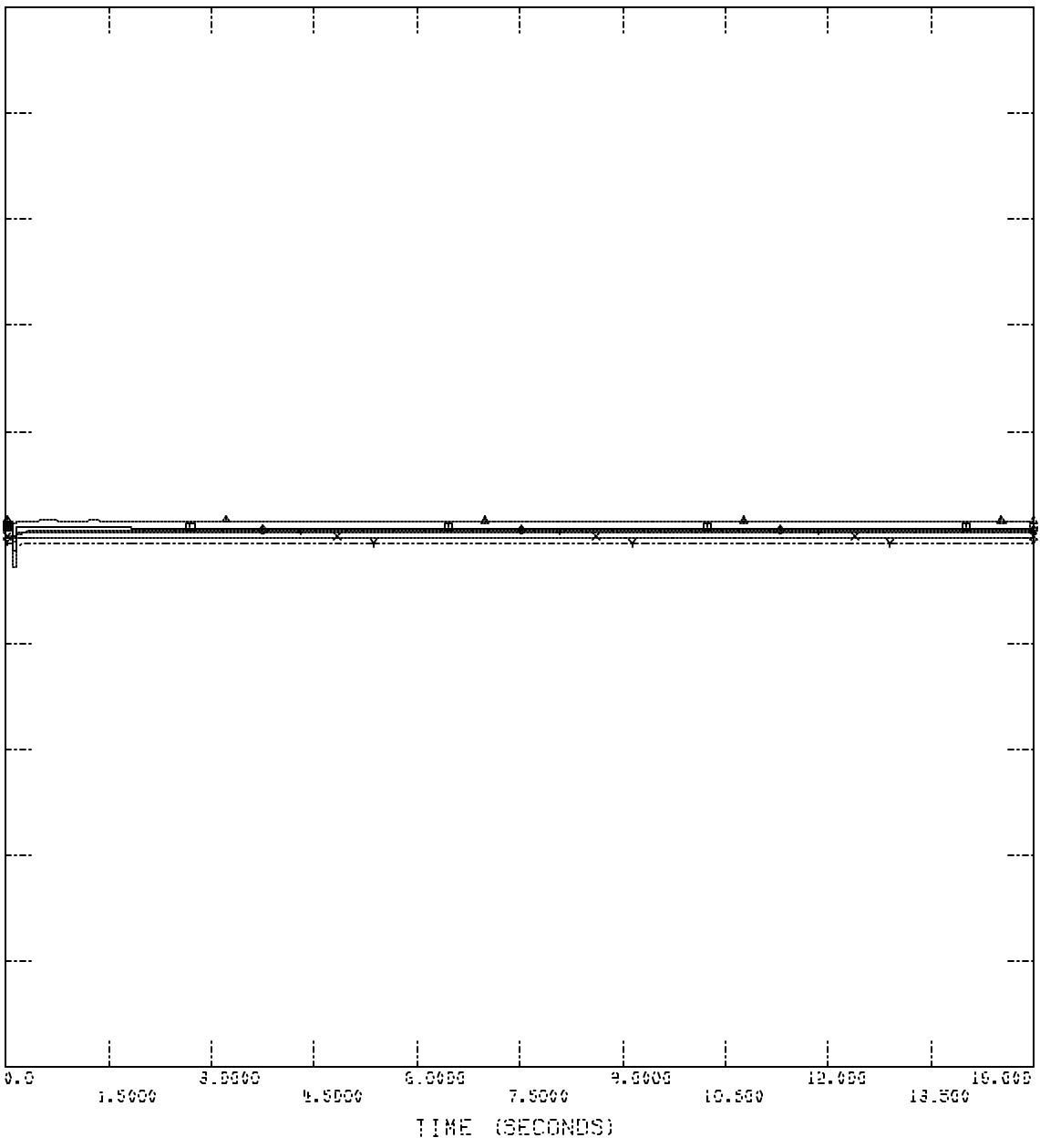
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 FLT\_6\_SPH\_VOLTAGES

395KVA  
 172.8  
 172.8

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW IRTPN 2 ADDITION NO UPGRADES

FILE: C:\Interconnection Studies\Work\Inq\900MW\FESUL 19\FLT\_7\_1PH\_OUT

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|--------|-----------------------------------------|-----|
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| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV] | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV]      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV]      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV]       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRTPN 395KV]       | 0.0 |



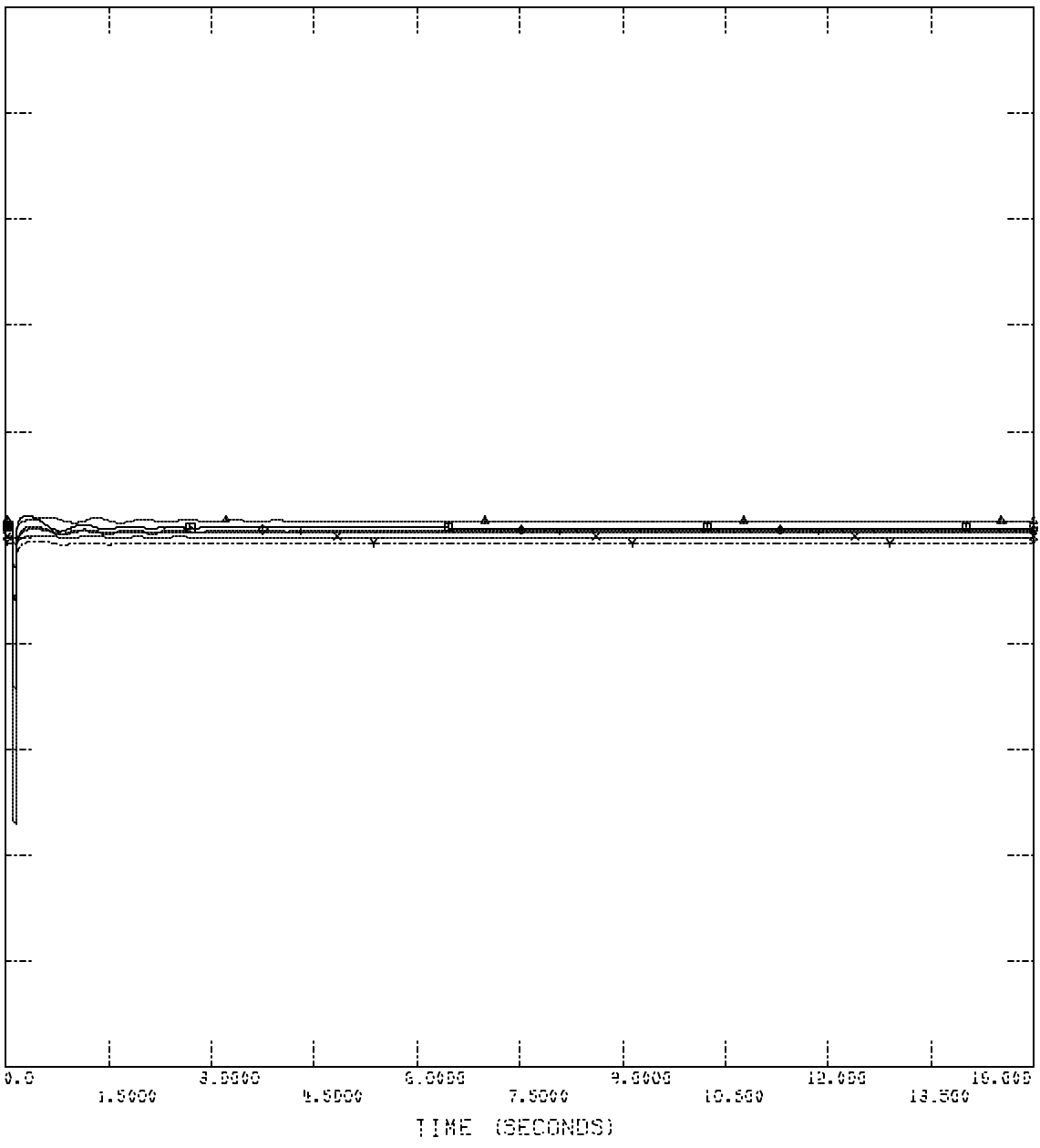
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395KVA  
1000000  
1000000

SPP MDMS ON STABILITY:2010 SUM PEAK\* MODIFIED  
GEN-2004-012 900MW IRTPM 2 ADDITION NO UPGRADES

FILE: C:\Interconnection Studies\WORLD\100\900MW\FESUL 19\FLT\_7\_3PH.GUT

2.0000 CHNL # 278: EVOLTAGE BRPH 395KV] 0.0  
2.0000 CHNL \* 293: EVOLTAGE PLEASNT HIL 395KV] X 0.0  
2.0000 CHNL \* 296: EVOLTAGE FAIRPT 395KV] + 0.0  
2.0000 CHNL \* 292: EVOLTAGE ST JOE 395KV] ◆ 0.0  
2.0000 CHNL \* 281: EVOLTAGE JEC N 395KV] ▲ 0.0  
2.0000 CHNL \* 279: EVOLTAGE IRTPM 395KV] ◆ 0.0



TUE, SEP 07 2004 16:27  
FLT\_7\_3PH\_VOLTAGES



395KVA  
172.4  
172.4

SPP MDMS ON STABILITY; 2010 SUN PEAK; MODIFIED  
GEN-2004-012 900MW IRTPN 2 ADDITION NO UPGRADES

FILE: C:\Interconnection Studies\Work\Inq\900MW\FESUL 19\FLT\_8\_1PH\_OUT

2.0000 CHNL # 278: EVOLTAGE BRN1 395KVJ 0.0

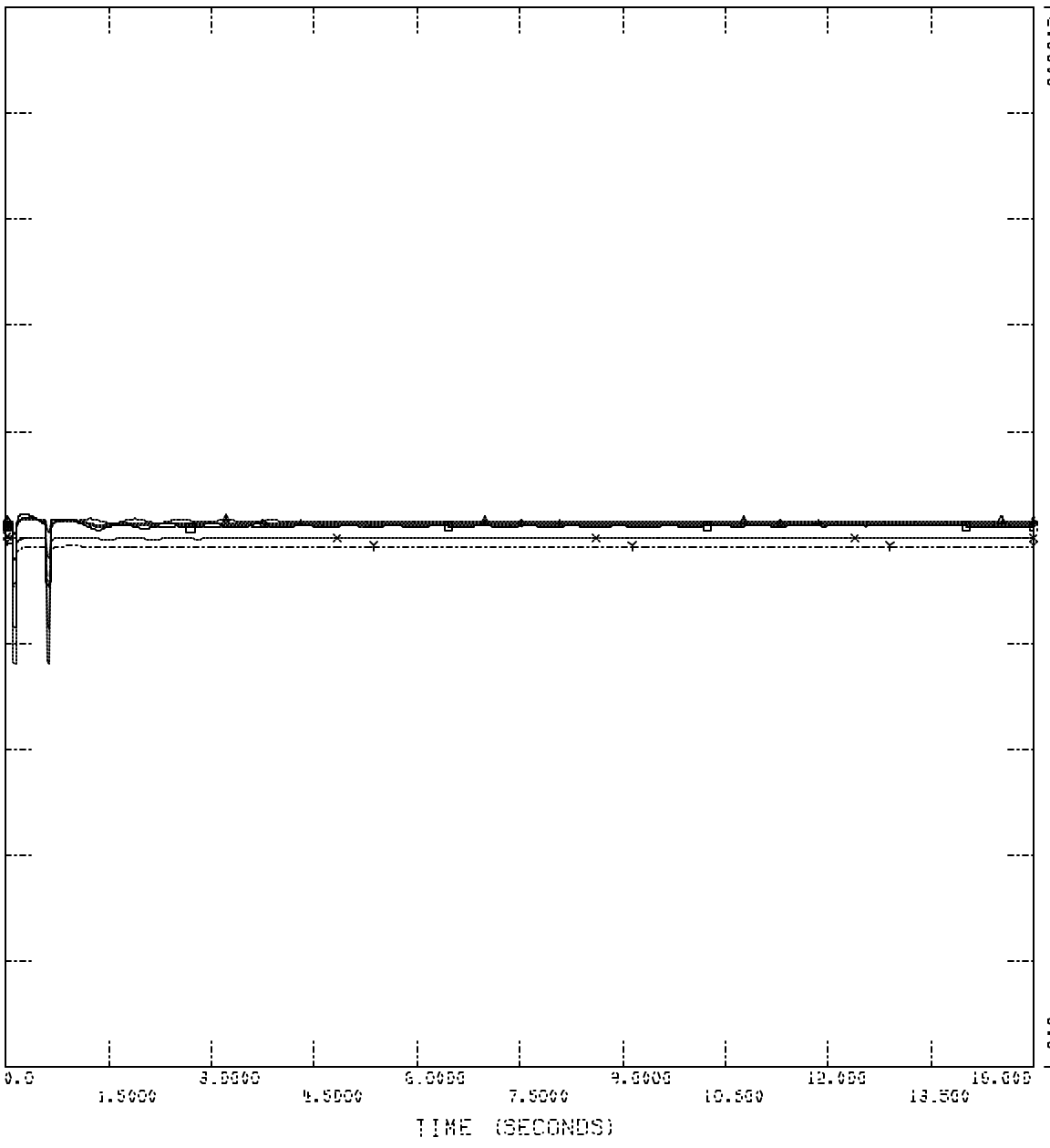
2.0000 CHNL # 293: EVOLTAGE PLEASNT HIL 395KVJ 0.0

2.0000 CHNL # 296: EVOLTAGE FAIRPT 395KVJ 0.0

2.0000 CHNL # 292: EVOLTAGE ST JOE 395KVJ 0.0

2.0000 CHNL # 281: EVOLTAGE JEC N 395KVJ 0.0

2.0000 CHNL # 279: EVOLTAGE IRTPN 395KVJ 0.0



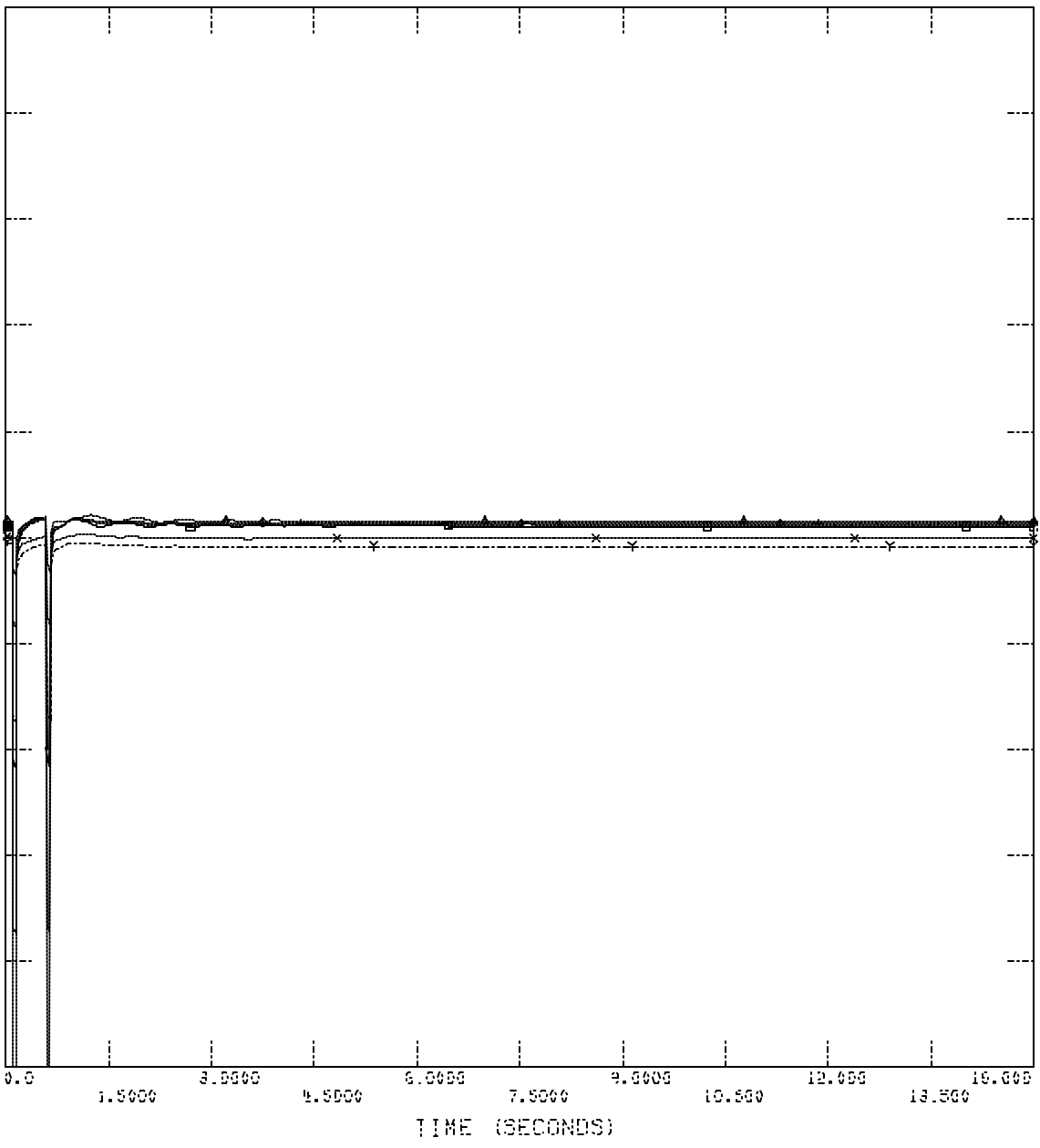
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FLT\_8\_1PH\_VOLTAGES

395KVA  
1000V  
1000000

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED  
GEN-2004-012 900MW ITRPN 2 ADDITION NO UPGRIDES

FILE: C:\Interconnection Studies\WOL\Inq\900MW\FESUL 19\FLT\_8\_SPH.GUT

2.0000 CHNL # 278: EVOLTAGE BRNTH 395KV] 0.0  
2.0000 CHNL \* 293: EVOLTAGE PLEASNT HIL 395KV] X  
2.0000 CHNL \* 296: EVOLTAGE FAIRPT 395KV] +  
2.0000 CHNL \* 292: EVOLTAGE ST JOE 395KV] ◆  
2.0000 CHNL \* 281: EVOLTAGE JEC N 395KV] ◆  
2.0000 CHNL \* 279: EVOLTAGE ITRPN 395KV] ◆  
2.0000 0.0



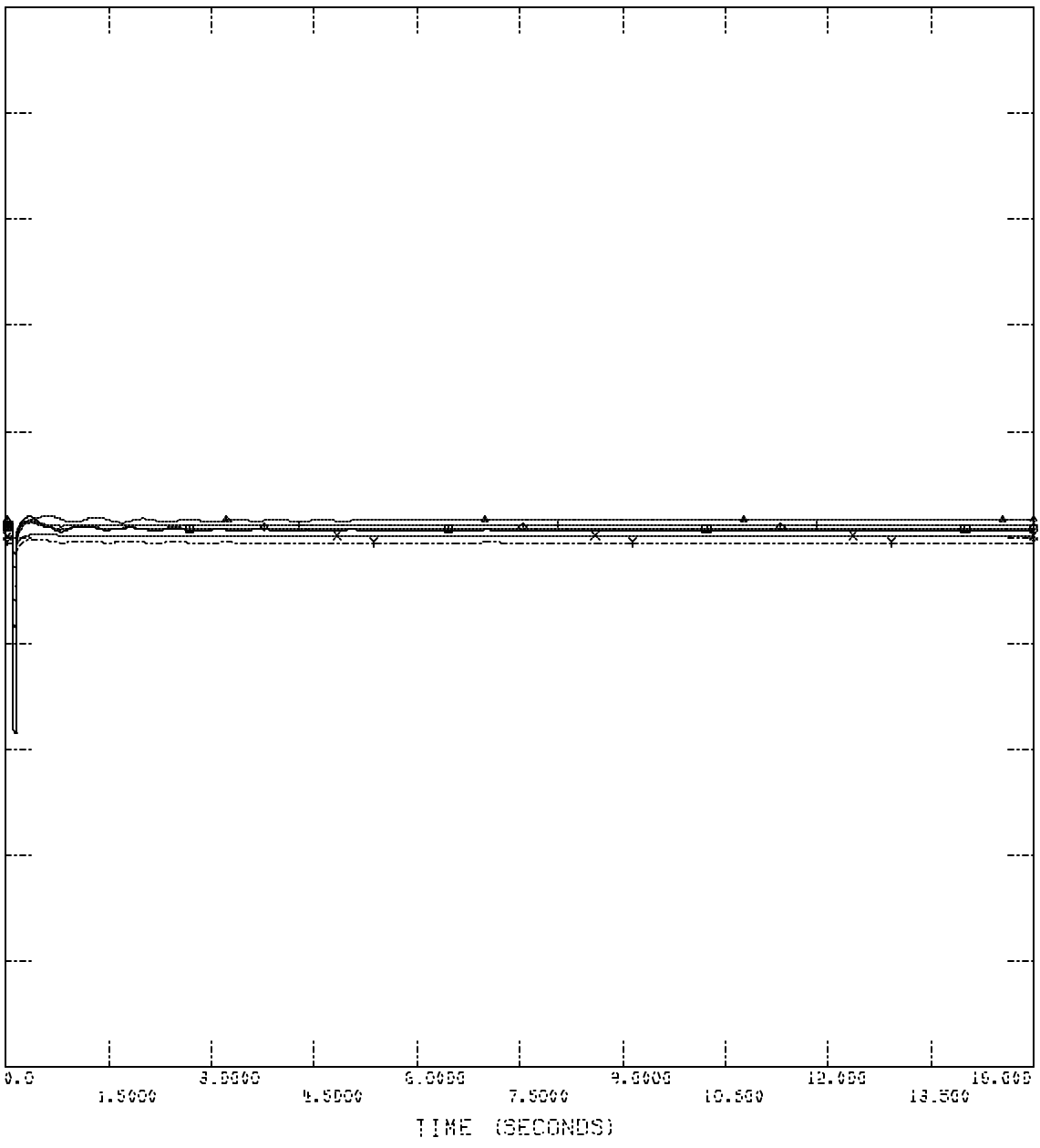
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FLT\_8\_SPH\_VOLTAGES

395KV  
 272A  
 272A

SPP MDMS 04 STABILITY;2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW ITRFM 2 ADDITION NO UPGRADES

FILE: C:\Interconnection Studies\Working\900MW\RESULT9\FLT\_9.OUT

|        |                                         |     |
|--------|-----------------------------------------|-----|
| 2.0000 | CHNL # 272A: CVOLTAGE BRNTH 395KV]      | 0.0 |
| 2.0000 | CHNL # 293: CVOLTAGE PLEASNT HIL 395KV] | 0.0 |
| 2.0000 | CHNL # 296: CVOLTAGE FAIRPT 395KV]      | 0.0 |
| 2.0000 | CHNL # 292: CVOLTAGE ST JOE 395KV]      | 0.0 |
| 2.0000 | CHNL # 281: CVOLTAGE JEC N 395KV]       | 0.0 |
| 2.0000 | CHNL # 279: CVOLTAGE ITRFM 395KV]       | 0.0 |



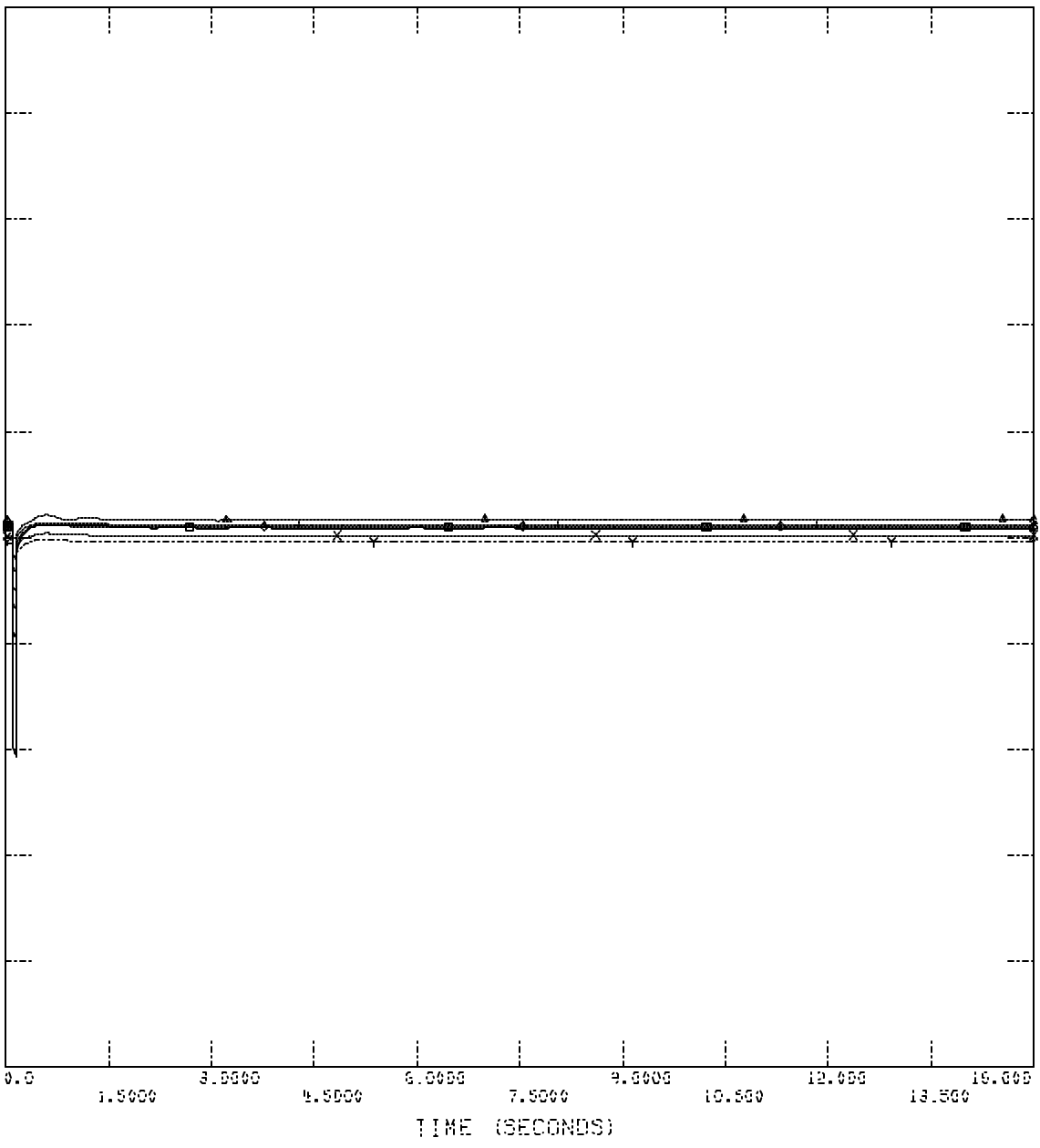
TUE, SEP 07 2004 16:27  
 FLT\_9\_VOLTAGES

395KVA  
 2724  
 2724

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW ITRPN 2 ADDITION NO UPDATES

FILE: C:\Interconnection Studies\WORKING\900MW\RESUL TS\FLT\_10\_001

|        |                                         |     |
|--------|-----------------------------------------|-----|
| 2.0000 | CHNL # 2724: EVOLTAGE BRN1R 395KVJ      | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KVJ | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KVJ      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KVJ      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KVJ       | 0.0 |
| 2.0000 | CHNL # 272: EVOLTAGE ITRPN 395KVJ       | 0.0 |



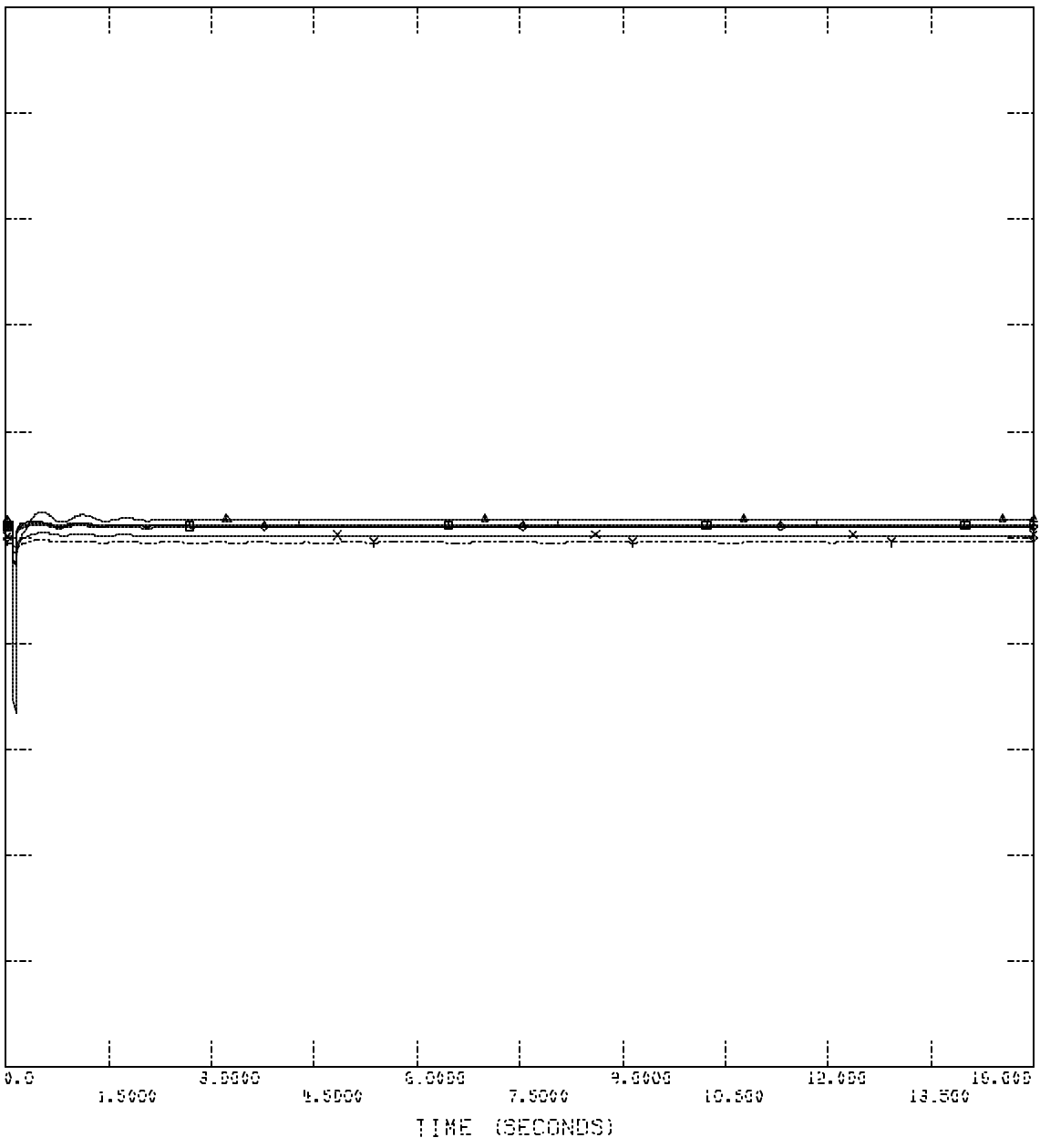
TUE, SEP 07 2004 16:27  
 FLT\_10\_VOLTAGES

395KV  
 2724  
 2724

SPP MDMS 04 STABILITY;2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW ITRPN 2 ADDITION NO UPGRIDES

FILE: C:\Interconnection Studies\WORKING\900MW\RESUL TS\FLT\_11\_11.001

|        |                                         |     |
|--------|-----------------------------------------|-----|
| 2.0000 | CHNL # 2724: EVOLTAGE BRN1R 395KV]      | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV] | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV]      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV]      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV]       | 0.0 |
| 2.0000 | CHNL # 272: EVOLTAGE ITRPN 395KV]       | 0.0 |

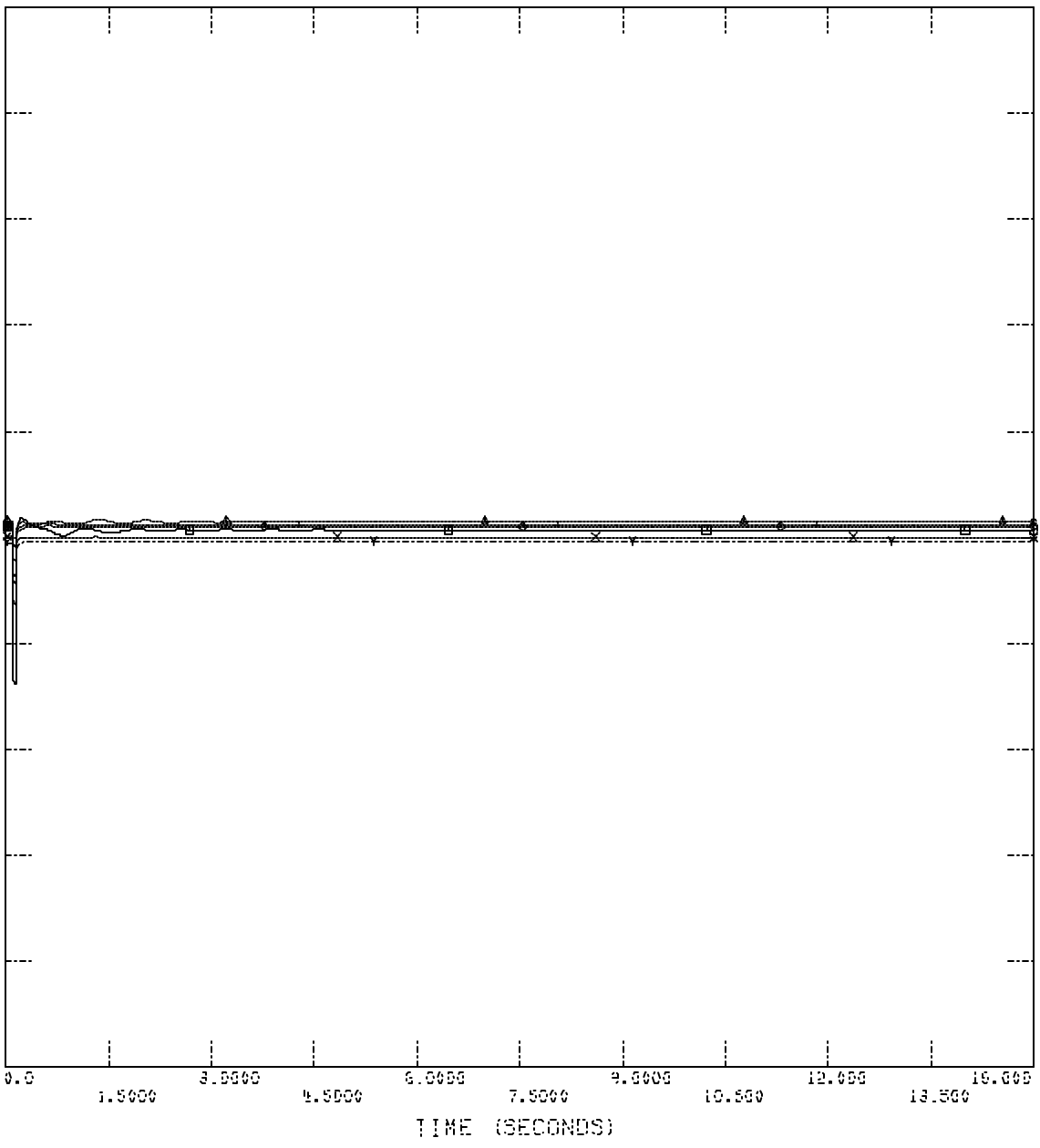


TUE, SEP 07 2004 16:27  
 FLT\_11\_VOLTAGES

395KVA  
12.1PH  
100MM

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED  
GEN-2004-012 900MM IRTPM 2 ADDITION NO UPGRADES

FILE: C:\Interconnection Studies\Working\900MM\RESULT\_12\_1PH.OUT  
CHNL # 278: EVOLTAGE\_HPRM 395KV] 0.0  
CHNL # 293: EVOLTAGE\_PLEASNT\_HIL 395KV] 0.0  
CHNL # 296: EVOLTAGE\_FAIHPT 395KV] 0.0  
CHNL # 292: EVOLTAGE\_ST\_JOE 395KV] 0.0  
CHNL # 281: EVOLTAGE\_JEC\_N 395KV] 0.0  
CHNL # 279: EVOLTAGE\_IRTN 395KV] 0.0



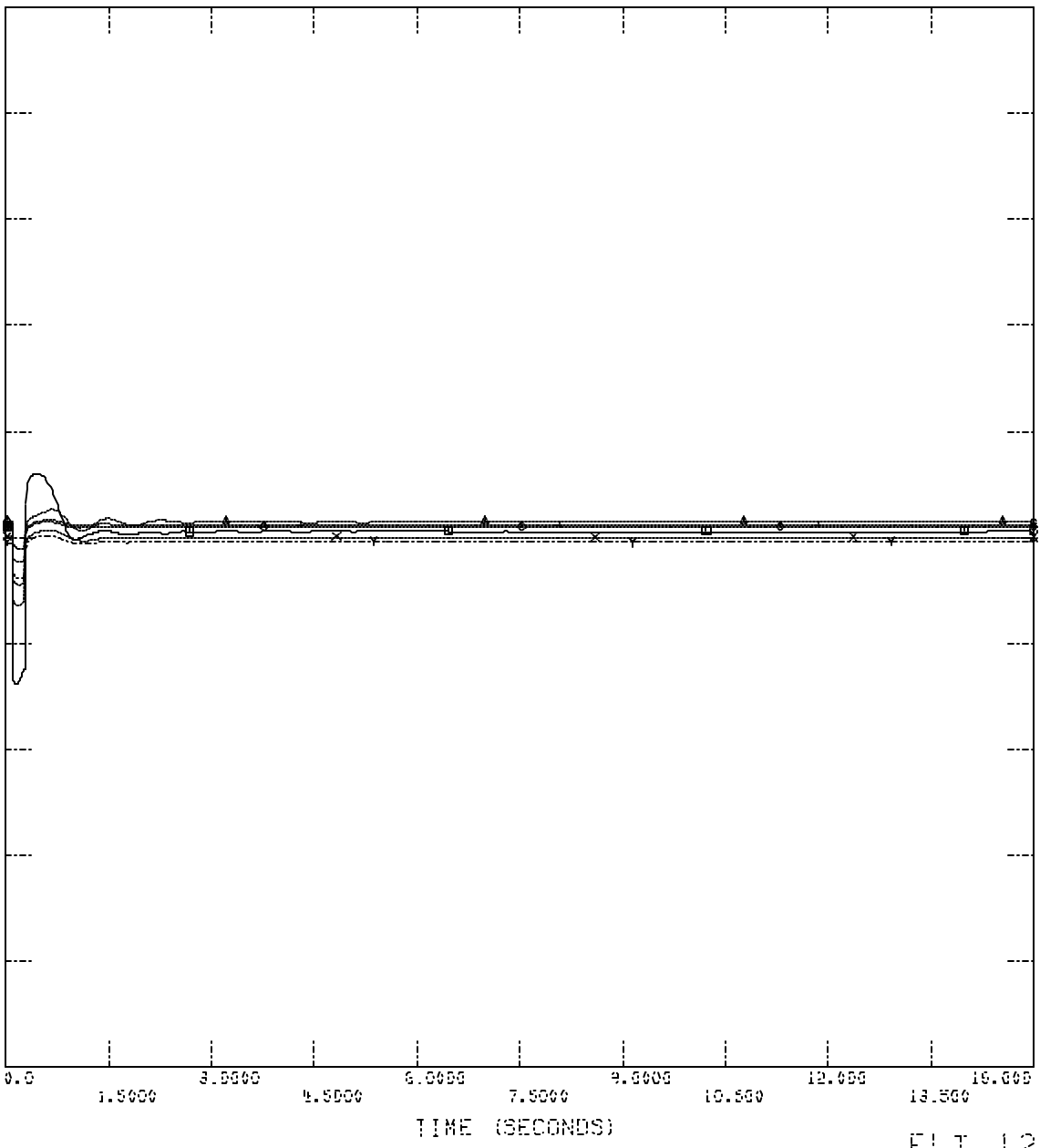
TUE, SEP 07 2004 16:27  
FLT\_12\_1PH\_VOLTAGES

395KVA  
 12.1PH  
 12.1PH

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW IRTPN 2 ADDITION NO UPGRADES

FILE: C:\Interconnection Studies\... \900MW\RESUL12VFLT\_12.1PH\_STUCK.DAT

|        |                                         |     |
|--------|-----------------------------------------|-----|
| 2.0000 | CHNL # 278: EVOLTAGE BRIN 395KVJ        | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KVJ | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KVJ      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KVJ      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KVJ       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRTPN 395KVJ       | 0.0 |



TUE, SEP 07 2004 16:27

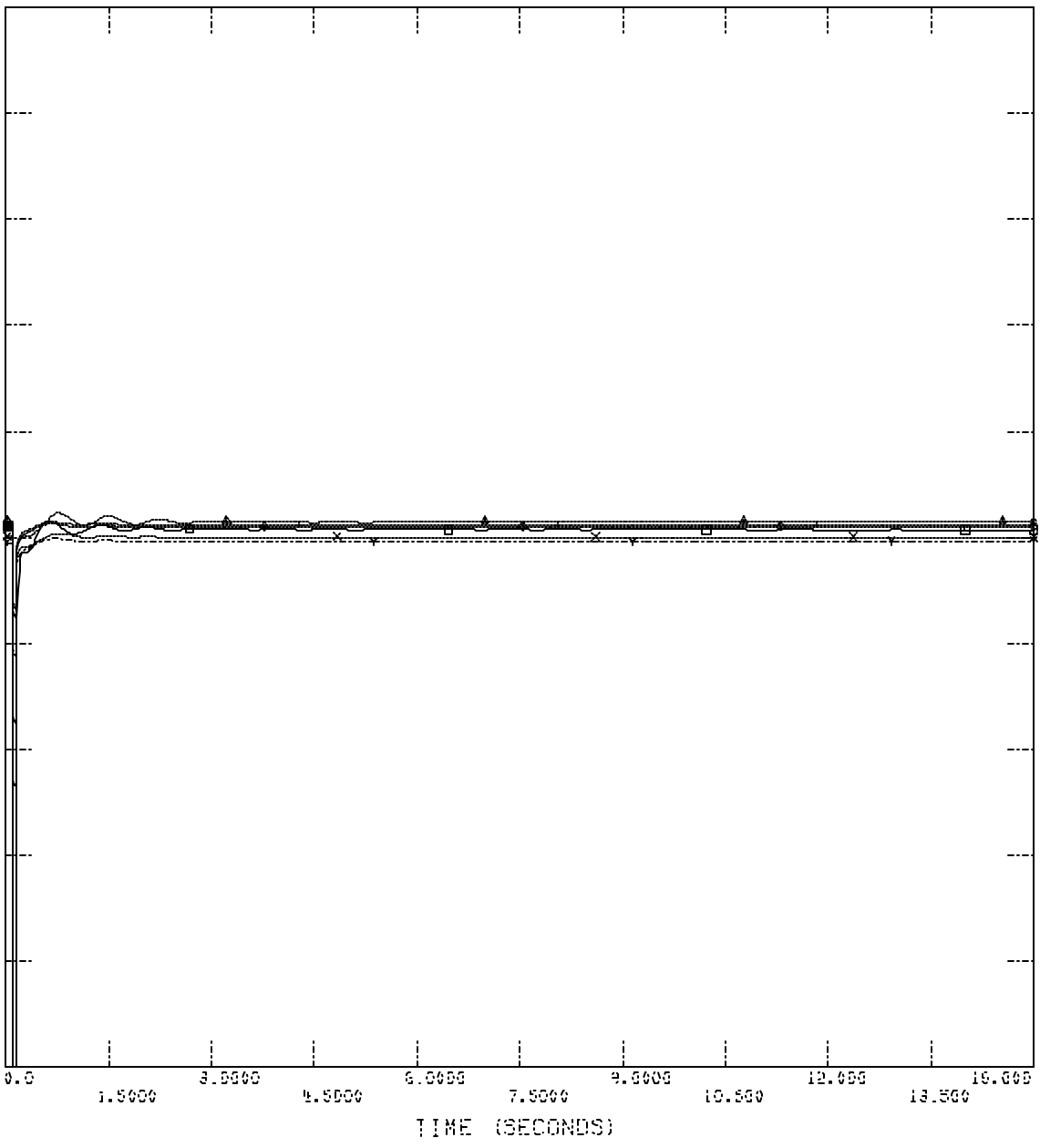
FLT\_12\_1PH\_STUCK\_VOLTAGES

395KVA  
 2724  
 2724

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW IRTFM 2 ADDITION NO UPGRADES

FILE: C:\Interconnection Studies\Working\900MW\RESULT\TSVFLT\_12\_3PH.OUT

|        |                                         |     |
|--------|-----------------------------------------|-----|
| 2.0000 | CHNL # 2724: EVOLTAGE_HPHIL_395KV]      | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE_PLEASNT_HIL_395KV] | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE_FAIHPT_395KV]      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE_ST_JOE_395KV]      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE_JEC_N_395KV]       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE_IRTAN_395KV]       | 0.0 |



TUE, SEP 07 2004 16:27  
 FLT\_12\_3PH\_VOLTAGES

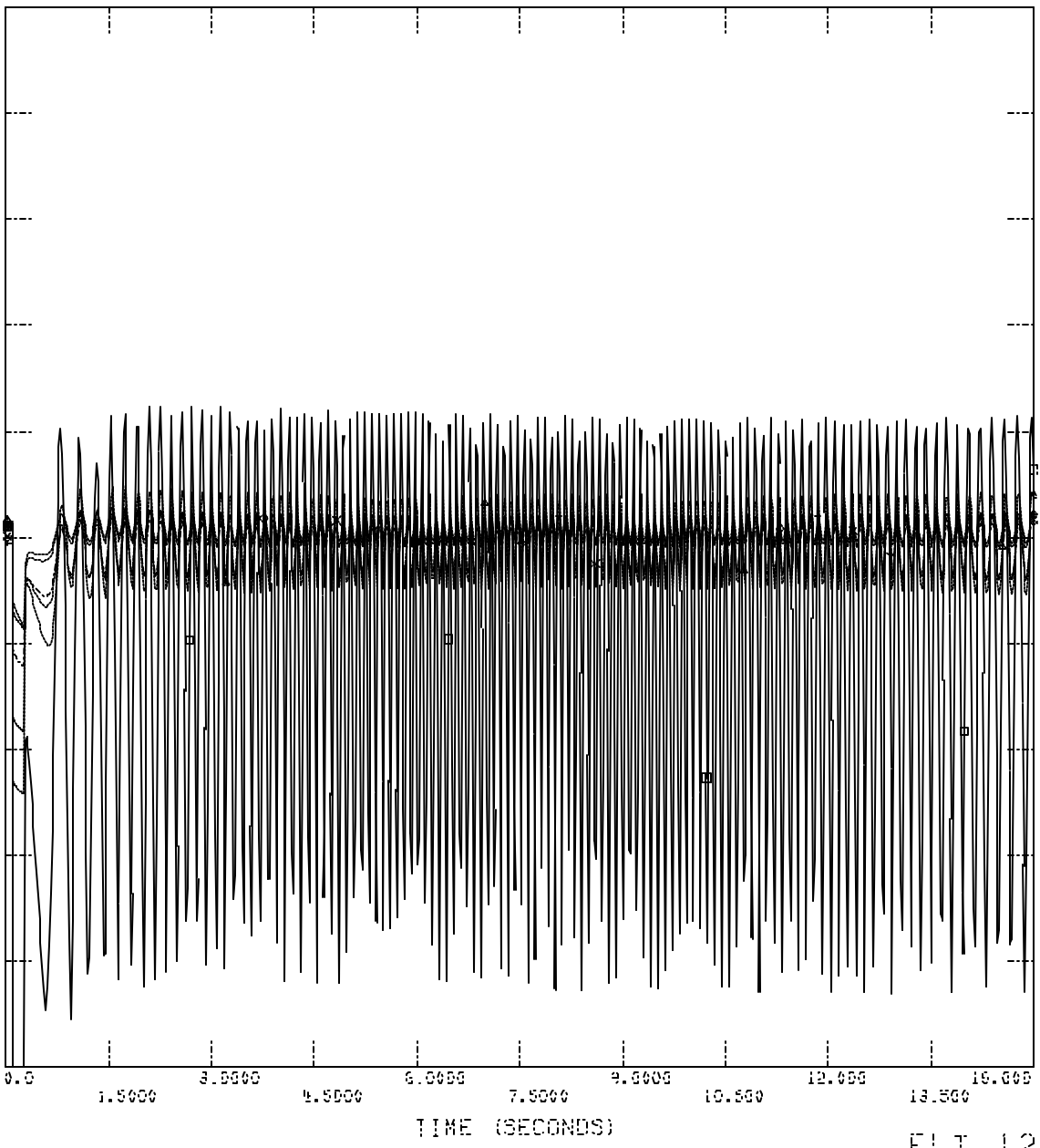


395KVA  
 12.3PH  
 2724

SPP MDMS 04 STABILITY;2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MM ITRPM 2 ADDITION NO UPDATES

FILE: C:\Interconnection Studies\... \900MM\RESUL1\SVFL1\_12\_3PH\_STUCK.DAT

|        |                                         |     |
|--------|-----------------------------------------|-----|
| 2.0000 | CHNL * 274: CVOLTAGE BRN 395KV]         | 0.0 |
| 2.0000 | CHNL * 293: CVOLTAGE PLEASNT HIL 395KV] | 0.0 |
| 2.0000 | CHNL * 296: CVOLTAGE FAIRPT 395KV]      | 0.0 |
| 2.0000 | CHNL * 292: CVOLTAGE ST JOE 395KV]      | 0.0 |
| 2.0000 | CHNL * 281: CVOLTAGE JEC N 395KV]       | 0.0 |
| 2.0000 | CHNL * 279: CVOLTAGE ITRPM 395KV]       | 0.0 |



TUE, SEP 07 2004 16:27

FLT\_12\_3PH\_STUCK\_VOLTAGES

## **Appendix C-1**

### **Plots of Fault Simulations**

Plots of selected machine angle response during faults

Scenario:

2010 Summer Peak

900MW

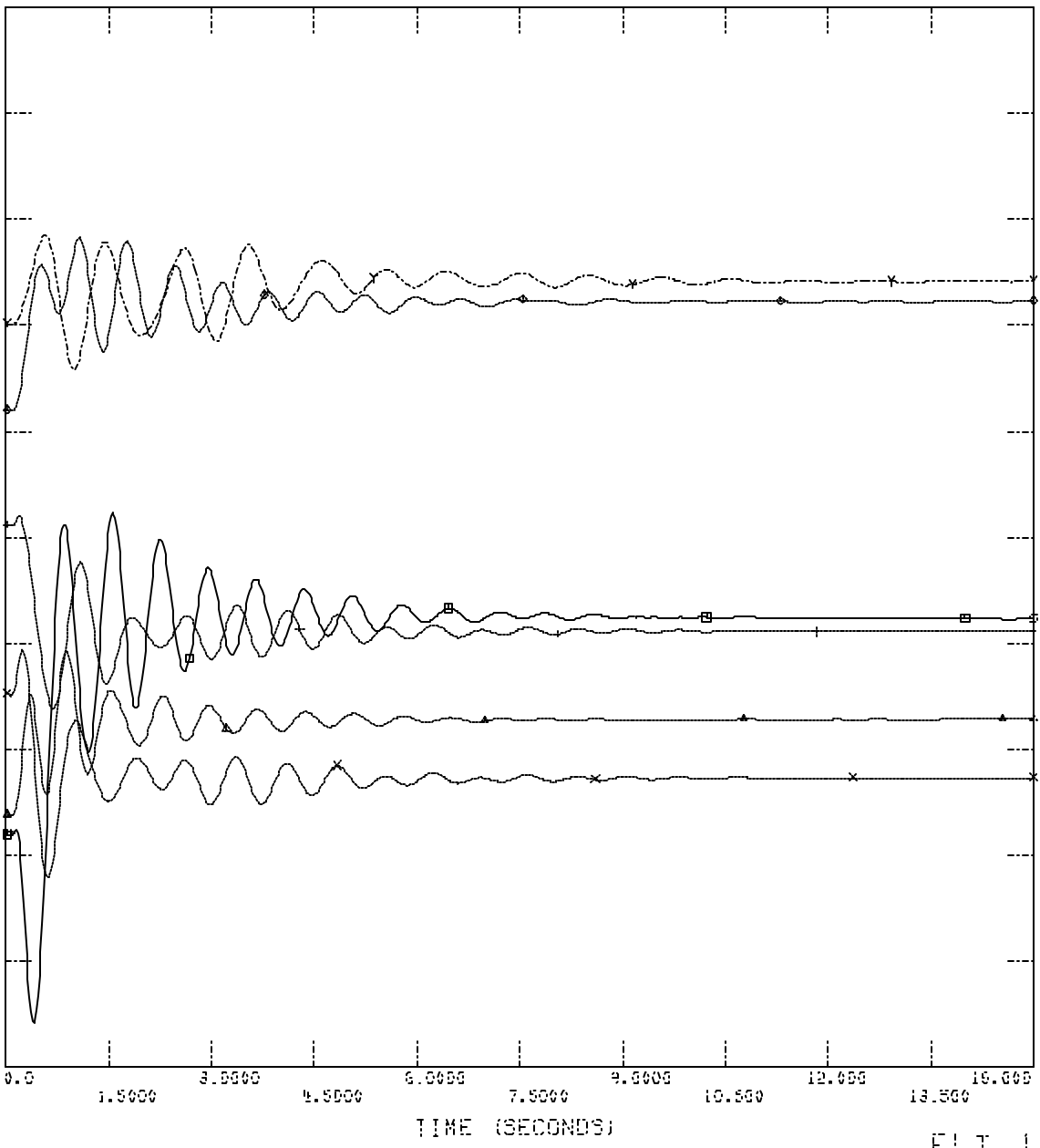
[Customer Plant at 900MW – Iatan-Nashua 345kV]

3000  
1000  
500  
250

SPP MDMG Q4 STABILITY;2010 SUM PEAK; MODIFIED  
GEN-2004-012 900MM INCL PRIOR QUEUED WITH 345KV UPGRADE

FILE: C:\Interconnection Studies\... \RESULTS\F1\_1\_1PH.001

35.000 CHNL # 14: ERNG JEFFREY EN CNTR MEREJ 10.000  
45.000 CHNL # 19: ERNG TECUMSEH EN CNTR MEREJ 20.000  
25.000 CHNL # 16: ERNG COOPER NPP03 0.0  
35.000 CHNL # 66: ERNG COOPER NPP03 10.000  
100.00 CHNL # 3: ERNG JATRN G1 KPPL3 0.0  
70.000 CHNL # 2: ERNG JATRN G2 KPPL3 25.000



TUE, SEP 07 2004 16:09

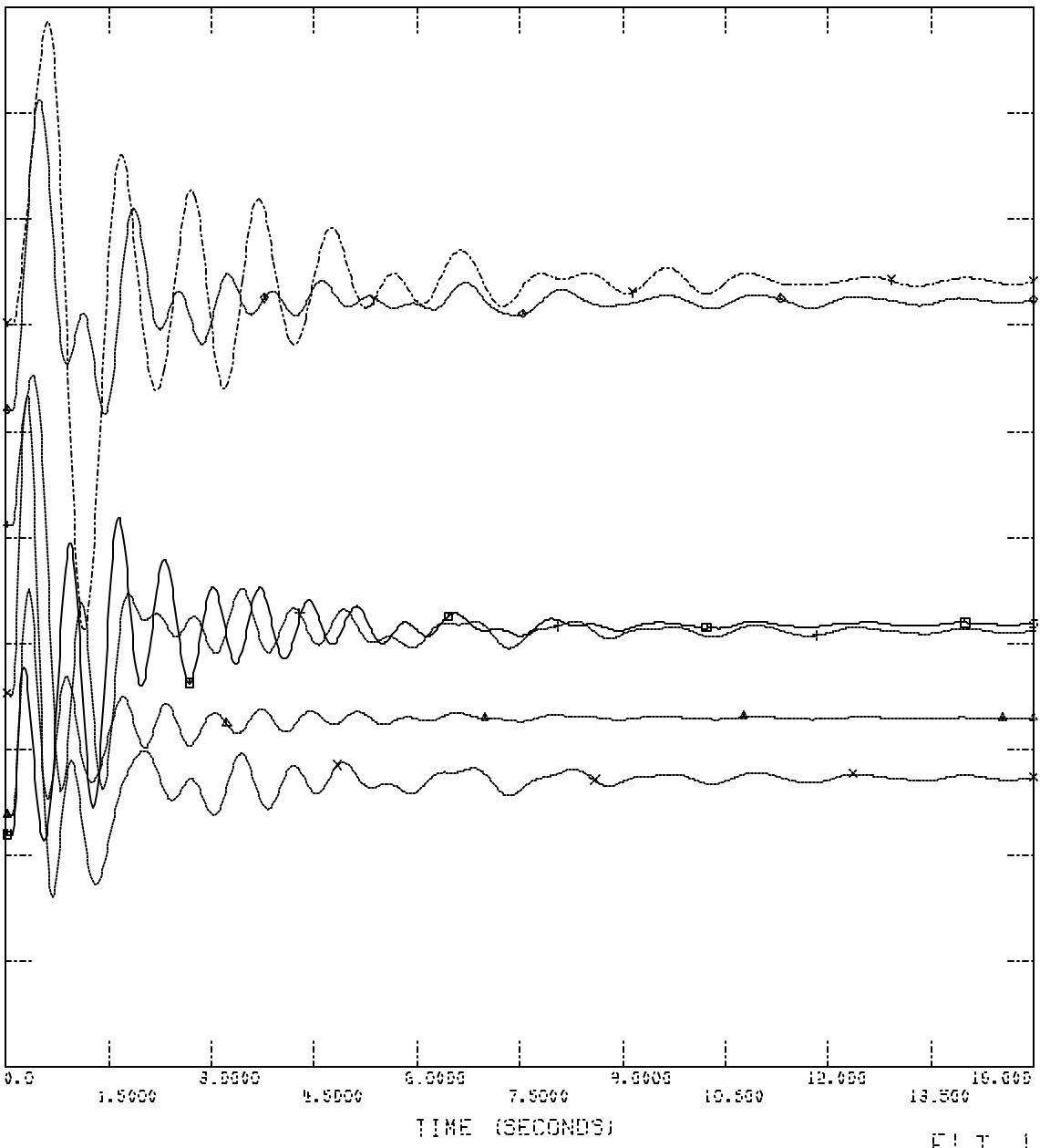
FLT\_1\_1PH\_MACHINE ANGLES

3000 PAGES  
 10/27  
 10/27

SPP MDMG Q4 STABILITY; 2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MM INCL PRIOR QUEUED WITH 345KV UPGRADE

FILE: C:\Interconnection Studies\... \RESUL TS\FL1\_1\_3PH\_001

|        |                                        |        |
|--------|----------------------------------------|--------|
| 35.000 | CHNL # 19: ERNG JEFFREY EN CNTR MERED  | 10.000 |
| 45.000 | CHNL # 16: ERNG TECUMSEH EN CNTR MERED | 20.000 |
| 25.000 | CHNL # 66: ERNG COOPER NPP03           | 0.0    |
| 35.000 | CHNL # 3: ERNG JARVIS G1 KPPLD         | 10.000 |
| 100.00 | CHNL # 2: ERNG JARVIS G2 KPPLD         | 0.0    |
| 70.000 |                                        | 25.000 |



TUE, SEP 07 2004 16:09

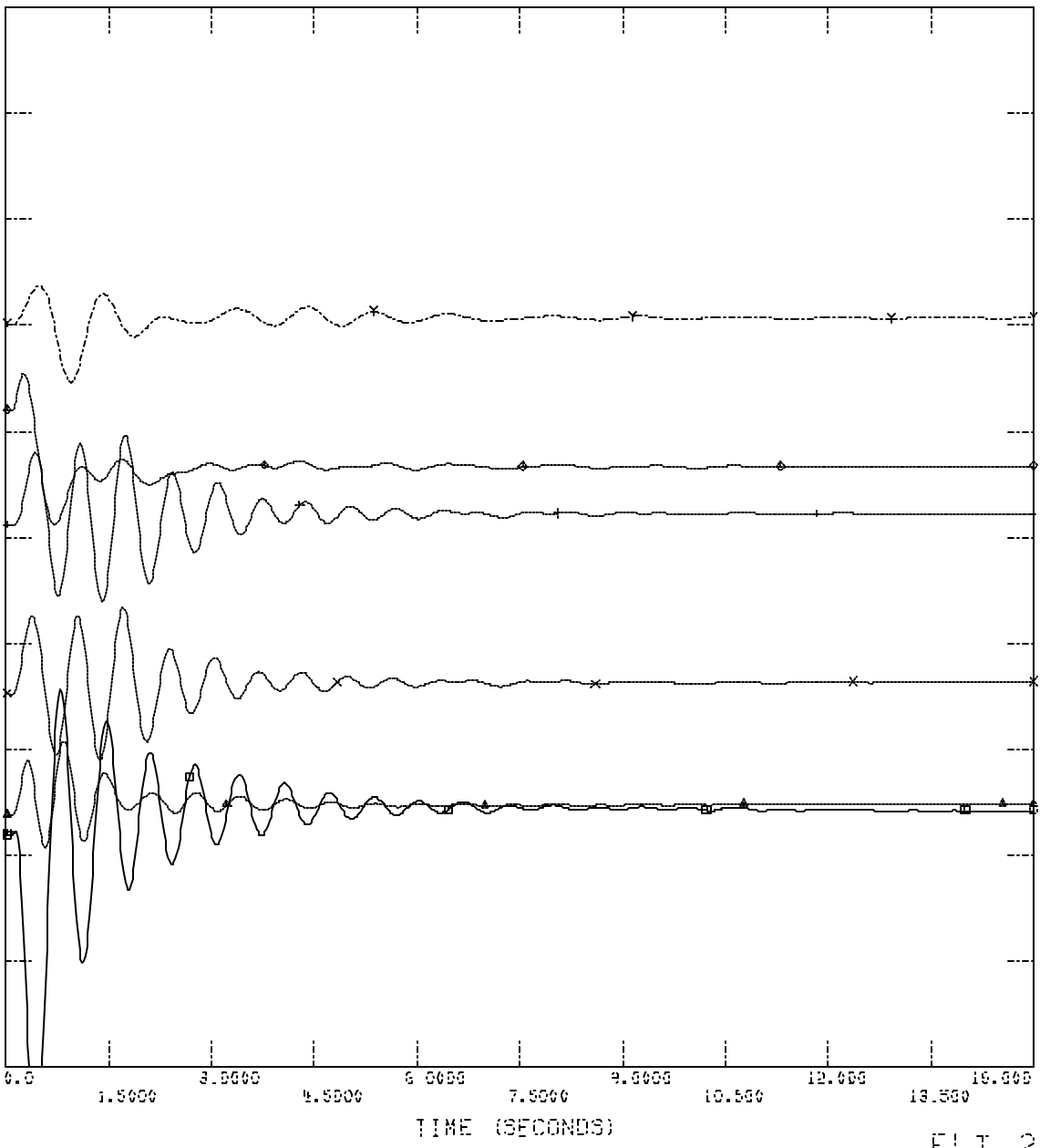
FLT\_1\_3PH\_MACHINE ANGLES

A  
 1000  
 500  
 0  
 -500  
 -1000

SPP MDMS 04 STABILITY;2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MM INCL PRIOR QUEUED WITH SUSKY UPGRADE

FILE: C:\Interconnection Studies\... \RESUL15\F1\_2\_1PH.001

CHNL # 14: ERNG JEFFREY EN CNTR MEREJ 10.000  
 CHNL # 16: ERNG TECUMSEH EN CNTR MEREJ 20.000  
 CHNL # 66: ERNG COOPER NPP0J 0.0  
 CHNL # 3: ERNG JARIN GJ KPPLJ 10.000  
 CHNL # 2: ERNG JARIN G2 KPPLJ 0.0  
 70.000 25.000



TUE, SEP 07 2004 16:09

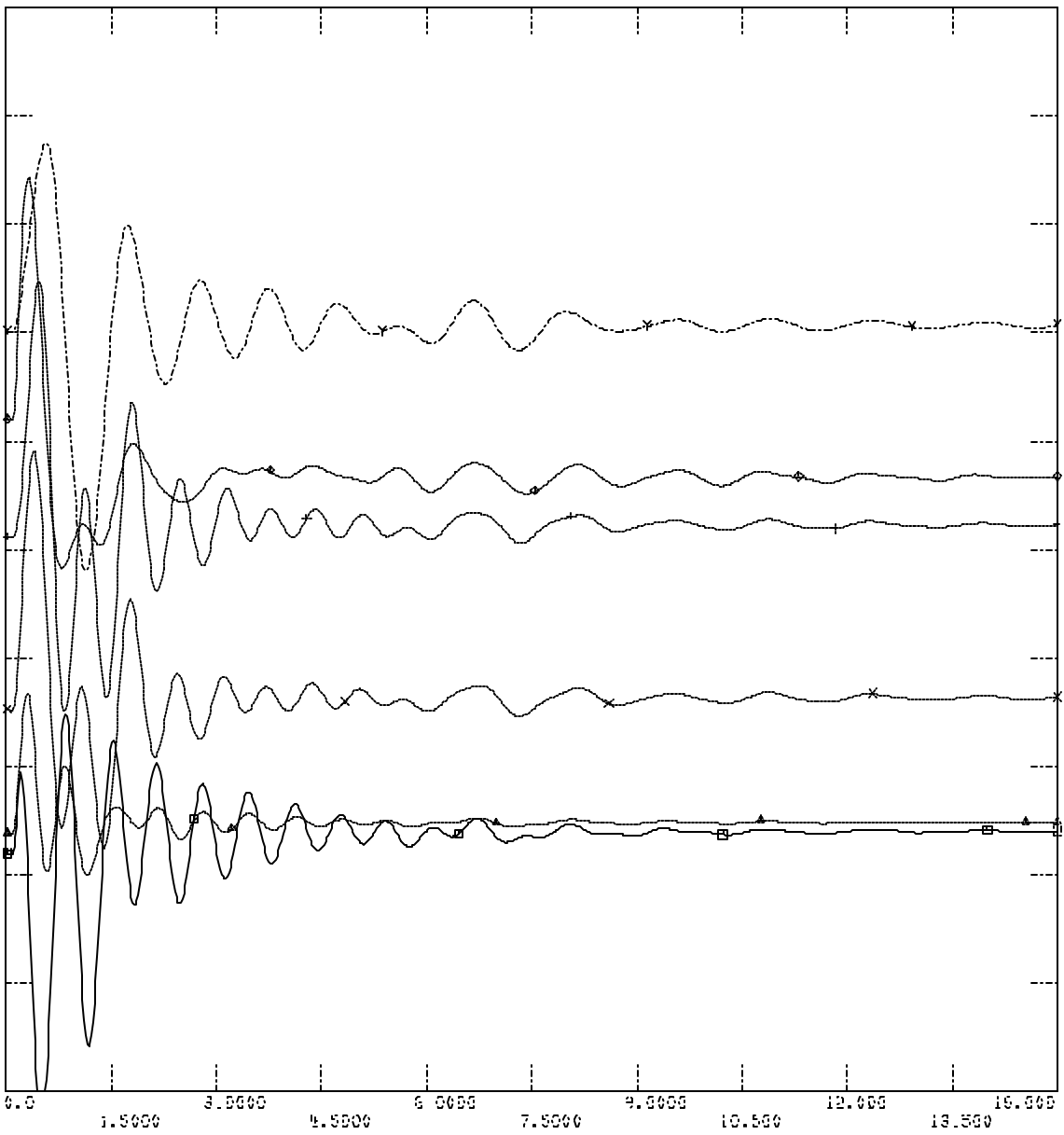
FLT\_2\_1PH\_MACHINE ANGLES

3000  
 2000  
 1000  
 0  
 -1000  
 -2000  
 -3000

SPP MDMS 04 STABILITY;2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MM INCL PRIOR QUEUED WITH SUSKY UPGRADE

FILE: C:\Interconnection Studies\... \RESUL1SVFL1\_2\_3PH.001

CHNL # 14: ERNG JEFFREY EN CNTR MEREJ 10.000  
 CHNL # 10: ERNG ME. C13. KPPLJ  
 CHNL # 19: ERNG TECUMSEH EN CNTR MEREJ 20.000  
 CHNL # 66: ERNG COOPER NPP0J 0.0  
 CHNL # 3: ERNG JATRN GJ KPPLJ 10.000  
 CHNL # 2: ERNG JATRN G2 KPPLJ 0.0  
 70.000 25.000



TUE, SEP 07 2004 16:09

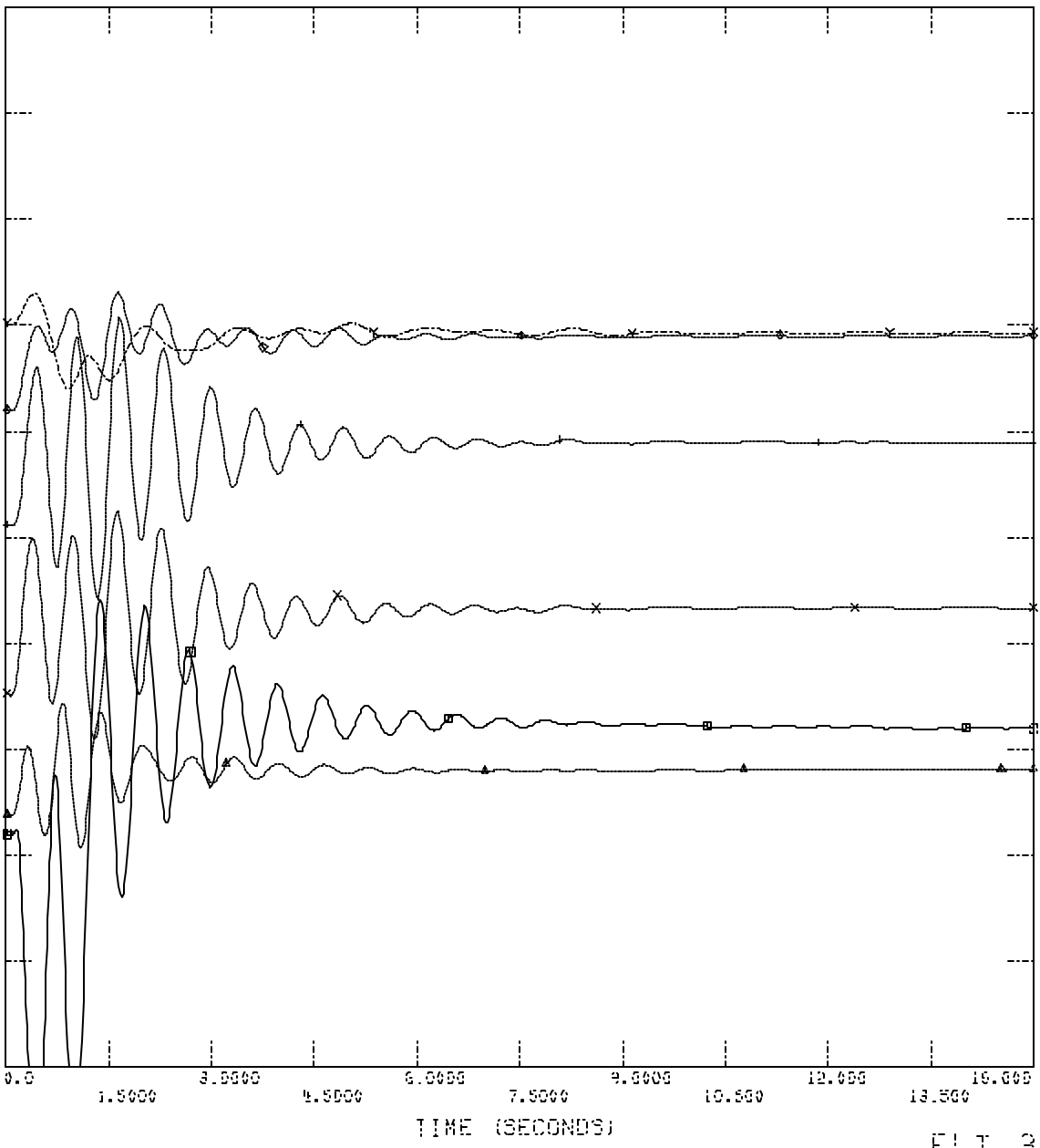
FLT\_2\_3PH\_MACHINE ANGLES

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 10000 WORDS

SPP MDWG 04 STABILITY;2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MM INCL PRIOR QUEUED WITH 3USKY UPGRADE

FILE: C:\Interconnection Studies\... \RESUL TS\VEL1\_3\_1PH.001

|        |                                        |        |
|--------|----------------------------------------|--------|
| 35.000 | CHNL # 14: ERNG JEFFREY EN CNTR MERED  | 10.000 |
| 45.000 | CHNL # 16: ERNG TECUMSEH EN CNTR MERED | 20.000 |
| 25.000 | CHNL # 66: ERNG COOPER NPP03           | 0.0    |
| 35.000 | CHNL # 3: ERNG JATRN G1 KPPL1          | 10.000 |
| 100.00 | CHNL # 2: ERNG JATRN G2 KPPL1          | 0.0    |
| 70.000 |                                        | 25.000 |



TUE, SEP 07 2004 16:09

FLT\_3\_1PH\_MACHINE ANGLES

FILE: C:\Interconnection Studies\... \RESUL TS\FL 1\_3\_3PH. OUT

SPP MDWG 04 STABILITY; 2010 SUM PEAK; MODIFIED  
GEN-2004-012 900MW INCL PRIOR QUEUED WITH SUSKY UPGRADE

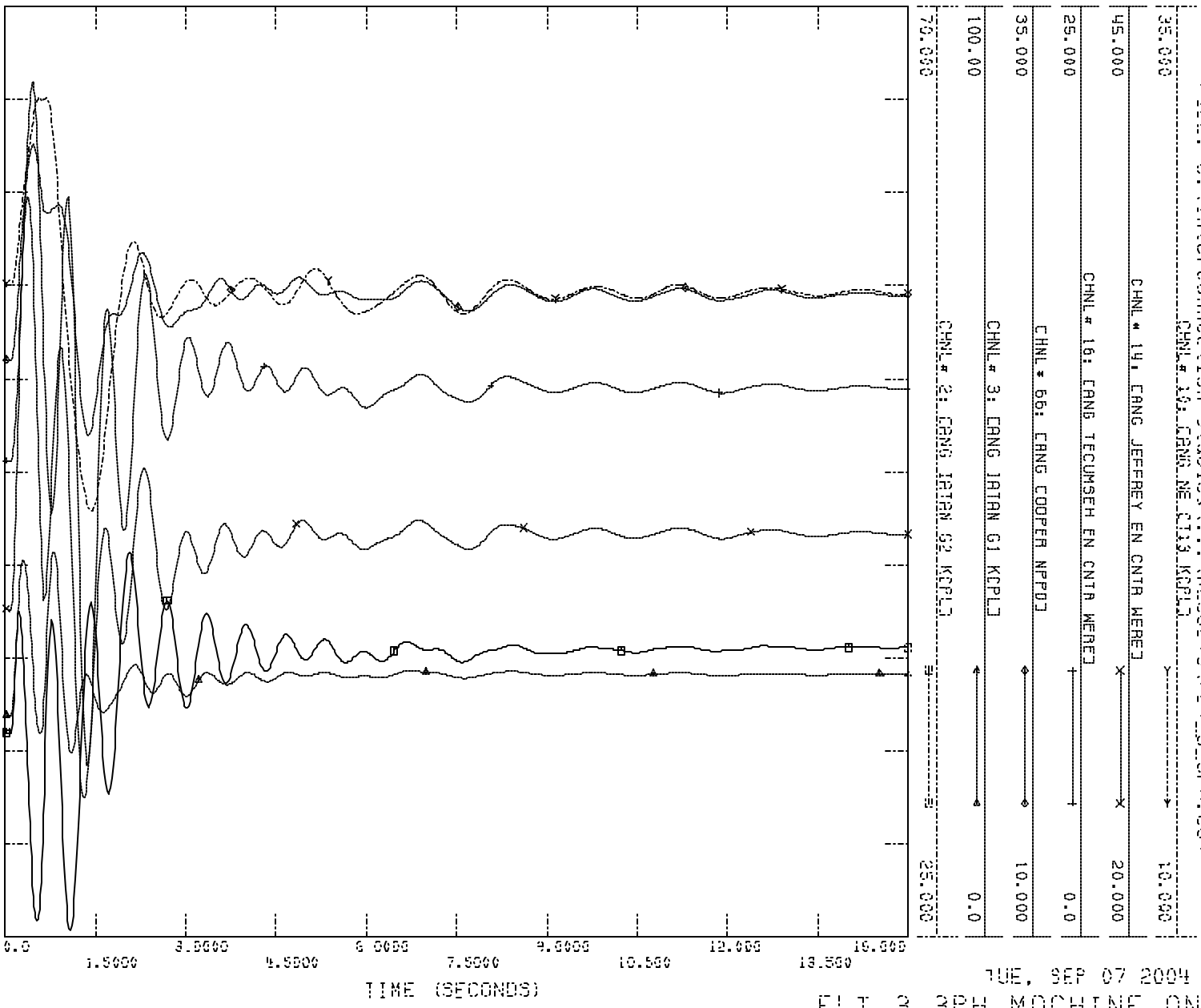
CHNL # 19: ERNG JEFFREY EN CNTR MEREJ

CHNL # 16: ERNG TECUMSEH EN CNTR MEREJ

CHNL # 66: ERNG COOPER NPP03

CHNL # 3: ERNG JATRN G1 KPPL3

CHNL # 2: ERNG JATRN G2 KPPL3



TUE, SEP 07 2004 16:09

FLT\_3\_3PH\_MACHINE ANGLES

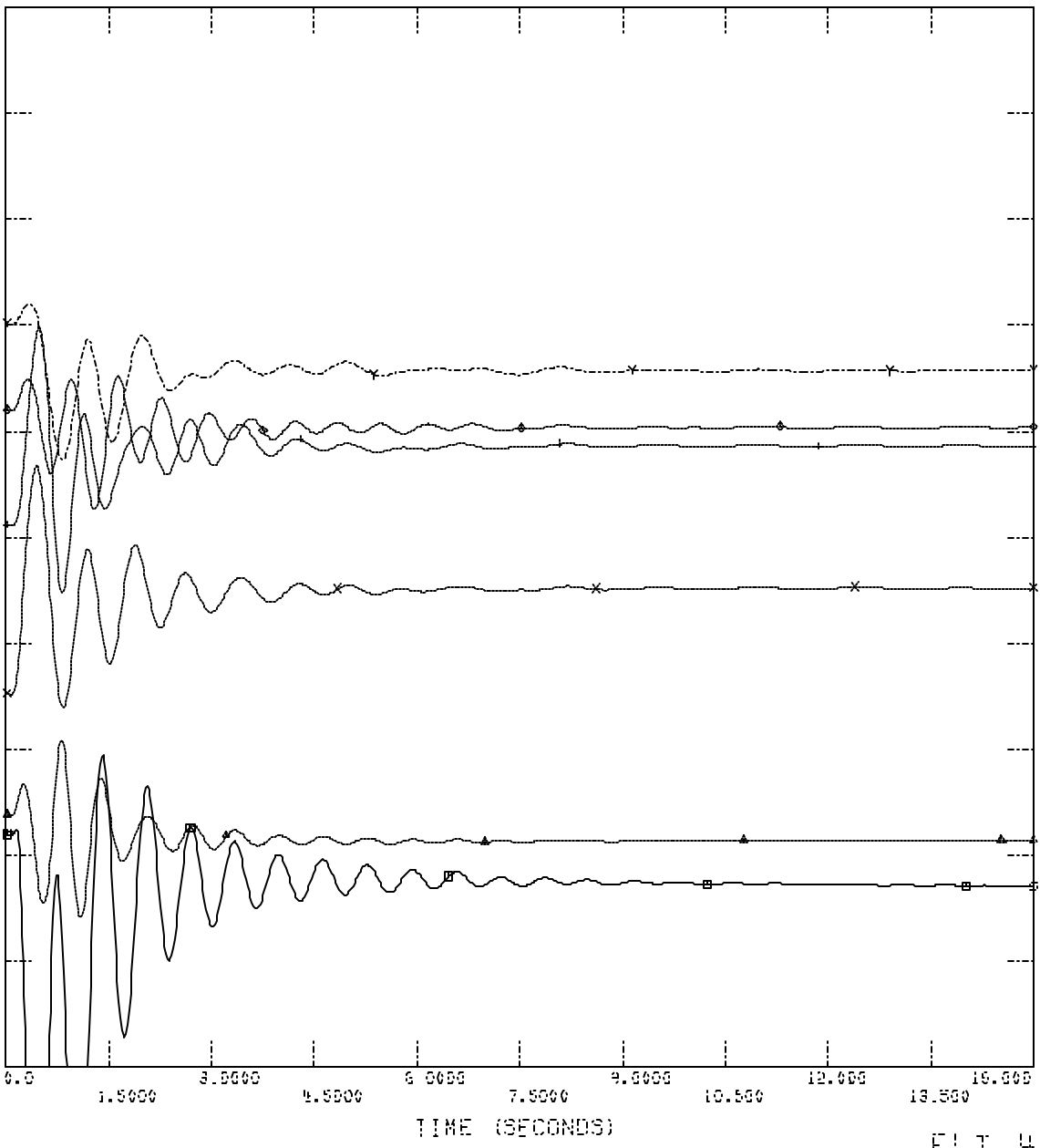


A  
 1000  
 500  
 0  
 -500  
 -1000

SPP MDMS 04 STABILITY;2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MM INCL PRIOR QUEUED WITH SUSKY UPGRADE

FILE: C:\Interconnection Studies\... \RESUL TS\FLT\_4\_IPH.001

CHNL # 14: ERNG JEFFREY EN CNTR MEREJ 10.000  
 CHNL # 16: ERNG TECUMSEH EN CNTR MEREJ 20.000  
 CHNL # 66: ERNG COOPER NPFDJ 0.0  
 CHNL # 3: ERNG JATRN GJ KPFLJ 10.000  
 CHNL # 2: ERNG JATRN G2 KPFLJ 0.0  
 70.000 25.000



TUE, SEP 07 2004 16:09

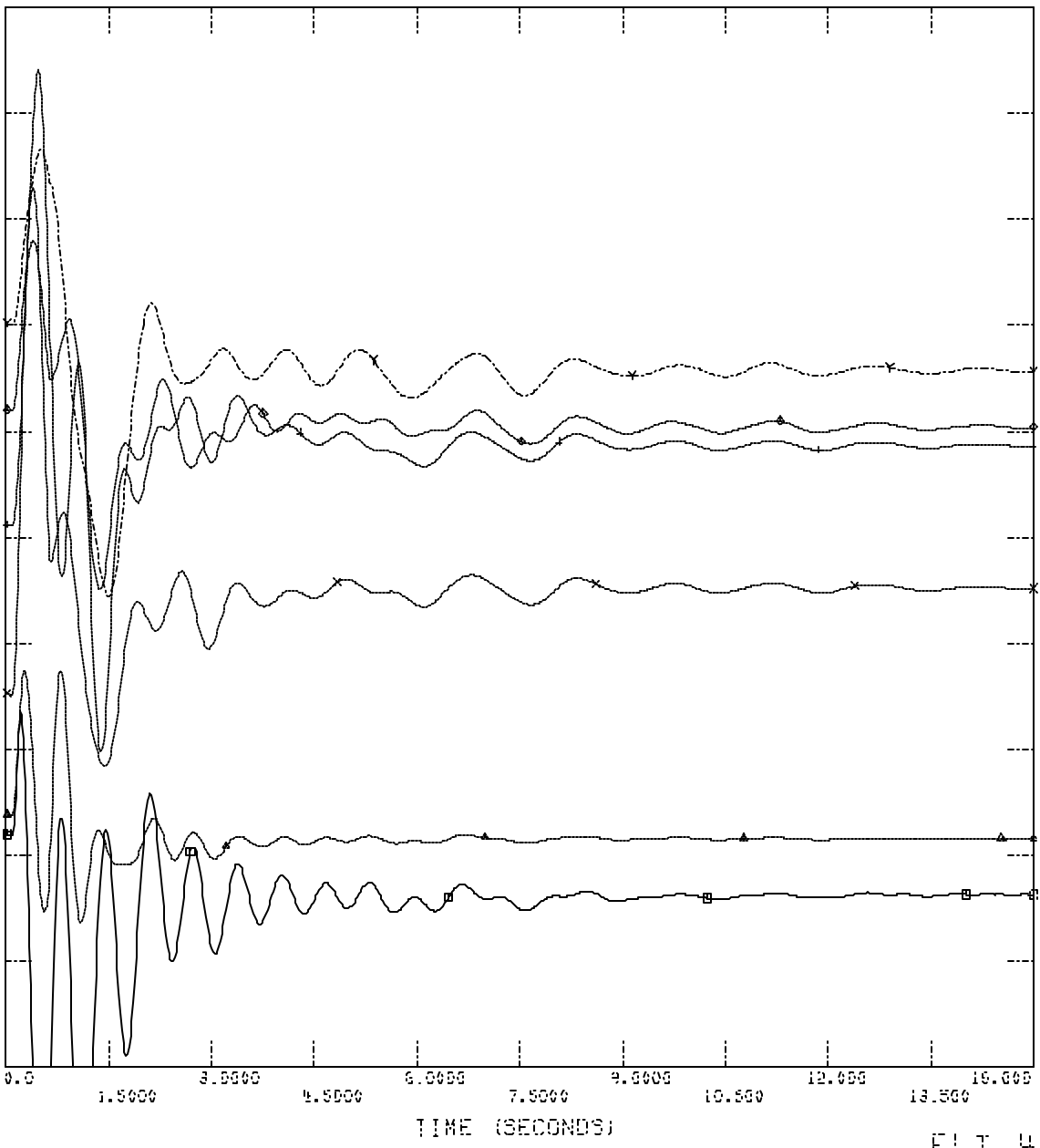
FLT\_4\_IPH\_MACHINE ANGLES

3000  
1000  
500  
0

SPP MDMG Q4 STABILITY;2010 SUM PEAK; MODIFIED  
GEN-2004-012 900MM INCL PRIOR QUEUED WITH 345KV UPGRADE

FILE: C:\Interconnection Studies\... \RESUL TS\FL1\_4\_3PH.001

35.000 CHNL # 14: ERNG JEFFREY EN CNTR MEREJ 10.000  
45.000 CHNL # 16: ERNG TECUMSEH EN CNTR MEREJ 20.000  
25.000 CHNL # 66: ERNG COOPER NPP03 0.0  
35.000 CHNL # 3: ERNG JATRN G1 KPPL1 10.000  
100.00 CHNL # 2: ERNG JATRN G2 KPPL1 0.0  
70.000 25.000



TUE, SEP 07 2004 16:09

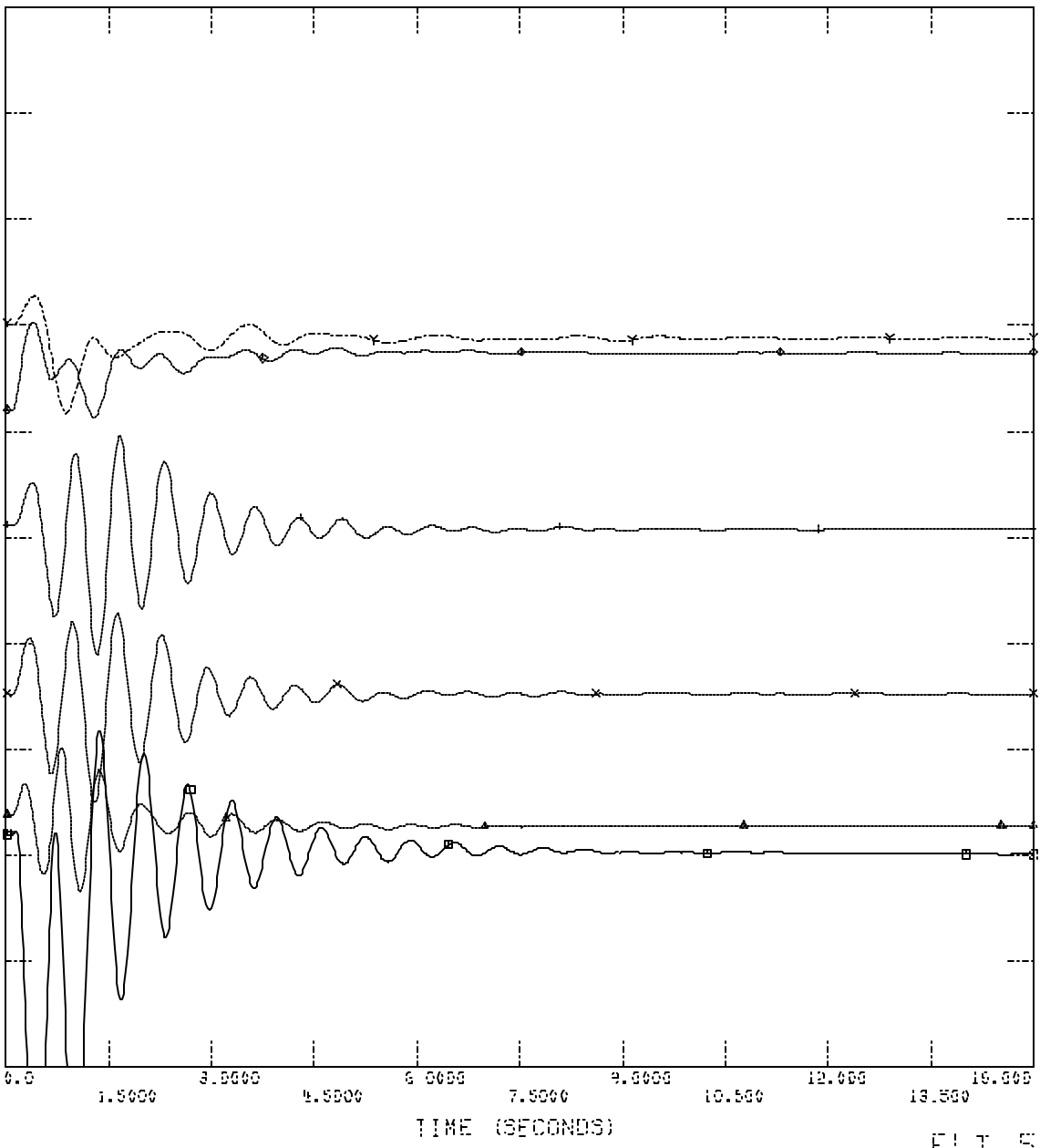
FLT\_4\_3PH\_MACHINE ANGLES

SEAN JEFFREY  
10/27/04

SPP MDMS Q4 STABILITY; 2010 SUM PEAK; MODIFIED  
GEN-2004-012 900MM INCL PRIOR QUEUED WITH SUSKY UPGRADE

FILE: C:\Interconnection Studies\... \RESUL19\F11\_5\_1PH.001

35.000 CHNL # 14: ERNG JEFFREY EN CNTR MEREJ 10.000  
45.000 CHNL # 16: ERNG TECUMSEH EN CNTR MEREJ 20.000  
25.000 CHNL # 66: ERNG COOPER NPP03 0.0  
35.000 CHNL # 3: ERNG JATRN G1 KPPLD 10.000  
100.00 CHNL # 2: ERNG JATRN G2 KPPLD 0.0  
70.000 CHNL # 21: ERNG JATRN G2 KPPLD 25.000



TUE, SEP 07 2004 16:09

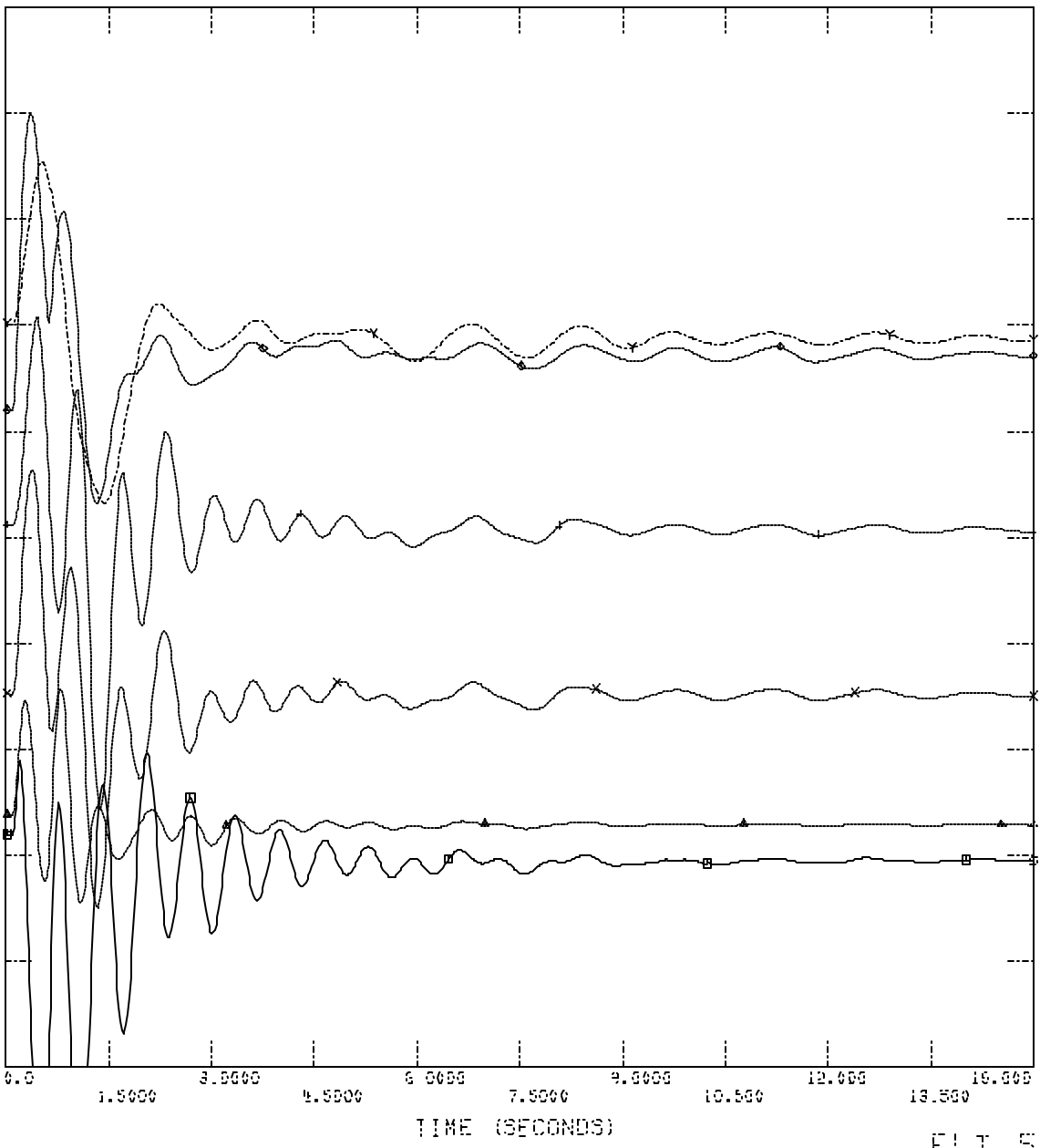
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SPP MDMG Q4 STABILITY;2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MM INCL PRIOR QUEUED WITH SUSKY UPGRADE

FILE: C:\Interconnection Studies\... \RESUL19\F11\_5\_3PH.001

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TUE, SEP 07 2004 16:09

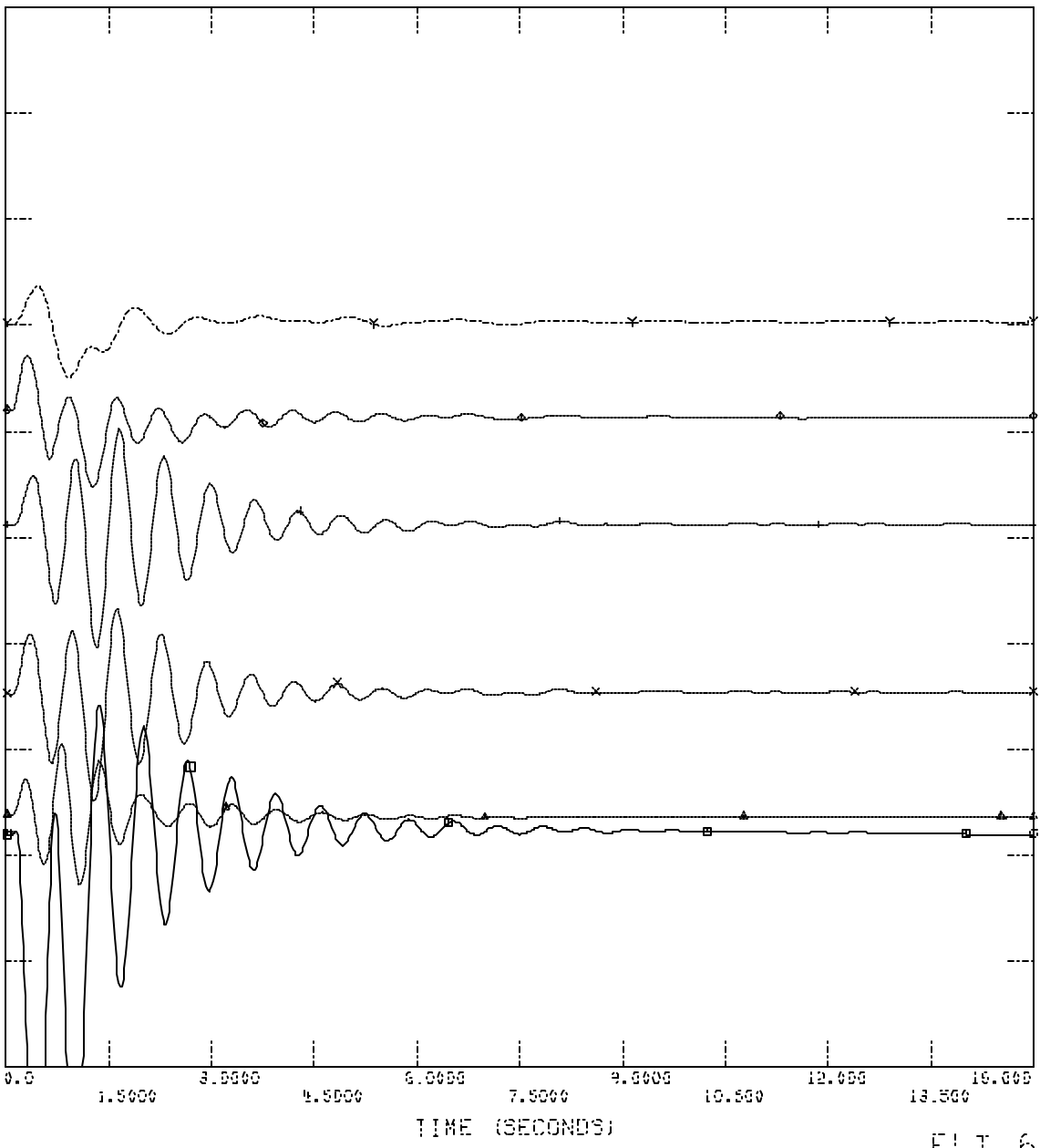
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SPP MDMS 04 STABILITY;2010 SUM PEAK; MODIFIED  
GEN-2004-012 900MM INCL PRIOR QUEUED WITH SUSKY UPGRADE

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TUE, SEP 07 2004 16:10

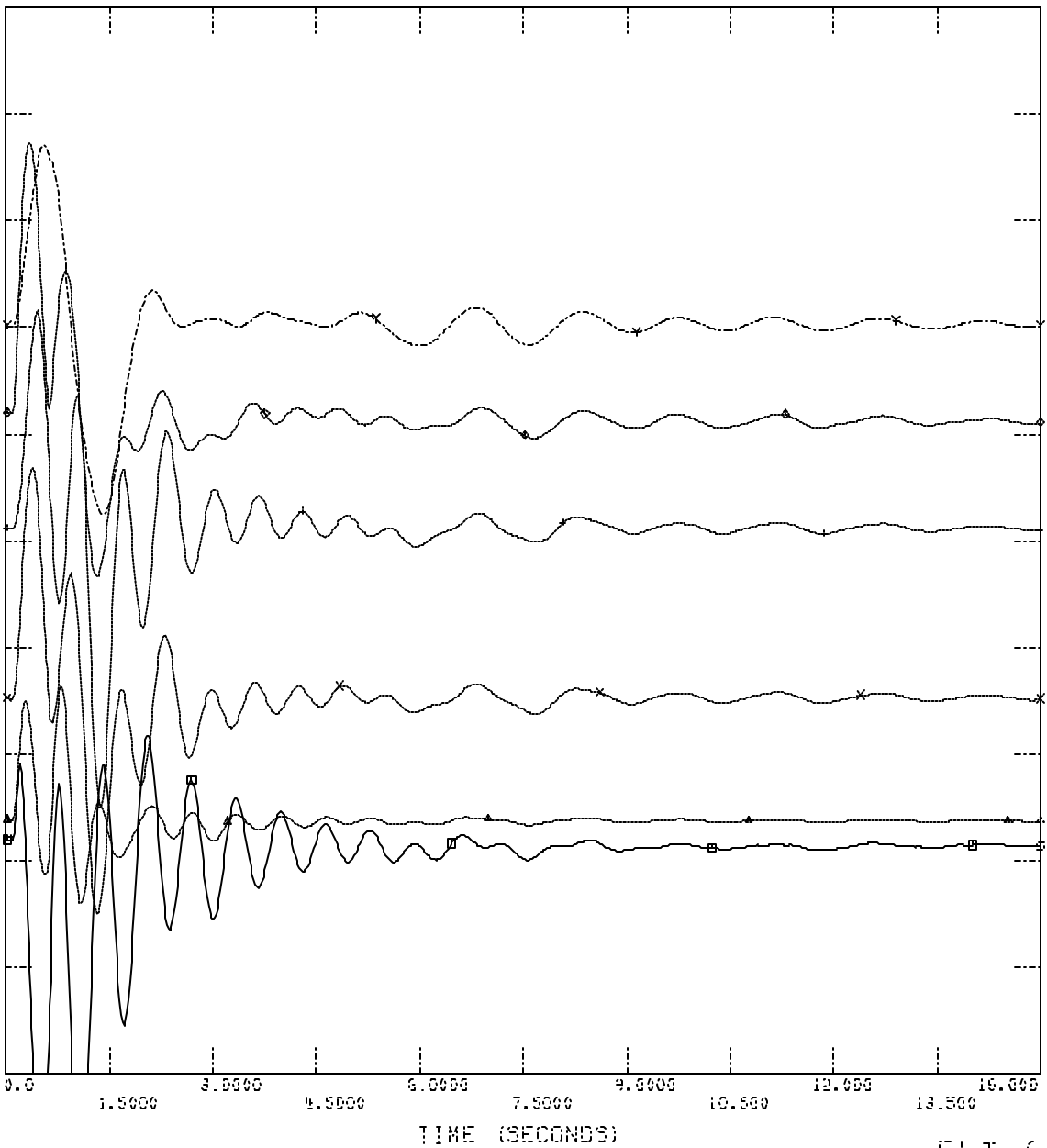
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SPP MDMG Q4 STABILITY;2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MM INCL PRIOR QUEUED WITH 345KV UPGRADE

345KV  
 900MM  
 12/2/04

FILE: C:\Interconnection Studies\... \RESUL TS\FL 1\_6\_SPH.001

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TUE, SEP 07 2004 16:10

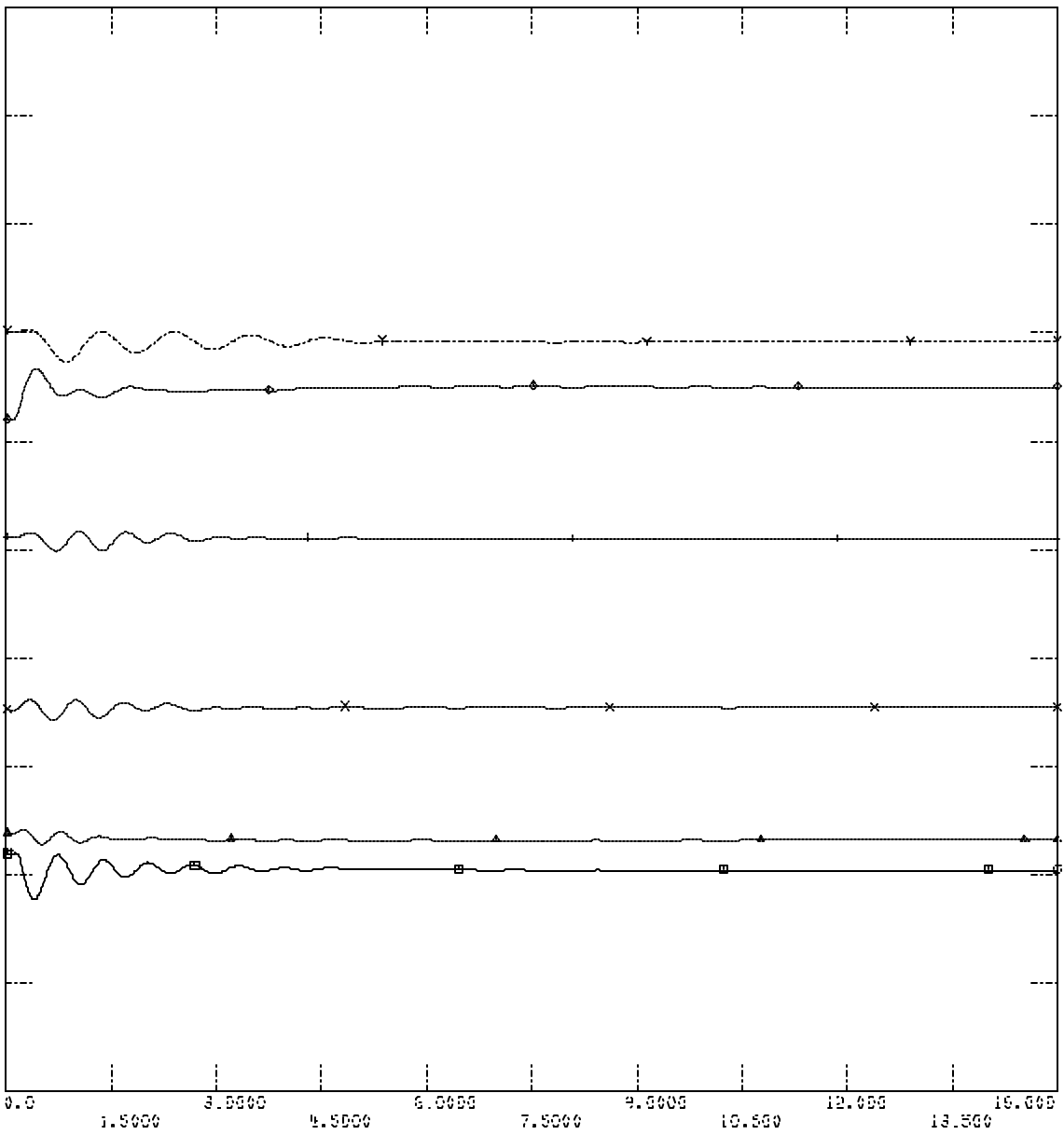
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SPP MDMS Q4 STABILITY; 2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MM INCL PRIOR QUEUED WITH SUSKY UPGRADE

FILE: C:\Interconnection Studies\... \RESUL TS\FLT\_7\_1PH.001

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TUE, SEP 07 2004 16:10

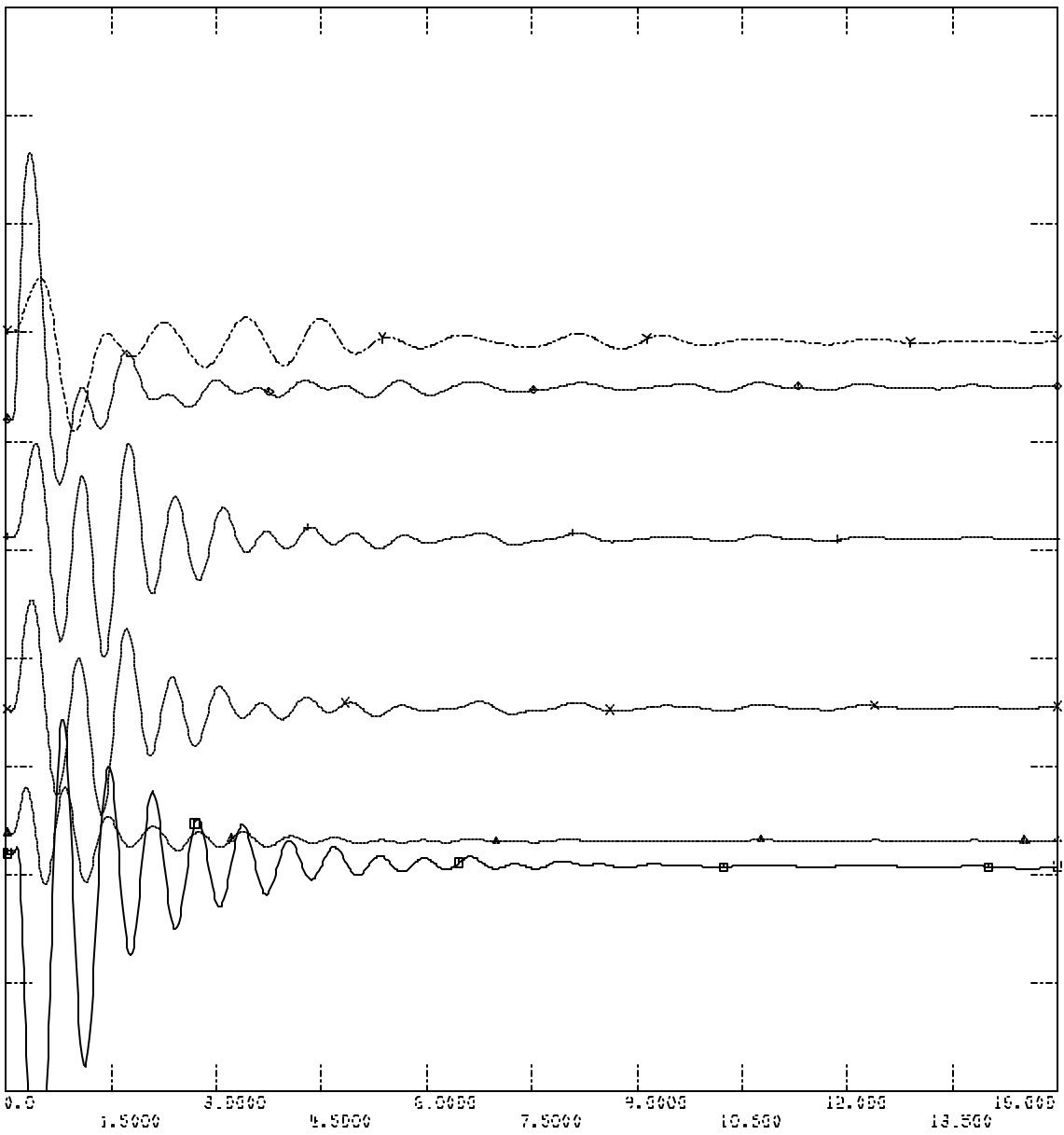
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SPP MDMG Q4 STABILITY;2010 SUM PEAK; MODIFIED  
GEN-2004-012 900MM INCL PRIOR QUEUED WITH 3USKY UPGRADE

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100.00 CHNL # 3: ERNG JATRN GJ KPPLJ 0.0  
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TUE, SEP 07 2004 16:10

FLT\_7\_SPH\_MACHINE ANGLES

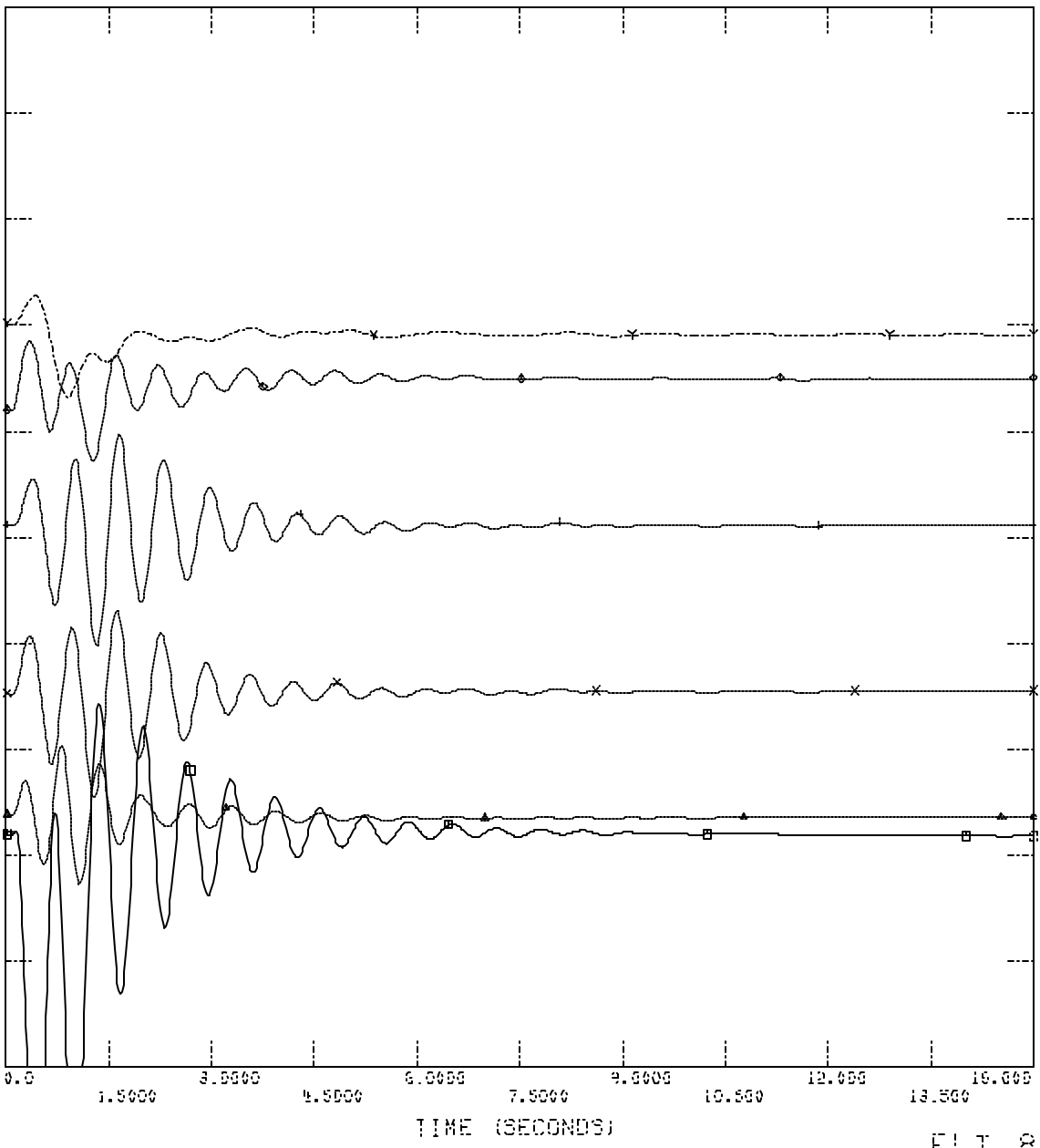


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SPP MDMS Q4 STABILITY;2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MM INCL PRIOR QUEUED WITH SUSKY UPGRADE

FILE: C:\Interconnection Studies\... \RESUL TS\FL1\_8\_1PH.001

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| 25.000 | CHNL # 66: ERNG COOPER NPFDJ           | 0.0    |
| 35.000 | CHNL # 3: ERNG JATRN GJ KPFLJ          | 10.000 |
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TUE, SEP 07 2004 16:10

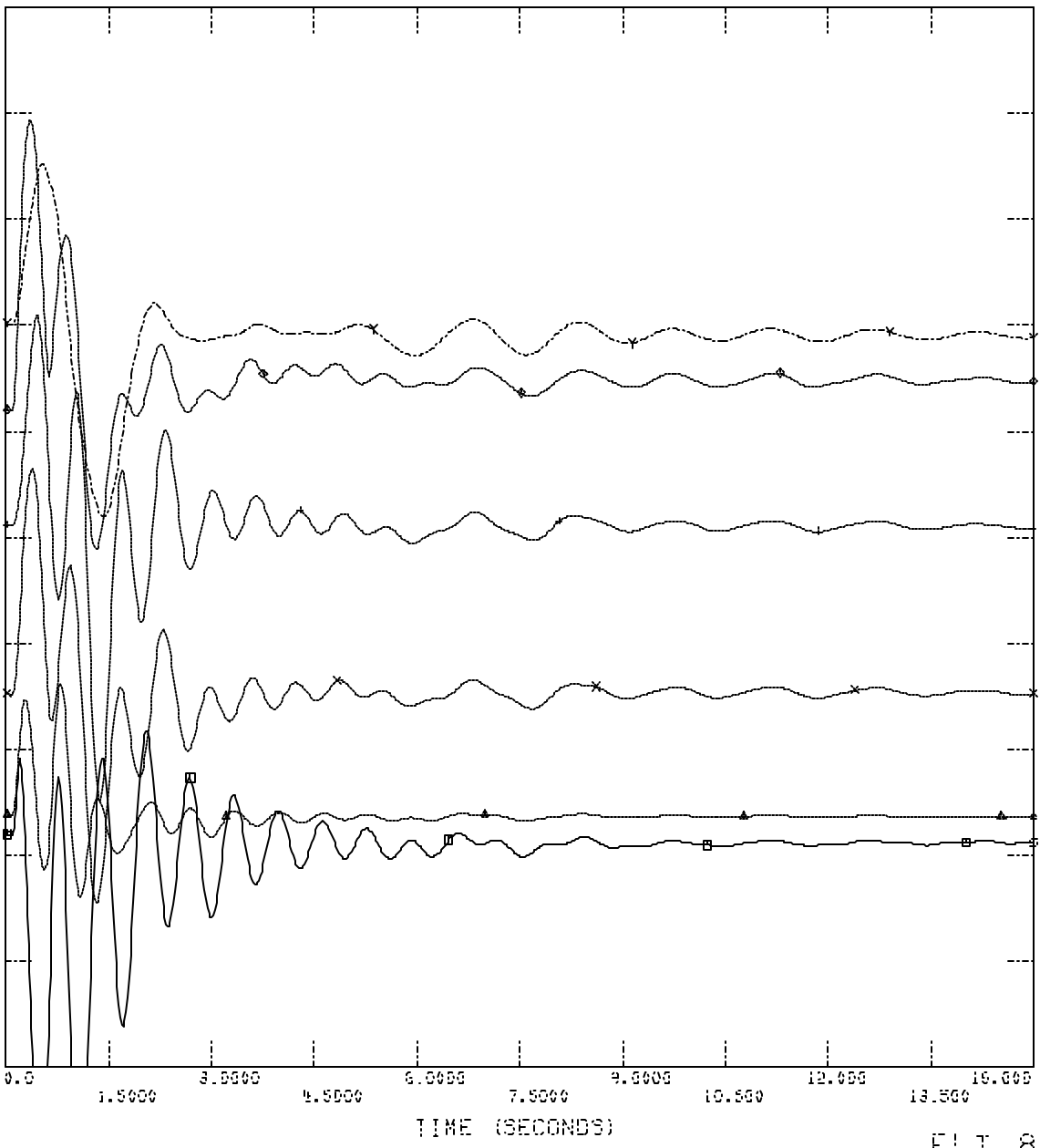
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SPP MDMG Q4 STABILITY;2010 SUM PEAK; MODIFIED  
GEN-2004-012 900MM INCL PRIOR QUEUED WITH 345KV UPGRADE

FILE: C:\Interconnection Studies\... \RESULTSV\F1\_8\_SPH.001

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25.000 CHNL # 66: ERNG COOPER NPP0J 0.0  
35.000 CHNL # 66: ERNG COOPER NPP0J 10.000  
100.00 CHNL # 3: ERNG JATRN GJ KPPLJ 0.0  
70.000 CHNL # 2: ERNG JATRN G2 KPPLJ 25.000



TUE, SEP 07 2004 16:10

FLT\_8\_SPH\_MACHINE ANGLES

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SPP MDMG Q4 STABILITY;2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MM INCL PRIOR QUEUED WITH 345KV UPGRADE

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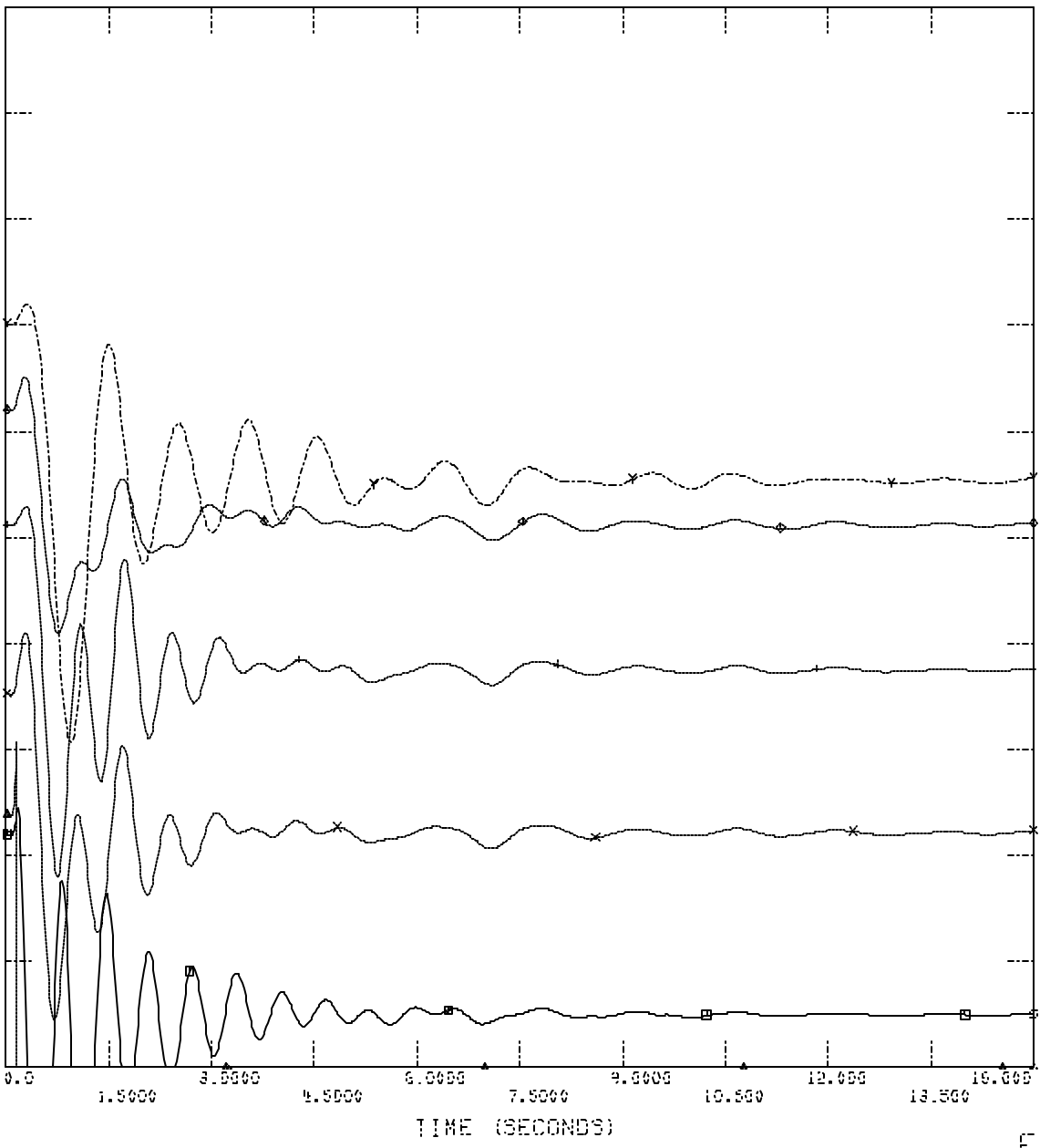
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100.00 CHNL # 3: ERNG JATRN G1 KOPPL 0.0

70.000 CHNL # 2: ERNG JATRN G2 KOPPL 25.000



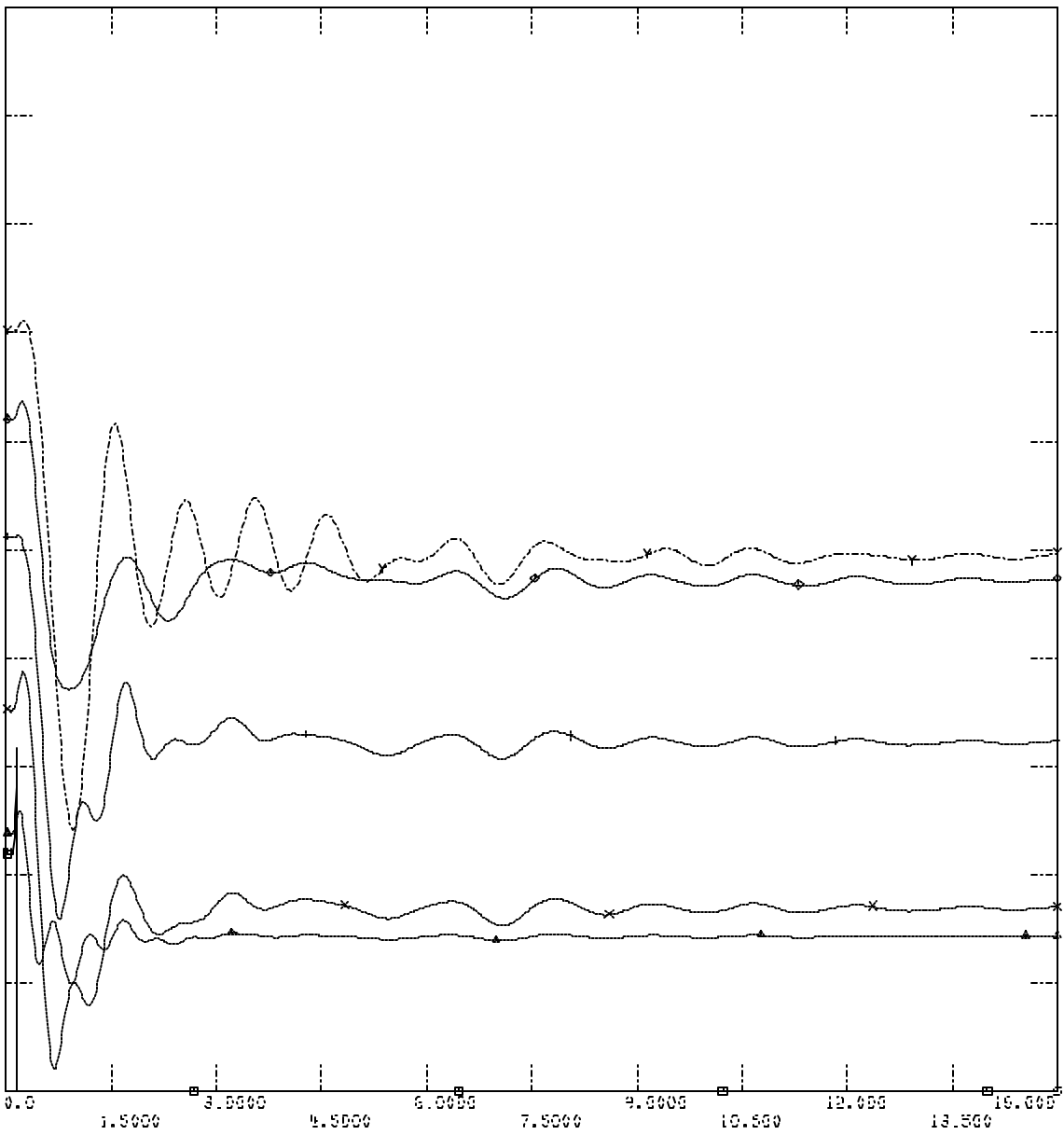
TUE, SEP 07 2004 16:10  
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SPP MDMS 04 STABILITY;2010 SUM PEAK; MODIFIED  
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TIME (SECONDS)

TUE, SEP 07 2004 16:10  
FLT\_10\_MACHINE ANGLES



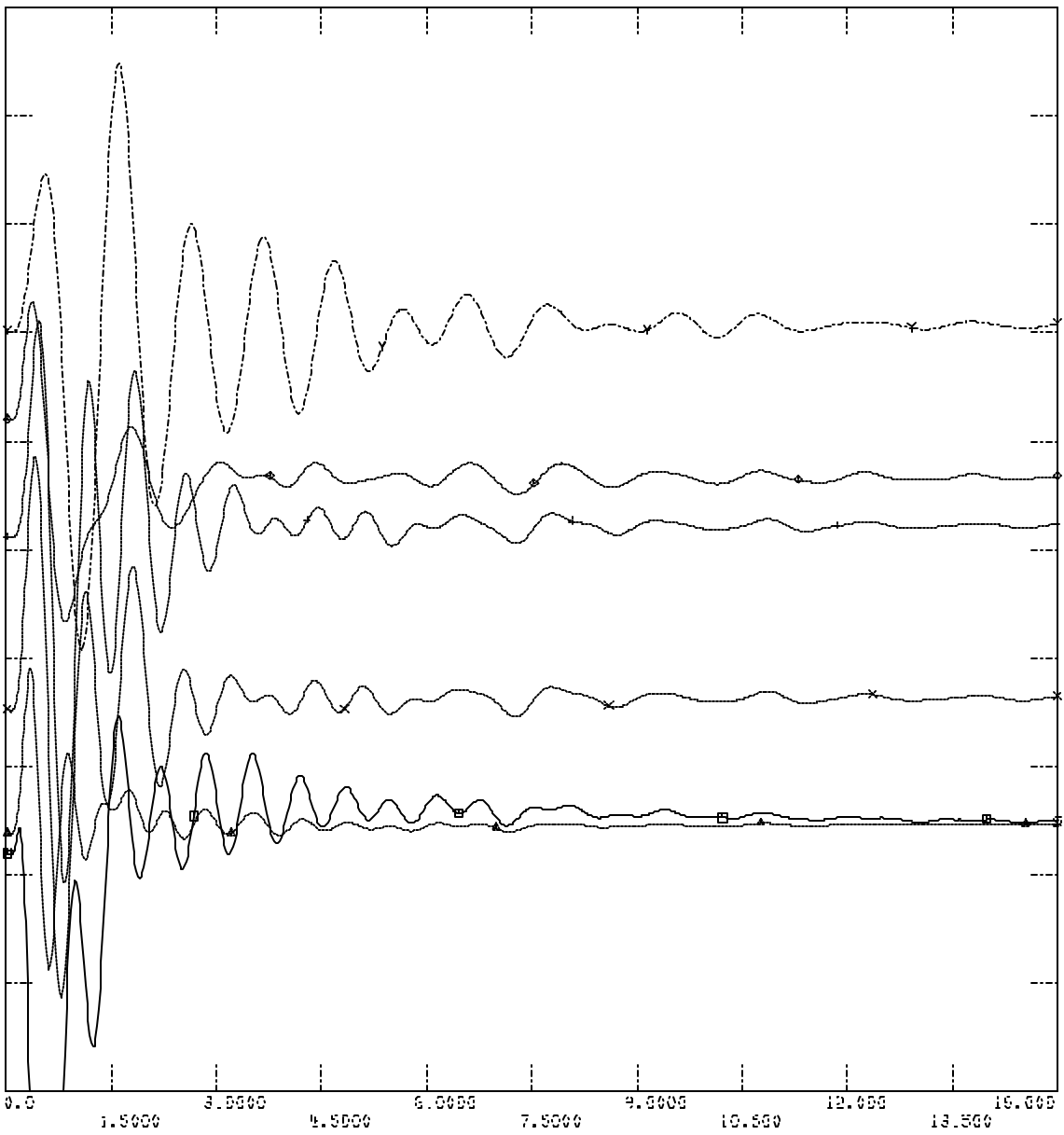
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SPP MDWG 04 STABILITY;2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MM INCL PRIOR QUEUED WITH 345KV UPGRADE

FILE: C:\Interconnection Studies\...NRESUL19VFL1\_12\_IPH\_Stuck.001

|        |                                        |        |
|--------|----------------------------------------|--------|
| 35.000 | CHNL # 19: ERNG JEFFREY EN CNTR MEREJ  | 10.000 |
| 45.000 | CHNL # 16: ERNG TECUMSEH EN CNTR MEREJ | 20.000 |
| 25.000 | CHNL # 66: ERNG COOPER NPP03           | 0.0    |
| 35.000 | CHNL # 3: ERNG JATRN G1 KPPL3          | 10.000 |
| 100.00 | CHNL # 2: ERNG JATRN G2 KPPL3          | 0.0    |
| 70.000 |                                        | 25.000 |



TUE, SEP 07 2004 16:10

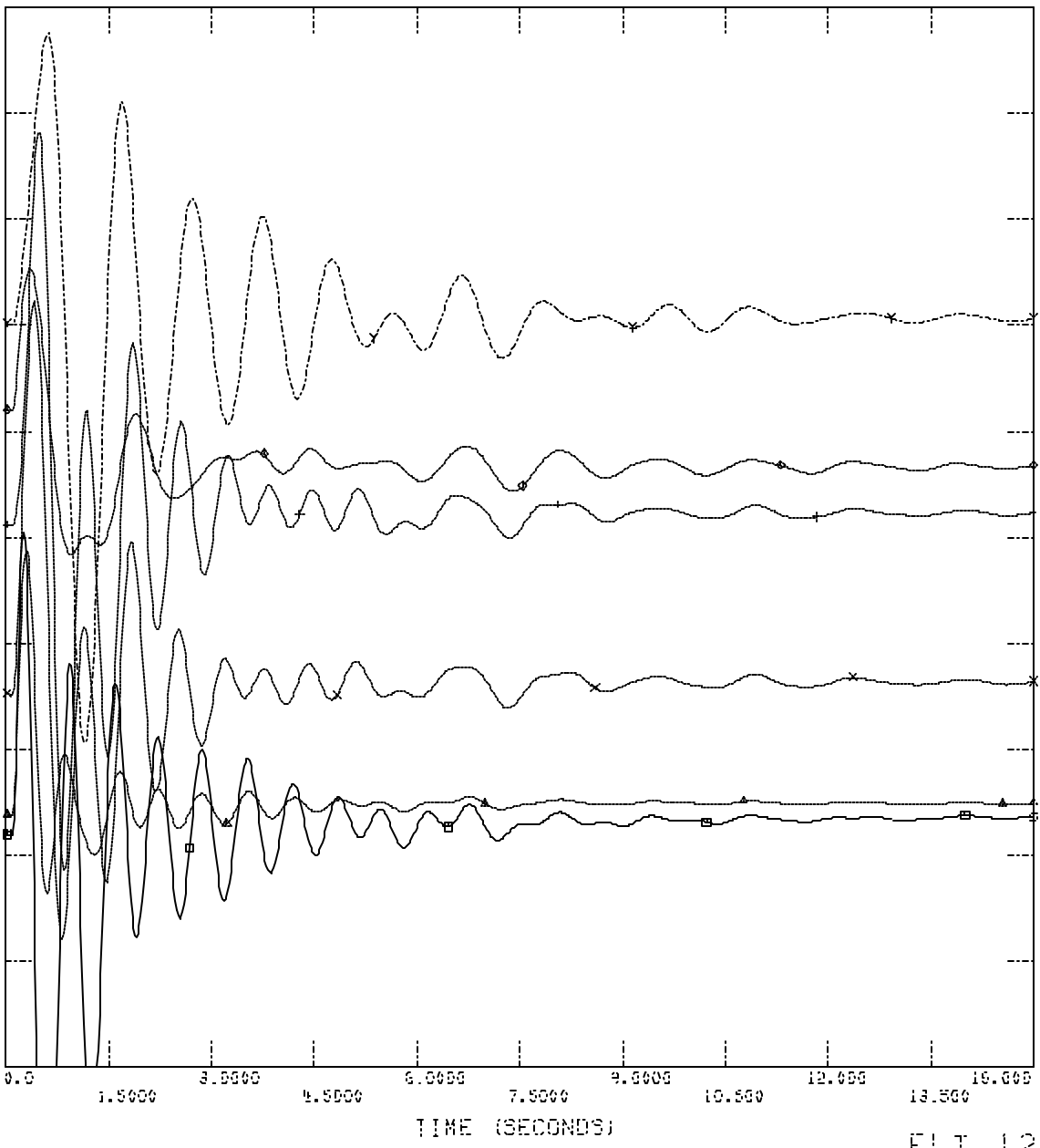
FLT\_12\_IPH\_STUCK\_MACHINE

3000 PAGES  
 10000 LINES  
 1000000 BYTES

SPP MDMS Q4 STABILITY;2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MM INCL PRIOR QUEUED WITH SUSKY UPGRADE

FILE: C:\Interconnection Studies\... \RESULTS\FLT\_12\_3PH.001

|        |                                        |        |
|--------|----------------------------------------|--------|
| 35.000 | CHNL # 14: ERNG JEFFREY EN CNTR MEREJ  | 10.000 |
| 45.000 | CHNL # 16: ERNG TECUMSEH EN CNTR MEREJ | 20.000 |
| 25.000 | CHNL # 66: ERNG COOPER NPP03           | 0.0    |
| 35.000 | CHNL # 3: ERNG JATRN G1 KPPL3          | 10.000 |
| 100.00 | CHNL # 2: ERNG JATRN G2 KPPL3          | 0.0    |
| 70.000 |                                        | 25.000 |



TUE, SEP 07 2004 16:10

FLT\_12\_3PH\_MACHINE ANGLES





## **Appendix C-2**

### **Plots of Fault Simulations**

Plots of selected bus voltage response during faults

Scenario:

2010 Summer Peak

900MW

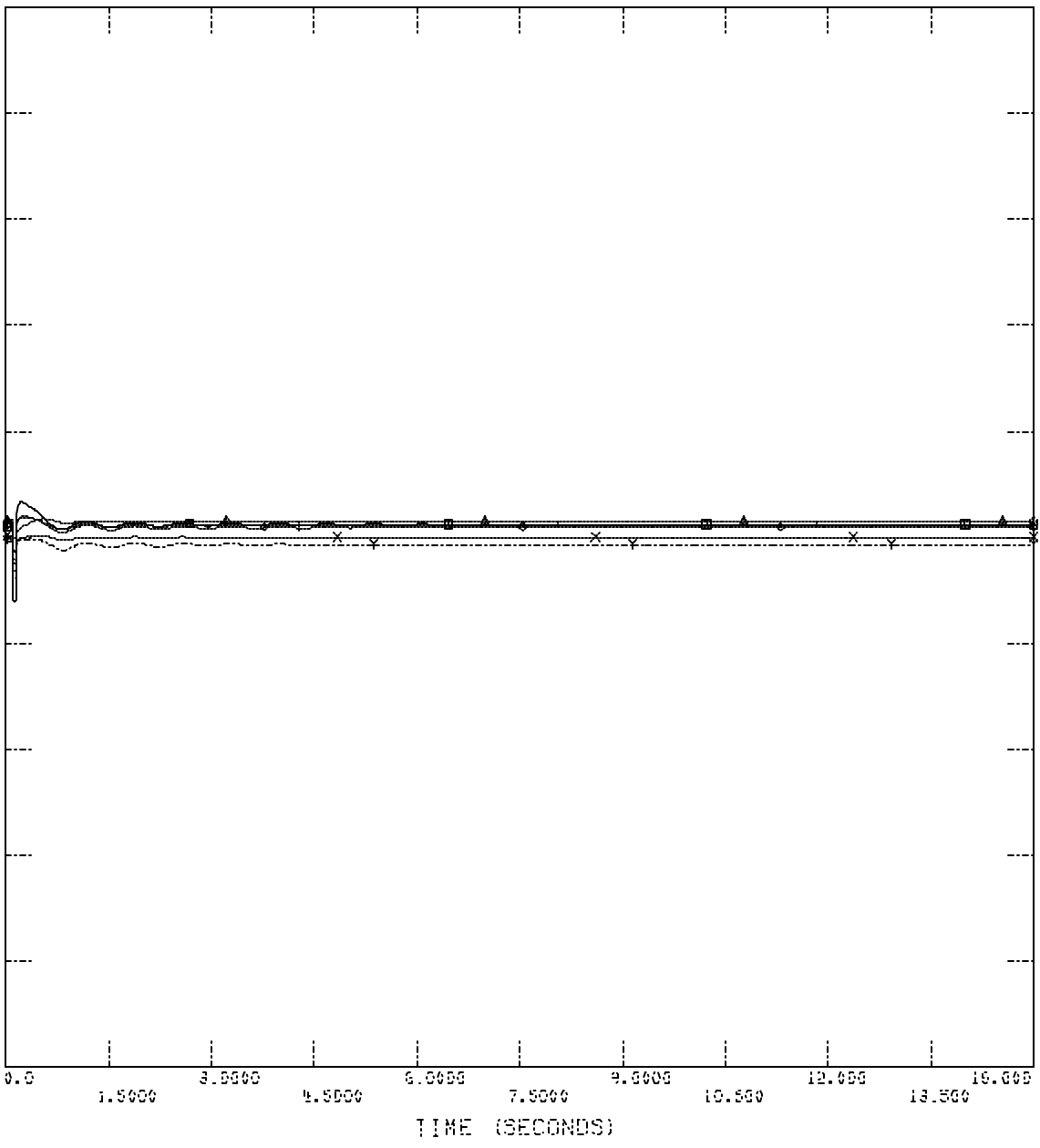
[Customer Plant at 900MW – Iatan-Nashua 345kV]

395KV  
2000  
1000  
0

SPP MDMS 04 STABILITY;2010 SUM PEAK; MODIFIED  
GEN-2004-012 900MW INCL PRIOR QUEUED WITH 395KV UPGRADE

FILE: C:\Interconnection Studies\...\RESULTSV\FLT\_1\_1PH.001

|        |                                         |     |
|--------|-----------------------------------------|-----|
| 2.0000 | CHNL # 278: EVOLTAGE BRNTH 395KV]       | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV] | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV]      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV]      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV]       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRAN 395KV]        | 0.0 |



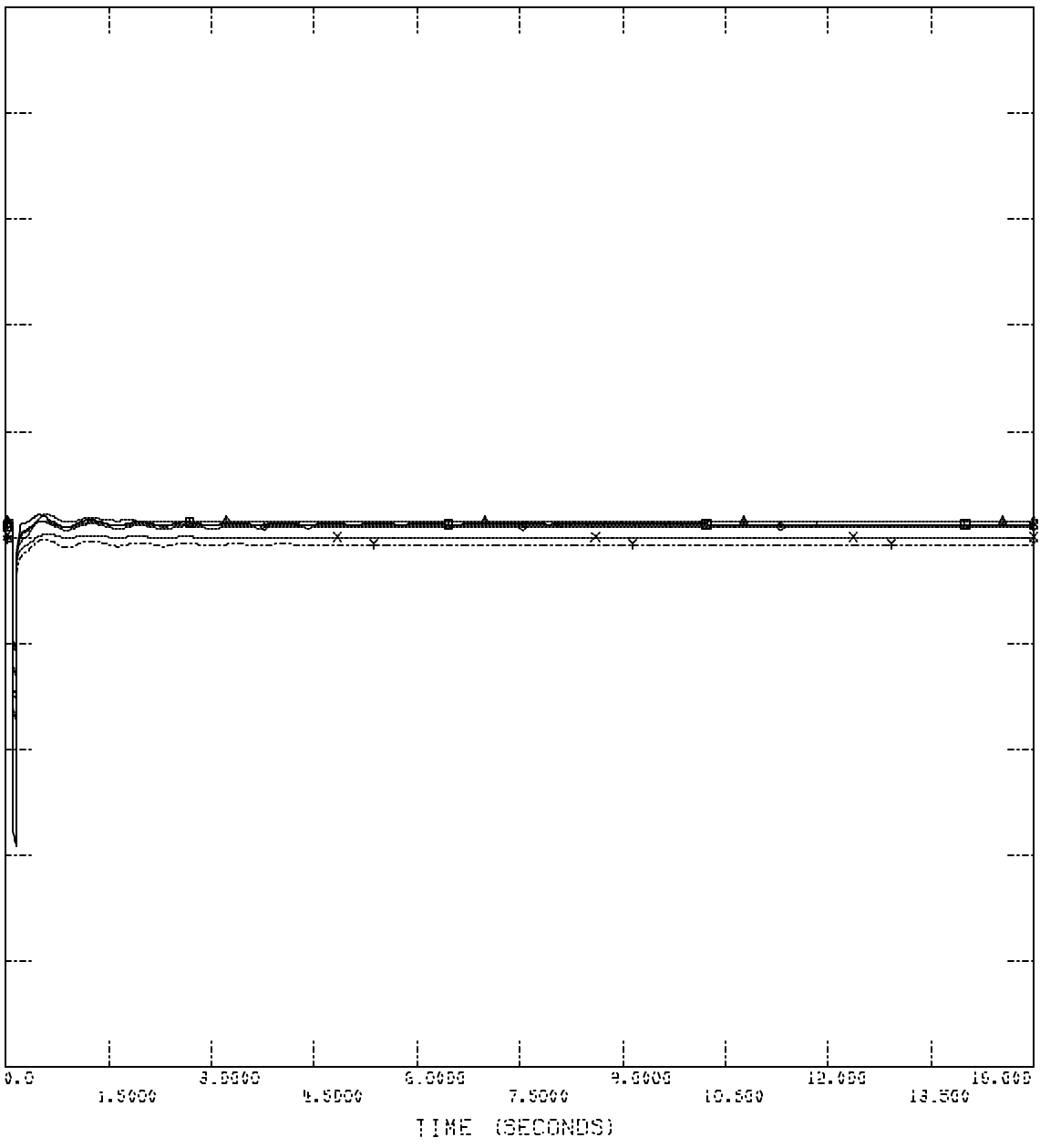
TUE, SEP 07 2004 16:14  
FLT\_1\_1PH\_VOLTAGES

395KV  
 395KV  
 395KV  
 395KV

SPP MDMS ON STABILITY;2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW INCL PRIOR QUEUED WITH 395KV UPGRADE

FILE: C:\Interconnection Studies\...\RESULTSV\F1\_1\_3PH.001

|        |                                         |     |
|--------|-----------------------------------------|-----|
| 2.0000 | CHNL # 278: EVOLTAGE BRNTH 395KV]       | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV] | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV]      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV]      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV]       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRTRN 395KV]       | 0.0 |



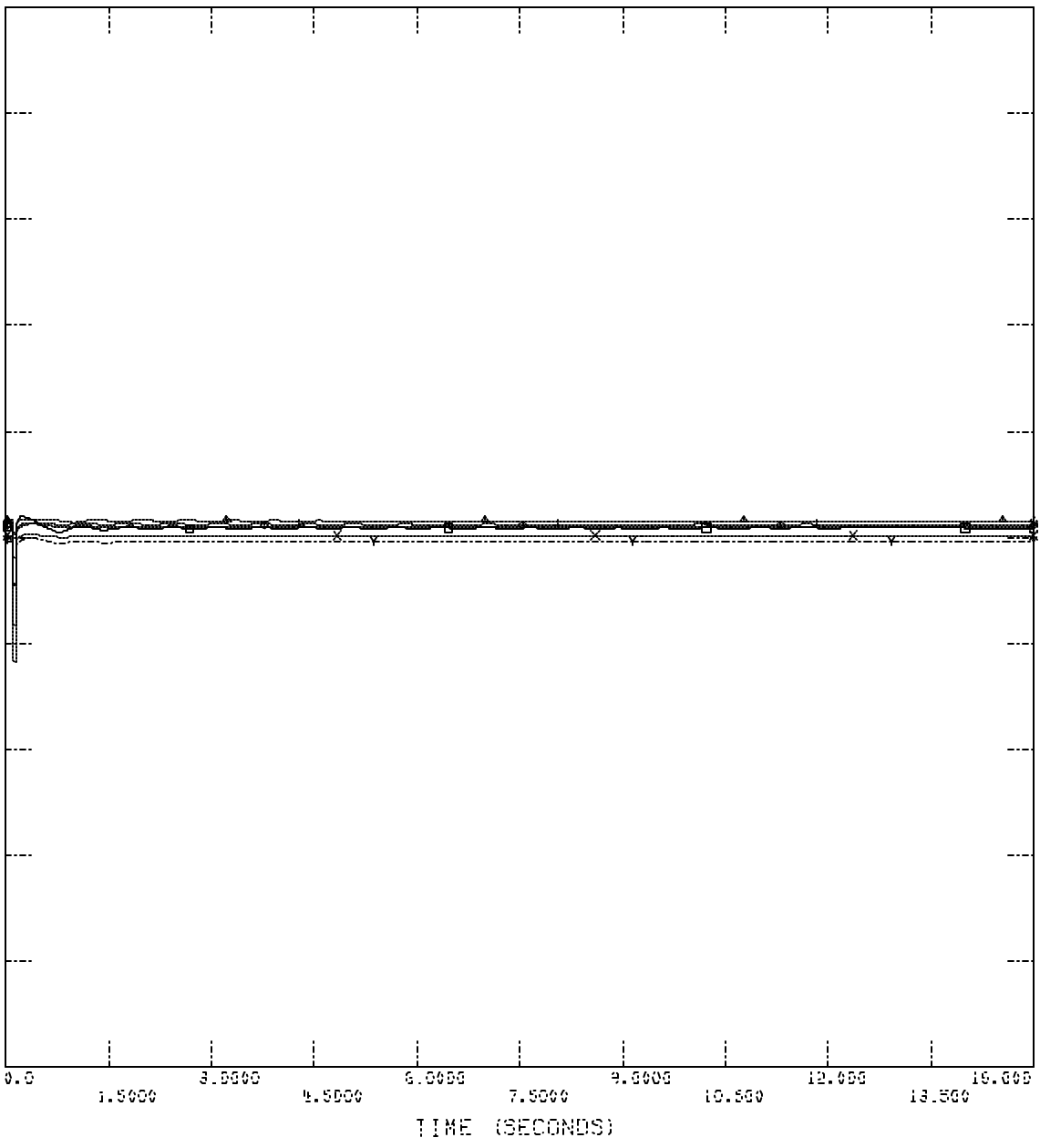
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 FLT\_1\_3PH\_VOLTAGES

395KV  
 395KV  
 395KV  
 395KV

SPP MDMS ON STABILITY;2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW INCL PRIOR QUEUED WITH 395KV UPGRADE

FILE: C:\Interconnection Studies\...\RESULTSV\F1\_2\_1PH.001

|        |                                        |     |
|--------|----------------------------------------|-----|
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| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRAN 395KV        | 0.0 |



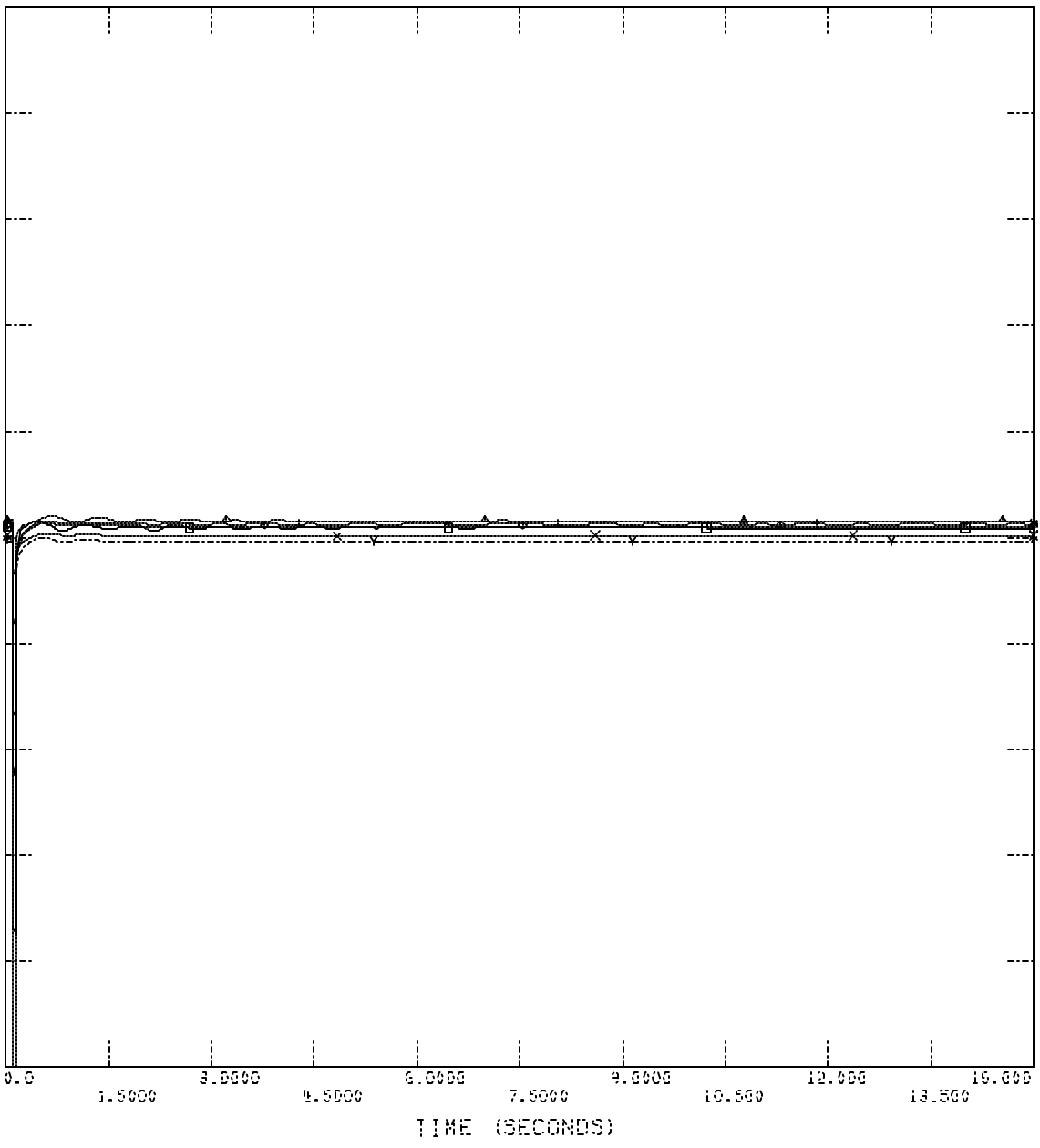
TUE, SEP 07 2004 16:14  
 FLT\_2\_1PH\_VOLTAGES

395KV  
 272A  
 293A

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW INCL PRIOR QUEUED WITH 395KV UPGRADE

FILE: C:\Interconnection Studies\... \RESUL19\F1\_2\_3PH.001

|        |                                       |     |
|--------|---------------------------------------|-----|
| 2.0000 | CHNL # 272: EVOLTAGE BRN 395KV        | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLESNH HIL 395KV | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV     | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV     | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV      | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRPN 395KV       | 0.0 |



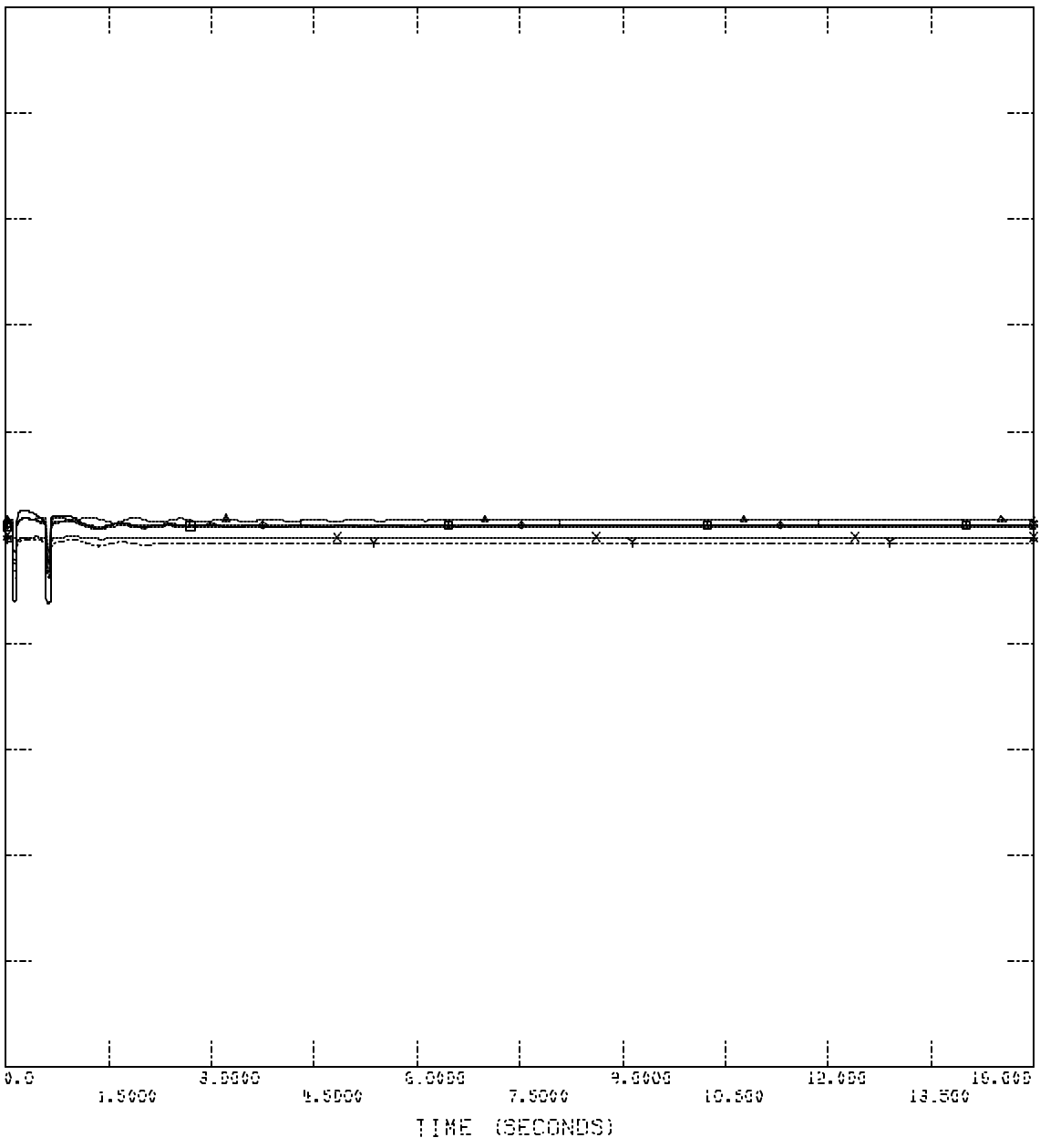
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 FLT\_2\_3PH\_VOLTAGES

395KV  
 395KV  
 395KV

SPP MDMS 04 STABILITY;2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW INCL PRIOR QUEUED WITH 395KV UPGRADE

FILE: C:\Interconnection Studies\...\RESULTSV\F1\_3\_1PH.001

|        |                                        |     |
|--------|----------------------------------------|-----|
| 2.0000 | CHNL # 278: EVOLTAGE BRIN 395KV        | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRIN 395KV        | 0.0 |



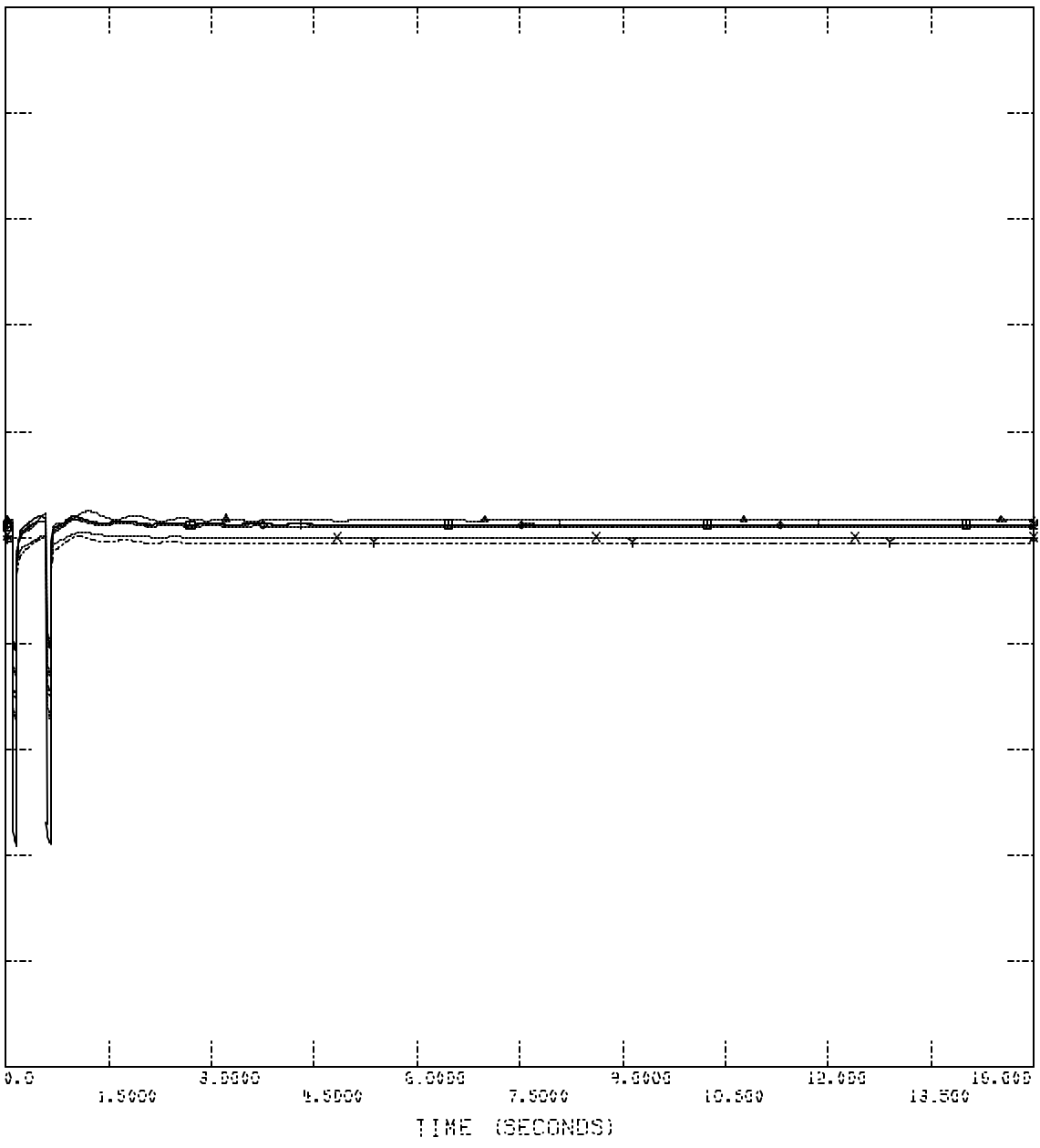
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 FLT\_3\_1PH\_VOLTAGES

395KV  
 2.0000  
 0.0000

SPP MDWG 04 STABILITY;2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW INCL PRIOR QUEUED WITH 395KV UPGRADE

FILE: C:\Interconnection Studies\...\RESULTSV\F1\_3\_SPH\_OUT

|        |                                         |     |
|--------|-----------------------------------------|-----|
| 2.0000 | CHNL # 278: EVOLTAGE BRNTH 395KV]       | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV] | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV]      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV]      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV]       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRAN 395KV]        | 0.0 |



TUE, SEP 07 2004 16:14  
 FLT\_3\_SPH\_VOLTAGES

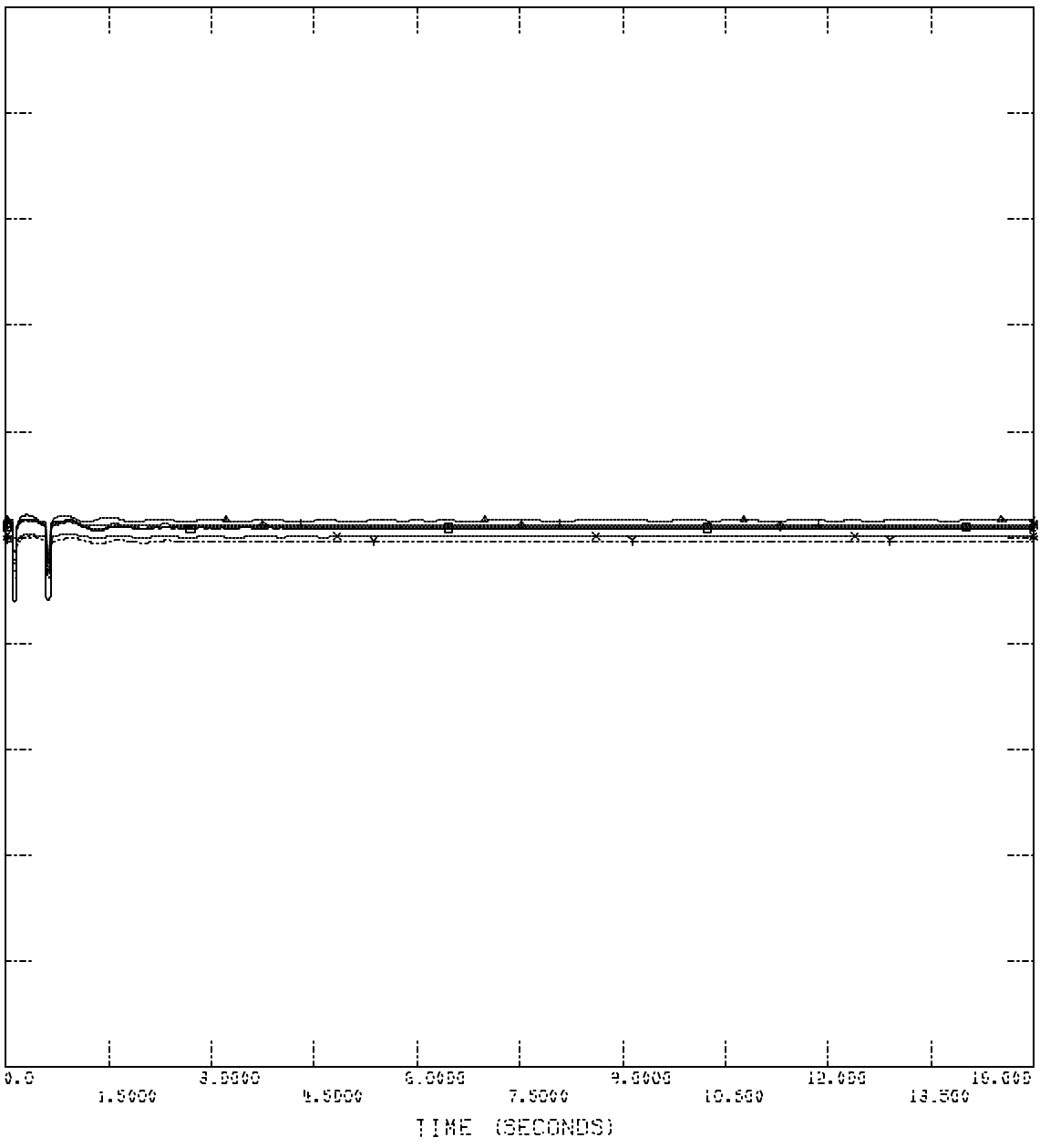


395KV  
2000V  
1000V

SPP MDMS 04 STABILITY;2010 SUM PEAK; MODIFIED  
GEN-2004-012 900MW INCL PRIOR QUEUED WITH 395KV UPGRADE

FILE: C:\Interconnection Studies\... \RESUL TS\F1 7\_9\_1PH.001

|        |                                         |     |
|--------|-----------------------------------------|-----|
| 2.0000 | CHNL # 278: EVOLTAGE BRIN 395KV]        | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV] | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV]      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV]      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV]       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRIN 395KV]        | 0.0 |



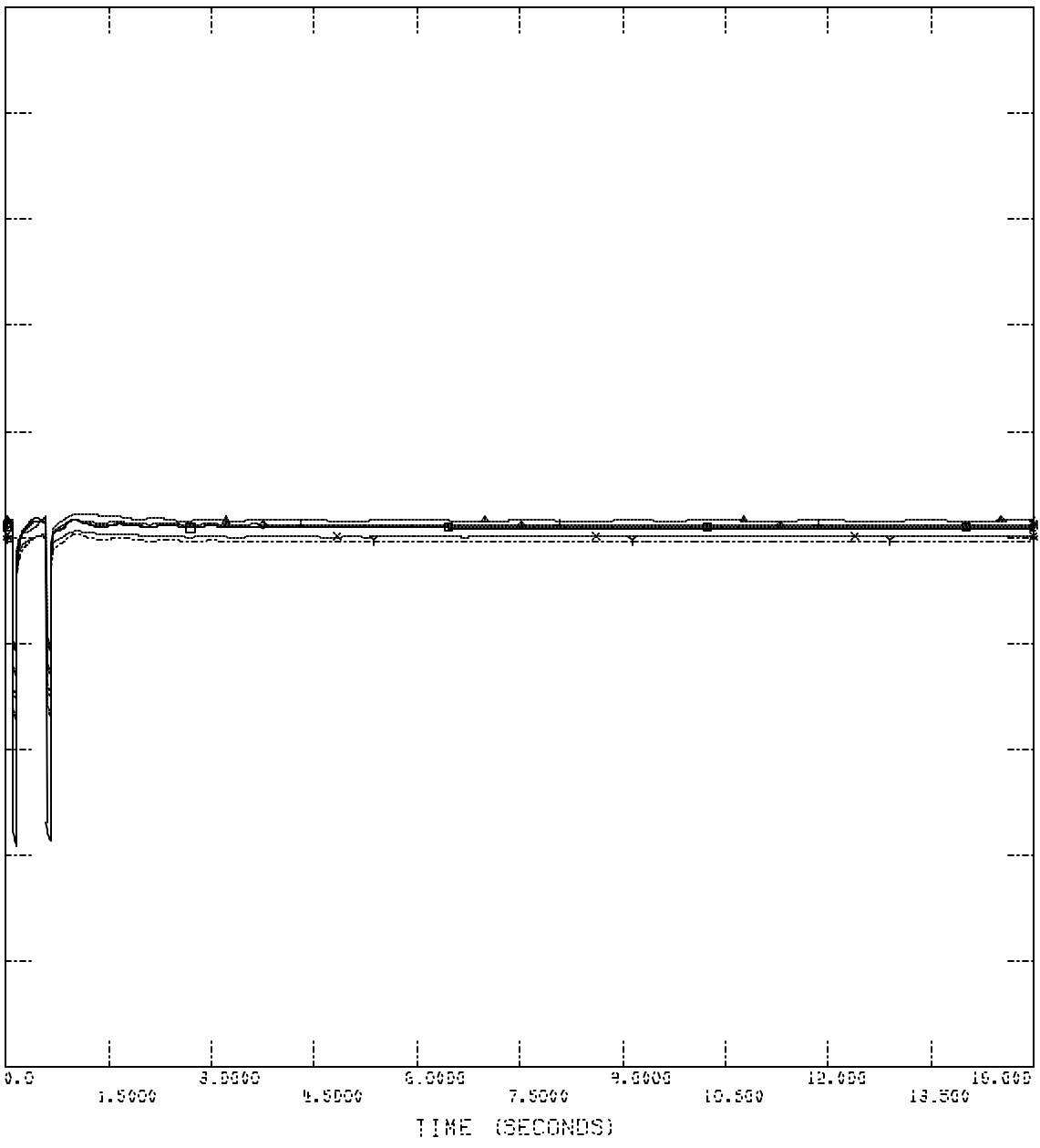
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FLT\_4\_1PH\_VOLTAGES

395KV  
 395KV  
 395KV  
 395KV

SPP MDMS 04 STABILITY;2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW INCL PRIOR QUEUED WITH 395KV UPGRADE

FILE: C:\Interconnection Studies\...\RESULTSV\F1\_4\_3PH.001

|        |                                        |     |
|--------|----------------------------------------|-----|
| 2.0000 | CHNL # 278: EVOLTAGE BRN 395KV         | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRAN 395KV        | 0.0 |



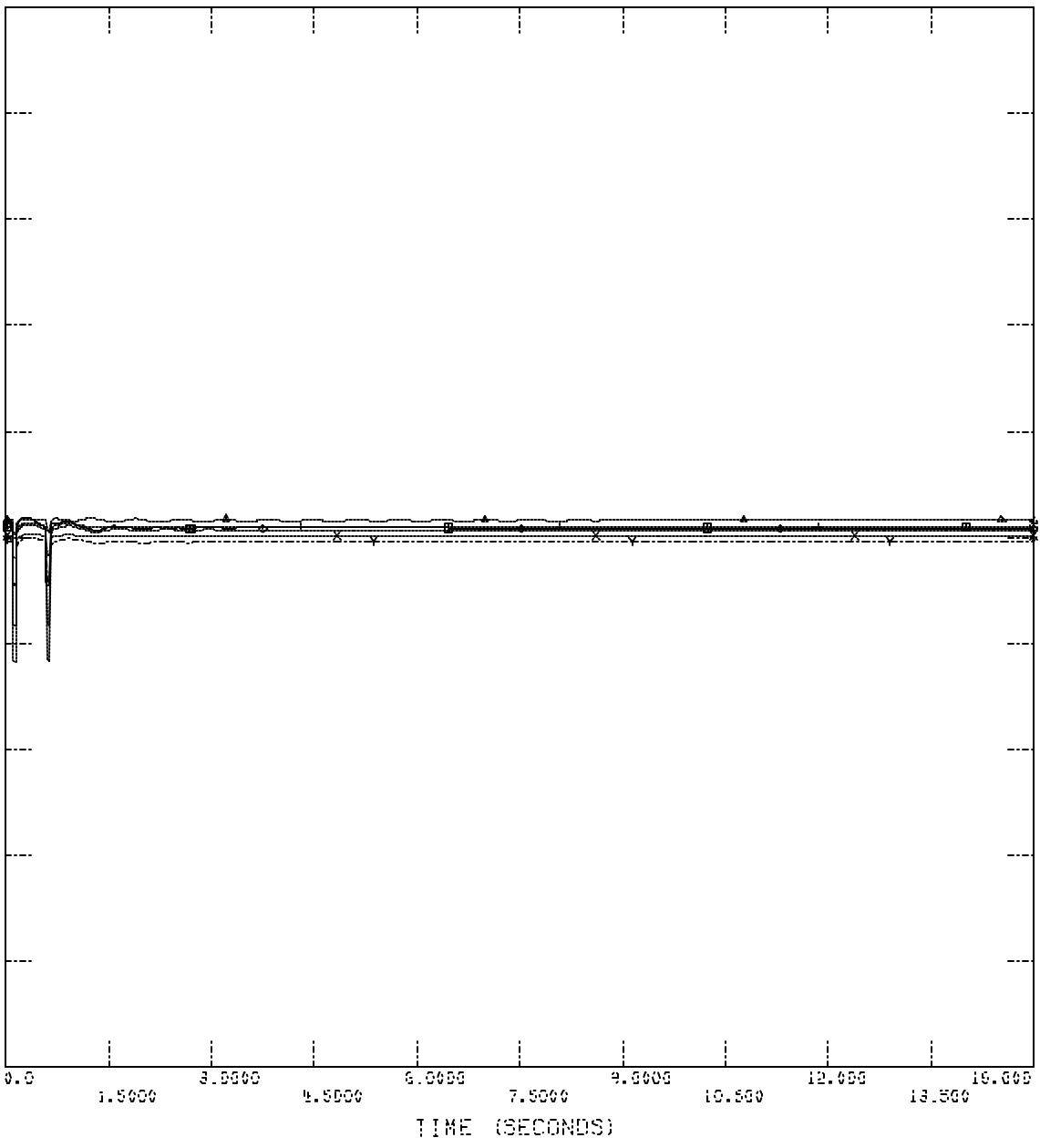
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 FLT\_4\_3PH\_VOLTAGES

395KV  
 2724  
 293

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW INCL PRIOR QUEUED WITH 395KV UPGRADE

FILE: C:\Interconnection Studies\... \RESUL TS\F1\_5\_1PH.001

|        |                                         |     |
|--------|-----------------------------------------|-----|
| 2.0000 | CHNL # 2724: EVOLTAGE BRNTH 395KV]      | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV] | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV]      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV]      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV]       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRPN 395KV]        | 0.0 |



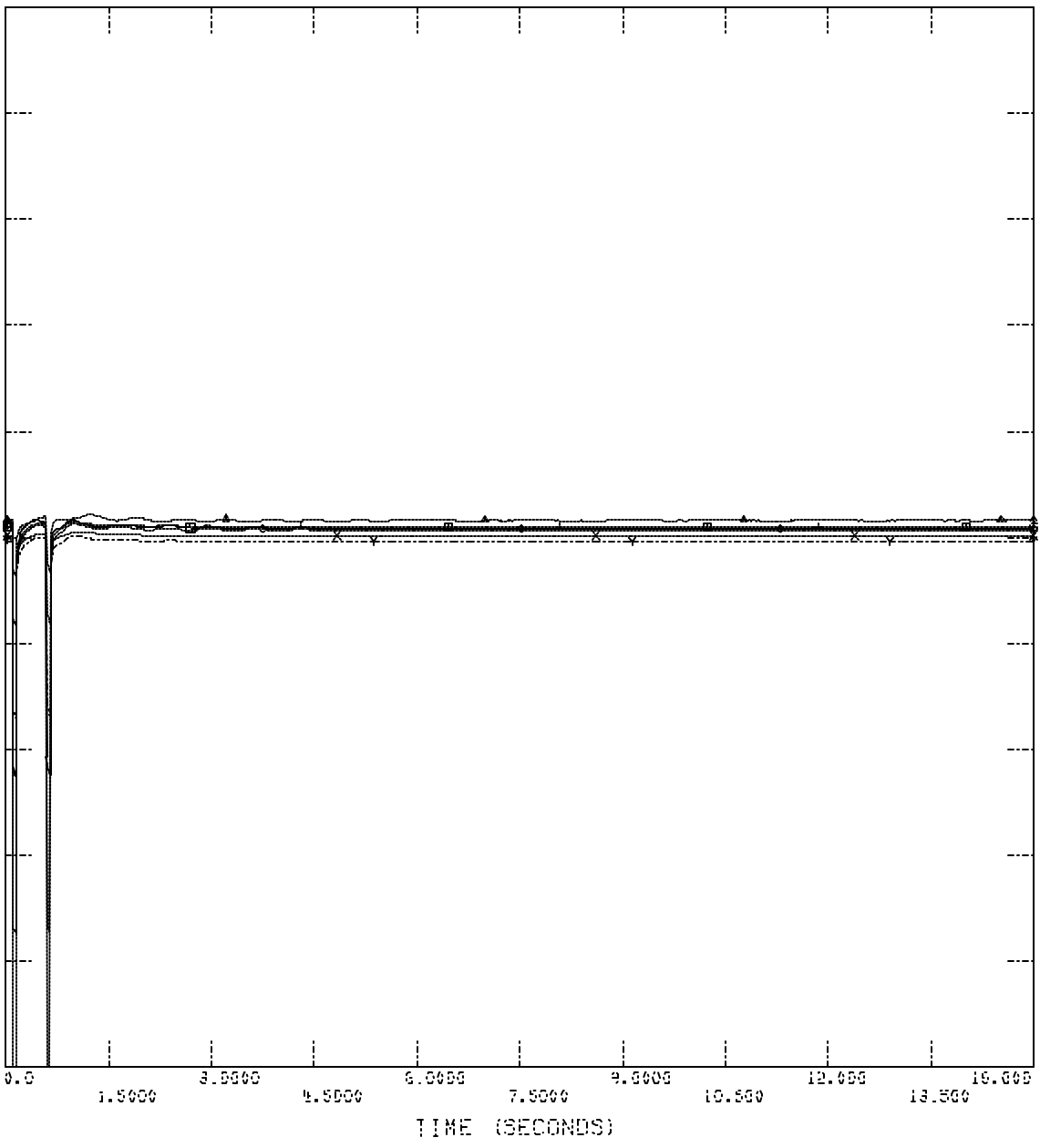
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 FLT\_5\_1PH\_VOLTAGES

395KV  
2004-09-07

SPP MDMS ON STABILITY;2010 SUM PEAK; MODIFIED  
GEN-2004-012 900MW INCL PRIOR QUEUED WITH 395KV UPGRADE

FILE: C:\Interconnection Studies\...\RESULTSV\F1\_5\_3PH.001

| Channel    | Measurement                | Value |
|------------|----------------------------|-------|
| CHNL # 278 | EVOLTAGE BRNTH 395KV       | 0.0   |
| CHNL # 293 | EVOLTAGE PLEASNT HIL 395KV | 0.0   |
| CHNL # 296 | EVOLTAGE FAIRPT 395KV      | 0.0   |
| CHNL # 292 | EVOLTAGE ST JOE 395KV      | 0.0   |
| CHNL # 281 | EVOLTAGE JEC N 395KV       | 0.0   |
| CHNL # 279 | EVOLTAGE IATRN 395KV       | 0.0   |



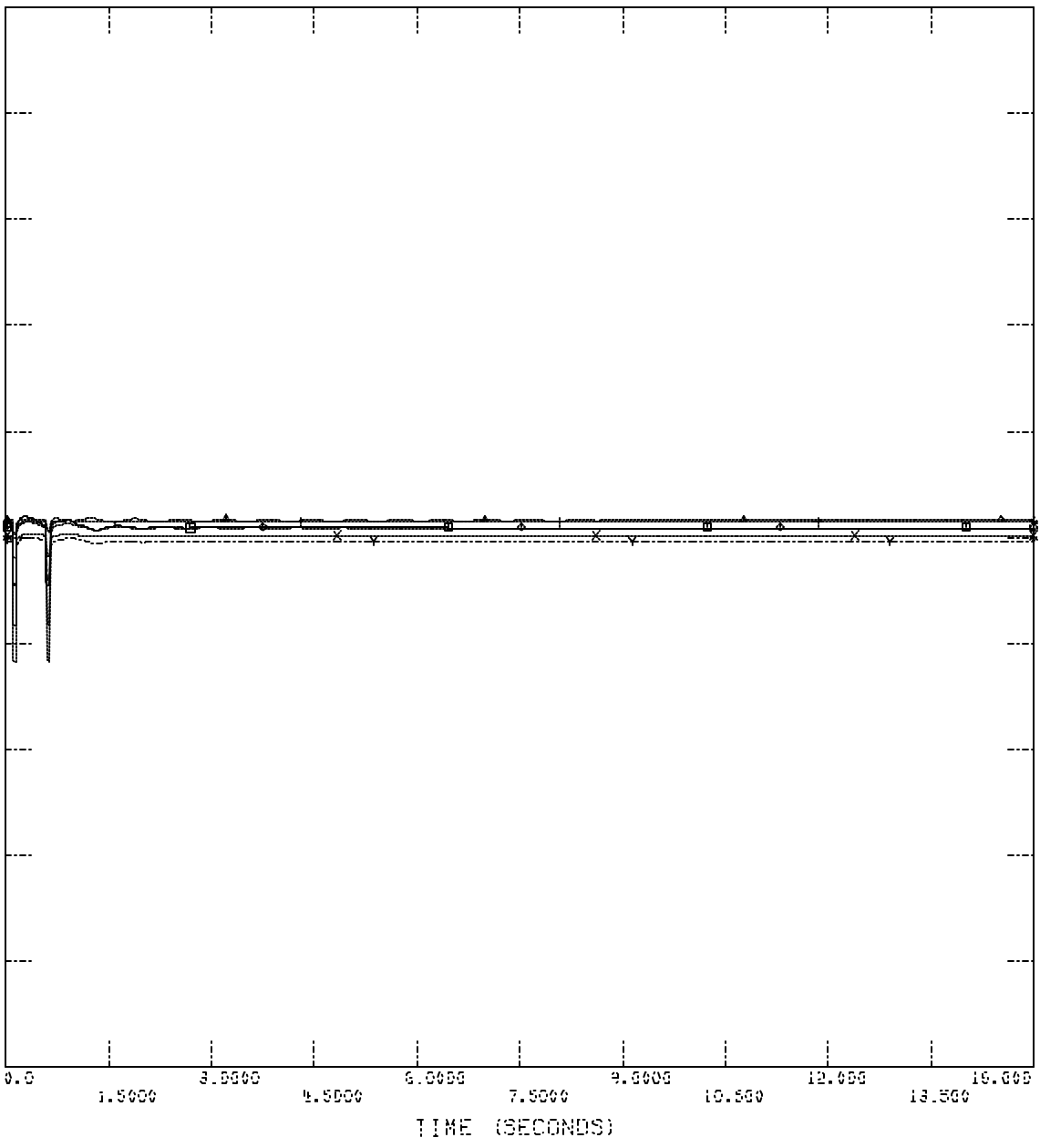
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FLT\_5\_3PH\_VOLTAGES

395KV  
2000V  
1000V

SPP MDMS ON STABILITY;2010 SUM PEAK; MODIFIED  
GEN-2004-012 900MW INCL PRIOR QUEUED WITH 395KV UPGRADE

FILE: C:\Interconnection Studies\...\RESULTSV\FLT\_6\_1PH.001

|        |                                         |     |
|--------|-----------------------------------------|-----|
| 2.0000 | CHNL # 278: EVOLTAGE BRTH 395KV]        | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV] | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV]      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV]      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV]       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRTRN 395KV]       | 0.0 |



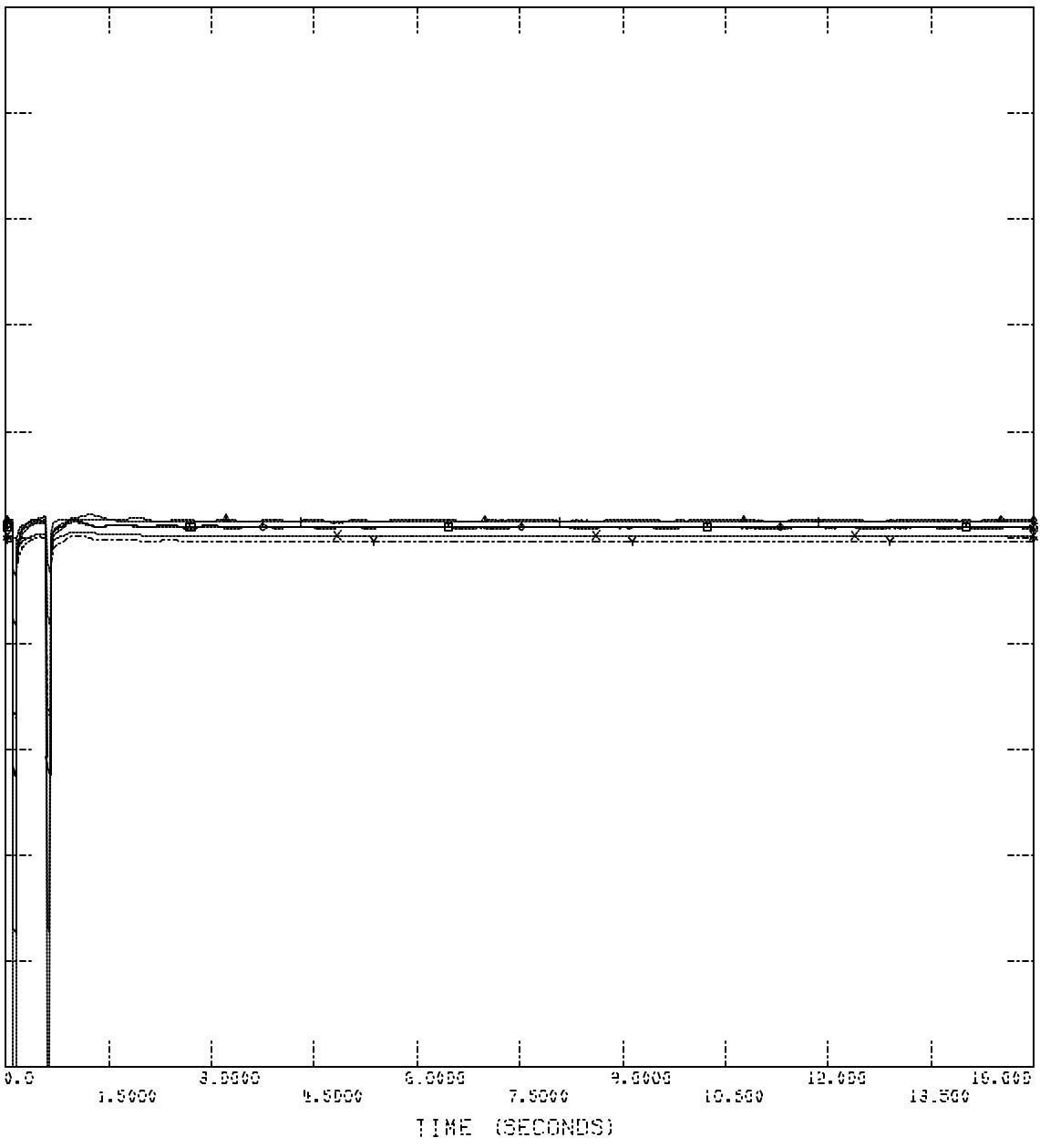
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FLT\_6\_1PH\_VOLTAGES

395KV  
 272A  
 293A  
 292A  
 281A  
 279A

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW INCL PRIOR QUEUED WITH 395KV UPGRADE

FILE: C:\Interconnection Studies\...\RESULTSV\F1\_6\_SPH\_OUT

|        |                                        |     |
|--------|----------------------------------------|-----|
| 2.0000 | CHNL # 272: EVOLTAGE BRNTH 395KV       | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IATRN 395KV       | 0.0 |



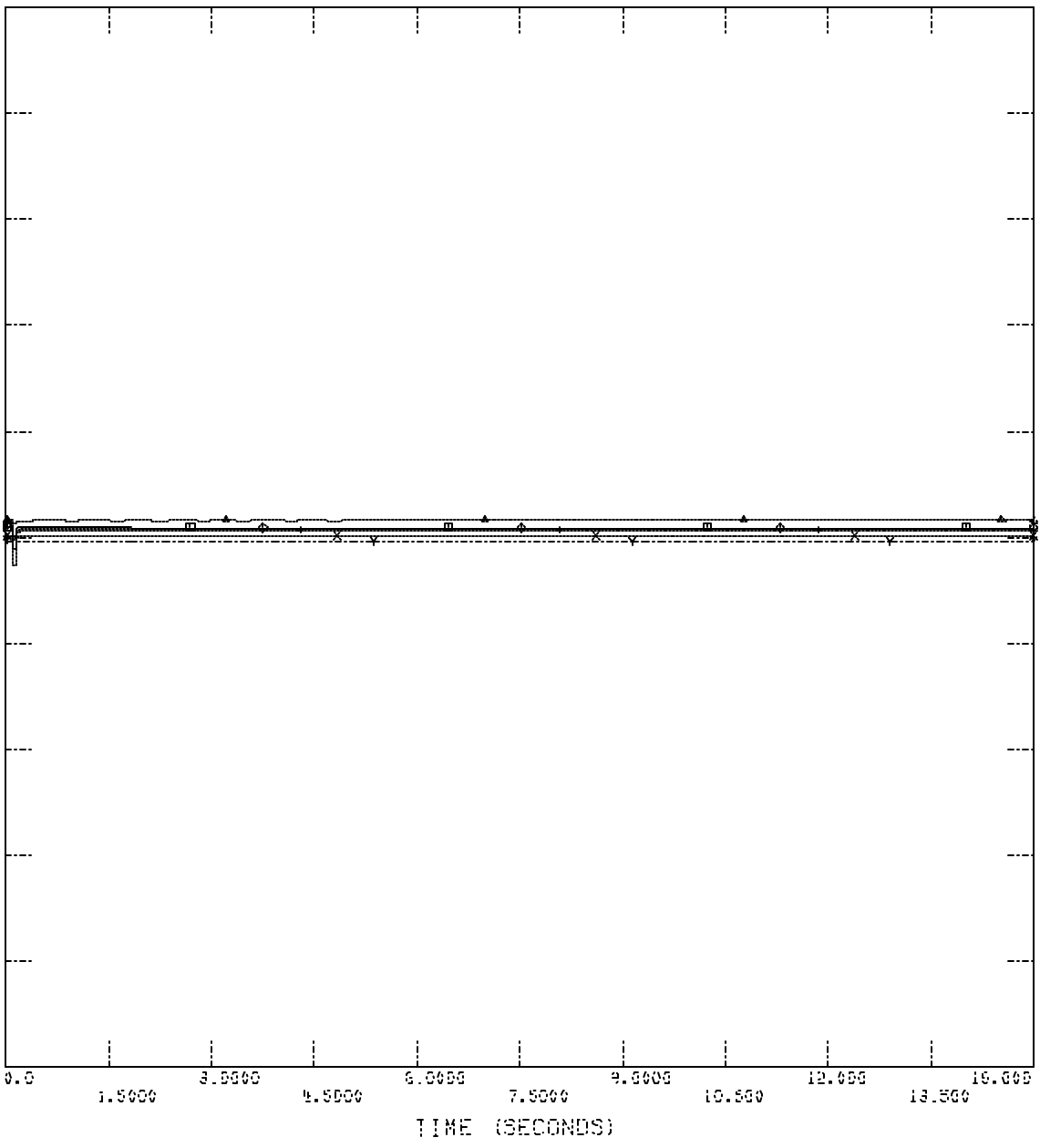
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 FLT\_6\_SPH\_VOLTAGES

395KV  
 395KV  
 395KV

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW INCL PRIOR QUEUED WITH 395KV UPGRADE

FILE: C:\Interconnection Studies\... \RESUL TS\FLT\_7\_1PH.001

|        |                                       |     |
|--------|---------------------------------------|-----|
| 2.0000 | CHNL # 278: EVOLTAGE BRIN 395KV       | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLESNH HIL 395KV | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV     | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV     | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV      | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRIN 395KV       | 0.0 |



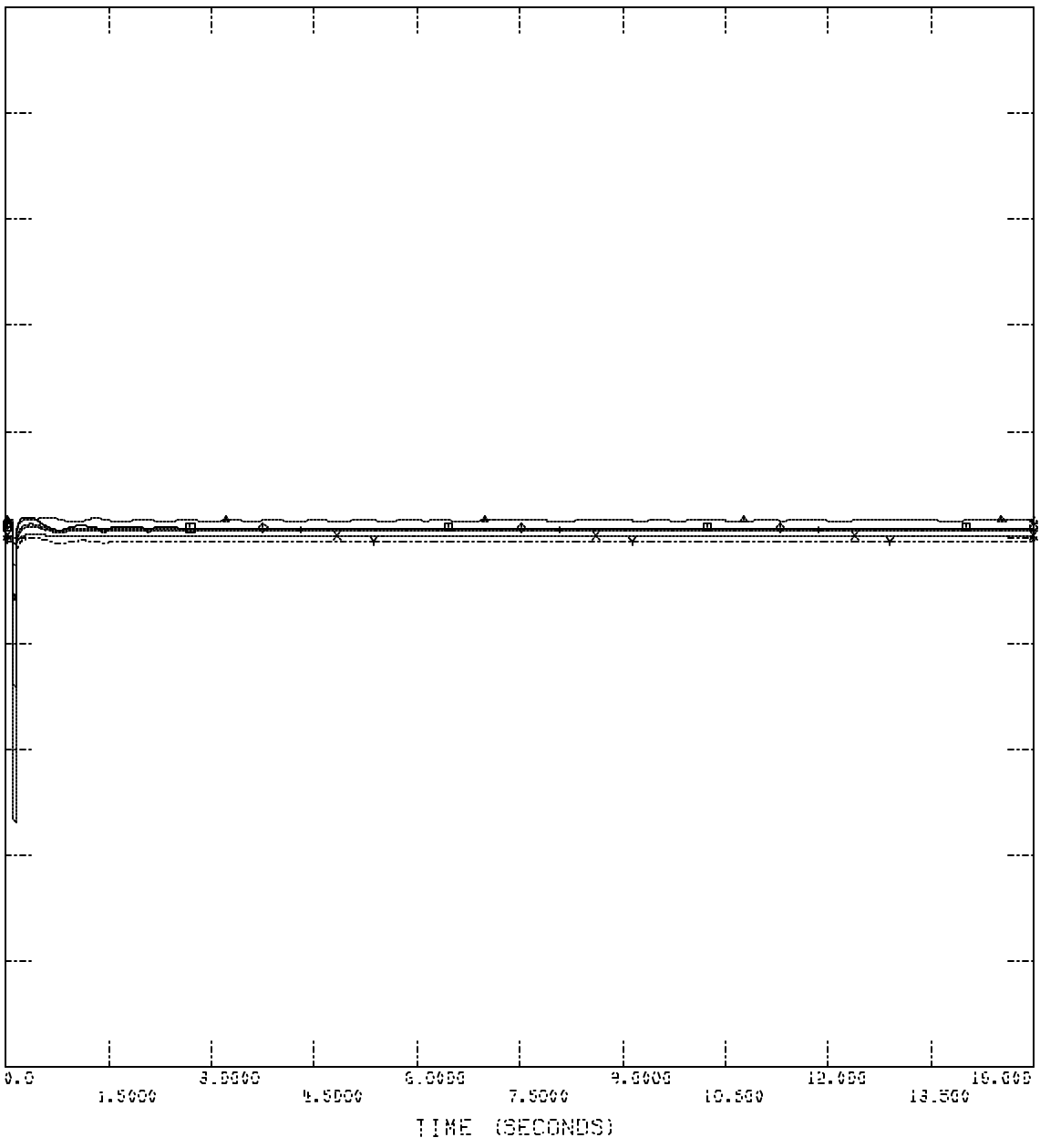
TUE, SEP 07 2004 16:14  
 FLT\_7\_1PH\_VOLTAGES

395KV  
 395KV  
 395KV

SPP MDMS ON STABILITY;2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW INCL PRIOR QUEUED WITH 395KV UPGRADE

FILE: C:\Interconnection Studies\...\RESULTSV\F1\_7\_SPH.001

|        |                                        |     |
|--------|----------------------------------------|-----|
| 2.0000 | CHNL # 278: EVOLTAGE BRIN 395KV        | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRIN 395KV        | 0.0 |



TUE, SEP 07 2004 16:14  
 FLT\_7\_SPH\_VOLTAGES

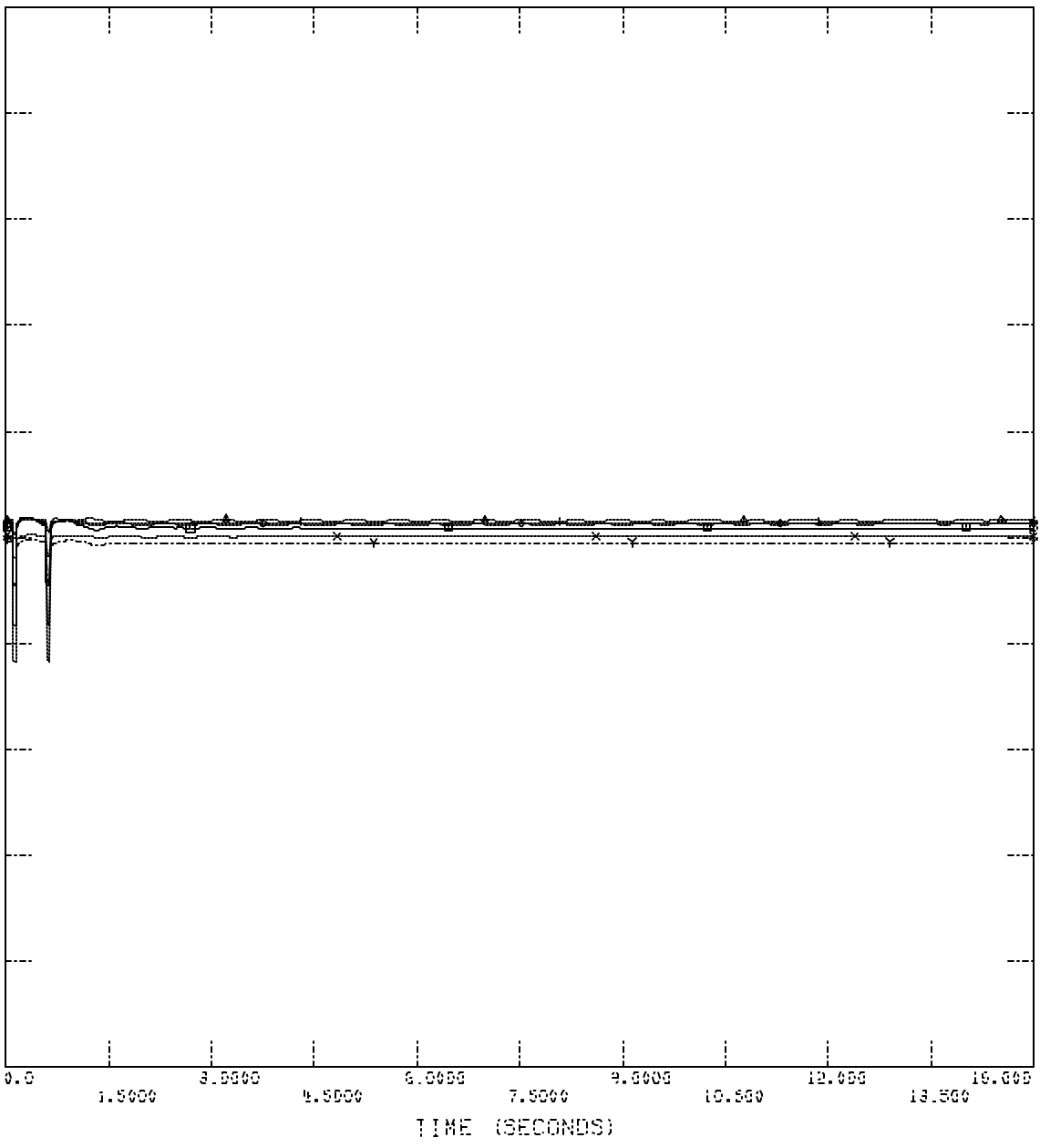


395KV  
2004-09-07 16:14

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED  
GEN-2004-012 900MW INCL PRIOR QUEUED WITH 395KV UPGRADE

FILE: C:\Interconnection Studies\...\RESULTSV\F1\_8\_1PH.001

| Channel | Channel Name                           | Scale |
|---------|----------------------------------------|-------|
| 2.0000  | CHNL * 278: EVOLTAGE BRIN 395KV        | 0.0   |
| 2.0000  | CHNL * 293: EVOLTAGE PLEASNT HIL 395KV | 0.0   |
| 2.0000  | CHNL * 296: EVOLTAGE FAIRPT 395KV      | 0.0   |
| 2.0000  | CHNL * 292: EVOLTAGE ST JOE 395KV      | 0.0   |
| 2.0000  | CHNL * 281: EVOLTAGE JEC N 395KV       | 0.0   |
| 2.0000  | CHNL * 279: EVOLTAGE IRIN 395KV        | 0.0   |



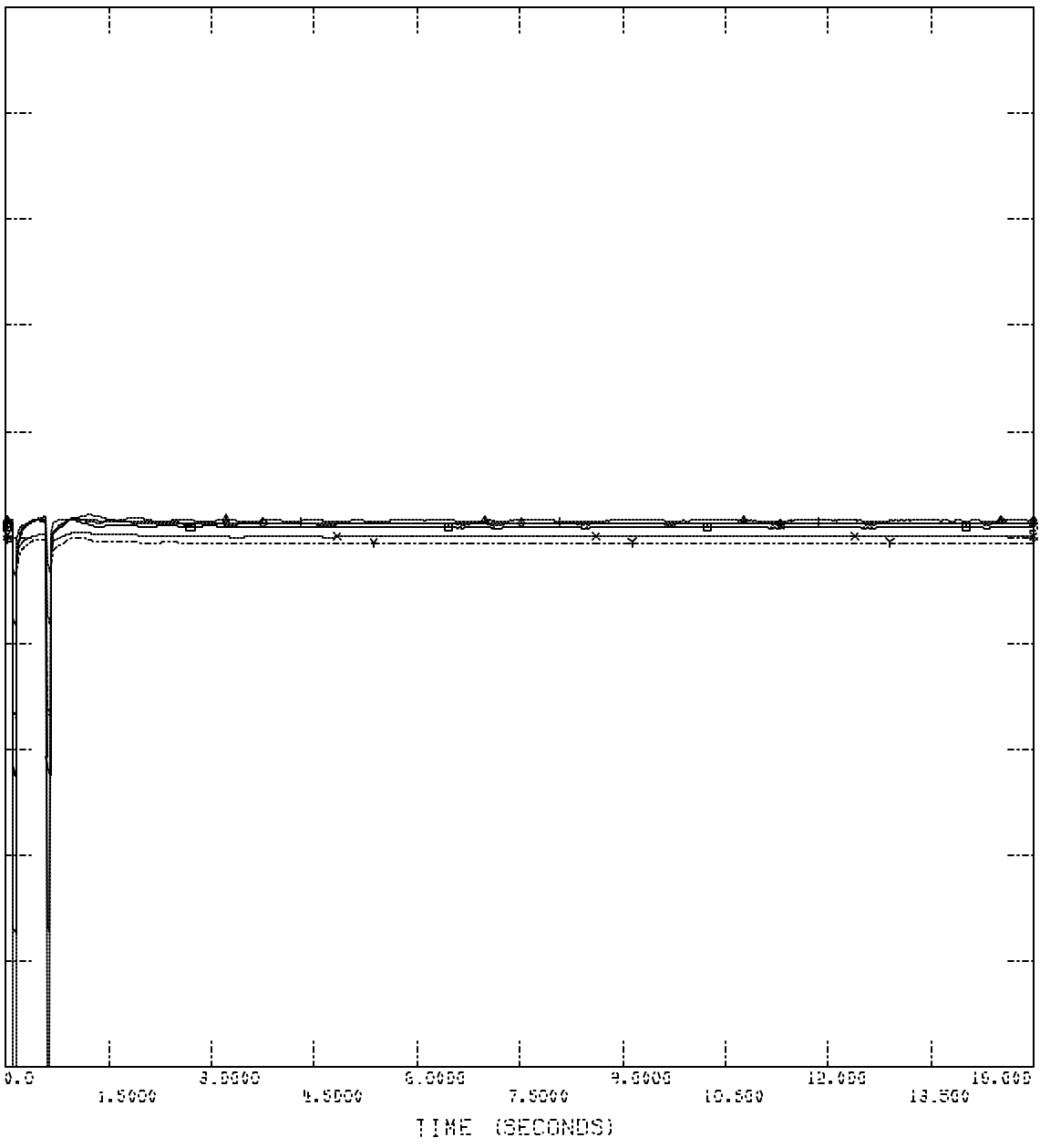
TUE, SEP 07 2004 16:14  
FLT\_0\_1PH\_VOLTAGES

395KVA  
 272A  
 293A

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW INCL PRIOR QUEUED WITH 395KV UPGRADE

FILE: C:\Interconnection Studies\...\RESULTSV\F1\_8\_SPH.001

|        |                                         |     |
|--------|-----------------------------------------|-----|
| 2.0000 | CHNL # 272: EVOLTAGE BRNTH 395KV]       | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV] | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV]      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV]      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV]       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IATRN 395KV]       | 0.0 |



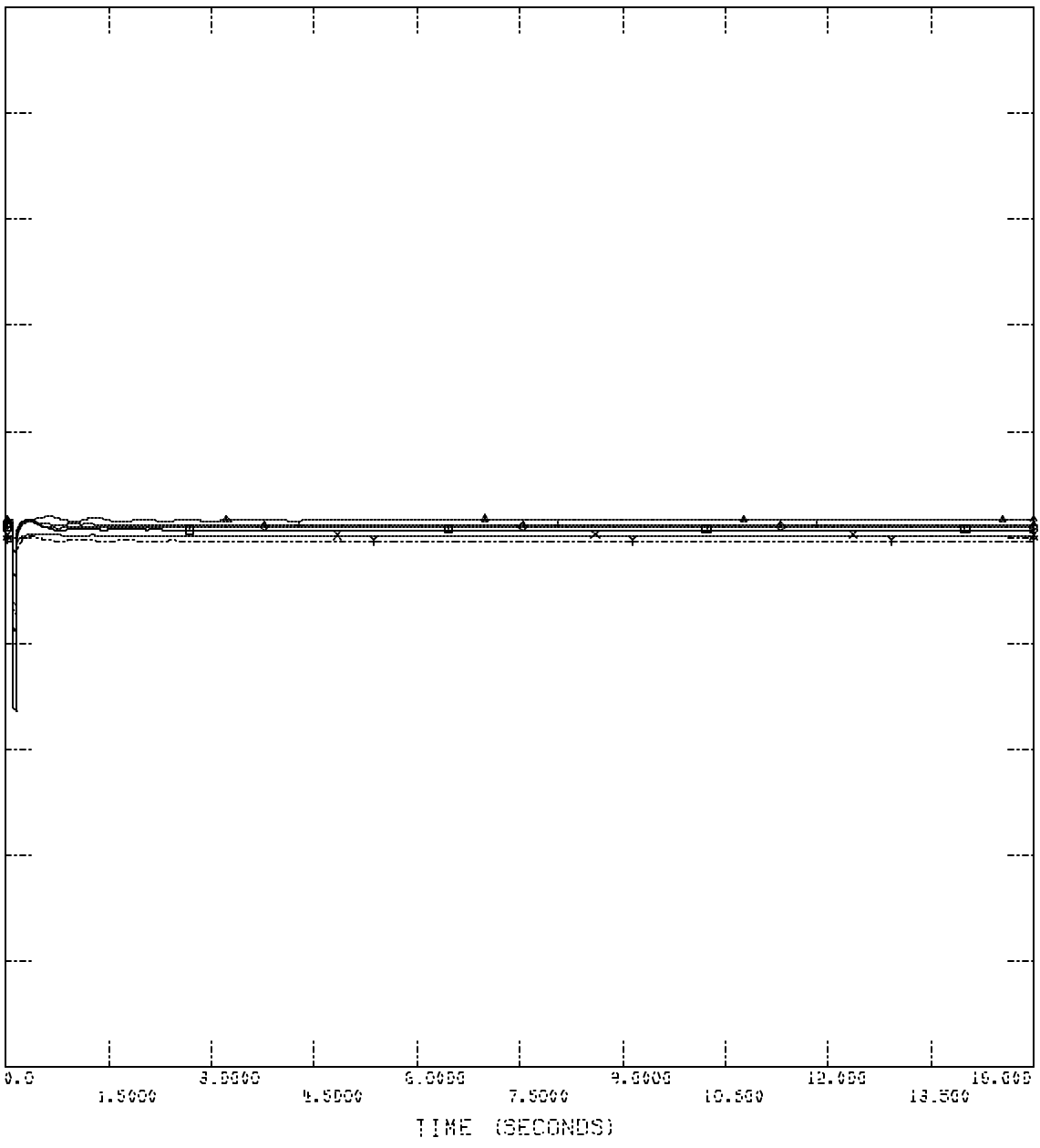
TUE, SEP 07 2004 16:14  
 FLT\_8\_SPH\_VOLTAGES

395KVA  
 1000000  
 1000000  
 1000000

SPP MDMS Q4 STABILITY;2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW INCL PRIOR QUEUED WITH 395KV UPGRADE

FILE: C:\Interconnection Studies\...\900MW W NEW 395\RESULTS\FLT\_9\_OUT

2.0000 CHNL # 278: EVOLTAGE BRBH 395KV] 0.0  
 2.0000 CHNL # 293: EVOLTAGE PLEASNT HIL 395KV] 0.0  
 2.0000 CHNL # 296: EVOLTAGE FAIRPT 395KV] 0.0  
 2.0000 CHNL # 292: EVOLTAGE ST JOE 395KV] 0.0  
 2.0000 CHNL # 281: EVOLTAGE JEC N 395KV] 0.0  
 2.0000 CHNL # 279: EVOLTAGE IATRN 395KV] 0.0



TUE, SEP 07 2004 16:14  
 FLT\_9\_VOLTAGES

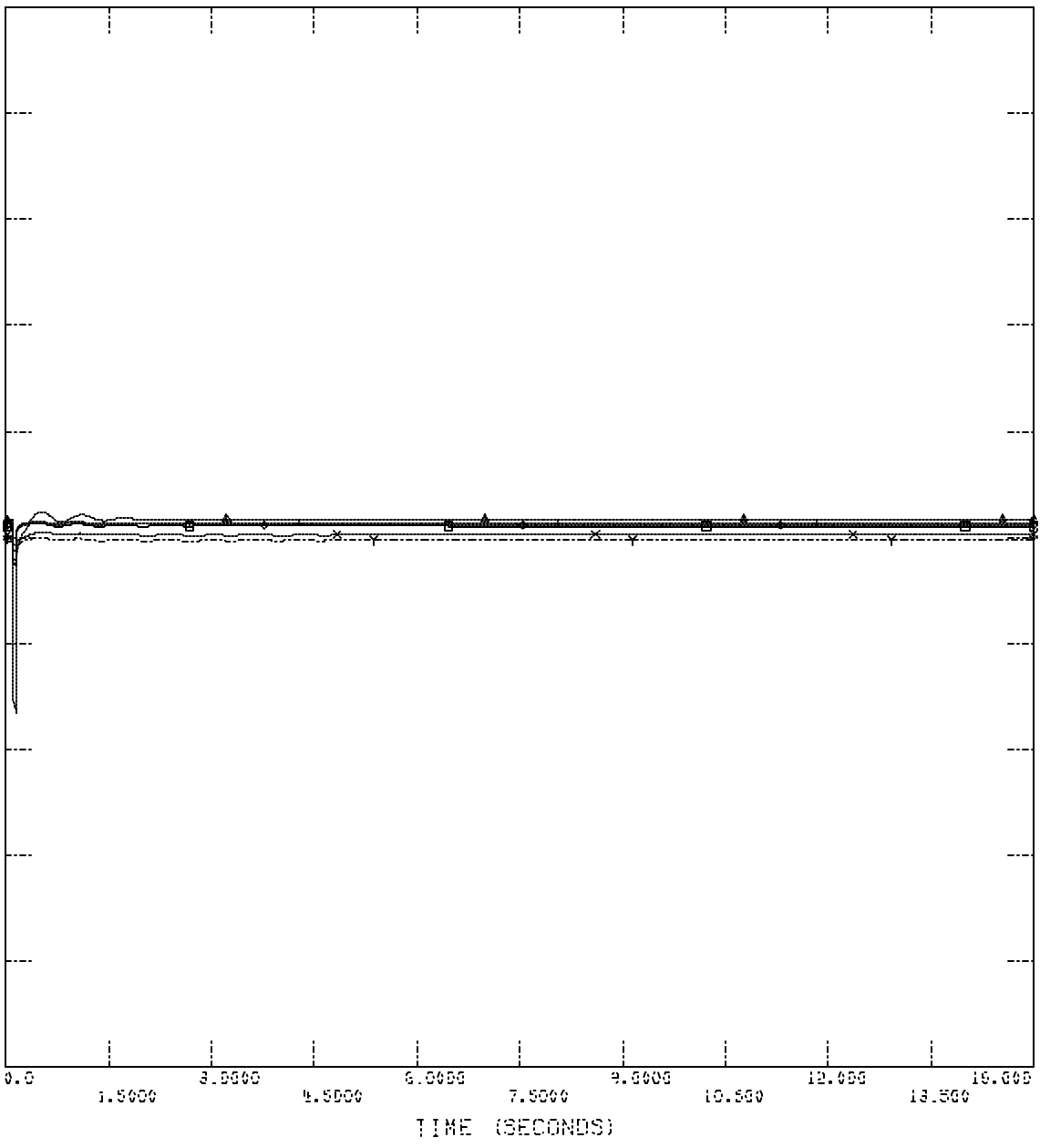


395KV  
 1500MVA  
 115KV

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW INCL PRIOR QUEUED WITH 395KV UPGRADE

FILE: C:\Interconnection Studies\... \900MW w new 395VRESUL15VFL1\_11.DAT

|        |                                        |     |
|--------|----------------------------------------|-----|
| 2.0000 | CHNL # 278: EVOLTAGE BRBR 395KV        | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IATRN 395KV       | 0.0 |



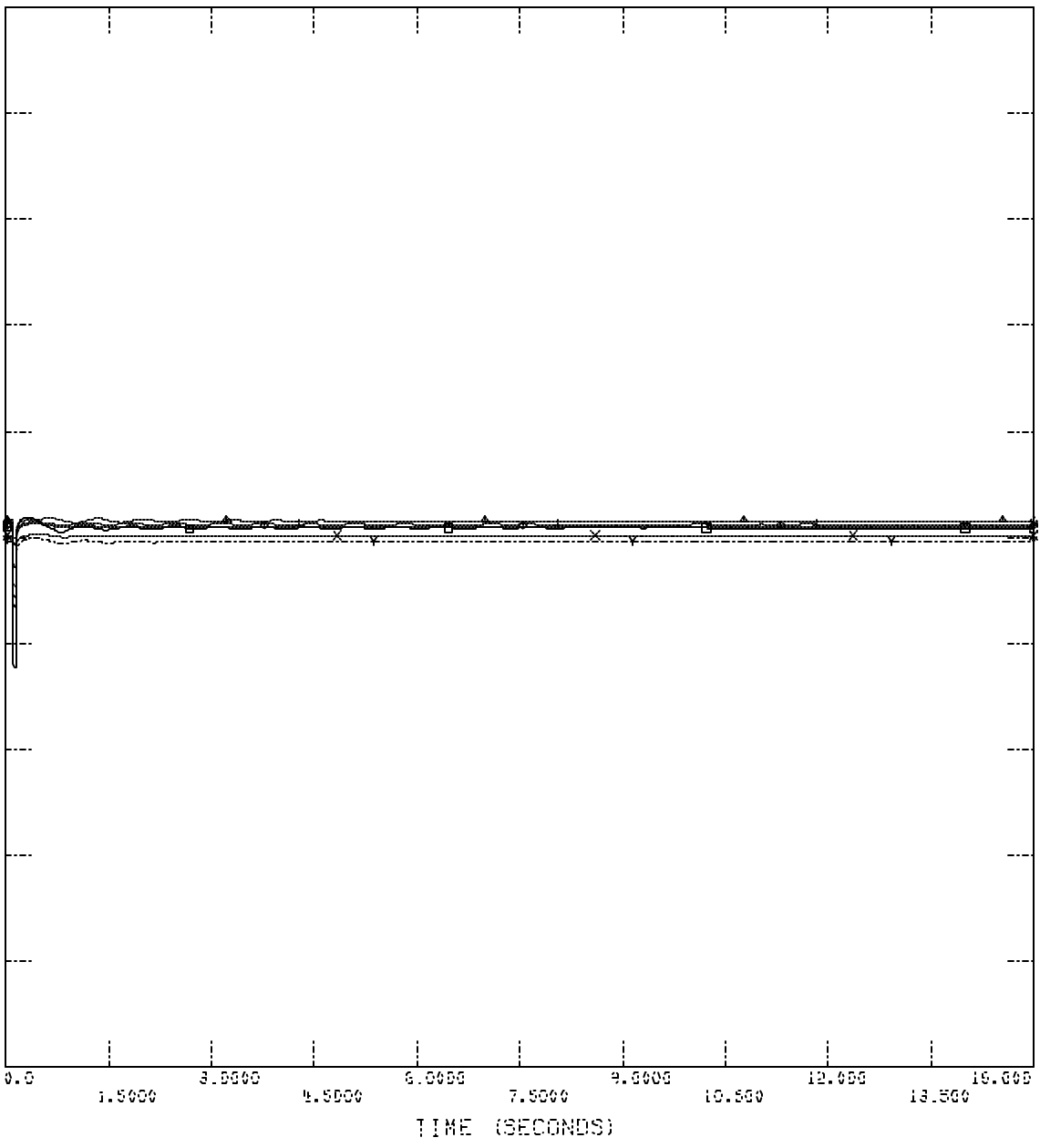
TUE, SEP 07 2004 16:14  
 FLT\_11\_VOLTAGES

395KV  
 272A  
 293A

SPP MDMS 04 STABILITY;2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW INCL PRIOR QUEUED WITH 395KV UPGRADE

FILE: C:\Interconnection Studies\... \RESULTS\FLT\_12\_1PH.DAT

|        |                                        |     |
|--------|----------------------------------------|-----|
| 2.0000 | CHNL # 272: EVOLTAGE BRN 395KV         | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRAN 395KV        | 0.0 |



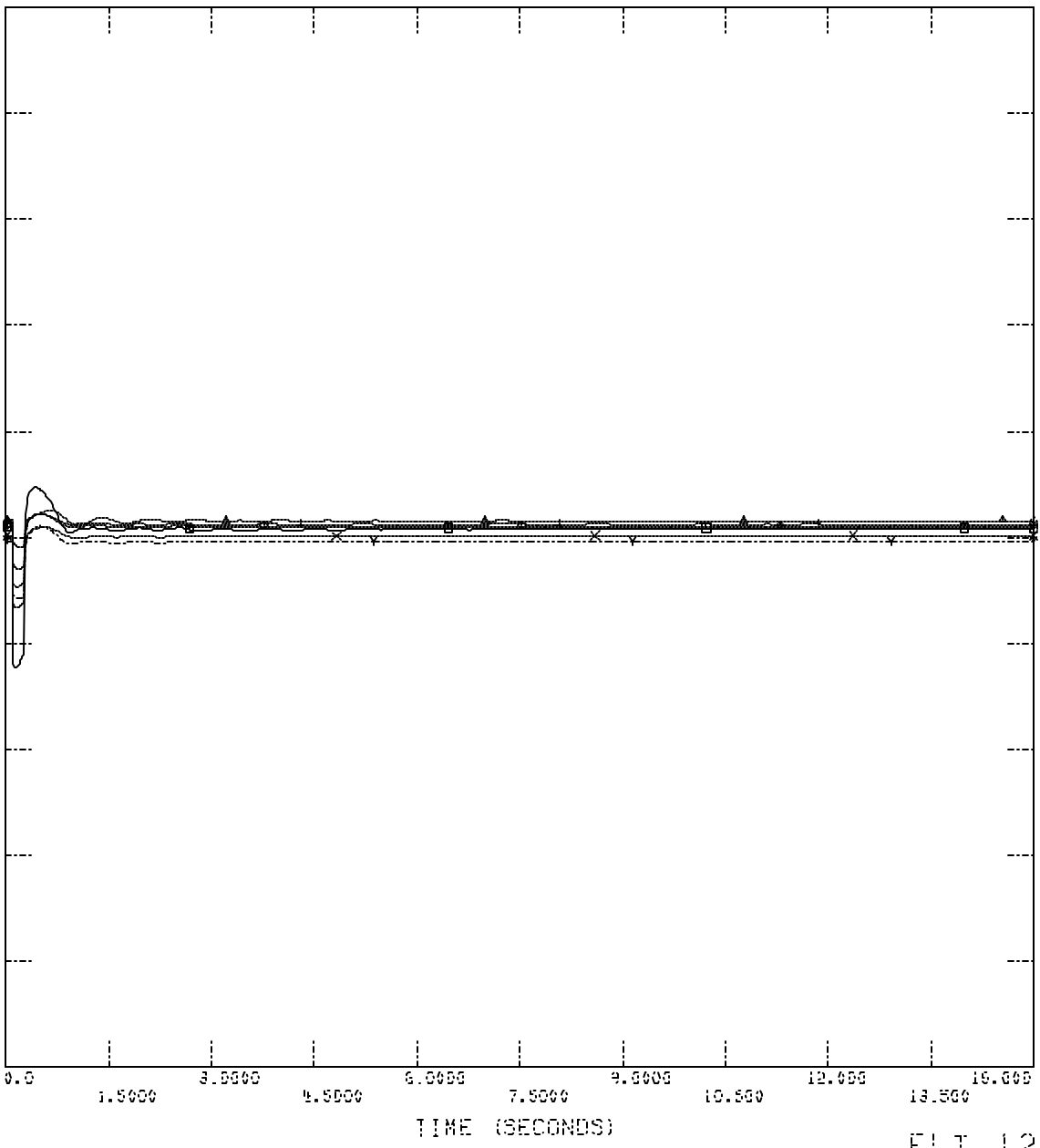
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 FLT\_12\_1PH\_VOLTAGES

395KVA  
 12.1PH  
 12.1PH

SPP MDMS Q4 STABILITY;2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW INCL PRIOR QUEUED WITH 395KV UPGRADE

FILE: C:\Interconnection Studies\...NRESUL13VFLT\_12\_1PH\_Stuck.001

|        |                                         |     |
|--------|-----------------------------------------|-----|
| 2.0000 | CHNL # 278: EVOLTAGE BRIN 395KV]        | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV] | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV]      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV]      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV]       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRAN 395KV]        | 0.0 |



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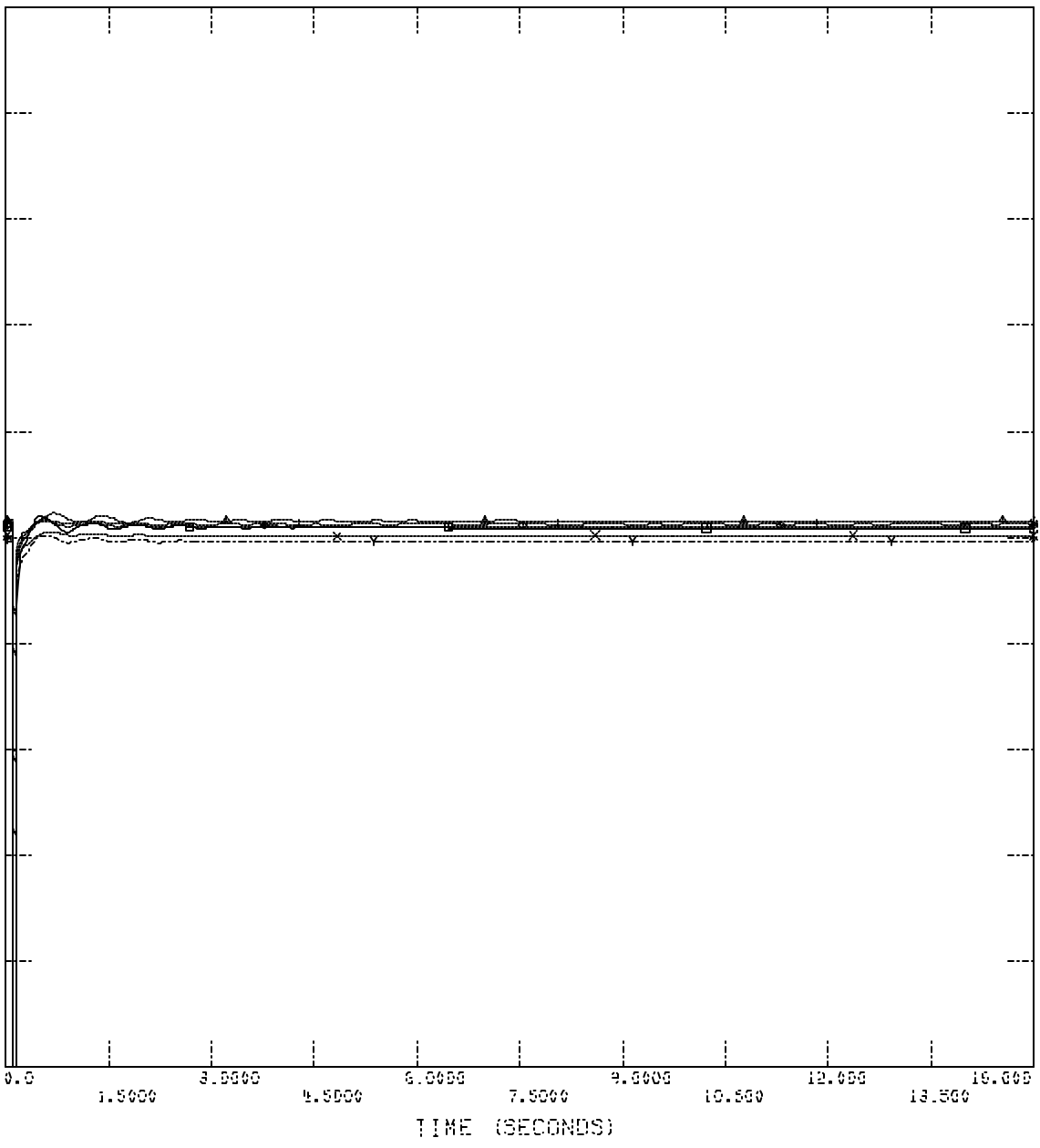
FLT\_12\_1PH\_STUCK\_VOLTAGES

395KV  
 272A  
 272A

SPP MDMS 04 STABILITY;2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW INCL PRIOR QUEUED WITH 395KV UPGRADE

FILE: C:\Interconnection Studies\... \RESULTS\FLT\_12\_3PH.DAT

|        |                                        |     |
|--------|----------------------------------------|-----|
| 2.0000 | CHNL # 272: EVOLTAGE BRN 395KV         | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRPN 395KV        | 0.0 |



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 FLT\_12\_3PH\_VOLTAGES

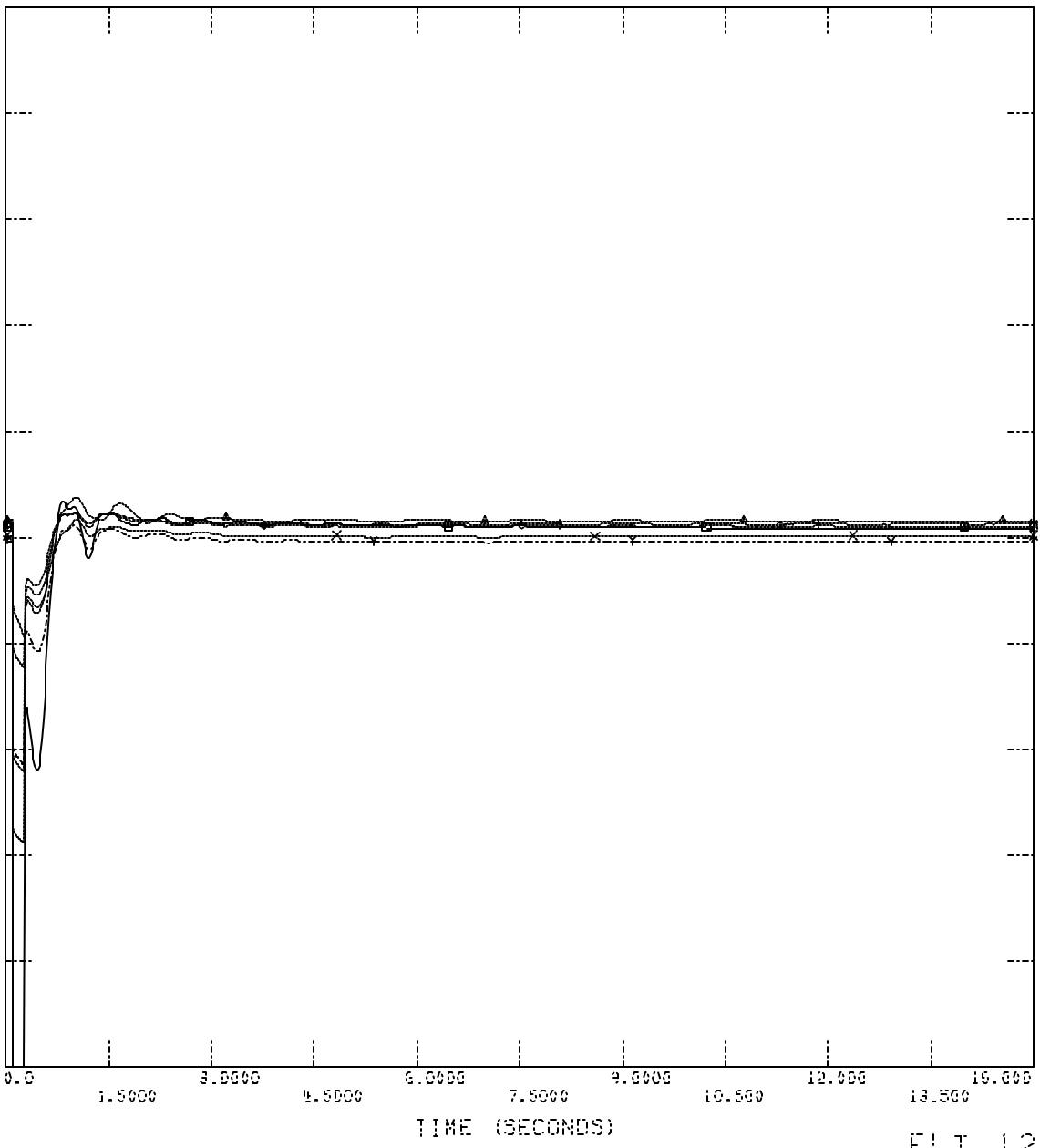


395KV  
 272A  
 272A

SPP MDMS ON STABILITY; 2010 SUM PEAK; MODIFIED  
 GEN-2004-012 900MW INCL PRIOR QUEUED WITH 395KV UPGRADE

FILE: C:\Interconnection Studies\...NRESUL13\FLT\_12\_3PH\_Stuck.001

|        |                                         |     |
|--------|-----------------------------------------|-----|
| 2.0000 | CHNL # 272: EVOLTAGE BRIN 395KV]        | 0.0 |
| 2.0000 | CHNL # 293: EVOLTAGE PLEASNT HIL 395KV] | 0.0 |
| 2.0000 | CHNL # 296: EVOLTAGE FAIRPT 395KV]      | 0.0 |
| 2.0000 | CHNL # 292: EVOLTAGE ST JOE 395KV]      | 0.0 |
| 2.0000 | CHNL # 281: EVOLTAGE JEC N 395KV]       | 0.0 |
| 2.0000 | CHNL # 279: EVOLTAGE IRIN 395KV]        | 0.0 |



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FLT\_12\_3PH\_STUCK\_VOLTAGES