Impact Study
For
Generation Interconnection Request
GEN-2007-013

SPP Tariff Studies
(#GEN-2007-013)

August 2008

Summary

Pursuant to the tariff and at the request of Southwest Power Pool (SPP), Black & Veatch performed the following Impact Study to satisfy the Impact Study Agreement executed by the requesting customer and SPP for SPP Generation Interconnection request GEN-2007-013. The request for interconnection was placed with SPP in accordance SPP's Open Access Transmission Tariff, which covers new generation interconnections on SPP's transmission system.

<OMITTED TEXT> (Customer) has requested an Impact Study for the purpose of interconnecting 99 MW of wind generation within the control area of Sunflower Electric Power Corporation in Wichita County, Kansas. The proposed method of interconnection is a new three breaker 115kV substation along the Tribune – GEN-2001-039M wind farm 115kV line. A new 115kV transmission line from Setab - GEN-2001-039M is required for the interconnection of this generation.

Power Factor Requirements

The Customer has requested to study GE 1.5 MW wind turbines and Clipper 2.5 MW wind turbines for this generation interconnection request. Both of these turbine types have capability of +/- 95% lead/lag power factor at the generator terminals. The GE turbines have the ability with the 'wind var' option to react to system conditions to maintain a constant power factor or voltage schedule. The Clipper turbines can only maintain a pre-set power factor at the generator terminals and cannot react to system conditions post fault. An analysis was conducted to determine whether the wind turbines are sufficient to meet the power factor criteria for the wind farm in lieu of the earlier specified 34.5kV capacitors specified in the Feasibility Study.

The new line from GEN-2001-039M to Setab was placed in the model. The interconnection generators were set to hold a voltage schedule at the point of interconnection, the new SUNC 1151kV substation, of 1.0 per unit voltage under system intact conditions and the most stringent contingencies that the wind farm will be subjected. The analysis was conducted for both the summer and winter peak. The results of the analysis are below.

SEASON	CONTINGENCY	PF @POI	PF	MW @POI	Mvars @POI
12SP	NONE	0.985	Lag	96.8	-17
12SP	Tap 07-13 – Tap 01-39M	0.999	Lag	97.0	-3
12SP	Tap 07-13 – Tribune	0.985	Lag	97.3	-17
08WP	NONE	0.985	Lag	96.8	-17
08WP	Tap 07-13 – Tap 01-39M	0.988	Lag	96.9	-15
08WP	Tap 07-13 – Tribune	0.988	Lag	96.9	-15

The analysis determined that the customer will need to be able to provide unity power factor at the point of interconnection for any system configuration. With the new 115kV transmission line in service, additional capacitor banks will not be necessary for the GE or the Clipper turbines.

Interconnection Facilities

The requirements for interconnection of the 99 MW consist of constructing a new 115kV switching station consisting of three 115kV circuit breakers on the existing transmission line from the Tribune to the GEN-2001-039M wind farm. This station will be owned by SUNC. In addition, a new 115kV transmission line from GEN-2001-039M to Setab will be constructed for the interconnection of this interconnection request. This line is needed to avoid voltage collapse for an outage of the existing circuit from GEN-2001-039M to Setab. When this line is outaged, both GEN-2001-039M and GEN-2007-013 wind farm outputs are delivered from the area by the line to Tribune. Higher queued wind farms to the north of Tribune (GEN-2006-034) and to the south of Tribune (GEN-2007-011) cause voltages to be depressed for this outage because of the lack of transmission outlet for the outage. These facilities are shown in Figure 1. The Customer did not propose a specific route of its 115 kV line to serve its 115/34.5 kV collection system facilities. It is assumed that obtaining all necessary right-of-way for construction of the Customer 161 kV transmission line and the 115/34.5 kV collector substation will not be a significant expense.

Low Voltage Ride Through Analysis

Transient stability analysis has indicated that the Clipper wind turbines will meet FERC Order 661A low voltage ride through (LVRT) requirements with the Setab – GEN-2001-039M transmission line in service. For the GE turbines to meet the LVRT requirements, the turbines will need to be purchased with the manufacturer's LVRTII package.

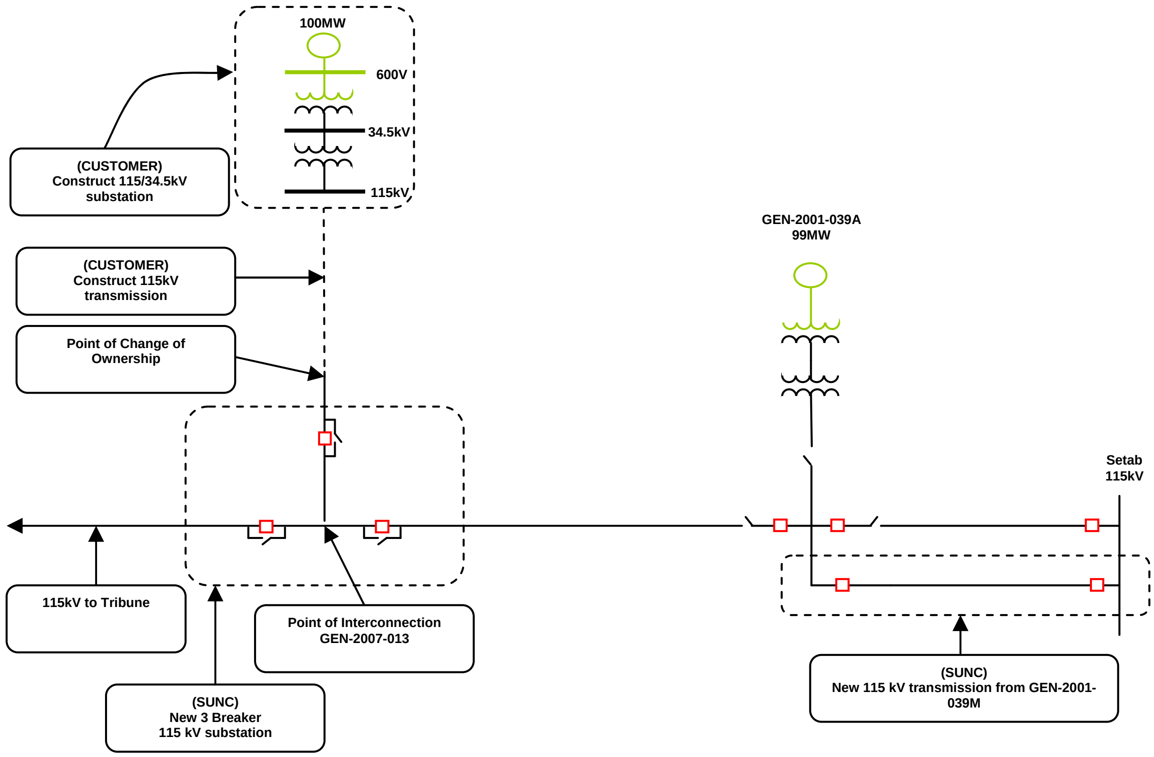

Figure 1: Proposed Method of Interconnection

(Final design to be determined)

Table 1: Interconnection Facilities

FACILITY	ESTIMATED COST (2008 DOLLARS)
CUSTOMER – (1) 115/34.5 kV Customer collector substation facilities.	*
CUSTOMER – (1) 115 kV transmission line from Customer collector substation to the proposed station to be located on the Maryville – Midway 161 kV transmission line.	*
SUNC – 115kV substation consisting of three 115kV circuit breakers and associated facilities	$2,800,000
SUNC – 115kV transmission line from GEN-2001-039M wind farm to Setab (11.25 miles)	$2,180,000
SUNC – Substation work at Setab and GEN-2001-039M	$2,000,000
TOTAL	**$6,980,000**

Voltage Stability Analysis

The Impact Study by Black & Veatch indicated stability issues were encountered for the loss of the Cities Service – Setab 115kV transmission line. These issues are encountered due to the existence of prior queued projects near the GEN-2007-013 wind farm. There is a 99 MW wind farm to the east, GEN-2001-039, which has an executed Interconnection Agreement and is currently under construction. There is an 80MW wind farm to the north, GEN-2006-034, which has a completed Facility Study. There is a 135MW wind farm to the south, GEN-2007-011, which is currently in Facility Study phase.

The transient stability study indicated the GEN-2007-013 wind farm was unstable with the use of Clipper wind turbines and marginally unstable with the use of GE turbines. A voltage stability analysis was also conducted for the winter model to determine the stability margin at the point of interconnection. For this analysis, the winter model only was used. The GE turbines were scaled down to their minimum generation. The outage was taken and the amount of generation studied at GEN-2007-013 was increased. The GE turbines were assumed to have the GE ‘wind var’ option. The prior queued projects were assumed to be operating in power factor control mode.

Voltage Stability analysis indicates that voltage collapse will occur when the GEN-2007-013 generation facility reaches approximately 55MW. This is assuming no stability margin and the existing facilities necessary for 100MW. Therefore, this is not an indication that 55MW is available; it only indicates that 100MW is not available. For the outage of the GEN-2001-039M wind farm voltage collapse appears to occur near Syracuse. At this point loading on the Syracuse – Williamson 115kV line is approximately 155MVA (158% of Rate B) and 128MVA on the GEN-2006-034 – Ruleton 115kV line (130% of Rate B). Therefore, it is not prudent to install reactive compensation to mitigate the voltage collapse issue that would further complicate loading on the line.

The mitigation recommended is to construct a new 115kV line from the GEN-2001-039M wind farm to the SUNC Setab 115kV substation bus. All voltage and dynamic stability issues are resolved with the addition of this new transmission line.

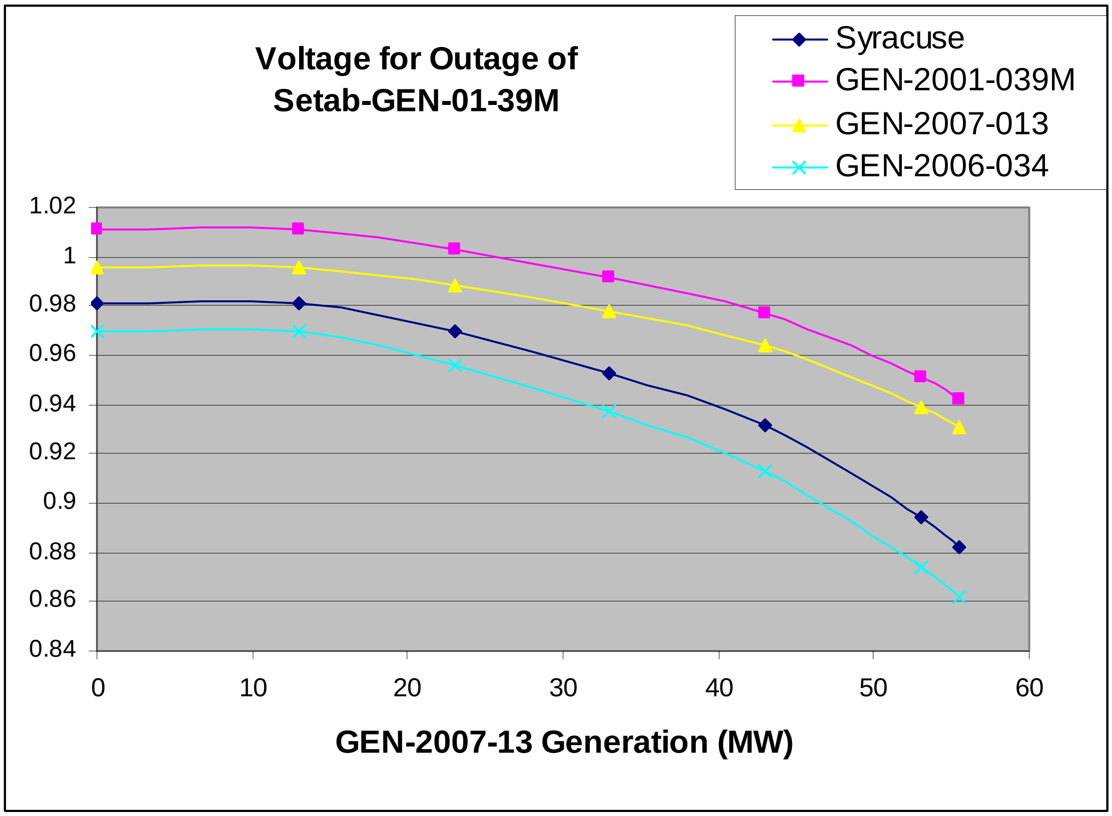

Figure 2. P-V Curve for Outage of the Setab – GEN-2001-039M transmission line

Conclusion

<OMITTED TEXT> (Customer) has requested an Impact Study for the purpose of interconnecting 99 MW of wind generation within the control area of Sunflower Electric Power Corporation in Wichita County, Kansas. The proposed method of interconnection is a new three breaker 115kV substation along the Tribune – GEN-2001-039M wind farm 115kV line. The GEN-2007-013 interconnection request has exhibited stability issues with all previous queued interconnection requests modeled as in service. The mitigation for the stability issues is to construct a 115kV transmission line from the Setab substation to the GEN-2001-039M wind farm substation.

The Customer will be required to purchase the GE or Clipper wind turbines with the low voltage ride through capability for meeting FERC Order 661A. For the GE turbines, this will require the purchase of the manufacturer's LVRTII package.

IMPACT STUDY FOR SPP GENERATION QUEUE POSITION GEN-2007-013

SOUTHWEST POWER POOL (SPP)
July 25, 2008

By

BLACK & VEATCH

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EXECUTIVE SUMMARY

A transient stability study has been performed for Southwest Power Pool (SPP) Interconnection Queue Position GEN-2007-013 as part of the System Impact Study. The Interconnection Queue Position GEN-2007-013 is a wind farm of 100 MW capacity in Wichita County, Kansas. The wind farm is proposed to be interconnected on the 115 kV transmission line between Tribune and Setab. This line is owned by Sunflower Electric Power Corp (SUNC).

Transient Stability studies were conducted with the full output of 100 MW (100%). The Customer has requested to study two turbine options. Option 1 is to use Clipper 2.5 MW wind turbines and Option 2 is to use GE 1.5MW wind turbines.

The 2012 summer load flow case and 2008 winter load flow case together with the SPP SDDWG 2006 stability model were used as the base case for the transient stability analysis. The study was performed using PTI's PSS/E program, which is an industry-wide accepted power system simulation program.

Transient Stability studies were conducted with the GEN-2007-013 output at 100 MW (100%) for two scenarios, i.e., (i) summer load and (ii) winter load. Twenty Six (26) contingencies were considered for each of the scenarios.

The study has indicated that GE 1.5 MW option shall have Low Voltage Ride Through II (LVRT II) package in order for the wind turbines not to trip for close-in system faults.

Both the options exhibited stability issues for faults closer to Setab on Setab – City Service 115 kV line. However with the proposed new 115 kV line between Setab and Gen-2001-09M in service, the wind turbines were found to stay connected for all the contingencies that were studied and also did not exhibit any instability.

If any previously queued projects that were included in this study drop out then this System Impact Study may have to be revised to determine the impacts of this Interconnection Customer's project on transmission facilities.

1. INTRODUCTION

This report discusses the results of a transient stability study performed for Southwest Power Pool (SPP) Interconnection Queue Position GEN-2007-013.

The Interconnection Queue Position GEN-2007-013 is a wind farm of 100 MW capacity in Wichita County, Kansas. The wind farm is proposed to be interconnected on the 115 kV transmission line between Tribune and Setab. This line is owned by Sunflower Electric Power Corp (SUNC). The system one line diagram of the area near the Queue Position GEN-2007-013 is shown in Figure 1.

The Customer has requested to study two turbine options. Option 1 is to use Clipper 2.5 MW Wind Turbine Generator and the Option 2 is to use GE 1.5 MW Wind Turbine Generator. Transient Stability studies were conducted with the full output of 100 MW (100%) for both options.

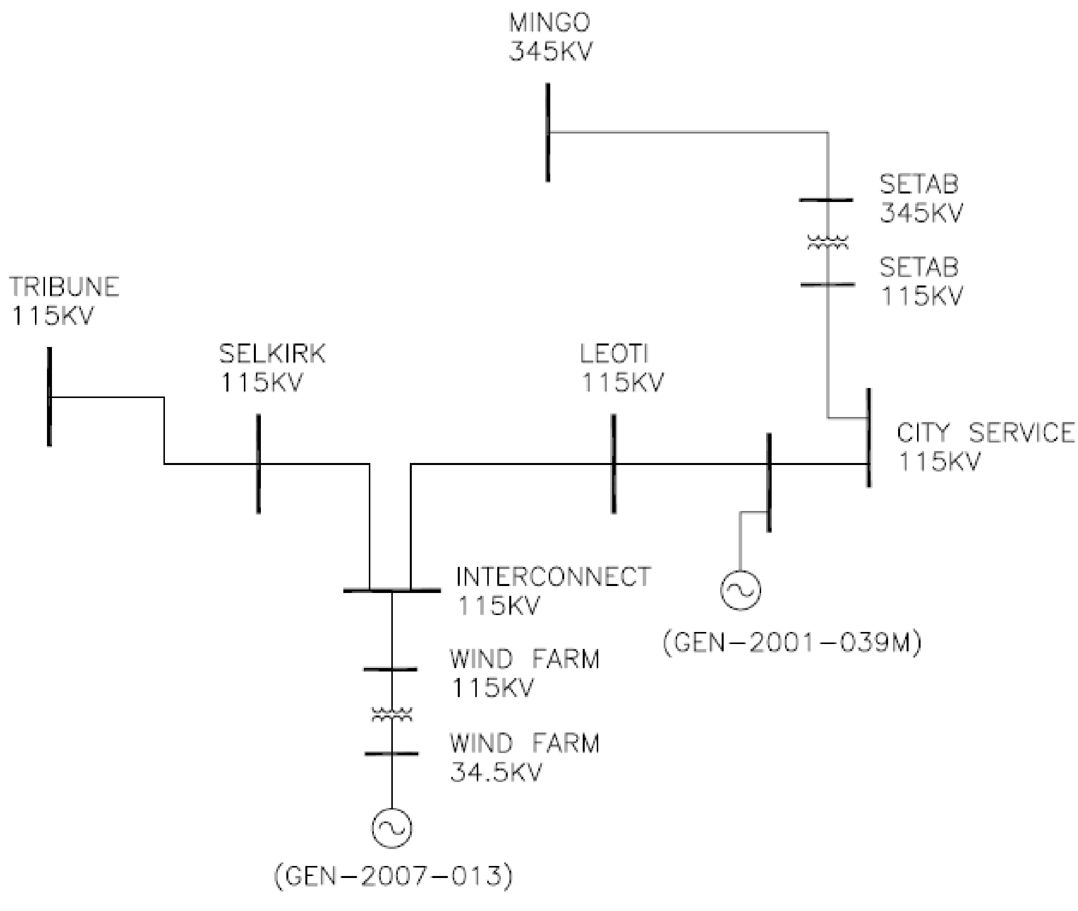

Figure 1: System One Line Diagram near GEN-2007-013

2. STABILITY STUDY CRITERIA

The 2012 summer load flow and 2008 winter load flow cases together with the SPP SDDWG 2006 stability model were used as the base case for the transient stability analysis. These models were provided by SPP.

Using Planning Standards approved by NERC, the following stability definition was applied in the Transient Stability Analysis:

"Power system stability is defined as that condition in which the difference of the angular positions of synchronous machine rotor becomes constant following an aperiodic system disturbance."

Disturbances such as three phase and single phase line faults were simulated for a specified duration and the synchronous machine rotor angles were monitored for their synchronism following the fault removal.

The ability of the wind generators to stay connected to the grid during the disturbances and during the fault recovery was also monitored.

3. SIMULATION CASES

Transient Stability studies were conducted for Option 1 and Option 2 with the GEN-2007-013 output at 100 MW for (i) 2012 summer and (ii) 2008 winter load flow cases.

Table 1 indicates the contingencies that were studied for each of the two cases.

Fault	Fault Definition
FLT13PH	Three phase fault on Wind farm - Leoti 115 kV line, near the Wind farm, with one shot reclosing after 20 cycles.
FLT21PH	Single phase fault on Wind farm - Leoti 115 kV line, near the Wind farm, with one shot reclosing after 20 cycles.
FLT33PH	Three phase fault on Wind farm - Selkirk 115 kV line, near the Wind farm, with one shot reclosing after 20 cycles.
FLT41PH	Single phase fault on Wind farm - Selkirk 115 kV line, near the Wind farm, with one shot reclosing after 20 cycles.
FLT53PH	Three phase fault on Syracuse- Tribune 115 kV line, near Syracuse, with one shot reclosing after 20 cycles.
FLT61PH	Single phase fault on Syracuse- Tribune 115 kV line, near Syracuse, with one shot reclosing after 20 cycles.
FLT73PH	Three phase fault on the Syracuse- Williams 115 kV line, near Syracuse, with one shot reclosing after 20 cycles.
FLT81PH	Single phase fault on the Syracuse- Williams 115 kV line, near Syracuse, with one shot reclosing after 20 cycles.

FLT93PH	Three phase fault on the Syracuse- Bear Creek 115 kV line, near Syracuse, with one shot reclosing after 20 cycles.
FLT101PH	Single phase fault on the Syracuse- Bear Creek 115 kV line, near Syracuse, with one shot reclosing after 20 cycles.
FLT113PH	Three phase fault on G06-34 Sub to Kanardo 115 kV line, near Kanardo, with one shot reclosing after 20 cycles.
FLT121PH	Single phase fault on G06-34 Sub to Kanardo 115 kV line, near Kanardo, with one shot reclosing after 20 cycles.
FLT133PH	Three phase fault on the Setab - City Service 115 kV line, near Setab, with one shot reclosing after 20 cycles.
FLT141PH	Single phase fault on the Setab - City Service 115 kV line, near Setab, with one shot reclosing after 20 cycles.
FLT153PH	Three phase fault on the Williams - Fletcher 115 kV line, near Fletcher, with one shot reclosing after 20 cycles.
FLT161PH	Single phase fault on the Williams - Fletcher 115 kV line, near Fletcher, with one shot reclosing after 20 cycles.
FLT173PH	Three phase fault on the 345kV side of Setab Autotransformer.
FLT181PH	Single phase fault on the 345kV side of Setab Autotransformer.
FLT193PH	Three phase fault on the 345kV side of Mingo Autotransformer.
FLT201PH	Single phase fault on the 345kV side of Mingo Autotransformer.
FLT213PH	Three phase fault on the Mingo - Setab 345 kV line, near Setab, with no reclose.
FLT221PH	Single phase fault on the Mingo - Setab 345 kV line, near Setab, with no reclose.
FLT233PH	Three phase fault on the Atwood Switch - Hemdon 115 kV line, near Atwood Switch, with one shot reclosing after 20 cycles.
FLT241PH	Single phase fault on the Atwood Switch - Hemdon 115 kV line, near Atwood Switch, with one shot reclosing after 20 cycles.
FLT253PH	Three phase fault on the Setab – Scot City 115 kV line, near Setab, with one shot reclosing after 20 cycles.
FLT261PH	Single phase fault on the Setab – Scot City 115 kV line, near Setab, with one shot reclosing after 20 cycles.

Table 1: Study Cases

In all of the simulations, the fault duration was considered to be 5 cycles.

4. SIMULATION MODEL - CLIPPER WIND TURBINES

Clipper turbines have four separate output shafts, each feeding a 650 kW permanent magnet synchronous generator. The following is the main electrical parameter of the Clipper 2.5 MW wind turbine:

Rated Power : 2.5 MW

The models of the Wind Farm such as generators, transformers and cables were added to the base cases for the purpose of this study. The equivalent generators of the wind farm were based on the number of collector circuits shown on the Customer provided single line diagram. Figure 2 shows the one line diagram of GEN-2007-013 collector system that was modeled for Clipper Wind Turbine option. The PSS/E models for the Clipper wind turbines were provided by the Customer.

Table 2 provides the number of Clipper 2.5 MW wind generators that were modeled as equivalents at each collector buses of the wind farm.

Collector Bus	No. of generators aggregated
GEN1_3	1
GEN1_4	1
GEN1_5-10	6
GEN1_1-2	2
GEN2_11-20	10
GEN3_21-30	10
GEN4_31-40	10

Table 2: Equivalent Generators with Clipper 2.5 MW Turbines

The Customer also provided the following substation transformer’s impedance:

Wind Plant Substation Transformer Impedance: 8.0 % at 66 MVA
Generator step-up Transformer Impedance: 5.75 % at 2.75 MVA

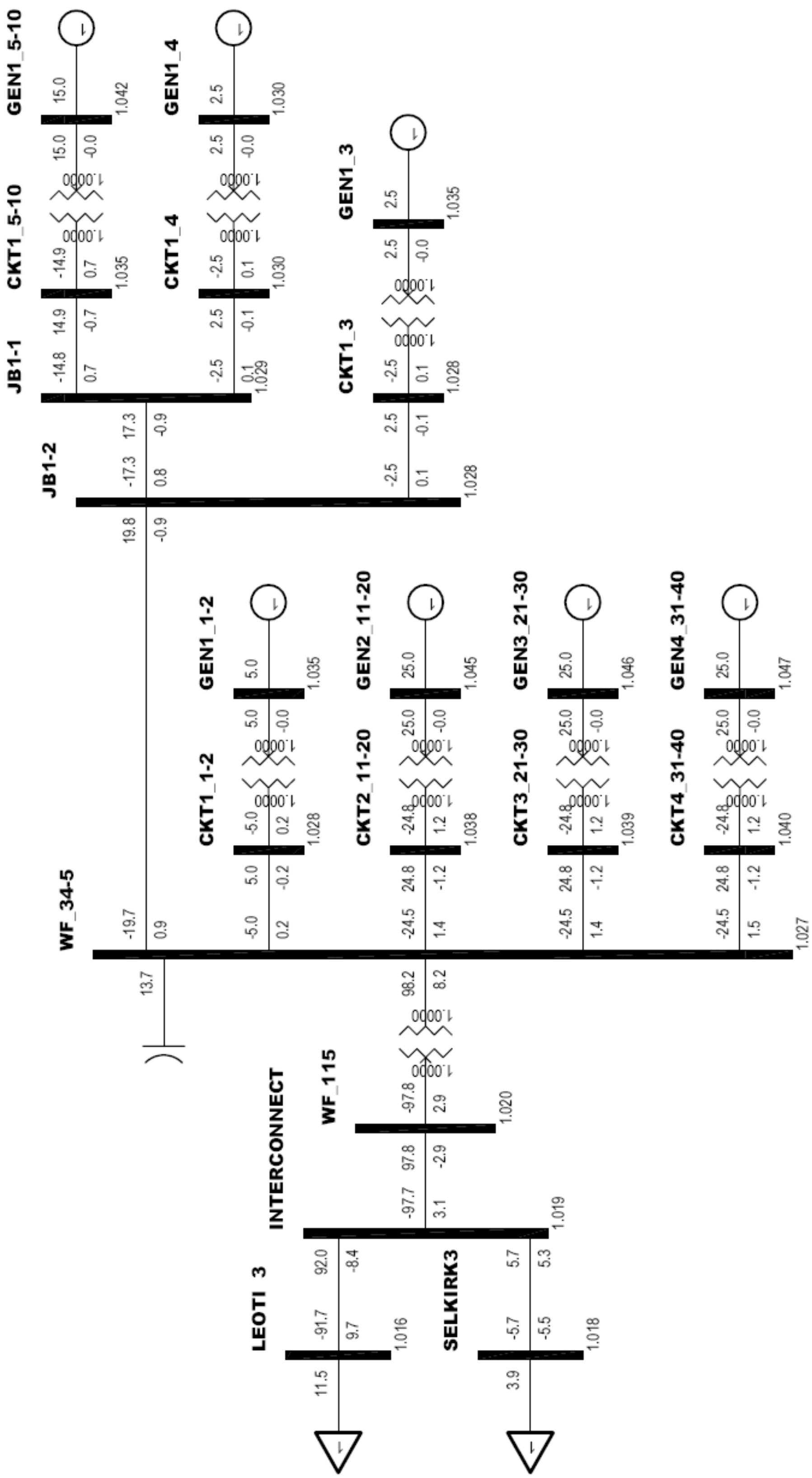

Figure 2: Collector System Model for Clipper Option

Standard protection settings, as provided in the Clipper PSS/E model, were used in the study and they are shown in Figure 3.

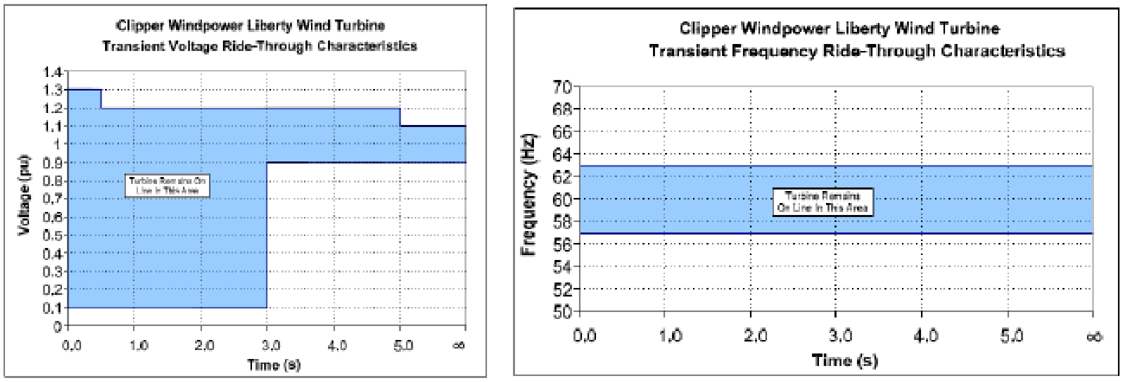

Figure 3: Protective Voltage and Frequency Settings for Clipper 2.5 MW Turbines.

5. SIMULATION MODEL - GE WIND TURBINES

Customer requested to use GE Wind turbine with low voltage ride through (LVRT) option for the System Impact Study. The GE turbines are a three phase double fed induction generator. The following are the main electrical parameters of the GE 1.5 MW wind turbine.

Rated Power : 1.5 MW
Apparent Power : 1,670 kVA
Maximum Reactive Power Output : 490 kVAR
Maximum Reactive Power Consumption : 730 kVAR

The models of the Wind Farm equipment such as generators, transformers and cables were added to the base case for the purpose of this study. The equivalent generators of the wind farm were based on the number of collector circuits shown on the Customer provided single line diagram. Figure 4 shows the one line diagram of GEN-2007-013 collector system using GE 1.5 MW wind turbines.

Table 3 provides the number of GE 1.5 MW wind generators modeled as equivalents at each collector buses of the wind farm.

Collector Bus	No. of generators aggregated
CKT1_3	1
CKT1_53-61	9
CKT1_62-66	5

CKT1-4	1
CKT2_36-49	14
CKT2_50-52	3
CKT3_19-24	6
CKT3-18	1
CKT3_11-10	2
CKT3_5-9	5
CKT3_1-2	2
CKT4_12-17	6
CKT4_25-35	11

Table 3: Equivalent Generators with G.E -1.5 MW Turbines

The Customer also provided the following substation transformer's impedance:

Transformer Impedance: 8.0 % at 100 MVA

The wind farm was modeled using the GE wind turbine model available in PSS/E. The effects of rotor current control and the turbine pitch control were also modeled. The generator data used in the study is as noted in Table 4.

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

Table 4: GE 1.5 MW Wind Turbine Generator Parameters

Standard protection settings, as provided in the GE 1.5 MW Wind Turbine model, were used in the study and they are shown in Table 5.

Protective Function	**LVRT I**		**LVRT II**	
	Protection Setting	**Time Delay (seconds)**	**Protection Setting**	**Time Delay (Seconds)**
Over Frequency	61.5 Hz	30	61.5 Hz	30
Over Frequency	62.5 Hz	0.02	62.5 Hz	0.02
Under Frequency	56.5 Hz	0.02	56.5 Hz	0.02
Under Frequency	57.5 Hz	10.0	57.5 Hz	10.0
Under Voltage	30%	0.02	15%	0.625
Under Voltage	70%	0.1	70%	0.625
Under Voltage	75%	1.0	75%	1.0
Under Voltage	85%	10.0	85%	10.0
Over Voltage	110%	1.0	110%	1.0
Over Voltage	115%	0.1	115%	0.1
Over Voltage	130%	0.02	130%	0.02

Table 5: Protective Functions and Settings for GE 1.5 MW Turbines, for LVRT I & LVRT II

6. SYSTEM MODELING

The Customer provided the wind turbine feeder conductor types, lengths and impedance values. Table 6 indicates the transmission line parameters, as provided by the Customer, were used in the model for the underground lines within the Wind Farm:

Conductor Size	**Resistance (Ohms/1000 ft)**	**Reactance (Ohms/1000 ft)**	**Capacitance (MicroF/1000 ft)**
1/0	0.2120	0.0550	0.0370
4/0	0.1070	0.0490	0.0450
500 kcmil	0.047	0.0420	0.0600
1000 kcmil	0.0280	0.0370	0.0770

Table 6: Cable impedance per 1000 feet

The prior queued projects GEN-2001-039M (99MW), GEN-2006-034(84MW), GEN-2006-040 (108MW), GEN-2006-032 (200MW), GEN-2003-013 (196MW), GEN-2006-049 (400MW), Sunflower prior queued project (600MW) and GEN-2007-011 (135MW) were also included in the study model.

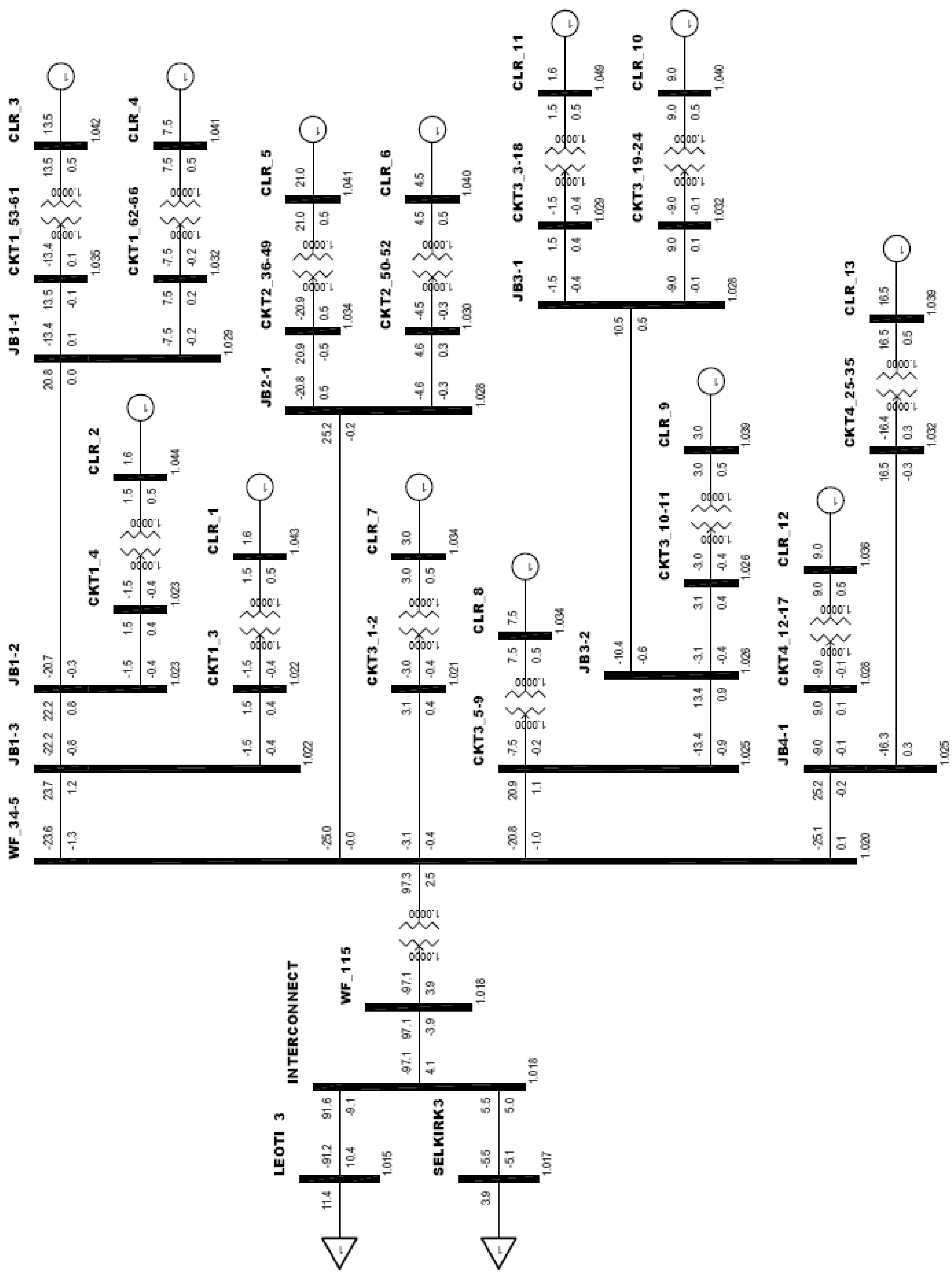

Figure 4: 100% Power Flow Base Case for GEN-2007-013 with GE WTG

7. STUDY ASSUMPTIONS

The following assumptions were made in the study:

1. The wind speed over the entire wind farm was assumed to be uniform and constant during the study period.
2. The other generators in the SPP control area were scaled down to accommodate the new generation as indicated in Table 7.

Scenario	**Generation within SPP**	
	Summer	**Winter**
Without the Wind Farms	41671	28932
GEN-2007-013 at 100% output with the prior queued projects	41771	29032

Table 7: SPP Dispatches

8. SIMULATION RESULTS

Initial simulation was carried out without any disturbance to verify the numerical stability of the model and was confirmed to be stable. Table 8 provides the summary of the study results for the contingencies that were studied.

Fault Number	**CLIPPER 2.5 MW**		**GE 1.5 MW**	
	Summer Load	**Winter Load**	**Summer Load**	**Winter Load**
FLT13PH	--	- -	UV	UV
FLT21PH	- -	- -	- -	- -
FLT33PH	- -	- -	UV	UV
FLT41PH	- -	- -	- -	- -
FLT53PH	- -	- -	- -	- -
FLT61PH	- -	- -	- -	- -
FLT73PH	- -	- -	- -	- -
FLT81PH	- -	- -	- -	- -
FLT93PH	- -	- -	- -	- -
FLT101PH	- -	- -	- -	- -
FLT113PH	- -	- -	- -	- -
FLT121PH	- -	- -	- -	- -
FLT133PH	T, PQ	T, PQ	PT	PT
FLT141PH	T, PQ	S	PT	PT

FLT153PH	- -	- -	- -	- -
FLT161PH	- -	- -	- -	- -
FLT173PH	- -	- -	- -	- -
FLT181PH	- -	- -	- -	- -
FLT193PH	- -	- -	- -	- -
FLT201PH	- -	- -	- -	- -
FLT213PH	- -	- -	- -	- -
FLT221PH	- -	- -	- -	- -
FLT233PH	- -	- -	- -	- -
FLT241PH	- -	- -	- -	- -
FLT253PH	- -	- -	- -	- -
FLT261PH	- -	- -	- -	- -

T : Gen-2007-013 tripped due to angle deviation
UV : Gen-2007-013 tripped due to under voltage with LVRT I option
PT : Post-Transient voltage issues encountered
S : Stability issues encountered
PQ : Prior queued project tripped
- - : Wind Farm did not trip

Table 8: Stability Study Results Summary

Clipper 2.5 MW

In the case of Clipper 2.5 MW option, the wind turbines were found to be tripped for faults on Setab – City Service 115 kV line due to out of step conditions. Gen-2007-013 machines were found to stay connected for the other contingencies that were studied.

GE 1.5 MW

GE 1.5 MW wind turbines were found to be tripped on under voltage even with the Low Voltage Ride Through I (LVRT I) option for three phase faults closer to the wind farm substation. However, the wind turbines were found to stay connected with Low Voltage Ride Through II (LVRT II) option, which has more tolerance towards under voltage.

Post-transient voltage oscillations and low voltages were observed on the 115 kV system for faults on Setab – City Service 115 kV line, which are not desirable.

Proposed 115 kV Line to Setab

A new 115 kV transmission line between Setab and Gen-2001-039M has been proposed. Transient stability studies were repeated by considering this new line in place. The stability and post-transient issues that were observed for faults closer to Setab were found to be mitigated. The Clipper machines that previously tripped were also found to stay connected.

Figure 5 shows the system response for FLT133PH with Clipper machines and Figure 6 shows the system response for the same fault, but with the proposed new line in place.

Similarly, Figure 7 and 8 show the system response for GE wind turbine option with and without the new line respectively.

7. SUMMARY

A transient stability analysis was conducted for the SPP Interconnection Generation Queue Position GEN-2007-013. Two different types of wind turbines, i.e, Clipper 2.5 MW and GE 1.5 MW, were considered in the study. The study was conducted for two different power flow scenarios, i.e., one for summer peak and one for winter peak.

The study has indicated that GE 1.5 MW option shall have Low Voltage Ride Through II (LVRT II) package in order for the wind turbines not to trip for close-in system faults.

Both the options exhibited stability issues for faults closer to Setab on Setab – City Service 115 kV line. However with the proposed new 115 kV line between Setab and Gen-2001-09M in service, the wind turbines were found to stay connected for all the contingencies that were studied and also did not exhibit any instability.

Disclaimer

If any previously queued projects that were included in this study drop out, then this System Impact Study may have to be revised to determine the impacts of this Interconnection Customer’s project on SPS transmission facilities. Since this is also a preliminary System Impact Study, not all previously queued projects were assumed to be in service in this System Impact Study. If any of those projects are constructed, then this System Impact Study may have to be revised to determine the impacts of this Interconnection Customer’s project on transmission facilities. In accordance with FERC and SPP procedures, the study cost for restudy shall be borne by the Interconnection Customer.

Figure 5: System Responses for Clipper 2.5 MW option, FLT133PH

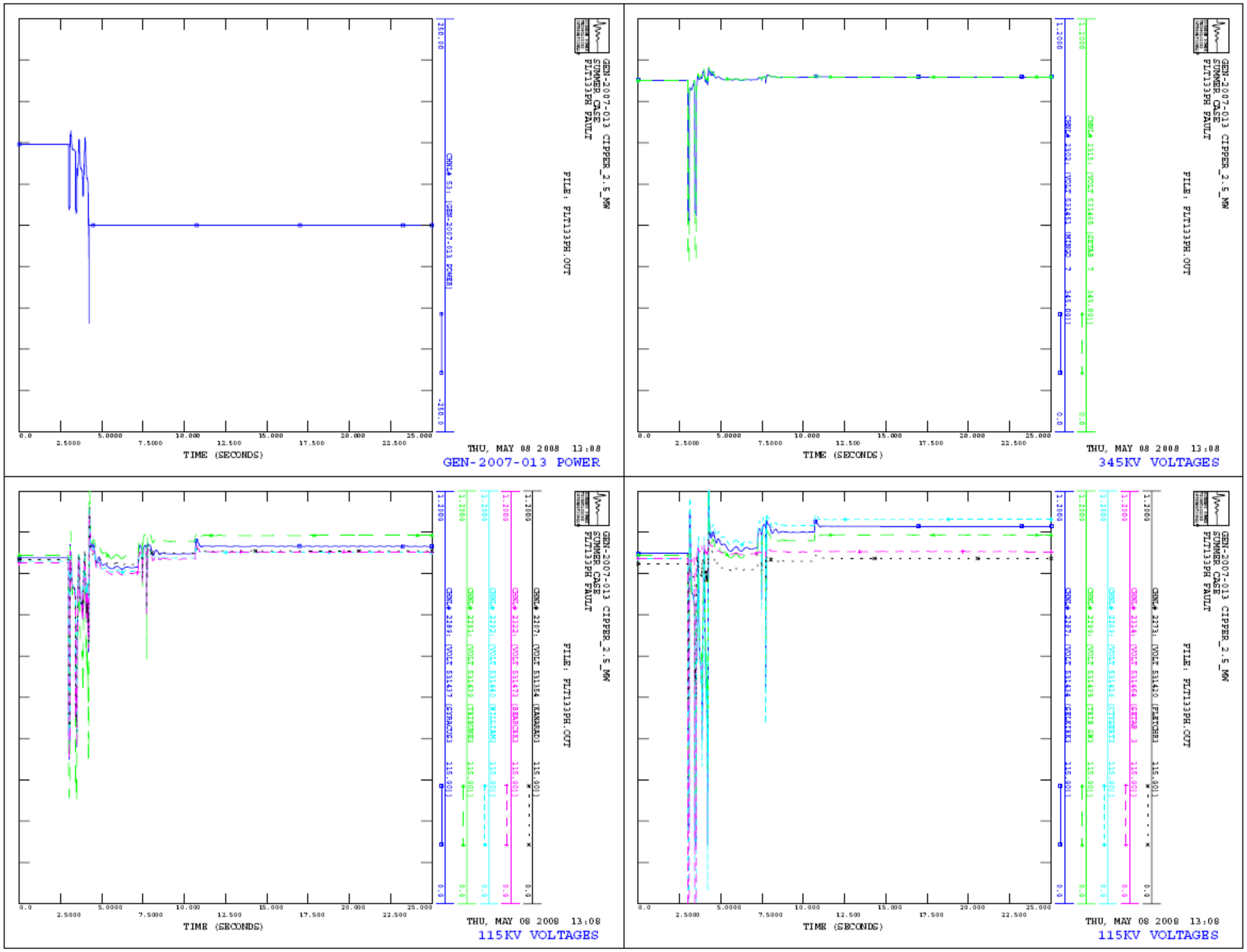

Figure 5: System Responses for Clipper 2.5 MW option, FLT133PH (cont'd)

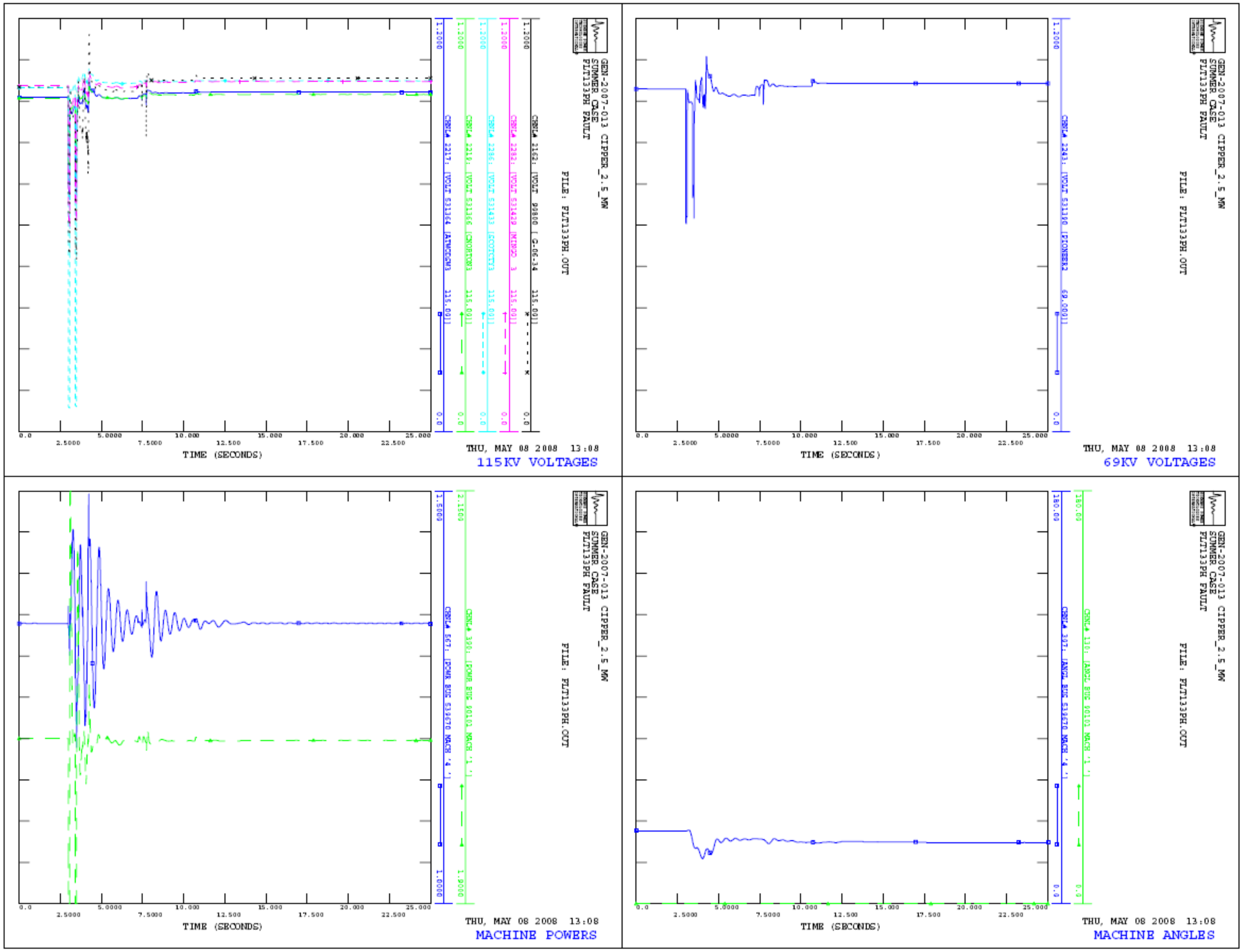

Figure 5: System Responses for Clipper 2.5 MW option, FLT133PH (cont'd)

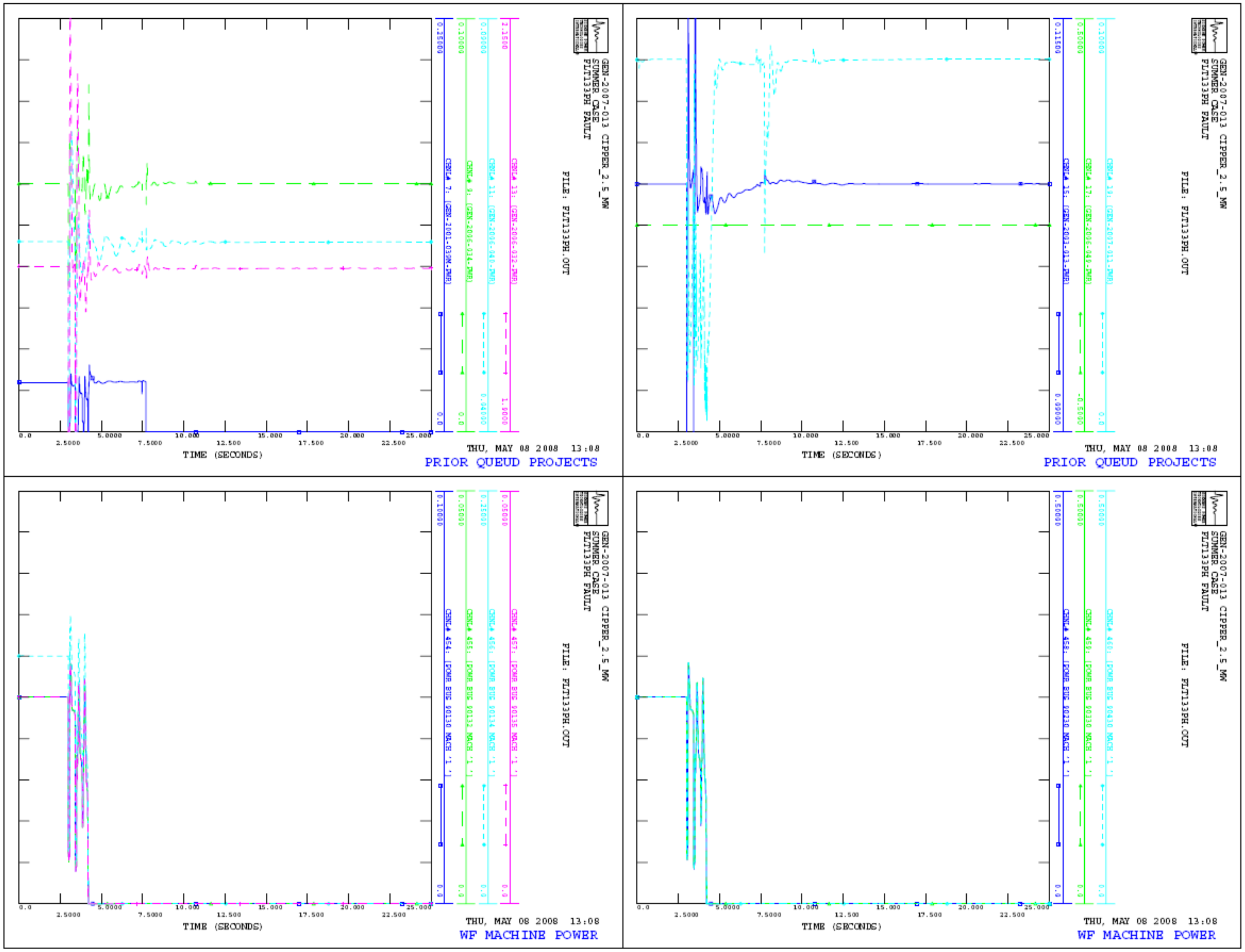

Figure 6: System Responses for Clipper 2.5 MW option, with the new line in, FLT133PH

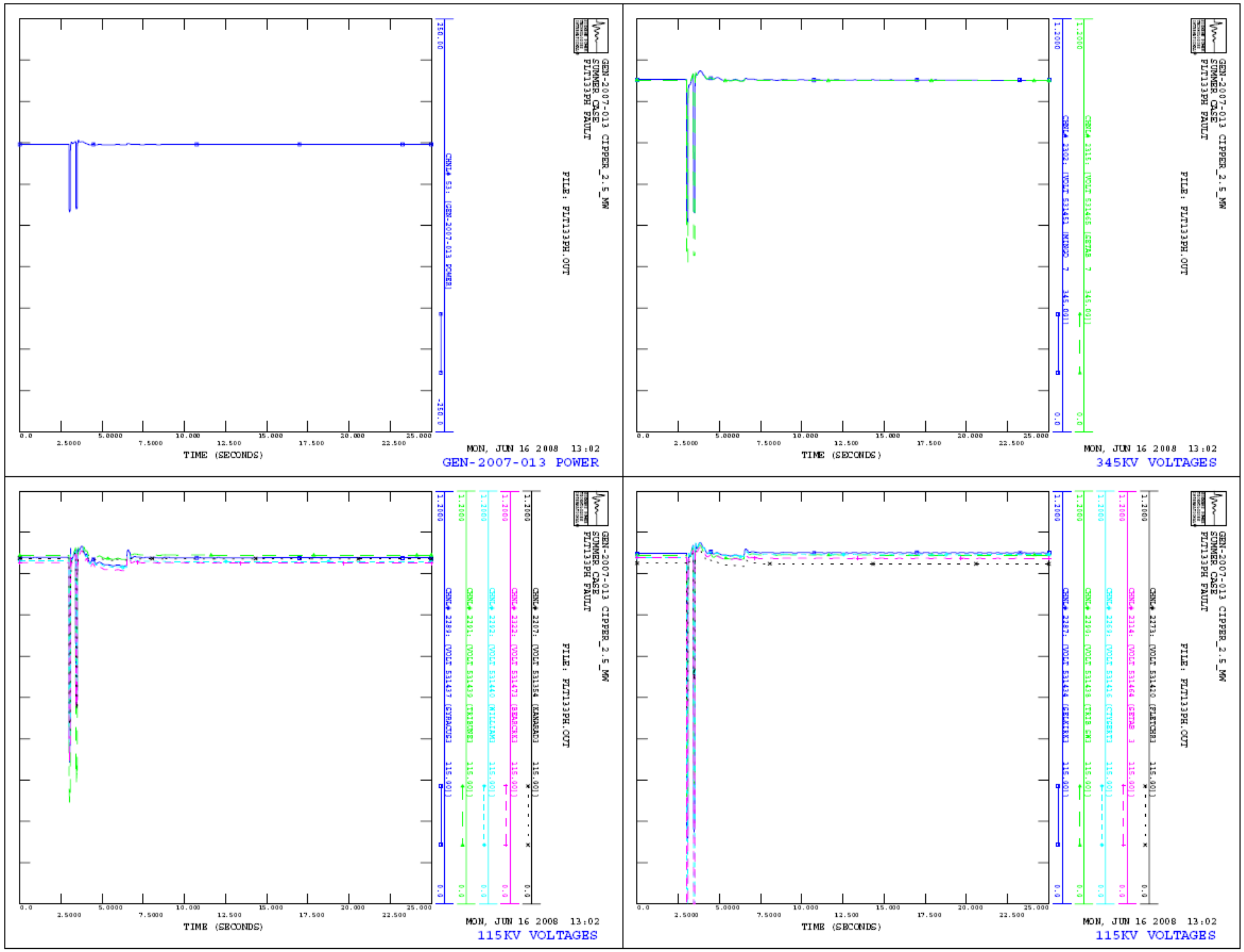

Figure 6: System Responses for Clipper 2.5 MW option, with the new line in, FLT133PH (cont'd)

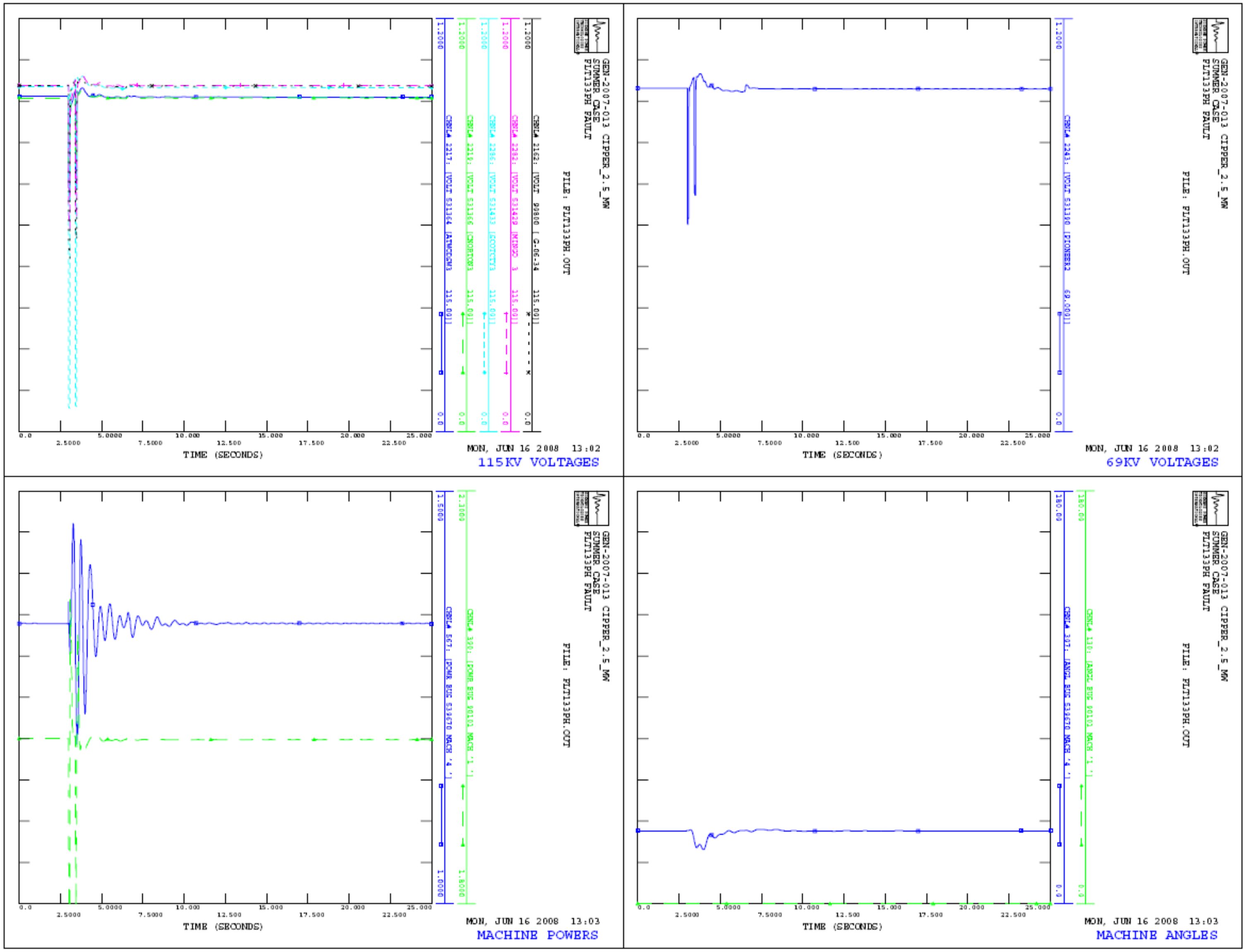

Figure 6: System Responses for Clipper 2.5 MW option, with the new line in, FLT133PH (cont'd)

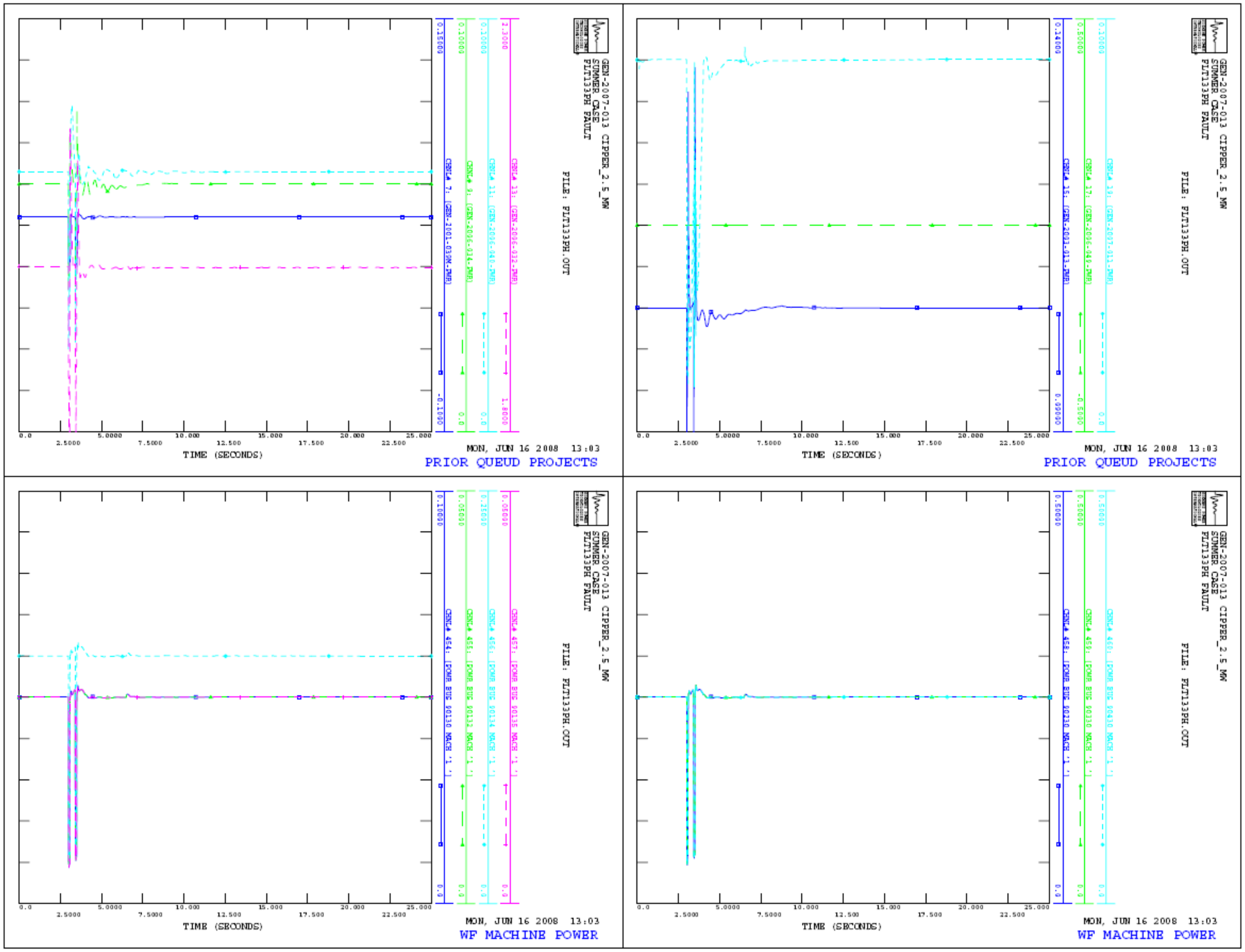

Figure 7: System Responses for GE 1.5 MW option, FLT133PH

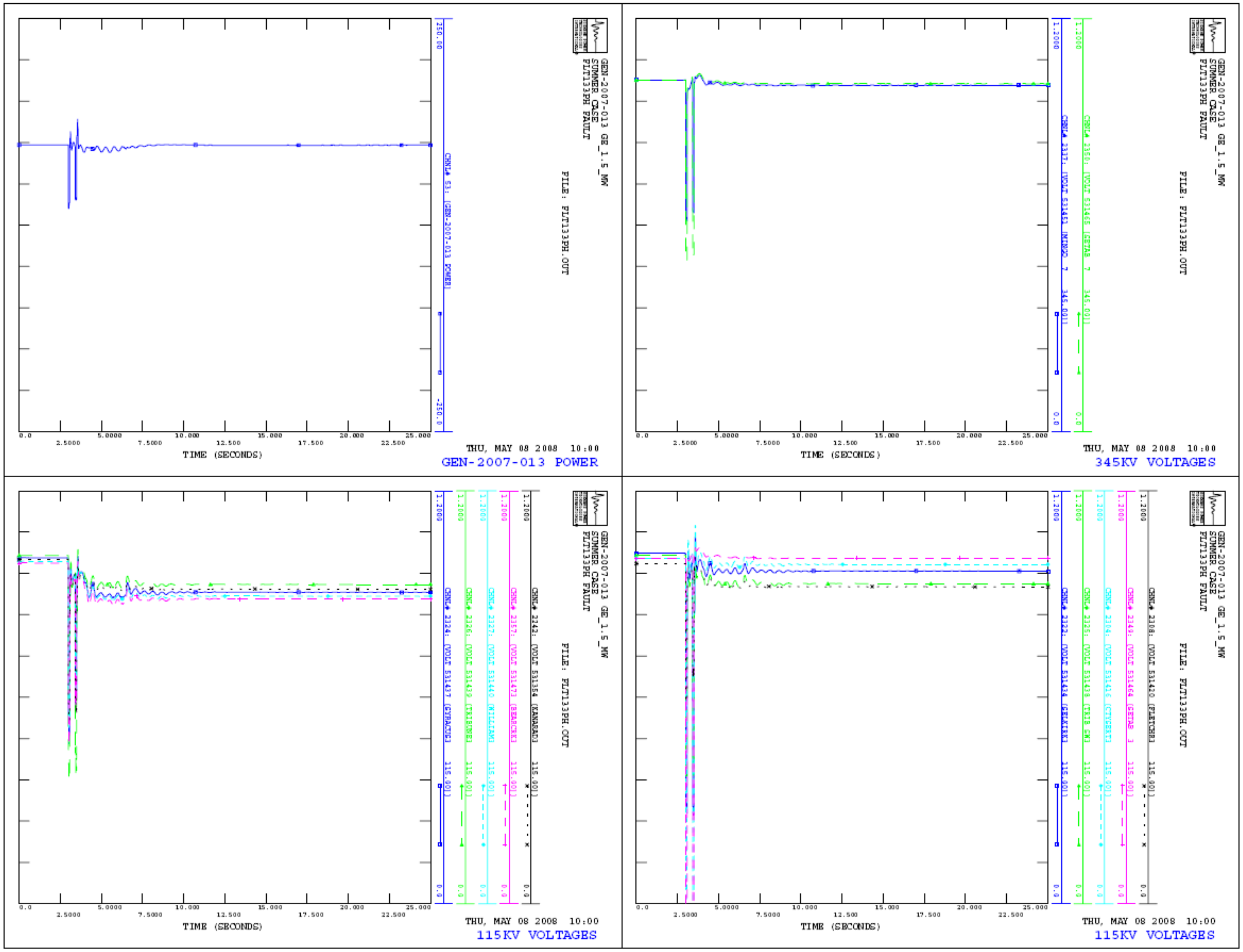

Figure 7: System Responses for GE 1.5 MW option, FLT133PH (cont'd)

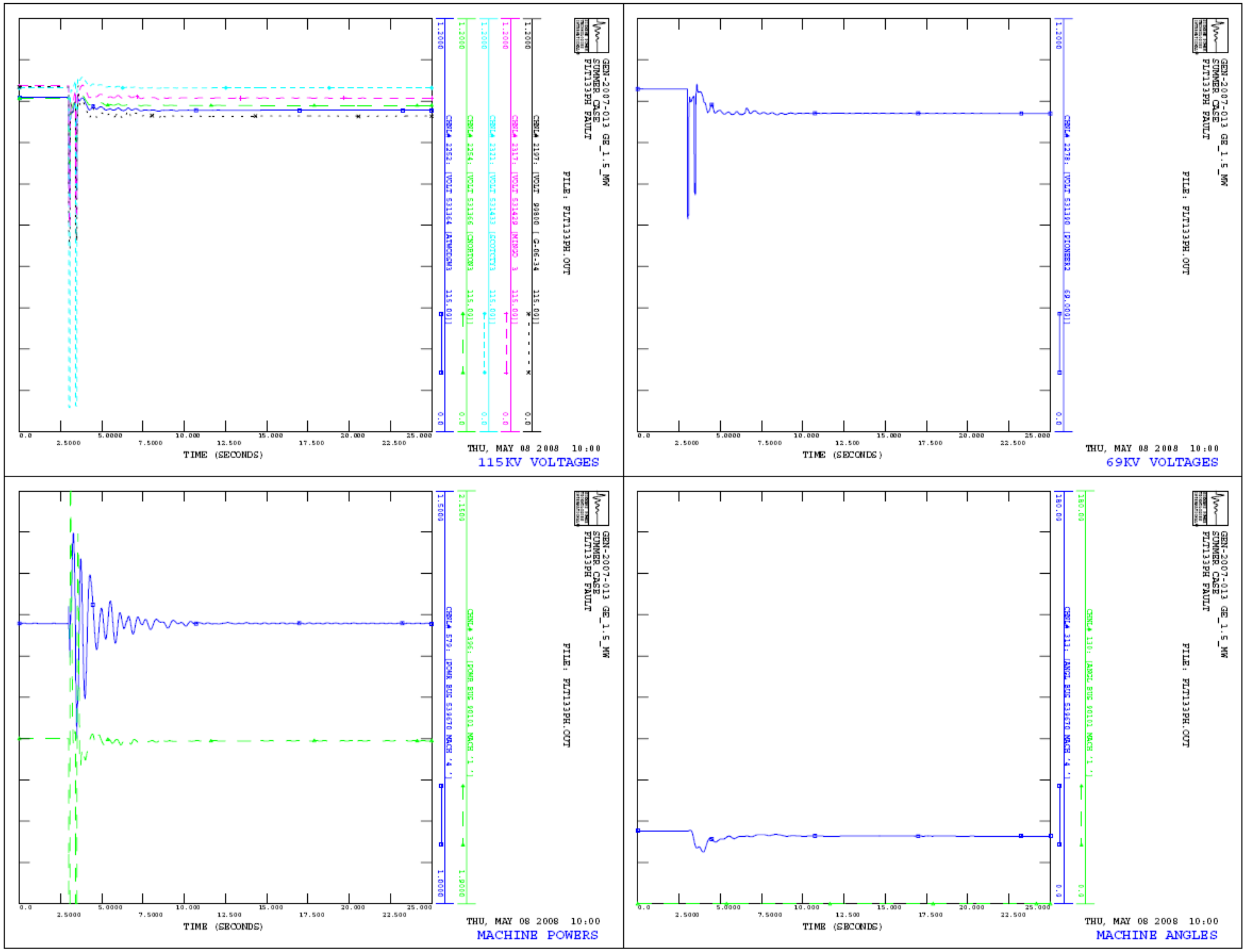

Figure 7: System Responses for GE 1.5 MW option, FLT133PH (cont'd)

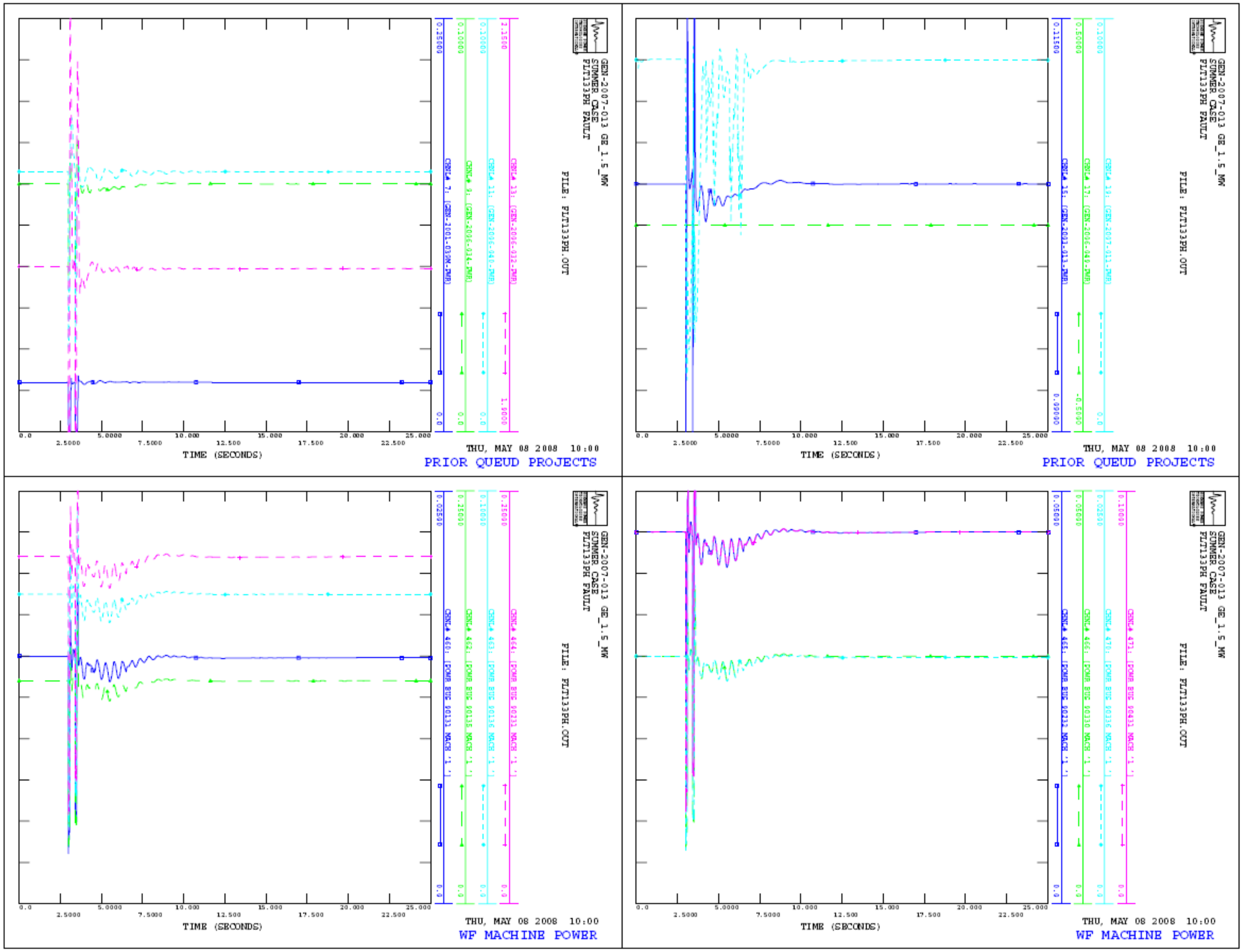

Figure 8: System Responses for GE 1.5 MW option, with the new line in. FLT133PH

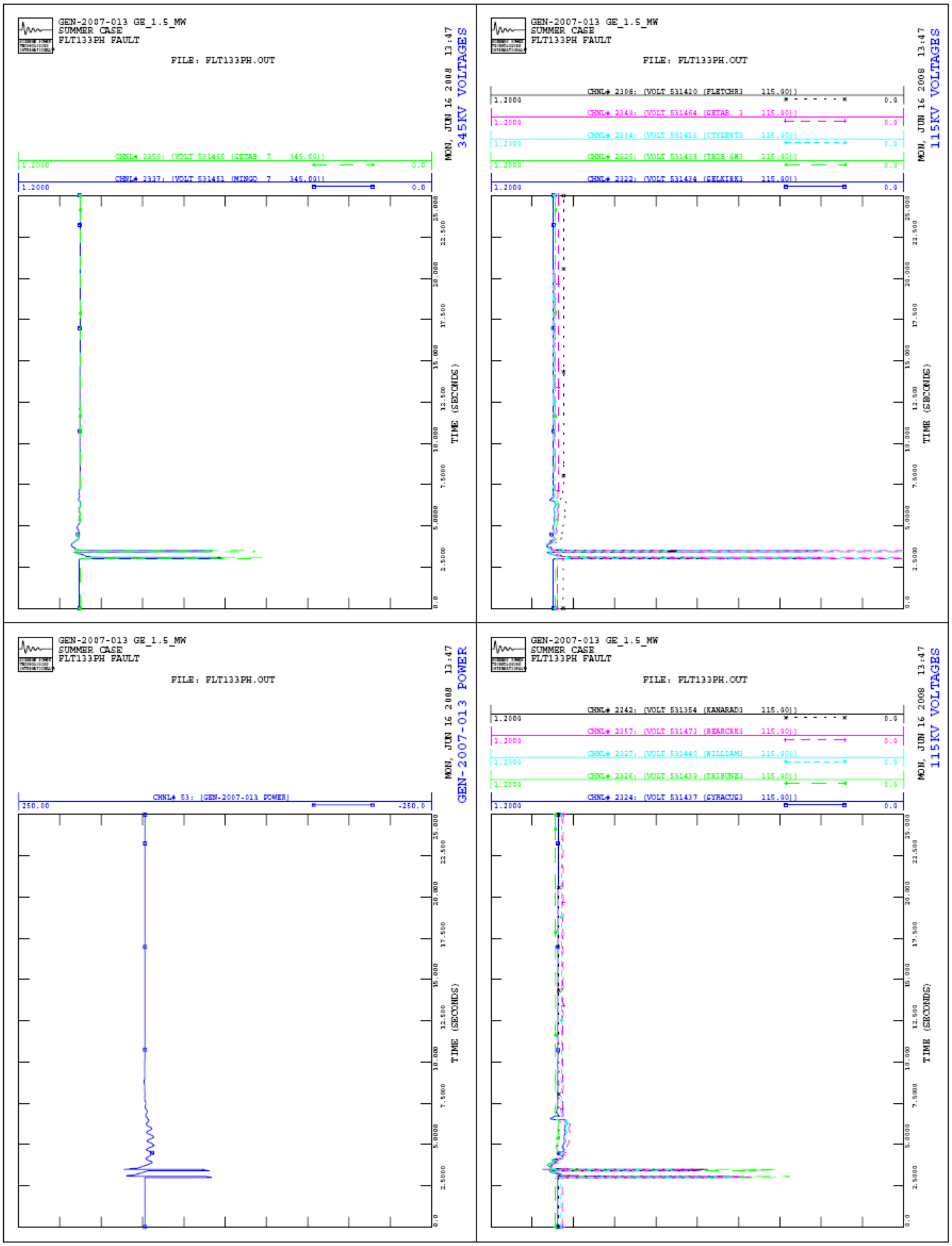

Figure 8: System Responses for GE 1.5 MW option, with the new line in, FLT133PH (cont'd)

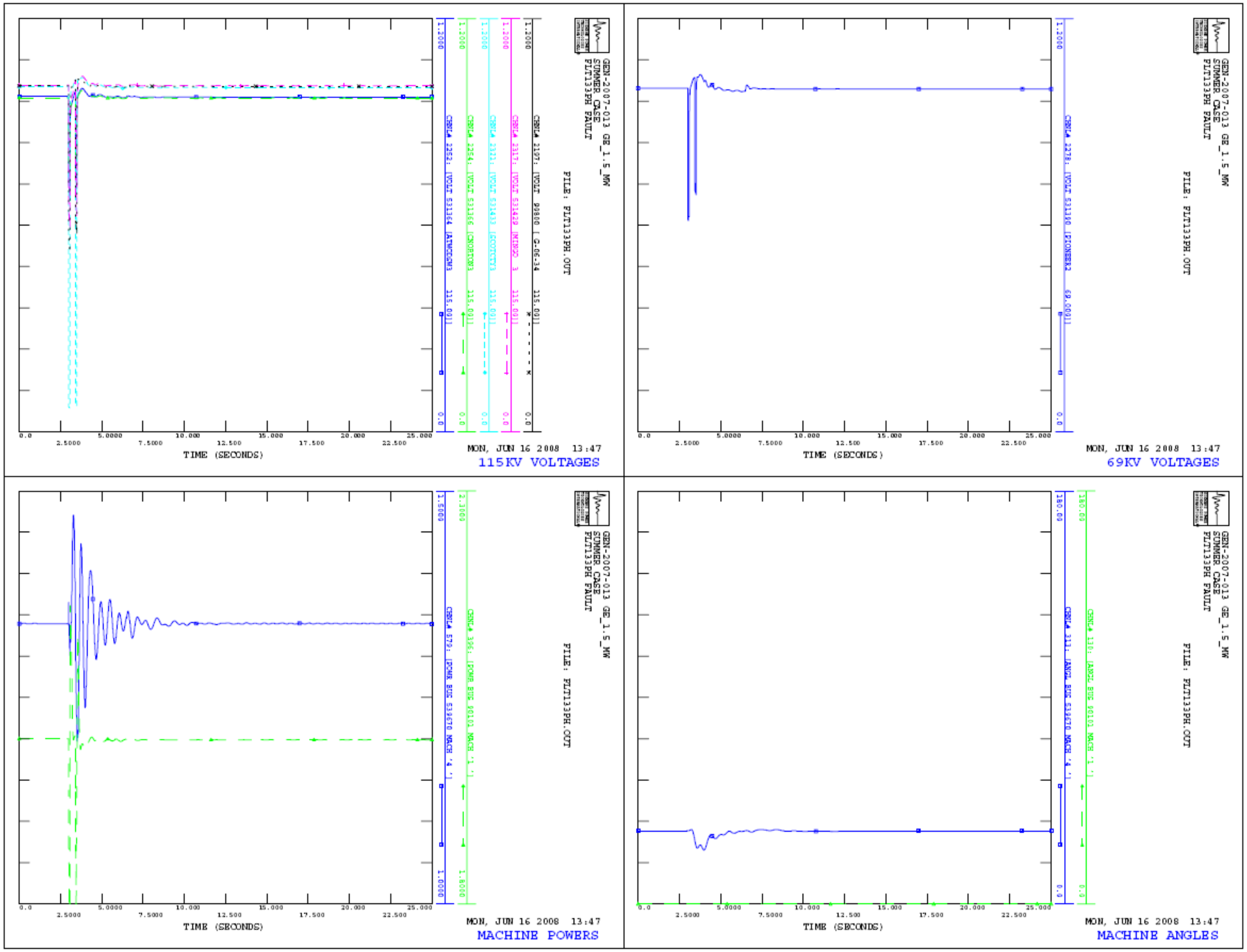

Figure 8: System Responses for GE 1.5 MW option, with the new line in, FLT133PH (cont'd)