GENERATION INTERCONECTION
REQUEST # GI-2008-33

SUPPLEMENTAL SYSTEM IMPACT STUDY REPORT - PART 3
THREE 100 MW GAS GENERATORS, FT. MORGAN, COLORADO

XCEL ENERGY – PSCO TRANSMISSION PLANNING WEST
MAY 2015

Table of Contents

Executive Summary

On December 31, 2008, Public Service Company of Colorado (PSCO) Transmission Planning received a generation interconnection request, GI-2008-33, to determine the potential system impacts associated with interconnecting a 300 MW natural gas-fired generation facility at the Pawnee Substation by way of a 3-mile radial 345 kV transmission line. The 345 kV bus at Pawnee was considered as the Point of Interconnection (POI). The customer requested a commercial operation date for the facility to coincide with the completion of a new 345 kV transmission line between Pawnee and Smoky Hill and the related 345/230 kV substations, that was completed in June 2013[1]. The study request indicated that 1/3 of the generation would be delivered to the Black Hills service area near Pueblo, Colorado, while the remaining 2/3's of the generation would be delivered to the Cheyenne area in Wyoming through Western Area Power Administration's (WAPA) transmission network.

On January 23, 2012, an Interim Interconnection System Impact Study Report No. 1 for Request # GI-2008-33 was posted on the PSCO OASIS. The study report summarized the results of the power flow study. The study was conducted to determine if the transmission system could reliably serve the proposed 300 MW generation facility at Pawnee (GI-2008-33), dispatched at maximum capacity with wind generation resources in the area (Peetz Logan and Limon at Missile Site) dispatched at high generation levels (75%). The study found that a third Smoky Hill 560 MVA 345/230/13.8 kV transformer would be required as a network reinforcement. On March 21, 2012, an Interim Interconnection System Impact Study Report No. 2 for Request # GI-2008-33 was posted on the PSCO OASIS. This study report included the results of the power flow study, short circuit analysis, cost estimates, and a project schedule. The study report restated the need for a third Smoky Hill 560 MVA 345/230/13.8 kV transformer for network reinforcement; however, the addition of a third 560 MVA 345-230-13.8kV transformer is not feasible at Smoky Hill Substation. To add transformation, a new Harvest Mile 230/345kV Substation has been proposed. The Harvest Mile 230/345kV Substation will be an extension of the existing Smoky Hill Substation. It will accommodate the additional transformer and line terminations for present and future needs and will be located approximately one half mile east of the Smoky Hill Substation. In April 2015, the Colorado Public Utilities Commission (CPUC) granted PSCO a Certificate of Public Convenience and Necessity (CPCN) to construct the Pawnee-Daniels Park 345 kV Transmission Project. The Harvest Mile 230/345kV Substation is a component of that project. The proposed in-service date for the Pawnee-Daniels Park 345kV Transmission Project is 2022.

This report represents Part 3 of the System Impact Study and summarizes the results of transient stability analyses that were conducted for the GI-2008-33 generation facility. A Western Electricity Coordinating Council (WECC) 2014 heavy summer base case ("14HS4.sav") was selected for the study. The case was modified to reflect the study purpose. A new 345kV bus that represents the 345kV yard at the proposed generating plant was added to the case. The new

[1] The Pawnee-Smoky Hill 345kV transmission line is a Senate Bill 100 project that was completed in June 2013. It consists of a new double-circuit 345-kV transmission line that connects Pawnee Substation near Brush, Colorado and Smoky Hill Substation near Aurora, Colorado.

345kV bus (that represents the 345kV yard at the generating plant) was connected to the Pawnee 345kV bus by way of a three-mile 345kV transmission line. Three (3) 100 MW GE LMS100 natural gas-fired simple cycle combustion turbine models were added at the 345kV bus through appropriate step-up transformation. The proposed generation facility was dispatched at 300 MW with 1/3 of the generation scheduled to Black Hills at Pueblo, Colorado (i.e. reduction of Airport Generation Station) and 2/3's of the generation to the Cheyenne area in Wyoming (WAPA-RM balancing authority). All present day Limon wind generation facilities were represented in the study case. The Pawnee/Manchief generation level was 505 MW in the study case. The Peetz Logan and Limon (at Missile Site) wind generating facilities were re-dispatched to reflect a high wind generation level at 75% of maximum capacity. The generation increases at Peetz Logan and Limon were balanced against corresponding generation decreases at Comanche and Plains End. Transient stability simulations were conducted using the modified study case. Twelve dynamic simulations were conducted at locations near the Point of Interconnection. These involved the application of three-phase faults (with fault clearing after five cycles for 230kV busses and fault clearing after four cycles for 345kV busses). The results indicate that generating units are stable (remain in synchronism) and display positive damping and the maximum transient voltage dips and frequency deviations are within criteria. Based on these results, PSCO Transmission Planning concludes that there would be no transient stability issues created by the GI-2008-33 facility (three 100 MW natural gas-fired generators at Pawnee) at the generation levels represented in the study case.

Transient Stability Analysis

1.1 Introduction

The purpose of the GI-2008-33 stability study was to evaluate the impact of the addition of three 100 MW General Electric LMS100 aero-derivative simple-cycle gas-fired turbines interconnected at the Pawnee 345kV station on system reliability.

1.2 Methodology

PSCO uses a deterministic approach for transmission system planning. System performance should meet certain criteria under normal conditions (all lines in service) and for outage conditions (element(s) out of service). PSCO will consider the following contingencies in its assessment of the reliability of the study area.

- Single contingencies: Assessment identifying system impacts when a single branch is removed from service.

1.3 Computer Software

Analysis was performed using Positive Sequence Load Flow (GE-PSLF version 18.1).

1.4 Model Development

The 2014 HS4 Approved Operating Case ("14HS4.sav") in GE PSLF Version 18.0 format (approved on November 7, 2013) was used for the study. The study base case reflects the system topology and load forecast for the 2014 summer peak demand period. The base case was modified to reflect the addition of the GI-2008-33 units at a 300 MW generation level and required transmission facilities to connect the generating station to the Pawnee 345kV bus. The project generation was connected to the 345-kV transmission system by way of a three-mile 345kV transmission line connected to Pawnee. The machine models used in the analysis were based on the models that are presently used at the Panoche[2] Energy Center in Area 30 (PG&E). The output of the generation facility was re-dispatched with 1/3 of the generation delivered to the Black Hills service area near Pueblo, Colorado, while the remaining 2/3's of the generation was delivered to the Cheyenne area in Wyoming through Western Area Power Administration's (WAPA) transmission network. All present day Limon wind generation facilities were represented in the study case. The Pawnee/Manchief generation level was 505 MW. The wind generation resources in the area (Peetz Logan and Limon at Missile Site) were dispatched at high generation levels (75%). The generation increases at Peetz Logan and Limon were balanced against corresponding generation decreases at Comanche and Plains End.

1.5 Assumptions

The following models were used in this study to represent the dynamic characteristics of the three 100 MW GE LMS100 (GI-2008-33) generators:

- IEEE model type GENROU (Round Rotor Generator Model)
- IEEE model type AC8B (Excitation System Model)
- IEEE model type GGOV1 (Turbine-Governor Model)
- IEEE model type PSS2A (Power System Stabilizer Model)

The modeling data used for the GI-2008-33 generating station is the same as the modeling data used at the Panoche Energy Center (see section "1.4 Model Development" above). It is understood that any future system impact study must include the proper settings from the customer and that the power system stabilizer must be properly tuned to the interconnection location. Therefore, the purpose of this stability study is to demonstrate that three 100 MW GE LMS100 generating units (using the same dynamic data as units at the Panoche Energy Center) connected to the Pawnee 345kV bus by way of a three-mile 345kV transmission line remain synchronized to the system with positive damping for every disturbance simulated and that voltage and frequency responses are within criteria. It is understood that these particular dynamic settings are not optimal; however, if three 100 MW GE LMS100 natural gas-fired generating

[2] The models used are General Electric LMS100 generators that are presently modeled in the WECC cases for the Panoche Energy Center in Area 30 (PG&E). The Panoche Energy Center (near Firebaugh, California) is a 400-MW simple-cycle power plant using four GE LMS100 units with fast-start capability. The station is used by PG&E to meet regional power and grid stabilization needs. The 400 MW Panoche Energy Center began Commercial Operation in June 2009. Two 250 MVA 230-13.8kV transformers are used to connect the four GE LMS100 generators to the 230kV system

units are reliable with these settings, it is assumed that they will be reliable (and likely provide better results) with the proper settings supplied by the customer.

1.6 Contingency Criteria

Power Flow Criteria

PSCO adheres to NERC Transmission Planning Standards, WECC Reliability Criteria, and PSCO internal company criteria for planning reliability studies. The following criteria apply to the PSCO system.

Category A – System Normal
"N-0" System Performance Under Normal (No Contingency) Conditions (Category A) NERC Standard TPL-001-0

Voltage:	0.95 to 1.05 per unit
Line Loading:	100 percent of continuous rating
Transformer Loading:	100% of highest 65 °C rating

Category B – Loss of generator, line, or transformer (Forced Outage)
"N-1" System Performance Following Loss of a Single Element (Category B) NERC Standard TPL-002-0

Voltage:	0.90 to 1.10 per unit for 300kV and below (PSCO) 0.90 to 1.05 per unit for above 300kV (PSCO)
Line Loading:	100 percent of continuous rating
Transformer Loading:	100% of highest 65 °C rating

Category C – Loss of Bus or a Breaker Failure (Forced Outage)
"N-2 or More" System Performance Following Loss of Two or More Elements (Category C) NERC Standard TPL-003-0

Voltage and Thermal:	Allowable emergency limits will be considered as determined by the affected parties and the available emergency mitigation plan. Curtailment of firm transfers, generation re-dispatch and load shedding will be considered if necessary.

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Category D – Extreme Events (Forced Outages)
"N-2 or More" System Performance Following Extreme Events
(Category D) NERC Standard TPL-004-0

Voltage and Thermal:	Allowable emergency limits as determined by available emergency mitigation plan. Curtailment of firm transfers, generator re-dispatches and load shedding is permissible if necessary.

Transient Stability Criteria

Transient stability criteria require that all generating machines remain in synchronism and all power swings should be well damped. Transient voltage performance should meet the following criteria:

- Following fault clearing for Category B contingencies, voltage may not dip more than 25% of the pre-fault voltage at load buses, more than 30% at non-load buses, or more than 20% for more than 20 cycles at any bus.
- Following fault clearing for Category C contingencies, voltage may not dip more than 30% of the pre-fault voltage at any bus or more than 20% for more than 40 cycles at any bus.

In addition, transient frequency performance should meet the following criteria:

- Following fault clearing for Category B contingencies, frequency should not dip below 59.6 Hz for 6 cycles or more at a load bus
- Following fault clearing for Category C contingencies, frequency should not dip below 59.0 Hz for 6 cycles or more at a load bus

1.7 Study Procedure

1. Select the 2014 HS4 Approved Operating Case ("14HS4.sav") in GE PSLF Version 18.0 format.
2. Add a new 345kV bus and a model for the three-mile 345k line that represents the transmission that would connect the new generating station to the Pawnee 345kV bus.
3. Add models for the three (3) 100 MW GE LMS100 natural gas-fired simple cycle combustion turbines at the generator buses through appropriate transformation.
4. Dispatch the proposed facility (GI-2008-33) at 300 MW. Schedule 1/3 of the generation to Black Hills at Pueblo, Colorado (reduce Airport Generation Station) and 2/3 of the generation to the Cheyenne area in Wyoming (WAPA-RM balancing authority).
5. Enhance the study case to reflect the present day Limon generation facilities (at Missile Site)

6. Re-dispatch the study case to reflect high levels (75%) of wind generation for the Peetz Logan and Limon (at Missile Site) generation facilities. The generation increases at Peetz Logan and Limon are balanced against corresponding generation decreases at Comanche and Plains End.
7. Conduct the three-phase fault simulations with four-cycle clearing times for 345kV circuit breakers and five-cycles clearing times for 230kV circuit breakers

1.8 Transient Stability Analysis

Transient stability is the ability of the power system to maintain synchronism when subjected to severe transient disturbances such as faults on transmission facilities, loss of generation, or loss of a large load. The system response to disturbances may result in large excursions of generator rotor angles, power flows, bus voltages and bus frequencies. Transient stability studies evaluate generator rotor angles, bus voltages, bus frequencies, and power flows before, during and after a disturbance to determine if the generating facilities remain synchronized to the system after the disturbance and bus voltages and bus frequencies remain within criteria indicating an acceptable transient response to the disturbance.

Transient stability analyses were performed on the study case created in Part 1.7 for different three-phase faults around Pawnee and Missile Site. These faults consisted of three-phase faults occurring near the end of the transmission lines as well as faults at nearby power transformers. Three-phase faults applied to 230kV busses were cleared in five cycles and the three-phase faults applied to 345kV busses were cleared in four cycles. The simulations show that generating units remain synchronized and displayed positive damping and bus voltages and bus frequencies display maximum transient voltage dips and frequency deviations within criteria. Based on these results, PSCO Transmission Planning concludes that there would be no transient stability issues created by the GI-2008-33 facility (three 100 MW natural gas-fired generators at Pawnee) at the generation levels represented in the study case.

1.9 Study Results

Table 1. Transient Stability Results

Stability Scenarios						
#	Fault Location	Facility Tripped	Clearing Time (cycles)	Pre GI-2008-33	Post-Fault Voltage Recovery	Angular Stability
1	Pawnee 345 kV	Pawnee*-Missile Site 345 kV	Primary (4.0)	Acceptable	Maximum transient voltage dips and frequency deviations within criteria	Synchronized with positive damping
2	Missile Site 345 kV	Pawnee-Missile Site* 345 kV	Primary (4.0)	Acceptable	Maximum transient voltage dips and frequency deviations within criteria	Synchronized with positive damping
3	Missile Site 345 kV	Missile Site*-Smoky Hill 345 kV	Primary (4.0)	Acceptable	Maximum transient voltage dips and frequency deviations within criteria	Synchronized with positive damping
4	Pawnee 345 kV	Pawnee*-GI-2008-33	Primary (4.0)	N/A	Maximum transient voltage dips and frequency deviations within criteria	Synchronized with positive damping
5	Pawnee 230 kV	Pawnee*-Ft.Lupton 230 kV	Primary (5.0)	Acceptable	Maximum transient voltage dips and frequency deviations within criteria	Synchronized with positive damping
6	Pawnee 230 kV	Pawnee*-Brick Center 230 kV	Primary (5.0)	Acceptable	Maximum transient voltage dips and frequency deviations within criteria	Synchronized with positive damping
7	Pawnee 230 kV	Pawnee*-Missile Site 230 kV	Primary (5.0)	Acceptable	Maximum transient voltage dips and frequency deviations within criteria	Synchronized with positive damping
8	Pawnee 230 kV	Pawnee*-Story 230 kV	Primary (5.0)	Acceptable	Maximum transient voltage dips and frequency deviations within criteria	Synchronized with positive damping
9	Pawnee 230 kV	Pawnee*-Peetz Logan 230 kV	Primary (5.0)	Acceptable	Maximum transient voltage dips and frequency deviations within criteria	Synchronized with positive damping
10	Pawnee 230 kV	Pawnee GSU Transformers, Pawnee C1 Unit	Primary (5.0)	Acceptable	Maximum transient voltage dips and frequency deviations within criteria	Synchronized with positive damping
11	Missile Site 345 kV	Missile Site 345/230 Xfmr	Primary (4.0)	Acceptable	Maximum transient voltage dips and frequency deviations within criteria	Synchronized with positive damping
12	Pawnee 345 kV	Pawnee 345/230 Xfmr #1 & #2	Primary (4.0)	Acceptable	Maximum transient voltage dips and frequency deviations within criteria	Synchronized with positive damping

Appendix A Transient Stability Plots

The transient stability plots are described in Table 2 below. Six plots precede the “diagram set title”. Each plot has a name such as “bus voltage”, “generator terminal voltage”, “bus frequency”, “generator speed”, “generator relative rotor angle”, and “generator power output”. Each scenario simulation is designated with a line or transformer designation such as “line_1” or “tran_10”. Each diagram set has a title such as “line PAWNEE to MIS_SITE 345, PAWNEE end” that is an abbreviated description of the simulation. The detailed description is found in Table 2 below.

Table 2. Transient Stability Simulations – Descriptions of the Plots

No	Diagram Set Title	Detailed Description	Measured Quantities
Line_1	Line PAWNEE to MIS_SITE 345, PAWNEE end	At 1.0 second, apply a three-phase fault at Pawnee end of Pawnee-Missile Site 345kV line. After four cycles, trip the line to clear the fault	Bus voltage, generator terminal voltage, bus frequency, generator speed, generator relative rotor angle, generator power output
Line_2	Line Pawnee to MIS_SITE 345, MIS_SITE end	At 1.0 second, apply a three-phase fault at Missile Site end of Pawnee-Missile Site 345kV line. After four cycles, trip the line to clear the fault	Bus voltage, generator terminal voltage, bus frequency, generator speed, generator relative rotor angle, generator power output
Line_3	Line MIS_SITE to SMOKYHIL 345, MIS_SITE end	At 1.0 second, apply a three-phase fault at Missile Site end of Missile Site-Smoky Hill 345kV line. After four cycles, trip the line to clear the fault	Bus voltage, generator terminal voltage, bus frequency, generator speed, generator relative rotor angle, generator power output
Line_4	Line PAWNEE to GENSITE 345, PAWNEE end	At 1.0 second, apply a three-phase fault at Pawnee end of Pawnee-Generator Site 345kV line. After four cycles, trip the line to clear the fault and trip generation	Bus voltage, generator terminal voltage, bus frequency, generator speed, generator relative rotor angle, generator power output
Line_5	Line PAWNEE to FTLUPTON 230, PAWNEE end	At 1.0 second, apply a three-phase fault at Pawnee end of Pawnee-Ft. Lupton 230kV line. After five cycles, trip the line to clear the fault	Bus voltage, generator terminal voltage, bus frequency, generator speed, generator relative rotor angle, generator power output
Line_6	Line PAWNEE to BRICKCTR 230, PAWNEE end	At 1.0 second, apply a three-phase fault at Pawnee end of Pawnee-Brick Center 230kV line. After five cycles, trip the line to clear the fault	Bus voltage, generator terminal voltage, bus frequency, generator speed, generator relative rotor angle, generator power output
Line_7	Line PAWNEE to MIS_SITE 230, PAWNEE end	At 1.0 second, apply a three-phase fault at Pawnee end of Pawnee-Missile Site 230kV line. After five cycles, trip the line to clear the fault	Bus voltage, generator terminal voltage, bus frequency, generator speed, generator relative rotor angle, generator power output
Line_8	Line PAWNEE to STORY 230, PAWNEE end	At 1.0 second, apply a three-phase fault at Pawnee end of Pawnee-Story 230kV line. After five cycles, trip the line to clear the fault	Bus voltage, generator terminal voltage, bus frequency, generator speed, generator relative rotor angle, generator power output

Line_9	Line PAWNEE to PTZLOGAN 230, PAWNEE end	At 1.0 second, apply a three-phase fault at Pawnee end of Pawnee-Peetz Logan 230kV line. After five cycles, trip the line to clear the fault	Bus voltage, generator terminal voltage, bus frequency, generator speed, generator relative rotor angle, generator power output
Tran_10	Tran PAWNEE 230 to PAWNEE 22, ck u1 and u2	At 1.0 second, apply a three-phase fault at Pawnee 230kV end of Pawnee 230-22kV step-up transformer. After five cycles, trip the transformers to clear the fault	Bus voltage, generator terminal voltage, bus frequency, generator speed, generator relative rotor angle, generator power output
Tran_11	Tran MIS_SITE 345 to MIS_SIT 230, ck1	At 1.0 second, apply a three-phase fault at Missile Site 345kV end of Missile Site 345-230kV transformer Circuit 1. After four cycles, trip the transformer to clear the fault	Bus voltage, generator terminal voltage, bus frequency, generator speed, generator relative rotor angle, generator power output
Tran_12	Line PAWNEE 345 to PAWNEE 230, Ck T1	At 1.0 second, apply a three-phase fault at Pawnee 345kV end of Pawnee 345-230kV transformer Circuit T1. After four cycles, trip the transformer to clear the fault	Bus voltage, generator terminal voltage, bus frequency, generator speed, generator relative rotor angle, generator power output

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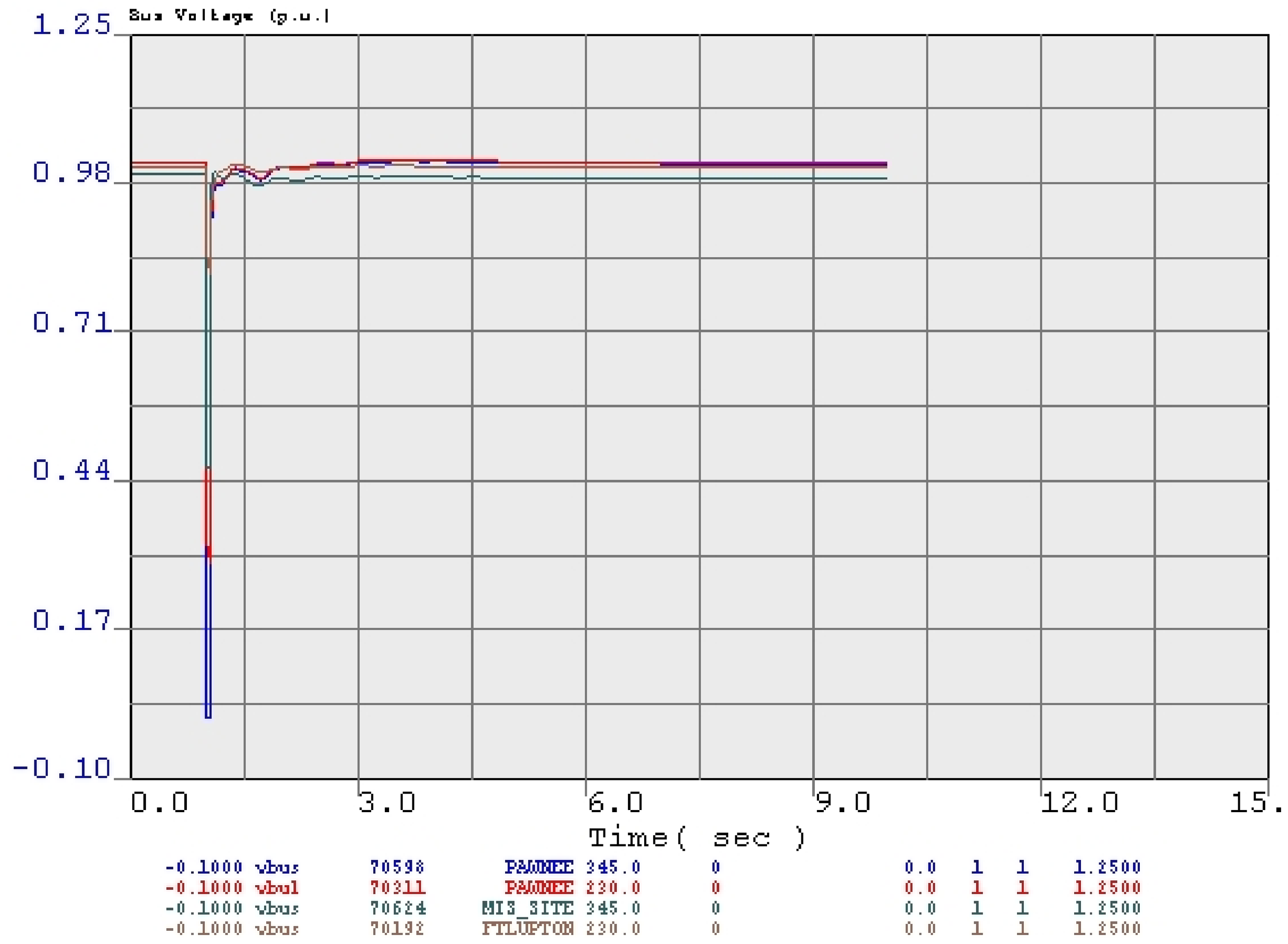
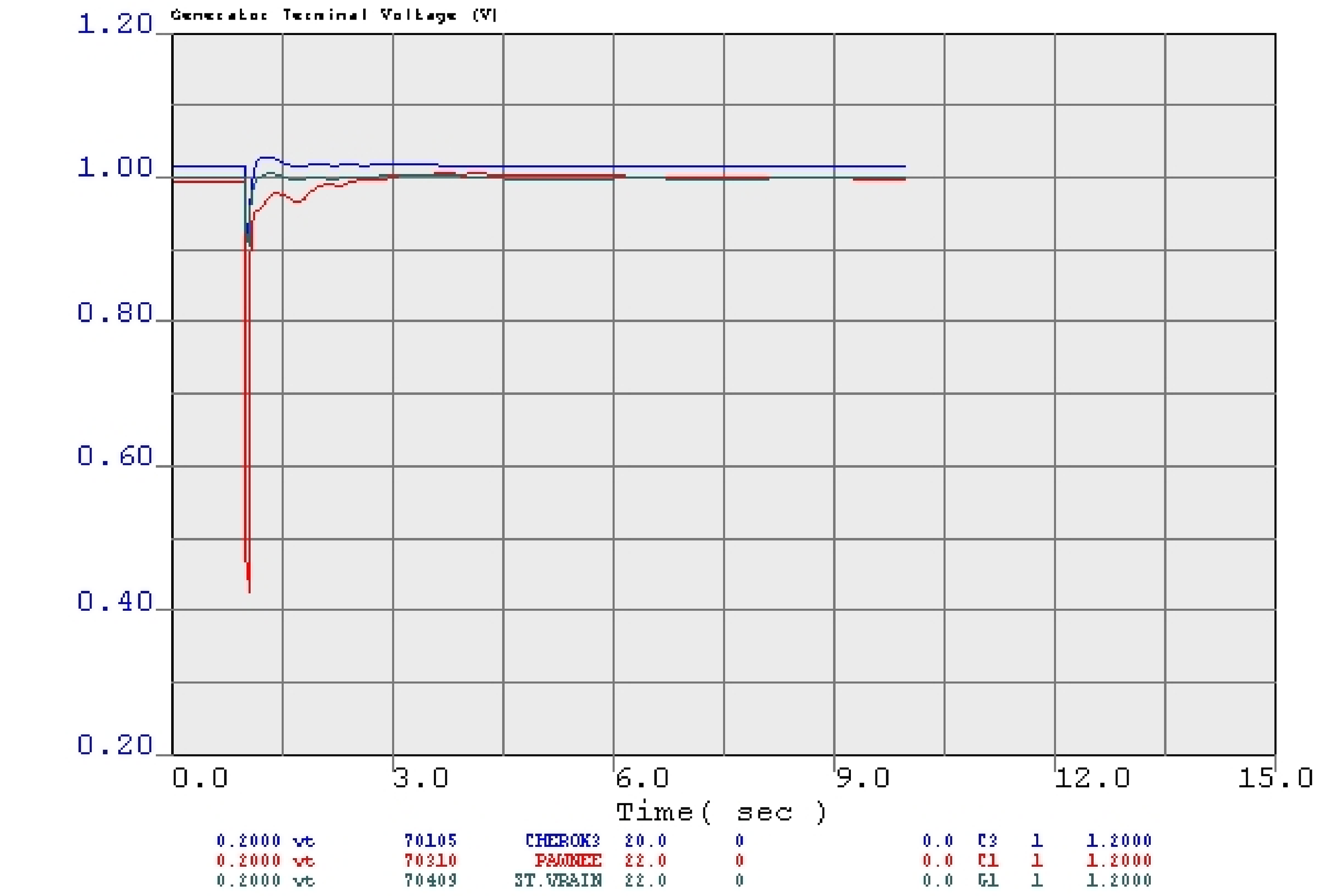
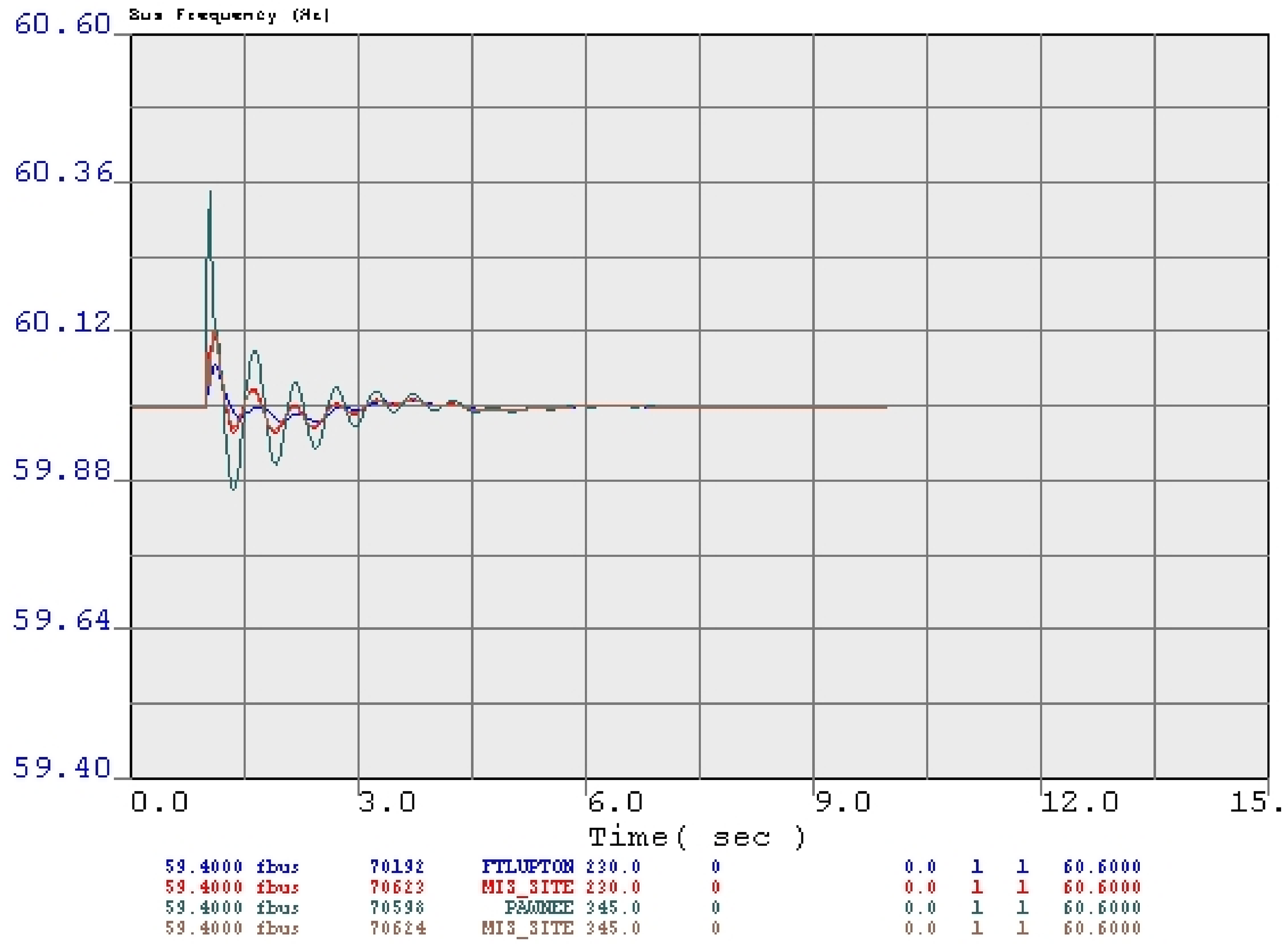
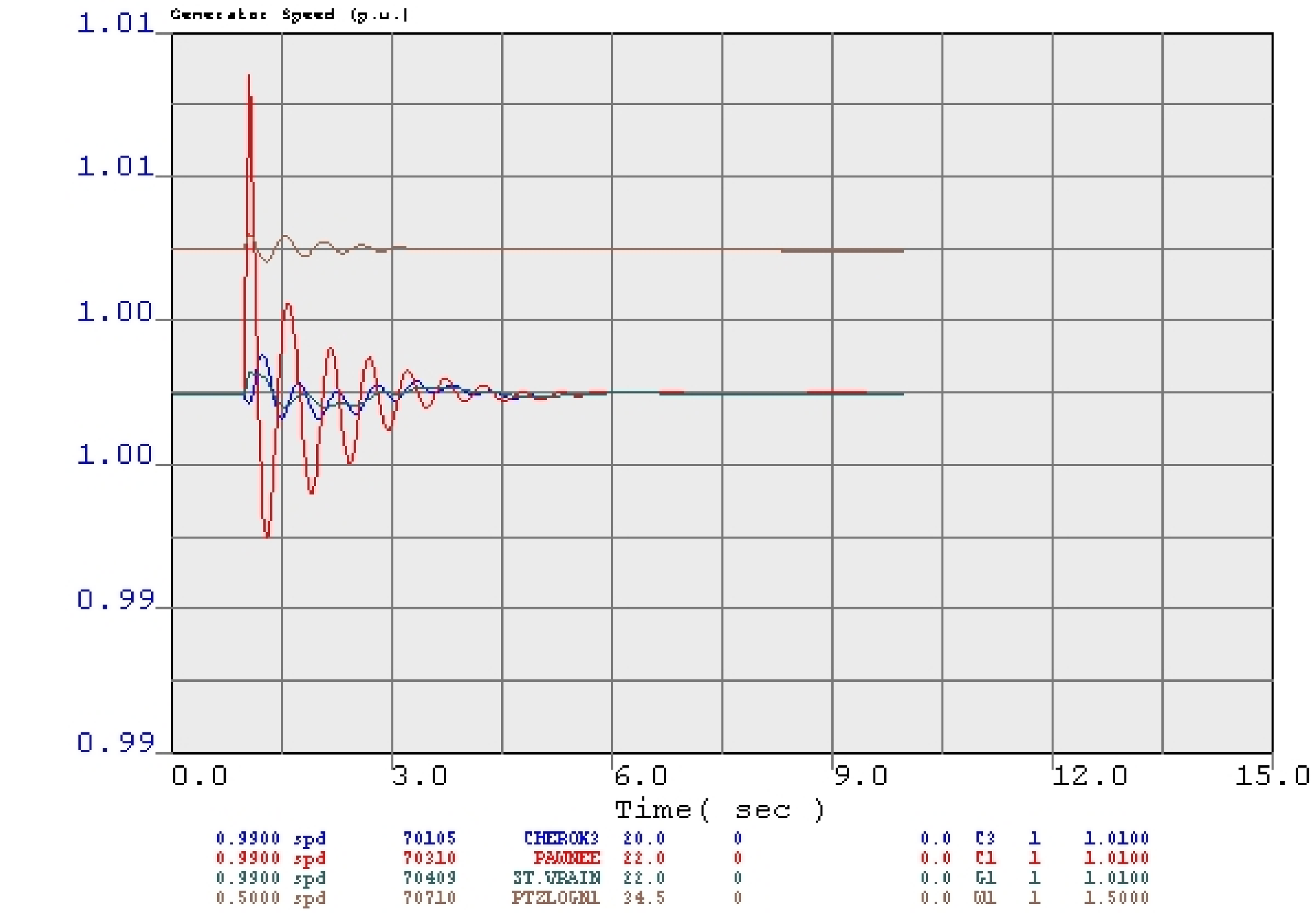
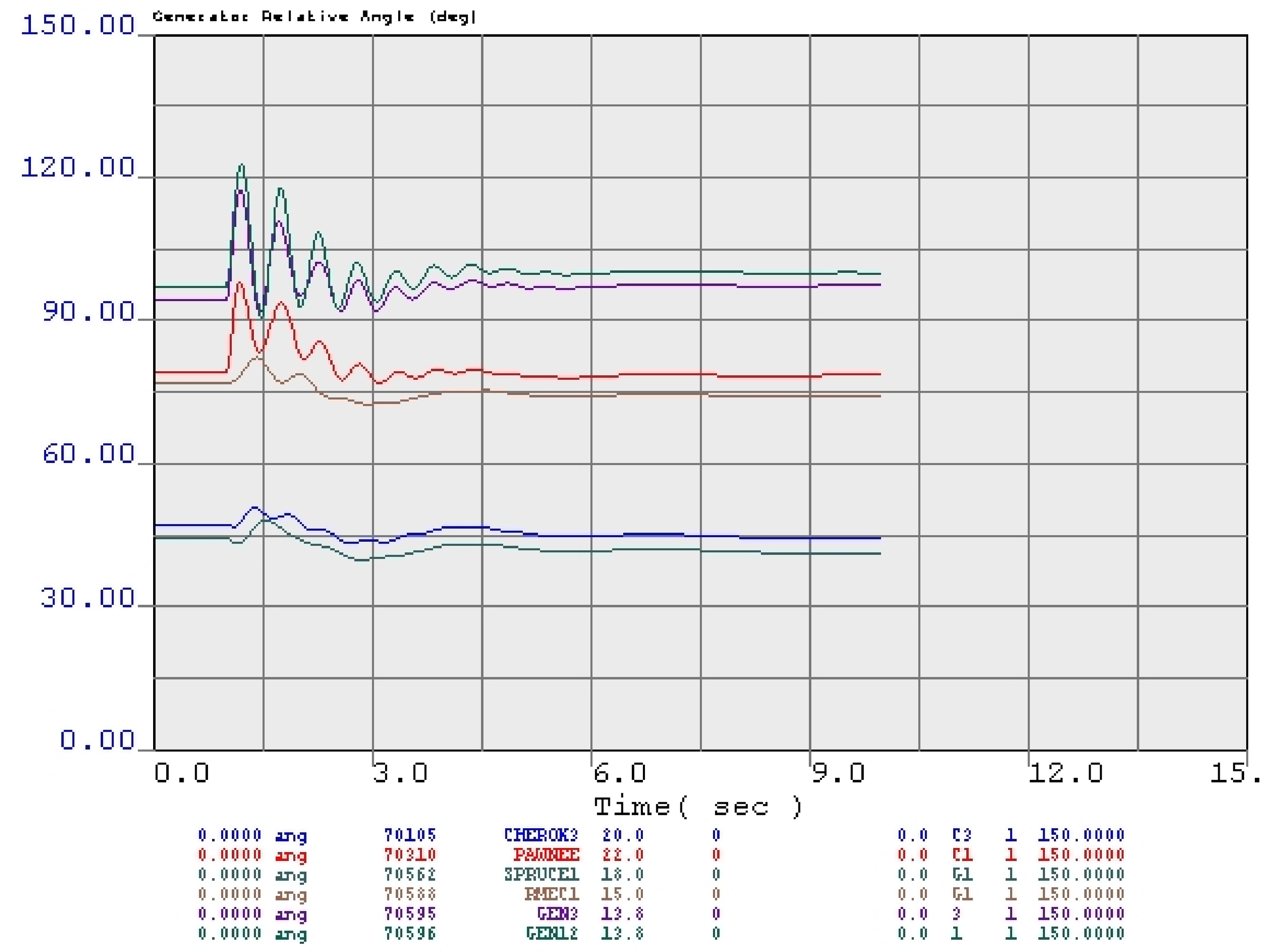
Transient Stability Plots
High (75%) Wind Generation Levels at Peetz Logan and Limon (at Missile Site)

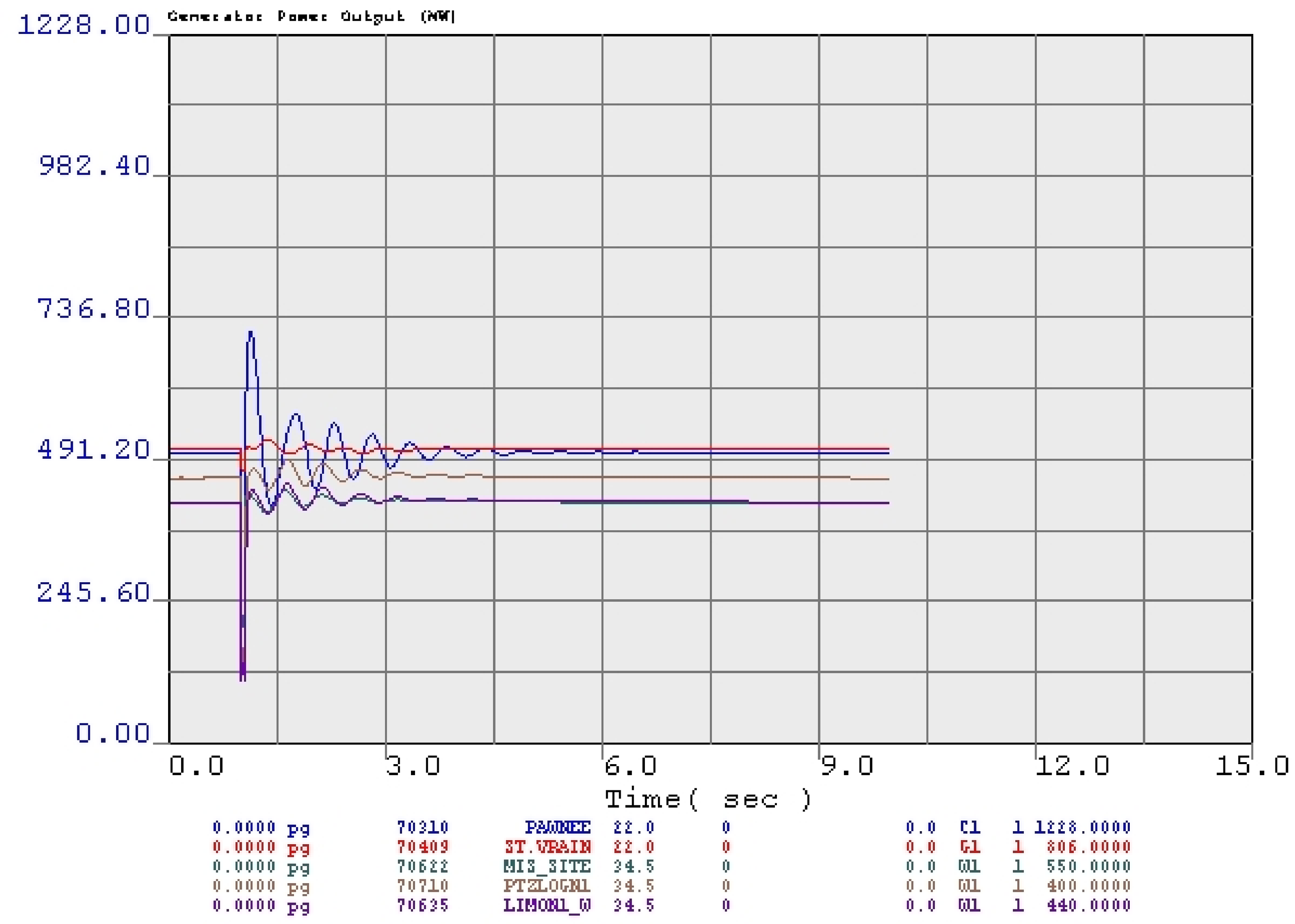












line_1
line PAWNEE to MIS_SITE 345, PAWNEE end
NOVEMBER 7, 2013

14hs4a_proj_Wind75-line_1.chf

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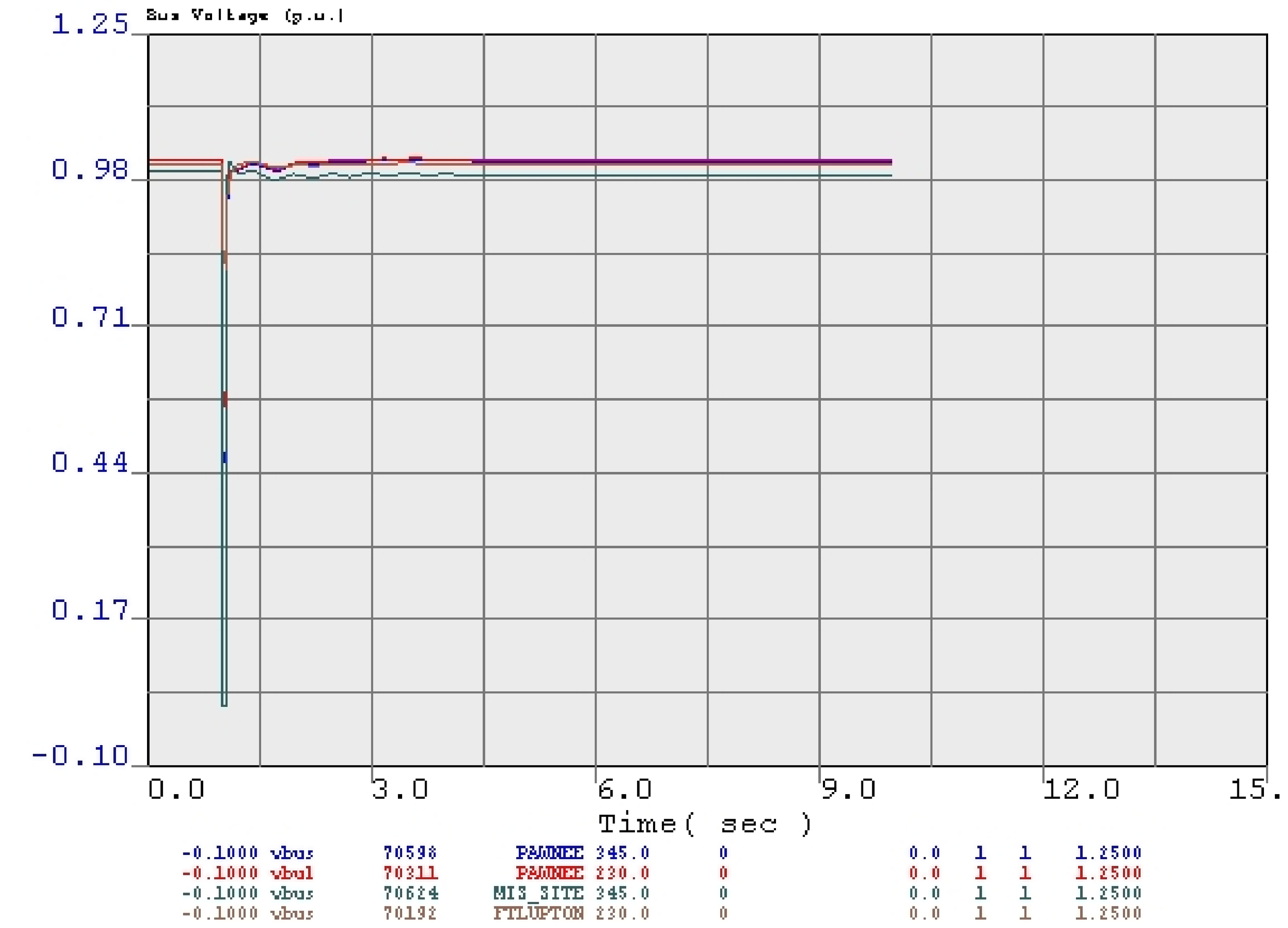
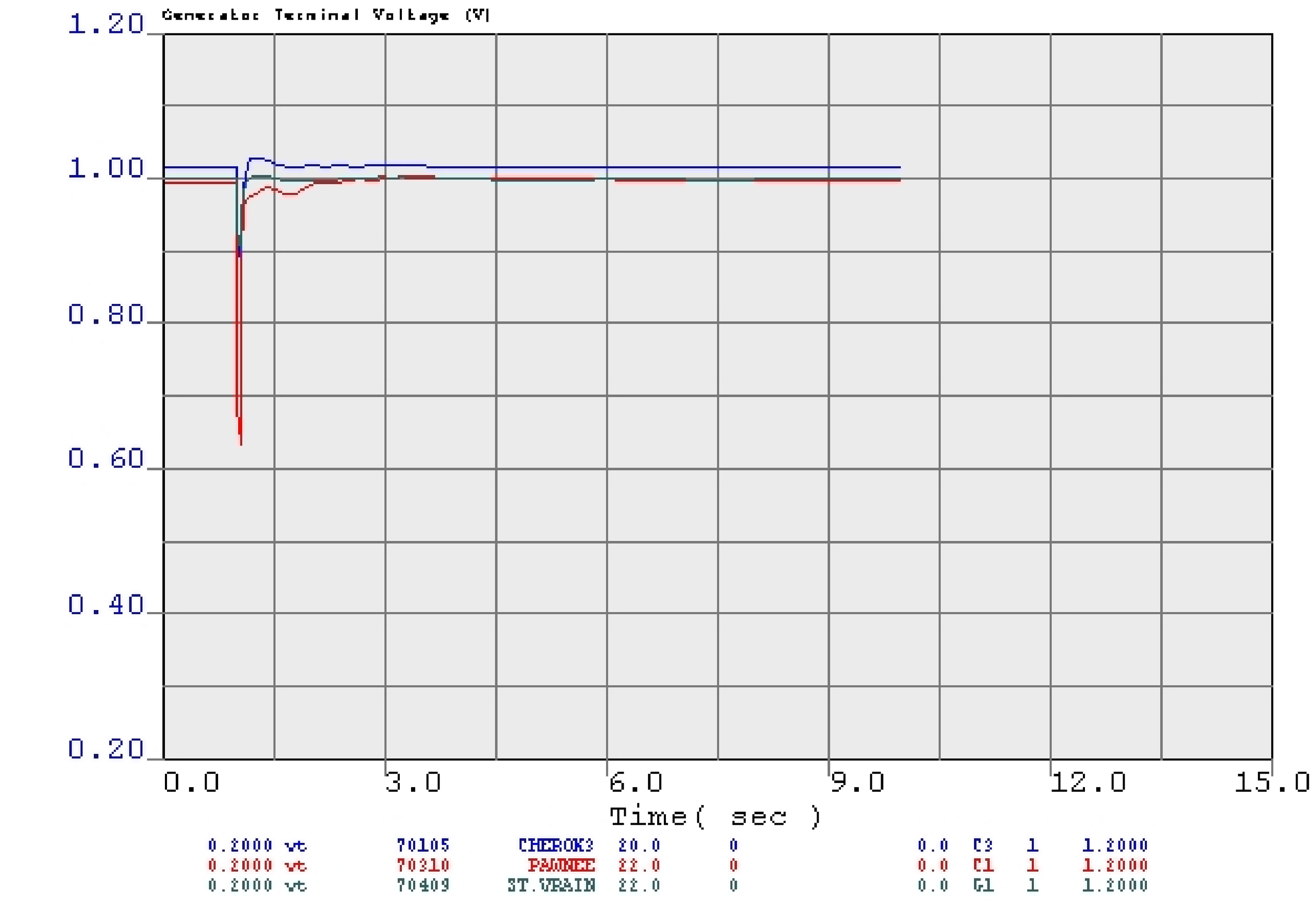
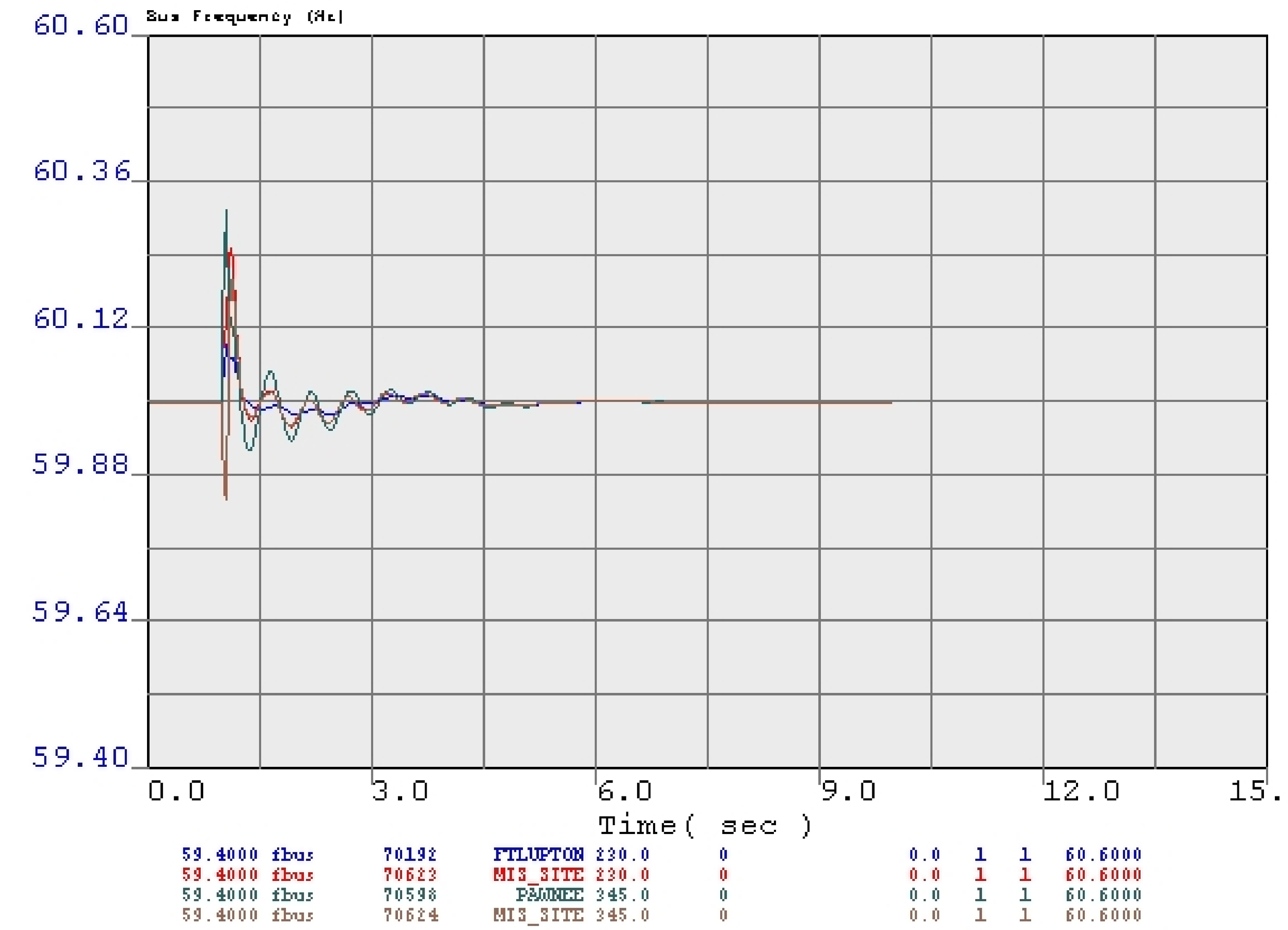
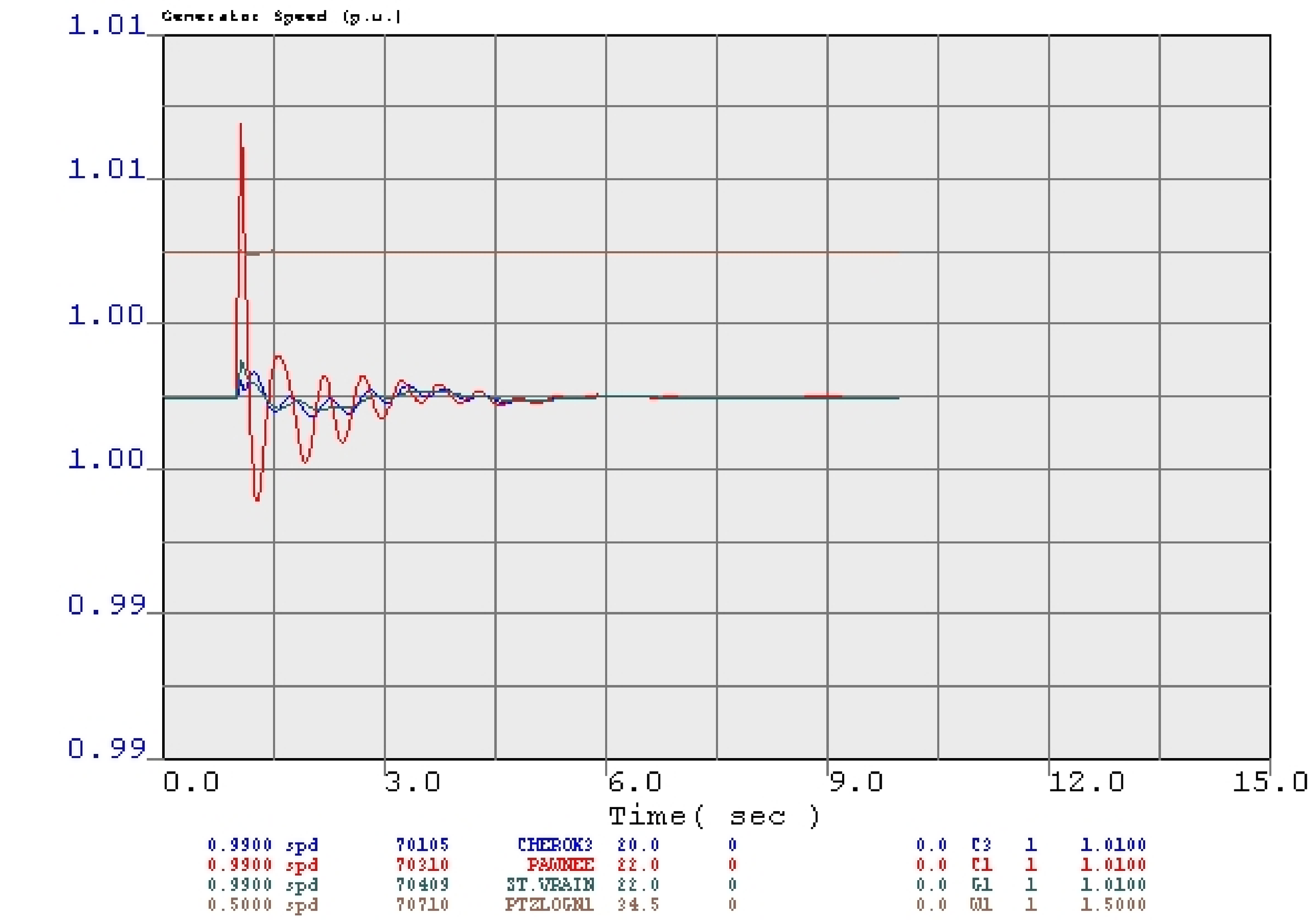
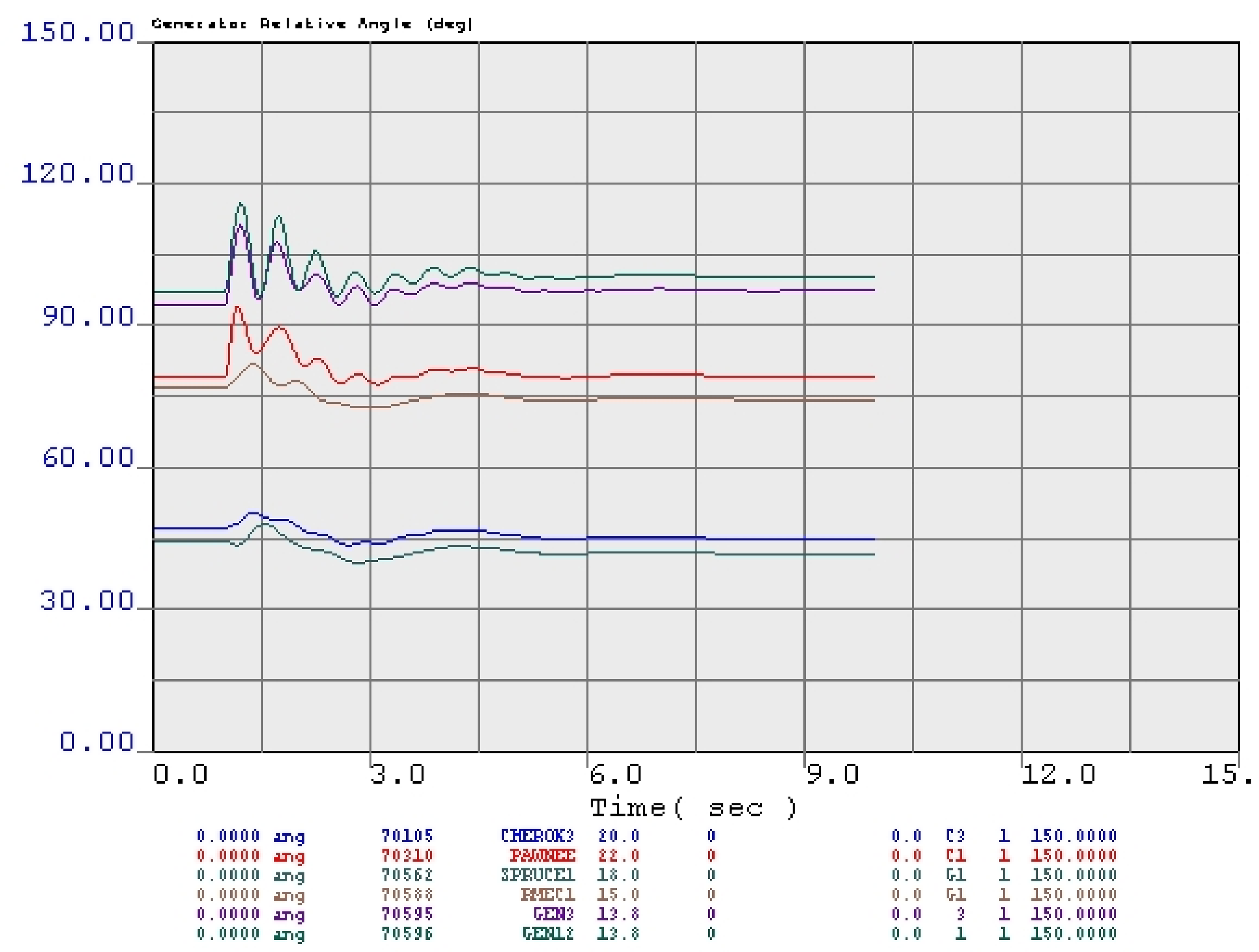
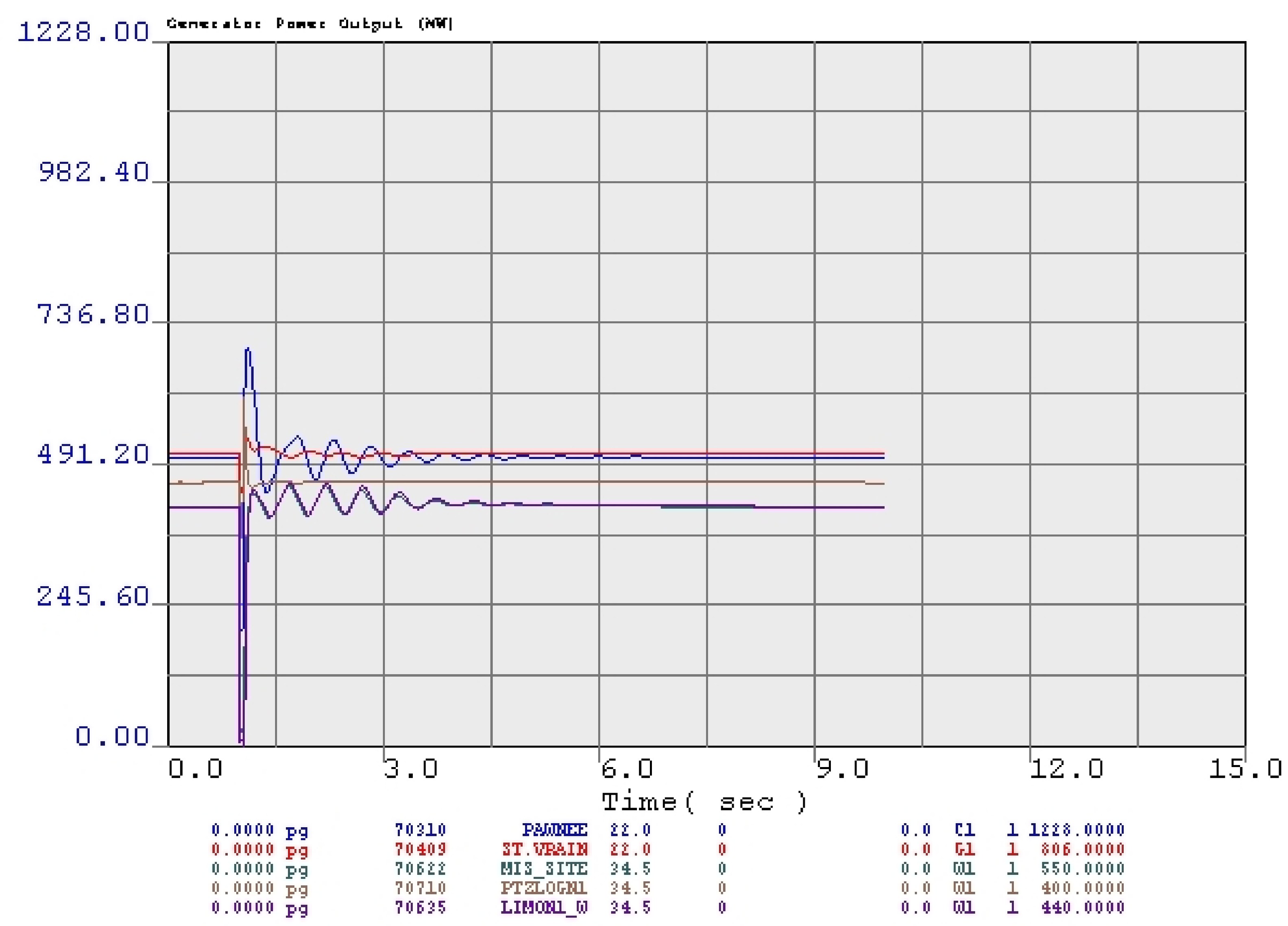




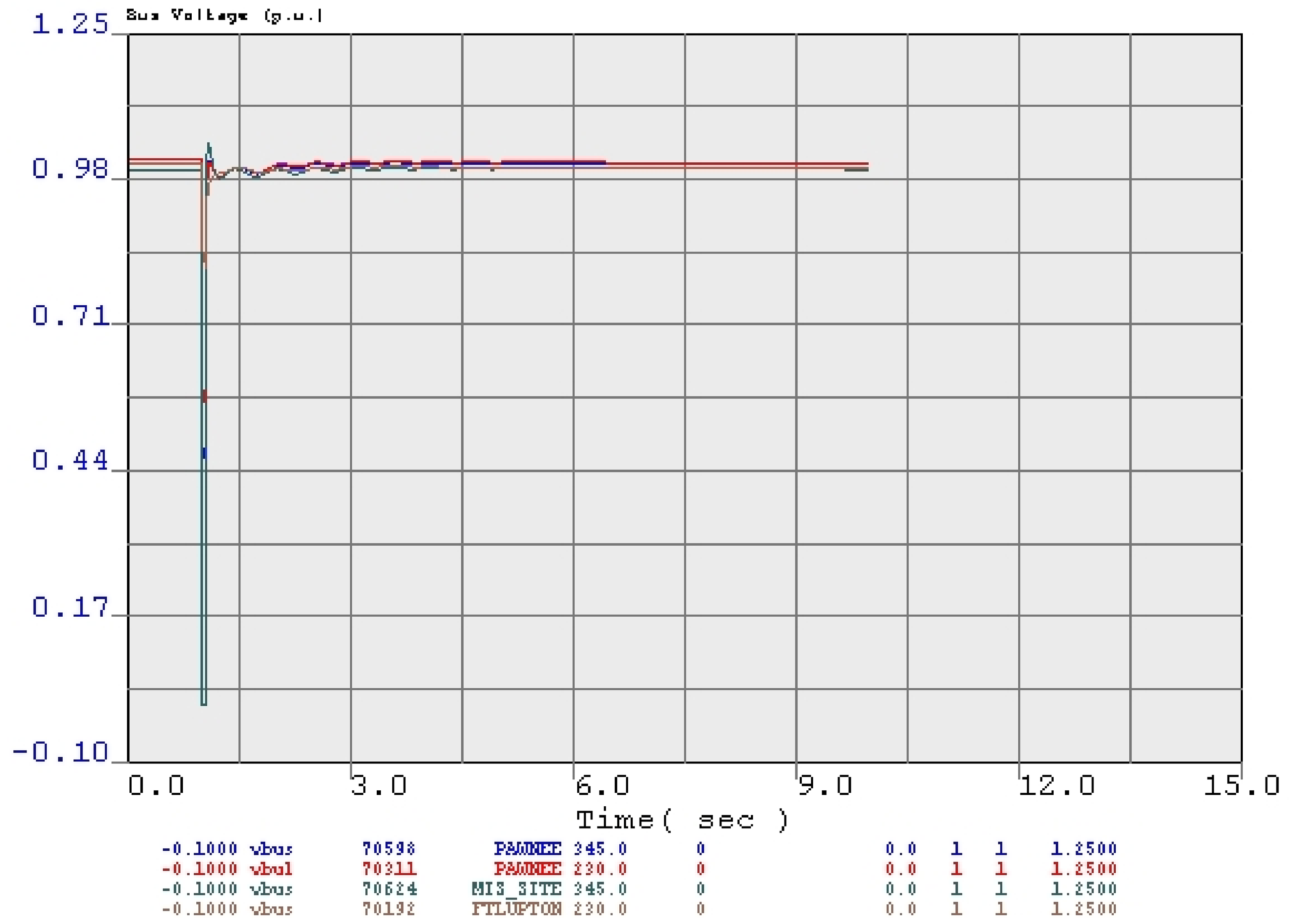


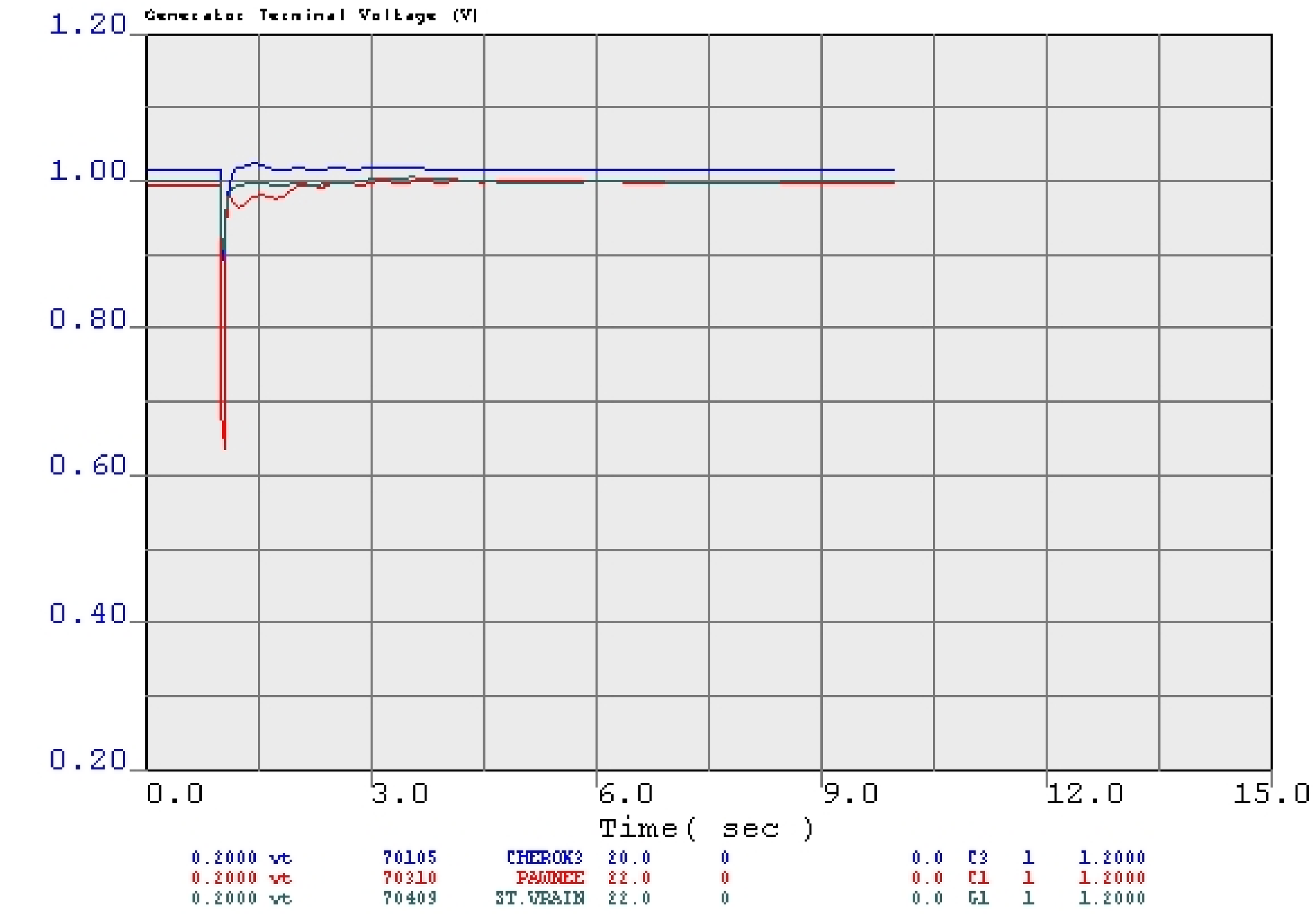


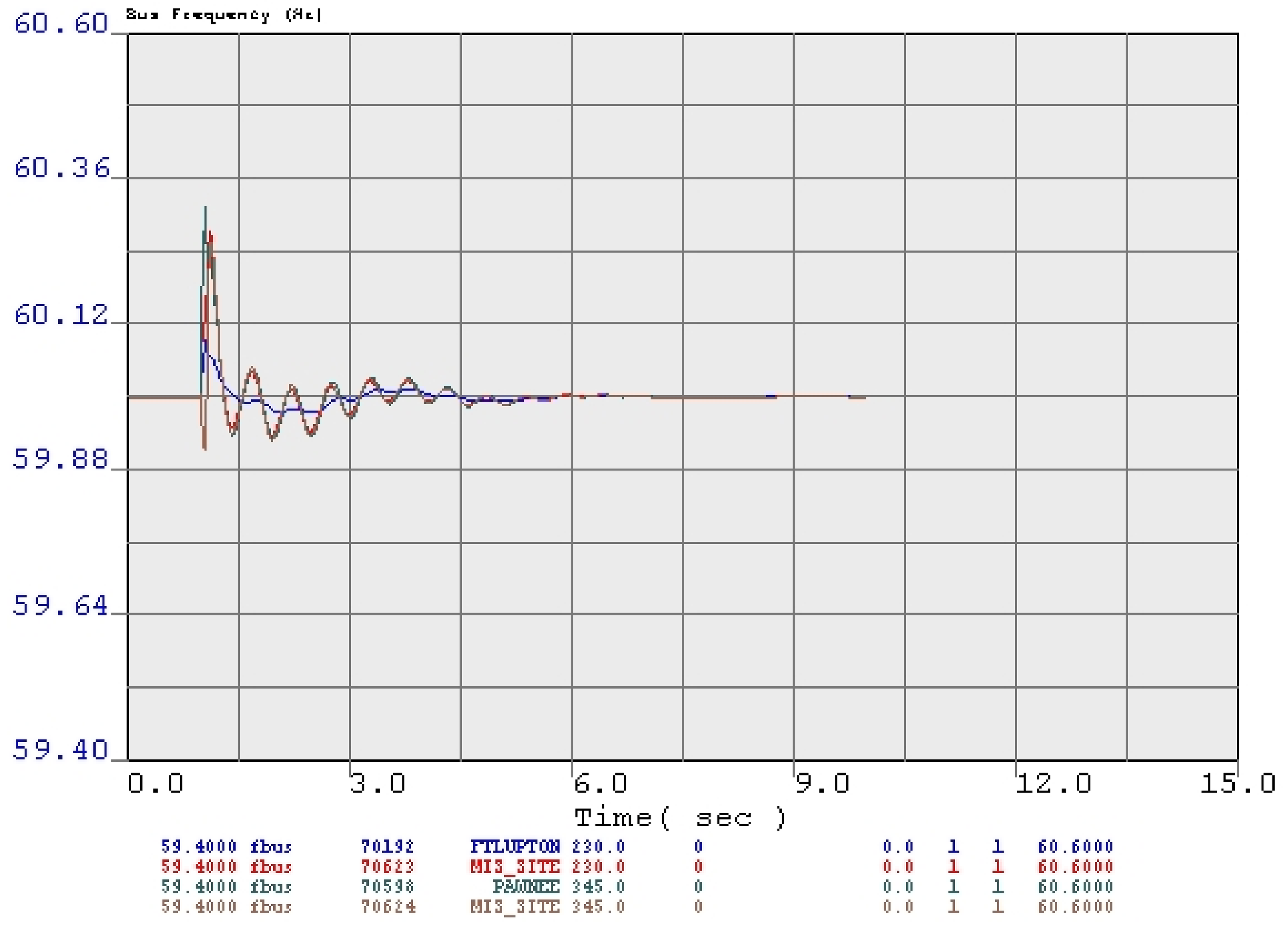


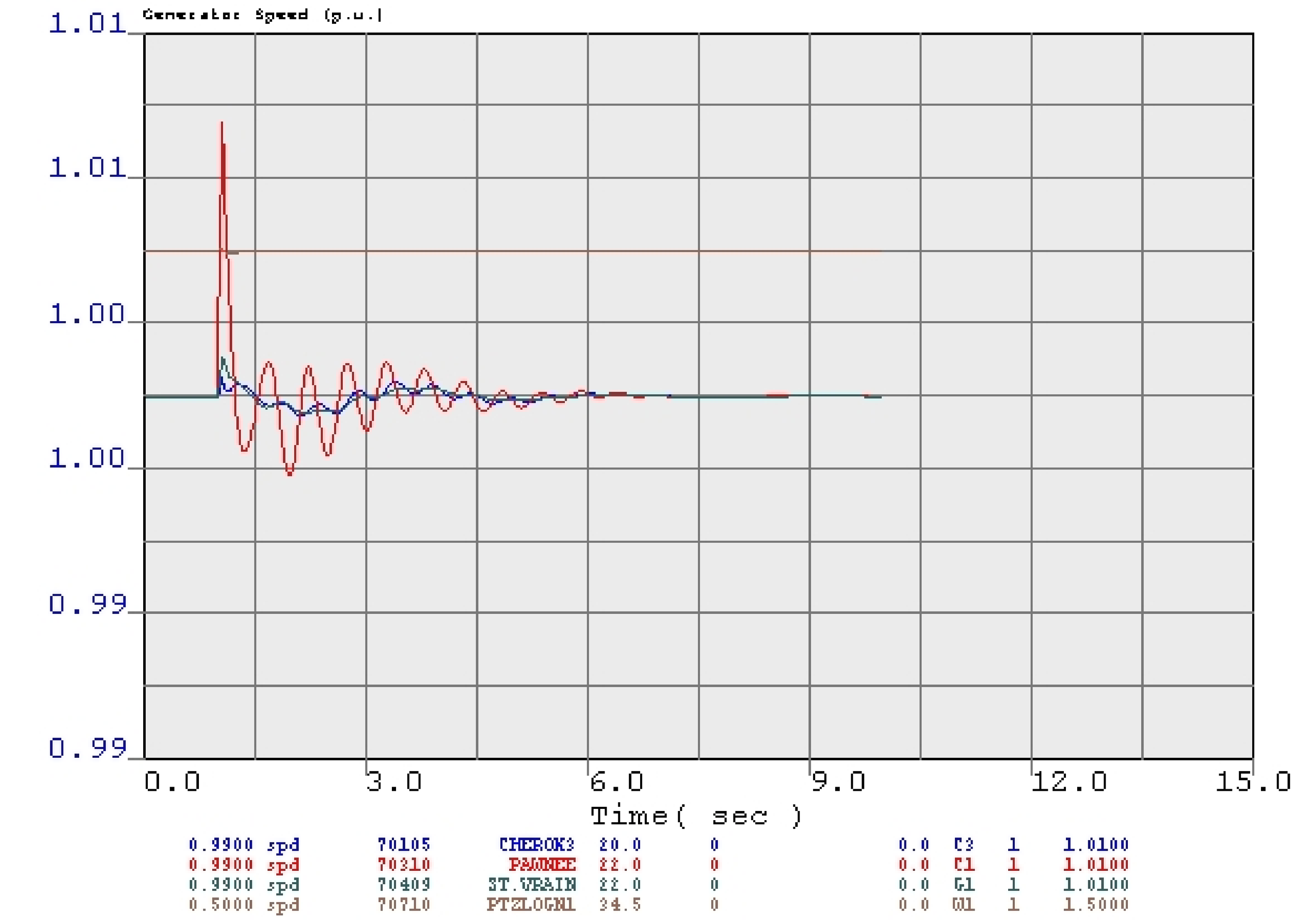


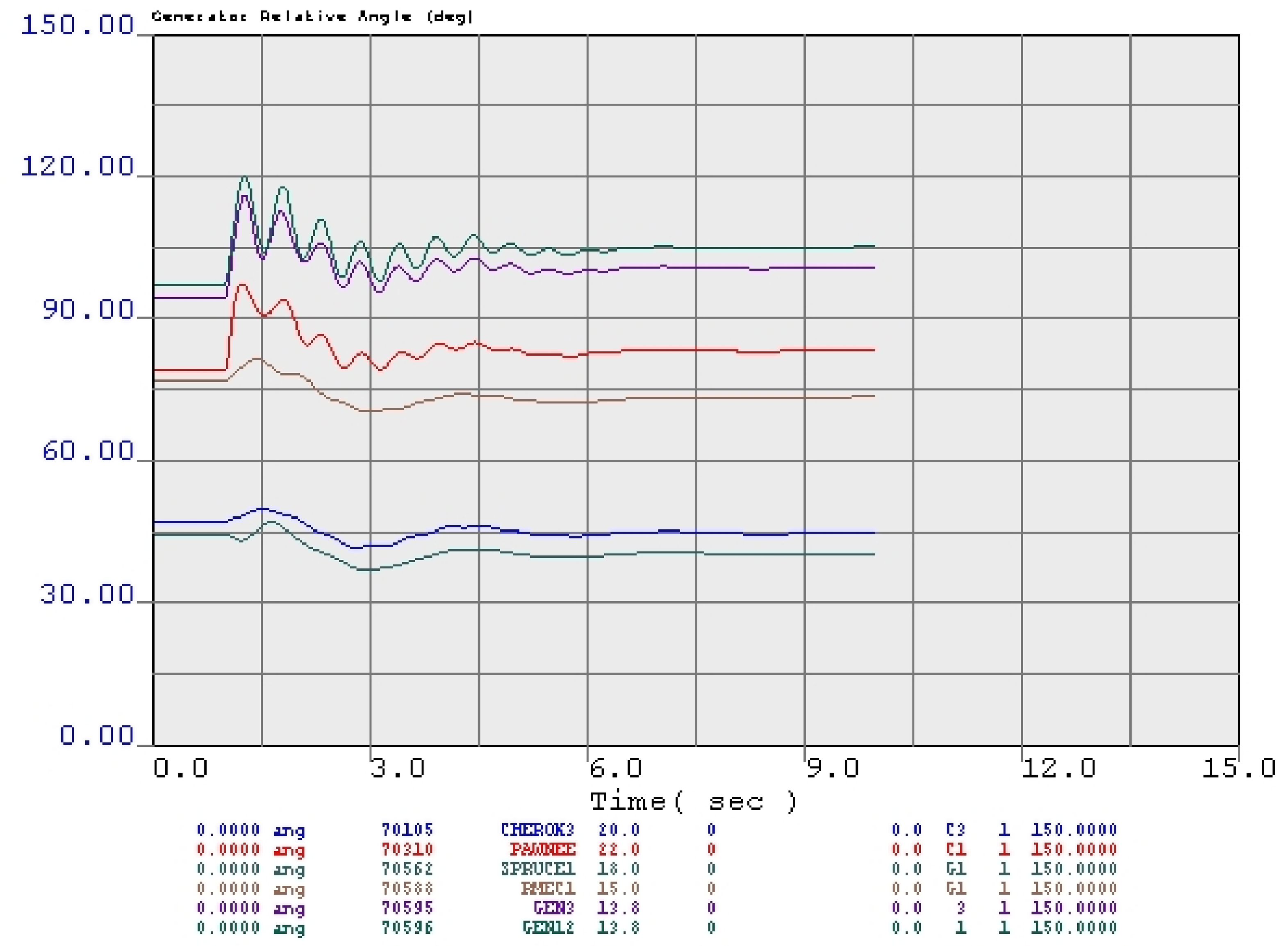
line_2
line PAWNEE to MIS_SITE 345, MIS_SITE end
NOVEMBER 7, 2013

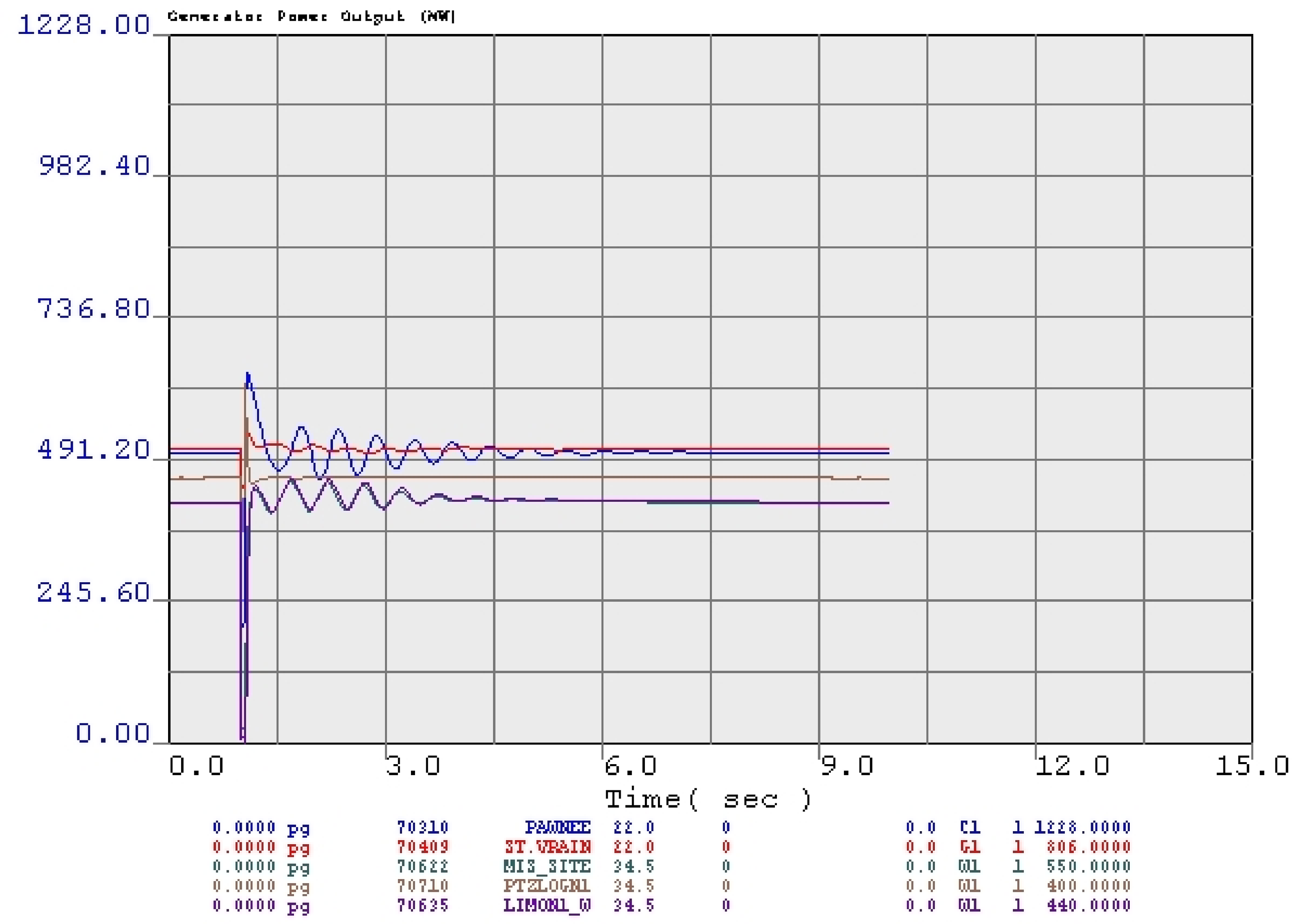




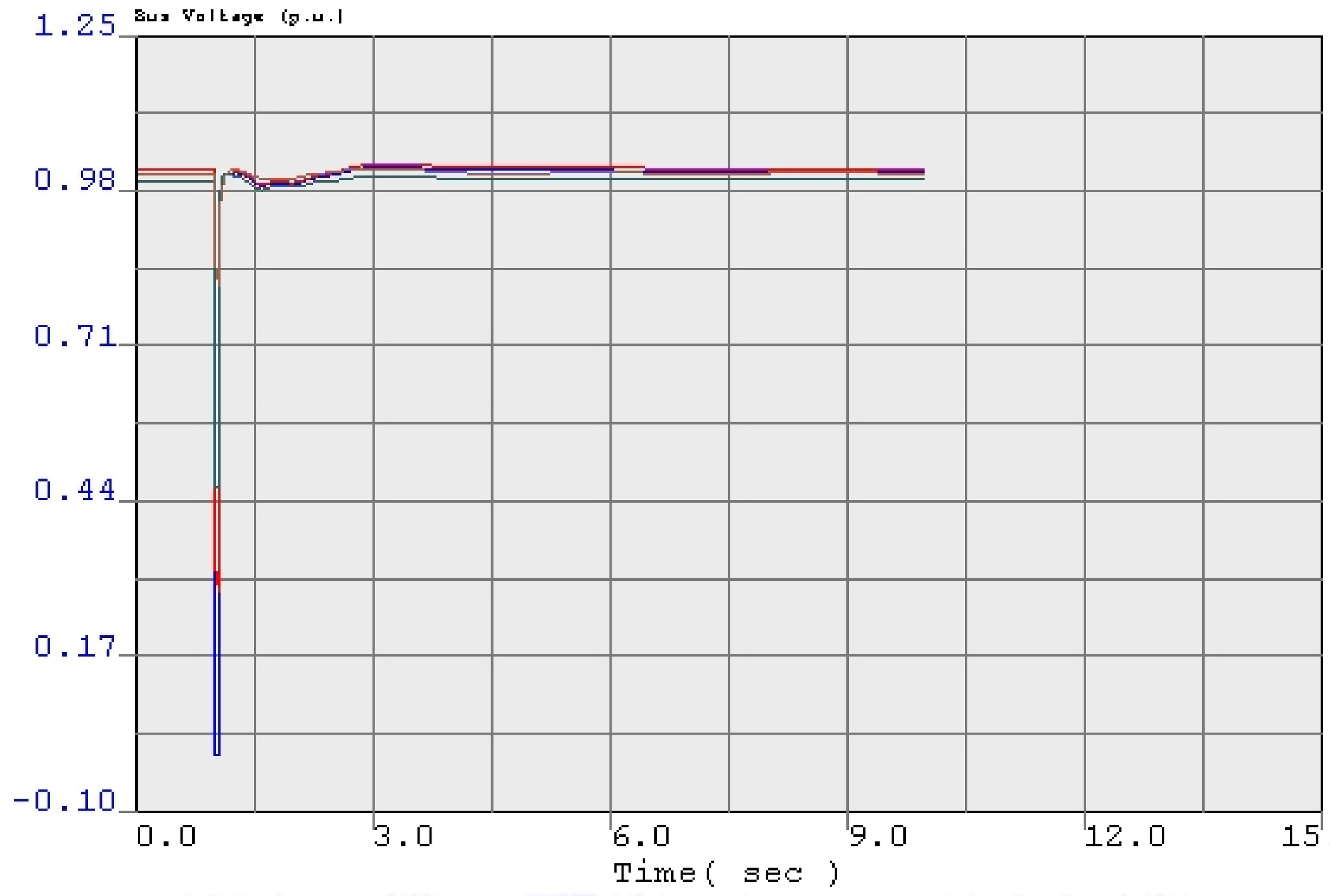




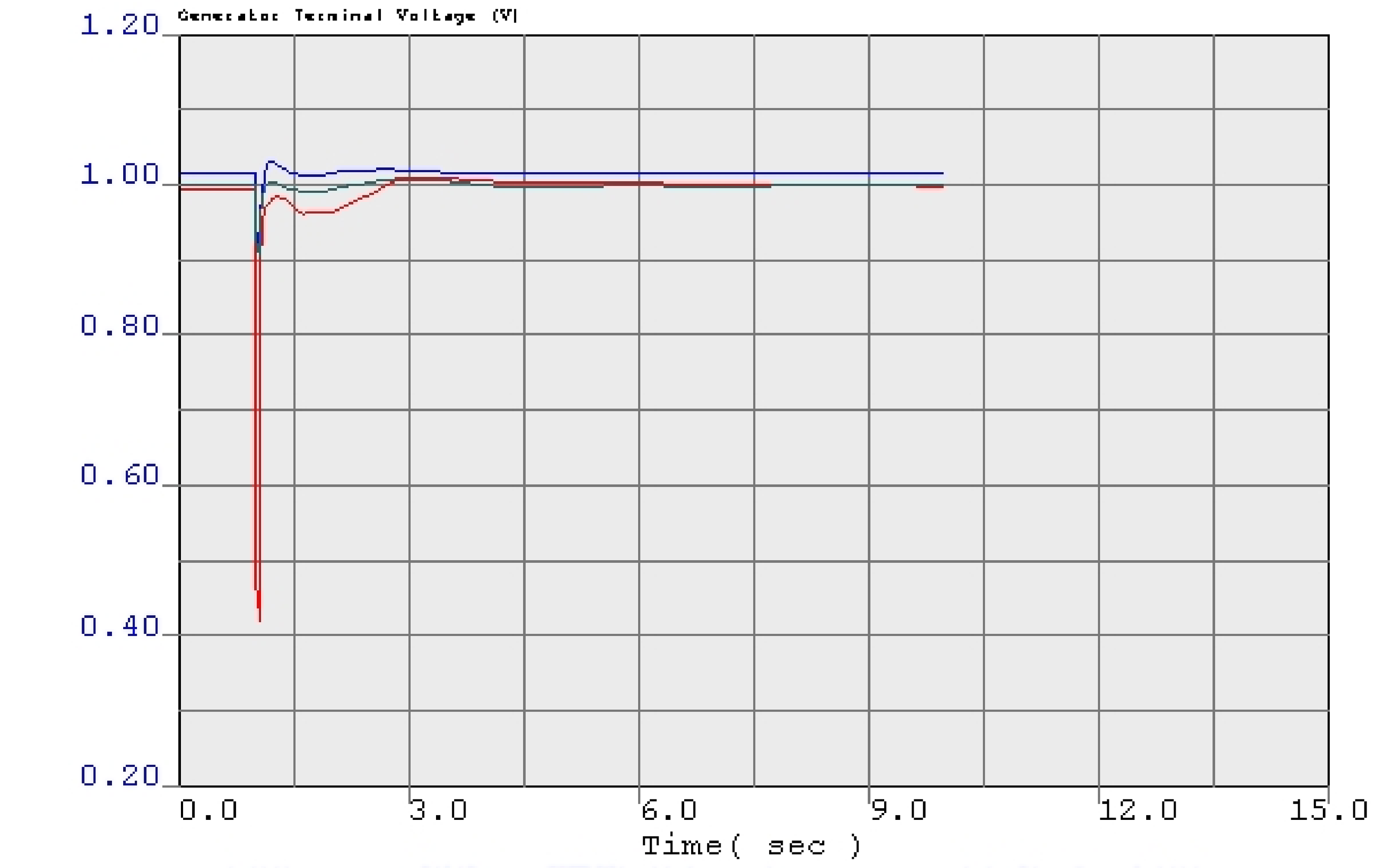




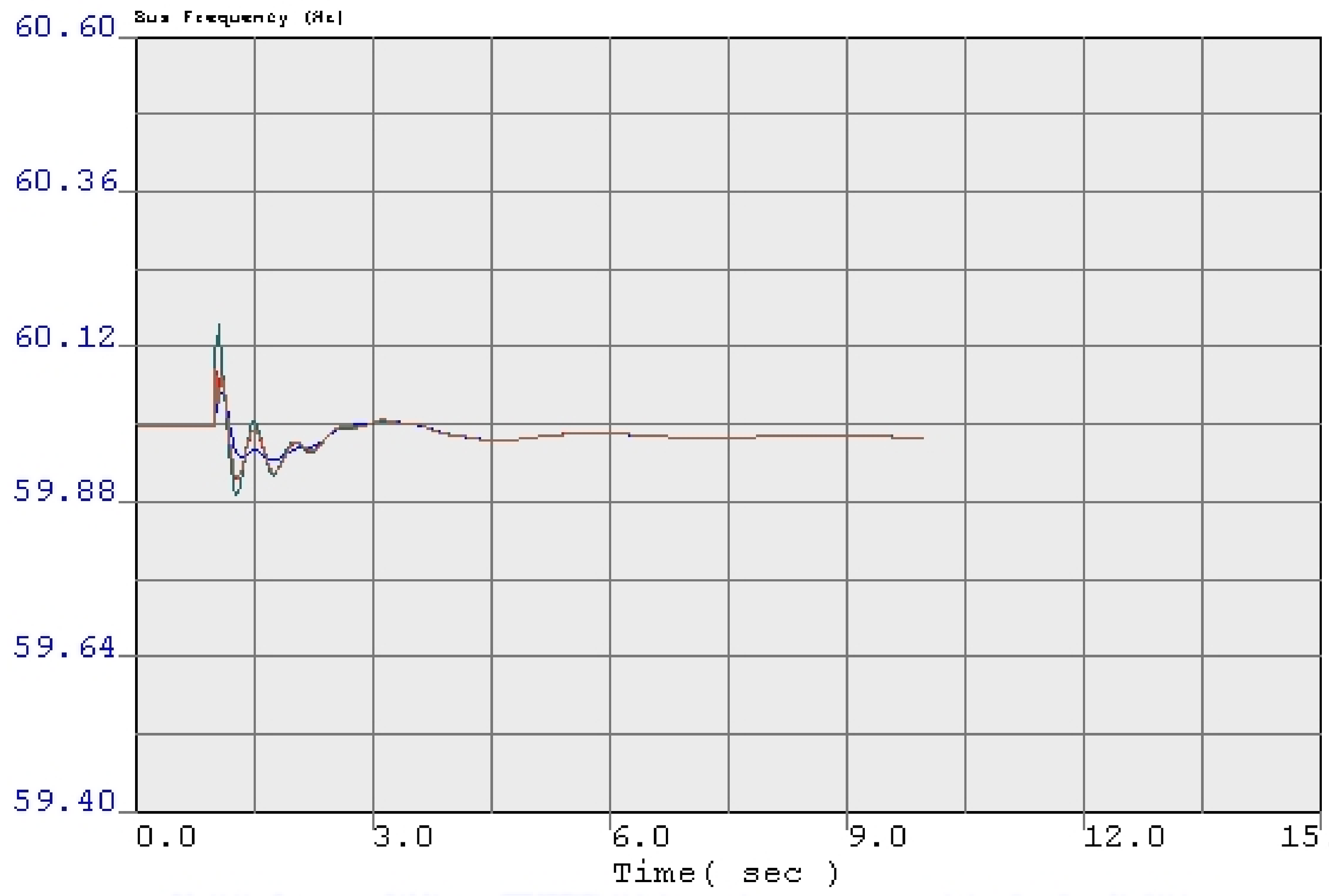
line_3
line MIS_SITE to SMOKYHIL 345, MIS_SITE end
NOVEMBER 7, 2013



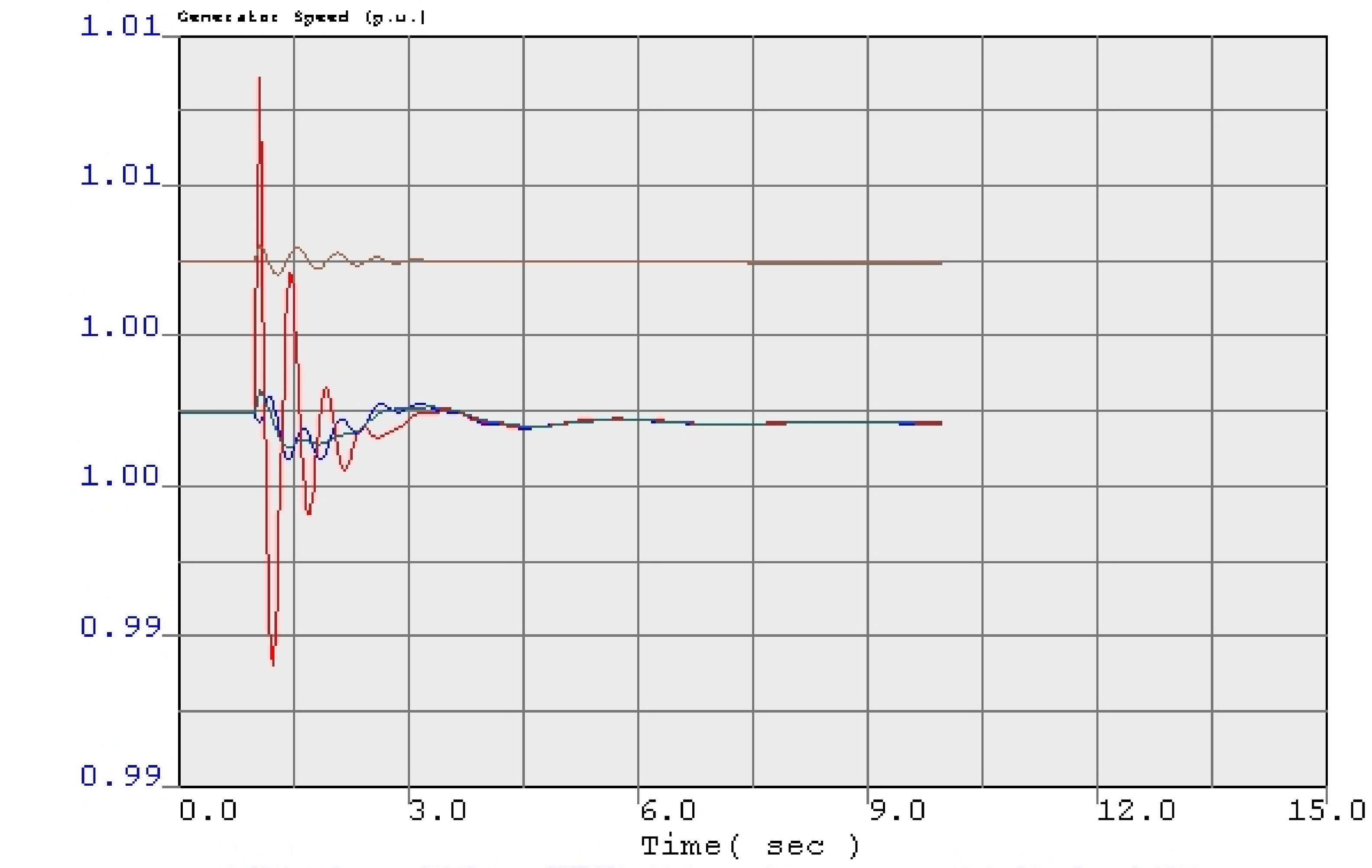
-0.1000	vbus	70598	PAWNEE	345.0	0	0.0	1	1	1.2500
-0.1000	vbul	70311	PAWNEE	230.0	0	0.0	1	1	1.2500
-0.1000	vbus	70624	MIS_SITE	345.0	0	0.0	1	1	1.2500
-0.1000	vbus	70192	FTLUPTON	230.0	0	0.0	1	1	1.2500



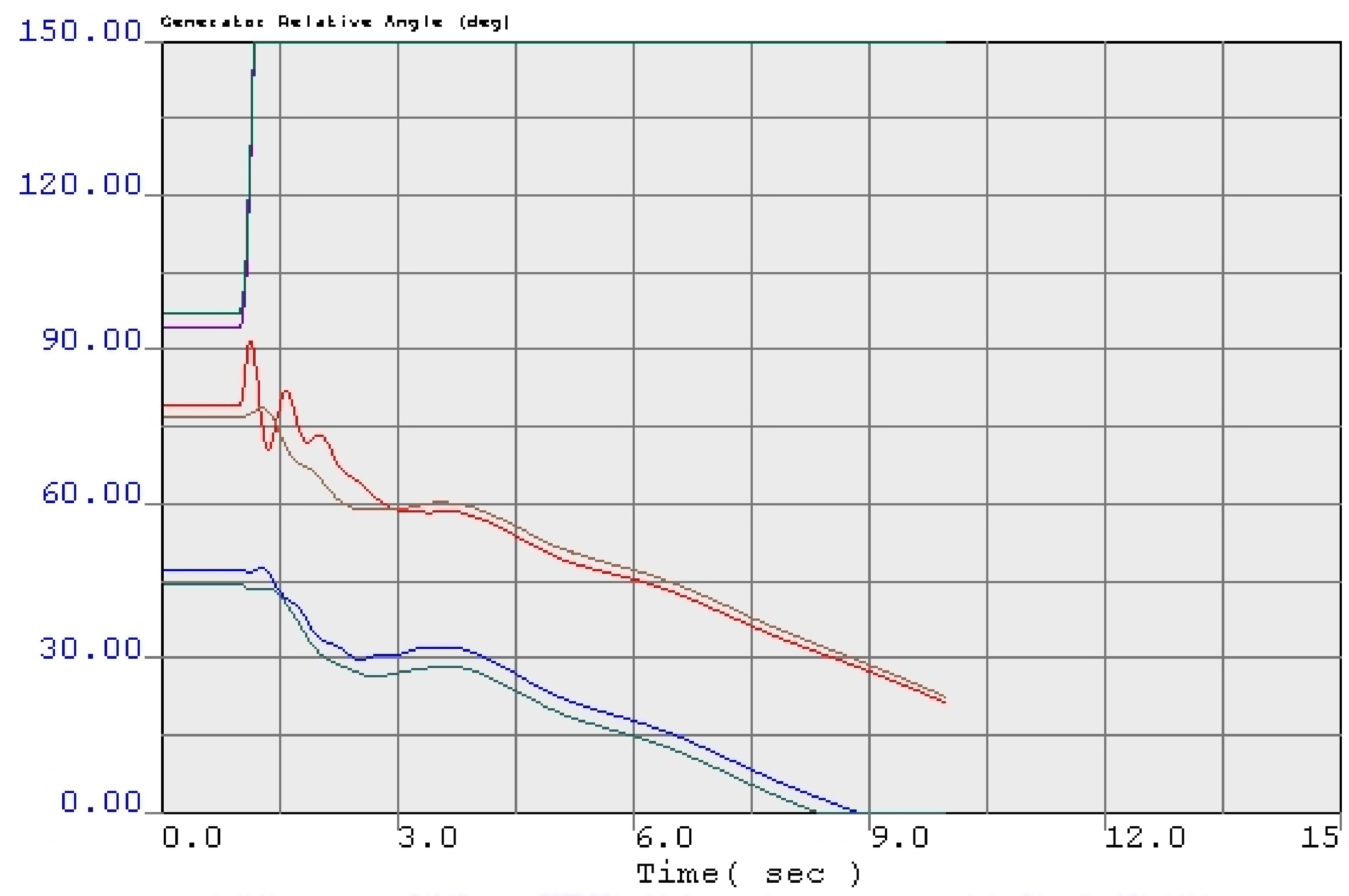
0.2000	vt	70105	CHEROK3	20.0	0	0.0	C3	1	1.2000
0.2000	vt	70310	PAWNEE	22.0	0	0.0	C1	1	1.2000
0.2000	vt	70409	ST.VRAIN	22.0	0	0.0	G1	1	1.2000



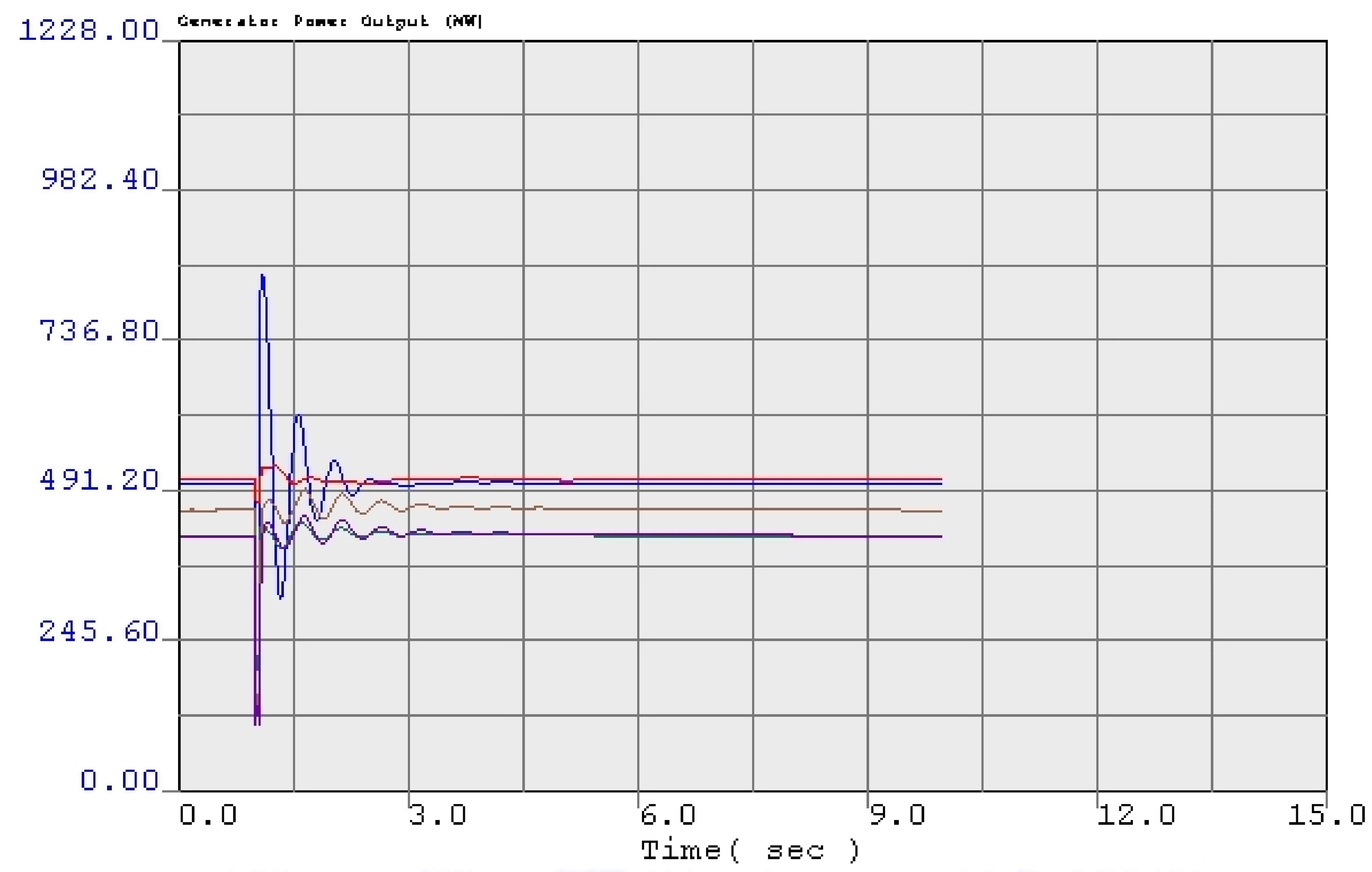
59.4000	fbus	70192	FTLUPTON	230.0	0	0.0	1	1	60.6000
59.4000	fbus	70623	MIS_SITE	230.0	0	0.0	1	1	60.6000
59.4000	fbus	70598	PAWNEE	345.0	0	0.0	1	1	60.6000
59.4000	fbus	70624	MIS_SITE	345.0	0	0.0	1	1	60.6000



0.9900	spd	70105	CHEROK3	20.0	0	0.0	C3	1	1.0100
0.9900	spd	70310	PAWNEE	22.0	0	0.0	C1	1	1.0100
0.9900	spd	70409	ST.VRAIN	22.0	0	0.0	G1	1	1.0100
0.5000	spd	70710	PTZLOGN1	34.5	0	0.0	W1	1	1.5000



0.0000	ang	70105	CHEROK3	20.0	0	0.0	C3	1	150.0000
0.0000	ang	70310	PAWNEE	22.0	0	0.0	C1	1	150.0000
0.0000	ang	70562	SPRUCE1	18.0	0	0.0	G1	1	150.0000
0.0000	ang	70588	RMEC1	15.0	0	0.0	G1	1	150.0000
0.0000	ang	70595	GEN3	13.8	0	0.0	3	1	150.0000
0.0000	ang	70596	GEN12	13.8	0	0.0	1	1	150.0000



0.0000	pg	70310	PAWNEE	22.0	0	0.0	C1	1	1228.0000
0.0000	pg	70409	ST.VRAIN	22.0	0	0.0	G1	1	806.0000
0.0000	pg	70622	MIS_SITE	34.5	0	0.0	W1	1	550.0000
0.0000	pg	70710	PTZLOGN1	34.5	0	0.0	W1	1	400.0000
0.0000	pg	70635	LIMON1_W	34.5	0	0.0	W1	1	440.0000

line_4
line PAWNEE to GENSITE 345, PAWNEE end
NOVEMBER 7, 2013

14hs4a_proj_Wind75-line_4.chf

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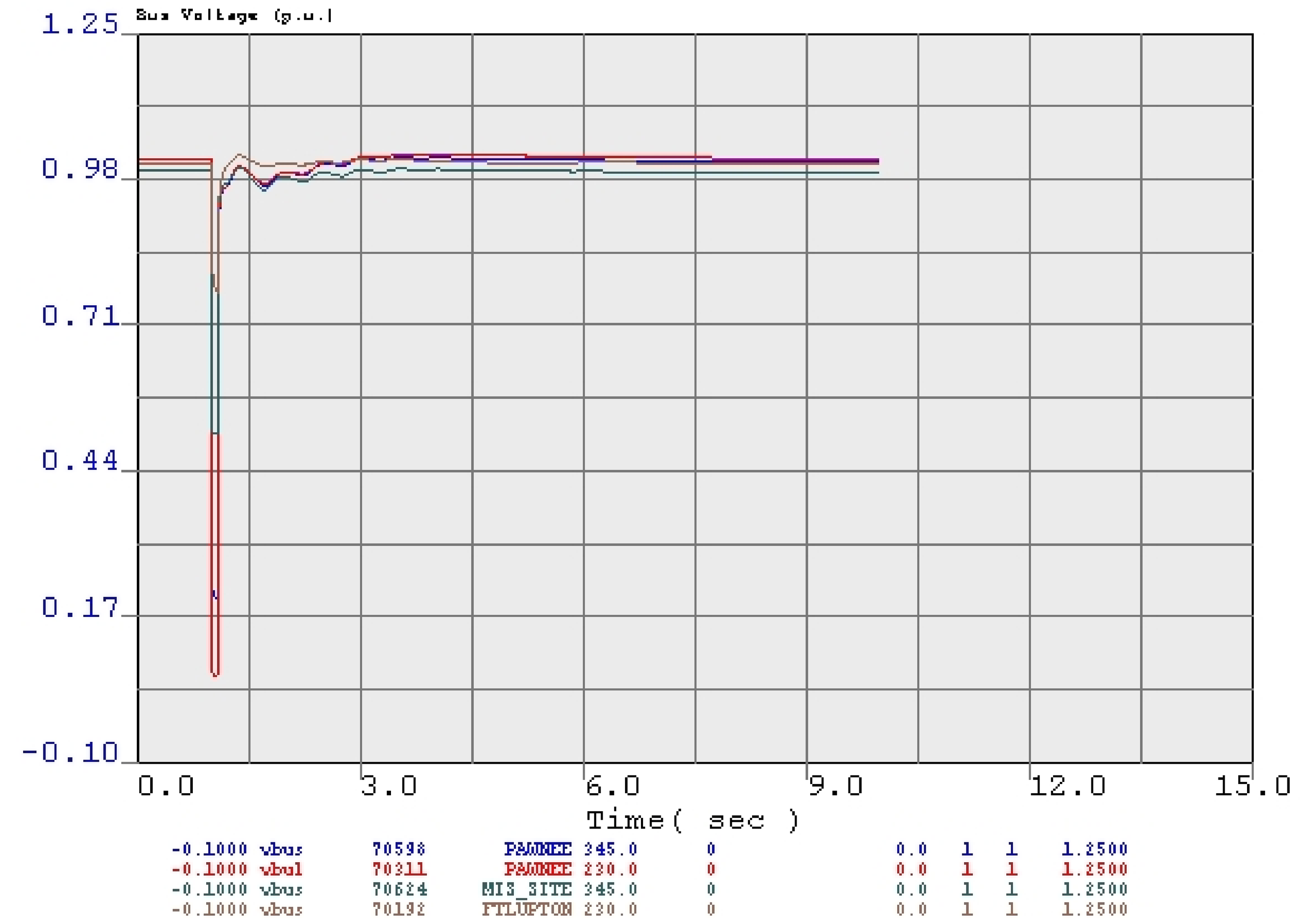
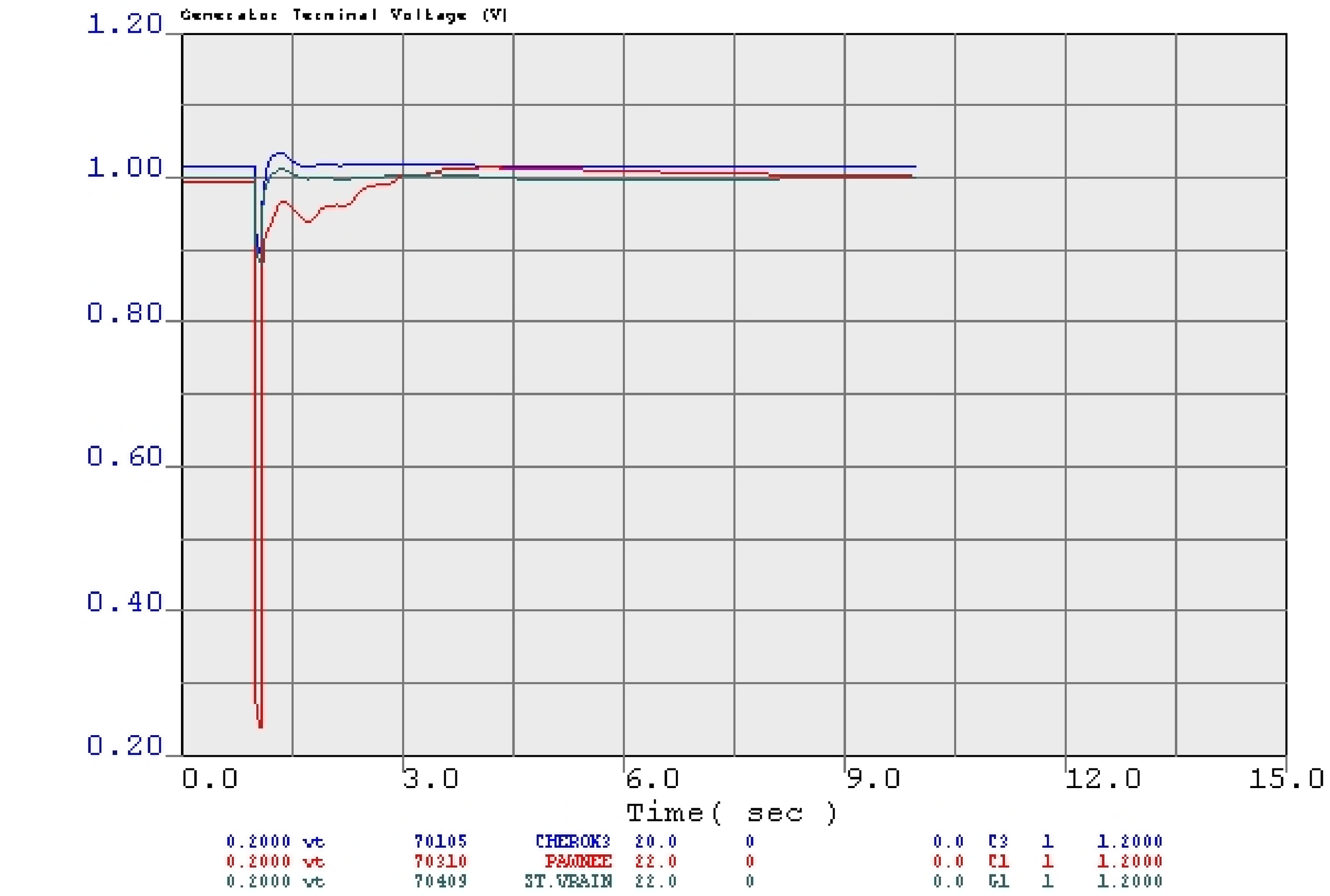
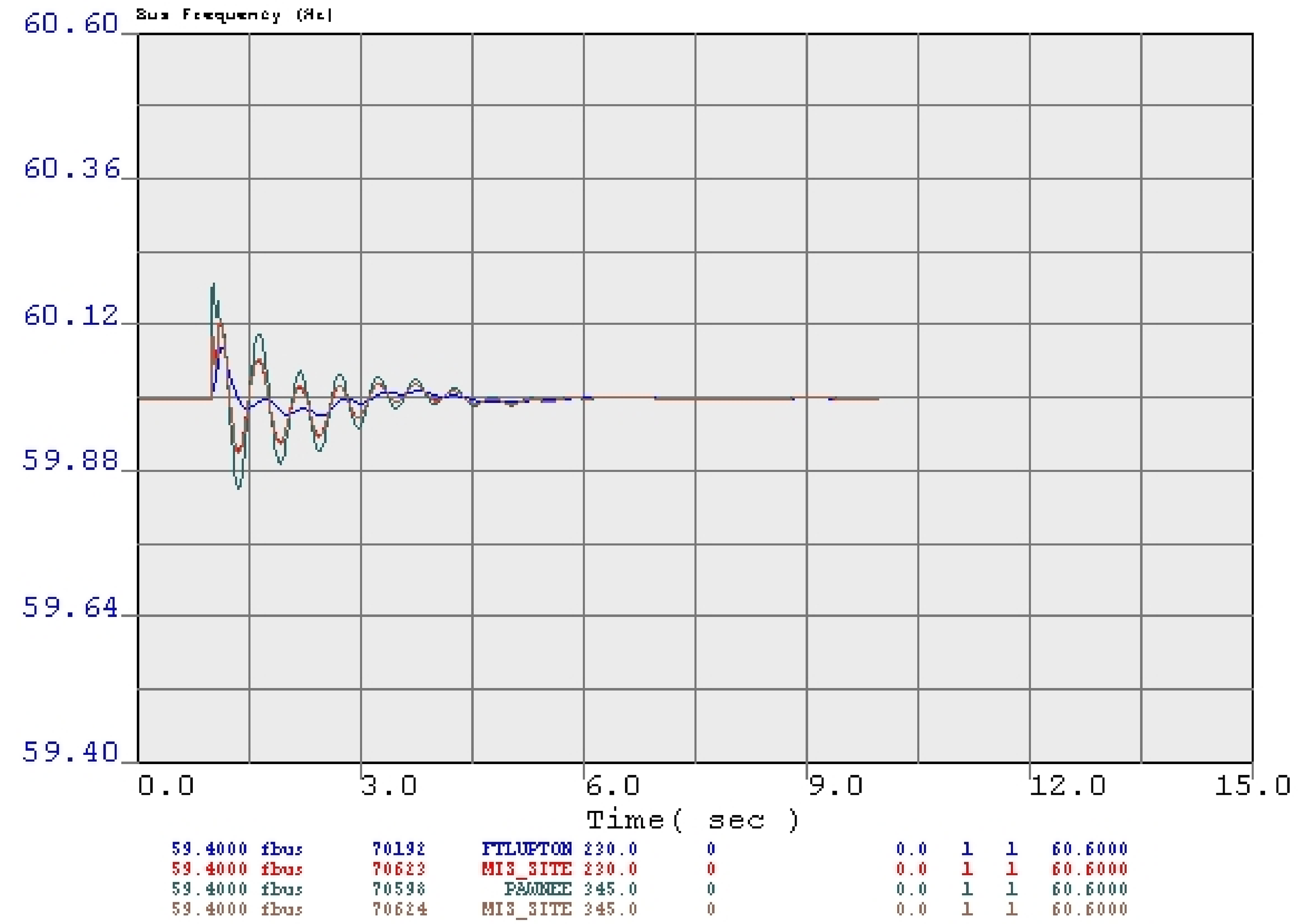
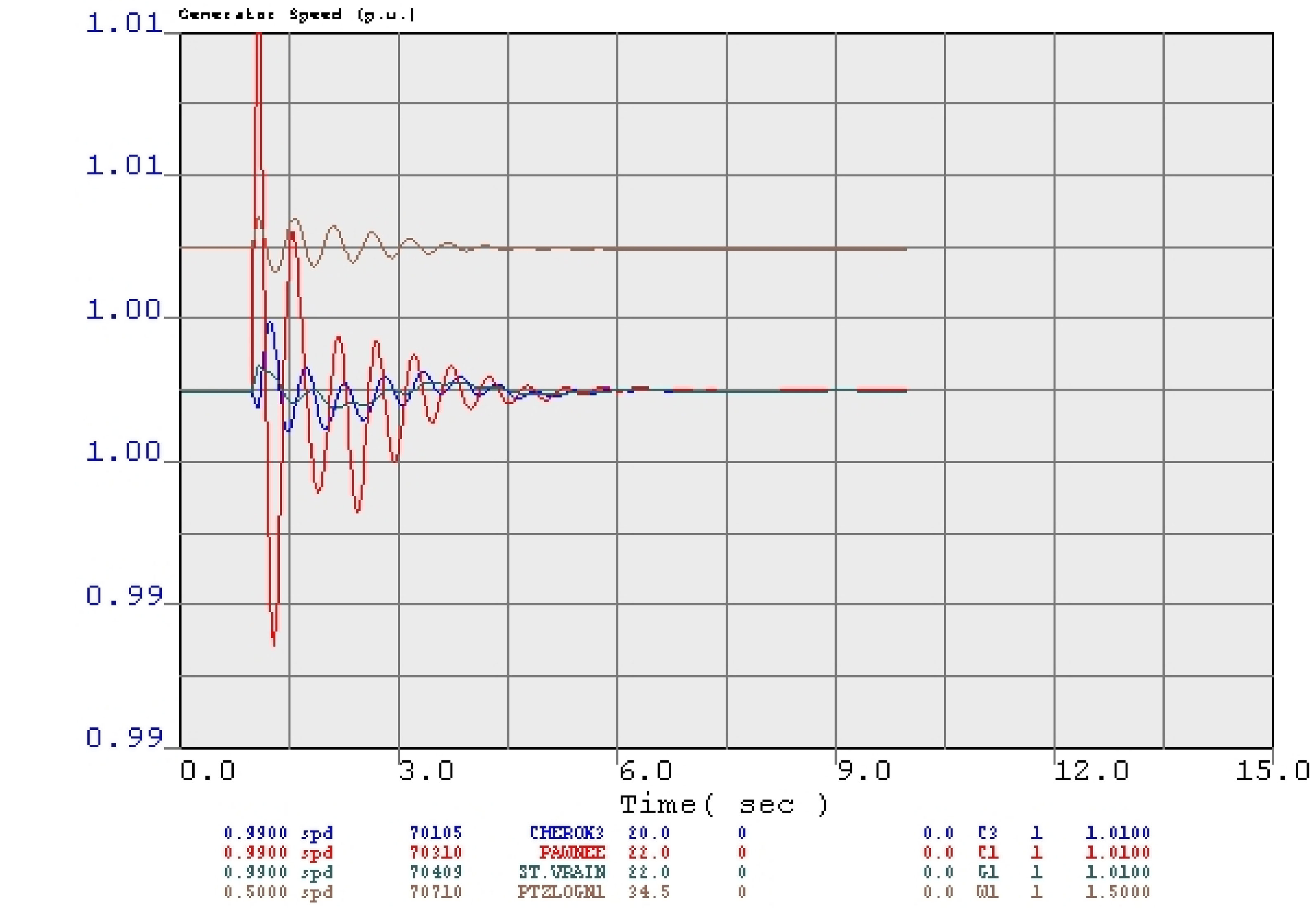
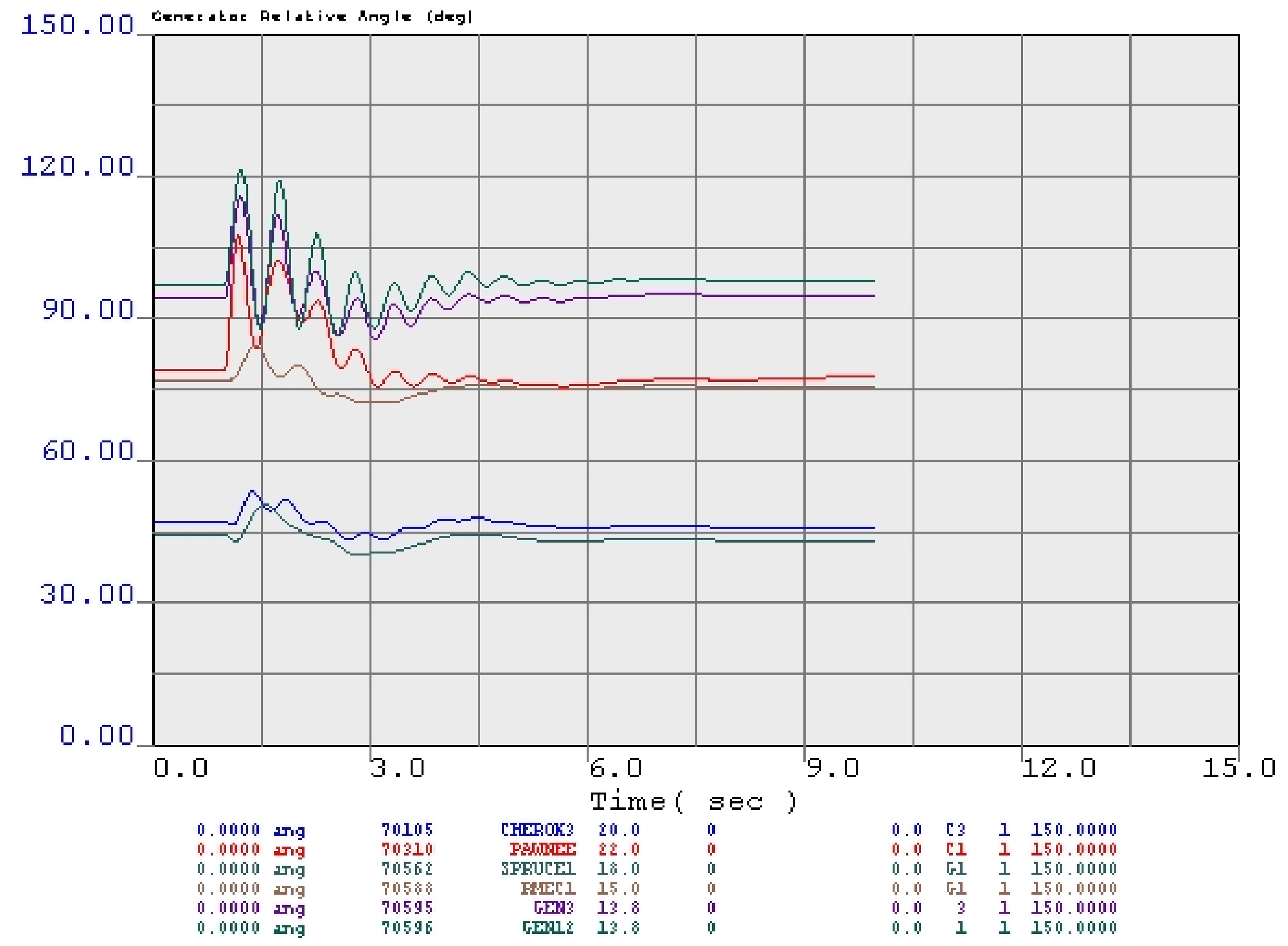
Fri May 29 08:21:34 2015

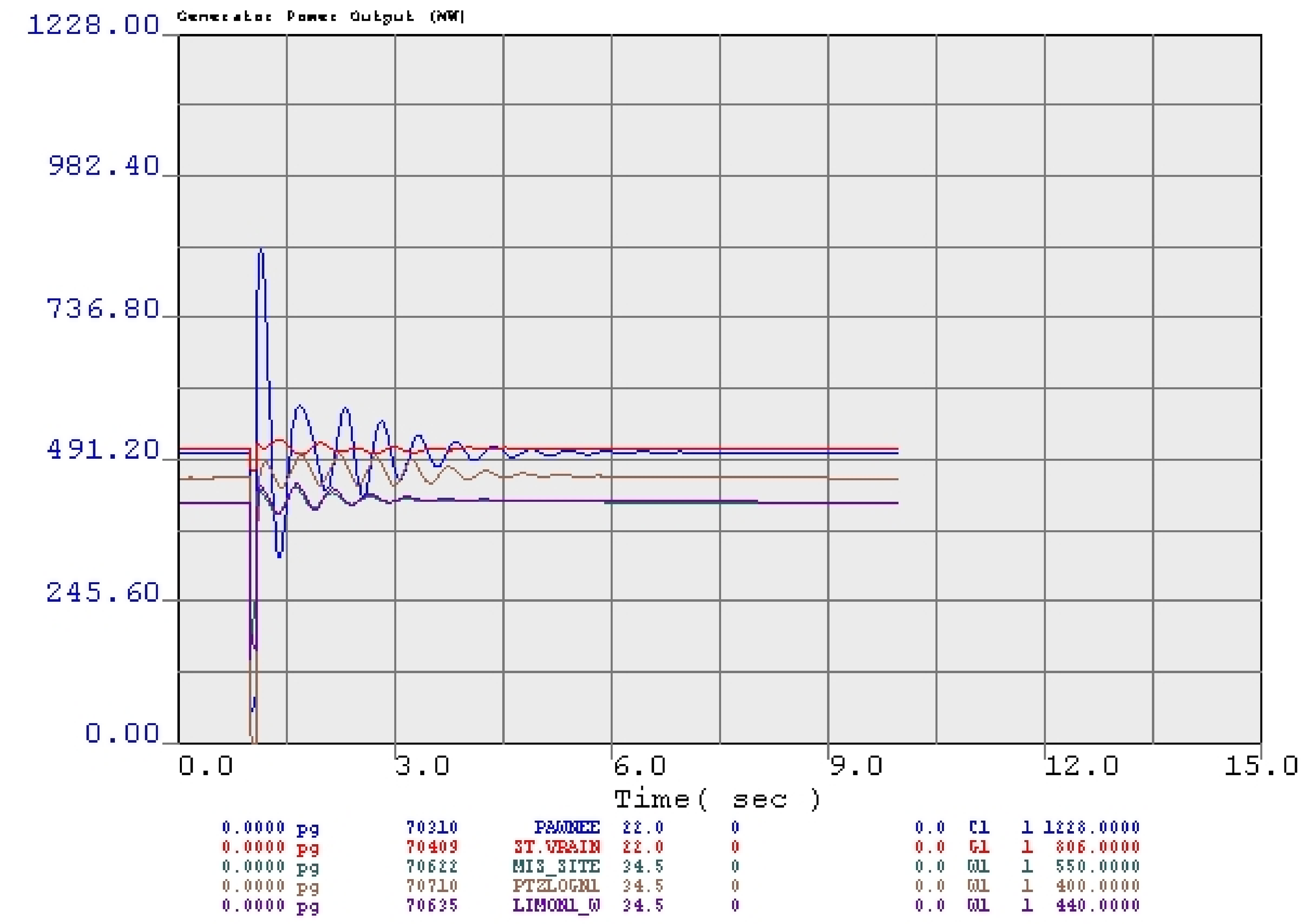












line_5
line PAWNEE to FTLUPTON 230, PAWNEE end
NOVEMBER 7, 2013

14hs4a_proj_Wind75-line_5.chf

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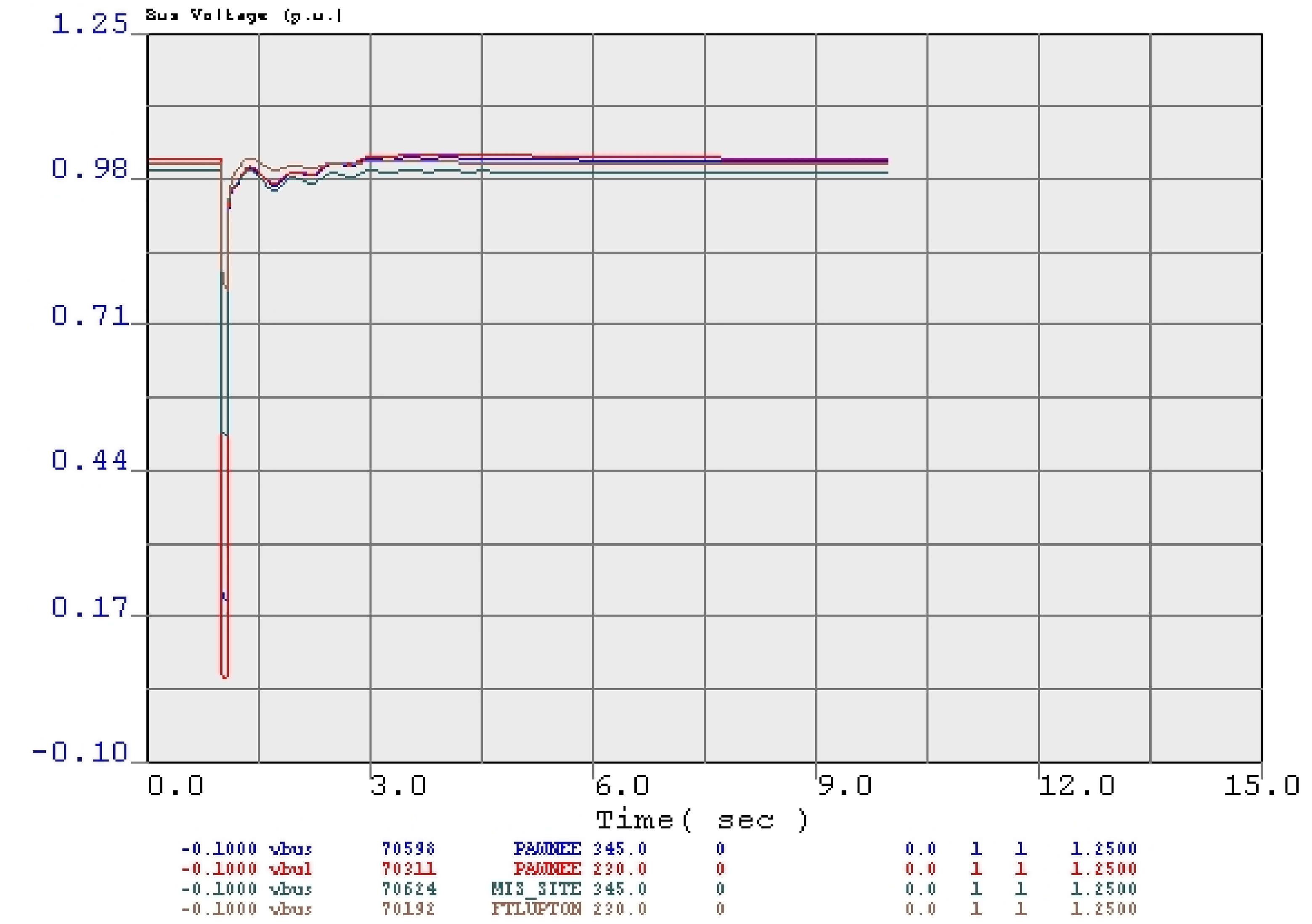
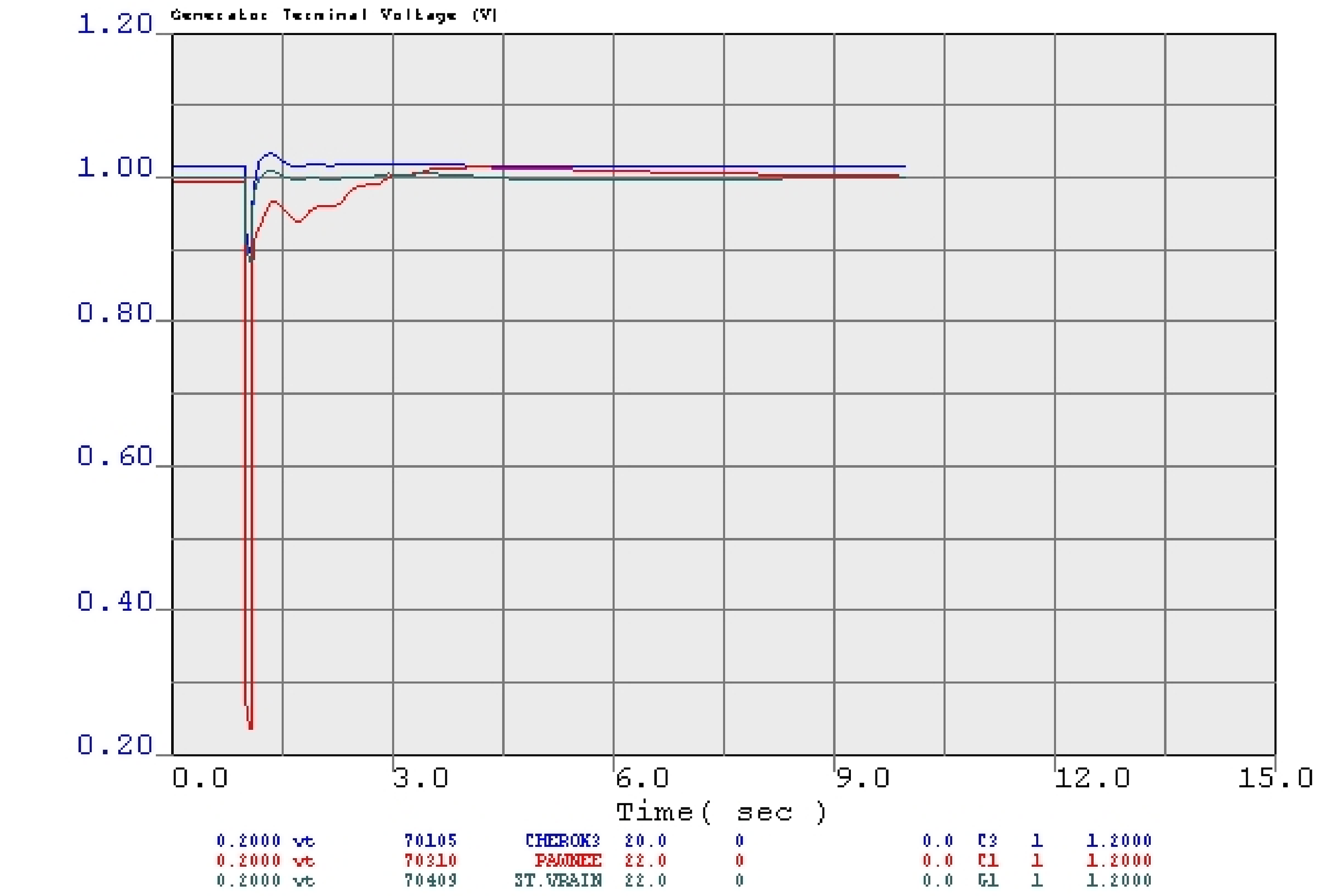
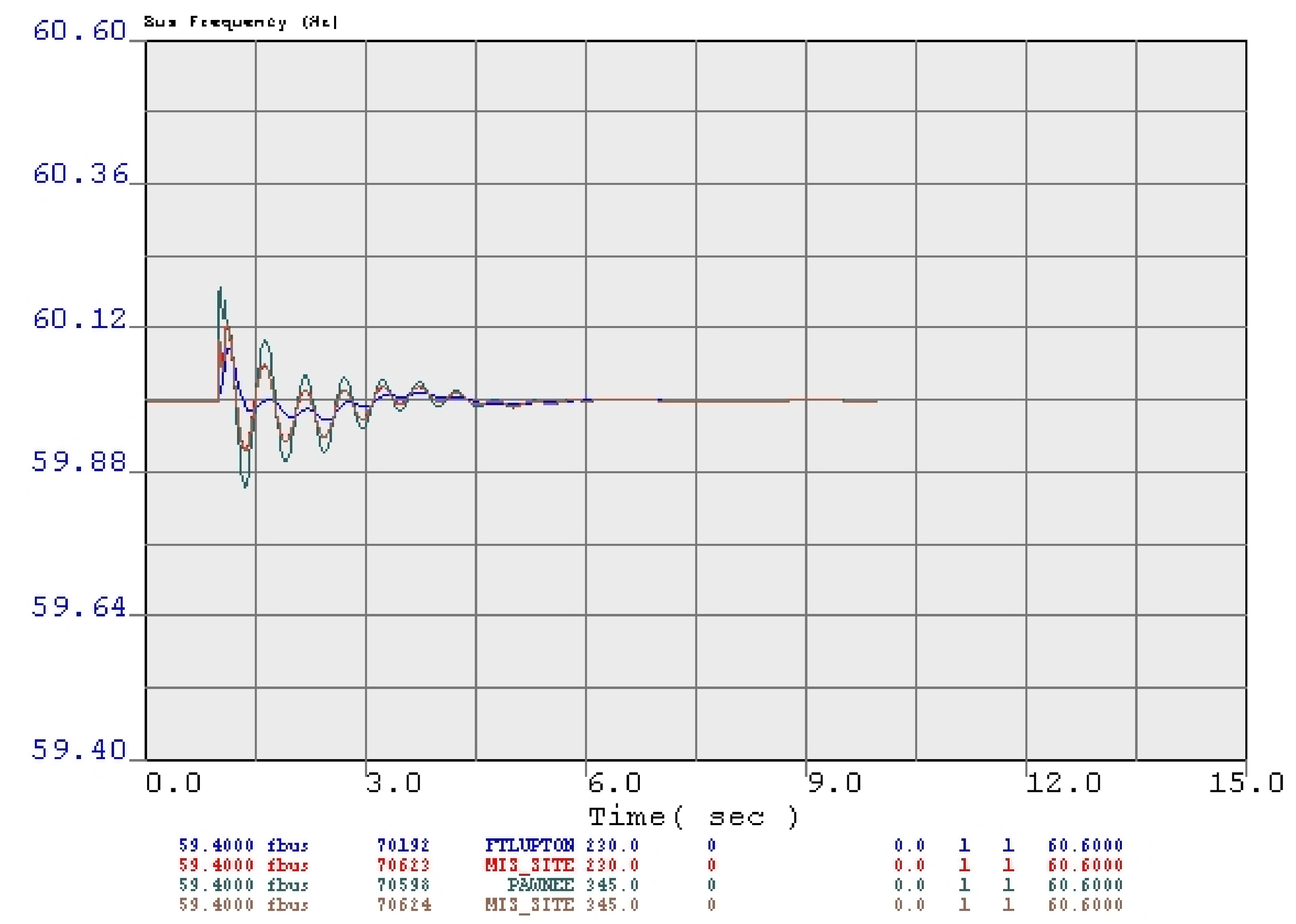
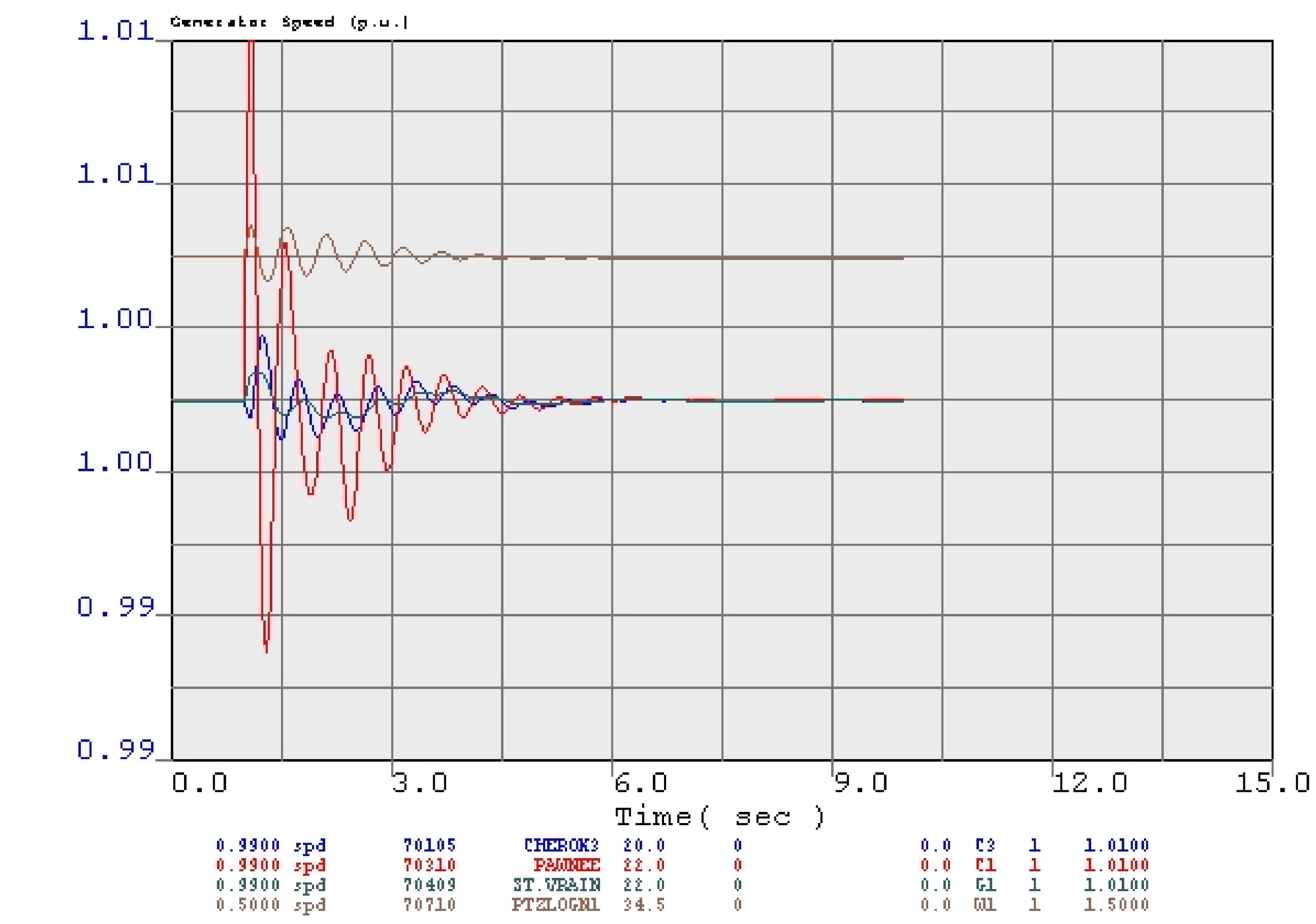
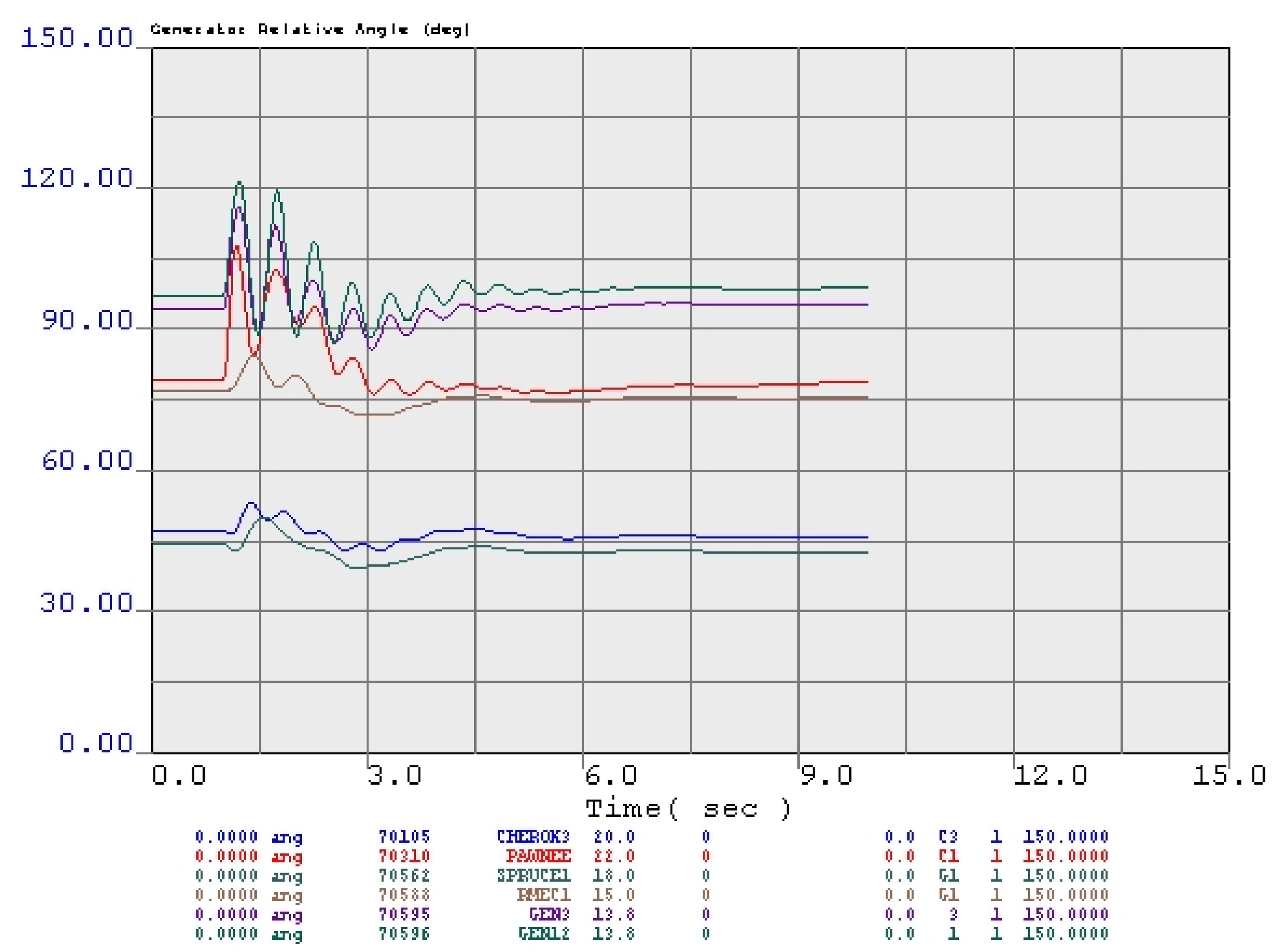
Fri May 29 08:22:14 2015

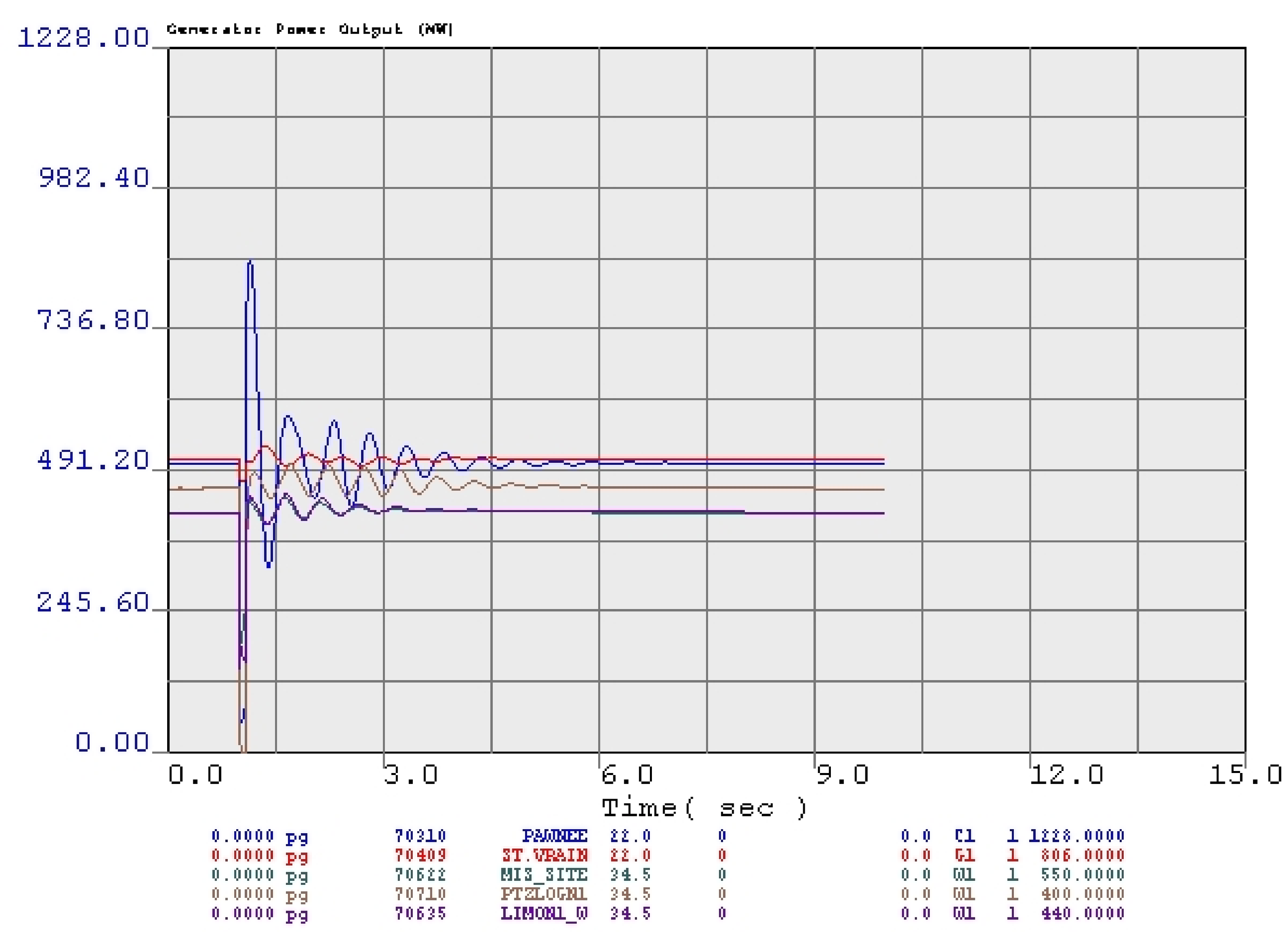




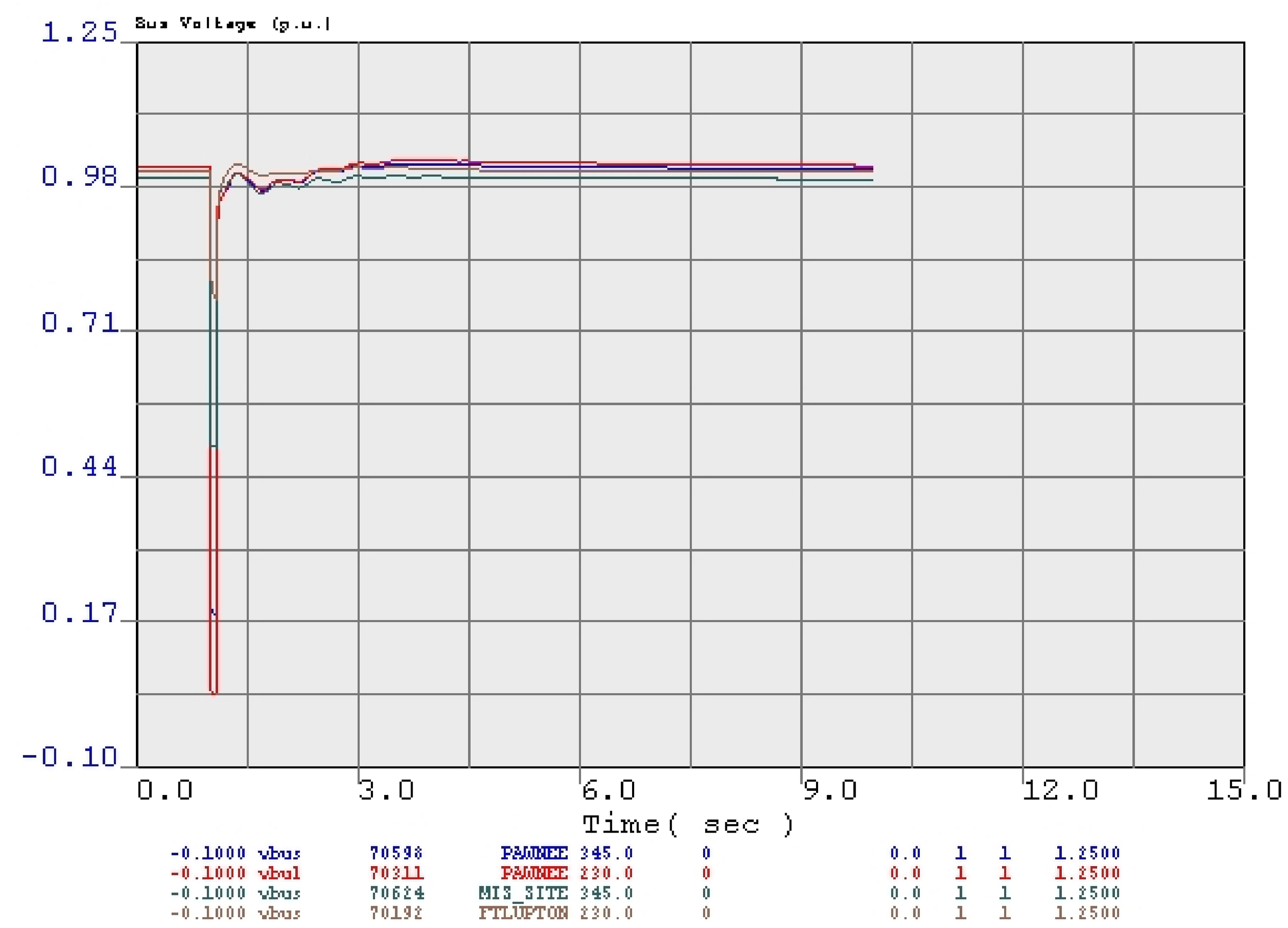


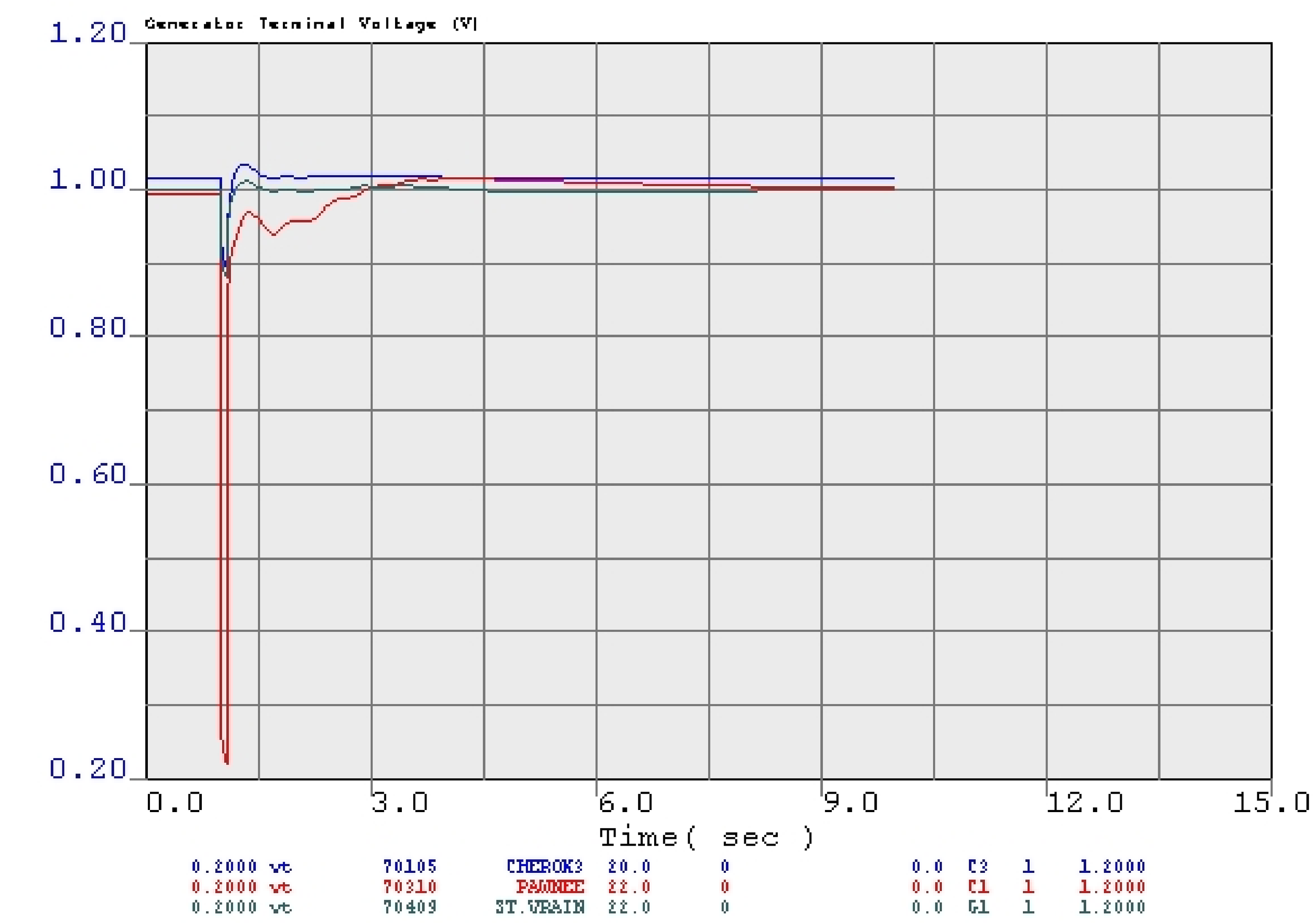


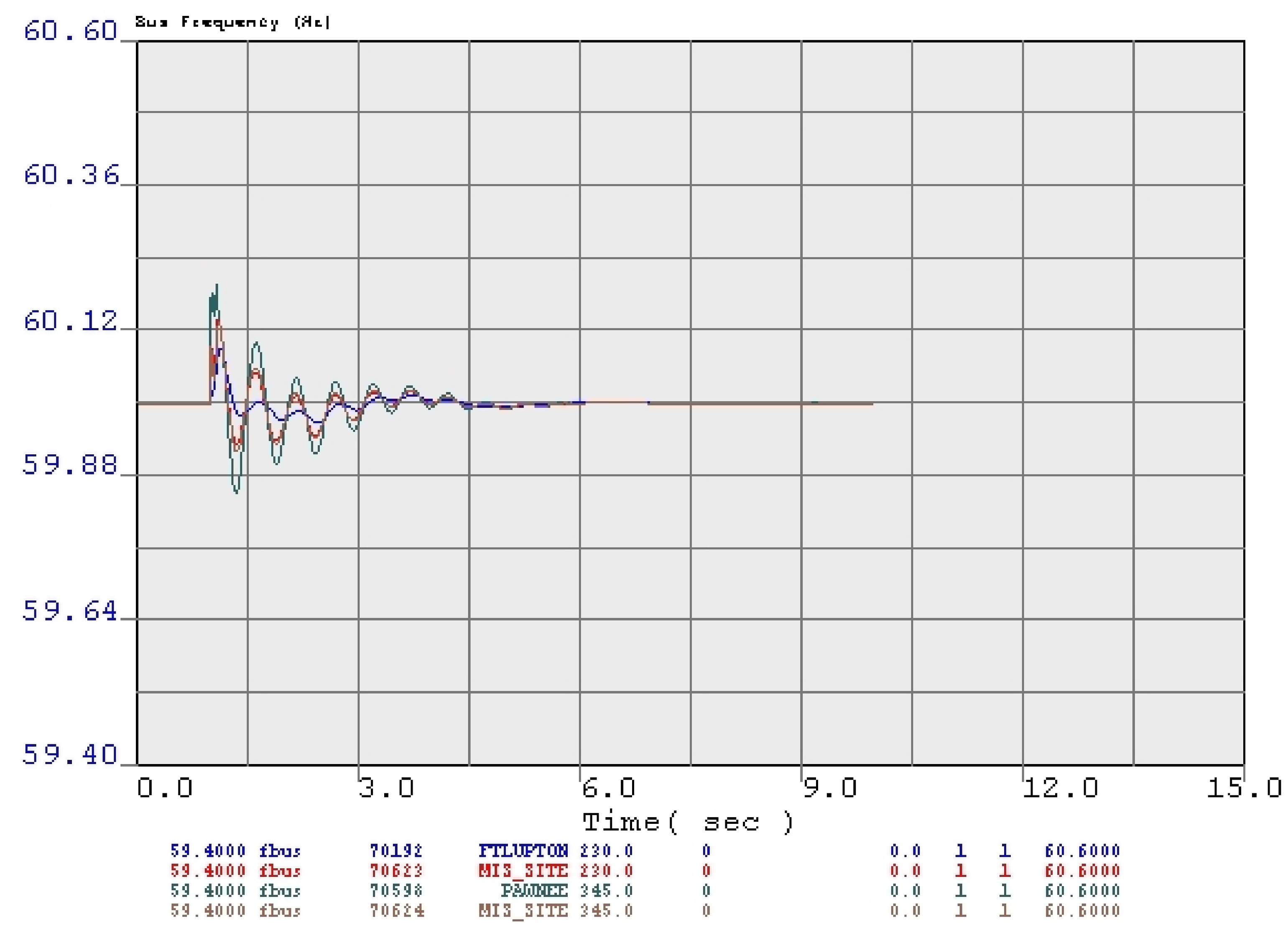


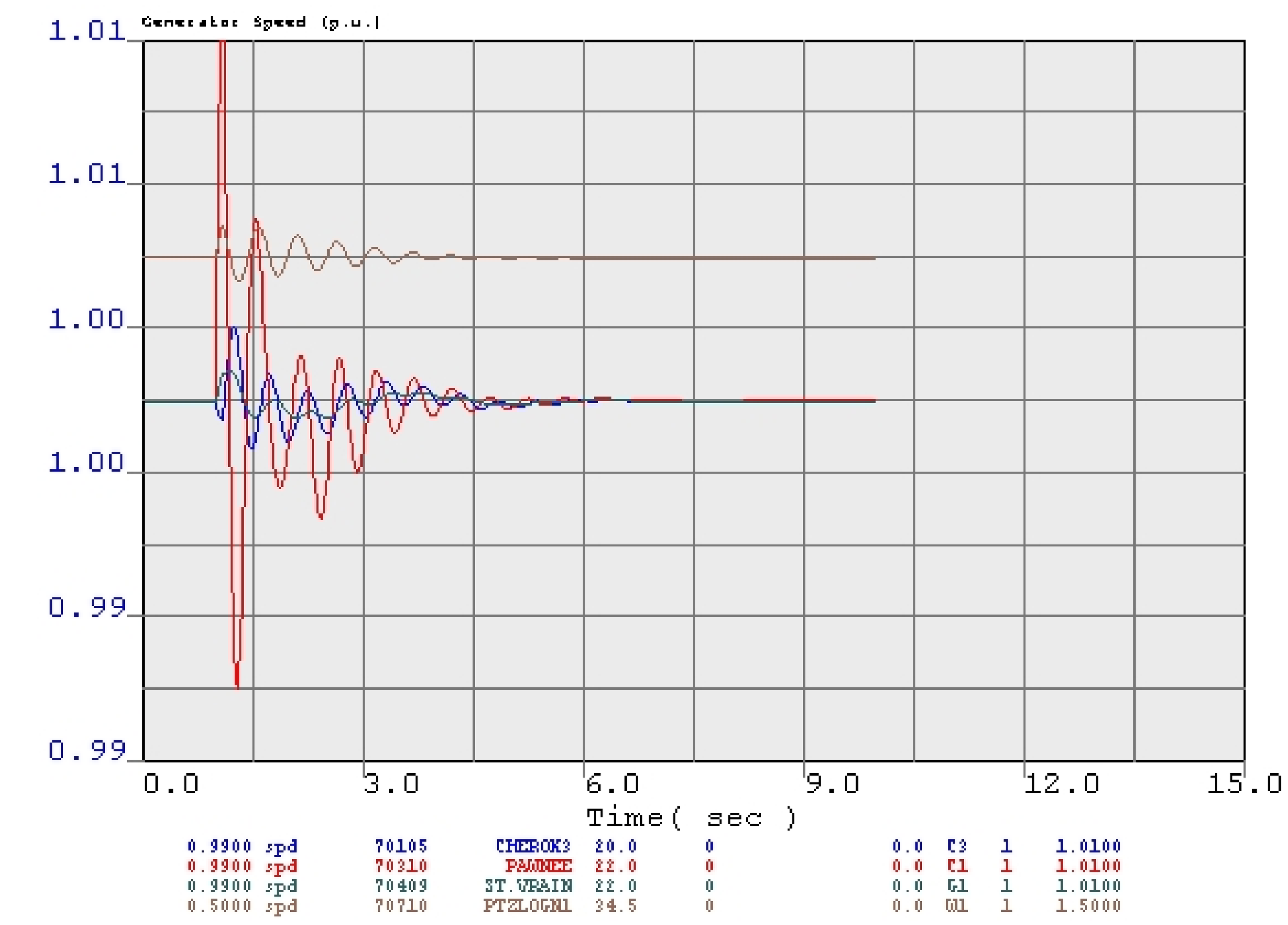


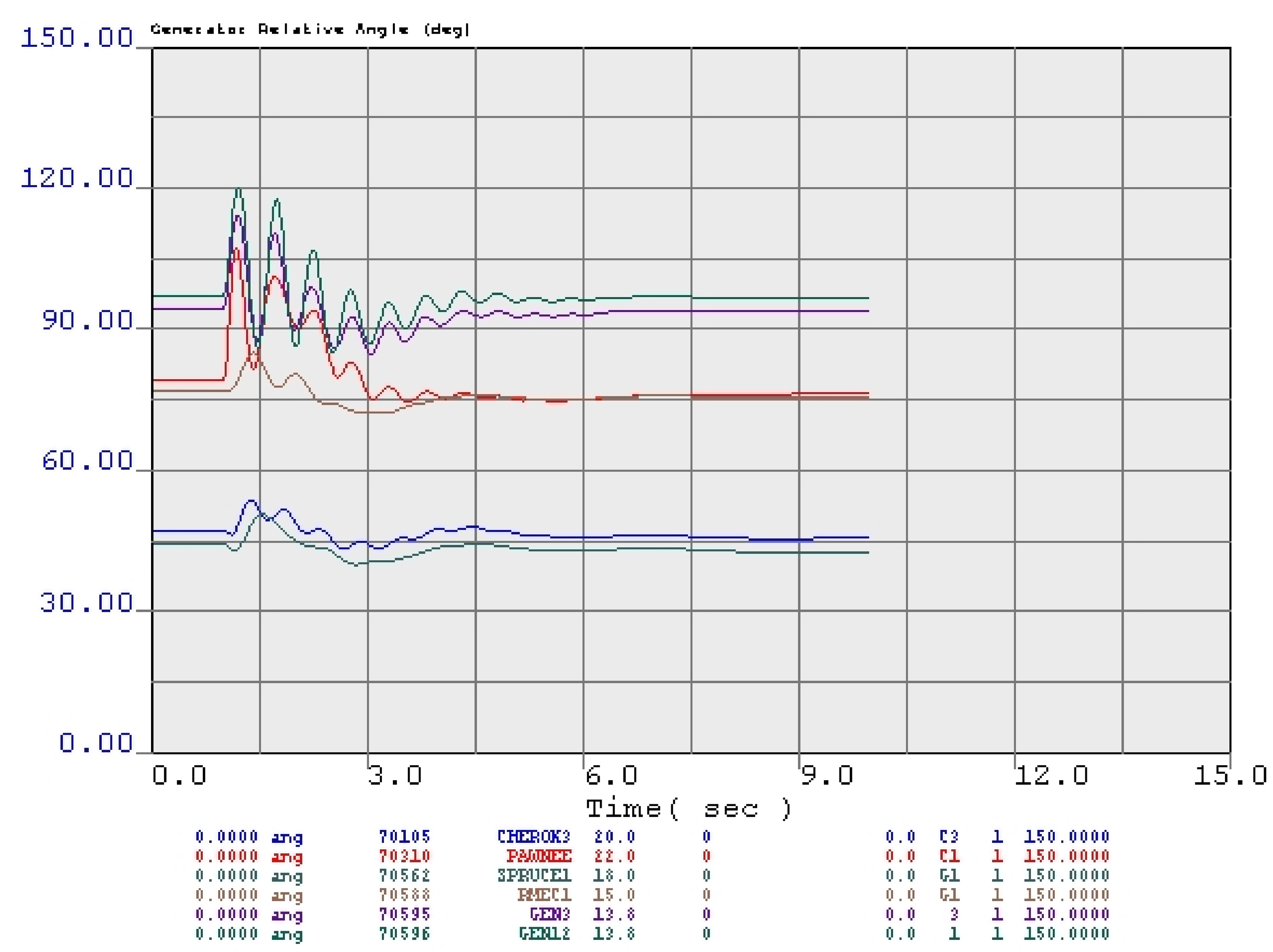
line_6
line PAWNEE to BRICKCTR 230, PAWNEE end
NOVEMBER 7, 2013

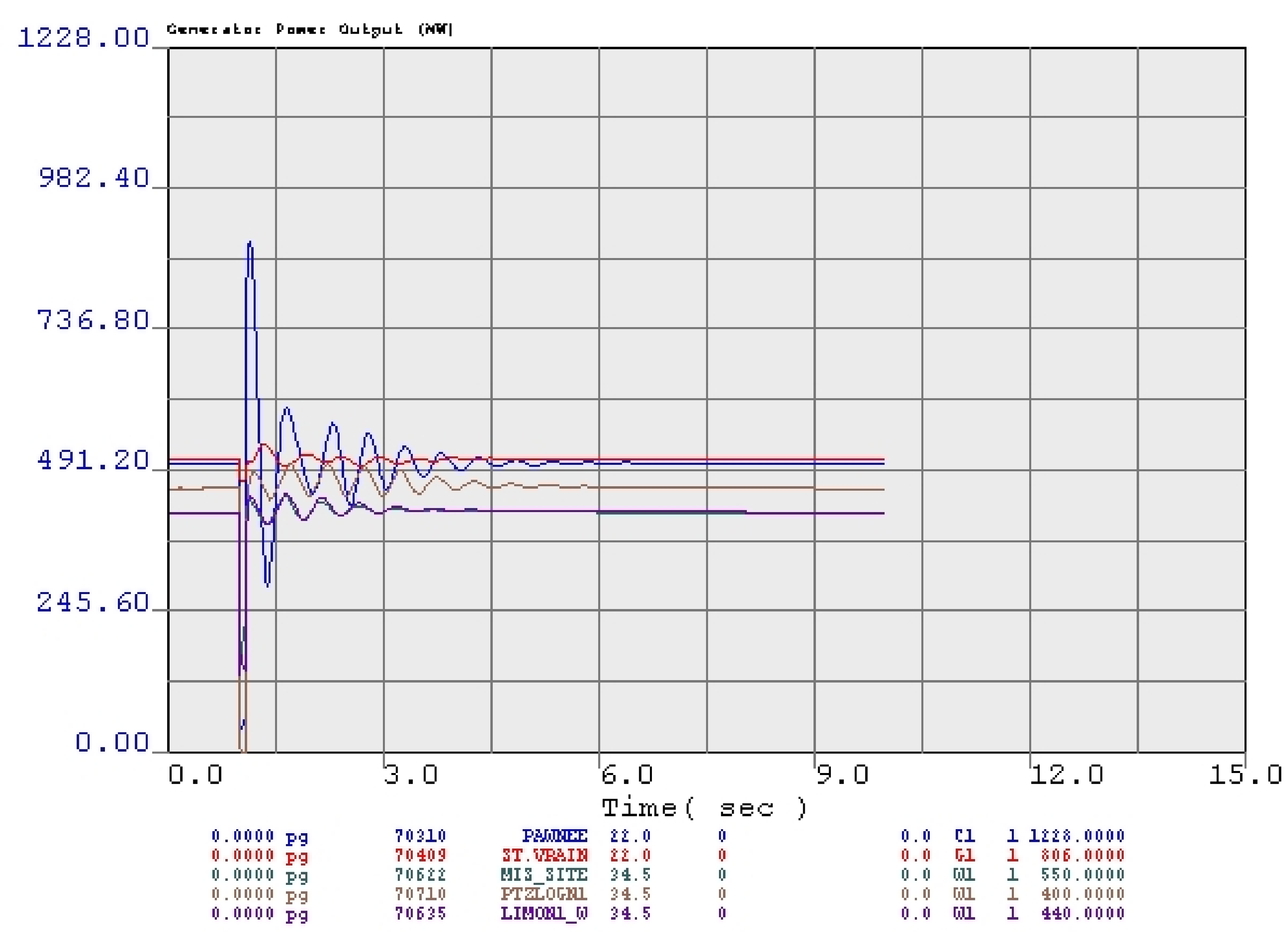




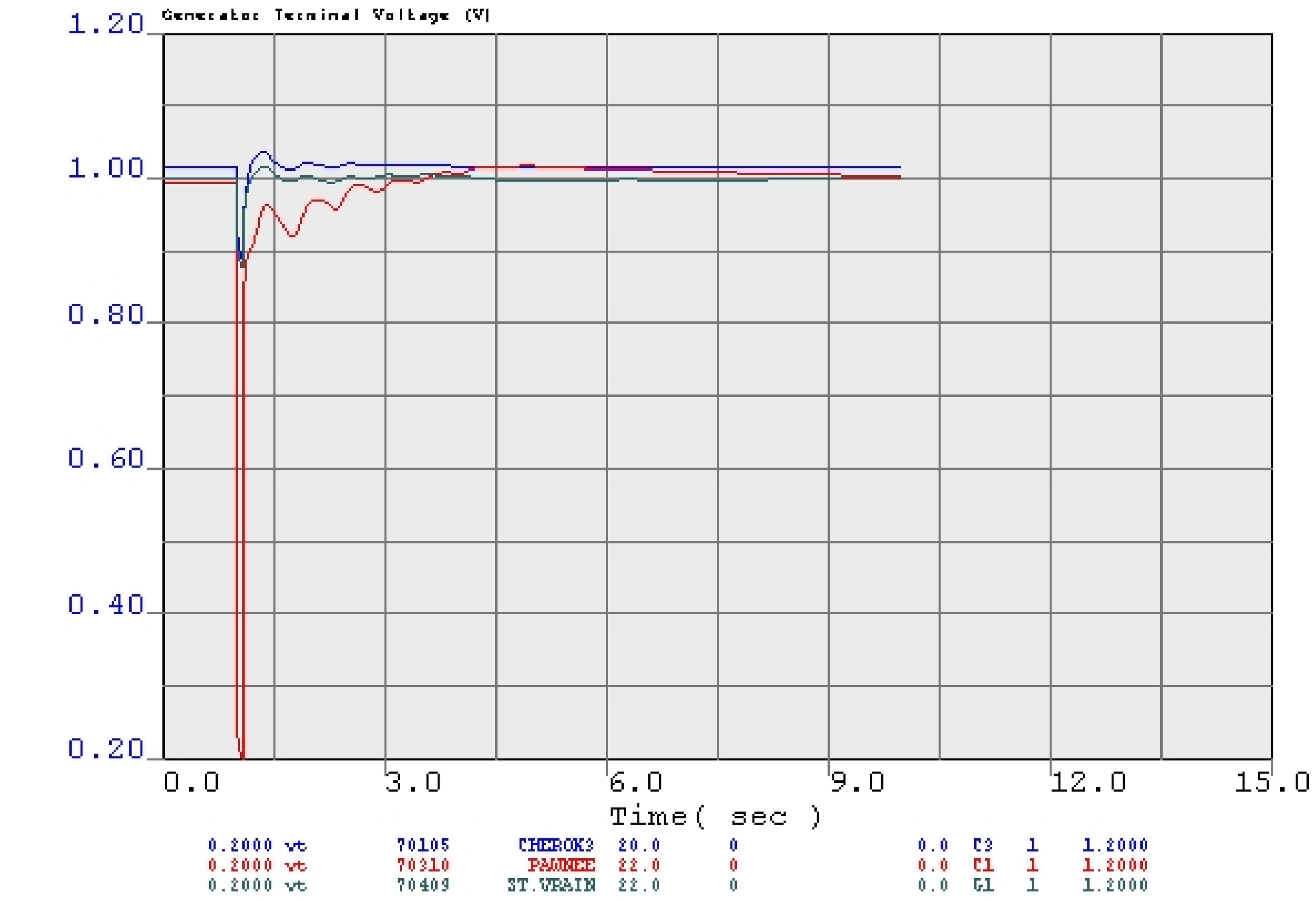


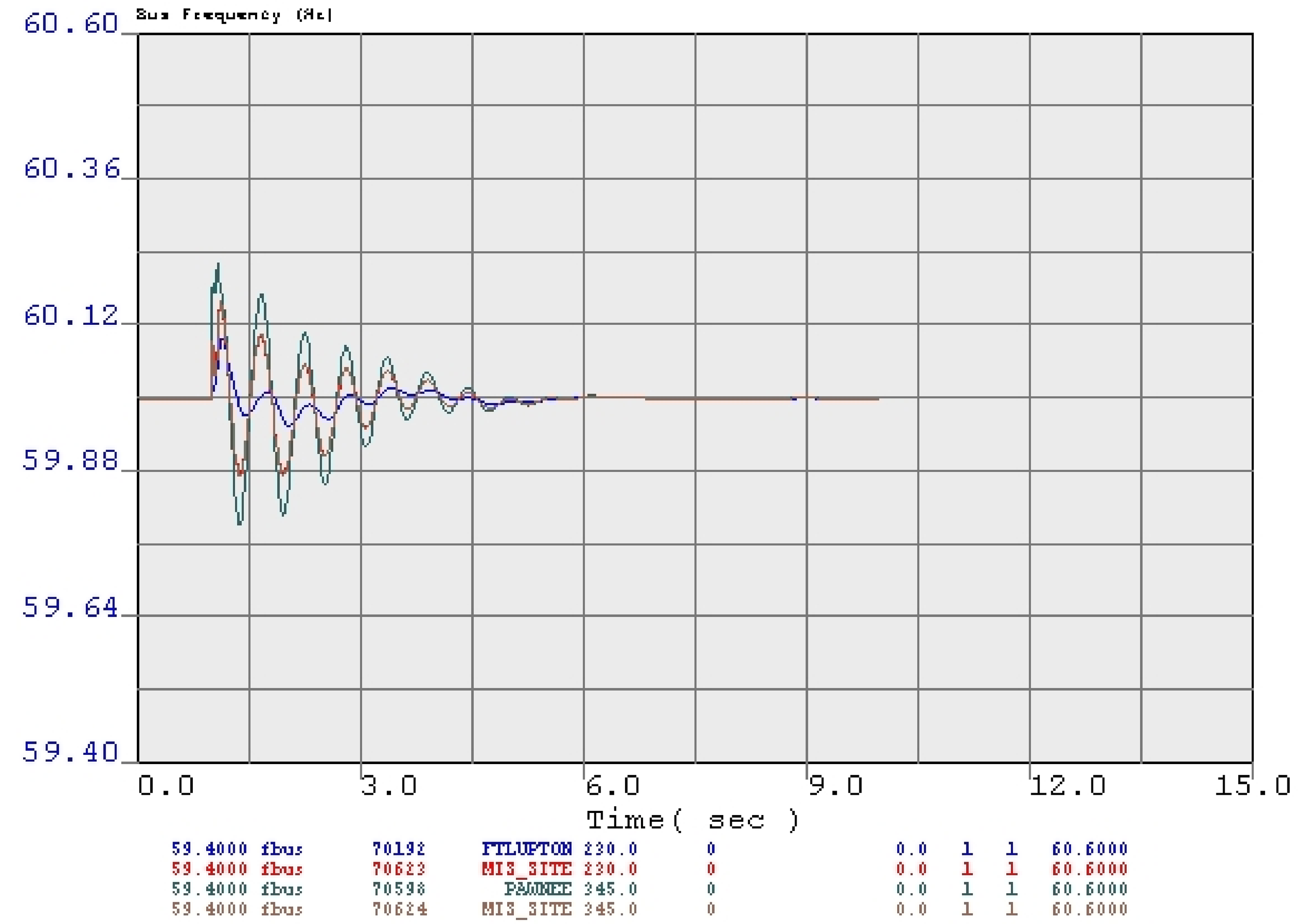


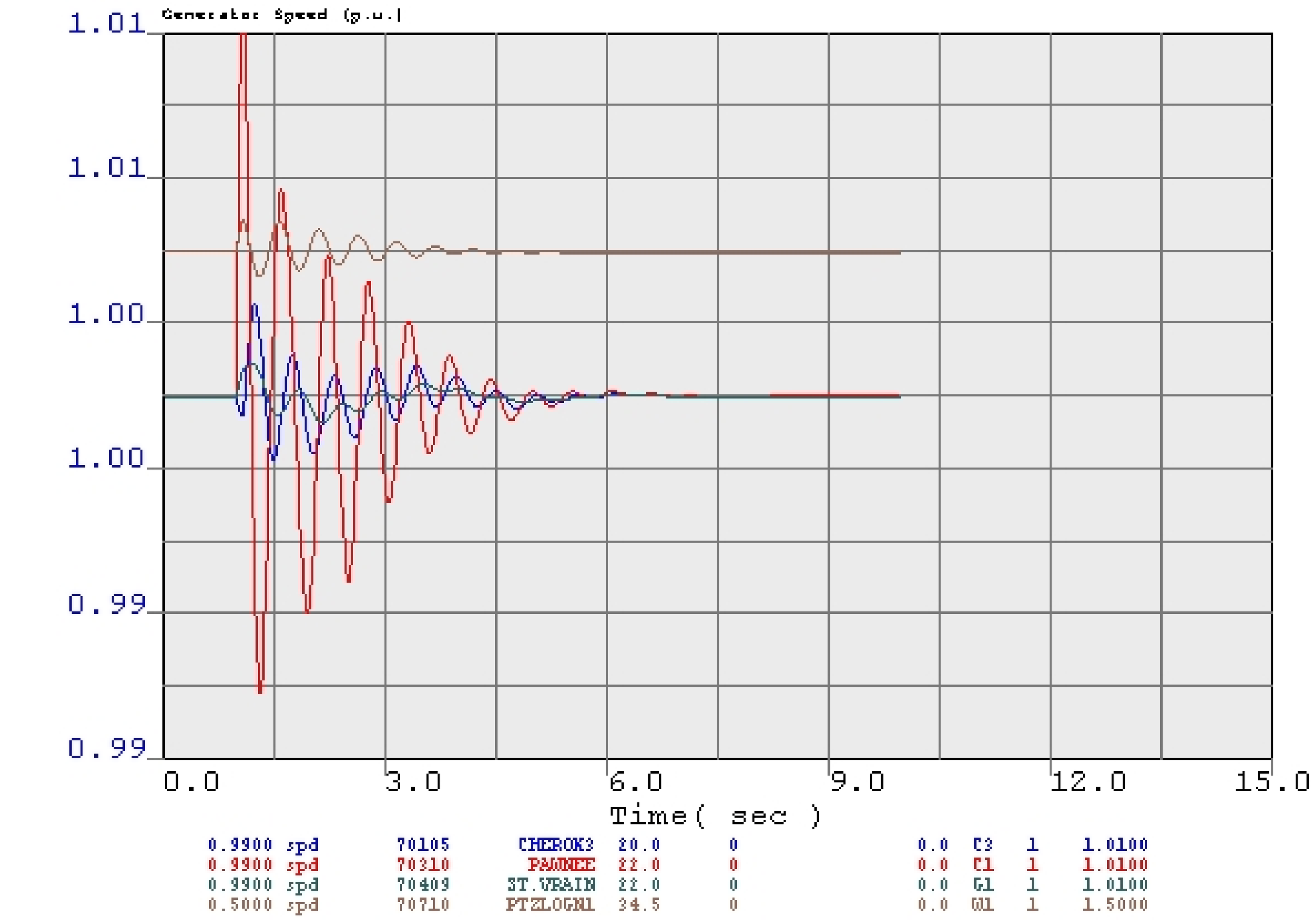


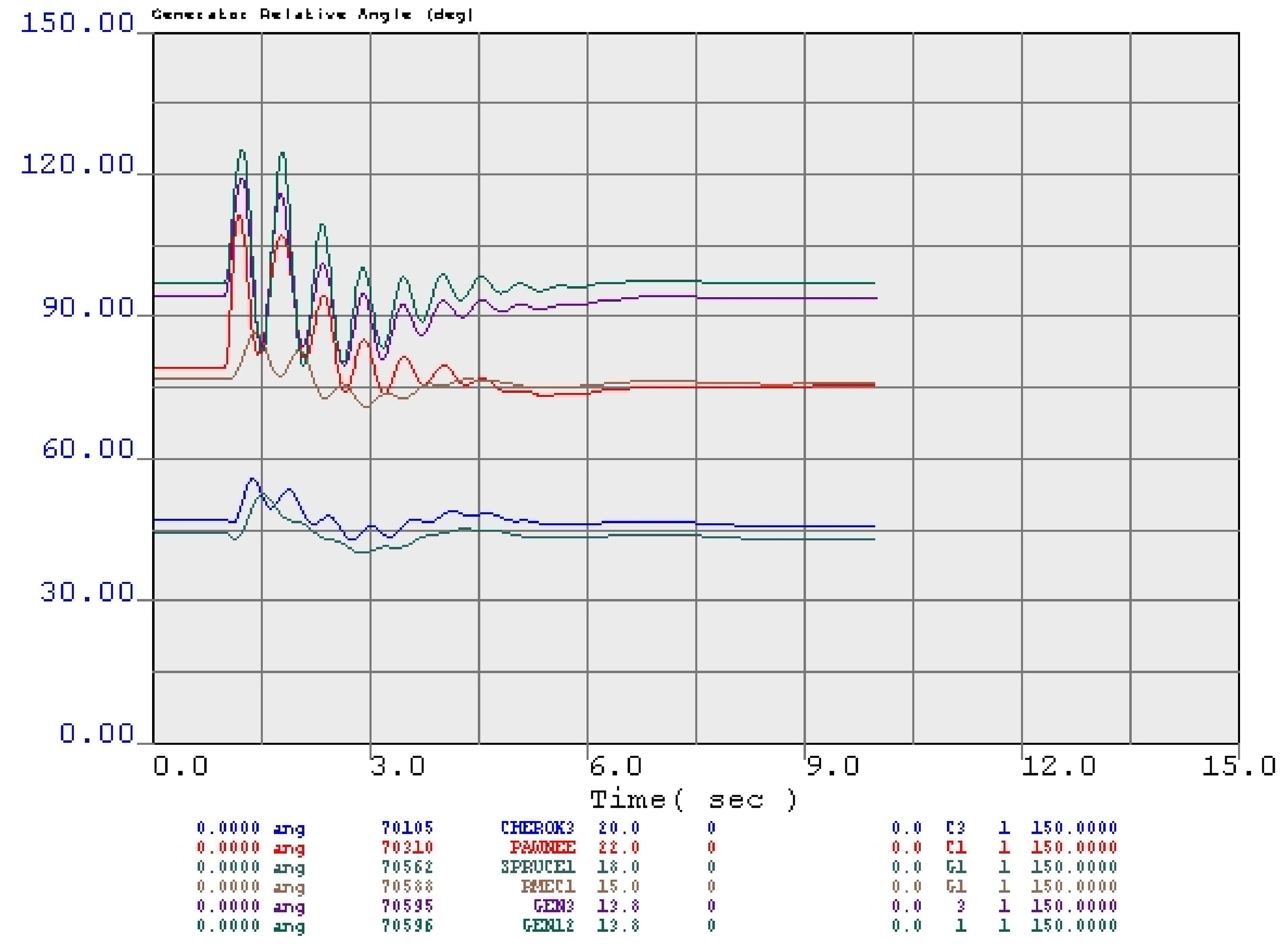


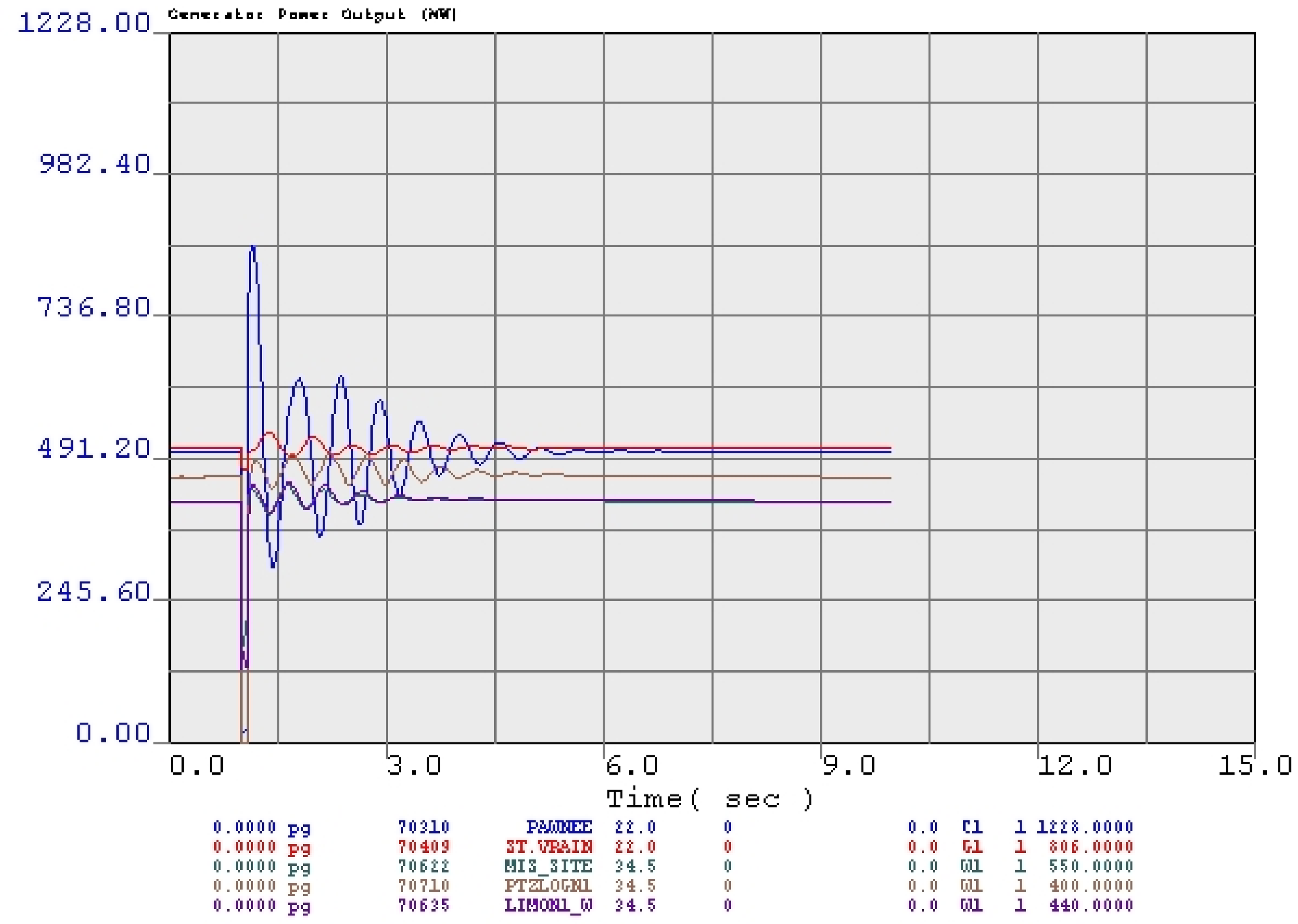
line_7
line PAWNEE to MIS_SITE 230, PAWNEE end
NOVEMBER 7, 2013











line_8
line PAWNEE to STORY 230, PAWNEE end
NOVEMBER 7, 2013

14hs4a_proj_Wind75-line_8.chf

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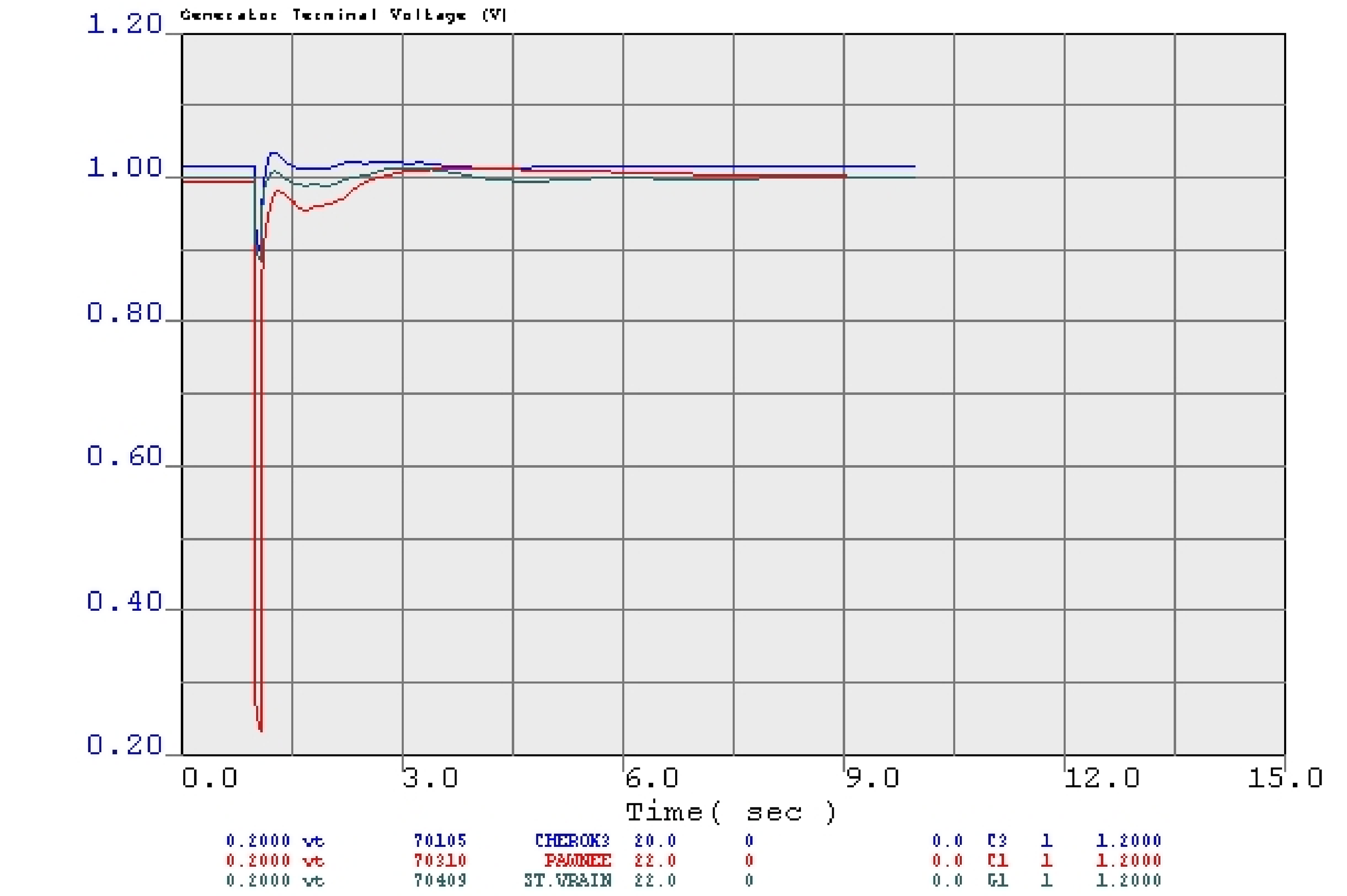
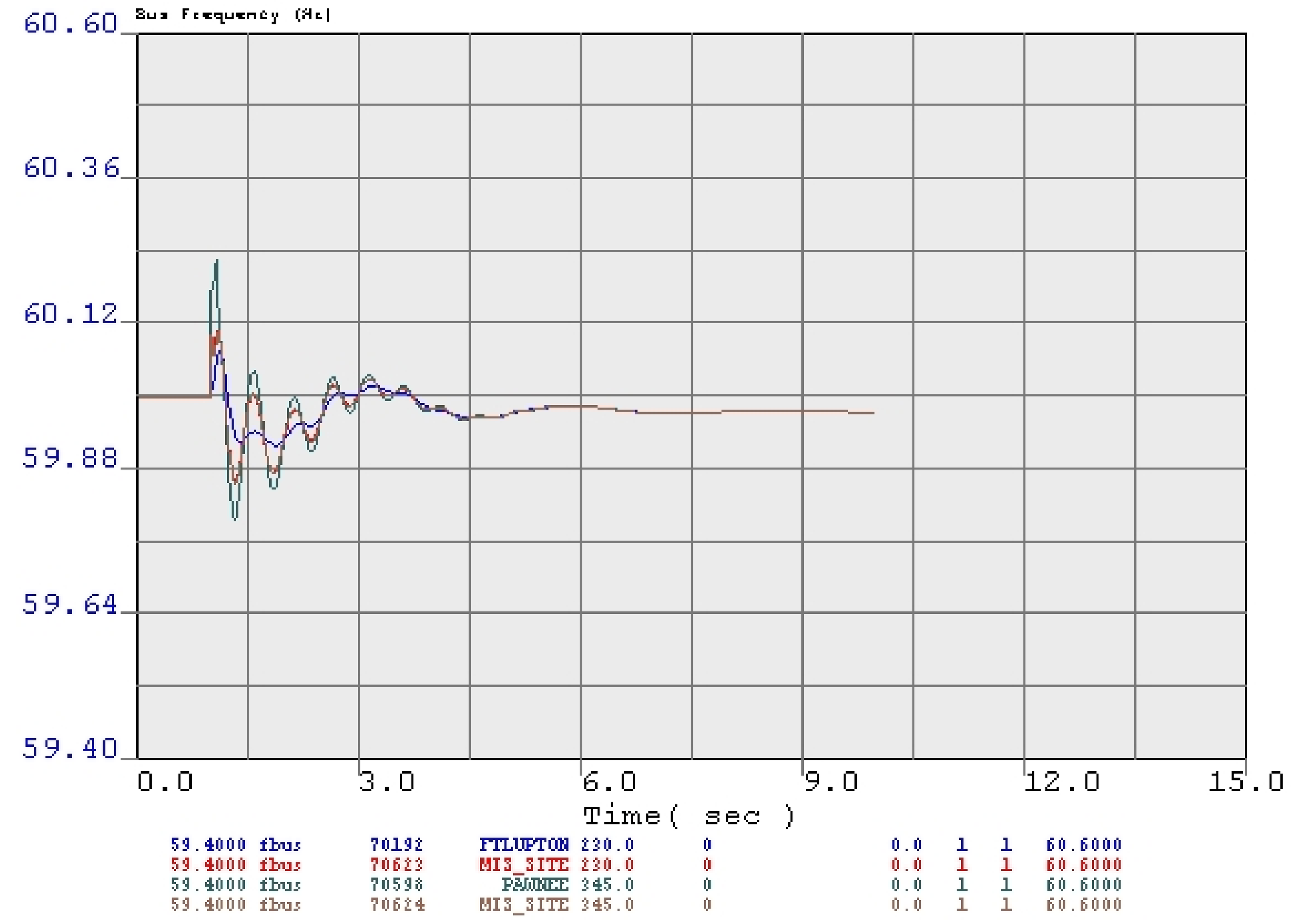
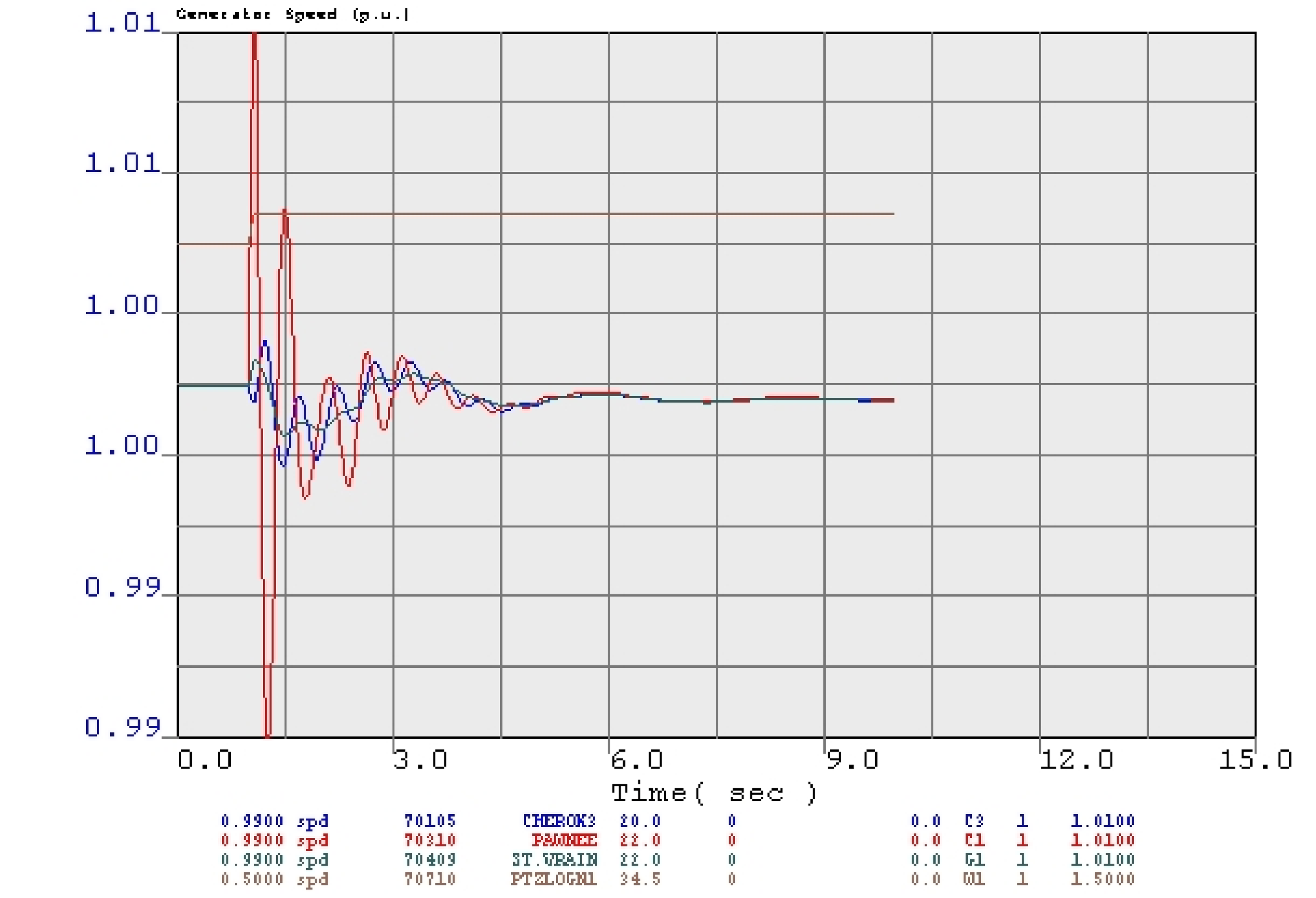
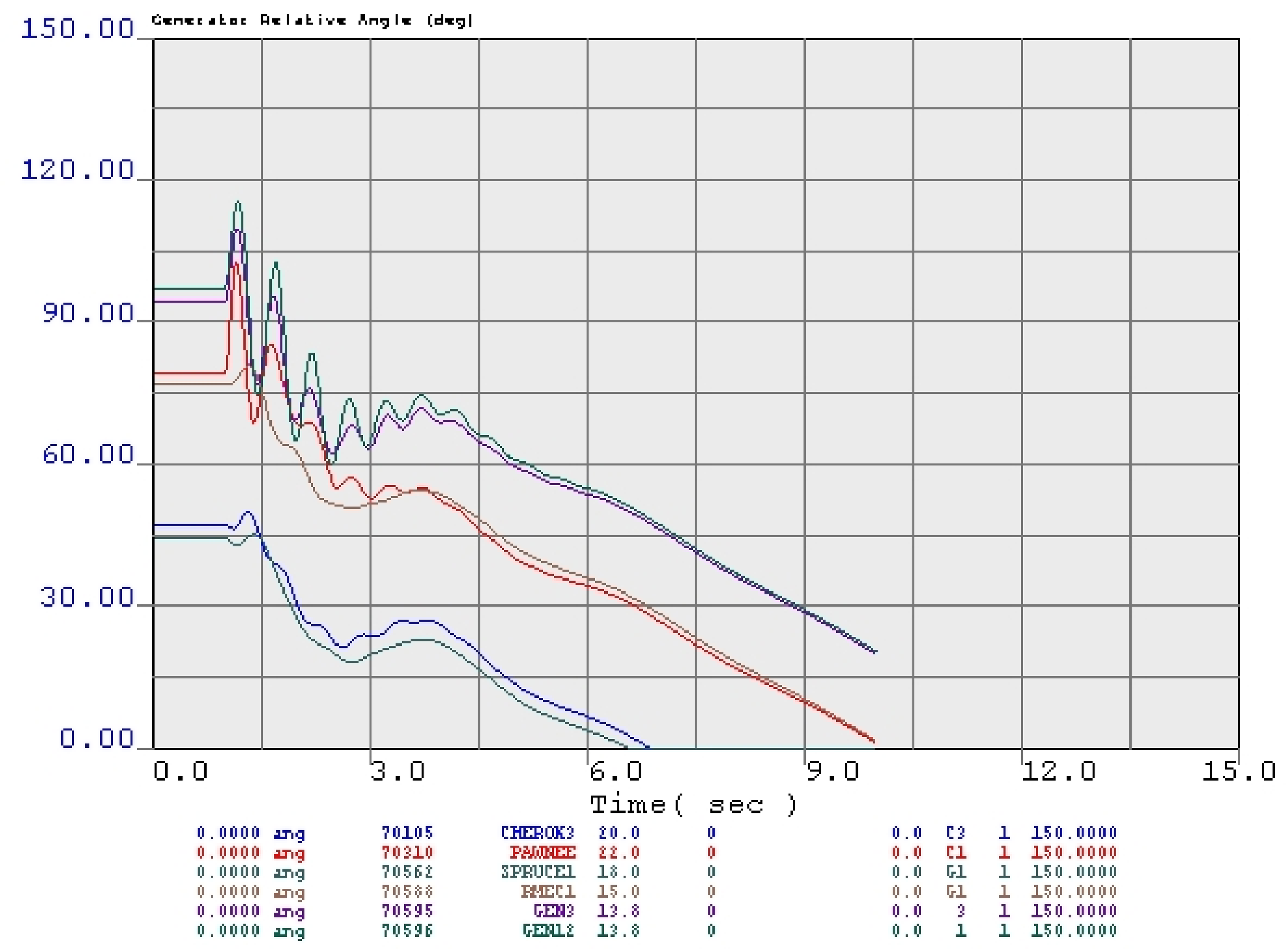
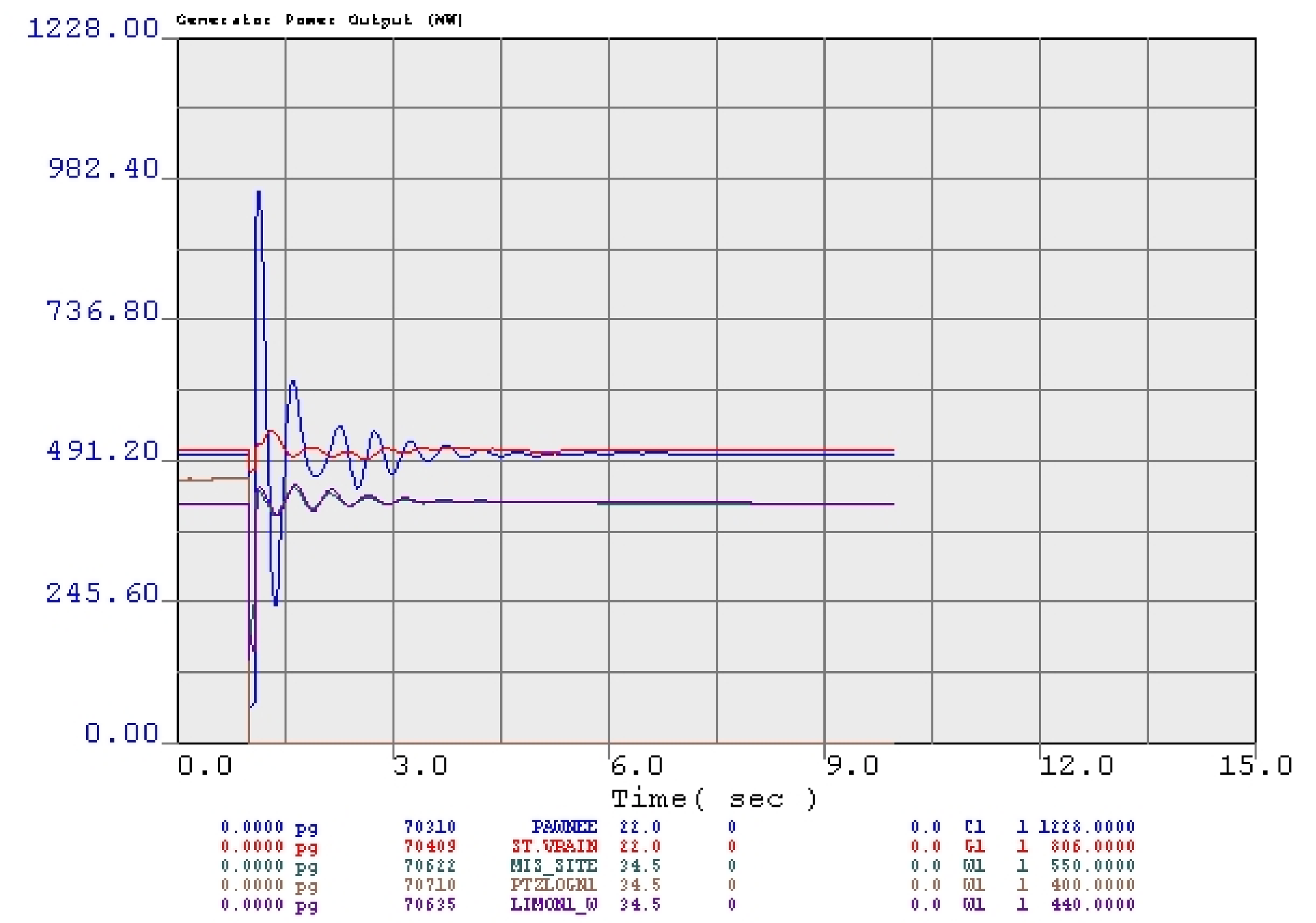
Fri May 29 08:24:32 2015



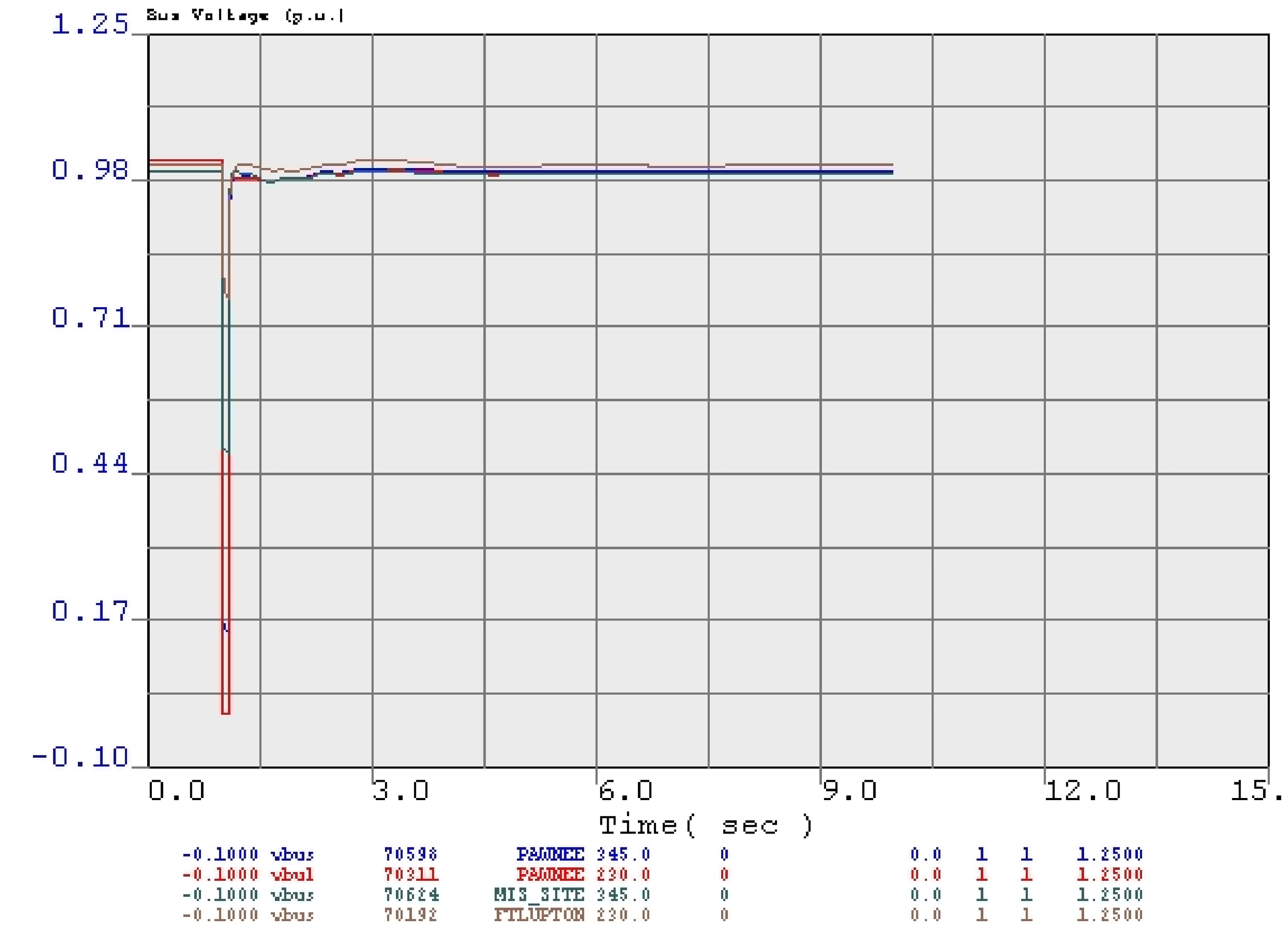


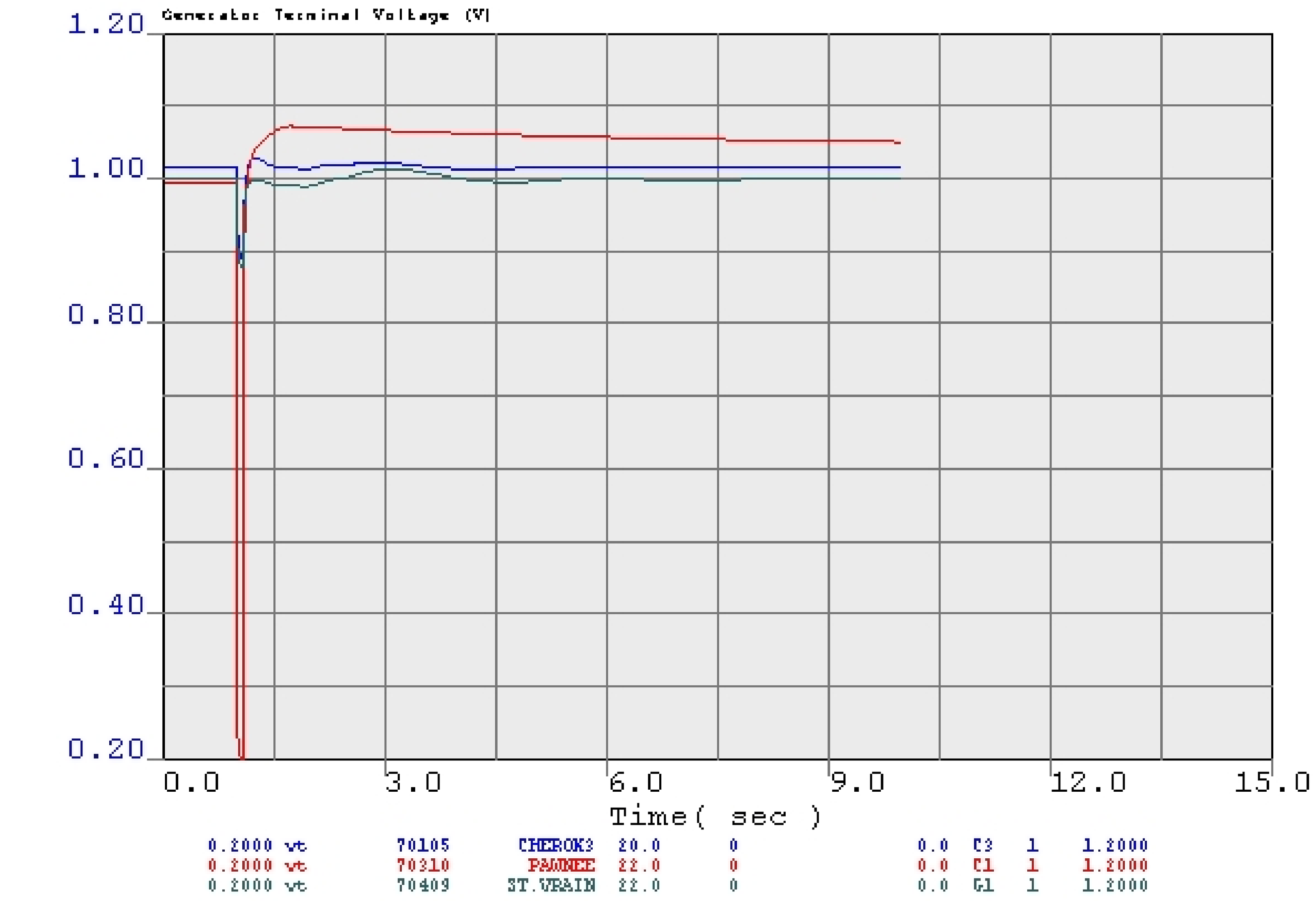


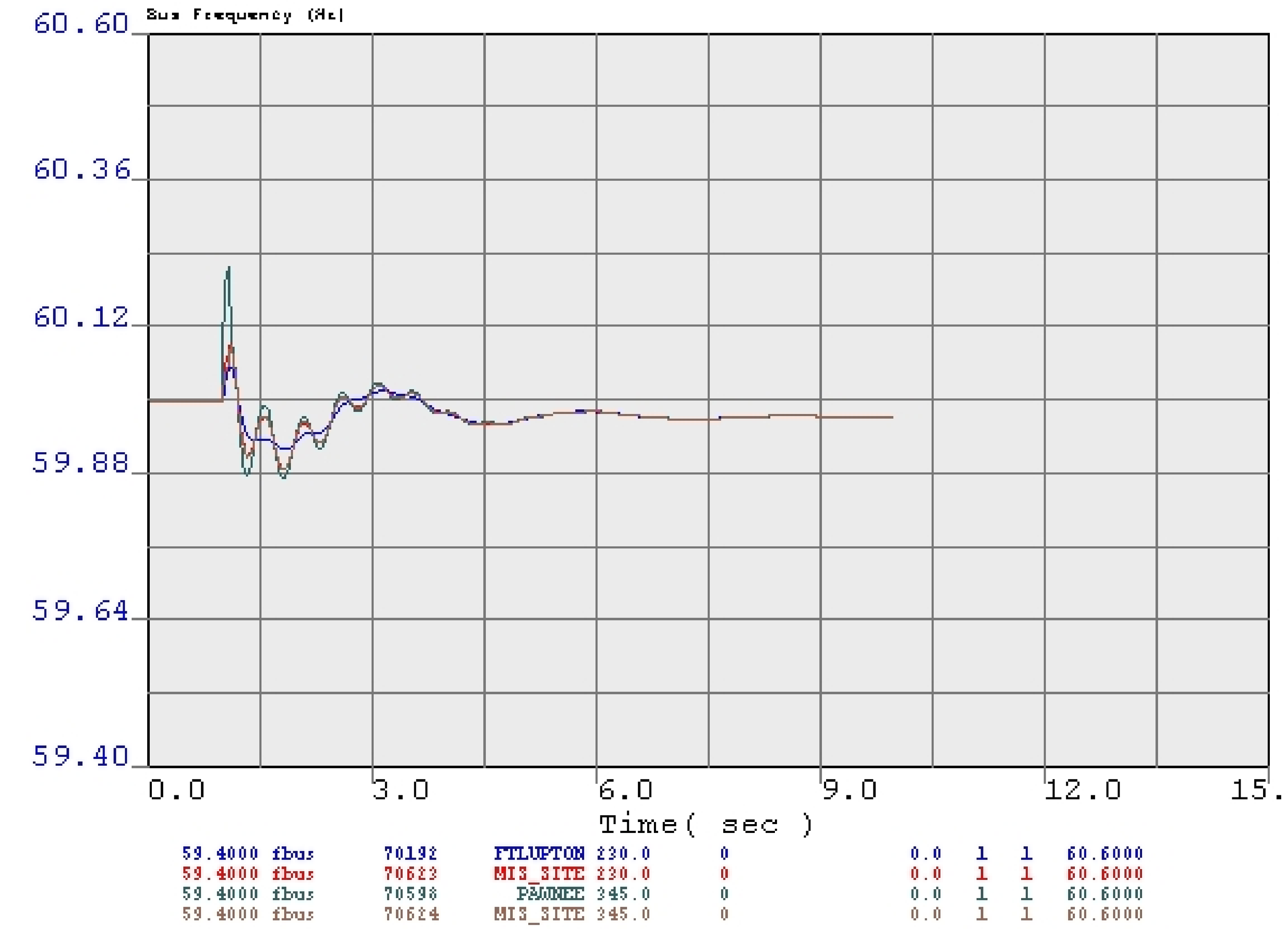


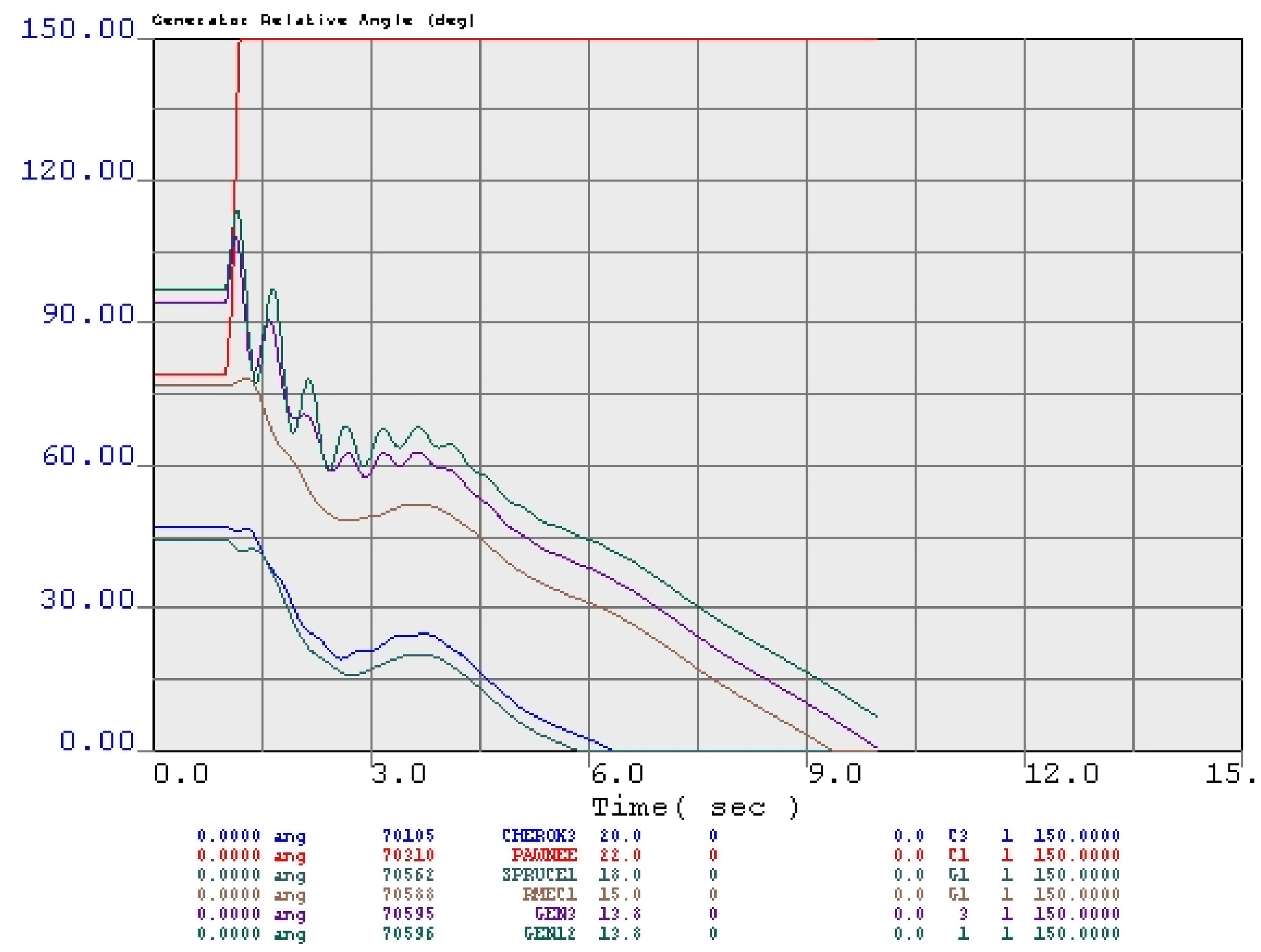


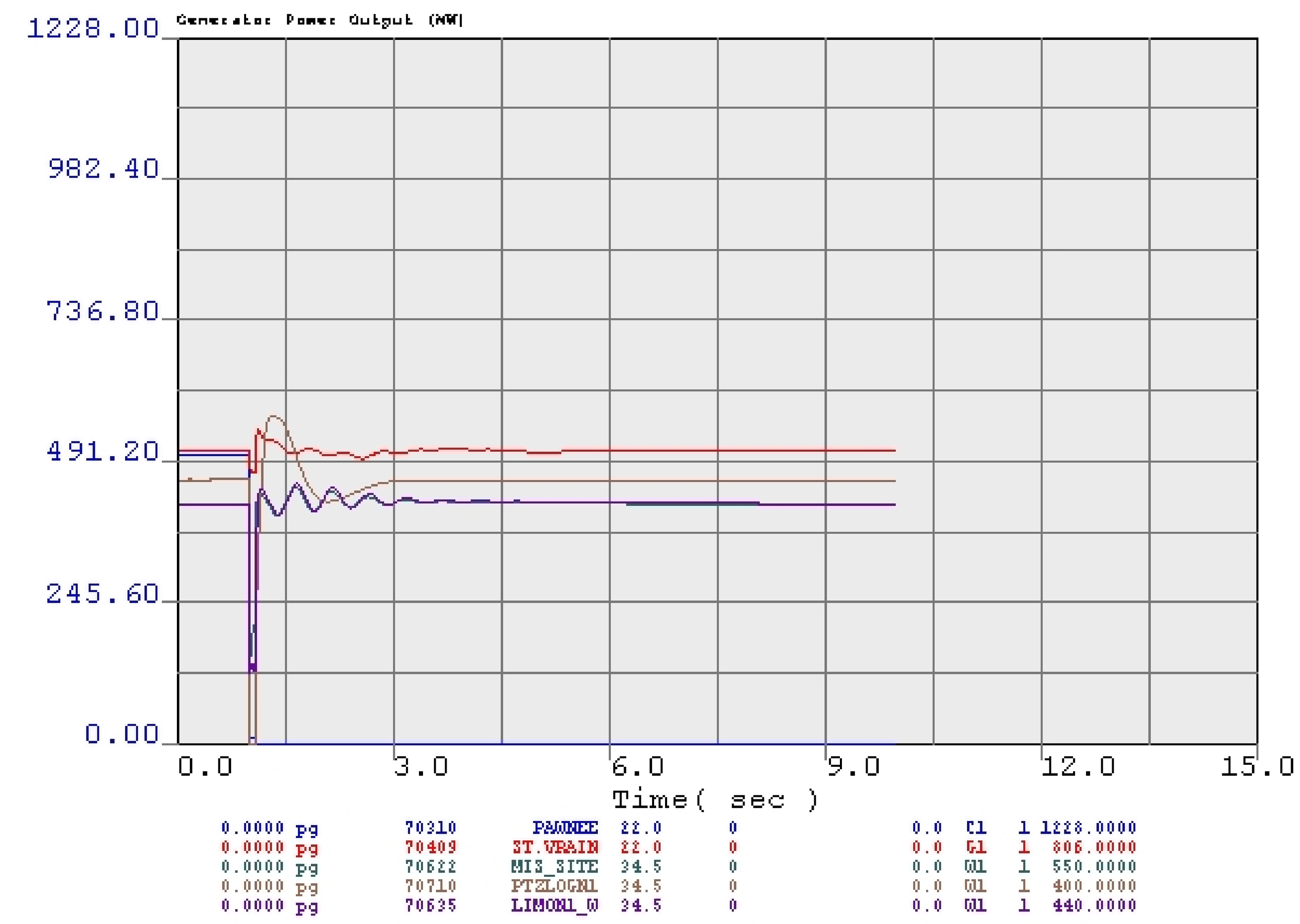
line_9
line PAWNEE to PTZLOGN 230, PAWNEE end
NOVEMBER 7, 2013



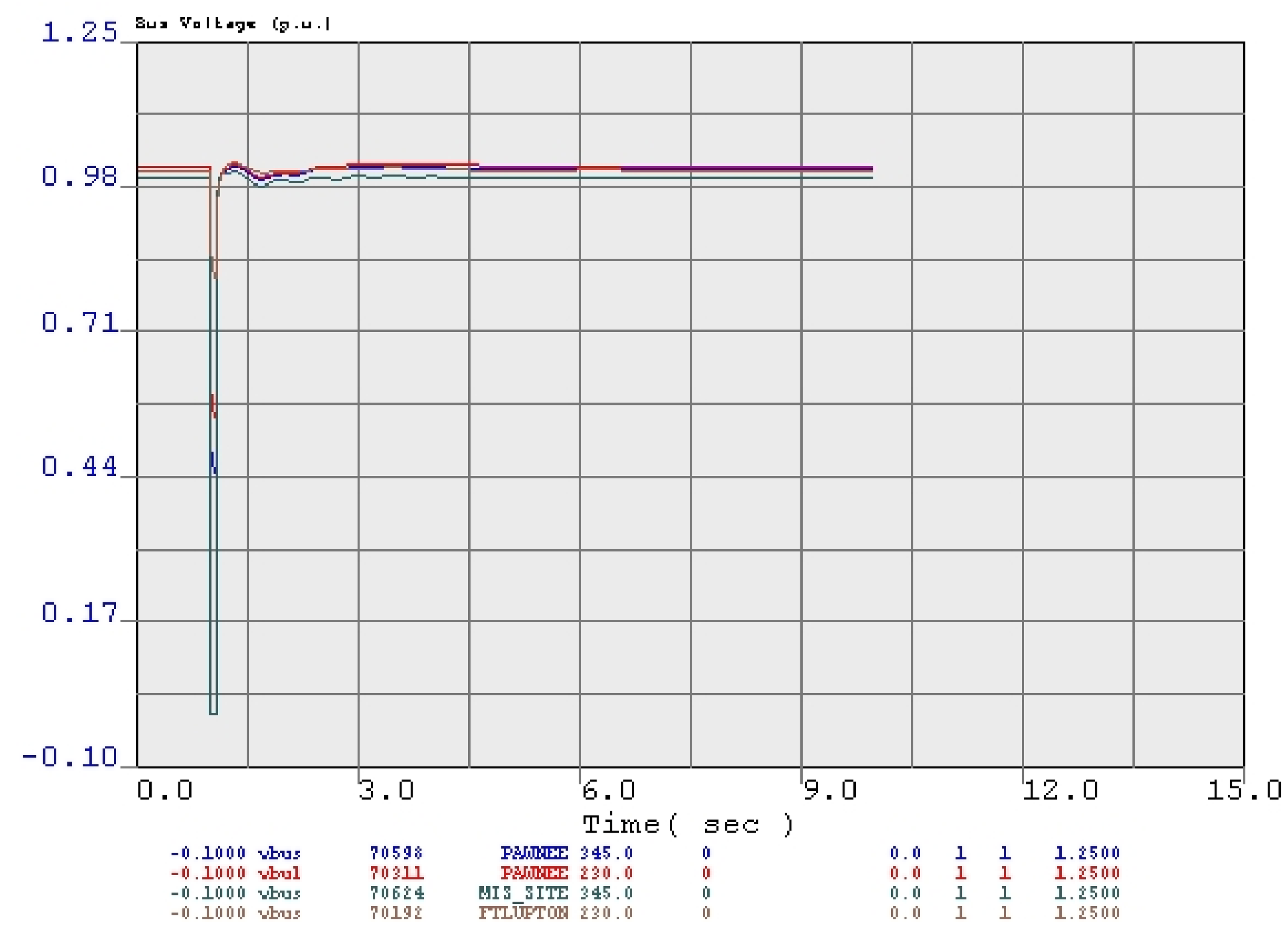


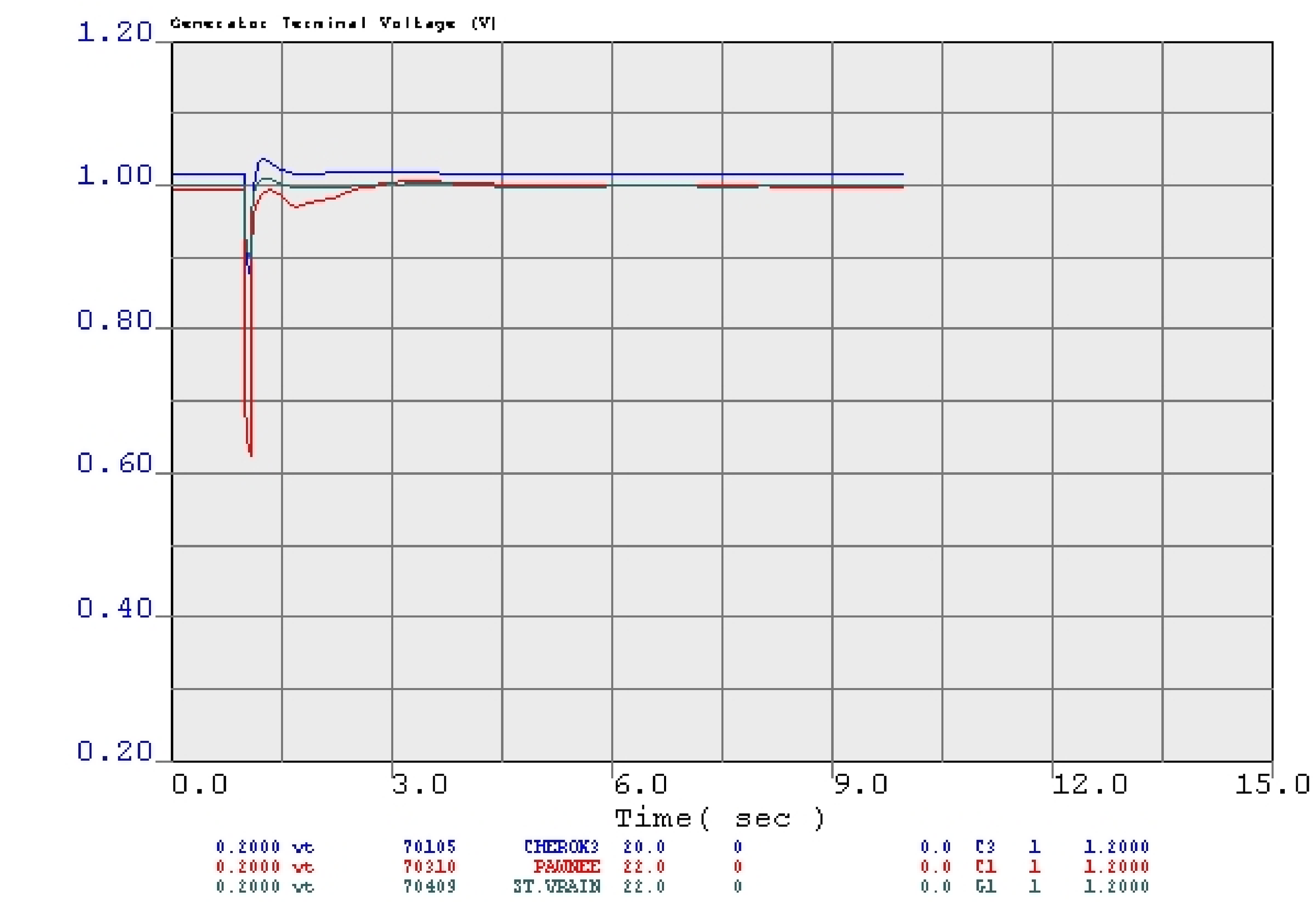


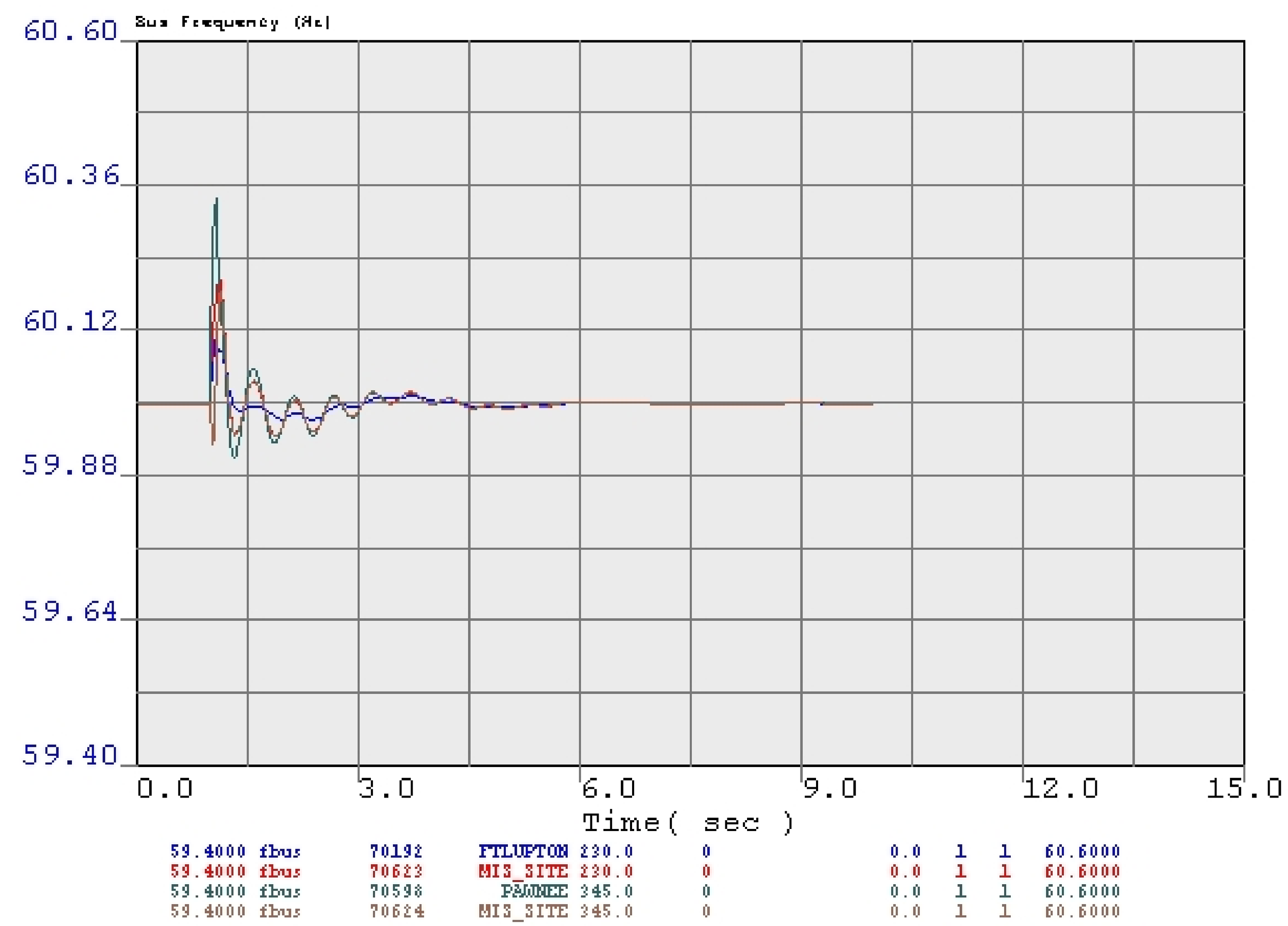


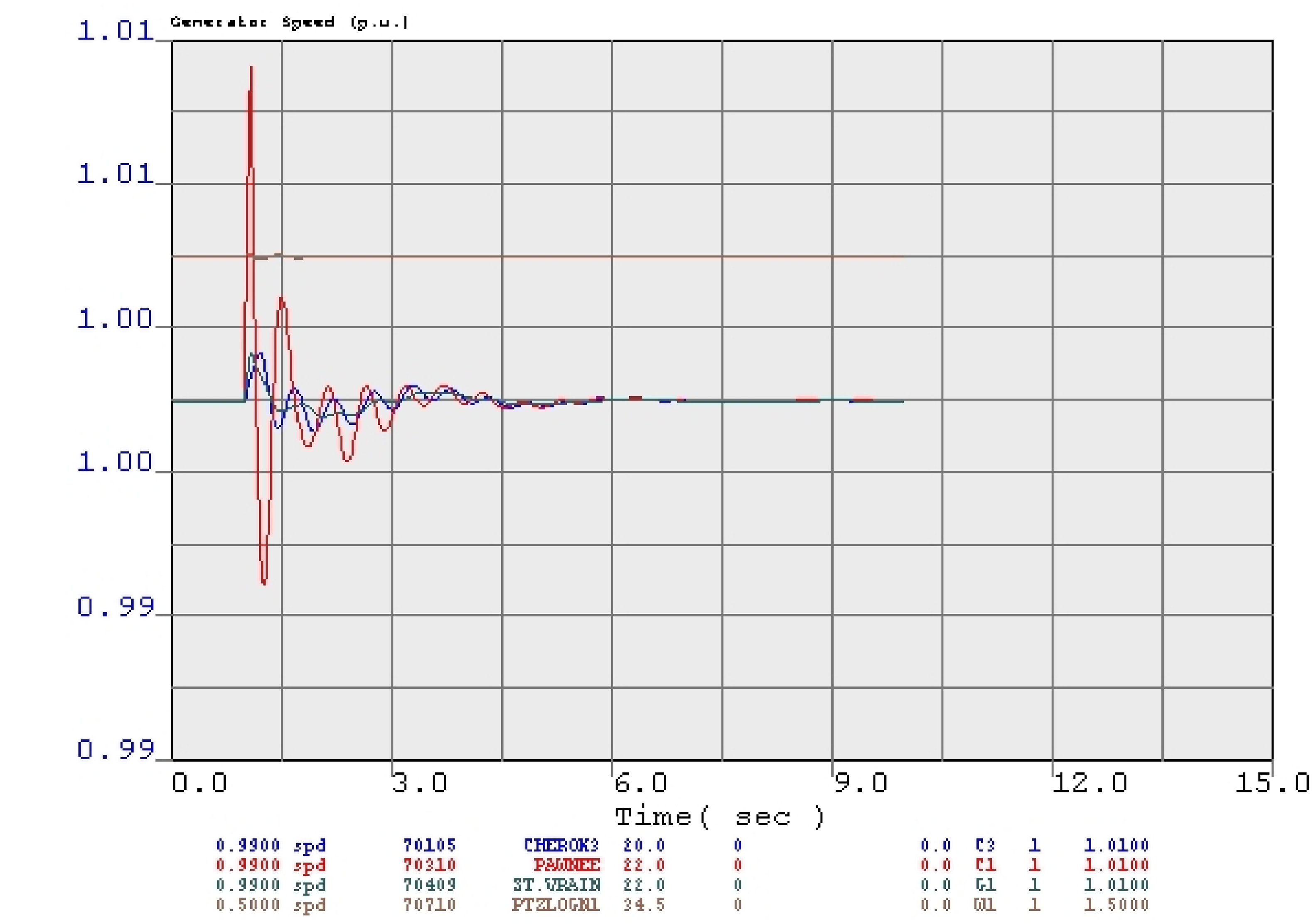


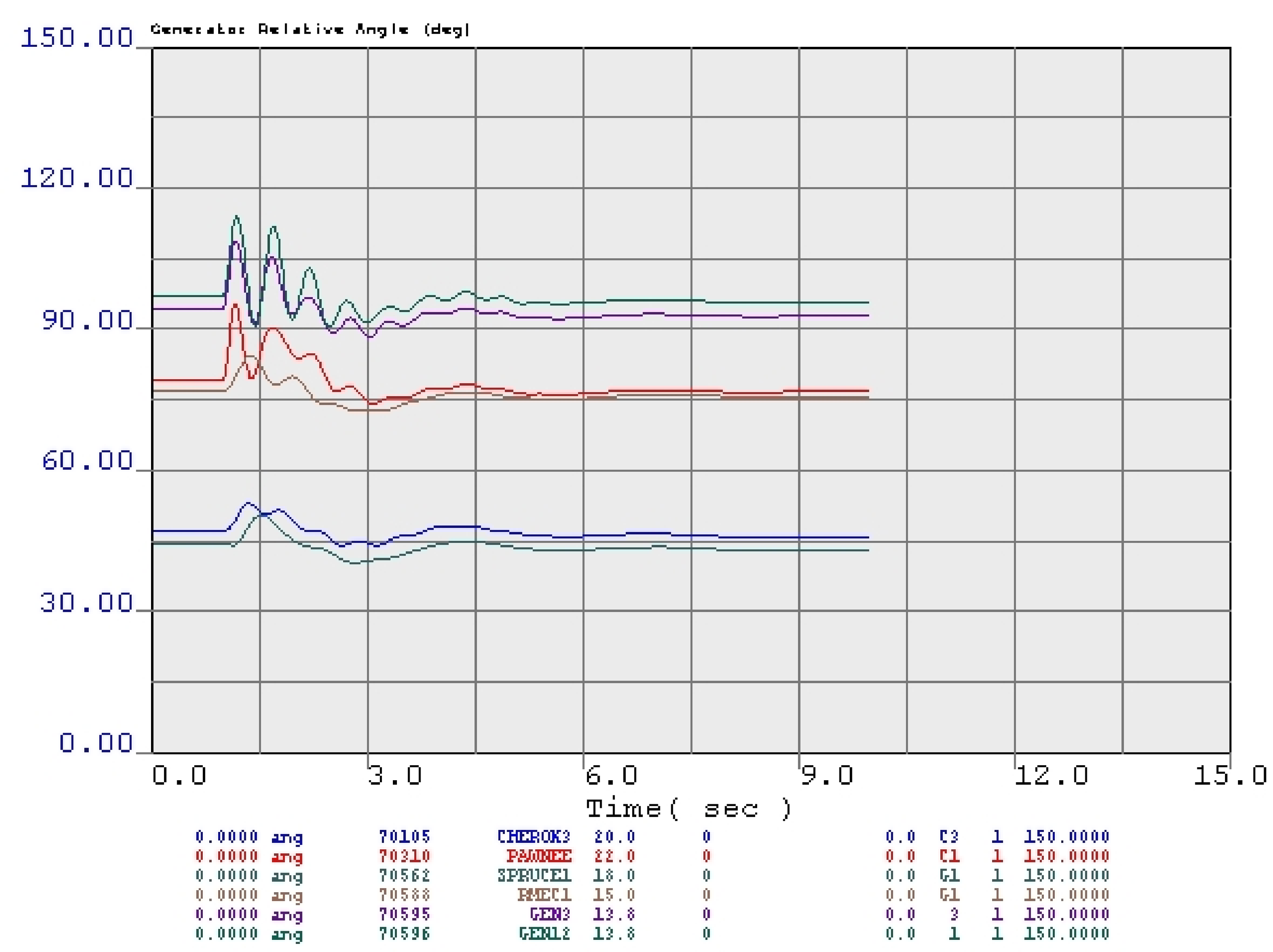
tran_10
tran PAWNEE 230 to PAWNEE 22 ck u1 and u2
NOVEMBER 7, 2013

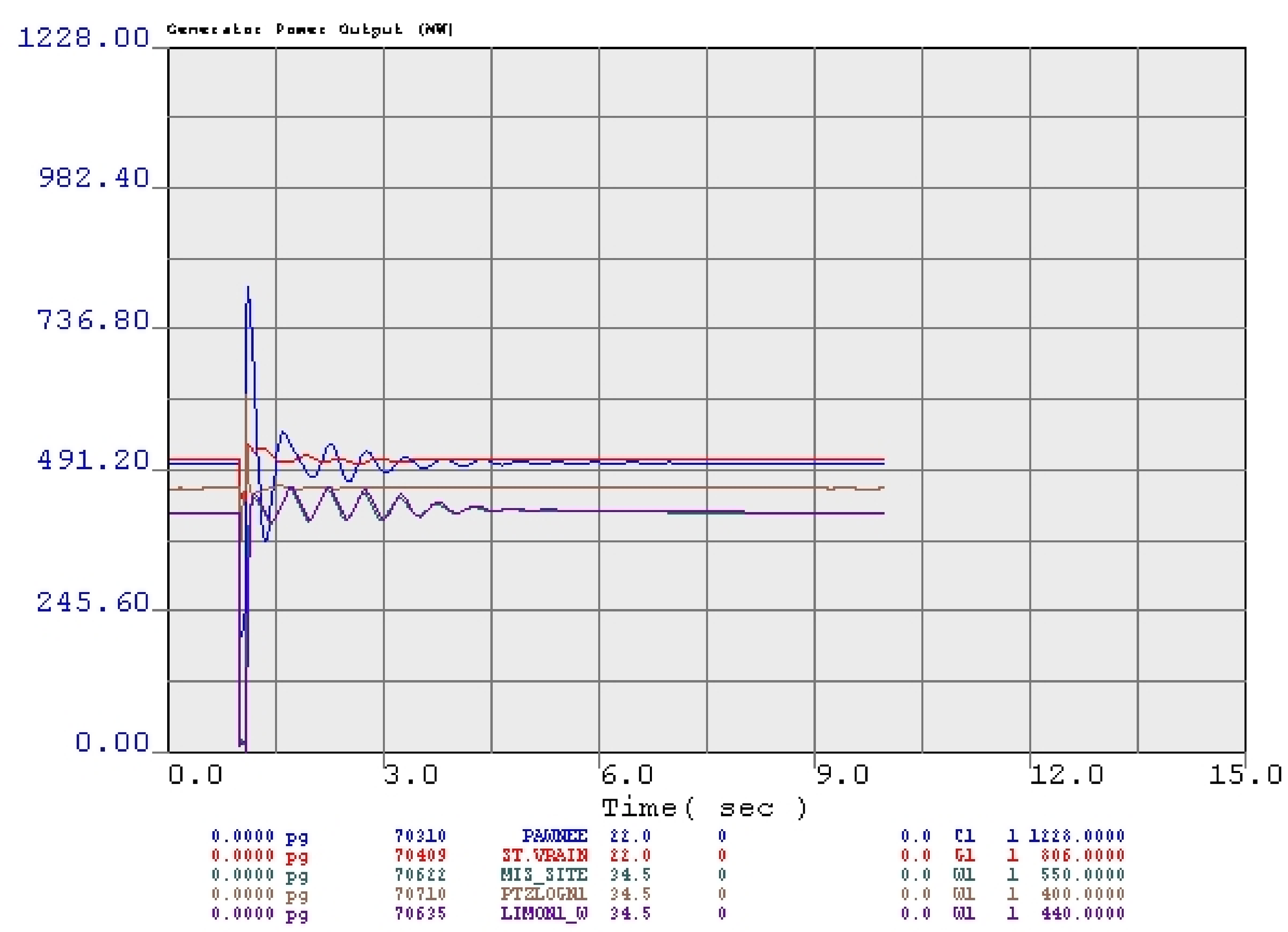




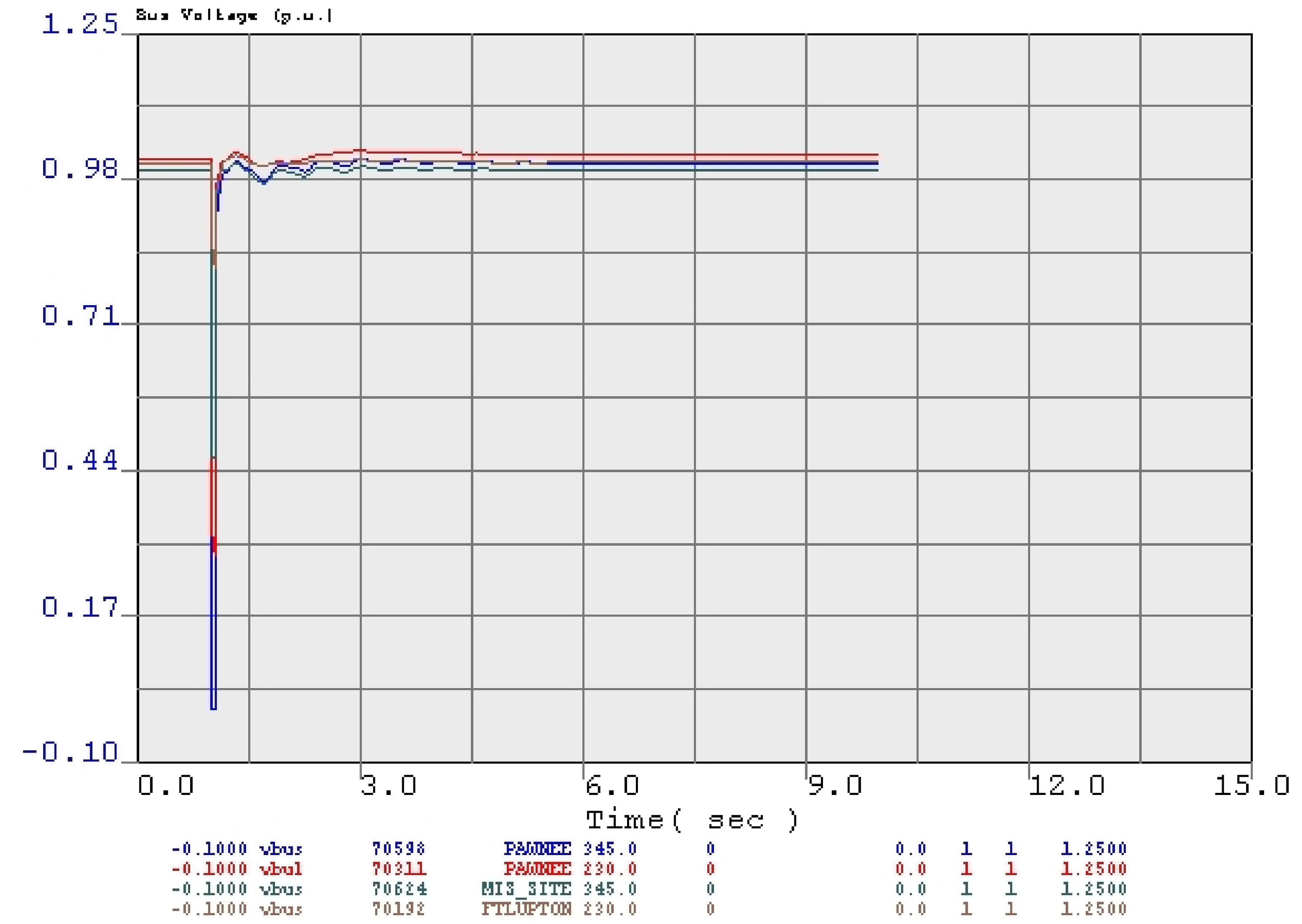


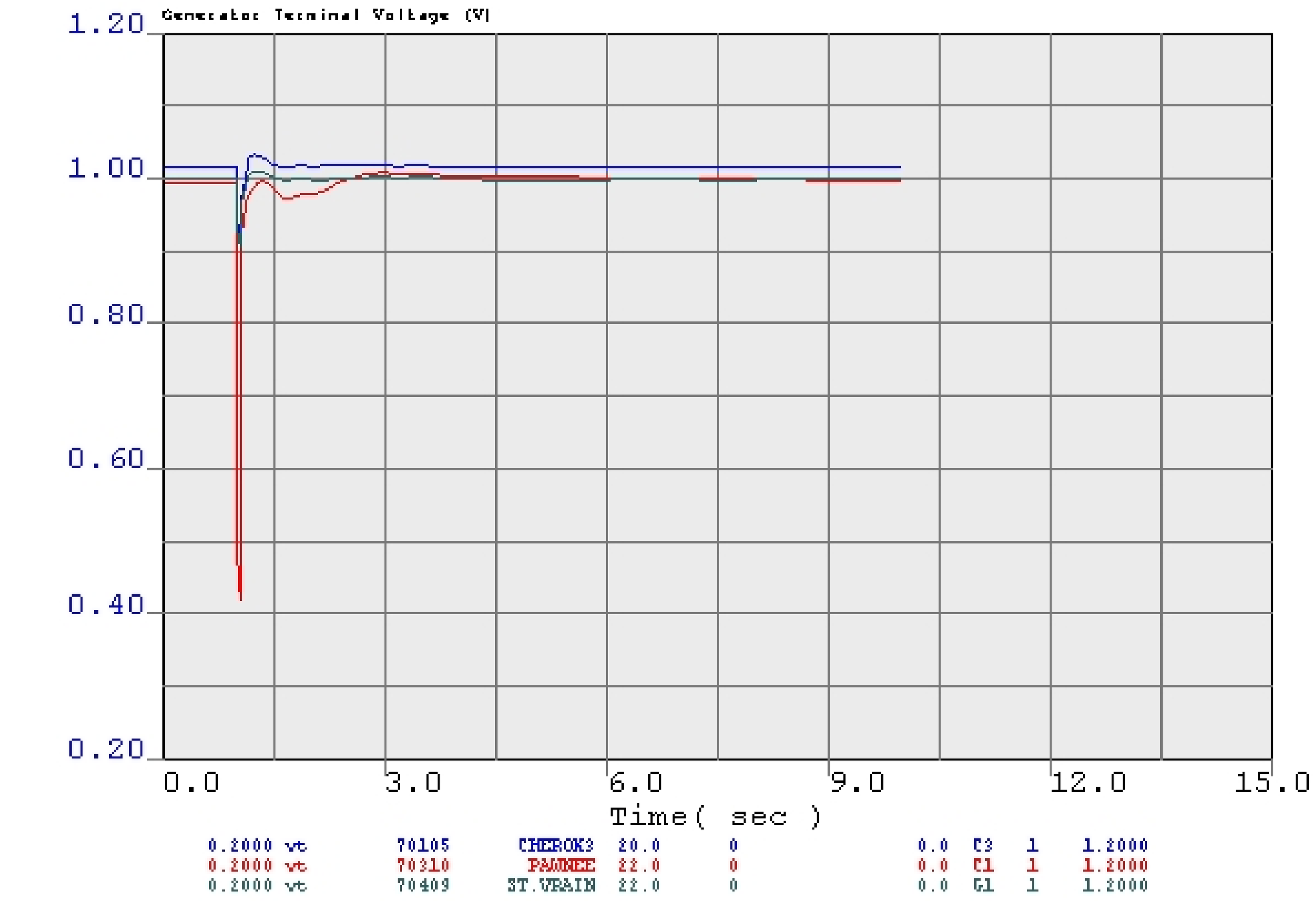


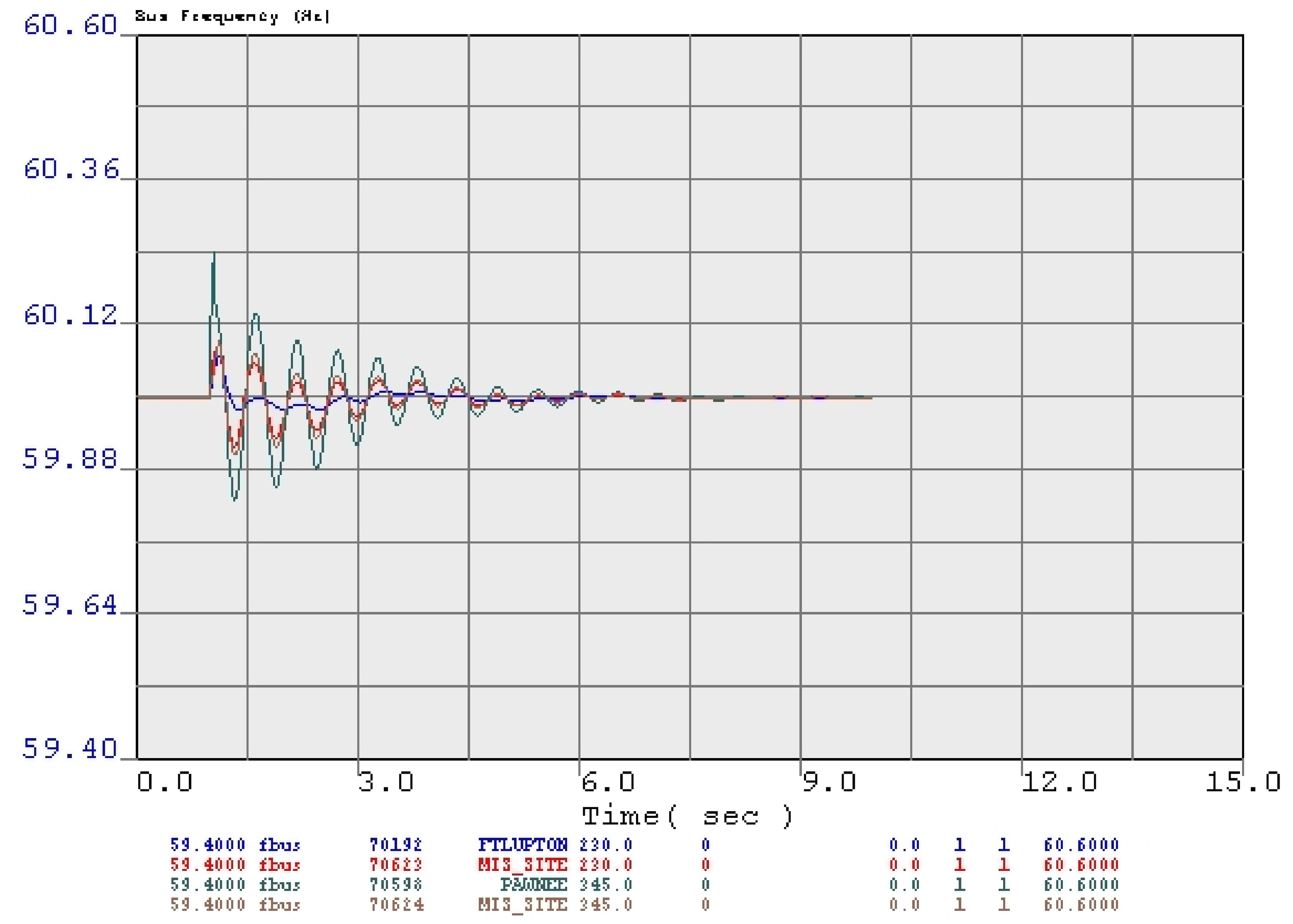


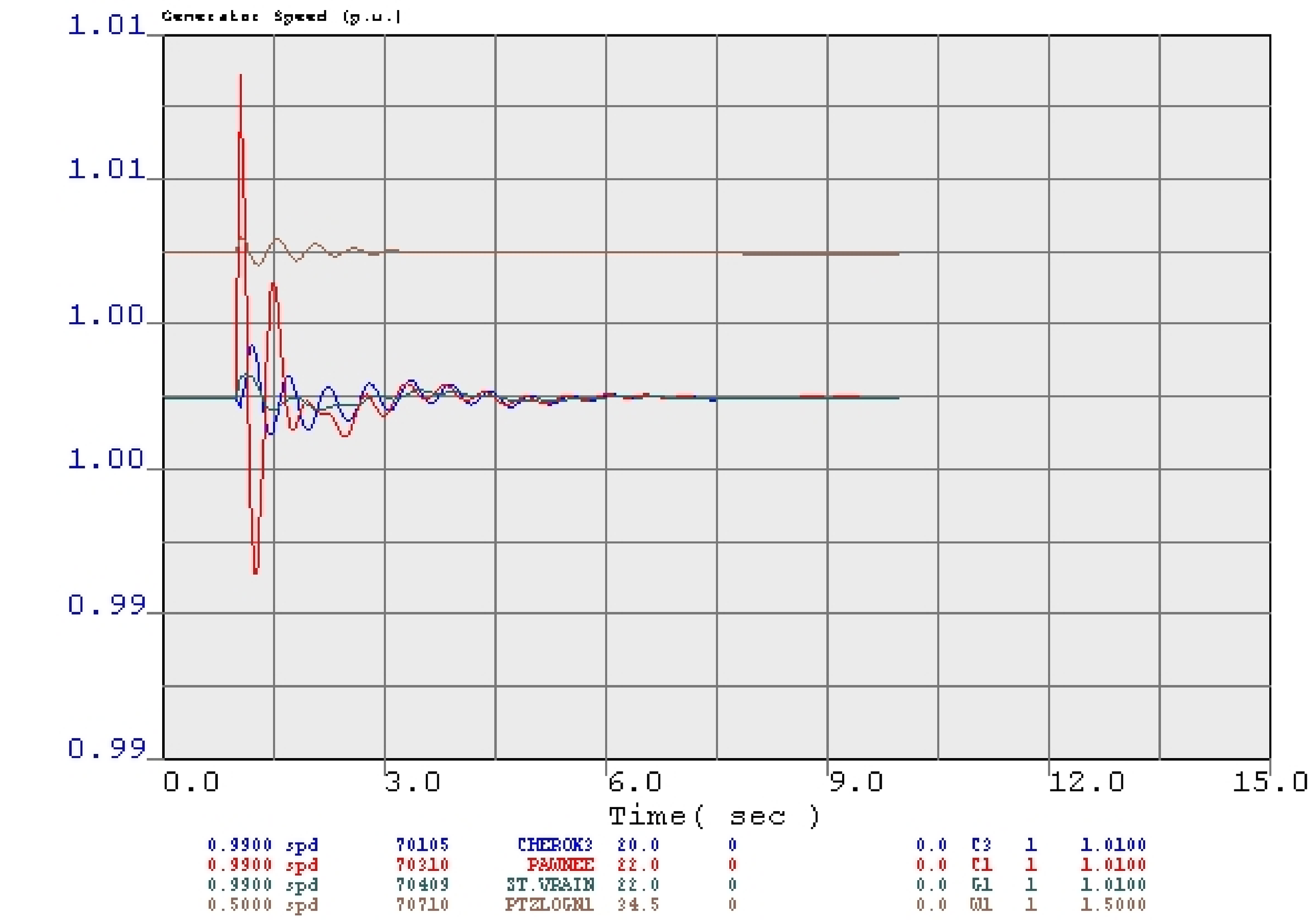


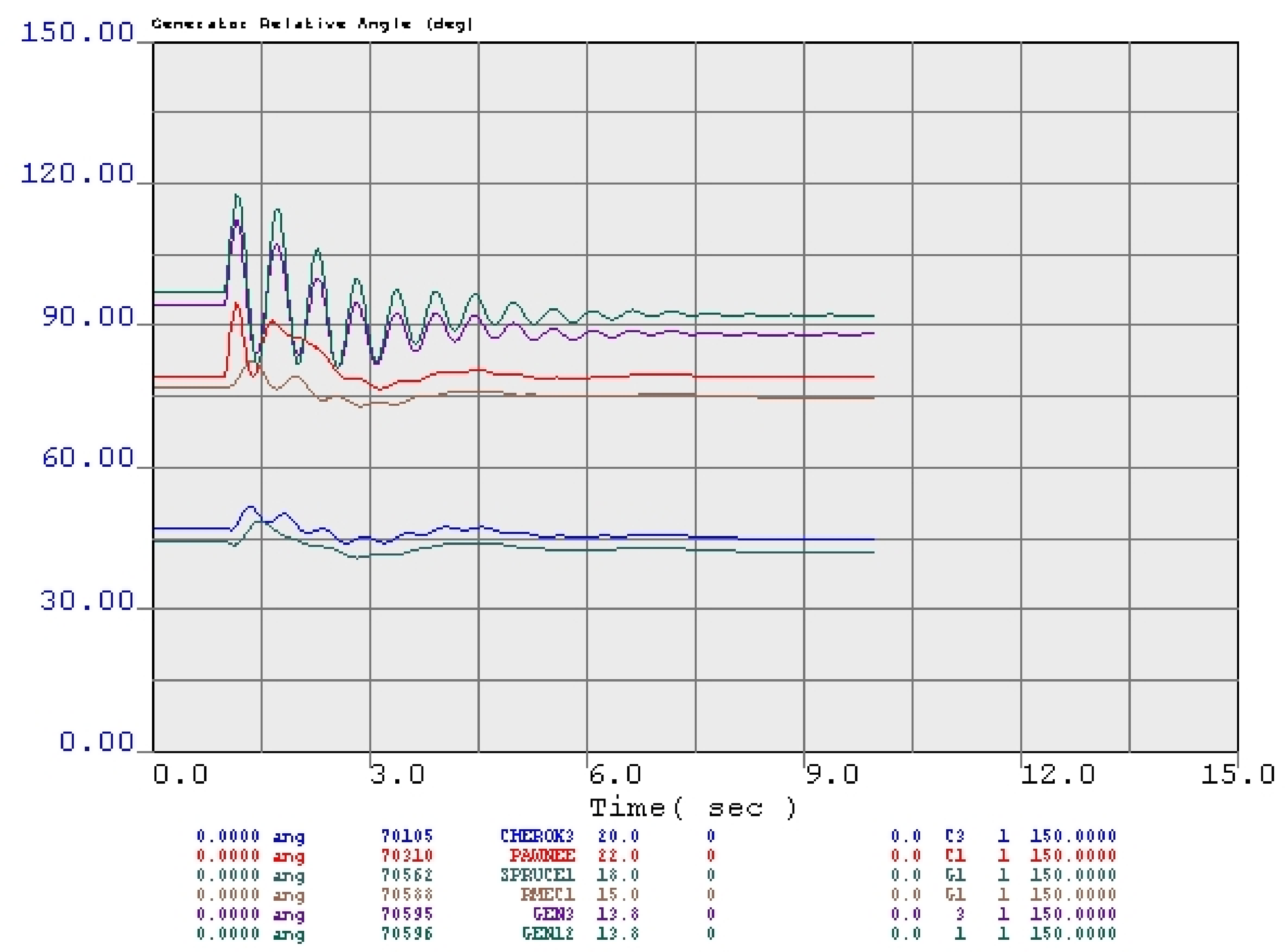
tran_11
tran MIS_SITE 345 to MIS_SITE 230 ck 1
NOVEMBER 7, 2013

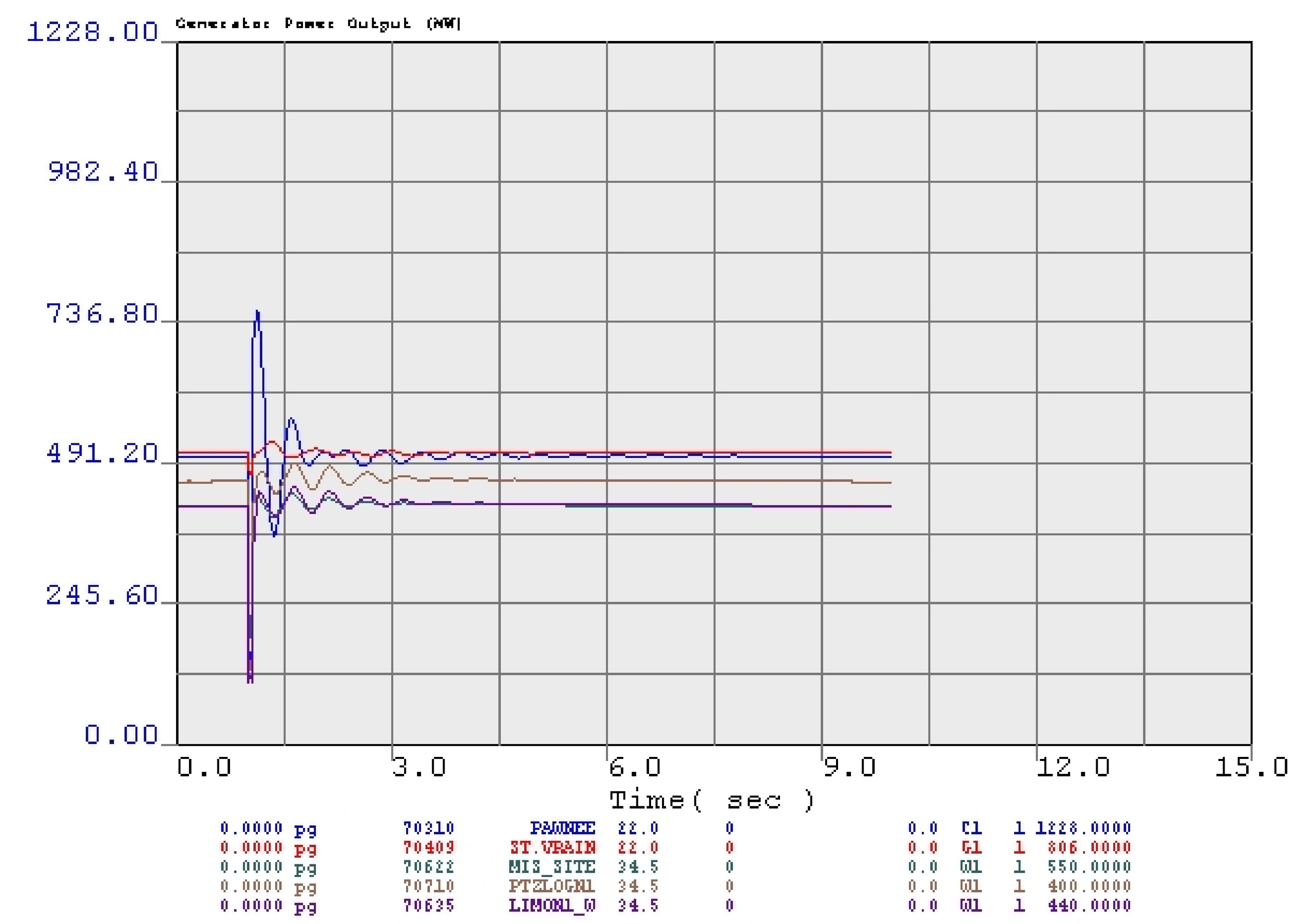












tran_12
tran PAWNEE 345 to PAWNEE 230 ck T1
NOVEMBER 7, 2013

14hs4a_proj_Wind75-tran_12.chf	3\studies\DYTOOLS-HD\plts Fri May 29 08:33:26 2015